DRAFT

PARTIAL PERMANENT SOLUTION WITH CONDITIONS STATEMENT

New Bedford High School Campus

New Bedford, Massachusetts
Release Tracking Number (RTN) 4-15685

Submitted to:

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January 2016

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Acronyms

AAL	Allowable Ambient Limit
ACM	Asbestos containing material
ACEC	Areas of Critical Environmental Concern
ARP	Acquired Residential Properties
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Incorporated
ATSDR	U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry
AUL	Activity and Use Limitation
BOL	Bill of Lading
BETA	The BETA Group, Incorporated
CEP	Critical Exposure Pathway
CLEAN	Citizens Leading Environmental Action Network
CFM	cubic feet per minute
CFR	Code of Federal Regulations
COPC	Compound of Potential Concern
CSA	Comprehensive Site Assessment
DOT	Department of Transportation
DPI	Department of Public Infrastructure
DRO	Diesel Range Organics
ELCR	Excess Lifetime Cancer Risk
EPA	United States Environmental Protection Agency
EPCs	Exposure Point Concentrations
EPH	Extractable Petroleum Hydrocarbons
ERC	Environmental Risk Characterization
ES	Environmental Screening
GIS	Geographic Information System
GPM	Gallons Per Minute
GPS	Global Positioning System
GRO	Gasoline Range Organics
GTS	GTS Environmental Technology, Incorporated
HASP	Health and Safety Plan
HI	Hazard Index
HVAC	Heating, ventilation and air conditioning
IATV	Indoor Air Threshold Values
IH	Imminent Hazard
IRA	Immediate Response Action
KMS	Keith Middle School
LB	Pounds
LSP	Licensed Site Professional
LTMMIP	Long-Term Monitoring and Maintenance Implementation Plan
MassDEP	Massachusetts Department of Environmental Protection
MassGIS	Massachusetts Geographic Information System
MCP	Massachusetts Contingency Plan

mg/kg	Milligrams per Kilogram
mg/m3	Milligrams per Cubic Meter
MIPS	Membrane Interface Probe System
MSR	Material Shipping Record
NAPL	Non-Aqueous Phase Liquid
NAPL	Non-Aqueous Phase Liquid
NBEA	New Bedford Educators Association, Inc.
NBHS	New Bedford High School
NEA	Northeast Analytical Laboratories
NPDES	National Pollutant Discharge Elimination System
NYCRR	New York Register and Official Compilation of Codes, Rules and Regulations
OEME	Office of Environmental Measurement and Evaluation
OHM	Oil and/or Hazardous Material
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCDD	polychlorinated dibenzo-p-dioxin
PCDF	polychlorinated dibenzofuran
PCE	Tetrachloroethylene
PG	Pressure Gauge
pg/g	picograms per gram
PID	Photoionization Detector
PIP	Public Involvement Plan
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
QC	Quality Control
PSWS	Parker Street Waste Site
RAFs	relative absorption factors
RAM	Release Abatement Measure
RAO	Response Action Outcome
RAO-P	Response Action Outcome - Partial
RCRA	Resource Conservation and Recovery Act
RfCs	reference concentrations
RfDs	Subchronic reference doses
RIP	Remedy Implementation Plan
RGP	Remediation General Permit
RMR	Remedial Monitoring Report
ROW	Right-of-Way
RTN	Release Tracking Number
SP	Sample Port
SAP	Sampling and Analysis Plan
SFs	slope factors
SOC	Superseding Order of Conditions
SOP	Standard Operating Procedure
SRM	Substantial Release Migration

SVOC	Semivolatile Organic Compounds
TCE	Trichloroethylene
TCLP	toxicity characteristic leaching procedure
TEQ	Toxicity Equivalent
TFE	Total Fluid Extraction
TPH	Total Petroleum Hydrocarbon
TRC	TRC Environmental Corporation
TSCA	Toxic Substances Control Act
UCL	Upper Concentration Limit
ug/m^3	micrograms per cubic meter
UR	Unit Risk
UST	Underground Storage Tank
V	Valve
VC	Vinyl Chloride
TEI	Triumvirate Environmental, Incorporated
VOCs	Volatile Organic Compounds
VHB	Vanasse Hangen Brustlin
VPH	Volatile Petroleum Hydrocarbons
VSP	Vapor Sample Port
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

This Partial Permanent Solution with Conditions Statement was prepared by TRC Environmental Corporation (TRC) on behalf of the City of New Bedford (City) to document the achievement of a Permanent Solution with Conditions under the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000) for a soil remedy portion of the New Bedford High School (NBHS) campus related response actions in New Bedford, Massachusetts, as summarized below:

- Response actions have been conducted to achieve a level of No Significant Risk;
- The sources of impacts at the Site have been controlled or eliminated;
- A Permanent Solution has been achieved;
- An Activity and Use Limitation (AUL) has been implemented to maintain a level of No Significant Risk; and
- Impacts detected at the Site do not exceed an MCP Upper Concentration Limit (UCL) in soil and/or groundwater.

The portion of the NBHS campus that this Partial Permanent Solution with Conditions applies to includes the entire NBHS campus impacted by fill materials, which is in some locations similar to those in industrial landfills and is intermixed or containing material classifiable as historic fill; hereinafter referred to as "the Site". This Partial Permanent Solution with Conditions does not include the Immediate Response Action (IRA) area (RTN 4-22409) located in the vicinity of (beneath) the mechanical room (Room B-114) in the NBHS building where soil and groundwater are impacted by a separate release. The Site as defined for this Permanent Solution with Conditions is shown on Figure 2.

This Partial Permanent Solution with Conditions documents the completion of the remedial activities taken to address soil impacts and is administratively tracked by the Massachusetts Department of Environmental Protection (MassDEP) under Release Tracking Number (RTN) 4-15685. No other response actions are necessary at the Site.

To bring the Site remedial activities to closure, the potential risks associated with Site soil were mitigated by removing soil from one hot spot location at a depth greater than three feet below grade with MCP UCL exceedances and by removing additional areas of soil that contributed to Exposure Point Concentrations (EPCs) in excess of the MCP Method 1/Method 2 S-1 standards in the top three feet of soil in unpaved areas. Following the completion of remedial activities, an AUL was developed for implementation on the property to prevent potential exposure to soils at depths greater than three feet and beneath pavement and building structures. Over 7,956 cubic yards of impacted soil have been removed as part of IRA and Release Abatement Measure (RAM) activities to achieve the Partial Permanent Solution with Conditions.

A Method 3 risk characterization was used to characterize human health risk at the Site, which determined that a Condition of No Significant Risk has been achieved for the top three feet of soil in unpaved areas.

The City conducted these remedial actions under the direction of a Licensed Site Professional (LSP) with the approval of MassDEP and United States Environmental Protection Agency (EPA), as appropriate.

1.0 INTRODUCTION

TRC Environmental Corporation (TRC) has completed the following Partial Permanent Solution with Conditions Statement for submittal to the Massachusetts Department of Environmental Protection (MassDEP), on behalf of the City of New Bedford (City) School Department through the City's Department of Environmental Stewardship. The Partial Permanent Solution with Conditions Statement was prepared per the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000 for a portion of the New Bedford High School (NBHS) campus in New Bedford, Massachusetts and documents the completion of the remedial activities taken to address a portion of the soil impacts administratively tracked under Release Tracking Number (RTN) 4-15685. A Site Location Map is included as Figure 1. This Partial Permanent Solution with Conditions applies to the entire NBHS campus that is impacted by fill materials, in some locations similar to those in industrial landfills, intermixed or containing other material classifiable as historic fill under the MCP, and hereinafter referred to as "the Site". This Permanent Solution with Conditions does not include the Immediate Response Action (IRA) area (RTN 4-22409) located in the vicinity of (beneath) the mechanical room (Room B-114) in the NBHS building where soil and groundwater are impacted by a separate release. The Site as defined for this Partial Permanent Solution with Conditions is shown on Figure 2. This closure statement also addresses RTNs 4-21847, 4-21872 and 4-23526.

This report is subject to the limitations included in Appendix A.

1.1 Release Background

Response actions at the Site were completed under RTN 4-15685. Additional MassDEP assigned RTNs applicable to the Site include 4-21847, 4-21872, 4-22409 and 4-23526. RTNs 4-21847, 4-21872, 4-23526 are associated with completed IRAs, which were incorporated into the remedy advanced for the Site under RTN 4-15685. As noted above, IRA and/or Release Abatement Measure (RAM) activities under RTN 4-22409, and other portions of RTN 4-15685 are ongoing.

Prior to Tier Classification, response actions were conducted at the Site under a Special Project Designation Permit. RTN 4-15685 achieved a Tier II Classification on April 17, 2014.

Note that this Partial Permanent Solution with Conditions Statement applies to a portion of the NBHS campus, as previously described and as indicated on Figure 2.

1.1.1 Site History

Based on review of historical United State Geological Survey (USGS) topographic maps from 1941 and 1949, wetlands were located at the Site prior to land disturbance and Disposal Site-related filling activity. On the 1941 (1936 survey data) map and 1949 (1948 survey data) map, the Site is still illustrated as wetland.

Based on review of historical aerial photographs, the Site was subject to land disturbance or disposal activity between and during the 1930s and 1960s; other portions of the Disposal Site were subject to land disturbance and disposal activities into the 1970s. The chemical profile of fill

materials found at some locations of the Site are similar to those of industrial landfills indicating that the fill material is associated with dumping from industrial sources, intermixed or combined with fill material meeting the definition of historic fill under the MCP. NBHS was constructed between 1970 and 1972. Materials dredged from New Bedford during the construction of the "Hurricane Dike" were reportedly transported to the site and used to stabilize the site for construction of the NBHS (NVS Report). Soil/fill displaced for construction of the building's foundation was reportedly transported across Hathaway Boulevard to what was then vacant land (the present-day location of the Keith Middle School [KMS]). In 1994, that location was graded to create the Former Andrea McCoy Soccer Field (Former McCoy Field) across Hathaway Boulevard from the Site (*McCoy Field PCB Approval Tech Support Document*, EPA dated August 24, 2005). During an environmental investigation of the Former McCoy Field as a possible location for a middle school in 2000, concentrations of polychlorinated biphenyls (PCBs) above regulatory reporting criteria were detected, triggering a reporting condition to MassDEP. MassDEP assigned RTN 4-15685 to the site.

Following the detection of PCBs at the Former McCoy Field, additional investigations of the surrounding area, including NBHS, properties adjacent to the KMS and the Paul F. Walsh Memorial Field, were undertaken by BETA Group, Incorporated (BETA) on behalf of the City in connection with a conditional approval issued by EPA (*PCB Risk-Based Cleanup and Disposal Approval*, McCoy Field (New Keith Middle School), New Bedford, MA, USEPA August 24, 2005). The additional investigations by BETA included soil sampling at the NBHS property (BETA, 2006).

1.1.2 Response Actions Undertaken by Others

The following summarizes investigation activities performed by others. A detailed description of investigative activities is included in the *Phase II Comprehensive Site Assessment New Bedford High School Campus* dated April 2011 (hereinafter "Phase II").

In July 2001, Vanasse Hangen Brustlin, Incorporated (VHB) collected 22 soil samples from 15 sampling locations at the Site (VHB, 2001). All samples were analyzed for PCBs, Resource Conservation and Recovery Act (RCRA) 8 metals, and three of the samples were also analyzed for semi-volatile organic compounds (SVOCs), and extractable petroleum hydrocarbons (EPH). On or about May 6, 2010, these data were brought to TRC's attention by the City. The samples were identified as SS-1 to SS-15 by VHB. Due to TRC having utilized the same identification designations prior to knowledge of the VHB samples, a "V" has been added to the sample identifications (e.g., SS-1 became VSS-1) to avoid confusion.

BETA conducted subsurface environmental investigations at the Site between September 2004 and February 2006. During that time, BETA advanced 343 soil borings and collected 12 surface soil samples (0-6 inches) at the Site. Of these 343 sampling locations, BETA observed fill at 276 locations (BETA, 2006).

The results of laboratory analyses are discussed in Section 2.3. BETA identified the impacts (BETA, 2006) by the following chemicals: PCBs, metals (arsenic, barium cadmium, chromium, lead, and mercury), and PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene,

benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene).

1.1.3 Activities Undertaken by TRC

The following summarizes investigation activities performed by TRC. A detailed description of investigative activities is included in the Phase II dated April 6, 2011.

The majority of TRC's environmental investigations consisted of GeoProbe® direct push soil borings using track-, truck-, or dolly-mounted drill rigs to sample soil and observe subsurface soil conditions. Surface soil samples were collected using hand tools. Soil sampling was the primary means of identifying and delineating Site impacts. In addition, TRC installed and sampled seven groundwater monitoring wells at the Site in 2008 and 2009 to evaluate metals, PCBs, and PAHs.

The investigative approach was intended to evaluate the presence or absence of fill and the horizontal and vertical extent of such fill or related impacts. In general, soil borings were advanced and soil samples were collected until native overburden was encountered unless refusal was encountered first. Where native material was submitted for laboratory analysis, two samples of native material from two different depths were typically collected to characterize the native horizon. The lower native sample was retained for analysis contingent upon the results of the upper native horizon analysis in an attempt to delineate the vertical extent of impacts, if present, without having to remobilize sampling teams. The contingent native material was not analyzed if the native material interval above it was found to be un-impacted (i.e., below MCP Method 1 soil criteria) based on laboratory analysis or as otherwise directed by the LSP. Some relatively shallow soil samples were also collected to supplement data previously collected by others to close potential data gaps and support an evaluation of potential risks.

Additional soil sampling was conducted to refine the delineation of impacted areas in support of remedial planning. Based on prior sampling results, delineation soil sampling was conducted along concentric rings (i.e., step-out sampling) surrounding sampling locations identified for potential excavation. Initial (i.e., inner ring) delineation samples were sent for laboratory analysis for potential contaminants of concern (COCs) Based on the laboratory analytical results associated with inner ring delineation samples, additional (outer ring) samples were authorized for analysis at the discretion of the LSP in consultation with the City. Supplemental investigation and step-out delineation sampling activities were conducted within each Exposure Point (EP) Area to identify the lateral and vertical extent of excavation to achieve the remedial goal (i.e., EPCs less than or equal to Method 1/Method 2 S-1 soil standards, which were later verified via Method 3). Based on the risk characterization results, the supplemental sampling investigations were focused on a vertical depth of up to three feet below ground surface, targeting surface soils considered to be accessible under the MCP. The excavation limits for targeted locations were determined by recalculating the EPCs for each targeted area after the samples within the excavation boundaries were eliminated from the data set, confirming that a Condition of No Significant Risk would be achieved for the targeted areas following excavation.

All sample locations, including sample locations that were excavated during remedial actions, are identified in Figure 2.

Dioxin Investigative Sampling

Soil sampling for polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and dioxin-like PCBs, which are collectively referred to as dioxins or dioxin-like compounds, was carried out across the NBHS Campus. Sampling and analytical procedures are outlined in the *Proposed New Bedford High School Dioxin Investigation Technical Approach Memorandum* from TRC to the City dated March 30, 2010. On April 15, 2010 a total of sixteen samples were collected from five sampling locations and analyzed for dioxins (SW-846 Method 8290) and PCB congeners (SW-846 Method 1668A) by Analytical Perspectives of Wilmington, North Carolina. All samples were also analyzed for PCBs Aroclors by Pace Analytical, Incorporated (Pace; formerly Northeast Analytical, Incorporated) of Schenectady, New York and PAHs, MCP metals and mercury by Con-Test Analytical Laboratory (Con-Test) of East Longmeadow, Massachusetts.

Dioxin and dioxin-like compounds may be formed as part of a combustion process under appropriate conditions. Data collected to date indicate that ash is present in impacted fill at the Site. The five sampling locations targeted were previously sampled locations that were identified as being likely to have the highest concentrations of dioxins and dioxin-like compounds based on a review of available soil data. The soil data indicate that PCBs are the only chlorinated dioxin/dibenzofuran precursor compounds at the Site. There is no other indication in the available analytical data of the presence of any other chlorinated organic compounds with the potential to serve as chlorinated dioxin/dibenzofuran precursors in significant concentrations, based on available data for volatile organic compounds (VOCs), SVOCs, pesticides, and PCBs.

The evaluation of target sample locations was based on the review of existing chemical signatures and geographic coverage within the population of previous soil sample locations. The soil sampling program was designed to collect samples from biased high ("worst case") locations at the Site. Soil sample locations with concentrations greater than regulatory limits for PCBs, PAHs, and/or metals were selected for review. Sample locations were selected based on the presence of ash/cinders, metals enrichment, and PAHs; PCB concentrations greater than regulatory limits; and to provide geographic coverage. The conservative worst case biased sampling approach was intended to avoid underestimating risk from exposure to dioxins in Site soil and, in all likelihood, resulted in overestimating risk. At each location, a surface (0 to 1 foot interval) soil and subsurface (1 to 3 foot interval) sample was collected. A second subsurface sample, targeting the historic fill, was also collected at each location during the initial investigation of dioxins and dioxin-like compounds.

At the request of MassDEP, additional dioxin investigative sampling was performed as outlined in the *Proposed NBHS Dioxin Follow-up Sampling – Technical Approach* from TRC to the City dated April 13, 2011. On June 7-10, 2011, soil investigative sampling was conducted for PCDDs, and PCDFs and PCB congeners. A total of eighteen samples were collected from nine sample locations and analyzed for chlorinated dioxins (SW-846 Method 8290A) and PCB congeners (SW-846 Method 1668A) by Cape Fear Analytical, LLC (Cape Fear) of Wilmington, North Carolina. The sampling locations included previous sample locations estimated as worst case scenarios based on a review of available soil data collected, and locations that provide data that are

representative of potential exposures across the New Bedford High School campus. At each sample location, a sample was taken of the top one foot soil interval, and the one to three foot soil interval. Sample locations are identified on Figure 2.

Additional dioxin investigative sampling was performed on October 20, 2011 to delineate dioxin impacted soils in the vicinity of sample location HB-22 from 1-3 feet below surface. Samples were collected at eleven sample locations in a grid pattern having a 2.5 foot lateral separation for first two grids and a 5 foot lateral separation for the third grid. Consistent with previous delineation activities, an iterative step-out soil sampling approach was employed. Soil samples were submitted to Cape Fear for chlorinated dioxins analysis (SW-846 Method 8290A). Based on a review of the analytical results and using MCP risk assessment procedures, soil samples HB-22A, HB-22B, HB-22C and HB-22D were determined to represent appropriate excavation bounds.

Following the delineation and subsequent soil excavation, the MassDEP adopted EPA's 2012 reference dose (RfD) for risk estimation of dioxin-like compounds as total toxic equivalents (TEQs) in Method 3 risk assessments. Consequently, non-cancer health effects associated with the total TEQ EPC became associated with an unacceptable risk for soil exposures within the 0 to 3 foot interval at the NBHS Campus, in the potential daycare child scenario. The issue primarily resulted from the small size of the total TEQ data set for the 0 to 3 foot soil depth interval as a result of the execution of the RAM-related spot excavation program, coupled with the variability in the remaining data set. The post-excavation data set resulted in an EPC, derived using a 95% UCL of the arithmetic mean, associated with an exposure dose greater than the reference dose for non-cancer health effects for this scenario.[1]

As a result of the change in the reference dose and consistent with discussions between the City and MassDEP, it was deemed appropriate to conduct additional soil investigation activities in the vicinity of location HB-22 in support of supplemental excavation activities. The additional investigation was initiated on February 21, 2014. Land Planning, Incorporated of Hansen, Massachusetts (Land Planning) marked the previous HB-22 excavation limits (i.e., soil sampling locations HB-22A through HB-22D), allowing for pre-marking of supplemental soil boring ("step-out") locations. As depicted in Figure 3, step-out soil boring locations extended at 2.5 foot intervals east of location HB-22B (i.e., HB-22F, HB-22J, HB-22N and HB-22R) and south of location HB-22C (i.e., HB-22G, HB-22K, HB-22O and HB-22S). Step-out sampling was not necessary for the HB-22A and HB-22D sampling locations to the west and north, since the total TEQ concentrations identified there were associated with hazard quotients below risk thresholds for non-cancer health effects. Following utility clearance activities (i.e., Dig-Safe® and municipal notification), a total of eight soil borings were advanced by New England Geotech of Jamestown, Rhode Island on February 21, 2014.

Soil borings were advanced using Geoprobe® direct push methods (6600DT truck-mounted drill rig). Field screening of soil samples consisting of visual and olfactory observations, jar headspace readings using a calibrated photoionization detector (PID), and professional judgment, consistent with TRC Standard Operating Procedures (SOPs) and general industry practice, was conducted throughout the investigation. TRC employed the MassDEP jar headspace technique (MassDEP,

[1] Fully and partially excavated soil boring locations were removed from the database, thus reducing the available dataset.

1996) to screen for the presence of volatile organic compounds (VOCs) in soil. TRC also evaluated and logged the geologic character of the soil samples consistent with the Burmeister (1958) method.

Soil samples were submitted to Cape Fear for PCB Congener (EPA Method 1668A - World Health Organization [WHO] list) and/or dioxin/furan (EPA Method 8290A) analysis (see Table 2-11). A total of 18 soil samples were collected for potential laboratory analysis. Soil samples were collected from the 1 to 3 foot interval at soil sampling locations HB-22A and HB-22B for PCB Congener analysis. Sample volume was retained from the 0 to 1 foot and 1 to 3 foot intervals at each of the remaining eight soil boring locations; however only samples HB-22F (1-3') and HB-22G (1-3') were initially analyzed for PCB Congeners and dioxins/furans. The remaining sample volume was retained for contingency analysis, pending receipt and review of the initial HB-22F (1-3') and HB-22G (1-3') analytical results. Additional samples were authorized at the discretion of the LSP of Record.

Based on the supplemental soil sampling results, an updated EPC, based on the 95% UCL on the arithmetic mean, was determined to be associated with a hazard quotient below the threshold for non-cancer health effects in the daycare child scenario. The updated risk calculations indicated that a Condition of No Significant Risk in support of a permanent solution for the NBHS Campus could be achieved following additional soil removal, described in section 2.3.2.

Groundwater Investigation

Following installation, groundwater samples were collected from seven on-Site monitoring wells. Groundwater samples were collected on the following dates; August 19, 2008 (MW-4 through MW-6), September 16, 2008 (MW-7 and MW-8B), and April 23, 2009 (MW-HH-13, MW-HRC-33). Additional groundwater investigations were performed in connection with the IRA Substantial Release Migration/Critical Exposure Pathway response actions in the vicinity of the Mechanical room, as discussed in the Phase II. The groundwater data collected from 2010 to 2012 from monitoring wells outside the Mechanical Room (MW-11, MW-12, MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23, MW-24, MW-25, MW-26, MW-29 and MW-30) as part of the IRA Substantial Release Migration/Critical Exposure Pathway response actions were also used in the risk characterization, and are discussed herein. The monitoring well locations are identified on Figure 2.

Groundwater samples were collected following EPA Region I low stress (low flow) sampling guidelines (USEPA, 2010). During purging activities, water quality parameters were monitored using a YSI 600XL Sonde and 650 MDS data logger and a LaMotte 2020 turbidity meter. Groundwater samples were collected after water quality parameters had stabilized in accordance with the low flow guidance, or after one hour of purging if parameters did not stabilize. A modification of the low flow guidance was the use of peristaltic pumps to collect the samples.

1.2 Objective

TRC completed this Partial Permanent Solution with Conditions in accordance with 310 CMR 40.1056 (Content of Permanent Solution with Conditions) utilizing a MCP Method 3 Risk

Assessment, to document that a Condition of No Significant Risk exists and the requirements of a Permanent Solution with Conditions are met.

1.3 Permanent Solution with Conditions Minimum Content Information – 310 CMR 40.1056(1)

1.3.1 Disposal Site Information – 310 CMR 40.1056(1)(a)

Consistent with 310 CMR 40.1056(1)(a) of the MCP, the following table summarizes the required Disposal Site Information.

Site/Disposal Site Name	New Bedford High School campus
Address	230 Hathaway Boulevard (East of Hathaway Boulevard and North of Parker Street)
City	New Bedford
Release Tracking Number	4-15685
Latitude/Longitude	41.642686°/-70.946229°
UTM Coordinates	Northing: 4611923 meters; Easting: 337873 meters

1.3.2 Class of Permanent Solution– 310 CMR 40.1056(1)(b)

As described herein, remedial activities conducted at the Site succeeded in achieving a Partial Permanent Solution with Conditions consistent with 310 CMR 40.1041 (2) of the MCP, filed as a partial.

1.3.3 Risk Characterization Method Employed – 310 CMR 40.1056(1)(c)

A Method 3 Risk Characterization was conducted to characterize the potential risk of harm posed by the Site to health, safety, public welfare, and the environment, pursuant to 310 CMR 40.0900. As described herein, a Condition of No Significant Risk has been achieved.

1.3.4 Relationship to Other Permanent or Temporary Solution Statements – 310 CMR 40.1056(1)(d)

No Permanent or Temporary Solutions Statements are known to exist in relation to the Site. No additional response actions are needed for any portions of the Site.

1.3.5 Activity and Use Limitation Summary – 310 CMR 40.1056(1)(e)

An AUL is required to achieve a Condition of No Significant Risk. A Partial Permanent Solution with Conditions applies to this Site (see Appendix B for a copy of the Notice of Activity and Use Limitation and related supporting information).

1.3.6 Permanent Solution with Conditions Not Based upon 310 CMR 40.1013 Assumptions – 310 CMR 40.1056(1)(f)

The Partial Permanent Solution with Conditions is not based on assumptions about the current or future site activities, uses, or conditions that do not require an AUL pursuant to 310 CMR 40.1013.

1.3.7 Permanent Solution Not Based upon Active Exposure Pathway Mitigation Measures – 310 CMR 40.1056(1)(g)

The Partial Permanent Solution with Conditions is not based upon Active Exposure Pathway Mitigation Measures pursuant to 310 CMR 40.1025.

1.3.8 LSP Opinion – 310 CMR 40.1056(1)(h)

The LSP opines that all the requirements of a Partial Permanent Solution with Conditions as specified in 310 CMR 40.1000 have been met.

1.3.9 Certification of Submittal – 310 CMR 40.1056(1)(i)

This Partial Permanent Solution with Conditions Statement and all documents required by 310 CMR 40.0009 have been submitted with this Partial Permanent Solution with Conditions Statement.

1.3.10 Upper Concentration Limits – 310 CMR 40.1056(1)(j)

None of the oil or hazardous material (OHM) chemicals detected at the Site exceed or are associated with EPCs above corresponding UCLs, as described on 310 CMR 40.0996.

1.3.11 Supporting Analytical Data – 310 CMR 40.1056(1)(k)

All analytical data used in support of this partial Permanent Solution with Conditions was generated pursuant to MassDEP's Compendium of Analytical Methods (CAM).

1.3.12 Operation, Maintenance, and/or Monitoring – 310 CMR 40.1056(1)(l)

A description of operation, maintenance, and/or monitoring required to confirm and /or maintain those conditions at the Site that the Partial Permanent Solution with Conditions is based upon are described in the AUL in Appendix B.

2.0 PERMANENT SOLUTION WITH CONDITIONS SUPPORTING DOCUMENTATION

2.1 Disposal Site Location Description – 310 CMR 40.1056(2)(a)

The Disposal Site, tracked by RTN 4-15685 and commonly referred to as the Parker Street Waste Site (PSWS), encompasses NBHS and an area in the vicinity of NBHS. The focus of this Partial Permanent Solution with Conditions is an approximately 34.6-acre area within the Disposal Site identified by the City of New Bedford Assessor as the following parcels: map 75 block 12, map 69 block 345, map 69 block 460, and map 70 block 1 (the Site). The Site is located on the north side of Parker Street between Hathaway Boulevard to the west and Liberty Street to the east, and south of the Hetland Rink property. The Site includes the NBHS campus excluding RTN 4-22409, associated with a separate release in the vicinity of the NBHS mechanical room (B-114). A Site location map is provided as Figure 1.

The Universal Transverse Mercator (UTM) coordinates for the Site are 4,611,923 meters north and 337,873 meters east in Zone 19. The latitude and longitude of the Site are 41.642686 latitude and -70.946229 longitude.

Site Boundary. The Site Boundary is illustrated in Figure 2.

Proximity to Environmental Resources. The Site's proximity to environmental resources is illustrated in Figure 3, which presents a MassDEP Priority Resources Map with five hundred foot and one half-mile radii as measured from the Site.

Property Owner. The Site property is owned by the City of New Bedford School Department.

Site Use and Area Land Use. The Site consists of the NBHS building which is a single 529,192 square foot building (with a footprint of approximately 233,903 square feet) surrounded by paved parking areas, lawn and landscaped areas for recreational use, and paved tennis courts. Approximately 45-percent of the Site is covered by impervious surfaces (e.g., pavement or building). An ice skating rink and isolated wetland area, located along Hathaway Boulevard and Durfee and Liberty Streets, exist beyond the northern boundary of the NBHS property. The NBHS building has three main sections: (1) the gym; (2) the auditorium; and (3) the "Houses". The gym is located at the southern end of the NBHS campus. The grassy area in front (west) of the gym is used for outdoor gym classes. Fenced playing fields (a volley ball court, baseball field, and basketball and tennis courts) are located to the rear (east) of the gym. To the north of the gym is the main entrance to the high school, marked by a flag pole and traffic circle. The auditorium is housed in this central portion of the NBHS building. An unfenced field, used as a practice area, is located to the rear (east) of the auditorium. Further to the north within the NBHS building are the classrooms, arranged as a series of four "Houses" (A-Block) around a central core (B-Block). The grassy outdoor area to the east of the "Houses" is a congregating area for students. The fenced area to the north of the "Houses", between two large parking lots, has been developed as a Solar Park.

NBHS is presently heated via natural gas-fired boilers. Back-up electric power is provided by a natural gas fueled generator. The boilers were formerly fired using fuel oil stored in underground storage tanks (USTs), which were removed in 1999. Building maintenance, science laboratories, and the wood and automotive shops store very small quantities of regulated substances on Site. Small quantities of small arms ammunition are stored and utilized at an indoor shooting range.

Land uses at properties surrounding the Site are as follows:

- The Dr. Paul F. Walsh Athletic Field is located to the south of the Site across Parker Street;
- The Department of Public Facilities (DPF) Garage is located across Parker Street from the southeast corner of the Site;
- A church is located at the intersection of Parker Street and Hathaway Boulevard;
- An apartment complex and indoor rock climbing gym are located across Parker Street from the southwest corner of the Site;
- The Keith Middle School (KMS) is located to the west of the Site across Hathaway Boulevard;
- The Hetland Memorial Skating Rink is located to the north of and adjacent to the Site;
- A Department of Public Infrastructure (DPI)/DPF material storage area that is located east of the Site across Liberty Street; and
- The Oak Grove Cemetery located to the east of the Site beyond the DPI/DPF material storage area.

For the purposes of the risk characterization, the Site was divided into the following distinct potential Exposure Point (EP) Areas:

- HS-1: Children's Playground Area
- HS-2: Fenced Playing Field Area
- HS-3: Unfenced Playing Field Area
- HS-4: Gym Area
- HS-5: Flag Pole Area
- HS-6: House Area
- HS-7: Student Congregating Area
- HS-8: Solar Park Area
- HS-9: Beneath Pavement/Building Area
- HS-10: Tree Belts Area

These areas are depicted on Figure 2.

Institutions. No institutions are known to be present at or near the Site.

Residential Population. An estimated 2,500 people reside within a ½-mile radius of the Site. This estimate is based on the proportion of the City of New Bedford found within a ½-mile radius of the Site and community profile population data obtained from the official Commonwealth of Massachusetts website (DHCD, 2007).

Drinking Water Source Areas. Based on review of the MassDEP Priority Resources Map (see Figure 3), the Site is not located within a Zone II or Zone A of a drinking water supply area, an Interim Wellhead Protection Area (IWPA), or a potentially productive aquifer (PPA). The Site is serviced by the City municipal water supply.

Public/Private Wells. No private or non-municipal public wells are located within 500 feet of the Site. There are no municipal wells located within 1,000 feet of the Site.

Environmental Receptors. The Site is located in New Bedford in a residential area. There is no surface water or wetland habitat on the Site. The nearest water bodies are the KMS wetland located approximately 500 feet west of the Site, an associated outfall/stream located approximately 730 feet northwest of the Site, and the New Bedford Harbor, which is located approximately 1.2 miles to the east of the Site. There are no endangered species habitats, Areas of Critical Environmental Concern (ACECs) and/or certified vernal pools within 500 feet of the Site. A small isolated wetland is located immediately to the north of the NBHS in the rear of the Hetland Rink.

2.2 Conceptual Site Model– 310 CMR 40.1056(2)(b)

Prior to construction of NBHS in the early 1970s, most of the Disposal Site was occupied by a wetland. From the 1930s and into the 1970s, portions of the Disposal Site were subject to land disturbance and disposal activities.

During the construction of NBHS, organic wetland materials and much of the refuse dumped over the years were removed from the Site and replaced with a fill material. Some of the Site the fill material appears to be associated with dumping from industrial sources, intermixed or combined with fill material. In addition, materials dredged from New Bedford during the construction of the "Hurricane Dike" were reportedly transported to the site and used to stabilize the site for construction of the NBHS.

Chemicals of concern identified in the Site soils are consistent with those attributable to industrial wastes (PCBs, antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, vanadium, zinc, various PAHs, and dioxin-like compounds) and historic fill (e.g., coal, coal ash, wood ash and vehicle emission related PAHs, lead, and metals associated with coal). Groundwater monitoring has indicated that these chemicals have not migrated from Site soil to groundwater.

Chemicals of concern identified in the Site groundwater include chlorinated VOCs (principally tetrachloroethene, and vinyl chloride) found in the vicinity of monitoring well MW-7. The source of the chlorinated VOCs near MW-7 is unknown but it is presumed to be related to historical dumping practices. The extent of chlorinated VOCs in groundwater is limited. These compounds have not been detected in significant concentrations in any of the surrounding monitoring wells (MW-20, MW-22, MW-23, MW-24 and MW-30. Notably, MW-20 and MW-30 are located

between MW-7 and NBHS. It is possible that organic materials (peat) observed during construction of MW-7 have served to limit the migration in groundwater as the chlorinated VOCs preferentially adsorb to the organic carbon present in the peat.

TRC has investigated potential preferential migration of groundwater in the vicinity of MW-7 into a north-south running storm sewer line that is located between MW-7 and NBHS. The findings of this investigation were not conclusive. While this may provide a minor transport mechanism for chlorinated VOCs in groundwater, it does not represent a potential preferential pathway for chlorinated VOCs to enter indoor air at NBHS because there are no drain lines connecting the storm drain system to the interior of NBHS.

The groundwater impacts in the vicinity of MW-7 are not contiguous to and are separate from the VOC impacts in the vicinity of the mechanical room in the NBHS building, which are administratively tracked under RTN 4-22409.

Site investigations completed by TRC and others were consistent with the above summarized site model and identified PCBs, PAHs, metals, dioxin-like compounds and a localized VOC area near MW-7. The horizontal and vertical extent of OHM in Site soils and groundwater are summarized in Section 2.3.

2.3 Elimination or Control of OHM Sources and Control of OHM Subsurface Migration– 310 CMR 40.1056(2)(c) and 310 CMR 40.1056(2)(d)

The following describes the work undertaken and completed by TRC and others to address the historic fill associated with RTN-15685 at the Site.

2.3.1 Prior Work Undertaken by Others

Prior work undertaken by VHB and BETA consisted of investigative work only as previously described in Section 1.1.2.

2.3.2 Work Undertaken by TRC

Work undertaken by TRC, as described in Section 1.1.3, consisted of investigative work in support of remedial planning at the Site. Remediation activities at the Site included work performed as IRAs and RAMs. A summary of remediation activities is included herein.

IRA Sample Location HB-23

The following summarizes IRA activities conducted at the HB-23 soil sample location. IRA-related regulatory reporting for HB-23 is fully documented in the *Immediate Response Action Plan, New Bedford High School – HB-23 Soil Removal* dated May 2009 and the *Immediate Response Action Completion Report and Imminent Hazard Evaluation, HB-23 Area Impacted Soil Removal* dated July 2009.

On March 10, 2009, TRC, on behalf of the City, conducted soil sampling at the HB-23 portion of the NBHS grounds (west side of campus along Hathaway Boulevard) to delineate the extent of PCBs in soil and to determine the extent of required soil removal.

TRC's environmental investigation consisted of direct push soil borings using a truck-mounted drill rig to sample soil and observe subsurface soil conditions. Drilling services and equipment were provided by New England Geotech. TRC completed a total of 10 soil borings and collected a total of twenty soil samples.

The protocol for the delineation sampling called for the collection of five soil samples (0 to 1 foot and 1 to 3 feet in depth) centered at the HB-23 location (designated "A") and within ten feet of the HB-23A sampling location to the north, east, south and west (designated "B" through "E"). The protocol further called for the collection of five additional "outer ring" samples twenty feet from the HB-23A sampling location (designated "F" through "J"). "Outer ring" samples were also collected from the 0 to 1 and 1 to 3 feet intervals. All samples were collected on March 10, 2009 and the "A" through "E" samples were authorized for PCB Aroclor analysis by Northeast Analytical Laboratories (NEA, now Pace). The "F" through "J" samples were held at the laboratory, pending the results of the "A" through "E" sample analysis.

Total PCB concentrations were below the MCP Method 1 S-1/GW-2 and S-1/GW-3 soil standards at three of the five initial surface soil sample locations (HB-23B through HB-23D). However, at locations HB-23A and HB-23E, concentrations of 45.9 mg/kg and 13.5 mg/kg were detected in the 0 to 1 foot interval, respectively. Due to the detection of PCBs at levels greater than 10 mg/kg within the top 12 inches of soil at the HB-23A and HB-23E locations, a potential Imminent Hazard (IH) condition per 310 CMR 40.0321(2)b was reported to MassDEP and the "G" through "I" samples were immediately authorized for analysis. HB-23G was authorized primarily to determine the extent of PCBs in the 1 to 3 foot interval, while HB-23H and HB-23I, which flanked HB-23A and HB-23E, were authorized to determine the lateral extent of PCBs in surficial soil (0 to 1 foot). Analytical results from the additional samples located in the vicinity of HB-23 indicated that concentrations of PCBs above IH thresholds were confined to a polygonal area within the landscaped area along Hathaway Boulevard, encompassing a total of 568 square feet to a depth of 3 feet. The lateral extent of the excavation area was defined by PCB samples HB-23H to the northeast, HB-23G to the southeast, HB-23C to the south, HB-23B to the west, and HB-23I to the northwest.

Based on the IH evaluation for the HB-23 area, the estimated potential cancer risk for the young child recreational user exceeded the MCP risk limit for an IH due to an Excess Lifetime Cancer Risk (ELCR) with a value of 2E-05. The noncarcinogenic hazard quotient of 10 met the MCP Hazard Index (HI) limit of 10 for an IH evaluation. The IH was identified at the HB-23 area primarily due to the potential ingestion and dermal contact exposure pathways with PCB-containing surface soil. This triggered a 2-hour regulatory reporting obligation to the MassDEP in accordance with 310 CMR 40.0321(2) and 310 CMR 40.0311(7). The IH-related reporting condition was reported to the MassDEP by TRC in conjunction with the City on March 19, 2009. MassDEP orally approved IRA assessment and removal activities and assigned RTN 4-21847.

In May 2009, TRC submitted an IRA Plan and Imminent Hazard Analysis to MassDEP on behalf of the City in accordance with 310 CMR 40.0424.

On March 28, 2009, with oral approval from MassDEP, D. W. White Construction, Incorporated of Acushnet, Massachusetts (DW White) excavated PCB-impacted soils in the vicinity of the HB-23 area under TRC field supervision. Approximately 63.1 cubic yards of excavated soils were loaded directly into five roll-off containers lined with 6-mil polyethylene sheeting. All soils were excavated up to the staked excavation boundaries and down to 3 feet below grade. The dimensions of the excavation area were intended to be protective of potential future soil exposure, consistent with the assumptions in TRC's IH evaluation.

The excavated area was backfilled on March 28, 2009. Approximately 2.5 vertical feet of backfill was placed into the open excavation, followed by approximately 0.5 vertical feet of loam which was used to grade the area to the original surface elevation.

A composite waste characterization soil sample (i.e., "HB-23-Disposal") was collected from the excavated soils and submitted for laboratory analysis of VOCs, SVOCs, total PCBs, PAHs, total petroleum hydrocarbons (TPH), and RCRA 8 metals. An additional soil sample was collected for Toxicity Characteristic Leaching Procedure (TCLP) metals analysis, contingent upon total metals results. All waste characterization analyses were conducted by Con-Test.

The lined and covered roll-off containers containing the excavated soils were transported under a Bill of Lading to the Shawmut Avenue Transfer Station, owned by the City and located at 1103 Shawmut Avenue, New Bedford, Massachusetts, for temporary storage consistent with 310 CMR 40.0034(4) of the MCP.

The results of the "HB-23-Disposal" waste characterization sample were received following transport to the Shawmut Avenue Transfer Station. The sample exhibited a cadmium concentration of 18.1 mg/kg. The cadmium concentration exceeded the threshold for reuse via thermal processing. TCLP analysis was subsequently performed for all 8 RCRA metals. The TCLP analytical results did not exceed the 1.0 mg/L identified as the regulatory level for cadmium by MassDEP in 310 CMR 30.125. However, sample "HB-23-Disposal" also exhibited a total PCB concentration of 59.9 mg/kg. The EPA was notified of the PCB result and to discuss subsequent actions. The lined and covered roll-off containers were labeled with an EPA PCB label. Given that the total PCB concentration of the soil was greater than 50 mg/kg, the soil was considered a hazardous waste under 310 CMR 30.131, regulated under the Toxic Substances Control Act (TSCA), and \disposed at a TSCA-regulated facility.

On June 25, 2009, TRC oversaw the loading and transportation of the HB-23 area soils from the Transfer Station to the CWM Chemical Services, LLC chemical and industrial waste management facility in Model City, New York. Norman's Enterprises Construction Corporation (Norman's Enterprises) of New Bedford, Massachusetts conducted transfer activities in preparation for off-site disposal. Triumvirate Environmental, Incorporated (Triumvirate) of Somerville, Massachusetts provided transportation services to the approved TSCA-regulated disposal facility.

The five lined and covered roll-offs temporarily stored at the Shawmut Avenue Transfer Station did not meet specifications for transportation of the hazardous waste, but served to provide secure temporary storage until a suitable disposal facility was selected. As a result, the soil was removed from the polyethylene lined roll-offs, temporarily stockpiled on pavement on several layers of 6-mil polyethylene sheeting and subsequently loaded into three trucks by Norman's Enterprises. The weatherproof covering was removed and the entire content of each roll-off, including the polyethylene liner, was transferred onto the staged polyethylene sheeting. Care was taken to ensure that the polyethylene liner of each roll-off was not compromised prior to transferring the soil material and remained intact during the transfer activities. At no point during any of the soil transfer activities was a polyethylene liner compromised and therefore, no confirmatory wipe sampling was deemed necessary for any of the roll-offs. A front-end loader was then used to transfer the stockpiled soil into three trucks for off-site transportation and disposal. All of the soil transfer activities were conducted at the Shawmut Avenue Transfer Station.

On June 25, 2009, three trucks transported a total of approximately 84 tons of soil from the Shawmut Avenue Transfer Station to the Model City, New York facility in accordance with United States Department of Transportation (DOT), EPA and MassDEP regulations. All soil transportation was conducted by a licensed hauler and was handled under Uniform Hazardous Waste Manifest documentation (EPA Form 8700-22).

On July 20, 2009, TRC submitted an IRA Completion Report and Imminent Hazard Evaluation to MassDEP on behalf of the City in accordance with 310 CMR 40.0427. The IRA Completion Report served to document soil excavation activities undertaken to remove the PCB impacted soil from the HB-23 area of NBHS, and its subsequent disposal in Model City, New York.

IRA Sample Location HH-13

The following summarizes IRA activities conducted at the HH-13 soil sample location (northwest of House #2). Prior IRA-related regulatory reporting for HH-13 is fully documented in the *Immediate Response Action Completion Report and Imminent Hazard Evaluation, HH-13 Arsenic and Chromium Impacted Surface Soil* dated June 2009.

As discussed below, RTN 4-21872 was triggered on April 2, 2009 by the detections of arsenic and chromium at concentrations that could potentially pose an IH under 310 CMR 40.0321(2)(b) in surface soil (0 to 1 foot in depth) at the HH-13 area of the Site. Additional soil sampling and an IH evaluation indicated that an IH does not exist at the HH-13 area.

On March 11, 2009, soil sampling was conducted at sampling location HH-13, located on the NBHS grounds, to delineate the extent of previously detected concentrations of PAHs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene, and metals (arsenic, barium, cadmium, chromium, and lead). Additional soil sampling was conducted to further characterize/delineate soil impacts in this area to support remedial planning.

Environmental investigation consisted of direct push soil borings using a truck-mounted drill rig to sample soil and observe subsurface soil conditions. Drilling services and equipment were provided by New England Geotech. Surface soil samples were also collected using hand tools as part of the IRA assessment activities.

The delineation sampling of four "inner ring" soil borings within ten feet of the original HH-13 sampling location to the northwest, southwest, southeast, and northeast (designated HH-13A through HH-13D) was conducted. Four "outer ring" borings were also drilled approximately twenty feet from the original HH-13 sampling location (designated HH-13E through HH-13H). The inner and outer "ring" borings are illustrated on Figure 2-2. Soil samples were collected from each of the eight locations from the 0 to 1 foot interval to assess the extent of the potential IH condition and to support the preparation of an IH evaluation.

TRC initially authorized the laboratory to proceed with the analysis of the four "inner ring" soil samples for PAH, total PCBs, and selected metals (arsenic, barium, cadmium, chromium, and lead) analyses as part of the characterization/delineation effort to support remedial planning. The laboratory was instructed to hold the "outer ring" soil samples pending "inner ring" analytical results. Based on the results of the "inner ring" samples, the laboratory was instructed to proceed with the analysis of the four "outer ring" samples for the same metals suite as the "inner ring" samples.

Con-Test conducted PAH and metals analyses. NEA conducted the PCB analysis.

Initial metals results exhibited concentrations of arsenic (40 mg/kg) and chromium (1,960 mg/kg) in the top foot of soil at soil sampling location HH-13B. These concentrations equaled (in the case of arsenic) or exceeded (in the case of chromium) the threshold concentrations for a condition that potentially "could pose" an IH (310 CMR 0321[2] [b]).

The potential IH condition triggered a 2-hour regulatory reporting obligation to the MassDEP in accordance with 310 CMR 40.0321(2) (b) and 310 CMR 40.0311(7). TRC reported the condition to MassDEP via telephone on April 2, 2009. MassDEP orally approved IRA assessment activities and assigned RTN 4-21872.

The results of laboratory analysis of soil samples collected from the area immediately to the north of House #2 of the NBHS in March and April 2009 are summarized in Table 3-6. None of the delineation samples analyzed in this area exhibited concentrations at or above the MassDEP threshold that could pose an IH per 310 CMR 40.0321(2)(b) with the exception of the soil sample collected at sample location HH-13B, as previously identified.

The potential IH threshold value for total chromium (200 mg/kg within 1 foot of surface) is based on the potential presence of hexavalent chromium (i.e., chromium VI). In the absence of hexavalent chromium speciation data, the speciation IH threshold applies to chromium. Therefore, on April 10, 2009, four soil samples were collected from 0 to 1 foot below ground surface in the area of HH-13B (see Figure 2-2) to assess the type of chromium (valence state) in the soil (sample designations SS-HH-13-B1, SS-HH-13-B2, SS-HH-13-B3, and SS-HH-13-B4). These soil

samples were collected using hand tools and were analyzed for total chromium, hexavalent chromium, pH and ORP.

The chromium speciation data collected in close proximity to HH-13B indicated that chromium VI was not present at concentrations above the analytical reporting limit in the samples. Therefore, chromium was evaluated as chromium III. However, in order to be health-protective by conservatively evaluating the chromium data and the associated potential risk and hazard, chromium was also evaluated as chromium VI.

An IH evaluation was performed on the data and concluded that an IH did not exist.

HF-31 RAM

Prior sample results from BETA at sample location HF-31, immediately west of the girls' gym, detected total PCBs at a concentration of 2.55 mg/kg in the 1 to 3 foot soil horizon. In the vicinity of sample location HF-31, samples were collected at six sample locations in a grid pattern having a 10-foot lateral separation (sample locations identified as HF-31A, HF-31B, HF-31C, HF-31D, HF-31G, and HF-31H) at 0-1 foot and 1-3 foot intervals and analyzed for PCBs, cadmium, and lead for delineation purposes. Samples were collected at locations HF-31E and HF-31F, but not analyzed, as sample locations HF-31A and HF-31B exhibited results associated with acceptable risks. Using MCP risk assessment procedures, the excavation area was determined to be bound by samples HF-31A, HF-31B, HF-31G, and HF-31H.

During the delineation of PCB impacted soils at sample location HF-31, PCBs were detected at sample location HF-31D at a concentration of 71.6 milligrams per kilogram (mg/kg) in the 1-3 foot sampling interval. As PCBs were detected at a concentration greater than 50 mg/kg in soils, and meet the definition of PCB Remediation Waste (as defined in 40 CFR §761.3), the remediation activity at sample location HF-31D described in the *Release Abatement Measure Plan, Soil Excavation and Removal, New Bedford High School* dated April 2011 was designed to comply with both 40 CFR 761 and the MCP.

A PCB Remediation Notification letter was issued by the City to the EPA on July 14, 2010. Following a teleconference with the EPA Region 1 PCB Coordinator, an amendment to the PCB Remediation Notification letter was issued to EPA on October 21, 2010, which served to document items discussed during the teleconference.

The EPA issued a TSCA applicability letter to the City on December 2, 2010. Following a 20-day public comment period, the MassDEP issued conditional approval to conduct the RAM Plan activities on February 4, 2011.

Prior to excavation activities, confirmation sampling was performed in-situ near sample location HF-31D in accordance with 40 CFR §761 (Subpart O) as described below to establish pre-defined excavation boundaries. Confirmation samples were collected in accordance with 40 CFR §761.283 to evaluate excavation limits sufficient to remove all PCB Remediation Waste soils on December 8, 2010. Confirmatory samples were submitted to NEA for laboratory analysis of PCBs

(SW-846 Method 8082A) and to Con-Test for analysis of RCRA 8 metals (SW-846 Methods 6010B / 7471B). Confirmatory samples were collected as follows:

- One sample per 1.5 meters of sidewall; and
- One sample in the center of each 1.5 meter grid at the bottom of the excavation.

A total of five soil samples (i.e., HF-31-BW, HF-31-NSW, HF-31-SSW, HF-31-ESW and HF-31-WSW) and one duplicate were submitted for laboratory analysis. Based on the analytical results of the confirmatory soil sampling, none of the confirmatory sample results exhibited a total PCB concentration greater than or equal to 50 mg/kg. One additional soil sample (i.e., HF-31-DS) was collected on December 8, 2010 for the purposes of obtaining pre-approval of soil acceptance from a permitted disposal facility prior to excavation activities related to MCP risk reduction goals.

In February, 2011, the City's DPI mobilized to the Site to implement RAM preparation activities which were overseen by TRC. A temporary chain-link perimeter fence, including one lockable access gate, was erected around the work zone by Valtran® of New Bedford, Massachusetts. DPI placed steel plating throughout the work zone to protect areas outside the excavation limits within the work zone during mobilization, excavating, staging and demobilization. As the Site generally exhibits a flat topography, and there are no catch basins located in the vicinity of the excavations, sedimentation and erosion control measures were not implemented based on field observations.

Land Planning marked the pre-determined excavation limits of soil categorized as PCB Remediation Waste (i.e., soil boring locations HF-31-BW, HF-31-NSW, HF-31-SSW, HF-31-ESW and HF-31-WSW) and soil targeted for removal to accomplish the MCP risk reduction goals (i.e., soil boring locations HF-31A, HF-31B, HF-31G and HF-31H).

Soil excavation activities commenced with removal of the soil categorized as PCB Remediation Waste. Triumvirate was contracted by the City to facilitate offsite transportation and disposal of the soil classified as PCB Remediation Waste. The impacted soil was directly loaded into a total of seven lined cubic yard boxes. The cubic yard boxes were staged on wooden pallets underlain by 6 mil polyethylene sheeting during soil loading activities. Per the MassDEP approved RAM Plan and the EPA's request, to ensure that all PCB Remediation Wastes were removed, the pre-determined excavation limits were over excavated by approximately 6 to 12 inches. The total depth of the excavation was confirmed using a laser level. Each cubic yard box was subsequently loaded onto a truck and transported offsite for disposal at the EQ-Wayne Disposal, Incorporated chemical waste landfill facility in Bellville, Michigan per the TSCA applicability letter from the EPA to the City dated December 2, 2010.

Following the excavation of soil material categorized as PCB Remediation Waste, all equipment (e.g., excavator bucket and shovels) that had come into direct contact with soils determined to be actual or potential PCB Remediation Waste was decontaminated. As described in the RAM Plan, the City employed a prescriptive decontamination approach per 40 CFR Part 761.79(c)(2)(ii). Moveable equipment and tools were swabbed with a solvent.

Under the self-implementing decontamination approach, where solvent containing rags may be used to swab/decontaminate non-porous surfaces, spent solvents and solvent soaked rags were

managed for disposal via incineration at a permitted facility per 40 CFR Part 761.79(g)(3), (4) or (5). Such materials were transported offsite for disposal at the EQ-Wayne, Michigan facility in association with the cubic yard boxes.

Non-liquid cleaning materials (e.g., rags and gloves) and personal protective equipment (PPE) waste were managed in accordance with 40 CFR 761.61(a)(5)(v).

Following the removal of soil material categorized as PCB Remediation Waste, the open excavation was covered with polyethylene sheeting as a precautionary measure, and all equipment was staged and secured.

In order to accomplish the MCP risk reduction goals, excavation activities continued to the pre-determined limits bound by samples HF-31A, HF-31B, HF-31G, and HF-31H. These soils not categorized as PCB Remediation Waste were live loaded directly into lined City-owned trucks for offsite transportation and disposal at the Greater New Bedford Regional Refuse Management District - Crapo Hill Landfill in New Bedford, Massachusetts.

Once excavation activities were completed, the final limits and depth of the excavation were surveyed by Land Planning.

Backfilling commenced with the placement of documented compliant imported borrow material. Backfilling with imported borrow material continued until the excavation was brought up approximately 6-inches below grade to allow for placement of documented compliant imported loam, and subsequent re-seeding. Backfilling with imported loam was also completed in February 2011 using a front-end loader, bringing the excavation up to final grade. Reseeding was completed in the spring of 2011.

All backfill material, including borrow and loam, were imported from documented compliant sources.

Although vehicle and heavy equipment traffic was localized to paved and plated areas, any vehicles moving within the work zone were visually inspected to ensure no visible soil materials were present on the body or on the tires. Following completion of the backfilling activities, the plating and temporary fencing were removed.

RAM and RAM Modification – Soil Excavation and Removal at the NBHS Campus. The RAM Plan was submitted on behalf of the City to support the removal of impacted soil in areas of the campus not separately described herein, pavement of select areas to prevent direct exposure contact, and restoration activities at the Site. Soil EPCs evaluated under baseline conditions indicated a Condition of No Significant Risk had not been achieved for the top three feet of soil in unpaved areas under current and future use scenarios using a Method 1/Method 2 risk assessment, which was then verified by a Method 3 risk characterization. The proposed RAM activities included:

- Excavation of impacted soil that contributes to EPCs in excess of MCP Method 1/Method 2 S-1 soil standards in the top 3 feet in landscaped areas as well as excavation of impacted soil

with a benzo(a)pyrene UCL exceedance at sample location SB-308 (5 feet below ground surface);

- The use of paving in select areas to prevent direct contact exposure to impacted soil, and excavation and grading of soil in support thereof;
- Temporary soil stockpiling and stockpile management at an off-site City-owned location prior to disposal;
- Off-site disposal or reuse of excavated soil at appropriately licensed facilities; and
- Backfilling of soil excavations with documented compliant material screened in advance to ensure consistency with Method 1 S-1 soil standards.

On April 15, 2011, MassDEP issued a conditional approval to conduct the RAM Plan activities. As part of the conditional approval, a RAM Plan Modification was required to be submitted to MassDEP prior to conducting activities "where pavement will be increased and/or for the installation of storm water utilities." The *Release Abatement Measure Plan Modification, Soil Excavation and Removal, New Bedford High School* was submitted in July 2011. The RAM Plan Modification served to amend, not replace, the Original RAM Plan, and did not change activities implemented prior to submission of the modification. The RAM Plan Modification addressed the MassDEP's April 15, 2011 conditional approval, as well as the changes in RAM Plan activities which included the following:

- The installation of drainage structures in EP HS-5 (Flag Pole Area), to abate peak runoff volumes;
- The implementation of risk reduction measures in the northern portion of the Site at EP HS-8 to support the possible future use as a solar park (Original RAM Plan identified this area as to be paved);
- The elimination of on-site pavement crushing;
- The installation of a security fence in northern portion of the Site prior to the commencement of any work in the area;
- The use of the northern parking lot areas for temporary excavated soil storage, if necessary;
- In the areas to be paved where trees are located, the trees will remain in place and the soils surrounding the trees and root systems will be excavated to a depth of three feet; and
- In the remaining excavations where trees are located, the trees will remain in place and the soils surrounding the trees and root systems will be excavated to a depth of three feet.

On August 1, 2011, MassDEP issued a conditional approval for the RAM Plan Modification.

RAM activities were planned to address soil EPCs that, under baseline conditions, indicated that a Condition of No Significant Risk had not been achieved for soil within the 0 to 3 foot interval in landscaped areas under current and future use scenarios for HS-3, HS-4, HS-6, and HS-10. The Children's Playground Area (HS-1), the Fenced Playing Field Area (HS-2), and the Student Congregating Area (HS-7) did not require further action to achieve a Condition of No Significant Risk for the top three feet of soil. Portions of the Flag Pole Area (HS-5), the Junior High School

Gym Class Area (HS-8), a portion of the Tree Belt Area (HS-10), and the areas identified as Beneath Pavement/Buildings (HS-9) were covered or remained covered by pavement to prevent direct contact exposures to underlying soil as part of the remedial action. Due to concentrations of PCBs detected in HS-2 at sample location SS-32, this area was excavated as an added risk reduction measure. The following areas were identified for remedial action: SS-32; HF-40; HF-43, HE-44; HJ-42; HD-19, HD-20, HD-21; HF-14; HH-13; HA-19; HB-39, HB-40; HB-23, HC-22; SS-36; SB-360; SB-308; SB-270; excavation and paving in HS-5 (Flag Pole Area); excavation and paving in HS-10; excavation in northern area.

The following is a summary of activities performed under the RAM and RAM Modification. For a more detailed description refer to the *Release Abatement Measure Status Reports* dated August 2011, February 2012, August 2012, February 2013, August 2013, and February 2014 and/or the *Release Abatement Measure Completion Statement Report,* dated July, 2014 (hereinafter the "RAM Completion Report").

Prior to the start of excavation activities, the City's DPI prepared the temporary soil stockpile area at the Transfer Station with a perimeter silt fence, hay bales, and straw wattles per the design drawings and Soil Management Plan (SMP) included in the RAM Plan. The stockpile area was inspected by TRC prior to the initiation of RAM activities.

As identified in section 1.1.3, the boundaries of the excavation were delineated prior to excavation. The boundaries for each of the spot excavation areas were surveyed and pre-marked in the field prior to the implementation of RAM-related excavation activities.

A geophysical survey was performed by Sub-Surface Information Systems (SIS) of East Longmeadow, Massachusetts to supplement Dig-Safe® utility mark-outs within several areas of excavation (i.e., HA-19, HB-23, HB-39, HB-40, HC-22, HD-19, HD-20, HD-21, HF-14, SB-270 and SB-308) that were known or suspected to contain subsurface utilities. In addition, those areas exhibiting geophysical anomalies were further screened with a Verifier G_2 Utility Locator to check for buried electrical lines. Both traceable electrical lines and geophysical anomalies were marked out to the extent of the spot excavations.

In the areas to be paved where trees are located, the trees remained in place and the soil surrounding the trees and root systems was excavated to a depth of three feet. In the remaining excavations where trees are located, the trees remained in place and the soil surrounding the trees and root systems was excavated to a depth of three feet. Soil directly beneath the dense root mass of trees remained in place. Following the excavation surrounding the trees, a sample was taken of the soil remaining beneath the trees at a depth of 0-1 feet and 1-3 feet at four locations (north, south, east and west of the tree) and composited into one sample which was submitted for laboratory analysis.

Excavation activities began at the Site on April 16, 2011. Spot excavation activities continued intermittently based on site access provided by the New Bedford School Department to the pre-determined limits of each spot excavation through September 22, 2011. Additional excavations at sample location HB-22 were performed based on prior delineations as described in section 1.1.3, on December 17, 2011 and April 24, 2014. Excavation activities were scheduled during weekday periods, weekends and holidays so as to minimize the amount of work conducted while school was

in session or other school activities were taking place. Spot excavation activities were conducted as indicated in the following table:

Spot Soil Excavation Summary Table		
Spot Excavation Location	**Excavation Dates**	**Approximate Volume (yd^3)**
SB-360	April 16, 2011	193
SS-36	April 16, 2011	118
SB-270	April 17, 2011	107
SB-308	April 17, 2011	79
HF-14	April 18, 2011	353
HH-13	April 19, 2011	171
HC-22	April 20, 2011	45
HD-19 + HD-20 + HD-21	April 20, May 14 & 21, 2011	302
HA-19	May 14, 2011	160
SS-32	June 20, 2011	7
HJ-42	June 27, 2011	42
HB-39 + HB-40	June 27 & July 5, 2011	103
HF-43 + HE-44	June 27, July 8 & 11, 2011	124
HF-40	July 6 & 7, 2011	112
HB-23	July 11 – 13, 2011	314
Southern Island	August 9 - 12, 2011	269
Triangle Island	August 15 - 22, 2011	1,038
Northern Area	August 15 - 25, 2011	2,046
Flagpole Island	September 10 - 22 2011	2,299
HB-22	December 17, 2011	2.8
HB-22	April 24, 2014	8
		Total: 7,956 yd^3
Notes: yd^3 – cubic yards as measured in-situ		

Throughout the implementation of spot excavation activities, soil was removed and live loaded by the DPI into City-owned dump trucks lined with polyethylene sheeting. Street sweeping of paved surfaces was performed on a regular basis. The loaded trucks were visually inspected to ensure no visible soil materials were present on the body or tires of the vehicles prior to leaving the work zone. Trucks traveled the pre-determined route to the Transfer Station under a MassDEP Bill of Lading (BOL).

Trucks were weighed upon entry at the Transfer Station scale house and soil was segregated into predetermined stockpiles based on the in-situ chemical results and estimated off-site disposal scenarios. Daily inspection and maintenance of the soil stockpiles was performed by DPI, and TRC routinely inspected the stockpile containment and perimeter stormwater control measures during periods of prolonged inactivity as an additional check.

Upon completion of each of the spot excavations to 3-feet (deeper for the SB-308 excavation), documented compliant backfill was loaded directly into the open excavations. The backfill material was spread throughout the excavation in approximately 12-inch lifts and compacted. Backfilling with imported borrow continued until the excavation was brought up to approximately 6-inches below grade to allow for placement of documented complaint imported loam, and subsequent re-seeding. Backfill borrow and loam materials were acquired from sources previously tested by the City.

Spot excavation SB-308, located within the Bus Yard parking lot, was excavated to 5-feet below grade due to a benzo(a)pyrene UCL exceedance as described in the MassDEP approved RAM Plan. The existing asphalt was cut and removed by DPI for stockpiling at the Transfer Station with the excavated soil material. Backfilling of the SB-308 spot excavation included the use of documented compliant crushed stone and replacement of the asphalt rather than placement of loam and reseeding.

During spot excavation activities at the SB-270 and SB-308 locations, groundwater was encountered at approximately 2-feet below grade. As a result, limited dewatering was performed to facilitate excavation and backfill activities.

To facilitate spot excavations a total of nine trees were removed from locations HA-19, HF-14, HH-13, SB-270, HA-19 and HD-21. The tree stumps were transported by DPI to the Transfer Station stockpile area and segregated on polyethylene sheeting pending off-site disposal.

Restoration activities were completed by DPI on or about November 18, 2011 for the spot excavations, and on or about December 17, 2011 and April 24, 2014 for the HB-22 excavations.

IRA Sample Location TREE-TI-3

The following summarizes IRA activities conducted at the TREE-TI-3 soil sample location, northwest of House #2 across the paved driveway. IRA-related regulatory reporting for TREE-TI-3 is fully documented in the *Immediate Response Action Completion Report and Imminent Hazard Evaluation, Triangle Island TI-3 Area, New Bedford High School* dated November 2011.

On September 6, 2011 PCBs were detected in soil at a tree island composite sample location identified as “TREE-TI-3” during the NBHS campus RAM activities. PCBs were detected in the top foot of soil at a concentration requiring notification to MassDEP per 310 CMR 40.0321(2) (b) and 310 CMR 40.0311(7). Upon report by the City and TRC via telephone, MassDEP orally approved IRA assessment activities and assigned Release Tracking Number (RTN) 4-23526.

Initially, PCBs were incorrectly reported by the Con-Test for the “TREE-TI-3” sample at a concentration of 100 mg/kg. A quality assurance review of the data by TRC’s Senior Chemist and subsequent discussions with Con-Test determined that the laboratory had made a typographical error in the dilution factor, and the corrected results were 20 mg/kg.

Initial response actions included erecting a temporary chain-link fence encompassing the Triangle Island TREE-TI-3 location. The supplemental assessment consisted of collecting soil samples to delineate potential PCB impacts within the Triangle Island TI-3 root mass. The delineation approach targeted representative locations of the four grab aliquots that composed sample TREE-TI-3 (0-1). Soil samples TI-3N, TI-3E (including field duplicate), TI-3S and TI-3W were collected from the 0 to 1 foot depth interval on September 26, 2011 to represent the original northern, eastern, southern and western grab aliquots, respectively (see Figure 2). Two additional soil samples were collected from each soil boring location from the 1 to 1.3 foot and 2 to 2.3 foot depth intervals, respectively. These deeper samples were retained for analysis contingent upon the analytical results of the upper 0 to 1 foot horizon in an attempt to delineate the vertical extent of impacts, if present, without having to remobilize sampling teams. The soil samples were submitted to Pace for PCB analysis. Total PCB concentrations ranged from 0.115 mg/kg (TI-3N [0-1]) to 3.53 mg/kg (TI-3E [0-1]).

An IH evaluation was initiated within 14 days of obtaining knowledge of the reporting condition. TRC's risk assessment specialist conducted the IH calculations using an arithmetic mean as the EPC for PCBs. The IH was also conservatively calculated using the maximum detected concentration as the EPC for PCBs. In both cases the calculated HI and the ELCR did not exceed the MassDEP IH limits of 10 and 1E-05 for IH evaluations, respectively.

TRC performed the initial IH analysis on September 11, 2011, satisfying the IH evaluation initiation timeline under the MCP. The IH evaluation was subsequently revised on October 10, 2011 following laboratory correction of the TREE-TI-3 (0-1) sample result to 20 mg/kg.

The risk characterization calculations indicated that no IH condition existed at the Triangle Island TI-3 area of the NBHS Campus.

Exposure Point Area HS-8 / Solar Park

RAM-related actions at the HS-8 area at the northern Site boundary, including the majority of the spot excavation and associated temporary soil stockpiling activities, were completed in July 2011. Excavation and temporary stockpiling in support of paving activities, in consideration of existing trees, and associated with limited spot excavation activities were subsequently completed by December 2011. Following the execution of an agreement between the City and the operation and maintenance lessee, the remaining RAM-related activities (i.e., final design and remedial actions in support of solar park construction) were completed.

Remedial work associated with EP HS-8 was initiated by the City's DPI under the oversight of TRC on July 9, 2013, concurrent with preparation of the area for use as a solar park. RAM-related activities were largely completed by August 26, 2013 and involved tree and stump removal/characterization, soil excavation and consolidation, installation of geotextile separation fabric and compliant backfill, installation of a permanent security fence, and limited solar park-related development activities requiring management under the RAM (i.e., trench excavation for placement of electrical conduit, removing and resetting of vertical granite curbs, installation of grounding rods and paving). Remedial activities associated with EP HS-8 were outlined in the

RAM Status Report submitted to MassDEP on September 12, 2013 and are further described herein.

Tree Stump Removal and Characterization

Several trees required removal from EP HS-8 to facilitate construction of the solar park. Trees were cut between July 9, 2013 and July 12, 2013 consistent with the revised grading plan. Tree branches were trimmed and chipped onsite by DPI, while larger debris and tree trunks were stockpiled within the northeastern NBHS parking lot pending transportation offsite between August 2, 2013 and August 6, 2013.

Following tree removal, the tree stumps were removed from the solar park area (referred to in the remainder of the document as the "fenced portion of EP-HS-8"), and stockpiled in the northwestern NBHS parking lot. The majority of adhered soil was removed from the stumps by dry methods (i.e., brushing) prior to relocating each stump to the stockpile area. The stumps were stockpiled on pavement and covered with polyethylene sheeting pending characterization for offsite disposal.

Disposal characterization samples, representative of both the stump and associated adhered soil material, were collected on July 15, 2013. A composite sample, consisting of woody material from each stump as well as adhered soil material, was submitted to Con-Test for laboratory analysis of SVOCs, TPH, PCBs, RCRA 8 metals, flashpoint, ignitability, reactive cyanide, reactive sulfide and conductivity consistent with Policy #COMM-97-001 requirements for reuse in lined and unlined landfills. A grab soil sample was submitted to Con-Test for VOCs analysis.

Due to a detection of total lead of 110 milligrams per kilogram (mg/kg), the laboratory was authorized to conduct a TCLP lead analysis on the composite sample. The TCLP lead analysis exhibited a concentration of 0.12 milligrams per liter (mg/L), indicating the material was not characteristically hazardous for lead under RCRA.

The stump material was transported offsite by DPI on August 13, 2013 and August 14, 2013 as described in Section 2.3.

Risk Reduction Measures / Preparation of Fenced Portion of EP-HS-8

RAM-related activities associated with EP HS-8 were initiated on July 10, 2013 with the installation of erosion and sediment controls (e.g., placement of straw wattles, installation of filter fabric within catch basins, etc.) as described in the RAM Plan Modification and updated Storm Water Pollution Prevention Plan (SWPPP), Revision 2.1.

Remedial activities within EP HS-8 primarily involved the following activities:

- Excavation, backfilling, placement of loam and reseeding of the southern portion of EP HS-8 (i.e., outside the footprint of the permanent security fence), with spreading of excavated soil material within fenced portion of the EP HS-8;
- Trenching, installation of conduits and as needed pavement replacement. Excavated trench soil was spread within the fenced portion of the EP HS-8;

- Removal and relocation of an existing light pole;
- Rough grading of the fenced portion of EP-HS-8;
- Installation of a geotextile separation fabric;
- Placement and grading of 6 inches of washed, crushed stone;
- Installation of curbing; and
- Installation of a permanent security fence with locked access gate(s).

An area south of the fenced portion of EP-HS-8 was excavated to a depth of 3 feet below grade. Excavation activities commenced on July 17, 2013 at the western limit of the excavation and proceeded eastward. During the excavation activities one existing light pole was removed and subsequently relocated. The excavated soil material was placed within the fenced portion of EP-HS-8 and graded to achieve subgrade elevations conducive to construction of the solar park. Boulders encountered within the excavation area were pressure washed to remove potentially impacted soil material and left in place.

The excavation was backfilled (approximately 1 foot lifts) with documented compliant material to within 6 inches of the final grade. Characterization samples for backfill material and loam were collected on July 22, 2013 and July 26, 2013, respectively. The soil samples were submitted to Con-Test for analysis of VOCs, SVOCs, EPH, volatile petroleum hydrocarbon (VPH), PCBs, pesticide, herbicide and RCRA-8 metals. Backfilling of the excavation was completed on August 6, 2013. The excavation was completed with approximately 6 inches of loam on August 22, 2013 and subsequently reseeded.

Additional remedial work was focused on preparation of EP HS-8 for construction of the above-grade portion of the fenced portion of EP-HS-8.[2] Following removal of the trees as noted above, the fenced portion of EP-HS-8 was mowed to facilitate regrading activities. As depicted in Figure 2, portions of the perimeter of the fenced portion of EP-HS-8 were excavated to 6 inches below grade to so that final construction elevations would be consistent with the curbing and existing grades adjacent to the fenced portion of EP-HS-8. Two existing monitoring wells (MW-8A and MW-8B) located near the northwest corner of the solar park area were decommissioned as a result of this activity.

A portion of the existing northeastern parking lot was incorporated into the fenced portion of EP-HS-8 (see Figure 2). As a result, the northeastern parking lot was saw cut on July 22, 2013 to facilitate relocation of portions of the existing vertical granite curbing. The existing curbing was removed on July 26, 2013 and trenching in support of installation was conducted on August 7, 2013. The curbing was reinstalled along the eastern perimeter of the fenced portion of EP-HS-8 on August 15, 2013.

The existing asphalt pavement within the portion of the northeastern parking lot incorporated into the fenced portion of EP-HS-8 was left in place, however pavement was demolished and left below grade pursuant to the MassDEP Site Assignment Regulations for Solid Waste Facilities (310 CMR

[2] The above-grade construction did not require management under the RAM Plan or RAM Plan Modification.

16.00), specifically the asphalt pavement, brick and concrete recycling operations detailed in 310 CMR 16.03(2)(b)5. The City filed an On-Site Rubble Crushing Notification Form with the MassDEP on June 24, 2013.

A limited amount of soil material was excavated from EP HS-9 and EP HS-6 on July 25, 2013 and July 26, 2013 during trenching to facilitate installation of electrical conduits. This material was also graded into the fenced portion of EP-HS-8. The conduits, ultimately linking the solar park to the NBHS building, extend from the southern perimeter of the fenced portion of EP-HS-8 to A-Block, House #2. The electrical conduits were installed and encased in concrete on July 30, 2013. The remaining portion of the trench was backfilled with documented compliant material on August 1, 2013. Following compaction, the trench was repaved on August 15, 2013 (base/coarse) and August 20, 2013 (surface coat) and reseeded (unpaved areas).

Documented compliant backfill material was transported to the Site and installed within the southern, unfenced portion of EP HS-8 to provide for three feet of clean surface cover, as well as within the electrical trench (see Figure 2). Backfill material delivery commenced on July 30, 2013. Upon arrival, the backfill material was spread and compacted to achieve subgrade elevations.

Proof-rolling of soils within the fenced portion of EP HS-8 was completed by August 14, 2013 in preparation for placement of a layer of geotextile fabric and construction of the solar park. Beginning on August 16, 2013, a continuous layer of geotextile fabric (TenCate Mirafi® 180N) was placed within the entire footprint of the fenced portion of EP-HS-8. The geotextile fabric was covered with six inches of 1.5 inch imported washed, crushed stone and graded to the final elevations (Figure 2). Placement and grading of the stone was completed by September 3, 2013.

In preparation for completion of the permanent perimeter fence, vegetation and the existing chain link fence along the northern property boundary (border with the Hetland Rink property) was removed. An eight foot high permanent chain link fence was subsequently installed surrounding the entire perimeter of the fenced portion of EP-HS-8. Soil material displacement during posthole excavation was incorporated into the subgrade of the fenced portion of EP-HS-8. Permanent fence installation was completed for the fenced area of EP HS-8 in September 2013.

2.3.3 Extent of Site Chemical Impacts

This section describes the horizontal and vertical extent of impacts for COCs identified during TRC's subsurface investigations, including supplemental RAM-related sampling, and during previous assessments conducted by VHB and BETA. Copies of laboratory data reports were included in prior regulatory submittals.

Chemicals of concern at the Site include PCBs, metals (antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, and zinc), various PAHs, and dioxin-like compounds. The discussion of the extent of impacts focuses on Site chemicals that are indicative of a group of compounds (i.e., benzo(a)pyrene for the PAH group of chemicals), and include the following: PCBs, dioxin-like compounds, antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, vanadium, zinc and benzo(a)pyrene.

A summary of soil analytical results for each EP (HS-1 through HS-10) is included in Tables 2-1 through 2-10, with Site wide dioxin-like compound results included in Table 2-11. Tables 2-1 through 2-11 include data for samples, excluding locations excavated during implementation of response actions. The extent of impacts is discussed separately for each exposure area with the exception of dioxin-like compounds which are discussed on a Site wide basis.

Exposure Point Area HS-1: Children's Play Area

Samples were collected and analyzed for various parameters from 10 borings as part of the investigation activities in EP HS-1. A summary of analytical results, included in Table 2-1, supports that no remedial activities were warranted at EP HS-1.

The following is a summary of Site impacts in EP HS-1:

- Total PCBs as Aroclors were undetected in all nine samples;
- Total PCBs as congeners were detected in the two samples taken at concentrations of 0.00172 mg/kg at sample location PG-6 (0-1 feet) and 0.00589 mg/kg at sample location PG-6 (1-3 feet);
- PAHs were undetected in all seven samples;
- Arsenic was detected in two out of six samples at concentrations ranging from 0.79 mg/kg at sample location PG-6 (0.5-3 feet) to 1.22 mg/kg at sample location PG-3 (0.5-3 feet);
- Barium was detected in all six samples at concentrations ranging from 4.93 mg/kg at sample location PG-6 (0.5-3 feet) to 43.0 mg/kg at sample location PG-3 (0.5-3 feet);
- Cadmium was detected in one out of six samples at a concentration of 0.36 mg/kg at sample location PG-3 (0.5-3 feet);
- Chromium was detected in all six samples at concentrations ranging from 1.72 mg/kg at sample location PG-3 (0.5-1.5 feet) to 26 mg/kg at sample location PG-3 (0.5-3 feet);
- Lead was detected in all six samples at concentrations ranging from 2.93 mg/kg at sample location PG-6 (0.5-3 feet) to 16.9 mg/kg at sample location SS-65 (0-0.5 feet);
- Mercury was undetected in all five samples;
- Nickel was detected all three samples at concentrations ranging from 4.02 mg/kg at sample location SS-63 (0-0.5 feet) to 10.4 mg/kg at sample location SS-65 (0-0.5 feet);
- Vanadium was detected in two out of three samples at concentrations ranging from 7.21 mg/kg at sample location SS-63 (0-0.5 feet) to 11.9 mg/kg at sample location SS-65 (0-0.5 feet); and
- Zinc was detected in all three samples at concentrations ranging from 26.0 mg/kg at sample location SS-63 (0-0.5 feet) to 32.3 mg/kg at sample location SS-65 (0-0.5 feet).

Exposure Point Area HS-2: Fenced Playing Field

Samples were collected and analyzed for various parameters from 49 borings as part of the investigation activities in EP HS-2. A summary of analytical results is included in Table 2-2.

The following is a summary of Site impacts in EP HS-2: subsequent to performing the remedial activities identified in Section 2.3.2

- Total PCBs as Aroclors were detected in 48 out of 94 samples at concentrations ranging from 0.0664 mg/kg at sample location SS-31 (0.5 feet) to 4.93 mg/kg at sample location SS-19 (1 foot);
- Total PCBs as congeners were detected in the two samples taken at concentrations of 0.0233 mg/kg at sample location SS-28 (1-3 feet) and 0.544 mg/kg at sample location SS-28 (0-1 feet);
- Benzo(a)pyrene was detected in 22 out of 61 samples at concentrations ranging from 0.214 mg/kg at sample location SS-25 (1.5 feet) to 5.28 mg/kg at sample location SS-24 (1-3 feet);
- Arsenic was detected in 39 out of 73 samples at concentrations ranging from 1.61 mg/kg at sample location VSS-10 (0-0.5 feet) to 22.0 mg/kg at sample location SB-367 (5-6 feet);
- Barium was detected 72 out of 73 samples at concentrations ranging from 6.64 mg/kg at sample location HRE-29 (1-3 feet) to 783 mg/kg at sample location SB-366 (4 feet);
- Cadmium was detected 26 out of 73 samples at concentrations ranging from of 0.22 mg/kg at sample location SS-31 (1-3 feet) to 9.17 mg/kg at sample location SB-366 (4 feet);
- Chromium was detected in all 73 samples at concentrations ranging from 1.92 mg/kg at sample location SS-12 (2 feet) to 68.1 mg/kg at sample location SS-19 (0.5 feet);
- Lead was detected in 70 out of 73 samples at concentrations ranging from 0.87 mg/kg at sample location SS-18 (0.5 feet) to 2,360 mg/kg at sample location SB-366 (4 feet);
- Mercury was detected in 46 out of 64 samples at concentrations ranging from 0.016 mg/kg at sample location SB-366 (1-3 feet) to 1.02 mg/kg at sample location SS-26 (1.5 feet);
- Nickel was detected all three samples at concentrations ranging from 1.52 mg/kg at sample location SS-11 (0.5 feet) to 49.3 mg/kg at sample location SS-367 (5-6 feet);
- Vanadium was detected in 43 out of 60 samples at concentrations ranging from 5.34 mg/kg at sample location SS-30 (1.5 feet) to 59.3 mg/kg at sample location SS-20 (0.5 feet); and
- Zinc was detected in all 60 samples at concentrations ranging from 4.57 mg/kg at sample location SS-11 (0.5 feet) to 958 mg/kg at sample location SS-366 (4 feet).

Exposure Point Area HS-3: Unfenced Playing Field

Samples were collected and analyzed for various parameters from 58 borings as part of the investigation activities in EP HS-3. . A summary of analytical results is included in Table 2-3.

The following is a summary of Site impacts in EP HS-3 subsequent to performing the remedial activities identified in Section 2.3.2:

- Total PCBs as Aroclors were detected in 11 out of 30 samples at concentrations ranging from 0.094 mg/kg at sample location HRI-17 (1-3 feet) to 0.76 mg/kg at sample location HRJ.75-17 (1-2.5 feet);
- Total PCBs as congeners were detected in the two samples taken at concentrations of 0.0631 mg/kg at sample location SS-38 (1-3 feet) and 1.11 mg/kg at sample location SS-38 (0-1 feet);
- Benzo(a)pyrene was detected in five out of 17 samples at concentrations ranging from 0.317 mg/kg at sample location SS-38 (1.5 feet) to 6.76 mg/kg at sample location SS-37 (2 feet);
- Arsenic was detected in 13 out of 20 samples at concentrations ranging from 1.61 mg/kg at sample location VSS-10 (0-0.5 feet) to 16.0 mg/kg at sample location SB-38 (1.5 feet);
- Barium was detected in all 21 samples at concentrations ranging from 5.94 mg/kg at sample location SS-39 (2 feet) to 801 mg/kg at sample location SS-38 (1-3 feet);
- Cadmium was detected 10 out of 20 samples at concentrations ranging from of 0.36 mg/kg at sample location SS-37 (2 feet) to 1.53 mg/kg at sample location SS-40 (2 feet);
- Chromium was detected in all 21 samples at concentrations ranging from 2.2 mg/kg at sample location HRG-17 (1-3 feet) to 18.0 mg/kg at sample location SS-38 (1-3 feet);
- Lead was detected in all 28 samples at concentrations ranging from 2.93 mg/kg at sample location SS-39 (2 feet) to 6,870 mg/kg at sample location SB-360 (5 feet);
- Mercury was detected in 11 out of 15 samples at concentrations ranging from 0.016 mg/kg at sample location SB-360 (8 feet) to 0.654 mg/kg at sample location SS-40 (2 feet);
- Nickel was detected all 12 samples at concentrations ranging from 2.23 mg/kg at sample location SS-39 (2 feet) to 21.5 mg/kg at sample location SB-360 (5 feet);
- Vanadium was detected in nine out of 12 samples at concentrations ranging from 7.92 mg/kg at sample location SS-41 (0.5 feet) to 49.4 mg/kg at sample location SB-360 (5 feet); and
- Zinc was detected in all 12 samples at concentrations ranging from 8.18 mg/kg at sample location SS-39 (2 feet) to 506 mg/kg at sample location SS-40 (2 feet).

Exposure Point Area HS-4: Gym Area

Samples were collected and analyzed for various parameters from 58 borings as part of the investigation activities in EP HS-4. A summary of analytical results is included in Table 2-4.

The following is a summary of Site impacts in EP HS-4 subsequent to performing the remedial activities identified in Section 2.3.2. :

- Total PCBs as Aroclors were detected in 39 out of 72 samples at concentrations ranging from 0.0615 mg/kg at sample location HG-31 (1-3 feet) to 12.0 mg/kg at sample location HF-40 (3-5 feet);
- Total PCBs as congeners were detected in all four samples taken at concentrations ranging from 0.0243 mg/kg at sample location SB-365 (0-1 feet) to 0.386 mg/kg at sample location SB-365(1-3 feet);
- Benzo(a)pyrene was detected in eight out of 22 samples at concentrations ranging from 0.271 mg/kg at sample location SB-267 (1 feet) to 13.0 mg/kg at sample location HF-40 (3-5 feet);
- Antimony was detected in one out of 13 samples at a concentration of 7.1 mg/kg at sample location HF-40 (3-5 feet);
- Arsenic was detected in 16 out of 24 samples at concentrations ranging from 2.2 mg/kg at sample location VSS-12 (0-0.5 feet) to 53.4 mg/kg at sample location SB-365 (3-5 feet);
- Barium was detected in all 24 samples at concentrations ranging from 7.95 mg/kg at sample location SB-267 (9 feet) to 1,127.5 mg/kg at sample location SB-365 (5-7 feet);
- Cadmium was detected 28 out of 66 samples at concentrations ranging from of 0.30 mg/kg at sample location HG-40G (1-3 feet) to 8.78 mg/kg at sample location NBHS-1 (8 feet);
- Chromium was detected in all 24 samples at concentrations ranging from 2.04 mg/kg at sample location SB-365 (1-3 feet) to 154 mg/kg at sample location NBHS-1 (8 feet);
- Lead was detected in all 68 samples at concentrations ranging from 3.05 mg/kg at sample location SB-365 (1-3 feet) to 2,780 mg/kg at sample location NBHS-1 (8 feet);
- Mercury was detected in 18 out of 22 samples at concentrations ranging from 0.040 mg/kg at sample location SS-46 (0-0.5 feet) to 0.632 mg/kg at sample location SB-365 (5-7 feet);
- Nickel was detected all 16 samples at concentrations ranging from 2.28 mg/kg at sample location SS-44 (0-0.5 feet) to 173 mg/kg at sample location NBHS-1 (8 feet);
- Vanadium was detected in 12 out of 16 samples at concentrations ranging from 9.87 mg/kg at sample location SB-365 (0-1 feet) to 219 mg/kg at sample location SB-365 (5-7 feet); and
- Zinc was detected in all 16 samples at concentrations ranging from 14.1 mg/kg at sample location SB-267 (9 feet) to 1,670 mg/kg at sample location NBHS-1 (8 feet).

Exposure Point Area HS-5: Flag Pole Area

Samples were collected and analyzed for various parameters from 28 borings as part of the investigation activities in EP HS-5. . A summary of analytical results is included in Table 2-5.

The following is a summary of Site impacts in EP HS-5 subsequent to performing the remedial activities identified in Section 2.3.2:

- Total PCBs as Aroclors were detected in all four at concentrations ranging from 0.133 mg/kg at sample location SS-13-K (0.5-4 feet) to 4.87 mg/kg at sample location SS-13-AO (1-4 feet);
- Benzo(a)pyrene was detected in all five samples at concentrations ranging from 0.95 mg/kg at sample location COMP SS-13-AG, AK, AO, AR (0.5-4 feet) to 11.0 mg/kg at sample location COMP SS-13-Q,R,C,D (1-4 feet);
- Arsenic was detected in all 5 samples at concentrations ranging from 6.0 mg/kg at sample location COMP SS-13-Q,R,C,D (1-4 feet) to 31.0 mg/kg at sample location COMP SS-13-A,F,S,T (0.5-4 feet);
- Barium was detected in all 5 samples at concentrations ranging from 120 mg/kg at sample location COMP SS-13-Q,R,C,D (1-4 feet) to 310 mg/kg at sample location COMP SS-13-AQ,AM,AN,AJ, AL (1-4 feet);
- Cadmium was detected all five samples at concentrations ranging from of 1.0 mg/kg at sample location COMP SS-13-Q,R,C,D (1-4 feet) to 2.4 mg/kg at sample location COMP SS-13-A,F,S,T (0.5-4 feet);
- Chromium was detected in all five samples at concentrations ranging from 8.9 mg/kg at sample location COMP SS-13-Q,R,C,D (1-4 feet) to 32.0 mg/kg at sample location COMP SS-13-AW,AX,AY,AZ (0.5-4 feet);
- Lead was detected in all nine samples at concentrations ranging from 72.0 mg/kg at sample location SS-13-K (0.5-4 feet) to 1,800 mg/kg at sample location SS-13-AN (1-4 feet); and
- Mercury was detected in all five samples at concentrations ranging from 0.32 mg/kg at sample location COMP SS-13-Q,R,C,D (1-4 feet) to 0.95 mg/kg at sample location COMP SS-13-AQ, AM, AN, AJ, AL (1-4 feet).

Exposure Point Area HS-6: House Area

Samples were collected and analyzed for various parameters from 75 borings as part of the investigation activities in EP HS-6. . A summary of analytical results is included in Table 2-6.

The following is a summary of Site impacts in EP HS-6 subsequent to performing the remedial activities identified in Section 2.3.2:

- Total PCBs as Aroclors were detected in 24 out of 35 samples at concentrations ranging from 0.0702 mg/kg at sample location HH-30A (1-3 feet) to 23.07 mg/kg at sample location HH-13E (1-3 feet);
- Total PCBs as congeners were detected in all three samples taken at concentrations ranging from 1.02 mg/kg at sample location SS-52 (0-1 feet) to 1.41 mg/kg at sample location SS-52 (1-3 feet);

- Benzo(a)pyrene was detected in nine out of 26 samples at concentrations ranging from 0.366 mg/kg at sample location HF-14B (1-3 feet) to 23.07 mg/kg at sample location HH-13E (1-3 feet);
- Arsenic was detected in 16 out of 36 samples at concentrations ranging from 1.18 mg/kg at sample location VSS-5 (0-0.5 feet) to 31.5 mg/kg at sample location HH-13J (1-3 feet);
- Barium was detected in all 38 samples at concentrations ranging from 6.42 mg/kg at sample location SB-361 (1-3 feet) to 12,800 mg/kg at sample location HH-13J (1-3 feet);
- Cadmium was detected 17 out of 38 samples at concentrations ranging from of 0.29 mg/kg at sample location HD-20F (1-3 feet) to 13.3 mg/kg at sample location HH-13J (1-3 feet);
- Chromium was detected in all 37 samples at concentrations ranging from 1.68 mg/kg at sample location SB-361 (1-3 feet) to 7,800 mg/kg at sample location HH-13E (1-3 feet);
- Lead was detected in all 37 samples at concentrations ranging from 1.75 mg/kg at sample location HRG-14A (1-3 feet) to 2,070 mg/kg at sample location HH-13J (1-3 feet);
- Mercury was detected in 11 out of 15 samples at concentrations ranging from 0.016 mg/kg at sample location SB-361 (0-1 feet) to 0.34 mg/kg at sample location HF-14 (3-4 feet);
- Nickel was detected all 12 samples at concentrations ranging from 1.52 mg/kg at sample location HD-19B (1-3 feet) to 49.0 mg/kg at sample location HF-14 (3-4 feet);
- Vanadium was detected in eight out of 12 samples at concentrations ranging from 9.82 mg/kg at sample location SS-52 (0-0.5 feet) to 210 mg/kg at sample location HF-14 (3-4 feet); and
- Zinc was detected in all 12 samples at concentrations ranging from 6.73 mg/kg at sample location SB-361 (1-3 feet) to 360 mg/kg at sample location HF-14 (3-4 feet).

Exposure Point Area HS-7: Hang-Out Area

Samples were collected and analyzed for various parameters from 13 borings as part of the investigation activities in EP HS-7. A summary of analytical results, included in Table 2-7, supports that no remedial activities were warranted at EP HS-7.

The following is a summary of Site impacts in EP HS-7:

- Total PCBs as Aroclors were detected in nine out of 16 samples at concentrations ranging from 0.0904 mg/kg at sample location SB-362 (1-3 feet) to 0.509 mg/kg at sample location SB-362 (0-1 feet);
- Total PCBs as congeners were detected in the two samples taken at concentrations of 0.276 mg/kg at sample location SB-362 (1-3 feet) to 0.776 mg/kg at sample location SB-362 (0-1 feet);
- Benzo(a)pyrene was detected in three out of 12 samples at concentrations ranging from 0.215 mg/kg at sample location SB-362 (5 feet) to 0.348 mg/kg at sample location SB-362 (0-1 feet);

- Arsenic was detected in 13 out of 15 samples at concentrations ranging from 0.87 mg/kg at composite sample HO2.5+HO3 (0.5-1.5 feet) to 12.6 mg/kg at sample location SB-362 (6.5 feet);
- Barium was detected in all 15 samples at concentrations ranging from 8.77 mg/kg at sample location SB-363 (5 feet) to 271 mg/kg at sample location SB-362 (1-3 feet);
- Cadmium was detected nine out of 15 samples at concentrations ranging from of 0.33 mg/kg at sample location SS-54 (0-0.5 feet) to 5.77 mg/kg at sample location SB-362 (6.5 feet);
- Chromium was detected in all 15 samples at concentrations ranging from 3.63 mg/kg at sample location SB-363 (5 feet) to 47.7 mg/kg at sample location SB-362 (6.5 feet);
- Lead was detected in all 15 samples at concentrations ranging from 1.0 mg/kg at sample location SB-363 (5 feet) to 487 mg/kg at sample location SB-362 (1-3 feet);
- Mercury was detected in 13 out of 15 samples at concentrations ranging from 0.048 mg/kg at sample location SB-363 (1-3 feet) to 0.213 mg/kg at sample location SB-362 (0-1 feet);
- Nickel was detected all 12 samples at concentrations ranging from 2.36 mg/kg at sample location SB-363 (5 feet) to 40.3 mg/kg at sample location SB-362 (6.5 feet);
- Vanadium was detected in all 12 samples at concentrations ranging from 5.62 mg/kg at sample location SB-363 (5 feet) to 25.1 mg/kg at sample location SB-362 (1-3 feet); and
- Zinc was detected in all 12 samples at concentrations ranging from 7.66 mg/kg at sample location SB-363 (5 feet) to 703 mg/kg at sample location SB-362 (6.5 feet).

Exposure Point Area HS-8: Fenced Solar Park Area

Samples were collected and analyzed for various parameters from 90 borings as part of the investigation activities in EP HS-8. . A summary of analytical results is included in Table 2-8.

The following is a summary of Site impacts in EP HS-8 subsequent to performing the remedial activities identified in Section 2.3.2:

- Total PCBs as Aroclors were detected in 74 out of 84 samples at concentrations ranging from 0.12 mg/kg at sample location HG2 (0-1 feet) to 19.8 mg/kg at sample location HG2.5 (1-3 feet);
- Benzo(a)pyrene was detected in 19 out of 24 samples at concentrations ranging from 0.22 mg/kg at sample location HG2.5 (0-2 feet) to 133 mg/kg at sample location HF-10B (1-3 feet);
- Arsenic was detected in 38 out of 44 samples at concentrations ranging from 0.56 mg/kg at sample location HJ2.5 (0-2 feet) to 59.8 mg/kg at sample location SB-350 (5 feet);
- Barium was detected in all 44 samples at concentrations ranging from 19.3 mg/kg at sample location SB-350 (8 feet) to 7,430 mg/kg at sample location SB-350 (5 feet);
- Cadmium was detected 43 out of 50 samples at concentrations ranging from of 0.44 mg/kg at sample location SS-62 (0-0.5 feet) to 29.3 mg/kg at sample location HF-10B (1-3 feet);

- Chromium was detected in all 50 samples at concentrations ranging from 7.03 mg/kg at sample location VSS-2 (0-0.5 feet) to 1,370 mg/kg at sample location SB-350 (5 feet);
- Lead was detected in all 50 samples at concentrations ranging from 3.83 mg/kg at sample location SB-350 (8 feet) to 16,100 mg/kg at sample location HF-10B (1-3 feet);
- Mercury was detected in 38 out of 42 samples at concentrations ranging from 0.027 mg/kg at sample location SS-58 (0-0.5 feet) to 17.0 mg/kg at composite sample HG7+HH7 (0.75-3 feet);
- Nickel was detected all 10 samples at concentrations ranging from 4.25 mg/kg at sample location SS-59 (0-0.5 feet) to 167 mg/kg at sample location SB-350 (5 feet);
- Vanadium was detected in all 10 samples at concentrations ranging from 9.23 mg/kg at sample location SB-350 (8 feet) to 602 mg/kg at sample location SB-350 (5 feet); and
- Zinc was detected in all 10 samples at concentrations ranging from 19.6 mg/kg at sample location SB-350 (8 feet) to 1,300 mg/kg at sample location SB-350 (5 feet).

Exposure Point Area HS-9: Beneath Pavement/Building Area

Samples were collected and analyzed for various parameters from 147 borings as part of the investigation activities in EP HS-9. . A summary of analytical results is included in Table 2-9.

The following is a summary of Site impacts in EP HS-9 subsequent to performing the remedial activities identified in Section 2.3.2:

- Total PCBs as Aroclors were detected in 95 out of 173 samples at concentrations ranging from 0.0436 mg/kg at sample location SS-13-O (1-4 feet) to 40.0 mg/kg at sample location HRC-33 (0.67-2 feet);
- Total PCBs as congeners were detected in the two samples taken at concentrations of 0.468 mg/kg at sample location HB-26 (1-3 feet) to 16.6 mg/kg at sample location HB-26 (3-5 feet);
- Benzo(a)pyrene was detected in 21 out of 26 samples at concentrations ranging from 0.532 mg/kg at sample location SB-364 (9.5 feet) to 30.0 mg/kg in composite sample HC16+HC15+HC14 (1.5-3 feet);
- Antimony was detected in 1 out of 46 samples at a concentration of 226 mg/kg at sample location SB-285 (3.5 feet);
- Arsenic was detected in 57 out of 88 samples at concentrations ranging from 1.52 mg/kg at sample location VSS-3 (1-2 feet) to 94.0 mg/kg in composite sample HD13+HD14+HD15 (1.5-3 feet);
- Barium was detected in 83 out of 88 samples at concentrations ranging from 5.9 mg/kg at sample location SB-312 (5 feet) to 15,400 mg/kg in composite sample HC16+HC15+HC14 (1.5-3 feet);
- Cadmium was detected 55 out of 90 samples at concentrations ranging from of 0.46 mg/kg at sample location HB-26 (1-3 feet) to 84.3 mg/kg at sample location SB-287 (4 feet);

- Chromium was detected in 87 out of 88 samples at concentrations ranging from 1.61 mg/kg at sample location HRC-33M (1-3 feet) to 2,050 mg/kg in composite sample HD13+HD14+HD15 (1.5-3 feet);
- Lead was detected in 124 out of 125 samples at concentrations ranging from 2.01 mg/kg at sample location SB-296 (10 feet) to 11,000 mg/kg in composite sample HD13+HD14+HD15 (1.5-3 feet);
- Mercury was detected in 56 out of 85 samples at concentrations ranging from 0.018 mg/kg at sample location NBHS-7 (3 feet) to 76.0 mg/kg in composite sample COMP SS-13-E,L,K,B (0.5-4 feet);
- Nickel was detected 65 out of 69 samples at concentrations ranging from 1.2 mg/kg at sample location SB-307 (9 feet) to 113 mg/kg at sample location SB-274 (4 feet);
- Vanadium was detected in 41 out of 69 samples at concentrations ranging from 5.53 mg/kg at sample location SB-312 (9 feet) to 311 mg/kg at sample location SB-285 (3.5 feet); and
- Zinc was detected in all 69 samples at concentrations ranging from 7.34 mg/kg at sample location SB-349 (14 feet) to 4,500 mg/kg at sample location SB-293 (9 feet).

Exposure Point Area HS-10: Tree Belts

Samples were collected and analyzed for various parameters from 164 borings as part of the investigation activities in EP HS-10. A summary of analytical results is included in Table 2-10.

The following is a summary of Site impacts in EP HS-10 subsequent to performing the remedial activities identified in Section 2.3.2:

- Total PCBs as Aroclors were detected in 59 out of 100 samples at concentrations ranging from 0.0635 mg/kg at sample location SB-359 (0-1 feet) to 20.0 mg/kg at sample location TREE-TI-3 (0-1 feet);
- Total PCBs as congeners were detected in four out of five samples taken at concentrations ranging from 0.0055 mg/kg at sample location SB-359 (1-3 feet) to 0.261 mg/kg at sample location HA-33/34 (0-1 feet);
- Benzo(a)pyrene was detected in 15 out of 39 samples at concentrations ranging from 0.276 mg/kg at sample location SB-359 (0-1 feet) to 8.37 mg/kg at sample location HRO-30 (1-3 feet);
- Arsenic was detected in 39 out of 71 samples at concentrations ranging from 2.15 mg/kg at sample location HA-43+HA44 (0.75-3 feet) to 195 mg/kg at sample location SB-359 (8 feet);
- Barium was detected in 71 out of 73 samples at concentrations ranging from 5.5 mg/kg at sample location SB-02 (3 feet) to 7,000 mg/kg at sample location TREE-TI-3 (1-3 feet);
- Cadmium was detected 39 out of 73 samples at concentrations ranging from of 0.27 mg/kg at sample location TREE-HS-1 (0-1 feet) to 15.0 mg/kg at sample location HB-23 E/N/W (1-3 feet);

- Chromium was detected in all 73 samples at concentrations ranging from 2.1 mg/kg at sample location TREE-TI-1 (1-3 feet) to 770 mg/kg at sample location HB-23 E/N/W (1-3 feet);
- Lead was detected in all 78 samples at concentrations ranging from 2.18 mg/kg at sample location SB-359 (12 feet) to 3,000 mg/kg at sample location TREE-TI-3 (1-3 feet);
- Mercury was detected in 21 out of 35 samples at concentrations ranging from 0.014 mg/kg at sample location SB-359 (12 feet) to 0.959 mg/kg at sample location SB-359 (4 feet);
- Nickel was detected all 26 samples at concentrations ranging from 2.16 mg/kg at sample location SB-05 (8 feet) to 94.1 mg/kg at sample location SB-359 (8 feet);
- Vanadium was detected in 17 out of 26 samples at concentrations ranging from 5.32 mg/kg at sample location SB-01 (1 feet) to 94.1 mg/kg at sample location SB-359 (8 feet); and
- Zinc was detected in all 26 samples at concentrations ranging from 9.35 mg/kg at sample location SB-05 (8 feet) to 2,980 mg/kg at sample location SB-369 (8 feet).

Dioxin-like Compounds. Thirty-seven samples were collected and analyzed for dioxin-like compounds from 22 borings as part of the investigation activities throughout the Site. The following is a discussion of the Site impacts subsequent to performing the remedial activities identified in Section 2.3.2. A summary of analytical results is included in Table 2-11.

Dioxin-like compounds, expressed as the contribution of total TEQs, were detected in all 30 samples at concentrations ranging from 3.1E-07 at sample location PG-6 (0-1 feet) to 1.9E-04 at sample location HG-2 (1-3 feet).

2.3.3.1 Groundwater

Groundwater was analyzed at the Site for VOCs, PAHs, PCBs, and total and dissolved MCP Metals. All concentrations were below the MCP Method 1 GW-2/GW-3 groundwater standards for PAHs and PCBs.

The analytical results for the groundwater samples did not include the detection of any MCP metals or mercury at concentrations exceeding their MCP Method 1 groundwater standards for the GW-3 category, with the exception of the detection of total lead in MW-5 at 19.2 µg/L, and MW-HRC-33 at 10.5 µg/L, which exceeds the GW-3 standard of 10 µg/L. The analytical results for dissolved lead at MW-5 and MW-HRC-33 did not indicate the presence of lead above the laboratory reporting limit of 8.0 µg/L and 7.5 µg/L, respectively. Lead was not detected above the laboratory reporting limit for any other groundwater sample submitted at the Site. The detection of lead in groundwater monitoring well MW-5 and MW-HRC-33 is most likely attributable to the lead being adsorbed to, or contained in, particulates in the groundwater sample given that lead was undetected in the dissolved metals sample.

The discussion of groundwater VOC data excludes data related to the IRA activities tracked under RTN 4-22409 in the vicinity of the Mechanical Room. All VOC concentrations were below the applicable MCP Method 1 standards for all monitoring wells with the exception of trichloroethene (TCE) which exceeded applicable MCP Method 1 GW-2 standards in groundwater samples in one

Site monitoring well (MW-5) during one sampling round in February 2012. The monitoring well (MW-5) was sampled a total of eleven times between January 2010 and December 2012 with TCE detected at concentrations ranging from 1.8 µg/L to 5.3 µg/L.

The discussion of groundwater VOC data excludes data related to the IRA activities tracked under RTN 4-22409 in the vicinity of the Mechanical Room. VOC concentrations in monitoring wells located outside the Mechanical Room area were below the applicable MCP Method 1 standards with the exception of trichloroethene (TCE) which exceeded applicable MCP Method 1 GW-2 standards in a groundwater sample in one monitoring well (MW-5) during one sampling round in February 2012 (5.3 ug/L). The monitoring well (MW-5) was sampled a total of eleven times between January 2010 and December 2012 with TCE detected at concentrations ranging from 1.8 µg/L to 5.3 µg/L. Based on a temporal average concentration for monitoring well MW-5 for TCE, MCP Method 1 GW-2 standards are not exceeded within 30 feet of the NBHS building. In addition, groundwater VOC concentrations measured in monitoring wells located greater than 30 feet but less than 100 feet from the NBHS building (i.e., monitoring wells MW-7 and MW-24 currently classified within the MCP GW-3 category) do not exceed 10 times the MCP Method 1 GW-2 standards. LNAPL has not been encountered in any of the monitoring wells, and, as previously discussed, no preferential pathways for VOC migration exist from the VOC-impacted groundwater to the NBHS building.

Based on these findings, no evaluation of the vapor intrusion pathway is currently indicated. No expansion of or addition to the NBHS building footprint is reasonably anticipated in the foreseeable future. However, should such changes be contemplated in the future, particularly in the vicinity of MW-7 and/or MW-24, groundwater conditions and the need for vapor mitigation to protect the health of building occupants would require re-evaluation.

The locations of monitoring wells sampled are presented on Figure 2. Groundwater sampling results are presented on Table 2-11.

2.4 Elimination or Control of OHM Sources and Control of OHM Subsurface Migration – 310 CMR 40.1056(2)(c) and 310 CMR 40.1056(2)(d)

As discussed in Section 3, the response actions have successfully reduced OHM concentrations at the Site resulting in the achievement of a Condition of No Significant Risk in the top three feet of soil. An AUL is used to achieve a Condition of No Significant Risk below three feet of soil. A Permanent Solution with Conditions is applicable for closeout of RTN 4-15685 at the Site.

2.5 Elimination of Non Aqueous Phase Liquid (NAPL) Assessment and Control – 310 CMR 40.1056(2)(e)

There is no NAPL present at the Site nor has it been present at the Site. A Permanent Solution with Conditions is applicable for RTN 4-15685 at the Site.

2.6 Achievement of Level of No Significant Risk – 310 CMR 40.1056(2)(f)

As discussed in detail in Section 3.0, the response actions have successfully reduced the HIs to less than 1 and ELCRs to less than 1.0E-05, resulting in the achievement of a Condition of No Significant Risk in the top three feet of soil in unpaved areas. An AUL is used to achieve a Condition of No Significant Risk below three feet of soil and below paved areas where impacted soils are present at shallower depths.

2.7 Achievement of Background – 310 CMR 40.1056(2)(g)

A Partial Permanent Solution with Conditions has been achieved for the Site. A Permanent Solution has been achieved and the response actions have achieved of a Condition of No Significant Risk in the top three feet of soil in unpaved areas. An AUL is used to achieve a Condition of No Significant Risk below three feet of soil and below paved areas where impacted soils are present at shallower depths. The benefit of additional remedial actions to achieve or approach background would be considered insufficient to justify the cost of those actions. Therefore, additional remedial activity is not warranted and would be substantial and disproportionate to the net gain in risk reduction, especially in a situation where No Significant Risk has been achieved. A Permanent Solution with Conditions is applicable for RTN 4-15685 at the Site.

Please see additional discussion concerning the feasibility of achieving background in Section 4.0.

2.8 Activity and Use Limitations – 310 CMR 40.1056(2)(h)

AUL conditions are included in Appendix B.

2.9 Upper Concentration Limits – 310 CMR 40.1056(2)(i)

No EPCs associated with RTN 4-15685 exceed MCP UCLs. A Permanent Solution with Conditions has been achieved for RTN 4-15685 at the Site.

2.10 Activity and Use Limitation Documentation – 310 CMR 40.1056(2)(j)

An AUL is required to maintain a Condition of No Significant Risk. A Permanent Solution with Conditions has been achieved for RTN 4-15685 at the Site. Included in Appendix B is a copy of the AUL certified by the registry of deeds office which has been implemented under 310 CMR 40.1070.

2.11 Data Usability Documentation – 310 CMR 40.1056(2)(k)

A Data Usability Assessment documenting that the data relied upon is scientifically valid and defensible, and of a sufficient level of precision, accuracy, and completeness to support the Permanent Solution, and a Data Representativeness Evaluation, documenting the adequacy of the spatial and temporal data sets to support the Permanent Solution are included in Section 4.0.

2.12 Operation, Maintenance, and Monitoring – 310 CMR 40.1056(2)(l)

Operation and maintenance is not necessary to maintain a Condition of No Significant Risk. A Permanent Solution with Conditions has been achieved for RTN 4-15685 at the Site.

3.0 RISK CHARACTERIZATION

This section was prepared per 310 CMR 40.0900 through 40.0996 of the MCP and Appendix F of the MassDEP *Guidance for Disposal Site Risk Characterization* (MassDEP, 1995) and provides a risk characterization for the Site. The risk characterization, which addresses human and environmental receptors reasonably expected to be at and near the Site, evaluates soil and groundwater environmental data collected on the NBHS campus, but does not consider data collected within the vicinity of the Mechanical Room, which relates to a separate release and RTN. As discussed herein, a Method 3 approach was selected to characterize risk at the campus and to demonstrate that the Site meets the definition of No Significant Risk, currently and in the future, as long as an AUL is placed on the property.

Supporting information applicable to the risk characterization is contained in Appendix C of this report as follows: Appendix C-1 (Medium-Specific Sampling Data), Appendix C-2 (Summary Statistics for Soil and Groundwater Samples), Appendix C-3 (ProUCL Documentation for 95% Upper Confidence Limits), Appendix C-4 (Trench Air Modeling), Appendix C-5 (Risk and Hazard Calculations for the 0 to 1 Foot Soil Interval), Appendix C-6 (Risk and Hazard Calculations for the 0 to 3 Foot Soil Interval), Appendix C-7 (Risk and Hazard Calculations for the 0 to 6 Foot Soil Interval), Appendix C-8 (Risk and Hazard Calculations for the 0 to 15 Foot Soil Interval), Appendix C-9 (Risk and Hazard Calculations for Groundwater) and Appendix C-10 (Risk Summary Tables).

3.1 Adequacy of Site Characterization

3.1.1 Impacted Media

At the Site, environmental media known to be impacted include soil and groundwater. As described in Section 2.0, soil and groundwater impacts were evaluated during environmental investigations conducted VHB in 2001, by BETA between 2004 and 2006 (soil only), and by TRC between 2008 and 2014 (soil and groundwater). Groundwater data collected for the Site between 2008 and 2014 from outside the Mechanical Room area of the NBHS building were considered in the Method 3 risk characterization. Soil data collected to define nature and extent of potential Site impacts as well as post-excavation soil samples were used in this risk characterization. Data from soil sampling locations that were excavated and disposed off-site have not been used in the risk characterization.

The vapor intrusion pathway is not considered to be a currently complete exposure pathway. The primary soil contaminants are largely non-volatile in nature. Volatile or semi-volatile compounds have been detected in soil only sporadically and at trace concentrations (i.e., significantly below standards and consistent with laboratory reporting limits). No groundwater VOC results have been detected greater than the MCP Method 1 GW-2 groundwater standards in groundwater located beneath or within 30 feet of the NBHS building (exclusive of the Mechanical Room area, addressed in a separate RTN), except for a single detection of TCE (5.3 µg/L) in MW-5 in February 2012 that slightly exceeded its GW-2 standard of 5 µg/L. This well was sampled 11 times for VOCs between January 2010 and December 2012. TCE was detected in 6 of those sampling events at a range of detected concentrations between 1.8 µg/L and 5.3 µg/L, and an arithmetic mean

concentration of 2 µg/L, indicating that TCE in monitoring well MW-5 is not serving as a significant continuous source of impacts to the NBHS building. Therefore, the vapor intrusion pathway has not been quantitatively evaluated in the risk characterization.

3.1.1.1 Soil

Impacts detected in soils at the Site include PCBs, dioxin/PCB TEQs, petroleum hydrocarbons, metals (antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, vanadium, and zinc), and various PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene), as described in Section 2.0.

Tables summarizing the results of laboratory analyses for soil samples collected at the Site are provided in Tables 2-1 through Table 2-11 of this report. Appendix C-1, Tables C-1.1 through C-1.10 present the soil data sets used for the risk characterization.

3.1.1.2 Groundwater

Impacts detected in groundwater at the Site include the PAH, phenanthrene, PCBs and metals. VOC impacts were also detected in Site groundwater, related to migration from the Mechanical Room area. As discussed in Section 2.0, VOC concentrations were below the MCP Method 1 GW-2 and GW-3 standards for all other Site-related monitoring wells with the exception of TCE which exceeded its applicable MCP Method 1 GW-2 standard in groundwater samples from one monitoring well (MW-5) during one sampling round in February 2012. The monitoring well (MW-5) was sampled a total of eleven times between January 2010 and December 2012 with TCE detected at concentrations ranging from 1.8 µg/L to 5.3 µg/L. In addition, detections of total lead above MCP Method 1 GW-3 standards are attributable to the lead being adsorbed to, or contained in, particulates in the groundwater sample (i.e., turbidity), and not likely to be dissolved phase lead.

Table 2-12 summarizes the results of laboratory analyses for groundwater samples collected at the Site. Appendix C-1, Table C-1.12 presents the groundwater data set used for the risk characterization.

3.1.2 Extent of Impacts

The nature and extent analysis is provided in Section 2.0. The nature and extent has been sufficiently delineated to support conclusions and opinions regarding the source, nature, extent, and post-excavation residual impacts at the Site and to support Site closure.

3.1.2.1 Horizontal and Vertical Extent

The horizontal and vertical extent of soil impacts are described in Section 2.0. In general, the horizontal and vertical extents of PAHs, metals, and PCBs in soil at the Site are generally consistent with the presence of fill-related material. The horizontal and vertical extents of soil impacts have been characterized via laboratory analysis and field screening (visual, olfactory, jar

headspace, and professional judgment). For soil from the 0 to 1 foot horizon, data indicate that the surficial soils were comparatively less impacted or un-impacted.

The horizontal and vertical extent of groundwater impacts for PAHs, PCBs and metals are described in Section 2.0. In general, the lack of groundwater impacts from the impacts associated with fill (PAHs, PCBs, metals) is consistent with the contaminant properties, namely the high sorption potential and limited potential to leach, and/or low solubility of the chemicals.

3.1.2.2 Background Concentrations

Site-specific background concentrations were not characterized in soil and groundwater.

For the purposes of this risk characterization, background concentrations for VOCs, PCBs, SVOCs (other than PAHs), pesticides and herbicides are considered to be non-detect. Background concentrations for petroleum-related compounds (e.g., TPH, gasoline range organics [GRO] and diesel range organics [DRO]) are also considered to be non-detect.

Even though the presence of fill containing coal, coal ash or wood ash is present at the Site, background concentrations of metals and PAHs selected for use in the risk characterization are MassDEP "Natural Soil" background concentrations as presented in the *Technical Update Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil* (MassDEP, 2002).

3.1.3 Chemicals of Potential Concern

Chemicals of Potential Concern (COPCs) for the risk characterization were identified by: a) screening concentrations against - available background values, b) eliminating results with low detection frequencies, and c) eliminating those results that are considered laboratory contaminants and not related to potential site impacts. In addition, contaminants that were not reported above laboratory reporting limits were also removed from further consideration as COPCs. Chemicals eliminated from the list of soil COPCs based on the comparison of detected concentrations to the MassDEP native soil background concentrations are provided in Appendix C-2, Tables C-2.1 through C-2.37. All chemicals detected in groundwater and summarized in Appendix C-2, Table C-2.38 (site-wide shallow groundwater) were considered COPCs, even if present below MCP standards.

The following table summarizes the COPCs at the Site and the media in which they were detected.

Chemicals of Potential Concern	
Chemicals	**Affected Media**
Benzene	Soil
cis-1,2-Dichloroethene	Groundwater
p-Isopropyltoluene	Soil and Groundwater
Tetrachloroethene	Groundwater
Toluene	Soil
1,2,3-Trichlorobenzene	Soil
1,2,4-Trichlorobenzene	Soil

Chemicals of Potential Concern	
Chemicals	**Affected Media**
Trichloroethene	Groundwater
Trimethylbenzene isomers	Soil
Vinyl chloride	Groundwater
GRO/DRO	Soil
C9-C10 Aromatics	Soil
C9-C12 Aliphatics	Soil
C11-C22 Aromatics	Soil
C19-C36 Aliphatics	Soil
Polycyclic Aromatic Hydrocarbons	Soil and Groundwater
Polychlorinated Biphenyls	Soil and Groundwater
Dioxin Total TEQs	Soil
4-Bromophenyl phenyl ether	Soil
4-Methylphenol	Soil
Benzoic acid	Soil
bis(2-Ethylhexyl)phthalate	Soil
Butyl benzyl phthalate	Soil
Dimethyl phthalate	Soil
di-n-Butyl phthalate	Soil
Carbazole	Soil
Dibenzofuran	Soil
Antimony	Soil
Arsenic	Soil and Groundwater
Barium	Soil and Groundwater
Beryllium	Soil
Cadmium	Soil
Chromium	Soil and Groundwater
Lead	Soil and Groundwater
Mercury	Soil
Nickel	Soil and Groundwater
Selenium	Soil
Silver	Soil and Groundwater
Vanadium	Soil
Zinc	Soil and Groundwater

3.2 Site Activities and Uses (Current and Foreseeable Future)

3.2.1 Current Uses

The Site is bounded by Hathaway Boulevard, Liberty Street and Parker Street to the west, east and south, respectively. An ice skating rink and isolated wetland area, located along Durfee Street, exist along the northern boundary of the NBHS property. There are numerous paved parking areas, roadways, and sidewalks/paths throughout the campus. The NBHS building is comprised of three main buildings: (1) the gym; (2) the auditorium; and (3) the "Houses". The gym building is located at the southern end of the campus. The grassy area in front (west) of the gym building is also used for outdoor gym classes. Fenced Playing Field Areas (a volley ball court, baseball field,

and basketball and tennis courts) are located to the rear (east) of the gym building. To the north of the gym building is the main entrance to the high school, marked by a flag pole and traffic circle. The auditorium is housed in this central portion of the NBHS building. An unfenced field, used as a practice area, is located to the rear of the auditorium. Further to the north are the classrooms, arranged as a series of four "Houses" around a central core. A day care center operates at the NBHS building each weekday morning between the end of September and early May and uses the Children's Playground Area for outdoor playtime in the rear of the building (east side) when the weather is not inclement. The grassy outdoor areas to the east of the "Houses" are used as a congregating area by the students. The fenced area to the north of the "Houses" has been developed into a solar park. Athletic teams use the fenced and unfenced fields for practices and games between mid-March and late November each year. Playing seasons for most athletic sports are approximately 18 weeks in length, which includes a 13-week season plus 5 weeks for pre-season and post-season play for spring and fall sports. Other non-paved areas of the Site can also be accessed during a similar time frame, before the ground freezes and becomes snow covered.

The only occupied building on the parcels is the NBHS building. However, based on the analysis of groundwater and soil data, the vapor intrusion pathway is incomplete at the NBHS building; the localized area of the Mechanical Room is under separate investigation but is not currently impacting occupied portions of the NBHS building because it is under negative pressure, preventing the migration of VOCs to adjoining occupied spaces. Therefore, no quantitative evaluation of the vapor intrusion pathway has been provided as part of this risk characterization.

The Site is located in a residential area with residential neighborhoods located within walking distance. Current potential child and adult receptors include:

- students (older children and teenagers);
- daycare children (ages 3 to 5);
- teachers and teacher's aides, and coaches;
- parents and other visitors (including young children);
- groundskeepers;
- plant engineers;
- resource officers and outdoor duty officers; and
- solar workers at the fenced solar park.

For the purposes of the current risk characterization and consistent with the previous portions of this report, the Site was divided into the following soil exposure points based on current activities known to be occurring:

- HS-1: Children's Playground Area
- HS-2: Fenced Playing Field Area
- HS-3: Unfenced Playing Field Area
- HS-4: Gym Area

- HS-5: Flag Pole Area
- HS-6: House Area
- HS-7: Student Congregating Area
- HS-8: Fenced Solar Park Area
- HS-9: Beneath Pavement/Building Areas
- HS-10: Tree Belts

Soils within the HS-9 and HS-5 exposure areas were not evaluated for current exposures since soils in these areas are currently inaccessible due to the presence of pavement or have been covered by at least three feet of clean cover material. For all other exposure points, analytical results for 0 to 1 foot interval, 0 to 3 foot interval, 0 to 6 foot interval and 0 to 15 foot interval were combined to generate exposure point concentrations, as data were available.

For EP HS-5, soil analytical data collected primarily characterized the 0 to 4 foot soil interval. Soils in this exposure area were excavated to a depth of at least three feet, indicating that the 0 to 4 foot interval analytical results are representative of soils that have been largely removed from the Site. However, analytical data for some sampling locations were retained as representative of impacts that remain at depths greater than three feet beneath the clean cover material. These sampling data were used to quantify future exposures in the risk characterization.

Soil sampling for polychlorinated dibenzo-p-dioxins (dioxins), polychlorinated dibenzofurans (furans) and dioxin-like PCBs (collectively referred to as dioxin-like compounds or congeners) was conducted by TRC between 2010 and 2014. These data were combined and assessed using a site-wide approach, except for EP HS-8 (the fenced solar park) which was evaluated as a separate exposure point using data collected at sample location HG-2. The sampling locations targeted for the site-wide sampling effort were previously sampled locations that TRC identified as being likely to represent the estimated highest, worst-case concentrations of dioxins, furans, and dioxin-like PCBs present based on a review of all soil data. The site-wide exposure point concentrations for the various soil depth intervals, expressed as the contribution of total TEQs for dioxin-like compounds, were used in conjunction with the depth-specific EPCs calculated for each EP to evaluate cumulative risks and hazards. Site-wide Total TEQ results are presented in Appendix C-1, Table C-1.11. Summary statistics for Total TEQs are presented in Appendix C-2, Tables C-2.35 through C-2.37 for the various depth intervals.

3.2.2 Foreseeable Future Uses

The City has no plans to change the land use of the NBHS parcels in the foreseeable future. Therefore, future receptors are anticipated to be the same as current receptors, with the addition of future construction and utility workers engaging in improvements or repairs at the Site. Construction and utility workers are additionally evaluated for exposures to shallow groundwater. To evaluate future unlimited activities and uses and the need for an AUL, park visitors and residents were also quantitatively evaluated in the risk characterization.

There are no private drinking water wells within 500 feet of the Site and the area is serviced by the municipal water supply system. The local aquifer does not qualify as a GW-1 category groundwater resource and is therefore, highly unlikely to be developed as a potable supply.

All of the exposure points identified (HS-1 through HS-10) were evaluated for future exposures. For each future exposure point, soil analytical results, regardless of depth or location beneath pavement or other barriers, were combined to generate exposure point concentrations which assumes that current exposure barriers are removed in the future and soils, currently at depth, are moved to the surface.

Future construction and utility worker exposures to shallow groundwater were evaluated on a site-wide basis. Monitoring wells that were sampled more than once between 2008 and 2010 were averaged prior to the development of groundwater exposure point concentrations.

3.3 Imminent Hazards

An IH is not present at this Site. This determination is based on a review of criteria for site conditions "deemed to pose" an IH under 310 CMR 40.0321(1) and the criteria for site conditions that "could pose" an IH under 310 CMR 40.0321(2). The results of TRC's review of conditions "deemed to pose" or that "could pose" an IH are set forth below.

3.3.1 Criteria for Releases Deemed to Pose an Imminent Hazard – 310 CMR 40.0321(1)

Site conditions are not known to have resulted in the presence of impacts within buildings, structures, or underground utility conduits at a concentration equal to or greater than 10-percent of the Lower Explosive Limit (LEL), as set forth in 310 CMR 40.0321(1)(a). Neither the City nor TRC have received reports or complaints of persistent odors in ambient or indoor air potentially attributable to potential site impacts.

The chemicals detected at the Site either do not possess reactive or explosive characteristics consistent with 310 CMR 40.0321(1)(b), or the chemicals are not present at concentrations or in situations expected to threaten safety.

Potential impacts detected at the Site do not appear to be related to impacts to a roadway that could endanger public safety as set forth in 310 CMR 40.0321(1)(c).

As further discussed in Section 3.3.2, potential site impacts do not pose a significant risk to human health when present for even a short period of time as specified in 310 CMR 40.0950.

Potential site impacts did not result in immediate and acute adverse impacts to freshwater or saltwater fish populations consistent with 310 CMR 40.0321(1)(e). The Site is not near a fresh or salt water waterway.

3.3.2 Criteria for Release that Could Pose an Imminent Hazard – 310 CMR 40.0321(2)

There are no reports of the potential impacts detected at the Site resulting in detections in a private drinking water supply well at a concentration equal to or greater than ten-times the GW-1 Reportable Concentration (RC) per 310 CMR 40.0321(2)(a); the GW-1 reporting category does not apply to this Site. In addition, no private drinking water supply wells are known to be present within 500 feet of the Site. The Site and surrounding area are supplied potable water by the municipality.

Concentrations within 12 inches of ground surface at the school campus do not exceed IH thresholds listed in 301 CMR 40.0321(2)(b). In addition, per 310 CMR 40.0321(2)(c), long-term risk levels associated with current exposures are less than ten times the Cumulative Receptor Risk Limits in 310 CMR 40.0993(6). Tables C-2.1 through C-2.9 in Appendix C-2 summarize the surficial soil data available for each exposure point area except EP HS-9, where surface soils are covered by pavement or buildings, HS-8, the fenced solar park area, and HS-5, where at least 3 feet of documented compliant cover material is present. For each EP, the presented data are representative of the 0 to 1 foot surface interval as the most applicable to actual exposures occurring at the Site. For all exposure points evaluated, the 0 to 1 foot exposure point concentrations are less than the MCP Method 1 soil standards, except for the site-wide total TEQ. Therefore, Method 3 risk calculations, presented in Appendix C-5, were performed to document that cumulative risks and hazards for the 0 to 1 foot soil interval do not present an IH condition. The assumptions and methods used for these calculations are discussed in detail in Section 3.6.1. Based on these calculations, an IH condition does not exist at the Site. A summary of the cumulative risks and hazards for the 0 to 1 foot soil interval for each applicable human receptor is presented in Appendix C-10, Table C-10.1.

3.4 Groundwater and Soil Categorization

The following sets forth the applicable groundwater and soil categories at the Site. This categorization was prepared consistent with 310 CMR 40.0932, 310 CMR 40.0933, and Table 40.0933(9) of the MCP.

3.4.1 Groundwater Categories

The groundwater categories for this Site were determined pursuant to 310 CMR 40.0932, research of available documentation, and through the use of MassDEP Priority Resources Map (Figure 3). Based on the available information, groundwater categories GW-2 and GW-3 apply to groundwater beneath this Site for the following reasons:

- **GW-2.** Groundwater beneath the Site is located less than 15 feet below ground surface and, in places, is within 30 feet of the existing occupied NBHS buildings. Therefore, specific wells are classified as GW-2 for current land use (see Table C-1.12 in Appendix C-1). Consistent with 310 CMR 40.0923(3)(c) and 310 CMR 40.1013, the GW-2 classification is not considered applicable under future Site conditions for monitoring wells solely classified as GW-3 under current Site conditions because a Permanent Solution with Conditions is anticipated for this Site. Section 2.3.3.1 includes information on the locations

of monitoring wells not currently classified as GW-2, but with GW-2 exceedances that could affect indoor air quality of a future occupied building.

- **GW-3.** All groundwater is thought to eventually discharge to surface water bodies per the MCP (310 CMR 40.0932(2)); therefore, groundwater category 3 (GW-3) is also relevant to the entire Site.

3.4.2 Soil Categories

Consistent with 310 CMR 40.0933(4), the applicability of the MCP soil categories was determined based on consideration of the frequency of Site use, intensity of activities and the accessibility of the soil, as well as human receptor characteristics.

For all areas of the Site except exposure point EP HS-8 (the fenced solar park), current adult frequency of use is determined to be "High" due to the potential for adults to be working full days (8 hours or more) at the Site. Adult intensity of activity is determined to be "High" because much of the Site lacks pavement or other barriers, soil impact is located at depths less than three feet below grade and recreational athletic activities are known to occur at the campus. Because the Site is near residential areas and used as a school with athletic facilities, children are expected to be frequent visitors to the Site under current conditions; therefore, frequency of Site use by children is determined to be "High". The intensity of use by children is also expected to be "High" because the Site is largely unpaved and is heavily used for school-related and recreational activities.

Potentially impacted soil at the Site is present within the 0 to 3 foot depth interval as well as the 3 to 15 foot depth interval (based on field observations and sampling). Potential soil impacts within the top three feet are therefore considered *accessible*, consistent with 310 CMR 40.0933(4)(c)(1), and soil within the 3 to 15 foot interval is considered *potentially accessible*, consistent with 310 CMR 40.0933(4)(c)(2). Potentially impacted soil located beneath paved parking areas, roadways, and buildings is considered *potentially accessible* or *isolated*, dependent on depth.

For the HS-8 exposure point, current adult frequency of use is determined to be "Low" due to the infrequent presence of adult workers at the solar park who are only present on an as-needed basis. Adult intensity of activity is also determined to be "Low" because soil impacts in this area are covered by six inches of crushed stone as an exposure barrier and no intrusive activities occur. Because this area is fenced, children are expected to be absent from the Site under current conditions; therefore, frequency of use by children is determined to be "Low". The intensity of use by children is also expected to be "Low" due to the presence of the gravel exposure barrier.

Based on the above-summarized information, and Table 40.0933(9) of the MCP, soil categories S-1, S-2 and S-3 currently apply to soil at the NBHS campus. Soil categories S-2 and S-3 currently apply to the soil at the HS-8 exposure point. Soil category S-1 is applicable to the future unlimited use evaluation.

3.5 Hazard Identification

For the Hazard Identification, soil and groundwater analytical data were reviewed to identify COPCs, as presented in Appendix C-2, Tables C-2.1 through C-2.38.

Soil and groundwater analytical data collected at the Site between 2004 and 2014 have been considered as part of this Method 3 risk characterization. These data are discussed in Section 2.0.

Data for soil samples used in the risk characterization are presented in Appendix C-1, Tables C-1.1 through C-1.11. Summary statistics for the exposure points are presented in Appendix C-2, Tables C-2.1 through C-2.8 for the 0 to 1 foot soil interval, Tables C-2.9 through C-2.16 for the 0 to 3 foot interval, Tables C-2.17 through C-2.24 for the 0 to 6 foot interval, and Tables C-2.25 through C-2.34 for the 0 to 15 foot interval. The 0 to 1 foot and 0 to 3 feet soil interval data were used to evaluate current exposures. The 0 to 6 foot interval data were only used to assess utility worker exposures. The 0 to 15 feet soil interval data were used to evaluate the future scenarios. Site-wide shallow groundwater data are presented in Appendix C-1, Table C-1.12 and summarized in Appendix C-2, Table C-2.38.

Because multiple rounds of groundwater data were collected from most monitoring wells (see Table 2-12), available groundwater data for each monitoring well were temporally averaged to account for seasonal variability, if applicable. Temporal averages are presented on Tables C-1.12 in Appendix C-1 and Tables C-2.38 in Appendix C-2. These data were used for the evaluation of direct contact excavation worker exposures. For compounds detected in multiple analyses (e.g., naphthalene detected in VPH, EPH, VOC and/or SVOC analyses), the analysis that resulted in the more conservative EPC (i.e., the higher result, which is more health protective) was quantitatively evaluated.

3.5.1 Hot Spot Evaluation

Soil data from the exposure points were evaluated for the presence of hot spots. Groundwater data were not evaluated for the presence of hot spots because maximum temporal average concentrations of the groundwater data set were used as exposure point concentrations.

A hot spot is defined in the MCP as a discrete area where the chemical concentrations are substantially higher than those present in the surrounding area. A discrete area where the average concentration within the area is greater than ten but less than one hundred times the average concentration in the immediate surrounding area is a hot spot unless there is no evidence that the discrete area would be associated with greater exposure potential than the surrounding area. In all cases, a discrete area where the chemical concentration is greater than one hundred times the concentration in the surrounding area is to be considered a hot spot. The identification of hot spots is performed to minimize the likelihood that a location with significantly elevated chemical concentrations will be diluted by combining it with locations of lesser chemical concentrations in the evaluation.

As further stated in the MCP, in no case should chemical concentrations equal to or less than an applicable MCP Method 1 soil standard be considered indicative of a hot spot. Therefore, those

chemicals in each soil interval that exceeded MCP Method 1 S-1 standards or lacked MCP standards (e.g., 4-methylphenol, di-n-butylphthalate and carbazole) were included in the hot spot analysis, unless the maximum detected concentration was used as the exposure point concentration. Using the maximum detected concentration as the exposure point concentrations is the same as assuming the concentration represents a hot spot.

The following table shows the maximum detected concentration of each of the chemicals in each soil interval included in the hot spot analysis, the average exposure point concentration for the specific soil interval excluding the maximum detection, and the variance between the maximum concentration and the average concentration. Soils within each depth interval are considered to be equally accessible to applicable receptors.

Chemical	Maximum Concentration (mg/kg)	Average Concentration Excluding Maximum (mg/kg)	Variance (Maximum versus Average Excluding Maximum)
0-1 Foot Soil Interval			
TEQ – Site-Wide	4.1E-05	1.8E-05	2.3-fold
Total PCBs – HS-2	4.93	0.41	4.5-fold
Lead – HS-2	671	51.9	13-fold
Total PCBs – HS-3	1.11	0.099	11-fold
Lead – HS-4	239.5	37.9	6.3-fold
Total PCBs – HS-6	1.01	0.22	4.7-fold
Lead – HS-7	292	85	3.4-fold
Total PCBs – HS-8	6.51	0.65	10-fold
Lead – HS-8	375.5	94.3	4-fold
Total PCBs – HS-10	5.1	0.5	10-fold
Barium – HS-10	2500	79.9	31-fold
Lead – HS-10	790	83	9.5-fold
0-3 Foot Soil Interval			
TEQ – Site-Wide	8.5E-05	2.2E-05	3.8-fold
Benzo(a)pyrene – HS-2	5.28	0.45	12-fold
Dibenzo(a,h)anthracene – HS-2	0.78	0.13	6-fold
Total PCBs – HS-2	4.93	0.41	12-fold
Lead – HS-2	890	100	8.9-fold
Benzo(a)pyrene – HS-3	6.76	0.41	17-fold
Benzo(b)fluoranthene – HS-3	7.26	0.46	16-fold
Total PCBs – HS-3	1.11	0.16	6.9-fold
Lead – HS-3	865	168.3	5.1-fold
Benzo(a)anthracene – HS-4	7.9	0.23	34-fold
Benzo(a)pyrene – HS-4	6.9	0.23	30-fold
Benzo(b)fluoranthene – HS-4	8.9	0.31	29-fold
Dibenzo(a,h)anthracene – HS-4	0.71	0.087	3.8-fold
Total PCBs – HS-4	2.6	0.48	5.4-fold
Lead – HS-4	665	118.6	5.6-fold
Total PCBs – HS-6	17.74	0.82	22-fold
Barium – HS-6	3293	67.8	49-fold
Lead – HS-6	928	75	12-fold

Chemical	Maximum Concentration (mg/kg)	Average Concentration Excluding Maximum (mg/kg)	Variance (Maximum versus Average Excluding Maximum)
Lead – HS-7	487	90	5.4-fold
Di-n-butyl phthalate – HS-8	5.6	0.75	7.5-fold
Butyl benzyl phthalate – HS-8	0.31	0.24	1.3-fold
Carbazole – HS-8	13	0.87	15-fold
Dibenzofuran – HS-8	7.2	0.36	20-fold
Benzo(a)anthracene – HS-8	167	4.9	34-fold
Benzo(a)pyrene – HS-8	133	4.0	33-fold
Benzo(b)fluoranthene – HS-8	183	5.4	34-fold
Benzo(k)fluoranthene – HS-8	75.7	1.7	45-fold
Chrysene – HS-8	171	4.1	42-fold
Dibenzo(a,h)anthracene – HS-8	17.2	0.36	48-fold
Indeno(1,2,3-cd)pyrene – HS-8	56.9	1.35	42-fold
Naphthalene – HS-8	76	0.79	96-fold
Phenanthrene – HS-8	710	8.5	84-fold
Total PCBs – HS-8	19.8	2.8	7.1-fold
Arsenic – HS-8	35	5.1	6.9-fold
Barium – HS-8	5110	633	8-fold
Lead – HS-8	16100	794	20-fold
Vanadium – HS-8	60	18.3	3.3-fold
Zinc – HS-8	580	74.4	7.8-fold
Di-n-butyl phthalate – HS-10	0.39	0.29	1.3-fold
Dibenzofuran – HS-10	0.7	0.07	10-fold
Benzo(a)anthracene – HS-10	10.3	0.9	11-fold
Benzo(a)pyrene – HS-10	8.37	0.71	12-fold
Benzo(b)fluoranthene – HS-10	8.97	0.96	9.3-fold
Dibenzo(a,h)anthracene – HS-10	0.85	0.10	8.5-fold
Total PCBs – HS-10	11	0.66	17-fold
Arsenic – HS-10	65.2	4.2	16-fold
Barium – HS-10	7000	216	32-fold
Lead – HS-10	3000	209	14-fold
0 to 6 Foot Soil Interval			
TEQ – Site-Wide	1.8E-04	5.1E-05	3.5-fold
Benzo(a)pyrene – HS-2	5.28	0.45	12-fold
Dibenzo(a,h)anthracene – HS-2	0.78	0.13	6.0-fold
Total PCBs – HS-2	4.93	0.40	12-fold
Arsenic – HS-2	22.1	3.23	6.8-fold
Lead – HS-2	2360	116	20-fold
Benzo(a)pyrene – HS-3	6.76	0.39	17-fold
Benzo(b)fluoranthene – HS-3	7.26	0.44	17-fold
Total PCBs – HS-3	1.11	0.15	7.4-fold
Lead – HS-3	6870	203	34-fold
Benzo(a)anthracene – HS-4	7.9	0.84	9.4-fold
Benzo(a)pyrene – HS-4	13	0.80	16-fold
Benzo(b)fluoranthene – HS-4	12	1.1	11-fold

Chemical	Maximum Concentration (mg/kg)	Average Concentration Excluding Maximum (mg/kg)	Variance (Maximum versus Average Excluding Maximum)
Dibenzo(a,h)anthracene – HS-4	0.71	0.17	4.2-fold
Indeno(1,2,3-cd)pyrene – HS-4	7.9	0.27	29-fold
Total PCBs – HS-4	12	0.52	23-fold
Arsenic – HS-4	53.4	4.2	13-fold
Barium – HS-4	1128	117	9.6-fold
Lead – HS-4	1590	172	9.2-fold
Dibenzofuran – HS-5	2.9	0.50	5.8-fold
Arsenic – HS-5	31	10	3.1-fold
Benzo(a)pyrene – HS-6	2.2	0.40	5.5-fold
Total PCBs – HS-6	17.74	0.83	21-fold
Barium – HS-6	4400	208	21-fold
Chromium – HS-6	1458	33	44-fold
Lead – HS-6	928	107	8.7-fold
Lead – HS-7	487	110	4.4-fold
Di-n-butyl phthalate – HS-8	5.6	0.75	7.5-fold
Butyl benzyl phthalate – HS-8	0.31	0.24	1.3-fold
Carbazole – HS-8	13	0.87	15-fold
Dibenzofuran – HS-8	7.2	0.36	20-fold
Benzo(a)anthracene – HS-8	167	4.7	36-fold
Benzo(a)pyrene – HS-8	133	3.8	35-fold
Benzo(b)fluoranthene – HS-8	183	5.2	35-fold
Benzo(k)fluoranthene – HS-8	75.7	1.6	47-fold
Chrysene – HS-8	171	3.9	44-fold
Dibenzo(a,h)anthracene – HS-8	17.2	0.34	51-fold
Indeno(1,2,3-cd)pyrene – HS-8	56.9	1.3	44-fold
Phenanthrene – HS-8	710	8.1	88-fold
Total PCBs – HS-8	19.8	2.7	7.3-fold
Arsenic – HS-8	59.8	5.8	10-fold
Barium – HS-8	7430	729	10-fold
Chromium – HS-8	1370	101	14-fold
Lead – HS-8	16100	780	21-fold
Vanadium – HS-8	602	25	24-fold
Zinc – HS-8	1300	171	7.6-fold
Dibenzofuran – HS-9	1.2	0.4	3-fold
Benzo(a)anthracene – HS-9	31.25	3.4	9.2-fold
Benzo(a)pyrene – HS-9	30	3.1	9.7-fold
Benzo(b)fluoranthene – HS-9	42	3.5	12-fold
Dibenzo(a,h)anthracene – HS-9	5.45	0.50	11-fold
Indeno(1,2,3-cd)pyrene – HS-9	20.8	1.8	12-fold
Naphthalene – HS-9	40	0.45	89-fold
Total PCBs – HS-9	40	1.8	22-fold
Arsenic – HS-9	94	16	5.9-fold
Barium – HS-9	15400	643	24-fold
Cadmium – HS-9	84.3	3.7	23-fold

Chemical	Maximum Concentration (mg/kg)	Average Concentration Excluding Maximum (mg/kg)	Variance (Maximum versus Average Excluding Maximum)
Chromium – HS-9	2050	74	28-fold
Lead – HS-9	11000	1386	7.9-fold
Zinc – HS-9	3540	548	6.5-fold
Di-n-butyl phthalate – HS-10	0.39	0.29	1.3-fold
Dibenzofuran – HS-10	0.7	0.071	9.9-fold
Benzo(a)anthracene – HS-10	10.3	0.83	12-fold
Benzo(a)pyrene – HS-10	8.37	0.66	13-fold
Benzo(b)fluoranthene – HS-10	8.97	0.89	10-fold
Dibenzo(a,h)anthracene – HS-10	0.85	0.11	7.7-fold
Total PCBs – HS-10	11	0.63	17-fold
Arsenic – HS-10	65.5	5.3	12-fold
Barium – HS-10	7000	215	33-fold
Lead – HS-10	3000	214	14-fold
0 to 15 Foot Soil Interval			
TEQ – Site-Wide	1.8E-04	5.1E-05	3.5-fold
Benzo(a)pyrene – HS-2	5.28	0.45	12-fold
Dibenzo(a,h)anthracene – HS-2	0.78	0.13	6-fold
Total PCBs – HS-2	4.93	0.40	12-fold
Arsenic – HS-2	22.1	3.2	6.9-fold
Lead – HS-2	2360	114	21-fold
Benzo(a)pyrene – HS-3	6.76	0.38	18-fold
Benzo(b)fluoranthene – HS-3	7.26	0.42	17-fold
Total PCBs – HS-3	1.11	0.15	7.4-fold
Lead – HS-3	6870	194	35-fold
Benzo(a)anthracene – HS-4	7.9	0.88	9-fold
Benzo(a)pyrene – HS-4	13	0.82	16-fold
Benzo(b)fluoranthene – HS-4	12	1.1	11-fold
Dibenzo(a,h)anthracene – HS-4	0.71	0.21	3.4-fold
Indeno(1,2,3-cd)pyrene – HS-4	7.9	0.39	20-fold
Total PCBs – HS-4	12	0.51	24-fold
Arsenic – HS-4	53.4	5.7	9.4-fold
Barium – HS-4	1128	123	9.2-fold
Lead – HS-4	2780	199	14-fold
Zinc – HS-4	1670	148	11-fold
Dibenzofuran – HS-5	2.9	0.50	5.8-fold
Arsenic – HS-5	31	10	3.1-fold
Benzo(a)pyrene – HS-6	2.2	0.37	5.9-fold
Total PCBs – HS-6	17.74	0.80	22-fold
Barium – HS-6	4400	200	22-fold
Chromium (III) – HS-6	1458	32	46-fold
Lead – HS-6	928	102	9.1-fold
Lead – HS-7	487	125	3.9-fold
Di-n-butyl phthalate – HS-8	5.6	0.75	7.5-fold
Butyl benzyl phthalate – HS-8	0.31	0.24	1.3-fold

Chemical	Maximum Concentration (mg/kg)	Average Concentration Excluding Maximum (mg/kg)	Variance (Maximum versus Average Excluding Maximum)
Carbazole – HS-8	13	0.87	15-fold
Dibenzofuran – HS-8	7.2	0.36	20-fold
Benzo(a)anthracene – HS-8	167	4.5	37-fold
Benzo(a)pyrene – HS-8	133	3.7	36-fold
Benzo(b)fluoranthene – HS-8	183	5.0	37-fold
Benzo(k)fluoranthene – HS-8	75.7	1.6	47-fold
Chrysene – HS-8	171	3.8	45-fold
Dibenzo(a,h)anthracene – HS-8	17.2	0.34	51-fold
Indeno(1,2,3-cd)pyrene – HS-8	56.9	1.3	44-fold
Phenanthrene – HS-8	710	7.8	91-fold
Total PCBs – HS-8	19.8	2.7	7.3-fold
Arsenic – HS-8	59.8	5.7	10-fold
Barium – HS-8	7430	712	10-fold
Chromium – HS-8	1370	99	14-fold
Lead – HS-8	16100	762	21-fold
Vanadium – HS-8	602	23	26-fold
Zinc – HS-8	1300	154	8.4-fold
Dibenzofuran – HS-9	1.2	0.40	3-fold
Benzo(a)anthracene – HS-9	31.25	2.4	13-fold
Benzo(a)pyrene – HS-9	30	2.2	14-fold
Benzo(b)fluoranthene – HS-9	42	2.4	18-fold
Dibenzo(a,h)anthracene – HS-9	5.45	0.40	14-fold
Indeno(1,2,3-cd)pyrene – HS-9	20.8	1.3	16-fold
Total PCBs – HS-9	40	1.4	29-fold
Arsenic – HS-9	94	12	7.8-fold
Barium – HS-9	15400	424	36-fold
Cadmium – HS-9	84.3	2.8	30-fold
Chromium – HS-9	2050	49	42-fold
Lead – HS-9	11000	1044	11-fold
Zinc – HS-9	4500	465	9.7-fold
Di-n-butyl phthalate – HS-10	0.39	0.29	1.3-fold
Dibenzofuran – HS-10	0.7	0.07	10-fold
Benzo(a)anthracene – HS-10	10.3	0.75	14-fold
Benzo(a)pyrene – HS-10	8.37	0.60	14-fold
Benzo(b)fluoranthene – HS-10	8.97	0.80	11-fold
Dibenzo(a,h)anthracene – HS-10	0.85	0.13	6.5-fold
Total PCBs – HS-10	11	0.59	19-fold
Arsenic – HS-10	195	6.0	33-fold
Barium – HS-10	7000	219	32-fold
Lead – HS-10	3000	235	13-fold
Zinc – HS-10	2980	58	51-fold

As shown above, the maximum concentrations of the compounds selected for evaluation for each soil interval vary from the average soil interval concentrations by less than 100-fold. There is also

no evidence that any discrete area where concentrations are between ten and 100 times greater than those in the surrounding areas would be associated with greater exposure potential than the surrounding area. Therefore, no hot spots as defined by the MCP were identified.

3.6 Exposure Assessment

Consistent with the requirements of 310 CMR 40.0923, the Exposure Assessment requires the identification of all current and reasonably foreseeable activities and uses associated with a site and a description of how these uses and activities could result in the exposure of human receptors to the COPCs present. Receptors and exposure pathways applicable to this risk characterization are discussed in this section as well as the exposure assumptions used for each receptor, developed to estimate the frequency and intensity of the exposure.

Section 3.2.1 identifies receptor populations that may be present at the Site, based on information obtained through interviews with school officials and observations made during visits to the Site. The identified receptors include:

- students (older children and teenagers);
- daycare children (ages 3 to 5);
- teachers, teacher's aides, and coaches;
- parents and other visitors (including young children);
- groundskeepers;
- plant engineers;
- resource officers and outdoor duty officers; and
- solar workers at the fenced solar park.

Each of these receptor populations may be exposed to potentially impacted soil during outdoor activities. Students (older children and teenagers) may be outdoors before and after school each school day, for outdoor classes a few times each week (e.g., half-hour gym class) and during after school activities (e.g., band or athletic practice/games during fall and spring). Students may also be present at the school during summer camps or for recreational activities (e.g., playing tennis during vacation). Daycare children have less than one hour of scheduled outdoor playtime each day (currently occurring at the HS-1 area) when the weather is not inclement. The daycare center operates five half-days per week from late September to mid-May. Though children attending the daycare are less exposed than the older students, the young children represent a population with greater developmental sensitivity than older children, teenagers and adults.

Teachers and teacher's aides may be exposed to soil in a similar manner as students, however, gym teachers in particular may be outdoors at the campus for a greater amount of time each day than students while staffing sequential classes, and possibly coaching athletic teams or staffing summer camps. Teachers and teacher's aides may also be exposed for a greater number of years than students and daycare children who tend to be present at the campus for only a few years. Parents and other visitors to the Site are likely exposed to a lesser extent in frequency and duration than students and staff. Other visitors may include individuals using the public tennis courts or the Unfenced Playing Field Area for weekend soccer games.

Groundskeepers reportedly maintain the grounds at the campus (e.g., mowing, mulching and planting) one to two days per week from the end of April until the beginning of November. Based on the information provided, staff teaching outdoor gym classes, coaching athletic teams and staffing summer camps are likely to be more exposed than groundskeepers.

Plant engineers are reported to be exposed to soil occasionally during facility upgrades or repairs that may require limited soil movement (e.g., installation of concrete pads). Resource officers spend time outdoors before and after school each day, while an outdoor duty officer patrols the exterior grounds five days per week on a rotating basis (i.e., different people perform this function on different days).

To estimate a worst-case scenario of the receptor populations present at the campus, older child/teenage students, daycare children, adult staff (representative of the most exposed teachers/aides and groundskeepers) and construction workers (conservatively representative of plant engineers) were quantitatively evaluated in the risk characterization. A solar worker was evaluated for the HS-8 exposure point. In addition, to evaluate future unlimited use scenarios, a park visitor, resident and emergency utility worker were also included quantitatively in the risk characterization. Current receptors were evaluated for exposures to the 0 to 1 and 0 to 3 soil depth intervals, while future receptors were evaluated for exposures to the 0 to 15 foot soil interval. Emergency utility workers were evaluated for the 0 to 6 foot interval only.

3.6.1 Exposure Assumptions

For the purposes of this Method 3 risk characterization, older child/teenage students, daycare children, adult staff and construction workers were selected for quantitative evaluation via incidental ingestion of soil, dermal contact with soil and the inhalation of fugitive dusts associated with Site soil. Construction workers were additionally evaluated for exposure to shallow groundwater via dermal contact and the inhalation of VOCs originating from shallow groundwater into an excavation trench. Exposure assumptions applicable to the receptors are provided on the risk calculation spreadsheets presented in Appendices C-3 through C-6. The following provides a description of the exposure assumptions used for the identified receptors.

- **Older Child/Teenage Student.** For the 11 to 18 year-old older child/teenage student, exposures are assumed to occur over a total of 36 weeks, during the spring, summer and fall when the ground is not frozen and school is in session, including summer session. During this 36-week period, outdoor exposures are assumed to occur 5 days per week for 1 hour per day. The exposure duration for non-cancer endpoints of toxicity was averaged over 36 weeks. The average weight of the child was set at 51.4 kilograms (kg). Incidental ingestion of soil was set at 50 milligrams per day (mg/day). Dermal contact with COPCs in soil was evaluated using a soil adherence factor of 0.14 milligrams per square centimeter (mg/cm^2), which assumes exposure via the face, hands, forearms, lower legs, and feet (approximate body surface area of 5,410 cm^2). For the fugitive dust pathway, methods and assumptions consistent with the MassDEP Technical Update "Characterization of Risks Due to Inhalation of Particulates by Construction Workers" (July 2008) were used including a PM_{10} of 60 micrograms per cubic meter ($\mu g/m^3$). Inhalation rates used are age-specific values provided by MassDEP in the 1995 risk assessment guidance document.

- **Daycare Child.** For the 3 to 5 year-old daycare child, exposures are assumed to occur over a total of 36 weeks, during the spring, summer and fall when the ground is not frozen. During this 36-week period, outdoor exposures are assumed to occur 5 days per week for 1 hour per day. The exposure duration for non-cancer endpoints of toxicity was averaged over 36 weeks. The average weight of the child was set at 15.5 kg. Incidental ingestion of soil was set at 100 mg/day. Dermal contact with COPCs in soil was evaluated using a soil adherence factor of 0.35 mg/cm^2, which assumes exposure via the face, hands, forearms, lower legs, and feet (approximate body surface area of 2,422 cm^2). For the fugitive dust pathway, methods and assumptions consistent with the MassDEP Technical Update "Characterization of Risks Due to Inhalation of Particulates by Construction Workers" (July 2008) were used including a PM_{10} of 60 $\mu g/m^3$. Inhalation rates used are age-specific values provided by MassDEP in the 1995 risk assessment guidance document.

- **Adult Staff.** For the adult staff, exposures are assumed to occur over a total of 30 weeks, during the spring, summer and fall. During this 30-week period, outdoor exposures are assumed to occur 5 days per week for 4 hours per day. The exposure duration for non-cancer endpoints of toxicity was averaged over 27 years. The average weight of the adult was set at 61.1 kg. Incidental ingestion of soil was set at 50 mg/day. Dermal contact with COPCs in soil was evaluated using a soil adherence factor of 0.03 mg/cm^2 and a body surface area of 3,473 cm^2. As with the child, methods and assumptions consistent with the MassDEP Technical Update "Characterization of Risks Due to Inhalation of Particulates by Construction Workers" (July 2008) were used for the fugitive dust pathway including an inhalation rate of 60 liters/minute.

- **Solar Worker.** For the adult worker at the solar park, exposures are assumed to occur over a total of 30 weeks, during the spring, summer and fall. During this 30-week period, outdoor exposures are assumed to occur 2 days per week for 4 hours per day. The exposure duration for non-cancer endpoints of toxicity was averaged over 27 years. The average weight of the adult was set at 61.1 kg. Incidental ingestion of soil was set at 50 mg/day. Dermal contact with COPCs in soil was evaluated using a soil adherence factor of 0.03 mg/cm^2 and a body surface area of 3,473 cm^2. As with the child, methods and assumptions consistent with the MassDEP Technical Update "Characterization of Risks Due to Inhalation of Particulates by Construction Workers" (July 2008) were used for the fugitive dust pathway including an inhalation rate of 60 liters/minute.

- **Construction Worker.** Exposure could occur during excavations that expose impacted soil and groundwater. Potential exposures to soil and trench air COPCs are assumed to occur 8 hours/day for 130 days/year. The exposure duration for non-cancer endpoints was averaged over 0.5 years (182 days). Workers are identified as adults (58 kg average body weight) involved in physical activities equivalent to an average inhalation rate of 20 m^3/day. Inhalation of fugitive dusts outdoors by adult workers was evaluated using a PM_{10} of 60 $\mu g/m^3$. The incidental ingestion rate of soil was set at 100 mg/day. Dermal contact with soil COPCs was assumed via the face, hands, forearms, and feet (approximate surface area of 3,477 cm^2) using a soil adherence factor of 0.29 mg/cm^2. Excavations were assumed to proceed down to the water table. Contact with shallow groundwater was

conservatively assumed to occur 8 hours/day for 65 days/year. Dermal contact with groundwater COPCs was also assumed to occur via the face, hands, forearms, and feet, consistent with soil exposures.

- **Emergency Utility Worker.** Exposure could occur during excavations that expose impacted soil and groundwater. Potential exposures to soil and trench air COPCs are assumed to occur 8 hours/day for up to 130 days/year. The exposure frequency for soil exposures was varied based on the magnitude of the risk calculated (from 1 day/week up to 5 days/week), until a Condition of No Significant risk was achieved for emergency soil exposures for a worker. Workers are identified as adults (58 kg average body weight) involved in physical activities equivalent to an average inhalation rate of 20 m^3/day. Inhalation of fugitive dusts outdoors by adult workers was evaluated using a PM_{10} of 60 $\mu g/m^3$. The incidental ingestion rate of soil was set at 100 mg/day. Dermal contact with soil COPCs was assumed via the face, hands, forearms, and feet (approximate surface area of 3,477 cm^2) using a soil adherence factor of 0.29 mg/cm^2. Excavations were assumed to proceed down to the water table. Contact with shallow groundwater was conservatively assumed to occur 8 hours/day for 65 days/year in all cases. Dermal contact with groundwater COPCs was also assumed to occur via the face, hands, forearms, and feet, consistent with soil exposures.

- **Young Child/Older Child/Adult Park Visitor.** For the adult and child, outdoor exposures to COPCs in soil are assumed to occur for 90 days/year (3 days/week for 30 weeks/year). Incidental ingestion of soil was set at 50 mg/day and 100 mg/day for the adult/youth and child, respectively. Dermal contact with COPCs in soil was evaluated using a soil adherence factor of 0.13 mg/cm^2 for the adult, 0.14 mg/cm^2 for the older child, and 0.35 mg/cm^2 for the young child, which assumes exposure via the face, hands, forearms, lower legs, and feet (5,653 cm^2, 4,427 cm^2, and 2,431 cm^2 for the adult, youth, and child, respectively). The exposure duration for non-cancer endpoints of toxicity was averaged over 16 years for the adult, and 7 years each for the older child and young child. The average weights of the adult, older child, and young child were set at 58.7 kg, 39.9 kg, and 17.0 kg, respectively.

- **Young Child/Older Child/Adult Resident.** For the adult, older child, and young child resident, outdoor exposures to COPCs in soil are assumed to occur for 150 days/year (5 days/week for 30 weeks/year). The exposure duration for non-cancer endpoints of toxicity was averaged over 16 years for the adult, and 7 years each for the older child and young child. The average weights of the adult, older child, and young child were set at 58.7 kg, 39.9 kg, and 17.0 kg, respectively. Incidental ingestion of soil was set at 50 mg/day and 100 mg/day for the adult/youth and child, respectively. Dermal contact with COPCs in soil was evaluated using a soil adherence factor of 0.13 mg/cm^2 for the adult, 0.14 mg/cm^2 for the older child, and 0.35 mg/cm^2 for the young child which assumes exposure via the face, hands, forearms, lower legs, and feet (5653 cm^2, 4427 cm^2, and 2431 cm^2 for the adult, older child, and young child, respectively). The vegetable intake pathway was included as a complete exposure pathway, as indicated by the Residential Shortform.

3.6.2 Estimation of Chemical Intake

To evaluate the risk of harm to human health, the intake of each COPC must be estimated, a process which involves assessing the amount of material in contact with the receptor and the amount actually available for absorption by the body. This assessment is achieved through the calculation of an average daily dose (ADD) for each COPC and for each route of exposure. Chemical-specific and exposure route-specific Relative Absorption Factors (RAFs) are used in the ADD equations to convert an exposure (amount) to a dose (amount per unit body weight).

The general ADD equation used to calculate intake is as follows and is consistent with that provided in MassDEP's *Guidance for Disposal Site Risk Characterization (July, 1995)*:

$$\text{ADD} = \frac{\text{Total Amount of Chemical Taken In}}{(\text{Body Weight}) * (\text{Averaging Period})}$$

The specific ADD equations for the various exposure pathways evaluated are provided below:

Incidental Ingestion of Soil

$$\text{ADD} = \frac{(\text{EPC})*(\text{Ingestion Rate})*(\text{Exposure Frequency})*(\text{Exposure Period})*\text{RAF}}{(\text{Body Weight})*(\text{Averaging Period})}$$

Dermal Contact with Soil

$$\text{ADD} = \frac{(\text{EPC})*(\text{Surface Area})*(\text{Exposure Frequency})*(\text{Exposure Period})*(\text{Adherence Factor})*\text{RAF}}{(\text{Body Weight})*(\text{Averaging Period})}$$

Dermal Contact with Groundwater

$$\text{ADD} = \frac{(\text{EPC})*(\text{Surface Area})*(\text{Exposure Frequency})*(\text{Exposure Duration})*(\text{Exposure Period})*\text{RAF}*K_p}{(\text{Body Weight})*(\text{Averaging Period})}$$

Inhalation of Trench Air

$$\text{ADD} = \frac{(\text{EPC})*(\text{Exposure Time})*(\text{Exposure Frequency})*(\text{Exposure Duration})}{(\text{Averaging Period})}$$

For the fugitive dust pathway, equations presented in Characterization of risks due to inhalation of particulates by construction workers (Revised Technical Update; 2008) were used. The equations used are as follows:

Inhalation of Fugitive Dust – GI System

$$\text{ADD/LADD} = \frac{(\text{EPC})*1.5*(\text{InhalationRate})*\text{RAF}*(\text{ExposureDuration})*(\text{ExposureFrequency})*(\text{ExposurePeriod})*PM_{10}}{(\text{Body Weight})*(\text{Averaging Period})}$$

Inhalation of Fugitive Dust – Respiratory System

$$ADD/LADD = \frac{(EPC)*0.5*(InhalationRate)*RAF*(ExposureDuration)*(ExposureFrequency)*(ExposurePeriod)*PM_{10}}{(Body\ Weight)*(Averaging\ Period)}$$

Exposure assumptions and the specific equations used to calculate ADDs are provided on the calculation spreadsheets presented in Appendices C-5 through C-9.

3.6.3 Exposure Point Concentrations

EPCs for soil and groundwater were determined for the Site consistent with 310 CMR 40.0926 and supporting MassDEP guidance.

An EPC is the measured or estimated amount of a constituent in the environmental medium of concern at the point of human contact. Based on MassDEP (1995) guidance, the EPCs for the environmental media typically correspond to the arithmetic mean of the reported results for each data set for areas of contiguous impacts that do not show evidence over which people average their exposure. However, when soil or groundwater sample locations are not evenly distributed over the Site, or concentrations are highly variable over the Site, or where exposure frequencies are higher in some areas than others, the arithmetic mean may not represent the average exposure concentration and, in cases of extremely high concentrations, a hot spot evaluation may be warranted. According to 310 CMR 40.0926(3)(b)(2), consideration of the observed distribution of the data, sampling strategy, graphical representation of analytical results, and/or statistical analyses with sufficient power and confidence may be used to demonstrate that the arithmetic mean concentration is unlikely to underestimate the average concentration at the exposure point.

For this Site, arithmetic average concentrations have been primarily used as EPCs; however, in those instances where individual chemicals were present at concentrations greater than ten times applicable S-1/GW-2 or S-1/GW-3 standards or where greater than 25-percent of the analytical results for an individual contaminant exceeded an applicable standard, EPCs that represent the 95-percent upper confidence limit of the arithmetic mean were calculated using EPA's ProUCL software version 5.00.00 (USEPA, 2013). The 95-percent upper confidence limit recommended by the ProUCL software was selected as the EPC in these cases. For small data sets, the maximum detected concentration was used as the EPC. EPCs were calculated for soil and groundwater current and future use scenarios. Appendix C-3 documents the output of the ProUCL program.

Tables C-2.1 through C-2.34 in Appendix C-2 present the soil EPCs (i.e., maximum, arithmetic mean or 95-percent upper confidence limit on the arithmetic mean) for the current and future scenarios. Groundwater EPCs are summarized in Appendix C-2, Table C-2.38, and represent the maximum temporal average concentrations in the site-wide data set.

Trench air EPCs were modeled for all volatile compounds detected in shallow groundwater, using the maximum temporal average concentrations presented on Table C-2.38 in Appendix C-2 as inputs to the model. For this pathway, a model developed by the Virginia Department of Environmental Quality (VDEQ) for groundwater encountered at depths less than 15 feet below ground surface has been used. Detailed information concerning the model can be found at

www.deq.state.va.us/vrprisk/raguide.html. The modeling of groundwater EPCs to trench air EPCs is presented in Appendix C-4.

3.7 Dose-Response Assessment

The Dose-Response Assessment is designed to evaluate the potential non-carcinogenic (threshold) and carcinogenic (non-threshold) effects of COPCs and describes the effects observed in humans and/or laboratory animals following the intake of a specific dose of the chemical. The information from the Dose-Response Assessment is used in conjunction with information from the Exposure Assessment to estimate the risk and hazard generated by each COPC from an exposure.

The toxicity values used in this Dose-Response Assessment of COPCs producing non-carcinogenic effects are the Reference Doses (RfDs) for oral and dermal exposures and Reference Concentrations (RfCs) for inhalation exposures. The chronic RfD and RfC values are based upon a 70-year lifetime exposure, and used to evaluate commercial worker exposures. Subchronic RfD and RfC values are based on defined, less than lifetime exposures and are appropriate for use in evaluating excavation worker-related risks.

EPA has developed a system for classifying chemicals according to the likelihood that the chemical is a human carcinogen. This system groups chemicals into five classes based upon the weight-of-evidence (of carcinogenicity) of the available data. Consistent with MassDEP risk characterization guidelines, class A, B, and C carcinogens are evaluated in a Method 3 risk characterization. Slope factors (SFs), for the oral and dermal exposure routes, and unit risks (URs), for the inhalation route, are used in this risk characterization to calculate cancer risks.

RAFs are used to account for differences between the method of administration in the study on which the RfD or SF is based and the site-specific routes of exposure. These values vary with the medium and route of exposure.

Total chromium data were evaluated as chromium (III) due to site-specific speciation data gathered as part of the follow-up delineation sampling at locations with elevated total chromium concentrations. The site-specific chromium speciation data is discussed in Section 3.3.2.

The RfD, RfC, SF, UR and RAF values used in this risk characterization are the same as those values used by MassDEP in the development of the 2014 MCP numerical standards, except for the following chemicals:

- 1,2,4-Trimethylbenzene and p-isopropyltoluene: toxicity values and RAFs for C9-C10 aromatics, as specified by MassDEP, were used as this compound is present as part of this hydrocarbon fraction;

- GRO: toxicity values and RAFs for C9-C10 aromatics, as specified by MassDEP, were used as this is the most toxic fraction that may be present in a gasoline-range mixture;

- Dibenzofuran (carcinogen class D): a chronic oral RfD (1E-03 mg/kg-day) and subchronic oral RfD (3E-04 mg/kg-day) provided by EPA's Superfund Technical Support Center was used; the RfC was calculated from the RfD assuming a body weight of 70 kg and an

inhalation rate of 20 m^3/day; RAFs were calculated using default assumptions for SVOCs, as presented by MassDEP (1995);

- 4-Bromodiphenyl ether: the oral RfD for tetrabromodiphenyl ether was selected as a surrogate for 4-bromodiphenyl ether, adjusted downward 10-fold for uncertainty in the use of this surrogate (1E-05 mg/kg-day); the RfC was calculated from the RfD assuming a body weight of 70 kg and an inhalation rate of 20 m^3/day; RAFs were calculated using default assumptions for VOCs, as presented by MassDEP (1995)

- 1,2,3-Trichlorobenzene: toxicity values and RAFs for 1,2,4-trichlorobenzene, as specified by MassDEP, were used as a surrogate for this structurally similar compound;

- Carbon disulfide: the oral RfD presented in the Integrated Risk Information System (IRIS) was used (1E-01 mg/kg-day); the RfC presented in IRIS was used (7E-01 mg/kg-day); RAFs were calculated using default assumptions for VOCs, as presented by MassDEP (1995);

- Di-n-butylphthalate: the oral RfD presented in IRIS was used (1E-01 mg/kg-day); the RfC was calculated from the RfD assuming a body weight of 70 kg and an inhalation rate of 20 m^3/day; RAFs were calculated using default assumptions for SVOCs, as presented by MassDEP (1995);

- Butyl benzyl phthalate: the oral RfD presented in IRIS was used (2E-01 mg/kg-day); the RfC was calculated from the RfD assuming a body weight of 70 kg and an inhalation rate of 20 m^3/day; RAFs were calculated using default assumptions for SVOCs, as presented by MassDEP (1995);

- 4-Methylphenol: the oral RfD presented in the Health Effects Assessment Summary Tables (HEAST) was used (5E-03 mg/kg-day); the RfC was calculated from the RfD assuming a body weight of 70 kg and an inhalation rate of 20 m^3/day; RAFs were calculated using default assumptions for SVOCs, as presented by MassDEP (1995);

- Benzoic acid: the oral RfD presented in IRIS was used (4E+00 mg/kg-day); the RfC was calculated from the RfD assuming a body weight of 70 kg and an inhalation rate of 20 m^3/day; RAFs were calculated using default assumptions for SVOCs, as presented by MassDEP (1995);

- Carbazole: noncancer toxicity values and RAFs specified by MassDEP for other carcinogenic PAHs were adopted for carbazole; the slope factor presented in HEAST (0.02 $(mg/kg\text{-}day)^{-1}$) was used.

Chronic and subchronic RfDs and RfCs, SFs and URs, as well as medium-specific RAFs, are provided on the calculation spreadsheets presented in Appendices C-5 through C-9.

3.8 Risk Characterization

To characterize the risk of harm to human health from potential soil and groundwater exposures, carcinogenic risks and non-carcinogenic hazards were estimated using the EPC for each COPC

present at each exposure point for each receptor, and the cumulative receptor risk values were compared to the MassDEP Risk Limits to assess whether a condition of No Significant Risk exists.

To estimate non-carcinogenic hazards, the Hazard Quotient for each COPC was calculated by dividing the ADD computed in the Exposure Assessment by the RfD or RfC identified in the Dose-Response Assessment. The cumulative HI for each receptor was subsequently calculated by summing the COPC hazard quotients for the exposure pathways applicable to each receptor. This HI is called a Screening HI and provides a conservative estimate of the true hazard because it assumes additivity even though COPCs may exert effects on different organ systems and/or through different mechanisms of action. The Screening HI was first compared to the Cumulative Receptor Non-Carcinogenic Risk Limit (Cumulative Receptor Hazard Index) of 1 (310 CMR 40.0993(6)) to characterize the risk of harm to human health, and to establish whether a condition of No Significant Risk exists at the Site. If the Screening HI was less than 1, no further discussion was necessary to characterize noncancer hazard. However, if the Screening HI exceeded the Risk Limit of 1, the Screening HI was segregated by target organ, as described in MassDEP guidance (MassDEP, 1995). Each target organ HI was then compared to the Risk Limit of 1 to establish whether a condition of No Significant Risk exists at the Site.

To calculate the ELCR for each COPC, the Lifetime Average Daily Dose (LADD) estimated in the Exposure Assessment is multiplied by the SF or UR identified in the Dose-Response Assessment. The ELCR for each COPC is then summed to calculate the Total ELCR for each exposure pathway. The Total Site Cancer Risk for each receptor is subsequently computed by summing the Total ELCR values for the exposure pathways applicable to each receptor. The Total Site Cancer Risk is then compared to the Total Site Cancer Risk Limit of 1×10^{-5} (CMR 40.0993(6)) to characterize the risk of harm to human health, and to establish whether a condition of No Significant Risk exists, as defined in 310 CMR 40.0993(7).

The risks and hazards estimated for each receptor and exposure point are summarized in Appendix C-10, Table C-10.1 (0 to 1 foot soil interval), Table C-10.2 (0 to 3 foot soil interval), Table C-10.3 (0 to 6 foot soil interval and shallow groundwater) and Table C-10.4 (0 to 15 foot soil interval and shallow groundwater).

As shown on Table C-10.1 in Appendix C-10, a Condition of No Significant Risk exists for the 0 to 1 foot soil interval for current older child/teenage students, daycare children, and adult staff, as well as for adult solar workers at exposure point HS-8. Therefore, no IH condition exists at the Site.

As shown on Table C-10.2 in Appendix C-10, a Condition of No Significant Risk exists for the 0 to 3 foot soil interval for current older child/teenage students, daycare children, and adult staff, as well as for adult solar workers at exposure point HS-8. Screening HIs exceed 1 for the daycare child at HS-6 (1.5) and HS-10 (2). However, target organ specific HIs are less than 1 for the daycare child at HS-6 (immune system HI of 1 associated with PCBs/total TEQ and nervous system HI of 0.5 associated with lead) and HS-10 (immune system HI of 1 associated with PCBs/total TEQ and nervous system HI of 1 associated with lead). Therefore, the site is currently safe to use for its designated purpose as a school and fenced solar park at exposure point HS-8.

Table C-10.3 in Appendix C-10 identifies that emergency utility worker exposures to the 0 to 6 foot soil interval and shallow groundwater are associated with a Condition of No Significant Risk (following target organ segregation) for excavations occurring up to 5 days per week, with the following limitations:

- HS-5: limit the duration of soil contact to 3 days due to potential exposure to lead in soil;
- HS-8: limit the duration of soil contact to 3 days due to potential exposure to lead in soil; and
- HS-9: limit the duration of soil contact to 2 days due to potential exposure to lead and antimony in soil.

Though screening HIs exceed 1 for the emergency utility worker at HS-3 (1.5), HS-5 (1.6), HS-8 (1.8) and HS-9 (2), target organ HIs are less than 1 for the emergency utility worker at HS-3 (immune system HI of 0.5 associated with PCBs/total TEQ and nervous system HI of 1 associated with lead), HS-5 (immune system HI of 0.6 associated with PCBs/total TEQ and nervous system HI of 1 associated with lead), HS-8 (immune system HI of 0.8 associated with PCBs/total TEQ and nervous system HI of 1 associated with lead) and HS-9 (immune system HI of 0.5 associated with PCBs/total TEQ, nervous system HI of 0.9 associated with lead and endocrine system HI of 0.6 associated with antimony).

Table C-10.4 identifies that under future conditions, the 0 to 15 feet soil interval at exposure points HS-1 is associated with a Condition of No Significant Risk. In addition, continued use of the HS-8 exposure point as a fenced solar park poses no significant risk to adult solar workers under future conditions. The exposure points and chemicals with potential to pose a significant risk to human health under future conditions, applicable to the top 15 feet of soil, are:

- HS-2: lead (daycare child, park visitor and resident)
- HS-3: lead (daycare child, park visitor and resident)
- HS-4: lead (daycare child, park visitor and resident)
- HS-5: PCBs, Total TEQs, carcinogenic PAHs and lead (older child/teenage student, daycare child, park visitor, resident and construction worker)
- HS-6: PCBs and Total TEQs (daycare child and resident)
- HS-7: lead (daycare child and resident)
- HS-8: PCBs, Total TEQs, carcinogenic PAHs and lead (park visitor, resident and construction worker)
- HS-9: PCBs, Total TEQs, carcinogenic PAHs, antimony and lead (older child/teenage student, daycare child, park visitor, resident and construction worker)
- HS-10: lead (daycare child, park visitor and resident)

Though the screening HI exceed 1 for the construction worker at HS-3 (1.5), target organ HIs are less than 1 (immune system HI of 0.5 associated with PCBs/total TEQ and nervous system HI of 1 associated with lead).

Based on this information, exposures to impacts in soil located deeper than three feet below ground surface should be controlled through the implementation of an AUL. In addition, exceedances of GW-2 standards for select VOCs are noted in the vicinity of monitoring wells MW-7 and MW-24, which are currently not classified as GW-2 due to their placement greater than 30 feet from the existing NBHS building. Should an occupied building be constructed in the future in the vicinity of MW-7 and/or MW-24, the potential for a complete vapor intrusion pathway should be evaluated.

A quantitative evaluation of the homegrown produce pathway was also included in the risk characterization. This evaluation indicates that Best Management Practices should be used should gardening occur at the site in the future at all locations except EP HS-1. Chemicals of potential concern for the produce ingestion pathway include PCBs, arsenic, cadmium, lead and zinc. Best Management Practices (BMPs) may include gardening in raised beds using imported clean soil with a barrier layer to separate clean soils from underlying impacted soils.

3.8.1 Applicable or Suitably Analogous Public Health Standards

As part of the evaluation of the condition of No Significant Risk of harm to human health (as defined in 310 CMR 40.0993(7)), the MCP requires a comparison of EPCs to Applicable or Suitably Analogous Public Health Standards (310 CMR 40.0993(3)). Such standards include, but are not limited to, Massachusetts *Air Quality Standards* promulgated in 310 CMR 6.00, Massachusetts *Surface Water Quality Standards* promulgated in 314 CMR 4.00, and Massachusetts *Drinking Water Quality Standards* promulgated in 310 CMR 22.00.

As noted in Section 3.1, the Site is not considered to be part of a potentially productive aquifer. Therefore, comparison of COPC groundwater concentrations to MassDEP *Drinking Water Standards* is not required for the evaluation of significant risk of harm to human health. In addition, air and surface water quality standards are not considered applicable to the Site.

3.9 Uncertainty Analysis

Risk characterizations are subject to a number of uncertainties. As a result, risk estimates derived from the equations and assumptions in this risk characterization should not be interpreted as absolute estimates of the risks of harm to human health posed by potential exposures to COPCs reported at the Site.

General sources of uncertainty include:

- adequacy of the Site characterization; ;
- quality and treatment of the analytical data;
- accuracy of the exposure assumptions;
- development of toxicity values (RfDs, RfCs, SFs, and URs);
- identification of target organs in risk characterization; and
- assumption of linear additivity of risk estimates in HIs and ELCRs.

Site-specific uncertainties are discussed below. As discussed below, multiple conservative (health-protective) assumptions are selected for use in the risk characterization process which generally leads to overestimation, rather than underestimation, of Site risks and hazards associated with exposures to chemicals.

3.9.1 Hazard Identification

Sampling was conducted with bias, targeting areas and depths that were likely to have overestimated actual concentrations of OHM based on field screening and observations. This type of sampling strategy is commonly used for site characterization. However, the soil data set may over-represent the impacts present across the property, resulting in an overestimation of the risks and hazards. Due to the heterogeneous nature of the fill material present at the Site, some discrete areas with fill impacts may not have been identified by the investigative efforts. However, any unidentified areas of fill impacts should be minimal since an extensive number (more than 1,000) soil samples were collected during the investigations at the Site.

3.9.2 Dose-Response Assessment

In the Dose-Response Assessment, Uncertainty and Modifying Factors, applied to toxicity information to obtain RfD and RfC values, are used to account for the following uncertainties, which, in turn, can add to the overall uncertainty of the risk characterization findings:

- the use of dose-response information from effects observed at high doses to predict the adverse health effects that may occur following exposure to the low levels expected from human contact with the COPCs in the environment;

- the use of dose-response information from short-term exposure studies to predict the effects of long-term exposures, and vice-versa;

- the use of dose-response information from animal studies to predict adverse health effects in humans;

- the use of dose-response information from homogeneous animal populations or healthy human populations to predict the adverse health effects likely to be observed in the general population, consisting of individuals with a wide range of sensitivities;

- the use of oral toxicity values as surrogate toxicity values for the dermal route of exposure; and

- the use of surrogate toxicity values for compounds without assigned values, such as those used to characterize the petroleum hydrocarbon fractions.

Uncertainty and modifying factors can range up to several orders of magnitude, depending on the substance, and may lead to a substantial overestimation of actual hazards associated with chemical exposures.

3.9.3 Exposure Assessment

The Exposure Assessment focuses on the evaluation of non-carcinogenic and carcinogenic effects for an exposed individual. Conservative (health-protective) exposure assumptions, as recommended by MassDEP, were used such as values for intake rates, surface areas, and body weights. Exposure frequencies and exposure periods were default MassDEP values, or selected to conservatively represent site-specific exposure conditions. In addition, conservative assumptions were used in the modeling of trench air concentrations from groundwater. The use of such conservative exposure and modeling assumptions can potentially overestimate the estimate of the risk of harm from exposure to the fill and contribute to the uncertainty of the risk characterization.

For some compounds, maximum detected concentrations were used as EPCs which results in uncertainty in the evaluation and may over- or underestimate the true risks and hazards at the Site, depending on the representativeness of the samples selected for site characterization. Because sampling was biased towards areas of suspected or observed contamination, the dataset likely overestimates overall impacts at the Site.

3.10 Risk of Harm to Safety, Public Welfare, and the Environment

The following sections present a characterization of risk to safety, public welfare, and an environmental risk characterization.

3.10.1 Characterization of Risk to Safety

The risk of harm to safety, as described in 310 CMR 40.0960, was evaluated for the Site. The Site location does not contain the following items related to potential site impacts:

- There are no rusted or corroded drums or containers, open pits or lagoons, at the Site;
- There is no threat of fire or explosion, or the presence of explosive vapors from potential site impacts; and
- There are no uncontainerized materials exhibiting the characteristics of corrosivity, reactivity, or flammability.

Based on the above information, it was determined that the Site does not pose a risk to safety.

3.10.2 Risk to Public Welfare

Per the MCP (310 CMR 40.0994), there are two purposes for characterizing the risk to public welfare: 1) to identify and evaluate nuisance conditions, which may be localized, and 2) to identify and evaluate significant community effects.

The characterization of risk to public welfare considers effects that are or may result from the presence of residual impacts. Further, the characterization of risk to public welfare is for current and reasonably foreseeable Site activities and uses, requiring an understanding of the Site, the receptors and exposure information. Per 310 CMR 40.0994, the characterization of risk to public welfare does not consider pecuniary effects or private resources.

Factors that the MCP takes into consideration to evaluate nuisance conditions and significant community effects include the following:

- **Nuisance conditions –** The breathing zone of ambient and/or indoor air at the Site is free of persistent, noxious odors (at present and for the reasonably foreseeable future). There are also no impacts from the Site on drinking water (noxious taste/odors), and there are no livestock impacts. Per the MCP, a nuisance condition is not present.

- **Loss of active or passive property uses –** The property is currently is used as an active school and solar park. Use of surrounding properties will remain consistent with the current use.

- **Non-pecuniary effects –** No public resources are known to be impacted by the Site. No public water supplies are impacted (odors, etc.), and the atmosphere is not impacted by noxious odors.

- **Upper Concentration Limits –** Soil EPCs do not exceed their respective MCP upper concentration limits (UCLs) for any soil interval (see Appendix C, Tables C-2.1 through C-2.34). In addition, groundwater EPCs do not exceed their respective MCP UCLs (Appendix C-2, Table C-2.38).

Based on the above information, a Condition of No Significant Risk to public welfare exists at the Site.

3.10.3 Environmental Risk Characterization

This environmental risk characterization briefly describes the terrestrial habitat present at the NBHS campus and evaluates the quality of the habitat associated with the Site. This risk assessment represents a Stage I - Method 3 Environmental Risk Characterization (ERC) under the MCP and was conducted in accordance with the *Guidance for Disposal Site Risk Characterization, Method 3 - Environmental Risk Characterization.* Massachusetts Department of Environmental Protection. Interim Final Policy WSC/ORS-95-141, April 1996. The objectives of this Stage I screening ERC are to determine whether significant environmental exposure exists at the Site and whether additional investigation to assess environmental risks is warranted.

The Site is located within an urbanized setting that provides limited terrestrial habitat for ecological receptors. No aquatic or wetland habitats are present on the Site or in the vicinity of the NBHS. A small wooded area containing both forested upland and an isolated forested wetland is present to the north of the Site and represents the only undeveloped habitat in the vicinity of the Site. Based on a review of priority habitats (Natural Heritage Atlas, 13th Edition, MassGIS, 2008), no state-listed threatened, endangered or species of special concern are present at the Site or in the vicinity. In addition, Areas of Critical Environmental Concern (ACEC) are not located in the vicinity of the Site. Furthermore, due to the nearly level topographic conditions present at the Site, transport of surface soil chemicals to off-Site, sensitive, habitats such as ACECs or wetlands is extremely unlikely.

The fenced and unfenced playing fields containing areas of exposed soil and grass represent maintained, landscaped habitats that provide limited value for ecological receptors. Undeveloped land consisting of non-maintained areas of forest, scrub-shrub or grassland is not present at the fields. The existing buildings, driveways and parking areas associated with the high school (as well as additional impervious areas consisting of basketball/tennis courts) comprise a significant area of impervious surfaces that are present within the campus. Currently, vegetation comprised primarily of maintained lawn is present in scattered patches throughout most of the campus while associated landscape plantings such as ornamental trees are typically present along the edges of parking areas and adjacent to buildings. These vegetated areas also represent maintained, landscaped habitats that provide limited value for ecological receptors. Undeveloped land consisting of non-maintained areas of forest, scrub-shrub or grassland is not present on the campus. Land use at the Site is not expected to change in the foreseeable future that would result in the establishment of more valuable habitats for terrestrial receptors.

Groundwater EPCs are summarized in Appendix C-2, Table C-2.38. As shown in this table, the groundwater analysis indicates the presence of total lead in monitoring wells MW-5 (19.2 µg/L) and MW-HRC-33 (10.5 µg/L) in excess of Method 1 GW-3 groundwater criteria (10 µg/L) (see Appendix C, Table C-1.12). However, dissolved lead was not detected in MW-5 or MW-HRC-33 groundwater, indicating a Condition of No Significant risk to the environment for groundwater exposure pathways.

Therefore, in accordance with the ERC guidance, no significant soil exposure pathways exist for ecological receptors at the Site and groundwater data indicate a Condition of No Significant risk to environmental receptors. Therefore, further ecological investigation at the Site is not warranted.

3.11 Conclusions

An IH condition does not currently exist at the Site. In addition, current soil exposure pathways for the 0 to 3 foot depth are associated with No Significant Risk, as well as emergency utility worker exposures to soils within the 0 to 6 foot interval and shallow groundwater. However, soil EPCs for PAHs, Total TEQs, PCBs, lead and/or antimony are associated with HIs greater than 1 and/or ELCRs greater than 1E-5 for future Site conditions. Therefore, a Condition of No Significant Risk does not exist for potential soil impacts at the Site under future use scenarios. Based on this information, exposures to compounds of concern in soil located deeper than three feet below ground surface should be controlled through the implementation of an AUL. In addition, exceedances of GW-2 standards for select VOCs are noted in the vicinity of monitoring wells MW-7 and MW-24, which are currently not classified as GW-2 due to their placement greater than 30 feet from the existing NBHS building. Should an occupied building be constructed in the future in the vicinity of MW-7 and/or MW-24, the potential for a complete vapor intrusion pathway should be evaluated. Furthermore, BMPs should be used in the future if the Site is used for gardening. BMPs may include gardening in raised beds using imported clean soil with a barrier layer to separate clean soils from underlying impacted soils.

Based on the requirements listed in 310 CMR 40.9060 and 310 CMR 40.0994, the Site does not pose a risk to safety or public welfare.

A Stage I Environmental Risk Characterization indicated no significant soil exposure pathways exist at the Site and groundwater data indicate a Condition of No Significant Risk to environmental receptors. Therefore, further ecological investigation at the Site is not warranted.

4.0 FEASIBILITY OF ACHIEVING BACKGROUND LEVELS

The MCP requires that at Sites where cleanup to a level of No Significant Risk has been performed, an evaluation of the feasibility to achieve or approach background conditions be performed.

Over 7,956 cubic yards of impacted soil have been removed as part of IRA RAM activities to achieve the Partial Permanent Solution with Conditions closure for the NBHS Campus. Potential risks associated with exposure to impacts in Site soil were mitigated by removing soil from one hot spot location at a depth greater than three feet below grade with MCP UCL exceedances and by removing additional areas of soil that contributed to EPCs in excess of the MCP Method 1/Method 2 S-1 standards in the top three feet of soil in unpaved areas. After the soil removal, an AUL was developed for implementation on the property to restrict potential exposure to soils below the top three feet of soil, and beneath pavement and building structures.

The response actions have achieved a Condition of No Significant Risk for the Site, and a Permanent Solution has been demonstrated to be appropriate. The benefit of additional remedial actions to achieve or approach background would be considered insufficient to justify the cost of those actions. Therefore, any additional remedial activity is not warranted and would be substantial and disproportionate to the net gain in risk reduction, especially in a situation where No Significant Risk has been achieved. A Partial Permanent Solution with Conditions is applicable for the Site.

5.0 DATA USABILITY AND REPRESENTATIVENESS

5.1 Data Usability Assessment

5.1.1 Analytical Data Usability Assessment

Refer to Appendix D for a summary of the Data Usability Assessment associated with TRC's investigation of the Site. In general, the analytical data are usable for MCP decisions and a Representativeness Evaluation based on the CAM requirements for acceptable accuracy, precision, and sensitivity. In general, the data are valid as reported and may be used for decision-making purposes with no cautions and/or limitations.

5.1.1.1 Rejection of Analytical Data

Appendix II of the Draft Interim Data Usability Guidance (March 2007) was used to evaluate if gross failures of quality control existed in the TRC Site data set. Any gross failures of quality control in the sampling or analytical procedures are noted in the Data Usability Assessment located in Appendix D.

5.1.2 Field Quality Control Data Usability Assessment

Quality control in the field was assessed in the Data Usability Assessments provided in Appendix D. In general, the results of these QC samples were within the established acceptance criteria. Any non-conformances are noted in Appendix D.

Holding times were achieved for all analyses performed, with the exception noted in Appendix D. Sampling procedures and sample preservation techniques were conducted in accordance with TRC SOPs.

In general, the data are usable for MCP decisions and a Representativeness Evaluation due to acceptable accuracy, precision, and sensitivity on the basis of the field quality control component of the program.

5.1.3 Achievement of Data Quality Objectives

Data Quality Objectives for the Site program were as follows:

- To assess the nature and extent of oil and hazardous material present in soil at the Site.
- To evaluate the potential risks posed by Site chemicals to human health, safety, public welfare and the environment.
- To evaluate the success of the Site remediation activities in achieving a Condition of No Significant Risk as defined by the MCP.

The Data Usability Assessment evaluated whether the data were usable to achieve project objectives. In addition, any cautions or limitations on the data which could affect the achievement of these objectives or the decision-making process were also highlighted.

5.2 Representativeness Evaluation

TRC prepared this Representativeness Evaluation to describe the extent to which Site data provide an accurate representation of Site environmental characteristics pursuant to 310 CMR 40.1056(2)(k) of the MCP and the Draft Final Representativeness and Data Usability Guidance document issued by MassDEP in March 2007 (Policy #WSC-07-350). The precision, accuracy and sensitivity of the Site data used in this Representativeness Evaluation were discussed in the Data Usability Assessment section (Section 5.1) of this Permanent Solution with Conditions. As stated in the Data Usability Assessment, the data are valid as reported and may be used for decision-making purposes with cautions and/or limitations noted in Appendix D.

5.2.1 Conceptual Site Model

The subject Site was subject to disposal activity. The Site is underlain by fill materials found in some locations being similar to those of industrial landfills indicating that some of the fill material is associated with dumping from industrial sources intermixed or containing material classifiable as historic fill under the MCP.

The Site fill contains common urban and industrial fill materials (primarily ash mixed with glass, metal, plastics, and other debris). Chemicals of concern identified in the Site soils are consistent with those attributable to industrial fill (PCBs, antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, vanadium, zinc, various PAHs, and dioxin-like compounds) and historic fill (e.g., coal, coal ash, wood ash and vehicle emission related PAHs, lead, and metals associated with coal).

Groundwater at the Site is impacted by VOCs (PCE, TCE, and vinyl chloride) in an isolated area in the vicinity of groundwater monitoring well MW-7. The source of the VOC impacts is uncertain, but unrelated to the VOC impacts in the vicinity of the mechanical room in the NBHS building that is administratively tracked under RTN 4-22409.

Site investigations completed by TRC and others were consistent with the above summarized site model and detected PCBs, PAHs, metals, dioxin-like compounds and a localized VOC area. The horizontal and vertical extent of oil and hazardous materials detected and remaining in Site soils are groundwater are summarized in Section 2.3. The source of the localized area of VOCs at sample location MW-7 is uncertain. Groundwater monitoring indicated no other impacts to groundwater from Site soil chemicals of concern.

Based on the post-soil removal sampling data, a Permanent Solution with Conditions has been achieved for the Site.

5.2.2 Work Plan, Data Quality Objectives and Data Collection Approach

A summary of TRC's investigation activities and remediation activities are found in Section 1.1.3 and 2.3.2, respectively.

The Data Quality Objectives (DQOs) for TRC's Site testing programs were to collect data that could be used to assess the nature and extent of oil and hazardous materials present in soil; evaluate the potential risks posed by soils and groundwater to human health, safety, public welfare and the environment; and support Site closure, if appropriate. The results of TRC's sampling are summarized in Tables 2-1 through 2-12.

5.2.3 Use of Field/Screening Data

During the field investigations, TRC used field screening data to aid in the collection of soil samples for laboratory analyses. Field screening for soil samples included use of a PID and the MassDEP Jar Headspace Analytical Screening Procedure to evaluate relative levels of VOCs at various depths at each soil boring location. PID readings were recorded on the field boring logs, which have been previously submitted in the RAM Plan, and subsequent RAM Status Reports. No significant PID readings above background were encountered during any of the field investigations. This is consistent with the results for the EPH samples collected by TRC.

Field screening also included visual observations for the presence of anthropogenic historic fill materials including ash, etc. Site history and TRC soil boring logs document the presence of historic fill containing ash.

5.2.4 Selection of Sampling Locations and Depths

Summaries of the sampling locations, depths, chemical analyses and rationale for the investigative samples collected at the Site are provided in Section 2.0 (Permanent Solution with Conditions Supporting Documentation). A summary of the TRC's soil and groundwater analytical results are provided in Tables 2-1 through 2-12.

5.2.5 Number and Spatial Distribution of Sampling Locations

A summary of TRC's investigation activities and remediation activities are found in Section 1.1.3 and 2.3.2, respectively.

The DQOs for TRC's Site testing programs were to collect data that could be used to assess the nature and extent of oil and hazardous materials present in soil; evaluate the potential risks posed by impacted soils and groundwater to human health, safety, public welfare and the environment; and support Site closure, if appropriate. The results of TRC's sampling are summarized in Tables 2-1-through 2-12.

5.2.6 Temporal Distribution of Samples

The conditions at this Site do not warrant monitoring over time. No Time Critical Conditions were identified at the Site. Groundwater is not a concern at this Site. No NAPL was observed in soil borings or noted in wells installed by others. No post-excavation EPCs exceeded the MCP UCLs. In the top three feet of soils, a Condition of No Significant Risk has been achieved.

5.2.7 Critical Samples

Critical soil samples are identified as those samples used in the calculation of EPCs for the Method 3 post-remedial risk characterization presented in Section 3.0, which include all soil boring samples collected by TRC and BETA. The sample results for these critical samples are provided in Tables C-1.1 through C-1.12 in Appendix C.

5.2.8 Completeness

Although certain antimony results were not usable for project objectives, as identified in Appendix D, there was sufficient Site data to adequately quantify EPCs as a result of the Data Usability Assessment presented in Section 5.1 of this Permanent Solution with Conditions. Therefore, >90% completeness was achieved for all Site data.

5.2.9 Uncertainty and Inconsistency

There are no known uncertainties and inconsistencies.

5.2.10 Conclusion from Representativeness Evaluation

TRC has developed the following conclusions with respect to the representativeness of the site data to actual site conditions:

- As indicated by the Data Usability Assessment presented in Section 5.0 of this Partial Permanent Solution with Conditions, the Site data used in this Partial Permanent Solution with Conditions to demonstrate that a Condition of No Significant Risk has been achieved are consistent and/or comparable to current MassDEP CAM requirements.

- The number of samples, sample depths, spatial and temporal distribution of the samples is sufficient to identify releases from the suspected source areas and to delineate the extent of oil and/or hazardous materials impacts at the Site.

- No significant discrepancies between Site history information, field screening results, and/or laboratory sample results were identified that would undermine the conclusions of this Permanent Solution with Conditions.

Based on the above conclusions, TRC has determined that the Site data are sufficiently representative of actual Site conditions and may be used to support this Partial Permanent Solution with Conditions.

6.0 PERMANENT SOLUTION WITH CONDITIONS

A Partial Permanent Solution with Conditions has been achieved at the Site, based on, and in accordance with, the following (310 CMR 40.1040 & 40.1041(2)):

- Response actions have been conducted to achieve a level of No Significant Risk;
- The source of OHM at the Site has been controlled or eliminated;
- A Permanent Solution has been achieved;
- An AUL has been implemented to maintain a level of No Significant Risk; and
- OHM at the Site do not exceed an UCL in soil and groundwater.

A Method 3 risk characterization was used to characterize human health risk at the Site and determined that No Significant Risk has been achieved for the top three feet of soil in unpaved areas. No other response actions are necessary at the Site.

7.0 PUBLIC INVOLVEMENT

The public involvement and/or notification activities to which the City of New Bedford is obligated with regard to this Site under 310 CMR 40.1403(3)(f) include notification regarding the availability of the Permanent Solution with Conditions Statement filed for this Site, which must be submitted to the Chief Municipal Officer and Board of Health in the City of New Bedford. This notification must be made in writing, and will be made concurrently with the filing of the Permanent Solution with Conditions Statement with the MassDEP Southeast Regional Office.

Copies of the public notification letters are provided in Appendix E.

8.0 REFERENCES

BETA, 2006. *Summary of Analytical Data, New Bedford High School, New Bedford, Massachusetts.* Prepared for: City of New Bedford, Department of Environmental Stewardship, 133 William Street, New Bedford, Massachusetts. Prepared by: BETA Group, Inc., Norwood, Massachusetts. June 9, 2006.

DHCD, 2007. Commonwealth of Massachusetts Department of Housing and Community Development. Community Profile for the City of New Bedford. http://www.mass.gov/dhcd/iprofile/205.pdf

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MassDEP, 2002. *Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil – In Support of the Massachusetts Contingency Plan"*(Mass DEP, 2002.

MassDEP, 2004. Massachusetts Department of Environmental Protection (MassDEP) Policy # WSC-04-160, *Conducting Feasibility Evaluations Under the MCP*. July 16, 2004.

TABLES

TABLE 2-1
Summary of Detected Analytical Results for Soil Samples
HS-1: Children's Playground Area
New Bedforn High School
New Bedford, Massachusett

Analysis	Analyte																				
							Sample Location:	PG-1	PG-2	PG-2A	PG-3		PG-4	PG-5	PG-6		PG-6		SS-63	SS-64	SS-65
							Sample Depth (ft.):	0-0.5	0-0.5	1-3	0-0.5	0.5-1.5	0-0.5	0-0.5	0-0.5	0.5-3	0-1	1-3	0-0.5	0-0.5	0-0.5
							Sample Date:	2/22/2006	2/22/2006	4/7/2009	2/22/2006	2/22/2006	2/22/2006	2/22/2006	2/22/2006	2/22/2006	6/10/2011	06/10/201	12/15/2008	12/15/2008	12/15/2008
		S-1/GW-2	S-1/GW-3	S-2/GW-2	S-2/GW-3	RC S-1	TSCA														
PCB Congeners																					
	Total PCBs	2	2	3	3	2	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.00172**	**0.00589**	NA	NA	NA
Metals																					
(mg/kg)	Arsenic	20	20	20	20	20	N/A	NA	NA	2.78 U	NA	**1.22**	NA	NA	NA	**0.786**	NA	NA	3.02 U	4.64 U	3.75 U
	Barium	1,000	1,000	3,000	3,000	1,000	N/A	NA	NA	**7.39**	NA	**43**	NA	NA	NA	**4.93**	NA	NA	**15.5**	**18.8**	**41.2**
	Cadmium	2	2	30	30	2	N/A	NA	NA	0.28 U	NA	**0.36**	NA	NA	NA	0.36 U	NA	NA	0.31 U	0.47 U	0.38 U
	Chromium	30	30	200	200	30	N/A	NA	NA	**2.74**	NA	**26**	NA	NA	NA	**1.72**	NA	NA	**3.84**	**5.45**	**8.43**
	Lead	300	300	300	300	300	N/A	NA	NA	**3.64**	NA	**3.24**	NA	NA	NA	**2.93**	NA	NA	**6.35**	**15.7**	**16.9**
	Nickel	20	20	700	700	20	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.02**	**4.51**	**10.4**
	Vanadium	600	600	1,000	1,000	600	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**7.21**	**9.28 U**	**11.9**
	Zinc	2,500	2,500	3,000	3,000	2,500	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**26.0**	**27.6**	**32.3**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

NA - Sample not analyzed for the listed analyte.

N/A - Not applicable.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

PCBs - Polychlorinated Biphenyls.

RC - Reportable Concentration.

TSCA - Toxic Substances Control Act criteria.

Data are based on the "Summary of Analytical Data, New Bedford High School" dated June 9, 2006, BETA Group, Inc.

TABLE 2-2
Summary of Analytical Detected Results for Soil Samples
HS-2: Fenced Playing Field
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HRA30	HRE-29		HRF-30	HRF-30A	HRG23	HRG25		HRG27		HRG29	HRG-29	HRI23	HRI27	HRI29	HRJ-26	HRJ-30	NBHS-SS-7
			Sample Depth (ft.):	0.75-1	0.67-1	1-3	1-2	1-3	2.5-3	0.5-3	1-3	0.5-3	1-3	0.75-1	1-3	2-3	1.25-3	1.5-3	2.5-4	2-3.5	0-0.5
			Sample Date:	2/22/2006	2/22/2006	4/7/2009	2/22/2006	4/7/2009	2/21/2006	2/21/2006	4/7/2009	2/21/2006	4/7/2009	2/22/2006	4/7/2009	2/21/2006	2/21/2006	2/21/2006	2/21/2006	2/21/2006	8/6/2008
		S-1/GW-2	S-1/GW-3												combo						
VOCs																					
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	**0.15**	NA	NA	NA	NA	NA	NA	NA	**0.26**	NA	NA	NA
	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	0.062 U	NA	NA	NA	NA	NA	NA	NA	**0.17**	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	0.062 U	NA	NA	NA	NA	NA	NA	NA	**0.21**	NA	NA	NA
PAHs																					
(mg/kg)	Acenaphthene	1,000	1,000	NA	NA	0.183 U	NA	0.191 U	NA	NA	0.190 U	NA	0.188 U	NA	0.1895 U	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.193**	NA	0.188 U	NA	0.1895 U	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.658**	NA	0.188 U	NA	0.1895 U	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.86**	NA	0.188 U	NA	**0.5255**	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.73**	NA	0.188 U	NA	**0.5**	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.85**	NA	0.188 U	NA	**0.5115**	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.02**	NA	0.188 U	NA	**0.4475**	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.710**	NA	0.188 U	NA	**0.158 J**	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	0.183 U	NA	0.191 U	NA	NA	**2.36**	NA	0.188 U	NA	**0.587**	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.321**	NA	0.188 U	NA	0.1895 U	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	0.183 U	NA	0.230	NA	NA	**3.11**	NA	0.188 U	NA	**0.7415**	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.386**	NA	0.188 U	NA	0.1895 U	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.26**	NA	0.188 U	NA	**0.483**	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	0.183 U	NA	0.191 U	NA	NA	0.190 U	NA	0.188 U	NA	0.1895 U	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	0.183 U	NA	0.191 U	NA	NA	0.190 U	NA	0.188 U	NA	0.1895 U	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	0.183 U	NA	0.234	NA	NA	**4.38**	NA	0.188 U	NA	**0.778**	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	0.183 U	NA	0.370	NA	NA	**4.37**	NA	0.188 U	NA	**1.295**	NA	NA	NA	NA	NA	NA
PCB Aroclors																					
(mg/kg)	Aroclor 1254	1	1	**0.99**	**0.82**	0.0527 U	**1.1**	**0.234 J**	0.16 U	**0.30**	0.0559 U	**3.79**	0.0548 U	**0.64**	0.0570 U	0.14 U	0.11 U	0.12 U	**0.25**	**0.25**	**0.102 J**
	Aroclor 1260	1	1	**0.94**	0.028 U	0.0527 U	0.029 U	0.0539 U	0.16 U	0.13 U	0.0559 U	0.11 U	0.0548 U	0.11 U	0.0570 U	0.14 U	0.11 U	0.12 U	**0.27**	**0.17**	0.0567 U
	Total PCBs	1	1	**1.93**	**0.82**	0.0527 U	**1.1**	**0.234 J**	0.31 U	**0.3**	0.0559 U	**3.79**	0.0548 U	**0.64**	0.0570 U	0.28 U	0.22 U	0.25 U	**0.52**	**0.42**	**0.102 J**
PCB Congeners																					
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																					
(mg/kg)	Tetrachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																					
(mg/kg)	Arsenic	20	20	NA	NA	2.74 U	NA	2.86 U	NA	NA	**9.74**	NA	2.81 U	NA	2.835 U	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	NA	NA	**6.64**	NA	**11.1**	NA	NA	**74.8**	NA	**15.2**	NA	**28**	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	NA	0.28 U	NA	0.29 U	NA	NA	**0.53**	NA	0.29 U	NA	0.29 U	NA	NA	NA	NA	NA	NA
	Chromium	100	100	NA	NA	**1.96**	NA	**2.13**	NA	NA	**8.61**	NA	**2.84**	NA	**11.0**	NA	NA	NA	NA	NA	NA
	Lead	200	200	NA	NA	**3.51**	NA	**5.77**	NA	NA	**315**	NA	**7.06**	NA	**70.2**	NA	NA	NA	NA	NA	NA
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																					
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	**17.3**	**17.3**	NA	NA	NA	NA	NA	NA	**9.4**	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 stan
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
(1) - MassDEP Method 1 standards and RC for C9-C10 aromatics used.
(2) - MassDEP RC for Dichloropropane used.
(3) - MassDEP RC for Dichloropropene used.
* - TRC developed standards.

TABLE 2-2
Summary of Analytical Detected Results for Soil Samples
HS-2: Fenced Playing Field
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SB-366				SB-367				VSS-9	VSS-10		VSS-11	SS-11		SS-12		SS-13		SS-14	
			Sample Depth (ft.):	1	1-3	4	7	1	1-3	5-6	8-9	0-0.5	0-0.5	0.5-1	0-0.5	0.5	2	0.5	2	0.5	1.5	0.5	2
			Sample Date:	2/26/2009	2/26/2009	2/26/2009	2/26/2009	2/26/2009	2/26/2009	2/26/2009	2/26/2009	7/23/2001	7/23/2001	7/23/2001	7/23/2001	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008
		S-1/GW-2	S-1/GW-3																				
VOCs																							
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs																							
(mg/kg)	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U	0.180 U	0.177 U	0.202 U	**0.197**	0.205 U	0.178 U
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U	0.180 U	0.177 U	0.202 U	**0.329**	0.205 U	0.178 U
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U	0.180 U	0.177 U	0.202 U	**1.21**	0.205 U	0.178 U
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.308**	0.180 U	0.177 U	0.202 U	**3.40**	0.205 U	**0.210**
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.299**	0.180 U	0.177 U	0.202 U	**2.16**	0.205 U	**0.217**
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.292**	0.180 U	0.177 U	0.202 U	**2.41**	0.205 U	**0.186**
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.257**	0.180 U	0.177 U	0.202 U	**1.20**	0.205 U	**0.200**
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U	0.180 U	0.177 U	0.202 U	**1.73**	0.205 U	0.178 U
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.313**	0.180 U	0.177 U	0.202 U	**2.55**	0.205 U	**0.212**
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U	0.180 U	0.177 U	0.202 U	**0.240**	0.205 U	0.178 U
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.627**	**0.309**	0.177 U	**0.218**	**6.71**	0.205 U	**0.431**
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U	0.180 U	0.177 U	0.202 U	**0.442**	0.205 U	0.178 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.255**	0.180 U	0.177 U	0.202 U	**1.57**	0.205 U	**0.181**
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U	0.180 U	0.177 U	0.202 U	0.180 U	0.205 U	0.178 U
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U	0.180 U	0.177 U	0.202 U	0.180 U	0.205 U	0.178 U
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.673**	**0.193**	0.177 U	0.202 U	**5.85**	0.205 U	**0.280**
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.725**	**0.330**	0.177 U	0.202 U	**5.53**	0.205 U	**0.428**
PCB Aroclors																							
(mg/kg)	Aroclor 1254	1	1	**0.282 J**	**0.238 J**	0.0587 U	0.220 UJ	**0.1160 J**	**0.0687 J**	0.0698 U	0.140 U	0.100 U	**0.111**	**0.116**	0.100 U	0.0500 U	**0.497 J**	**0.491 J**	0.0511 U	**0.0978 J**	**1.15** J	0.0575 U	**0.945 J**
	Aroclor 1260	1	1	0.0632 U	**0.107 J**	0.0587 U	0.220 UJ	0.0567 U	0.0552 U	0.0698 U	0.140 U	0.100 U	0.100 U	0.100 U	0.100 U	0.0500 U	**0.101 J**	**0.188 J**	0.0511 U	**0.0629 J**	**0.795 J**	0.0575 U	0.0522 U
	Total PCBs	1	1	**0.282 J**	**0.345 J**	0.0587 U	0.220 UJ	**0.116 J**	**0.0687 J**	0.0698 U	0.140 U	0.100 U	**0.111**	**0.116**	0.100 U	0.0500 U	**0.598 J**	**0.679 J**	0.0511 U	**0.1607 J**	**1.945 J**	0.0575 U	**0.945 J**
PCB Congeners																							
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																							
(mg/kg)	Tetrachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																							
(mg/kg)	Arsenic	20	20	**3.68**	2.68 U	**12.0**	9.97 U	3.06 U	2.70 U	**22.1**	4.18 U	**2.06**	**1.61**	**2.29**	**1.85**	2.59 U	**2.87**	2.69 U	2.65 U	3.03 U	**3.87**	**4.46**	2.66 U
	Barium	1,000	1,000	**40.4**	**21.7**	**783**	**153**	**41.8**	**29.7**	**382**	**14.6**	**18**	**19**	**23**	**27**	5.18 U	**84.3**	**9.17**	**11.9**	**19.5**	**77.6**	**88.2**	**53.0**
	Beryllium	90	90	0.33 U	0.27 U	**0.64**	1.00 U	0.31 U	0.27 U	**0.61**	0.42 U	NA	NA	NA	NA	0.26 U	0.28 U	0.27 U	0.27 U	0.31 U	0.27 U	0.31 U	0.27 U
	Cadmium	70	70	0.33 U	0.27 U	**9.17**	1.00 U	**0.38**	0.27 U	**0.70**	0.42 U	0.40 U	0.35 U	**0.42**	0.33 U	0.26 U	**0.43**	0.27 U	0.27 U	0.31 U	**0.74**	**1.09**	**0.36**
	Chromium	100	100	**19.3**	**2.77**	**44.3**	**3.27**	**10.0**	**4.19**	**27.2**	**7.33**	**5.03**	**4.13**	**5.28**	**9.76**	**2.02**	**9.51**	**2.58**	**1.92**	**5.74**	**13.0**	**15.6**	**5.27**
	Lead	200	200	**28.3**	**37.5**	**2,360**	**56.2**	**65.0**	**36.1**	**425**	**2.91**	**27**	**43**	0.35 U	**16**	**1.86**	**137**	**42.9**	**4.03**	**43.2**	**338**	**363**	**58.8**
	Mercury	20	20	**0.051**	**0.016**	**0.420**	**0.134**	**0.093**	**0.064**	**0.092**	0.034 U	0.08 U	**0.09**	**0.19**	0.07 U	0.015 U	**0.087**	**0.031**	0.019 U	**0.061**	**0.368**	**0.050**	**0.127**
	Nickel	600	600	**8.83**	**2.57**	**15.7**	**14.4**	**4.27**	**3.31**	**49.3**	**6.13**	NA	NA	NA	NA	**1.52**	**5.15**	**1.53**	**2.07**	**3.04**	**8.23**	**10.0**	**3.98**
	Silver	100	100	0.66 U	0.54 U	0.60 U	2.00 U	0.62 U	0.54 U	0.70 U	0.84 U	0.40 U	0.35 U	0.35 U	0.33 U	0.52 U	**0.85**	0.54 U	0.53 U	**0.86**	**1.16**	**1.31**	**0.86**
	Vanadium	400	400	**18.4**	5.35 U	**23.2**	20.0 U	**11.4**	5.40 U	**56.1**	**8.36**	NA	NA	NA	NA	5.18 U	**7.30**	5.38 U	5.30 U	**10.3**	**14.9**	**18.7**	**5.70**
	Zinc	1,000	1,000	**33.7**	**28.2**	**958**	**375**	**50.5**	**25.1**	**323**	**25.8**	NA	NA	NA	NA	**4.57**	**67.9**	**19.7**	**14.2**	**38.4**	**129**	**151**	**64.0**
GRO																							
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 stan
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
(1) - MassDEP Method 1 standards and RC for C9-C10 aromatics used.
(2) - MassDEP RC for Dichloropropane used.
(3) - MassDEP RC for Dichloropropene used.
* - TRC developed standards.

TABLE 2-2
Summary of Analytical Detected Results for Soil Samples
HS-2: Fenced Playing Field
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SS-15		SS-16			SS-17		SS-18		SS-19			SS-20			SS-21		SS-22	
		Sample Depth (ft.):		0.5	2	0.5	1	2	0.5	1.5	0.5	2	0.5	1	2	0.5	1	2	0.5	2	0.5	1.5
		Sample Date:		8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008
		S-1/GW-2	S-1/GW-3														combo					
VOCs																						
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs																						
(mg/kg)	Acenaphthene	1,000	1,000	0.180 U	0.177 U	0.179 U	**0.200**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U	0.201 U	**1.93**	0.191 U	0.181 U
	Acenaphthylene	600	10	0.180 U	0.177 U	0.179 U	0.182 U	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U	0.201 U	0.181 U	0.191 U	0.181 U
	Anthracene	1,000	1,000	0.180 U	0.177 U	0.179 U	**0.845**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**0.964**	0.170 U	0.178 U	0.184 U	0.173 U	0.201 U	**3.19**	0.191 U	**0.182**
	Benzo(a)anthracene	7	7	0.180 U	0.177 U	0.179 U	**2.30**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**2.15**	0.170 U	0.178 U	**0.473**	0.173 U	**0.398**	**4.16**	0.191 U	**0.789**
	Benzo(a)pyrene	2	2	0.180 U	0.177 U	0.179 U	**1.99**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**1.89**	0.170 U	0.178 U	**0.458**	0.173 U	**0.381**	**3.93**	0.191 U	**0.749**
	Benzo(b)fluoranthene	7	7	0.180 U	0.177 U	0.179 U	**2.11**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**2.24**	0.170 U	0.178 U	**0.553**	0.173 U	**0.453**	**4.01**	0.191 U	**0.843**
	Benzo(g,h,i)perylene	1,000	1,000	0.180 U	0.177 U	0.179 U	**1.06**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**1.43**	0.170 U	0.178 U	**0.24275 J**	0.173 U	**0.303**	**3.13**	0.191 U	**0.508**
	Benzo(k)fluoranthene	70	70	0.180 U	0.177 U	0.179 U	**0.978**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	**0.14675 J**	0.173 U	0.201 U	**1.66**	0.191 U	**0.325**
	Chrysene	70	70	0.180 U	0.177 U	0.179 U	**2.12**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**2.13**	0.170 U	0.178 U	**0.460**	0.173 U	**0.404**	**4.05**	0.191 U	**0.795**
	Dibenz(a,h)anthracene	0.7	0.7	0.180 U	0.177 U	0.179 U	**0.303**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U	0.201 U	**0.722**	0.191 U	0.181 U
	Fluoranthene	1,000	1,000	0.180 U	0.177 U	0.179 U	**3.96**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**5.06**	0.170 U	0.178 U	**0.7525**	0.173 U	**0.826**	**10.3**	0.191 U	**1.31**
	Fluorene	1,000	1,000	0.180 U	0.177 U	0.179 U	**0.412**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U	0.201 U	**1.37**	0.191 U	0.181 U
	Indeno(1,2,3-cd)pyrene	7	7	0.180 U	0.177 U	0.179 U	**1.24**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**1.51**	0.170 U	0.178 U	**0.25825 J**	0.173 U	**0.334**	**3.41**	0.191 U	**0.585**
	2-Methylnaphthalene	80	300	0.180 U	0.177 U	0.179 U	0.182 U	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U	0.201 U	**0.392**	0.191 U	0.181 U
	Naphthalene	20	500	0.180 U	0.177 U	0.179 U	0.182 U	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U	0.201 U	**0.658**	0.191 U	0.181 U
	Phenanthrene	500	500	0.180 U	0.177 U	0.179 U	**3.25**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**4.42**	0.170 U	0.178 U	**0.412**	0.173 U	**0.610**	**11.2**	0.191 U	**0.853**
	Pyrene	1,000	1,000	0.180 U	0.177 U	0.179 U	**3.41**	0.172 U	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**4.48**	0.170 U	0.178 U	**1.03**	0.173 U	**0.897**	**11.2**	**0.209**	**1.43**
PCB Aroclors																						
(mg/kg)	Aroclor 1254	1	1	0.0528 U	**0.0873 J**	0.0526 U	**3.43 J**	0.0500 U	0.0518 U	0.0507 U	0.0502 U	0.0500 U	0.0512 U	**4.93 J**	0.0500 U	0.0519 U	**0.5 J**	0.0502 U	**0.486 J**	**0.269 J**	0.0543 U	**0.654 J**
	Aroclor 1260	1	1	0.0528 U	0.0520 U	0.0526 U	0.107 U	0.0500 U	0.0518 U	0.0507 U	0.0502 U	0.0500 U	0.0512 U	0.166 U	0.0500 U	0.0519 U	0.0529 U	0.0502 U	0.0564 U	0.0523 U	0.0543 U	**0.142 J**
	Total PCBs	1	1	0.0528 U	**0.0873 J**	0.0526 U	**3.43 J**	0.0500 U	0.0518 U	0.0507 U	0.0502 U	0.0500 U	0.0512 U	**4.93 J**	0.0500 U	0.0519 U	**0.5 J**	0.0502 U	**0.486 J**	**0.269 J**	0.0543 U	**0.796 J**
PCB Congeners																						
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																						
(mg/kg)	Tetrachlorobiphenyl	NS	NS	NA	NA	NA	**0.32**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	NS	NS	NA	NA	NA	**2.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	NS	NS	NA	NA	NA	**1.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	NS	NS	NA	NA	NA	**0.036 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	**3.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																						
(mg/kg)	Arsenic	20	20	**4.36**	2.66 U	**4.75**	**5.70**	2.58 U	**4.87**	2.61 U	**4.61**	2.56 U	**4.23**	**8.07**	2.55 U	**4.65**	**3.245**	2.59 U	**4.51**	2.72 U	**3.80**	**4.12**
	Barium	1,000	1,000	**167**	**15.9**	**209**	**130**	**7.08**	**202**	**11.3**	**181**	**6.92**	**204**	**437**	**11.2**	**244**	**50.15**	**9.38**	**56.4**	**14.9**	**36.4**	**174**
	Beryllium	90	90	0.27 U	0.27 U	0.27 U	0.28 U	0.26 U	0.27 U	0.27 U	0.27 U	0.26 U	0.27 U	0.28 U	**0.47**	0.27 U	0.28 U	0.26 U	0.31 U	0.28 U	0.29 U	0.28 U
	Cadmium	70	70	**0.29**	0.27 U	0.27 U	**1.68**	0.26 U	0.27 U	0.27 U	0.27 U	0.26 U	0.27 U	**5.29**	0.26 U	0.27 U	**2.74**	0.26 U	**0.89**	0.28 U	0.29 U	**1.74**
	Chromium	100	100	**54.6**	**2.34**	**58.6**	**15.4**	**2.09**	**54.9**	**2.85**	**59.0**	**1.94**	**68.1**	**30.2**	**2.24**	**66.7**	**12.35**	**2.15**	**17.6**	**3.09**	**14.7**	**11.8**
	Lead	200	200	**0.97**	**13.7**	0.81 U	**342**	**4.07**	0.81 U	**2.78**	**0.87**	**2.31**	**4.02**	**671**	**4.41**	**1.75**	**78.65**	**2.82**	**115**	**19.1**	**36.1**	**355**
	Mercury	20	20	0.013 U	**0.181**	0.015 U	**0.313**	0.020 U	0.015 U	0.021 U	0.024 U	0.017 U	0.020 U	**0.616**	**0.017**	0.026 U	**0.0835**	0.019 U	**0.117**	**0.021**	**0.050**	**0.263**
	Nickel	600	600	**33.6**	**2.25**	**29.1**	**10.0**	**1.87**	**23.3**	**2.12**	**25.1**	**2.42**	**30.9**	**21.4**	**2.70**	**29.5**	**7.765**	**2.41**	**9.71**	**3.39**	**8.27**	**9.98**
	Silver	100	100	**5.35**	**0.54**	**3.05**	**1.36**	0.52 U	**2.07**	0.53 U	**1.11**	**0.98**	**4.93**	**5.89**	**1.38**	**5.31**	**2.725**	**1.07**	**4.36**	**1.31**	**2.78**	**3.11**
	Vanadium	400	400	**39.1**	5.31 U	**49.2**	**14.1**	5.16 U	**48.0**	5.22 U	**47.2**	5.12 U	**50.3**	**24.6**	5.10 U	**59.3**	**15.35**	5.17 U	**19.6**	5.43 U	**19.9**	**11.6**
	Zinc	1,000	1,000	**24.0**	**14.9**	**30.0**	**190**	**6.75**	**30.4**	**8.27**	**30.5**	**7.51**	**49.6**	**562**	**9.06**	**39.4**	**80.3**	**8.34**	**84.4**	**23.4**	**33.2**	**174**
GRO																						
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 stan
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
(1) - MassDEP Method 1 standards and RC for C9-C10 aromatics used.
(2) - MassDEP RC for Dichloropropane used.
(3) - MassDEP RC for Dichloropropene used.
* - TRC developed standards.

TABLE 2-2
Summary of Analytical Detected Results for Soil Samples
HS-2: Fenced Playing Field
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SS-23		SS-24			SS-25		SS-26			SS-27			SS-28				SS-29	
			Sample Depth (ft.):	0.5	2	0.5	1.5	1-3	0.5	1.5	0.5	1.5	2	0.5	2	1-3	0.5	1.5	0-1	1-3	0.5	2
			Sample Date:	8/7/2008	8/7/2008	8/7/2008	8/7/2008	3/31/2009	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	3/31/2009	8/7/2008	8/7/2008	6/8/2011	6/8/2011	8/7/2008	8/7/2008
		S-1/GW-2	S-1/GW-3															combo				
VOCs																						
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs																						
(mg/kg)	Acenaphthene	1,000	1,000	0.196 U	0.176 U	0.198 U	0.184 U	**0.920**	0.200 U	0.189 U	0.204 U	**0.652**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Acenaphthylene	600	10	0.196 U	0.176 U	0.198 U	0.184 U	**2.40**	0.200 U	0.189 U	0.204 U	**0.271**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Anthracene	1,000	1,000	0.196 U	0.176 U	0.198 U	0.184 U	**4.11**	0.200 U	0.189 U	0.204 U	**2.23**	0.176 U	0.188 U	0.196 U	**0.224**	0.203 U	**0.15425 J**	NA	NA	0.200 U	0.208 U
	Benzo(a)anthracene	7	7	0.196 U	0.176 U	0.198 U	0.184 U	**6.33**	0.200 U	**0.216**	0.204 U	**3.86**	0.176 U	0.188 U	**0.273**	**1.44**	**0.394**	**0.6735**	NA	NA	0.200 U	0.208 U
	Benzo(a)pyrene	2	2	0.196 U	0.176 U	0.198 U	0.184 U	**5.28**	0.200 U	**0.214**	0.204 U	**3.09**	0.176 U	0.188 U	**0.254**	**1.26**	**0.372**	**0.628**	NA	NA	0.200 U	0.208 U
	Benzo(b)fluoranthene	7	7	0.196 U	0.176 U	0.198 U	0.184 U	**6.09**	0.200 U	0.189 U	0.204 U	**3.10**	0.176 U	0.188 U	**0.298**	**1.85**	0.203 U	**0.6815**	NA	NA	0.200 U	0.208 U
	Benzo(g,h,i)perylene	1,000	1,000	0.196 U	0.176 U	0.198 U	0.184 U	**2.47**	0.200 U	0.189 U	0.204 U	**2.49**	0.176 U	0.188 U	0.196 U	**0.712**	**0.352**	**0.462**	NA	NA	0.200 U	0.208 U
	Benzo(k)fluoranthene	70	70	0.196 U	0.176 U	0.198 U	0.184 U	**2.42**	0.200 U	0.189 U	0.204 U	**1.26**	0.176 U	0.188 U	0.196 U	**0.640**	0.203 U	**0.2445**	NA	NA	0.200 U	0.208 U
	Chrysene	70	70	0.196 U	0.176 U	0.198 U	0.184 U	**5.98**	0.200 U	**0.237**	0.204 U	**3.53**	0.176 U	0.188 U	**0.291**	**1.67**	**0.378**	**0.6845**	NA	NA	0.200 U	0.208 U
	Dibenz(a,h)anthracene	0.7	0.7	0.196 U	0.176 U	0.198 U	0.184 U	**0.780**	0.200 U	0.189 U	0.204 U	**0.675**	0.176 U	0.188 U	0.196 U	**0.204**	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Fluoranthene	1,000	1,000	0.196 U	0.176 U	**0.266**	0.184 U	**12.1**	0.200 U	**0.353**	0.204 U	**8.39**	0.176 U	0.188 U	**0.549**	**2.76**	**0.670**	**1.27**	NA	NA	0.200 U	0.208 U
	Fluorene	1,000	1,000	0.196 U	0.176 U	0.198 U	0.184 U	**3.20**	0.200 U	0.189 U	0.204 U	**1.07**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Indeno(1,2,3-cd)pyrene	7	7	0.196 U	0.176 U	0.198 U	0.184 U	**3.35**	0.200 U	0.189 U	0.204 U	**2.83**	0.176 U	0.188 U	**0.243**	**0.965**	**0.382**	**0.5405**	NA	NA	0.200 U	0.208 U
	2-Methylnaphthalene	80	300	0.196 U	0.176 U	0.198 U	0.184 U	**1.52**	0.200 U	0.189 U	0.204 U	**0.487**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Naphthalene	20	500	0.196 U	0.176 U	0.198 U	0.184 U	**2.55**	0.200 U	0.189 U	0.204 U	**0.584**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Phenanthrene	500	500	0.196 U	0.176 U	0.198 U	0.184 U	**18.9**	0.200 U	0.189 U	0.204 U	**8.55**	0.176 U	0.188 U	**0.350**	**1.54**	**0.640**	**0.8955**	NA	NA	0.200 U	0.208 U
	Pyrene	1,000	1,000	0.196 U	0.176 U	**0.278**	0.184 U	**11.1**	0.200 U	**0.412**	0.204 U	**7.93**	0.176 U	0.188 U	**0.521**	**2.75**	**0.729**	**1.185**	NA	NA	0.200 U	0.208 U
PCB Aroclors																						
(mg/kg)	Aroclor 1254	1	1	0.0590 U	0.0522 U	0.0545 U	0.0524 U	0.0599 U	0.0592 U	**0.208 J**	0.0567 U	**1.31** J	0.0519 U	**0.0882 J**	**0.462 J**	**0.197 J**	**4.19 J**	**2.25 J**	NA	NA	0.0578 U	**0.187 J**
	Aroclor 1260	1	1	0.0590 U	0.0522 U	0.0545 U	0.0524 U	0.0599 U	0.0592 U	**0.0772 J**	0.0567 U	**0.343 J**	0.0519 U	0.0564 U	**0.175 J**	0.0537 U	0.110 U	0.05595 U	NA	NA	0.0578 U	**0.245 J**
	Total PCBs	1	1	0.0590 U	0.0522 U	0.0545 U	0.0524 U	0.0599 U	0.0592 U	**0.2852 J**	0.0567 U	**1.653 J**	0.0519 U	**0.0882 J**	**0.637 J**	**0.197 J**	**4.19 J**	**2.25 J**	NA	NA	0.0578 U	**0.432 J**
PCB Congeners																						
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.4E-01**	**2.3E-02**	NA	NA
PCB Homologs																						
(mg/kg)	Tetrachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	0.027 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	**0.034**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	0.027 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	0.041 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	**0.034**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																						
(mg/kg)	Arsenic	20	20	**3.55**	2.64 U	**3.19**	2.76 U	**7.05**	**3.42**	**3.96**	**3.23**	**7.53**	2.64 U	2.82 U	**3.46**	**5.68**	3.04 U	**5.45**	NA	NA	2.99 U	**8.34**
	Barium	1,000	1,000	**39.2**	**9.27**	**22.2**	**14.4**	**277**	**26.8**	**63.2**	**29.1**	**157**	**14.2**	**19.3**	**151**	**325**	**27.2**	**117.5**	NA	NA	**17.1**	**296**
	Beryllium	90	90	0.30 U	0.27 U	0.30 U	0.28 U	NA	0.30 U	0.29 U	0.31 U	**0.29**	0.27 U	0.29 U	0.30 U	NA	0.31 U	**0.2175 J**	NA	NA	0.30 U	**0.82**
	Cadmium	70	70	0.30 U	0.27 U	0.30 U	0.28 U	**1.28**	0.30 U	**0.69**	0.31 U	**2.43**	0.27 U	**0.42**	**0.73**	**1.17**	**0.39**	**1.69**	NA	NA	0.30 U	**0.72**
	Chromium	100	100	**16.7**	**2.11**	**8.84**	**2.41**	**11.9**	**15.7**	**10.5**	**16.9**	**13.5**	**2.24**	**6.33**	**7.85**	**7.09**	**6.99**	**13.65**	NA	NA	**5.19**	**13.0**
	Lead	200	200	**21.9**	**3.50**	**31.5**	**9.45**	**401**	**24.3**	**141**	**21.4**	**537**	**10.4**	**40.3**	**284**	**890**	**64.3**	**387**	NA	NA	**26.9**	**426**
	Mercury	20	20	**0.044**	0.020 U	**0.056**	0.022 U	NA	**0.046**	**0.165**	**0.057**	**1.02**	**0.027**	**0.052**	**0.147**	NA	**0.107**	**0.725**	NA	NA	**0.059**	**0.792**
	Nickel	600	600	**9.02**	**2.57**	**6.17**	**2.79**	NA	**7.33**	**5.30**	**7.64**	**25.7**	**2.65**	**4.76**	**6.56**	NA	**4.56**	**8.655**	NA	NA	**3.28**	**12.4**
	Silver	100	100	**2.56**	**1.04**	**1.91**	**1.17**	NA	**1.12**	**0.79**	**1.04**	**2.66**	**1.20**	**1.29**	**0.98**	NA	**0.89**	**1.58**	NA	NA	**0.68**	**1.19**
	Vanadium	400	400	**20.3**	5.28 U	**14.3**	5.52 U	NA	**17.0**	**11.2**	**17.1**	**10.7**	5.27 U	**10.1**	**8.33**	NA	**11.1**	**11.5**	NA	NA	**9.87**	**23.4**
	Zinc	1,000	1,000	**25.1**	**7.90**	**21.8**	**17.1**	NA	**24.3**	**140**	**22.7**	**279**	**28.1**	**79.7**	**244**	NA	**41.1**	**187.5**	NA	NA	**21.7**	**218**
GRO																						
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 stan
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
(1) - MassDEP Method 1 standards and RC for C9-C10 aromatics used.
(2) - MassDEP RC for Dichloropropane used.
(3) - MassDEP RC for Dichloropropene used.
* - TRC developed standards.

TABLE 2-2
Summary of Analytical Detected Results for Soil Samples
HS-2: Fenced Playing Field
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SS-30		SS-31			SS-32A		SS-32B		SS-32C		SS-32D		SS-33		SS-34		SS-35		
			Sample Depth (ft.):	0.5	1.5	0.5	2	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0.5	2	0.5	2	0.5	1.5	1-3
			Sample Date:	8/7/2008	8/7/2008	8/7/2008	8/7/2008	3/31/2009	2/26/2009	2/26/2009	2/27/2009	2/27/2009	2/27/2009	2/27/2009	2/27/2009	2/27/2009	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	3/31/2009
		S-1/GW-2	S-1/GW-3					combo							combo								
VOCs																							
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs																							
(mg/kg)	Acenaphthene	1,000	1,000	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	**0.184**
	Acenaphthylene	600	10	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	0.177 U
	Anthracene	1,000	1,000	0.188 U	**0.663**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**0.350**	0.195 U	0.177 U	0.197 U	**0.420**	**0.510**
	Benzo(a)anthracene	7	7	0.188 U	**0.965**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**0.704**	0.195 U	0.177 U	0.197 U	**0.764**	**1.15**
	Benzo(a)pyrene	2	2	0.188 U	**0.758**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**0.662**	0.195 U	0.177 U	0.197 U	**0.647**	**1.11**
	Benzo(b)fluoranthene	7	7	0.188 U	**0.751**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**0.711**	0.195 U	0.177 U	0.197 U	**0.653**	**1.17**
	Benzo(g,h,i)perylene	1,000	1,000	0.188 U	**0.454**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**0.436**	0.195 U	0.177 U	0.197 U	**0.328**	**0.737**
	Benzo(k)fluoranthene	70	70	0.188 U	**0.372**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**0.281**	0.195 U	0.177 U	0.197 U	**0.276**	**0.407**
	Chrysene	70	70	0.188 U	**0.875**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**0.686**	0.195 U	0.177 U	0.197 U	**0.723**	**1.25**
	Dibenz(a,h)anthracene	0.7	0.7	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	0.177 U
	Fluoranthene	1,000	1,000	0.188 U	**2.59**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**1.53**	0.195 U	0.177 U	0.197 U	**1.68**	**2.39**
	Fluorene	1,000	1,000	0.188 U	**0.286**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	**0.208**
	Indeno(1,2,3-cd)pyrene	7	7	0.188 U	**0.559**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**0.473**	0.195 U	0.177 U	0.197 U	**0.405**	**0.793**
	2-Methylnaphthalene	80	300	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	0.177 U
	Naphthalene	20	500	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	0.177 U
	Phenanthrene	500	500	0.188 U	**3.01**	0.195 U	0.212 U	0.1905 U	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**1.27**	0.195 U	0.177 U	0.197 U	**1.74**	**3.21**
	Pyrene	1,000	1,000	0.188 U	**1.91**	0.195 U	0.212 U	**0.15275 J**	NA	NA	NA	NA	NA	NA	NA	NA	0.203 U	**1.33**	0.195 U	0.177 U	0.197 U	**1.46**	**3.37**
PCB Aroclors																							
(mg/kg)	Aroclor 1254	1	1	0.0566 U	0.0506 U	**0.0664 J**	0.0592 U	0.0563 U	0.0612 U	**0.520 J**	**0.153 J**	0.0583 U	**0.0931 J**	**0.175 J**	**0.259 J**	**0.814 J**	**0.103 J**	**0.408 J**	**0.160 J**	0.0525 U	**0.161 J**	**0.472 J**	0.0529 U
	Aroclor 1260	1	1	0.0566 U	0.0506 U	0.0546 U	0.0592 U	0.0563 U	0.0612 U	0.0555 U	0.0569 U	0.0583 U	0.0645 U	0.0548 U	0.0619 U	0.0554 U	0.0576 U	**0.130 J**	0.0593 U	0.0525 U	0.0568 U	**0.213 J**	0.0529 U
	Total PCBs	1	1	0.0566 U	0.0506 U	**0.0664 J**	0.0592 U	0.0563 U	0.0612 U	**0.520 J**	**0.153 J**	0.0583 U	**0.0931 J**	**0.175 J**	**0.2585 J**	**0.814 J**	**0.103 J**	**0.538 J**	**0.160 J**	0.0525 U	**0.161 J**	**0.685 J**	0.0529 U
PCB Congeners																							
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																							
(mg/kg)	Tetrachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																							
(mg/kg)	Arsenic	20	20	2.82 U	2.62 U	**2.99**	**9.18**	**5.82**	NA	NA	NA	NA	NA	NA	NA	NA	3.04 U	2.75 U	**3.09**	2.66 U	2.96 U	**5.15**	2.66 U
	Barium	1,000	1,000	**18.2**	**14.9**	**18.6**	**197**	**136**	NA	NA	NA	NA	NA	NA	NA	NA	**22.2**	**63.4**	**26.2**	**15.9**	**20.3**	**37.8**	**24.4**
	Beryllium	90	90	0.29 U	0.27 U	0.30 U	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.31 U	0.28 U	0.30 U	0.27 U	0.30 U	0.28 U	NA
	Cadmium	70	70	0.29 U	0.27 U	0.30 U	**0.82**	**0.2225 J**	NA	NA	NA	NA	NA	NA	NA	NA	0.31 U	0.28 U	0.30 U	0.27 U	0.30 U	0.28 U	0.27 U
	Chromium	100	100	**6.54**	**2.76**	**5.66**	**10.5**	**7.11**	NA	NA	NA	NA	NA	NA	NA	NA	**6.02**	**6.69**	**6.53**	**2.32**	**5.02**	**7.74**	**4.10**
	Lead	200	200	**22.7**	**52.4**	**31.7**	**302**	**219**	NA	NA	NA	NA	NA	NA	NA	NA	**37.0**	**130**	**90.4**	**4.28**	**37.1**	**109**	**45.0**
	Mercury	20	20	**0.047**	**0.018**	**0.057**	**0.233**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.084**	**0.315**	**0.084**	0.022 U	**0.063**	**0.162**	NA
	Nickel	600	600	**4.67**	**3.09**	**6.18**	**12.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.71**	**5.77**	**5.39**	**2.67**	**3.76**	**5.45**	NA
	Silver	100	100	**2.01**	**1.26**	**1.89**	**3.47**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.86**	**1.70**	**2.44**	**1.15**	**1.70**	**2.12**	NA
	Vanadium	400	400	**12.3**	**5.34**	**11.9**	**25.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**11.8**	**8.77**	**13.0**	5.31 U	**10.9**	**10.1**	NA
	Zinc	1,000	1,000	**21.0**	**28.6**	**26.9**	**93.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**33.9**	**70.3**	**39.9**	**10.6**	**26.8**	**57.0**	NA
GRO																							
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 stan
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
(1) - MassDEP Method 1 standards and RC for C9-C10 aromatics used.
(2) - MassDEP RC for Dichloropropane used.
(3) - MassDEP RC for Dichloropropene used.
* - TRC developed standards.

TABLE 2-3
Summary of Analytical Detected Results for Soil Samples
HS-3: Unfenced Playing Field
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HRG17		HRG21	HRI-17		HRI-19	HRJ.75-17	HRK-19	HRK-21		HRK23	NBHS-SS-5	NBHS-SS-6	VSS-6	VSS-7	VSS-8
		Sample Depth (ft.):		2.5-3	1-3	2.5-3	2-3	1-3	1.5-2.5	1-2.5	1-3	1-3	1-3	0.5-3	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
		Sample Date:		2/21/2006	4/7/2009	2/21/2006	2/21/2006	4/7/2009	2/21/2006	2/21/2006	2/21/2006	2/21/2006	4/7/2009	2/21/2006	8/6/2008	8/6/2008	7/23/2001	7/23/2001	7/23/2001
		S-1/GW-2	S-1/GW-3									combo							
VOCs																			
(mg/kg)	Benzene	40	40	NA	NA	NA	NA	NA	NA	**0.036**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	**11**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Toluene	500	500	NA	NA	NA	NA	NA	NA	**0.041**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,4-Trimethylbenzene	100(1)	100(1)	NA	NA	NA	NA	NA	NA	**0.046**	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs																			
(mg/kg)	Acenaphthene	1,000	1,000	NA	0.182 U	NA	NA	0.196 U	NA	NA	NA	NA	**0.332**	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	0.182 U	NA	NA	0.196 U	NA	NA	NA	NA	0.255 U	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	0.182 U	NA	NA	**0.613**	NA	NA	NA	NA	**0.972**	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	0.182 U	NA	NA	**1.97**	NA	NA	NA	NA	**1.72**	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	0.182 U	NA	NA	**1.89**	NA	NA	NA	NA	**1.51**	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	0.182 U	NA	NA	**2.13**	NA	NA	NA	NA	**1.76**	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	0.182 U	NA	NA	**0.865**	NA	NA	NA	NA	**0.902**	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	0.182 U	NA	NA	**0.851**	NA	NA	NA	NA	**0.657**	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	0.182 U	NA	NA	**2.01**	NA	NA	NA	NA	**1.84**	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.182 U	NA	NA	**0.266**	NA	NA	NA	NA	**0.273**	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	0.182 U	NA	NA	**3.12**	NA	NA	NA	NA	**3.47**	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	0.182 U	NA	NA	0.196 U	NA	NA	NA	NA	**0.453**	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	0.182 U	NA	NA	**1.16**	NA	NA	NA	NA	**1.17**	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	0.182 U	NA	NA	0.196 U	NA	NA	NA	NA	**0.367**	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	0.182 U	NA	NA	**2.60**	NA	NA	NA	NA	**4.69**	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	0.182 U	NA	NA	**3.64**	NA	NA	NA	NA	**3.59**	NA	NA	NA	NA	NA	NA
PCB Aroclors																			
(mg/kg)	Aroclor 1254	1	1	0.11 U	**0.162 J**	**0.15**	**0.34**	**0.0940 J**	**0.23**	**0.76**	0.04 U	0.039 U	0.0655 U	0.13 U	**0.0956 J**	0.0524 U	0.100 U	0.100 U	0.100 U
	Aroclor 1260	1	1	0.11 U	0.0524 U	0.13 U	0.03 U	0.0587 U	0.03 U	0.029 U	0.04 U	0.039 U	0.0655 U	0.13 U	0.0538 U	0.0524 U	0.100 U	0.100 U	0.100 U
	Total PCBs	1	1	0.22 U	**0.162 J**	**0.15**	**0.34**	**0.0940 J**	**0.23**	**0.76**	0.04 U	0.039 U	0.0655 U	0.25 U	**0.0956 J**	0.0524 U	0.100 U	0.100 U	0.100 U
PCB Congeners																			
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																			
(mg/kg)	Arsenic	20	20	NA	2.72 U	NA	NA	**3.74**	NA	NA	NA	NA	**8.02**	NA	NA	NA	**1.61**	**2.37**	**3.48**
	Barium	1,000	1,000	NA	**9.14**	NA	NA	**106**	NA	NA	NA	NA	**223**	NA	NA	NA	**12**	**27**	**66**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	0.28 U	NA	NA	**0.46**	NA	NA	NA	NA	**1.45**	NA	NA	NA	0.35 U	0.38 U	**0.41**
	Chromium	100	100	NA	**2.20**	NA	NA	**6.57**	NA	NA	NA	NA	**8.23**	NA	NA	NA	**4.59**	**5.09**	**6.45**
	Lead	200	200	NA	**11.6**	NA	NA	**218**	NA	NA	NA	NA	**96.6**	NA	NA	NA	**18**	**65**	**162**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.07 U	0.08 U	**0.40**
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.35 U	0.38 U	0.37 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
J - Estimated value; below quantitation limit.
B - Detected in associated laboratory method blank.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Method 1 Standards.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
(1) - MassDEP Method 1 standards and RC for C9-C10 aromatics used.
(2) - MassDEP RC for Dichloropropane used.
(3) - MassDEP RC for Dichloropropene used.
(4) - MassDEP RC for 1,3-Dichloropropene used.
* - TRC developed standards.

TABLE 2-3
Summary of Analytical Detected Results for Soil Samples
HS-3: Unfenced Playing Field
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-360		SB-360D	SB-360V	SB-360W	SB-360X	SS-36E	SS-36I	SS-36V	SS-36W	SS-37		SS-38				
		Sample Depth (ft.):		5	8	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	0.5	2	0.5	1.5	1-3	0-1	1-3
		Sample Date:		3/4/2009	3/4/2009	3/4/2009	7/6/2009	7/6/2009	8/19/2009	3/9/2009	5/21/2009	7/6/2009	7/6/2009	8/8/2008	8/8/2008	8/8/2008	8/8/2008	3/31/2009	6/8/2011	6/8/2011
		S-1/GW-2	S-1/GW-3						combo						combo					
VOCs																				
(mg/kg)	Benzene	40	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Toluene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,4-Trimethylbenzene	100(1)	100(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs																				
(mg/kg)	Acenaphthene	1,000	1,000	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**0.259 J**	0.198 U	0.197 U	0.214 U	NA	NA
	Acenaphthylene	600	10	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**0.482 J**	0.198 U	0.197 U	0.214 U	NA	NA
	Anthracene	1,000	1,000	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**4.23**	0.198 U	0.197 U	0.214 U	NA	NA
	Benzo(a)anthracene	7	7	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**6.12**	0.198 U	**0.258**	0.214 U	NA	NA
	Benzo(a)pyrene	2	2	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**6.76**	0.198 U	**0.317**	0.214 U	NA	NA
	Benzo(b)fluoranthene	7	7	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**7.26**	0.198 U	**0.382**	0.214 U	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**3.92**	0.198 U	**0.303**	0.214 U	NA	NA
	Benzo(k)fluoranthene	70	70	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**1.212 J**	0.198 U	0.197 U	0.214 U	NA	NA
	Chrysene	70	70	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**5.45**	0.198 U	**0.323**	0.214 U	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**0.552 J**	0.198 U	0.197 U	0.214 U	NA	NA
	Fluoranthene	1,000	1,000	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**17.1**	**0.275**	**0.349**	0.214 U	NA	NA
	Fluorene	1,000	1,000	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**0.792 J**	0.198 U	0.197 U	0.214 U	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**5.32**	0.198 U	**0.305**	0.214 U	NA	NA
	Naphthalene	20	500	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**0.176 J**	0.198 U	0.197 U	0.214 U	NA	NA
	Phenanthrene	500	500	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**18.2**	0.198 U	**0.254**	0.214 U	NA	NA
	Pyrene	1,000	1,000	0.301 U	0.230 U	NA	NA	NA	NA	NA	NA	NA	NA	0.192 U	**13.8**	**0.281**	**0.346**	0.214 U	NA	NA
PCB Aroclors																				
(mg/kg)	Aroclor 1254	1	1	0.0822 U	0.0578 U	NA	NA	NA	NA	NA	NA	NA	NA	0.0551 U	**0.152 J**	**0.611 J**	**0.580 J**	0.0640 U	NA	NA
	Aroclor 1260	1	1	0.0822 U	0.0578 U	NA	NA	NA	NA	NA	NA	NA	NA	0.0551 U	0.05435 U	0.0574 U	0.0568 U	0.0640 U	NA	NA
	Total PCBs	1	1	0.0822 U	0.0578 U	NA	NA	NA	NA	NA	NA	NA	NA	0.0551 U	**0.152 J**	**0.611 J**	**0.580 J**	0.0640 U	NA	NA
PCB Congeners																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.11**	**0.06**
Metals																				
(mg/kg)	Arsenic	20	20	**14.5**	3.45 U	NA	NA	NA	NA	NA	NA	NA	NA	**4.09**	**4.79**	**4.10**	**16.0**	**14.6**	NA	NA
	Barium	1,000	1,000	**760**	**10.0**	**376**	NA	NA	NA	NA	NA	NA	NA	**13.0**	**94.35**	**58.6**	**311**	**801**	NA	NA
	Beryllium	90	90	**0.97**	0.35 U	NA	NA	NA	NA	NA	NA	NA	NA	0.29 U	0.285 U	0.30 U	**0.79**	NA	NA	NA
	Cadmium	70	70	**1.21**	0.35 U	NA	NA	NA	NA	NA	NA	NA	NA	0.29 U	**0.36**	**0.47**	**1.05**	**0.86**	NA	NA
	Chromium	100	100	**16.6**	**4.30**	**10.7**	NA	NA	NA	NA	NA	NA	NA	**5.68**	**7.18**	**6.89**	**12.6**	**18.0**	NA	NA
	Lead	200	200	**6,870**	**5.53**	**148**	**320**	**210**	**690**	**310**	**110**	**530**	**22**	**14.7**	**286**	**167**	**605**	**865**	NA	NA
	Mercury	20	20	**0.275**	**0.016**	NA	NA	NA	NA	NA	NA	NA	NA	**0.039**	**0.27**	**0.175**	**0.280**	NA	NA	NA
	Nickel	600	600	**21.5**	**4.54**	NA	NA	NA	NA	NA	NA	NA	NA	**4.00**	**6.73**	**3.95**	**11.2**	NA	NA	NA
	Silver	100	100	0.91 U	0.69 U	NA	NA	NA	NA	NA	NA	NA	NA	**1.69**	**2.38**	**0.81**	**1.00**	NA	NA	NA
	Vanadium	400	400	**49.4**	6.89 U	NA	NA	NA	NA	NA	NA	NA	NA	**10.1**	**12.2**	**10.9**	**18.6**	NA	NA	NA
	Zinc	1,000	1,000	**423**	**30.7**	NA	NA	NA	NA	NA	NA	NA	NA	**17.7**	**112.5**	**101**	**269**	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
J - Estimated value; below quantitation limit.
B - Detected in associated laboratory method blank.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Metho
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
(1) - MassDEP Method 1 standards and RC for C9-C10 aromatics used.
(2) - MassDEP RC for Dichloropropane used.
(3) - MassDEP RC for Dichloropropene used.
(4) - MassDEP RC for 1,3-Dichloropropene used.
* - TRC developed standards.

TABLE 2-3
Summary of Analytical Detected Results for Soil Samples
HS-3: Unfenced Playing Field
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SS-39			SS-40		SS-41	
		Sample Depth (ft.):		0.5	2	1-3	0.5	2	0.5	2
		Sample Date:		8/8/2008	8/8/2008	3/31/2009	8/8/2008	8/8/2008	8/8/2008	8/8/2008
		S-1/GW-2	S-1/GW-3							
VOCs										
(mg/kg)	Benzene	40	40	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA
	Toluene	500	500	NA	NA	NA	NA	NA	NA	NA
	1,2,4-Trimethylbenzene	100(1)	100(1)	NA	NA	NA	NA	NA	NA	NA
PAHs										
(mg/kg)	Acenaphthene	1,000	1,000	0.187 U	0.175 U	0.183 U	0.195 U	0.210 U	0.188 U	0.175 U
	Acenaphthylene	600	10	0.187 U	0.175 U	0.183 U	0.195 U	0.210 U	0.188 U	0.175 U
	Anthracene	1,000	1,000	0.187 U	0.175 U	0.183 U	0.195 U	**0.362**	0.188 U	0.175 U
	Benzo(a)anthracene	7	7	0.187 U	0.175 U	0.183 U	0.195 U	**1.15**	0.188 U	0.175 U
	Benzo(a)pyrene	2	2	0.187 U	0.175 U	0.183 U	0.195 U	**1.11**	0.188 U	0.175 U
	Benzo(b)fluoranthene	7	7	0.187 U	0.175 U	0.183 U	0.195 U	**1.25**	0.188 U	0.175 U
	Benzo(g,h,i)perylene	1,000	1,000	0.187 U	0.175 U	0.183 U	0.195 U	**0.851**	0.188 U	0.175 U
	Benzo(k)fluoranthene	70	70	0.187 U	0.175 U	0.183 U	0.195 U	**0.494**	0.188 U	0.175 U
	Chrysene	70	70	0.187 U	0.175 U	0.183 U	0.195 U	**1.17**	0.188 U	0.175 U
	Dibenz(a,h)anthracene	0.7	0.7	0.187 U	0.175 U	0.183 U	0.195 U	**0.217**	0.188 U	0.175 U
	Fluoranthene	1,000	1,000	0.187 U	0.175 U	0.183 U	0.195 U	**2.40**	0.188 U	0.175 U
	Fluorene	1,000	1,000	0.187 U	0.175 U	0.183 U	0.195 U	0.210 U	0.188 U	0.175 U
	Indeno(1,2,3-cd)pyrene	7	7	0.187 U	0.175 U	0.183 U	0.195 U	**0.929**	0.188 U	0.175 U
	Naphthalene	20	500	0.187 U	0.175 U	0.183 U	0.195 U	0.210 U	0.188 U	0.175 U
	Phenanthrene	500	500	0.187 U	0.175 U	0.183 U	0.195 U	**1.71**	0.188 U	0.175 U
	Pyrene	1,000	1,000	0.187 U	0.175 U	**0.193**	0.195 U	**2.49**	0.188 U	0.175 U
PCB Aroclors										
(mg/kg)	Aroclor 1254	1	1	0.0541 U	0.0562 U	0.0501 U	0.0589 U	**0.444 J**	0.0539 U	0.0516 U
	Aroclor 1260	1	1	0.0541 U	0.0562 U	0.0501 U	0.0589 U	**0.174 J**	0.0539 U	0.0516 U
	Total PCBs	1	1	0.0541 U	0.0562 U	0.0501 U	0.0589 U	**0.618 J**	0.0539 U	0.0516 U
PCB Congeners										
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA
Metals										
(mg/kg)	Arsenic	20	20	2.80 U	2.62 U	2.74 U	2.93 U	**7.24**	**2.97**	2.62 U
	Barium	1,000	1,000	**9.21**	**5.94**	**45.2**	**13.4**	**410**	**9.05**	**6.93**
	Beryllium	90	90	0.28 U	0.27 U	NA	0.30 U	**0.43**	0.29 U	0.27 U
	Cadmium	70	70	0.28 U	0.27 U	**0.52**	0.30 U	**1.53**	0.29 U	0.27 U
	Chromium	100	100	**5.06**	**2.52**	**4.64**	**5.66**	**15.4**	**5.21**	**3.01**
	Lead	200	200	**8.45**	**2.93**	**103**	**13.9**	**819**	**9.69**	**12.1**
	Mercury	20	20	**0.026**	0.013 U	NA	**0.032**	**0.654**	**0.037**	0.018 U
	Nickel	600	600	**3.32**	**2.23**	NA	**3.01**	**10.7**	**2.93**	**2.45**
	Silver	100	100	**0.85**	0.53 U	NA	**0.82**	**1.05**	**1.04**	**0.52**
	Vanadium	400	400	**9.18**	5.24 U	NA	**9.43**	**20.9**	**7.92**	5.23 U
	Zinc	1,000	1,000	**10.4**	**8.18**	NA	**16.4**	**506**	**11.3**	**11.9**

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
J - Estimated value; below quantitation limit.
B - Detected in associated laboratory method blank.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Meth
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
(1) - MassDEP Method 1 standards and RC for C9-C10 aromatics used.
(2) - MassDEP RC for Dichloropropane used.
(3) - MassDEP RC for Dichloropropene used.
(4) - MassDEP RC for 1,3-Dichloropropene used.
* - TRC developed standards.

TABLE 2-4
Summary of Analytical Detected Results for Soil Samples
HS-4: Gym Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HE-44C		HE-44F	HF-31A		HF-31B		HF-31D	HF-31G	HF-31H	HF35	HF-35A		HF-35B		HF-35C		HF-35D	
		Sample Depth (ft.):		0-1	1-3	0-1	0-1	1-3	0-1	1-3	4-6	1-3	1-3	2.5-3.5	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3
		Sample Date:		3/31/2009	3/31/2009	3/31/2009	4/2/2009	4/2/2009	4/2/2009	4/2/2009	4/15/2010	4/2/2009	4/2/2009	12/30/2004	4/1/2009	4/1/2009	4/1/2009	4/1/2009	4/1/2009	4/1/2009 combo	4/1/2009	4/1/2009
		S-1/GW-2	S-1/GW-3																			
SVOCs																						
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.68**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	**0.64**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.98**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	**0.66**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**0.90**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	**1.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**0.64**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Aroclors																						
(mg/kg)	Aroclor 1254	1	1	0.0571 U	**0.756 J**	NA	**1.35 J**	**2.49 J**	**0.310 J**	**2.66 J**	0.13 U	**0.334 J**	**0.565 J**	**1.58**	0.0547 U	0.0585 U	**0.118 J**	**0.786 J**	**0.133 J**	**0.817 J**	0.0597 U	**0.228 J**
	Aroclor 1260	1	1	0.0571 U	0.0556 U	NA	**0.291 J**	0.217 U	0.0554 U	0.219 U	0.13 U	0.0535 U	**0.355 J**	0.057 U	0.0547 U	**0.819 J**	0.0543 U	0.0557 U	0.0540 U	**0.4055 J**	0.0597 U	0.0558 U
	Aroclor 1262	1	1	NA	NA	NA	NA	NA	NA	NA	0.13 U	NA	NA	**0.264**	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	0.0571 U	**0.756 J**	NA	**1.641 J**	**2.49 J**	**0.310 J**	**2.66 J**	0.13 U	**0.334 J**	**0.920 J**	**1.844**	0.0547 U	**0.819 J**	**0.118 J**	**0.786 J**	**0.133 J**	**1.2225 J**	0.0597 U	**0.228 J**
PCB Congeners																						
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	**0.082 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																						
(mg/kg)	Trichlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																						
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	5.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	NA	NA	NA	NA	NA	NA	NA	**8.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**380**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	**0.81**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	0.29 U	**0.42**	NA	**0.51**	**0.47**	**0.41**	**0.49**	**0.69**	NA	NA	NA	0.28 U	**0.71**	0.28 U	**0.44**	0.28 U	**1.85**	0.31 U	**0.71**
	Chromium	100	100	NA	NA	NA	NA	NA	NA	NA	**20**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	200	200	**169**	**354**	**310**	**194**	**168**	**79.7**	**164**	**480**	NA	NA	NA	**42.7**	**154**	**16.9**	**151**	**26.2**	**593**	**24.2**	**471**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	**0.40**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	**43**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	**1.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	**32**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**220**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - micrograms per liter.
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Method 1 standards.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
(1) - SW-846 Chapter 7, Table 7-1, *Maximum Concentration of Contaminants for Toxicity Characteristic* .
* - TRC developed standards.
** - for Reference purposes only.

TABLE 2-4
Summary of Analytical Detected Results for Soil Samples
HS-4: Gym Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HF-38	HF40	HF-40C		HF-40D		HF-40E		HF-40G		HF-40H		HF-40I	HF-40J	HF-43 0-1 NW/NE/SW/SE	HF-43 1-3 NW/NE/SW/SE	HF-43A	
		Sample Depth (ft.):		1-3	3-5	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	1-3	1-3	0-1	1-3	0-1	1-3
		Sample Date:		4/2/2009	4/15/2010	3/10/2009	3/10/2009	3/9/2009	3/9/2009	3/10/2009	3/10/2009	3/10/2009	3/10/2009	3/9/2009	3/9/2009	4/9/2009	4/9/2009	7/11/2011	7/11/2011	4/1/2009	4/1/2009
		S-1/GW-2	S-1/GW-3																		
SVOCs																					
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	0.176 U	2.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	0.176 U	**8.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	0.176 U	**3.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	0.176 U	**7.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	0.176 U	**13**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	0.176 U	**12**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	0.176 U	**8.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	0.176 U	**4.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	0.176 U	**9.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.176 U	2.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	0.176 U	**30**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	0.176 U	**2.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	0.176 U	**7.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	0.176 U	2.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	0.176 U	**17**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	0.176 U	**37**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	0.176 U	**27**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Aroclors																					
(mg/kg)	Aroclor 1254	1	1	0.0524 U	**12**	**0.216 J**	**4.93 J**	**0.233 J**	**0.277 J**	NA	NA	NA	NA	NA	NA	NA	NA	**0.40**	**1.3**	0.0564 U	**2.60 J**
	Aroclor 1260	1	1	0.0524 U	1.2 U	0.0572 U	0.221 U	0.0615 U	0.0531 U	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	0.10 U	0.0564 U	0.177 U
	Aroclor 1262	1	1	NA	1.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	0.10 U	NA	NA
	Total PCBs	1	1	0.0524 U	**12**	**0.216 J**	**4.93 J**	**0.233 J**	**0.277 J**	NA	NA	NA	NA	NA	NA	NA	NA	**0.40**	**1.3**	0.0564 U	**2.60 J**
PCB Congeners																					
(mg/kg)	Total PCBs	1	1	NA	**0.098 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																					
(mg/kg)	Trichlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																					
(mg/kg)	Antimony	20	20	NA	**7.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	2.64 U	**12**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	**14.7**	**560**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	**0.48**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	0.27 U	**3.7**	0.29 U	0.28 U	0.31 U	0.28 U	0.29 U	**3.14**	0.28 U	**0.30**	0.32 U	0.28 U	**0.33**	**1.15**	0.28 U	**0.50**	0.29 U	**0.85**
	Chromium	100	100	**2.50**	**33**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	200	200	**3.58**	**770**	**36.1**	**85.3**	**48.4**	**29.8**	**54.8**	**643**	**40.8**	**86.9**	**24.2**	**4.06**	**43.3**	**218**	**43**	**130**	**13.7**	**629**
	Mercury	20	20	NA	**0.24**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	**21**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	0.62 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	**19**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	**580**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - micrograms per liter.
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Meth
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
(1) - SW-846 Chapter 7, Table 7-1, *Maximum Concentration of Contaminants for Toxicity C*
* - TRC developed standards.
** - for Reference purposes only.

TABLE 2-4
Summary of Analytical Detected Results for Soil Samples
HS-4: Gym Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			Sample Location:		HF-43B		HF-43G		HF-43H	HF44	HF44+HG44	HG-31	HG44	HH43	HH43+HI42	HH44
				Sample Depth (ft.):		0-1	1-3	0-1	1-3	1-3	0.5-3	0.5-3	1-3	1-3	1.5-3	1.5-3	2.5-3
				Sample Date:		3/31/2009	3/31/2009	4/1/2009	4/1/2009	4/1/2009	12/30/2004	12/30/2004	4/2/2009	12/30/2004	12/30/2004	12/30/2004	12/30/2004
		S-1/GW-2	S-1/GW-3														
SVOCs																	
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*	NA		NA		NA		NA	NA	0.057 U	NA	NA	NA	**0.078**	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA		NA		NA		NA	NA	0.17 U	NA	NA	NA	0.19 U	NA
	Acenaphthene	1,000	1,000	NA		NA		NA		NA	NA	**0.31**	0.179 U	NA	NA	0.064 U	NA
	Acenaphthylene	600	10	NA		NA		NA		NA	NA	**0.12**	0.179 U	NA	NA	0.064 U	NA
	Anthracene	1,000	1,000	NA		NA		NA		NA	NA	**4**	0.179 U	NA	NA	0.064 U	NA
	Benzo(a)anthracene	7	7	NA		NA		NA		NA	NA	**7.9**	0.179 U	NA	NA	**0.15**	NA
	Benzo(a)pyrene	2	2	NA		NA		NA		NA	NA	**6.9**	0.179 U	NA	NA	0.064 U	NA
	Benzo(b)fluoranthene	7	7	NA		NA		NA		NA	NA	**8.9**	0.179 U	NA	NA	**0.2**	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA		NA		NA		NA	NA	**1.7**	0.179 U	NA	NA	0.064 U	NA
	Benzo(k)fluoranthene	70	70	NA		NA		NA		NA	NA	**3.3**	0.179 U	NA	NA	0.064 U	NA
	Chrysene	70	70	NA		NA		NA		NA	NA	**6.7**	0.179 U	NA	NA	**0.16**	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA		NA		NA		NA	NA	**0.71**	0.179 U	NA	NA	0.064 U	NA
	Fluoranthene	1,000	1,000	NA		NA		NA		NA	NA	**15**	0.179 U	NA	NA	**0.27**	NA
	Fluorene	1,000	1,000	NA		NA		NA		NA	NA	**0.22**	0.179 U	NA	NA	0.064 U	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA		NA		NA		NA	NA	**1.8**	0.179 U	NA	NA	0.064 U	NA
	2-Methylnaphthalene	80	300	NA		NA		NA		NA	NA	**0.079**	0.179 U	NA	NA	0.064 U	NA
	Naphthalene	20	500	NA		NA		NA		NA	NA	**0.092**	0.179 U	NA	NA	0.064 U	NA
	Phenanthrene	500	500	NA		NA		NA		NA	NA	**1.2**	0.179 U	NA	NA	**0.22**	NA
	Pyrene	1,000	1,000	NA		NA		NA		NA	NA	**15**	0.179 U	NA	NA	**0.41**	NA
PCB Aroclors																	
(mg/kg)	Aroclor 1254	1	1	**0.0953 J**		**0.489 J**		**0.142 J**	0.0516 U	**7.13 J**	1.08 U	NA	**0.0615 J**	**0.565**	**0.899**	NA	**0.157**
	Aroclor 1260	1	1	0.0577 U		0.0557 U		0.0550 U	0.0516 U	0.561 U	1.08 U	NA	0.0526 U	0.058 U	0.067 U	NA	0.053 U
	Aroclor 1262	1	1	NA		NA		NA		NA	1.08 U	NA	NA	**0.279**	**0.292**	NA	0.053 U
	Total PCBs	1	1	**0.0953 J**		**0.489 J**		**0.142 J**	0.0516 U	**7.13 J**	2.17 U	NA	**0.0615 J**	**0.844**	**1.191**	NA	**0.157**
PCB Congeners																	
(mg/kg)	Total PCBs	1	1	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																	
(mg/kg)	Trichlorobiphenyl	N/A	N/A	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	N/A	N/A	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	N/A	N/A	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	N/A	N/A	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
Metals																	
(mg/kg)	Antimony	20	20	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	NA		NA		NA		NA	NA	**3.66**	2.68 U	NA	NA	**5.25**	NA
	Barium	1,000	1,000	NA		NA		NA		NA	NA	**86**	**28.2**	NA	NA	**344**	NA
	Beryllium	90	90	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	0.31 U		**0.55**	**0.32**	**0.82**		NA	NA	**0.83**	0.27 U	NA	NA	**1.78**	NA
	Chromium	100	100	NA		NA		NA		NA	NA	**7.31**	**3.64**	NA	NA	**36**	NA
	Lead	200	200	**52.2**		**134**	**82.8**	**273**		**281**	NA	**149**	**45.8**	NA	NA	**665**	NA
	Mercury	20	20	NA		NA		NA		NA	NA	**0.147**	NA	NA	NA	**0.223**	NA
	Nickel	600	600	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA		NA		NA		NA	NA	0.34 U	NA	NA	NA	0.39 U	NA
	Vanadium	400	400	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA		NA		NA		NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - micrograms per liter.
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Meth
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
(1) - SW-846 Chapter 7, Table 7-1, *Maximum Concentration of Contaminants for Toxicity C*
* - TRC developed standards.
** - for Reference purposes only.

TABLE 2-4
Summary of Analytical Detected Results for Soil Samples
HS-4: Gym Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			Sample Location:	HH44+HI44	HI42	HI43	HI44	HJ-42A		HJ-42B		HJ-42C		HJ-42D	
				Sample Depth (ft.):	1-3	2.5-3	1.5-3	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3
				Sample Date:	12/30/2004	12/30/2004	12/30/2004	12/30/2004	4/2/2009	4/2/2009	4/2/2009	4/2/2009	4/2/2009	4/2/2009	4/1/2009	4/1/2009
		S-1/GW-2	S-1/GW-3													
SVOCs																
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*		0.059 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90		0.18 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000		0.059 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10		**0.11**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000		**0.21**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7		**1.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2		**1.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7		**1.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000		**0.43**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70		**0.52**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70		**1.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7		0.059 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000		**2.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000		0.059 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7		**0.47**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300		0.059 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500		0.059 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500		**0.93**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000		**2.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Aroclors																
(mg/kg)	Aroclor 1254	1	1		NA	**0.538**	1.31 U	**1.5**	0.0561 U	0.0540 U	0.0536 U	**0.125 J**	0.0527 U	**0.676 J**	0.0532 U	**0.136 J**
	Aroclor 1260	1	1		NA	0.056 U	1.31 U	1.12 U	0.0561 U	0.0540 U	0.0536 U	**0.121 J**	0.0527 U	**0.190 J**	0.0532 U	0.0572 U
	Aroclor 1262	1	1		NA	**0.155**	1.31 U	1.12 U	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1		NA	**0.693**	2.63 U	**1.5**	0.0561 U	0.0540 U	0.0536 U	**0.246 J**	0.0527 U	**0.866 J**	0.0532 U	**0.136 J**
PCB Congeners																
(mg/kg)	Total PCBs	1	1		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																
(mg/kg)	Trichlorobiphenyl	N/A	N/A		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	N/A	N/A		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	N/A	N/A		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	N/A	N/A		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																
(mg/kg)	Antimony	20	20		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20		**4.87**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000		**135**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Beryllium	90	90		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70		**2.24**	NA	NA	NA	0.28 U	0.27 U	0.30 U	0.28 U	0.27 U	**2.66**	0.27 U	0.28 U
	Chromium	100	100		**9.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	200	200		**351**	NA	NA	NA	**7.41**	**4.06**	**8.36**	**26.4**	**6.83**	**247**	**12.3**	**16.8**
	Mercury	20	20		**0.15**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100		0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - micrograms per liter.
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Meth
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
(1) - SW-846 Chapter 7, Table 7-1, *Maximum Concentration of Contaminants for Toxicity C*
* - TRC developed standards.
** - for Reference purposes only.

TABLE 2-4
Summary of Analytical Detected Results for Soil Samples
HS-4: Gym Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HJ44	HJ44+HI43	HS-7	HS-9	HS-10	SB-267			SB-365						
			Sample Depth (ft.):	2.75-3	1.5-3	0-0.5	0-0.5	0-0.5	1	3.5	9	0-1	1-3	5-7	9	12	0-1	1-3
			Sample Date:	12/30/2004	12/30/2004	9/9/2004	9/9/2004	9/9/2004	7/14/2008	7/14/2008	7/14/2008	3/4/2009	3/4/2009	3/4/2009 combo	3/4/2009	3/4/2009	6/8/2011	6/8/2011
		S-1/GW-2	S-1/GW-3															
SVOCs																		
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	0.06 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	**0.076 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	**0.58875 J**	0.897 U	NA	NA	NA
	Acenaphthylene	600	10	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	0.4745 U	0.897 U	NA	NA	NA
	Anthracene	1,000	1,000	NA	**0.14**	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	**1.15875 J**	0.897 U	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	**0.51**	NA	NA	NA	**0.260**	0.207 U	0.199 U	0.188 U	0.178 U	**3.52**	0.897 U	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	**0.5**	NA	NA	NA	**0.271**	0.207 U	0.199 U	0.188 U	0.178 U	**2.91**	0.897 U	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	**0.71**	NA	NA	NA	**0.343**	**0.275**	0.199 U	0.188 U	0.178 U	**4.24**	0.897 U	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	**0.27**	NA	NA	NA	0.338 U	0.413 U	0.397 U	0.188 U	0.178 U	**0.58525 J**	0.897 U	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	**0.25**	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	**0.90875 J**	0.897 U	NA	NA	NA
	Chrysene	70	70	NA	**0.44**	NA	NA	NA	**0.325**	**0.682**	0.199 U	0.188 U	0.178 U	**3.46**	0.897 U	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.06 U	NA	NA	NA	0.338 U	0.413 U	0.397 U	0.188 U	0.178 U	0.4745 U	0.897 U	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	**0.92**	NA	NA	NA	**0.523**	0.207 U	0.199 U	0.188 U	0.178 U	**7.37**	0.897 U	NA	NA	NA
	Fluorene	1,000	1,000	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	**0.69875 J**	0.897 U	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	0.06 U	NA	NA	NA	0.338 U	0.413 U	0.397 U	0.188 U	0.178 U	**0.70875 J**	0.897 U	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	0.4745 U	0.897 U	NA	NA	NA
	Naphthalene	20	500	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	0.4745 U	0.897 U	NA	NA	NA
	Phenanthrene	500	500	NA	**0.7**	NA	NA	NA	**0.230**	**0.846**	0.199 U	0.188 U	0.178 U	**9.22**	0.897 U	NA	NA	NA
	Pyrene	1,000	1,000	NA	**1.5**	NA	NA	NA	**0.585**	**0.289**	0.199 U	0.188 U	0.178 U	**5.67**	0.897 U	NA	NA	NA
PCB Aroclors																		
(mg/kg)	Aroclor 1254	1	1	**1.13**	NA	0.12 U	0.11 U	0.11 U	0.0500 U	0.0586 U	0.0584 U	0.0574 U	0.0518 U	**0.501 J**	0.266 UJ	0.0576 U	NA	NA
	Aroclor 1260	1	1	0.056 U	NA	0.12 U	0.11 U	0.11 U	0.0500 U	0.0586 U	0.0584 U	0.0574 U	0.0518 U	**0.1098 J**	0.266 UJ	0.0576 U	NA	NA
	Aroclor 1262	1	1	**0.193**	NA	0.12 U	0.11 U	0.11 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	**1.323**	NA	0.23 U	0.22 U	0.22 U	0.0500 U	0.0586 U	0.0584 U	0.0574 U	0.0518 U	**0.690 J**	0.266 UJ	0.0576 U	NA	NA
PCB Congeners																		
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0243**	**0.386**
PCB Homologs																		
(mg/kg)	Trichlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																		
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	R	R	R	4.50 U	4.27 U	5.69 U	21.6 U	NA	NA	NA
	Arsenic	20	20	NA	**3.85**	NA	NA	NA	**3.19**	**14.3**	**4.84**	2.82 U	2.67 U	**53.4**	13.5 U	NA	NA	NA
	Barium	1,000	1,000	NA	**176**	NA	NA	NA	**14.0**	**200**	**7.59**	**17.7**	**10.9**	**1,128**	**181**	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	0.26 U	0.31 U	0.30 U	0.29 U	0.27 U	0.36 U	1.35 U	NA	NA	NA
	Cadmium	70	70	NA	**1.96**	NA	NA	NA	0.26 U	0.31 U	0.30 U	0.29 U	0.27 U	**5.59**	1.35 U	NA	NA	NA
	Chromium	100	100	NA	**11**	NA	NA	NA	**5.14**	**5.30**	**3.81**	**6.20**	**2.04**	**36.3**	**7.14**	NA	NA	NA
	Lead	200	200	NA	**447**	NA	NA	NA	**47.9**	**209**	**3.13**	**15.7**	**3.05**	**1590**	**19.0**	NA	NA	NA
	Mercury	20	20	NA	**0.103**	NA	NA	NA	**0.079**	**0.078**	0.012 U	**0.049**	0.014 U	**0.632**	**0.163**	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	**3.98**	**11.7**	**4.02**	**3.16**	**2.89**	**46.3**	**4.26**	NA	NA	NA
	Silver	100	100	NA	0.34 U	NA	NA	NA	**2.22**	**3.94**	**1.17**	0.57 U	0.54 U	**2.7575 J**	2.69 U	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	**10.6**	**18.3**	5.95 U	**9.87**	5.34 U	**219**	26.9 U	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	**33.8**	**25.3**	**14.1**	**28.6**	**16.3**	**993**	**96.3**	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - micrograms per liter.
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Meth
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
(1) - SW-846 Chapter 7, Table 7-1, *Maximum Concentration of Contaminants for Toxicity C*
* - TRC developed standards.
** - for Reference purposes only.

TABLE 2-4
Summary of Analytical Detected Results for Soil Samples
HS-4: Gym Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		NBHS-1		NBHS-SS-8	NBHS-SS-9	VSS-12		SS-42	SS-43	SS-44	SS-45	SS-46
		Sample Depth (ft.):		8	12	0-0.5	0-0.5	0-0.5	1-2	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
		Sample Date:		7/29/2008	7/29/2008	8/6/2008	8/6/2008	7/23/2001	7/23/2001	12/2/2008	12/2/2008	12/2/2008	12/2/2008	12/2/2008
		S-1/GW-2	S-1/GW-3			combo								
SVOCs														
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	**0.321**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Acenaphthylene	600	10	0.200 U	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Anthracene	1,000	1,000	**0.929**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Benzo(a)anthracene	7	7	**3.21**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Benzo(a)pyrene	2	2	**2.86**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Benzo(b)fluoranthene	7	7	**3.42**	0.665 U	NA	NA	NA	NA	0.199 U	**0.257**	0.201 U	0.207 U	0.206 U
	Benzo(g,h,i)perylene	1,000	1,000	**2.30**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Benzo(k)fluoranthene	70	70	**1.07**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Chrysene	70	70	**3.08**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Dibenz(a,h)anthracene	0.7	0.7	**0.643**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Fluoranthene	1,000	1,000	**3.87**	0.665 U	NA	NA	NA	NA	0.199 U	**0.437**	0.201 U	0.207 U	0.206 U
	Fluorene	1,000	1,000	**0.401**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Indeno(1,2,3-cd)pyrene	7	7	**2.60**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	2-Methylnaphthalene	80	300	0.200 U	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Naphthalene	20	500	**0.290**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Phenanthrene	500	500	**3.78**	0.665 U	NA	NA	NA	NA	0.199 U	**0.344**	0.201 U	0.207 U	0.206 U
	Pyrene	1,000	1,000	**5.35**	0.665 U	NA	NA	NA	NA	0.199 U	**0.258**	0.201 U	0.207 U	0.206 U
PCB Aroclors														
(mg/kg)	Aroclor 1254	1	1	**0.479 J**	0.230 UJ	0.05265 U	0.0508 U	0.100 U	**0.497**	0.0549 U	0.0581 U	0.0598 U	0.0580 U	0.0617 U
	Aroclor 1260	1	1	**1.33 J**	0.230 UJ	0.05265 U	0.0508 U	0.100 U	0.100 U	0.0549 U	0.0581 U	0.0598 U	0.0580 U	0.0617 U
	Aroclor 1262	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	**1.809 J**	0.230 UJ	0.05265 U	0.0508 U	0.100 U	**0.497**	0.0549 U	0.0581 U	0.0598 U	0.0580 U	0.0617 U
PCB Congeners														
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs														
(mg/kg)	Trichlorobiphenyl	N/A	N/A	**0.025**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pentachlorobiphenyl	N/A	N/A	**0.028 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Hexachlorobiphenyl	N/A	N/A	**0.039**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Heptachlorobiphenyl	N/A	N/A	**0.081**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	**0.17**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals														
(mg/kg)	Antimony	20	20	4.80 U	16.0 U	NA	NA	NA	NA	4.76 U	4.77 U	4.81 U	4.97 U	4.94 U
	Arsenic	20	20	**34.0**	9.97 U	NA	NA	**2.20**	**3.89**	**3.00**	2.98 U	3.01 U	**3.29**	**3.33**
	Barium	1,000	1,000	**370**	**39.5**	NA	NA	**25**	**119**	**17.5**	**29.1**	**17.7**	**24.9**	**21.3**
	Beryllium	90	90	0.30 U	1.00 U	NA	NA	NA	NA	0.30 U	0.30 U	0.31 U	0.32 U	0.31 U
	Cadmium	70	70	**8.78**	1.00 U	NA	NA	0.37 U	**0.81**	0.30 U	0.30 U	0.31 U	0.32 U	0.31 U
	Chromium	100	100	**154**	**13.7**	NA	NA	**5.52**	**96**	**5.29**	**7.92**	**4.87**	**7.13**	**7.08**
	Lead	200	200	**2,780**	**12.1**	NA	NA	**26**	**87**	**17.5**	**55.2**	**22.2**	**23.4**	**21.1**
	Mercury	20	20	**0.423**	0.089 U	NA	NA	0.07 U	**0.17**	**0.044**	**0.046**	**0.041**	**0.049**	**0.040**
	Nickel	600	600	**173**	**9.95**	NA	NA	NA	NA	**2.64**	**4.20**	**2.28**	**3.39**	**3.17**
	Silver	100	100	**29.0**	2.00 U	NA	NA	0.37 U	0.34 U	0.60 U	0.60 U	0.61 U	0.63 U	0.62 U
	Vanadium	400	400	**18.2**	20.0 U	NA	NA	NA	NA	**11.7**	**12.7**	**10.6**	**13.5**	**14.5**
	Zinc	1,000	1,000	**1670**	**28.7**	NA	NA	NA	NA	**27.7**	**54.9**	**36.9**	**30.4**	**31.5**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - micrograms per liter.
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Meth
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
(1) - SW-846 Chapter 7, Table 7-1, *Maximum Concentration of Contaminants for Toxicity C*
* - TRC developed standards.
** - for Reference purposes only.

TABLE 2-5
Summary of Analytical Detected Results for Soil Samples
HS-5: Flag Pole Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			COMP SS-13-A,F,S,T	COMP SS-13 - AG, AK, AO, AR	COMP SS-13-AQ, AM,AN,AJ,AL	COMP SS-13-AW,AX,AY,AZ	COMP SS-13-Q,R,C,D	SS-13-AJ	SS-13-AN	SS-13-AO	SS-13-K
		Sample Location:										
		Sample Depth (ft.):		0.5-4	0.5-4	1-4	0.5-4	1-4	1-4	1-4	1-4	0.5-4
		Sample Date:		9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004
		S-1/GW-2	S-1/GW-3									
SVOCs												
(mg/kg)	Dibenzofuran	10*	10*	**2.9**	0.38 U	2.1 U	0.43 U	**0.56**	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	**2.6**	0.38 U	2.1 U	0.43 U	0.37 U	NA	NA	NA	NA
	Acenaphthylene	600	10	2.1 U	0.38 U	2.1 U	**1.4**	**4**	NA	NA	NA	NA
	Anthracene	1,000	1,000	**10**	**0.63**	**4.6**	**3.9**	**2.2**	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	**17**	**1.4**	**6.9**	**3.4**	**10**	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	**7.7**	**0.95**	**5.8**	**3.3**	**11**	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	**13**	**1.2**	**5.6**	**2.2**	**8.4**	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	**6.2**	**1.1**	**3.8**	**3.2**	**6.3**	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	**13**	**1.4**	**5**	**3.6**	**14**	NA	NA	NA	NA
	Chrysene	70	70	**16**	**1.5**	**6.2**	**1.2**	**11**	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	**2.7**	**0.44**	2.1 U	**9.4**	**2.5**	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**47**	**3.3**	**19**	**0.53**	**33**	NA	NA	NA	NA
	Fluorene	1,000	1,000	**3.9**	0.38 U	**3**	**2**	**1.1**	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	**6**	**0.94**	**3.4**	NA	**5.6**	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	2.1 U	0.38 U	2.1 U	**0.55**	0.37 U	NA	NA	NA	NA
	Phenanthrene	500	500	**42**	**2.4**	**19**	**5.8**	**14**	NA	NA	NA	NA
	Pyrene	1,000	1,000	**38**	**3.1**	**16**	**8.2**	**25**	NA	NA	NA	NA
PCB Aroclors												
(mg/kg)	Aroclor 1254	1	1	NA	NA	NA	NA	NA	**0.719**	**1.57**	**4.87**	**0.133**
	Aroclor 1260	1	1	NA	NA	NA	NA	NA	**0.341**	0.208 U	0.383 U	0.0397 U
	Total PCBs	1	1	NA	NA	NA	NA	NA	**1.06**	**1.57**	**4.87**	**0.133**
Metals												
(mg/kg)	Arsenic	20	20	**31**	**6.8**	**10**	**19**	**6**	NA	NA	NA	NA
	Barium	1,000	1,000	**130**	**230**	**310**	**250**	**120**	NA	NA	NA	NA
	Cadmium	70	70	**2.4**	**1.2**	**2**	**1.7**	**1**	NA	NA	NA	NA
	Chromium	100	100	**17**	**22**	**27**	**32**	**8.9**	NA	NA	NA	NA
	Lead	200	200	**590**	**450**	**750**	**640**	**560**	**960**	**1,800**	**1,200**	**72**
	Mercury	20	20	**0.54**	**0.42**	**0.95**	**0.76**	**0.32**	NA	NA	NA	NA
	Silver	100	100	**0.59**	**0.56**	**1.1**	**0.59**	0.44 U	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - microgram per liter
NS - No standard available for this compound.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
J - Estimated value; below quantitation limit.
B - Detected in associated laboratory method blank.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

TABLE 2-6
Summary of Analytical Detected Results for Soil Samples
HS-6: House Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HD-19A		HD-19B		HD-19D		HD-20F	HD-21F	HD22			HD23			HF14	HF-14B	HF-14H		HH-13E	
		Sample Depth (ft.):		0-1	1-3	0-1	1-3	0-1	1-3	1-3	1-3	1-3	0-1	1-3	2-3	0-1	1-3	3-4	1-3	0-1	1-3	0-1	1-3
		Sample Date:		3/9/2009	3/9/2009	3/9/2009	3/9/2009	3/9/2009	3/9/2009	5/19/2009	5/20/2009	12/29/2004	4/9/2009	4/9/2009	12/29/2004	3/31/2009	3/31/2009	4/15/2010	3/11/2009	3/11/2009 (a)	3/11/2009 (a)	3/11/2009	3/11/2009
		S-1/GW-2	S-1/GW-3		combo																		
SVOCs																							
(mg/kg)	Acenaphthene	1,000	1,000	0.196 U	0.198 U	0.187 U	0.189 U	0.204 U	0.188 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	**0.217**	**0.59**	0.176 U	0.198 U	0.182 U	NA	NA
	Anthracene	1,000	1,000	0.196 U	0.198 U	0.187 U	0.189 U	0.204 U	**0.467**	NA	0.18 U	NA	**0.241**	**0.423**	NA	0.190 U	**0.626**	**0.93**	0.176 U	0.198 U	0.182 U	NA	NA
	Benzo(a)anthracene	7	7	**0.407**	0.198 U	0.187 U	0.189 U	0.204 U	**1.07**	NA	0.18 U	NA	**0.566**	**1.35**	NA	0.190 U	**1.24**	**2.4**	**0.339**	0.198 U	0.182 U	NA	NA
	Benzo(a)pyrene	2	2	**0.414**	0.198 U	0.187 U	0.189 U	0.204 U	**0.942**	NA	0.18 U	NA	**0.493**	**1.22**	NA	0.190 U	**1.01**	**2.2**	**0.366**	0.198 U	0.182 U	NA	NA
	Benzo(b)fluoranthene	7	7	**0.510**	0.198 U	0.187 U	0.189 U	0.204 U	**1.31**	NA	0.18 U	NA	**0.658**	**1.66**	NA	0.190 U	**1.03**	**3.1**	**0.377**	0.198 U	0.182 U	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	0.196 U	0.198 U	0.187 U	0.189 U	0.204 U	**0.439**	NA	0.18 U	NA	**0.218**	**0.577**	NA	0.190 U	**0.362**	**0.74**	**0.290**	0.198 U	0.182 U	NA	NA
	Benzo(k)fluoranthene	70	70	**0.218**	0.198 U	0.187 U	0.189 U	0.204 U	**0.557**	NA	0.18 U	NA	**0.239**	**0.622**	NA	0.190 U	**0.352**	**1.2**	0.176 U	0.198 U	0.182 U	NA	NA
	Chrysene	70	70	**0.408**	0.198 U	0.187 U	0.189 U	0.204 U	**1.07**	NA	0.18 U	NA	**0.551**	**1.35**	NA	0.190 U	**1.30**	**2.7**	**0.367**	0.198 U	0.182 U	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.196 U	0.198 U	0.187 U	0.189 U	0.204 U	0.188 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	0.206 U	0.46 U	0.176 U	0.198 U	0.182 U	NA	NA
	Fluoranthene	1,000	1,000	**1.17**	**0.389**	**0.196**	0.189 U	0.204 U	**3.31**	NA	0.18 U	NA	**0.992**	**2.32**	NA	**0.193**	**1.45**	**5.6**	**0.533**	0.198 U	0.182 U	NA	NA
	Fluorene	1,000	1,000	0.196 U	0.198 U	0.187 U	0.189 U	0.204 U	0.188 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	**0.291**	**0.52**	0.176 U	0.198 U	0.182 U	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	0.196 U	0.198 U	0.187 U	0.189 U	0.204 U	**0.577**	NA	0.18 U	NA	**0.293**	**0.694**	NA	0.190 U	**0.430**	**0.97**	**0.307**	0.198 U	0.182 U	NA	NA
	2-Methylnaphthalene	80	300	0.196 U	0.198 U	0.187 U	0.189 U	0.204 U	0.188 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	0.206 U	0.46 U	0.176 U	0.198 U	0.182 U	NA	NA
	Naphthalene	20	500	0.196 U	0.198 U	0.187 U	0.189 U	0.204 U	0.188 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	0.206 U	**0.50**	0.176 U	0.198 U	0.182 U	NA	NA
	Phenanthrene	500	500	**0.543**	**0.245**	0.187 U	0.189 U	0.204 U	**2.03**	NA	0.18 U	NA	**0.980**	**1.80**	NA	**0.204**	**3.28**	**4.4**	**0.368**	0.198 U	0.182 U	NA	NA
	Pyrene	1,000	1,000	**0.820**	**0.322**	0.187 U	0.189 U	0.204 U	**2.02**	NA	0.18 U	NA	**0.849**	**1.71**	NA	**0.264**	**2.22**	**2.1**	**0.670**	0.198 U	0.182 U	NA	NA
PCB Aroclors																							
(mg/kg)	Aroclor 1254	1	1	**0.242 J**	**0.252 J**	**0.226 J**	0.0536 U	0.0591 U	**0.250 J**	NA	NA	**4.79**	**0.132 J**	**2.42 J**	**3.74**	NA	NA	0.13 U	**1.41 J**	**0.129 J**	**0.439 J**	NA	**15.7 J**
	Aroclor 1260	1	1	0.0574 U	**0.1069 J**	0.0556 U	0.0536 U	0.0591 U	**0.0826 J**	NA	NA	0.061 U	0.0546 U	0.168 U	0.054 U	NA	NA	**1.0 J**	**0.613 J**	0.0555 U	**0.262 J**	NA	**7.37 J**
	Aroclor 1262	1	1	NA	NA	NA	NA	NA	NA	NA	NA	**0.654**	NA	NA	**0.418**	NA	NA	0.13 U	NA	NA	NA	NA	NA
	Total PCBs	1	1	**0.242 J**	**0.2904 J**	**0.226 J**	0.0536 U	0.0591 U	**0.3326 J**	NA	NA	**5.444**	**0.132 J**	**2.42 J**	**4.158**	NA	NA	**1.0 J**	**2.023 J**	**0.129 J**	**0.701 J**	NA	**23.07 J**
PCB Congerners																							
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.15 J**	NA	NA	NA	NA	NA
PCB Homologs																							
(mg/kg)	Pentachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																							
(mg/kg)	Arsenic	20	20	**3.68**	**5.76**	2.80 U	2.83 U	3.06 U	**4.11**	2.8 U	2.7 U	NA	**3.49**	**5.30**	NA	**3.08**	**17.4**	**14**	NA	2.97 U	2.73 U	2.93 U	**29.9**
	Barium	1,000	1,000	**174**	**316**	**89.8**	**15.3**	**23.4**	**146**	**86**	**13**	NA	**58.8**	**218**	NA	**36.5**	**385**	**4,400**	**24.3**	**22.6**	**22.5**	**232**	**2,460**
	Beryllium	90	90	0.30 U	0.30 U	0.28 U	0.29 U	0.31 U	0.29 U	NA	NA	NA	NA	NA	NA	NA	NA	**0.48**	NA	NA	NA	NA	NA
	Cadmium	70	70	**0.65**	**1.21**	**0.55**	0.29 U	0.31 U	**0.42**	**0.29**	0.27 U	NA	**0.38**	**1.26**	NA	0.29 U	**1.35**	**1.5**	0.27 U	0.30 U	0.28 U	0.30 U	**4.95**
	Chromium	100	100	**20.7**	**246**	**11.1**	**1.90**	**5.77**	**17.6**	NA	**2.1**	NA	**10.9**	**22.9**	NA	**7.09**	**28.8**	**480**	**4.27**	**5.55**	**5.94**	**10.6**	**7,800**
	Lead	200	200	**205**	**432**	**156**	**5.32**	**20.8**	**195**	**74**	**4.6**	NA	**74.6**	**234**	NA	**31.7**	**928**	**800**	**88.6**	**18.1**	**17.7**	**36.2**	**501**
	Mercury	20	20	**0.277**	**0.316**	**0.319**	0.019 U	**0.047**	**0.170**	NA	NA	NA	NA	NA	NA	NA	NA	**0.34**	NA	**0.045**	**0.022**	NA	NA
	Nickel	600	600	**7.03**	**18.5**	**4.32**	**1.52**	**2.73**	**7.82**	NA	NA	NA	NA	NA	NA	NA	NA	**49**	NA	NA	NA	NA	NA
	Vanadium	400	400	**17.2**	**68.8**	**10.5**	5.65 U	**11.4**	**13.7**	NA	NA	NA	NA	NA	NA	NA	NA	**210**	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	**230**	**165**	**84.1**	**16.4**	**20.8**	**91.4**	NA	NA	NA	NA	NA	NA	NA	NA	**360**	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - micrograms per liter.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable or not available.
NS - No MassDEP standards exist for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards or TCLP standard, as applicab
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
2004 and 2005 Data are based on the "Summary of Analytical Data, New Bedford High School" dated June 9, 2006, BETA Group, Inc.
(1) - SW-846 Chapter 7, Table 7-1, *Maximum Concentration of Contaminants for Toxicity Characteristic* .
(a) - The sample was re-collected on 3/31/2009 and analyzed for dibenzofuran.
* - The sample exhibits altered PCB pattern; best possible Aroclor match reported.
** - TRC developed standards.
^ - For reference purposes only.

TABLE 2-6
Summary of Analytical Detected Results for Soil Samples
HS-6: House Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HH-13F		HH-13G		HH-13H		HH-13I	HH-13J	HH-30A	HJ-25A	HRE-10	HRG-12A	HRG-14A	HS-11	HS-12	NBHS-SS-1	NBHS-SS-2	NBHS-SS-3	NBHS-SS-4	NBHS-SS-10
			Sample Depth (ft.):	0-1	1-3	0-1	1-3	0-1	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
			Sample Date:	3/11/2009	3/11/2009	3/11/2009	3/11/2009	3/11/2009	3/11/2009	4/8/2009	4/8/2009	4/2/2009	4/1/2009	3/31/2009	4/1/2009	4/1/2009	9/9/2004	9/9/2004	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008
		S-1/GW-2	S-1/GW-3																				
SVOCs																							
(mg/kg)	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	**0.195**	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA	NA	NA
PCB Aroclors																							
(mg/kg)	Aroclor 1254	1	1	NA	NA	NA	NA	NA	NA	NA	**12.4 J**	**0.0702 J**	0.0510 U	0.0500 U	0.0520 U	0.0520 U	**0.131**	**0.438**	0.0567 U	**0.260 J**	**0.316 J**	0.0554 U	**0.192 J**
	Aroclor 1260	1	1	NA	NA	NA	NA	NA	NA	NA	0.591 U	0.0524 U	0.0510 U	**0.521 J**	0.0520 U	0.0520 U	0.1 U	0.11 U	0.0567 U	0.0533 U	0.0529 U	0.0554 U	0.0544 U
	Aroclor 1262	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	0.11 U	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	**12.4 J**	**0.0702 J**	0.0510 U	**0.521 J**	0.0520 U	0.0520 U	**0.131**	**0.438**	0.0567 U	**0.260 J**	**0.316 J**	0.0554 U	**0.192 J**
PCB Congerners																							
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																							
(mg/kg)	Pentachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.081**	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.081**	NA	NA
Metals																							
(mg/kg)	Arsenic	20	20	2.86 U	**3.74**	**3.62**	**14.0**	**3.10**	2.65 U	NA	**31.5**	2.62 U	2.69 U	2.65 U	2.62 U	2.66 U	NA	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	**110**	**443**	**226**	**3,390**	**48.3**	**26**	**639**	**12,800**	**15.4**	**6.73**	**19.3**	**28.1**	**6.91**	NA	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	0.29 U	**0.52**	**0.49**	**2.15**	**0.49**	0.27 U	**3.20**	**13.3**	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	NA	NA	NA	NA	NA	NA	NA
	Chromium	100	100	**12.0**	**35.5**	**15.1**	**182**	**42.4**	**2.90**	**84.9**	**640**	**2.39**	**2.02**	**4.28**	**3.04**	**2.31**	NA	NA	NA	NA	NA	NA	NA
	Lead	200	200	**32.6**	**119**	**146**	**136**	**79.4**	**7.45**	NA	**2,070**	**8.29**	**3.19**	**11.3**	**4.12**	**1.75**	NA	NA	NA	NA	NA	NA	NA
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - micrograms per liter.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable or not available.
NS - No MassDEP standards exist for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 stan
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
TCLP - Toxicity Characteristic Leaching Procedure.
2004 and 2005 Data are based on the "Summary of Analytical Data, New Bedford High Sch
(1) - SW-846 Chapter 7, Table 7-1, *Maximum Concentration of Contaminants for Toxicity*
(a) - The sample was re-collected on 3/31/2009 and analyzed for dibenzofuran.
* - The sample exhibits altered PCB pattern; best possible Aroclor match reported.
** - TRC developed standards.
^ - For reference purposes only.

TABLE 2-6
Summary of Analytical Detected Results for Soil Samples
HS-6: House Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-361			VSS-5	SS-50	SS-52			
		Sample Depth (ft.):		0-1	1-3	6.5	0-0.5	0-0.5	0-0.5	1-3	0-1	1-3
		Sample Date:		3/4/2009	3/4/2009	3/4/2009	7/23/2001	12/2/2008	12/2/2008	3/31/2009	06/08/2011	06/08/2011
		S-1/GW-2	S-1/GW-3									
SVOCs												
(mg/kg)	Acenaphthene	1,000	1,000	0.174 U	0.176 U	0.178 U	NA	**0.257**	0.208 U	**0.542**	NA	NA
	Anthracene	1,000	1,000	0.174 U	0.176 U	0.178 U	NA	**0.900**	0.208 U	**1.62**	NA	NA
	Benzo(a)anthracene	7	7	0.174 U	0.176 U	0.178 U	NA	**2.03**	0.208 U	**1.42**	NA	NA
	Benzo(a)pyrene	2	2	0.174 U	0.176 U	0.178 U	NA	**1.65**	0.208 U	**1.17**	NA	NA
	Benzo(b)fluoranthene	7	7	0.174 U	0.176 U	0.178 U	NA	**2.05**	0.208 U	**1.37**	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	0.174 U	0.176 U	0.178 U	NA	**0.905**	0.208 U	**0.448**	NA	NA
	Benzo(k)fluoranthene	70	70	0.174 U	0.176 U	0.178 U	NA	**0.872**	0.208 U	**0.539**	NA	NA
	Chrysene	70	70	0.174 U	0.176 U	0.178 U	NA	**1.80**	0.208 U	**1.38**	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.174 U	0.176 U	0.178 U	NA	**0.221**	0.208 U	0.187 U	NA	NA
	Fluoranthene	1,000	1,000	0.174 U	0.176 U	0.178 U	NA	**4.32**	0.208 U	**2.70**	NA	NA
	Fluorene	1,000	1,000	0.174 U	0.176 U	0.178 U	NA	**0.380**	0.208 U	**0.944**	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	0.174 U	0.176 U	0.178 U	NA	**0.973**	0.208 U	**0.588**	NA	NA
	2-Methylnaphthalene	80	300	0.174 U	0.176 U	0.178 U	NA	0.210 U	0.208 U	**0.274**	NA	NA
	Naphthalene	20	500	0.174 U	0.176 U	0.178 U	NA	0.210 U	0.208 U	**0.505**	NA	NA
	Phenanthrene	500	500	0.174 U	0.176 U	0.178 U	NA	**3.06**	0.208 U	**4.30**	NA	NA
	Pyrene	1,000	1,000	0.174 U	0.176 U	0.178 U	NA	**4.79**	0.208 U	**2.95**	NA	NA
PCB Aroclors												
(mg/kg)	Aroclor 1254	1	1	0.0526 U	0.0531 U	0.0532 U	0.100 U	**0.939 J**	**0.179 J**	**3.18 J**	NA	NA
	Aroclor 1260	1	1	0.0526 U	0.0531 U	0.0532 U	0.100 U	0.0587 U	0.0612 U	0.164 U	NA	NA
	Aroclor 1262	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	0.0526 U	0.0531 U	0.0532 U	0.100 U	**0.939 J**	**0.179 J**	**3.18 J**	NA	NA
PCB Congerners												
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	**1.02**	**1.41**
PCB Homologs												
(mg/kg)	Pentachlorobiphenyl	N/A	N/A	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
(mg/kg)	Arsenic	20	20	2.61 U	2.64 U	2.67 U	**1.18**	**4.96**	3.11 U	2.81 U	NA	NA
	Barium	1,000	1,000	**12.1**	**6.42**	**8.99**	**10**	**69.9**	**21.0**	**43.0**	NA	NA
	Beryllium	90	90	0.27 U	0.27 U	0.27 U	NA	0.32 U	0.32 U	NA	NA	NA
	Cadmium	70	70	0.27 U	0.27 U	0.27 U	0.35 U	**0.42**	0.32 U	0.29 U	NA	NA
	Chromium	100	100	**2.70**	**1.68**	**3.02**	**2.92**	**11.7**	**5.24**	**10.1**	NA	NA
	Lead	200	200	**11.7**	**2.12**	**3.67**	**11**	**73.0**	**19.4**	**36.5**	NA	NA
	Mercury	20	20	**0.016**	0.012 U	0.016 U	0.07 U	**0.102**	**0.046**	NA	NA	NA
	Nickel	600	600	**2.19**	**1.90**	**2.79**	NA	**5.09**	**2.24**	NA	NA	NA
	Vanadium	400	400	5.22 U	5.27 U	5.34 U	NA	**18.3**	**9.82**	NA	NA	NA
	Zinc	1,000	1,000	**12.6**	**6.73**	**12.0**	NA	**60.2**	**23.1**	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
ug/L - micrograms per liter.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable or not available.
NS - No MassDEP standards exist for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
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SVOCs - Semivolatile Organic Compounds.
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TCLP - Toxicity Characteristic Leaching Procedure.
2004 and 2005 Data are based on the "Summary of Analytical Data, New Bedford High Scl
(1) - SW-846 Chapter 7, Table 7-1, *Maximum Concentration of Contaminants for Toxicity*
(a) - The sample was re-collected on 3/31/2009 and analyzed for dibenzofuran.
* - The sample exhibits altered PCB pattern; best possible Aroclor match reported.
** - TRC developed standards.
^ - For reference purposes only.

TABLE 2-7
Summary of Analytical Detected Results for Soil Samples
HS-7: Hang-Out Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HN3	HN3+HM3	HO2.5	HO2.5+HO3	HO3	VSS-4	SS-53	SS-54	SS-55	SS-56	SS-57
		Sample Depth (ft.):		1-2	0.75-2	0.5-1.5	0.5-1.5	0.5-1.25	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
		Sample Date:		2/22/2005	2/22/2005	2/22/2005	2/22/2005	2/22/2005	7/23/2001	12/2/2008	12/2/2008	12/2/2008	12/2/2008	12/2/2008
		S-1/GW-2	S-1/GW-3											
PAHs														
(mg/kg)	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	0.228	0.211 U	0.208 U	0.213 U	0.214 U
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	0.216	0.211 U	0.208 U	0.213 U	0.214 U
	Benzo(b)fluoranthene	7	7	NA	0.76	NA	0.58 U	NA	NA	0.269	0.211 U	0.208 U	0.213 U	0.214 U
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	0.207	0.211 U	0.208 U	0.213 U	0.214 U
	Fluoranthene	1000	1000	NA	NA	NA	NA	NA	NA	0.732	0.211 U	0.208 U	0.213 U	0.214 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	0.207 U	0.211 U	0.208 U	0.213 U	0.214 U
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	0.252	0.211 U	0.208 U	0.213 U	0.214 U
	Pyrene	1,000	1000	NA	NA	NA	NA	NA	NA	**0.567**	0.211 U	0.208 U	0.213 U	0.214 U
PCB Aroclors														
(mg/kg)	Aroclor 1254	1	1	**0.48**	NA	**0.22**	NA	0.113 U	0.100 U	**0.293 J**	**0.0959 J**	**0.148 J**	0.0648 U	0.0597 U
	Aroclor 1260	1	1	0.111 U	NA	0.111 U	NA	0.113 U	0.100 U	**0.136 J**	**0.123 J**	0.0606 U	0.0648 U	0.0597 U
	Total PCBs	1	1	**0.48**	NA	**0.22**	NA	0.227 U	0.100 U	**0.429 J**	**0.2189 J**	**0.148 J**	0.0648 U	0.0597 U
PCB Congeners														
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals														
(mg/kg)	Arsenic	20	20	NA	**0.88**	NA	**0.87**	NA	**1.52**	3.11 U	**3.55**	**3.92**	**4.50**	**3.32**
	Barium	1,000	1,000	NA	**29**	NA	**52**	NA	**11**	**60.4**	**40.2**	**28.1**	**40.8**	**23.6**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	0.32 U	0.32 U	0.32 U	0.32 U	0.33 U
	Cadmium	70	70	NA	**0.98**	NA	**1.26**	NA	0.32 U	**0.34**	**0.33**	0.32 U	0.32 U	0.33 U
	Chromium	100	100	NA	**13**	NA	**16**	NA	**3.74**	**10.6**	**9.16**	**8.59**	**14.2**	**10.9**
	Lead	200	200	NA	**53**	NA	**40**	NA	**8.89**	**67.2**	**54.4**	**89.4**	**67.2**	**30.7**
	Mercury	20	20	NA	**0.059**	NA	**0.099**	NA	0.07 U	**0.070**	**0.063**	**0.088**	**0.149**	**0.052**
	Nickel	600	600	NA	NA	NA	NA	NA	NA	**4.99**	**4.42**	**4.52**	**8.62**	**5.21**
	Silver	100	100	NA	0.06 U	NA	**0.22**	NA	0.32 U	0.63 U	0.64 U	0.63 U	0.64 U	0.65 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	**15.5**	**17.2**	**17.3**	**21.4**	**18.6**
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	**47.5**	**47.4**	**34.2**	**39.4**	**29.9**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.

TABLE 2-7
Summary of Analytical Detected Results for Soil Samples
HS-7: Hang-Out Area
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-362						SB-363		
		Sample Depth (ft.):		0-1	1-3	5	6.5	0-1	1-3	0-1	1-3	5
		Sample Date:		3/4/2009	3/4/2009	3/4/2009	3/4/2009	06/08/2011	06/08/2011	3/4/2009	3/4/2009	3/4/2009
		S-1/GW-2	S-1/GW-3									
PAHs												
(mg/kg)	Benzo(a)anthracene	7	7	0.395	0.221 U	0.246	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Benzo(a)pyrene	2	2	0.348	0.221 U	0.215	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Benzo(b)fluoranthene	7	7	0.41	0.221 U	0.244	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Chrysene	70	70	0.417	0.221 U	0.272	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Fluoranthene	1000	1000	0.696	0.343	0.431	0.507 U	NA	NA	0.64	0.195 U	0.184 U
	Indeno(1,2,3-cd)pyrene	7	7	0.192	0.221 U	0.214 U	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Phenanthrene	500	500	0.621	0.264	0.501	0.507 U	NA	NA	0.607	0.195 U	0.184 U
	Pyrene	1,000	1000	**0.793**	**0.270**	**0.530**	0.507 U	NA	NA	**0.573**	0.195 U	0.184 U
PCB Aroclors												
(mg/kg)	Aroclor 1254	1	1	**0.509 J**	**0.0904 J**	**0.154 J**	0.155 U	NA	NA	**0.283 J**	0.0582 U	0.0528 U
	Aroclor 1260	1	1	0.0568 U	0.0615 U	0.0599 U	0.155 U	NA	NA	0.0642 U	0.0582 U	0.0528 U
	Total PCBs	1	1	**0.509 J**	**0.0904 J**	**0.154 J**	0.155 U	NA	NA	**0.283 J**	0.0582 U	0.0528 U
PCB Congeners												
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	**0.776**	**0.276**	NA	NA	NA
Metals												
(mg/kg)	Arsenic	20	20	**5.37**	**9.86**	**6.59**	**12.6**	NA	NA	**5.18**	**4.48**	2.75 U
	Barium	1,000	1,000	**173**	**271**	**269**	**135**	NA	NA	**187**	**16.9**	**8.77**
	Beryllium	90	90	0.29 U	**1.11**	**0.70**	**1.56**	NA	NA	0.35 U	0.30 U	0.28 U
	Cadmium	70	70	**0.84**	**0.59**	**1.35**	**5.77**	NA	NA	**2.78**	0.30 U	0.28 U
	Chromium	100	100	**15.0**	**21.5**	**18.8**	**47.7**	NA	NA	**34.1**	**10.8**	**3.63**
	Lead	200	200	**277**	**487**	**448**	**319**	NA	NA	**292**	**5.35**	**1.00**
	Mercury	20	20	**0.213**	**0.088**	**0.120**	**0.183**	NA	NA	**0.211**	**0.048**	0.016 U
	Nickel	600	600	**9.37**	**18.0**	**10.5**	**40.3**	NA	NA	**8.03**	**5.02**	**2.36**
	Silver	100	100	0.58 U	0.67 U	0.65 U	1.52 U	NA	NA	0.69 U	0.59 U	0.55 U
	Vanadium	400	400	**18.3**	**25.1**	**19.4**	**17.8**	NA	NA	**24.4**	**14.3**	**5.62**
	Zinc	1,000	1,000	**191**	**99.6**	**264**	**703**	NA	NA	**181**	**20.7**	**7.66**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HF-10B		HG2				HG2.5	HG2.5+HH2.5	HG3		HG4	
		Sample Depth (ft.):		0-1	1-3	1-3	0-1	1-3	5-7	1-3	1-3	1-3	1-3	1-3	1-3
		Sample Date:		4/3/2009	4/3/2009	12/29/2004	4/15/2010	4/15/2010	4/15/2010	2/22/2005	2/22/2005	12/29/2004	2/22/2005	12/29/2004	2/22/2005
		S-1/GW-2	S-1/GW-3												
VOCs (mg/kg)	p-Isopropyltoluene (p-Cymene)	100(1)	100(1)	NA	NA	NA	NA	NA	**1.2**	NA	NA	NA	NA	NA	NA
VPH (mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	**51**	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	**25**	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	**160**	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	**120**	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	0.62 U	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	0.62 U	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	**1.2**	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	**2.5**	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	**2.3**	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	**3.2**	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	**1.6**	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	**1.2**	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	**2.9**	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	0.62 U	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	**5.7**	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	**0.74**	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	**1.7**	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	0.62 U	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	**4.7**	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	**5.4**	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	4.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	0.32 U	NA	NA	NA	NA	0.63 U	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	**0.41 JB**	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	0.32 U	NA	NA	NA	NA	0.63 U	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	0.96 U	NA	NA	NA	NA	**23**	NA	NA	NA	NA
	Carbazole	NS	NS	NA	NA	NA	NA	NA	NA	NA	**1.1**	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	0.32 U	NA	NA	NA	NA	0.63 U	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	0.199 U	**113**	0.32 U	0.20 U	**2.5**	0.42 U	NA	**0.91**	NA	NA	NA	NA
	Acenaphthylene	600	10	0.199 U	1.68 U	0.32 U	0.20 U	1.7 U	0.42 U	NA	0.63 U	NA	NA	NA	NA
	Anthracene	1,000	1,000	0.199 U	**190**	**0.69**	0.20 U	**4.0**	0.42 U	NA	**2.2**	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	0.199 U	**167**	**2.4**	0.20 U	**10**	**0.48**	NA	**10**	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	0.199 U	**133**	**2.2**	0.20 U	**9.0**	0.42 U	NA	**8.9**	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	0.199 U	**183**	**2.2**	0.20 U	**11**	**0.55**	NA	**13**	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	0.199 U	**58.3**	0.32 U	0.20 U	**4.6**	0.42 U	NA	**2**	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	0.199 U	**75.7**	**1.5**	0.20 U	1.7 U	0.42 U	NA	**4.5**	NA	NA	NA	NA
	Chrysene	70	70	0.199 U	**171**	**1.9**	0.20 U	**11**	**0.49**	NA	**7.8**	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.199 U	**17.2**	0.32 U	0.20 U	1.7 U	0.42 U	NA	0.63 U	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**0.257**	**443**	**5.6**	0.20 U	**21**	**0.86**	NA	**23**	NA	NA	NA	NA
	Fluorene	1,000	1,000	0.199 U	**121**	0.32 U	0.20 U	**1.9**	0.42 U	NA	**0.83**	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	0.199 U	**56.9**	0.32 U	0.20 U	**5.7**	0.42 U	NA	**2.7**	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	0.199 U	**47.8**	0.32 U	0.20 U	1.7 U	0.42 U	NA	0.63 U	NA	NA	NA	NA
	Naphthalene	20	500	0.199 U	**76.0**	0.32 U	0.20 U	1.7 U	0.42 U	NA	0.63 U	NA	NA	NA	NA
	Phenanthrene	500	500	**0.203**	**710**	**3.4**	0.20 U	**17**	**0.76**	NA	**11**	NA	NA	NA	NA
	Pyrene	1,000	1,000	**0.386**	**280**	**4.5**	**0.30**	**14**	**0.55**	NA	**12**	NA	NA	NA	NA

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HF-10B		HG2				HG2.5	HG2.5+HH2.5	HG3		HG4	
		Sample Depth (ft.):		0-1	1-3	1-3	0-1	1-3	5-7	1-3	1-3	1-3	1-3	1-3	1-3
		Sample Date:		4/3/2009	4/3/2009	12/29/2004	4/15/2010	4/15/2010	4/15/2010	2/22/2005	2/22/2005	12/29/2004	2/22/2005	12/29/2004	2/22/2005
		S-1/GW-2	S-1/GW-3												
PCB Aroclors															
(mg/kg)	Aroclor 1248	1	1	0.0587 U	**8.28 J**	1.27 U	0.12 U	0.49 U	0.49 U	0.121 U	NA	0.067 U	0.123 U	0.057 U	0.121 U
	Aroclor 1254	1	1	**0.460 J**	**7.10 J**	**4.19**	**0.12**	**4.2**	**4.0**	**19.8**	NA	**1.2**	**12.13**	**0.143**	**3.7**
	Aroclor 1260	1	1	**0.147 J**	**2.58 J**	1.27 U	0.12 U	0.49 U	0.49 U	0.121 U	NA	0.067 U	0.123 U	0.057 U	0.121 U
	Aroclor 1262	1	1	NA	NA	**0.644**	0.12 U	0.49 U	0.49 U	0.121 U	NA	**0.519**	0.123 U	0.057 U	0.121 U
	Aroclor 1268	1	1	NA	NA	1.27 U	0.12 U	0.49 U	0.49 U	0.121 U	NA	0.067 U	0.123 U	0.057 U	0.121 U
	Total PCBs	1	1	**0.607 J**	**17.96 J**	**4.834**	**0.12**	**4.2**	**4.0**	**19.8**	NA	**1.719**	**12.13**	**0.143**	**3.7**
Metals															
	Arsenic	20	20	**3.66**	**19.3**	**5.21**	3.0 U	**8.0**	**3.3**	NA	**8.56**	NA	NA	NA	NA
	Barium	1,000	1,000	**371**	**1,310**	**975**	**56**	**810**	**190**	NA	**873**	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	0.30 U	0.31 U	0.31 U	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**0.71**	**29.3**	**4.61**	**1.1**	**2.7**	**2.7**	NA	**7.94**	NA	NA	NA	NA
	Chromium	100	100	**25.7**	**119**	**320**	**11**	**97**	**47**	NA	**59**	NA	NA	NA	NA
	Lead	200	200	**118**	**16,100**	**413**	**220**	**1,900**	**320**	NA	**765**	NA	NA	NA	NA
	Mercury	20	20	NA	NA	**0.749**	**0.085**	**1.6**	**0.15**	NA	**0.405**	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	**7.3**	**29**	**25**	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	0.74 U	5.9 U	6.1 U	6.2 U	NA	0.12 U	NA	NA	NA	NA
	Silver	100	100	NA	NA	0.37 U	0.59 U	0.61 U	0.62 U	NA	**0.4**	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	**12**	**60**	**28**	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	**77**	**580**	**340**	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

N/A - Not applicable.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HG4+HG3	HG3+HG4	HG5	HG6	HG6+HG5	HG7	HG7+HH7	HG8	HG9		HG10	HG10+HG9	HH2.5
		Sample Depth (ft.):		1-3	1-3	0.5-3	0.5-3	0.5-3	0.75-3	0.75-3	1.5-3	1.5-3	1.5-3	2-3	1.5-3	1.5-3
		Sample Date:		12/29/2004	2/22/2005	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	2/22/2005
		S-1/GW-2	S-1/GW-3										Field Dup			
VOCs (mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.12**	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.064**	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.31**	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.1**	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.1**	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.7**	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.57**	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.39**	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.93**	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.9**	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.069**	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.4**	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.3**	NA
SVOCs (mg/kg)	Benzoic Acid	1,000*	1,000*	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.4**	NA
	Dimethyl phthalate	50	600	1.3 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.35**	NA
	Di-n-butylphthalate	NS	NS	4 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1 B**	NA
	Butyl benzyl phthalate	NS	NS	1.3 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA
	bis(2-Ethylhexyl)phthalate	90	90	4 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1**	NA
	Carbazole	NS	NS	NA	**0.74**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	1.3 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.079**	NA
	Acenaphthene	1,000	1,000	1.3 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.12**	NA
	Acenaphthylene	600	10	**10**	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.064**	NA
	Anthracene	1,000	1,000	1.3 U	**1.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.31**	NA
	Benzo(a)anthracene	7	7	**2.7**	**2.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.1**	NA
	Benzo(a)pyrene	2	2	1.3 U	**2.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.1**	NA
	Benzo(b)fluoranthene	7	7	1.3 U	**3.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.7**	NA
	Benzo(g,h,i)perylene	1,000	1,000	1.3 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.57**	NA
	Benzo(k)fluoranthene	70	70	1.3 U	**0.81**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.39**	NA
	Chrysene	70	70	**2.1**	**1.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.93**	NA
	Dibenz(a,h)anthracene	0.7	0.7	1.3 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA
	Fluoranthene	1,000	1,000	**5.1**	**6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.9**	NA
	Fluorene	1,000	1,000	1.3 U	**0.77**	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA
	Indeno(1,2,3-cd)pyrene	7	7	1.3 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA
	2-Methylnaphthalene	80	300	1.3 U	0.65 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA
	Naphthalene	20	500	1.3 U	**1.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.069**	NA
	Phenanthrene	500	500	1.3 U	**5.4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.4**	NA
	Pyrene	1,000	1,000	**5.5**	**3.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.3**	NA

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HG4+HG3	HG3+HG4	HG5	HG6	HG6+HG5	HG7	HG7+HH7	HG8	HG9		HG10	HG10+HG9	HH2.5
		Sample Depth (ft.):		1-3	1-3	0.5-3	0.5-3	0.5-3	0.75-3	0.75-3	1.5-3	1.5-3	1.5-3	2-3	1.5-3	1.5-3
		Sample Date:		12/29/2004	2/22/2005	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004 Field Dup	12/28/2004	12/28/2004	2/22/2005
		S-1/GW-2	S-1/GW-3													
PCB Aroclors																
(mg/kg)	Aroclor 1248	1	1	NA	NA	1.23 U	0.061 U	NA	0.06 U	NA	0.063 U	0.06 U	0.076 U	0.061 U	NA	0.136 U
	Aroclor 1254	1	1	NA	NA	1.23 U	**0.601**	NA	**1.9**	NA	**3.06**	**2.35**	**2.92**	**1.65**	NA	**14.3**
	Aroclor 1260	1	1	NA	NA	1.23 U	0.061 U	NA	0.06 U	NA	0.063 U	0.06 U	0.076 U	0.061 U	NA	0.136 U
	Aroclor 1262	1	1	NA	NA	1.23 U	**0.145**	NA	**0.21**	NA	**0.47**	**0.23**	**0.3**	**0.234**	NA	0.136 U
	Aroclor 1268	1	1	NA	NA	1.23 U	0.061 U	NA	0.06 U	NA	0.063 U	0.06 U	0.076 U	0.061 U	NA	0.136 U
	Total PCBs	1	1	NA	NA	2.45 U	**0.746**	NA	**2.11**	NA	**3.53**	**2.58**	**3.22**	**1.884**	NA	**14.3**
Metals																
	Arsenic	20	20	**5.98**	**3.36**	NA	NA	**3.17**	NA	**10**	NA	NA	NA	NA	**9.02**	NA
	Barium	1,000	1,000	**734**	**316**	NA	NA	**179**	NA	**1,710**	NA	NA	NA	NA	**752**	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**10**	**2.09**	NA	NA	**4.26**	NA	**6.34**	NA	NA	NA	NA	**7.46**	NA
	Chromium	100	100	**94**	**22**	NA	NA	**13**	NA	**150**	NA	NA	NA	NA	**80**	NA
	Lead	200	200	**1,140**	**354**	NA	NA	**419**	NA	**1,070**	NA	NA	NA	NA	**1,430**	NA
	Mercury	20	20	**0.92**	**0.344**	NA	NA	**0.386**	NA	**17**	NA	NA	NA	NA	**1.57**	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	0.81 U	0.12 U	NA	NA	0.77 U	NA	**2.22**	NA	NA	NA	NA	0.82 U	NA
	Silver	100	100	**0.65**	**0.16**	NA	NA	0.39 U	NA	**1.35**	NA	NA	NA	NA	**6.4**	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

N/A - Not applicable.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as a

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HH3		HH4	HH4+HI4	HH5	HH5+HI5	HH7	HH8	HH8+HG8	HH9	HH9+HI9	HH10	HH10+HI10
		Sample Depth (ft.):		0-1.5	1.5-3	1-3	1-3	0.75-3	0.75-3	1.25-3	0.5-3	0.5-3	1-3	0.75-3	1.5-3	1-3
		Sample Date:		2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/29/2004	12/29/2004
		S-1/GW-2	S-1/GW-3													
VOCs (mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2 U
	Dimethyl phthalate	50	600	0.07 U	NA	NA	0.63 U	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Di-n-butylphthalate	NS	NS	**0.21 B**	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	**0.3 JB**
	Butyl benzyl phthalate	NS	NS	0.07 U	NA	NA	0.63 U	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	bis(2-Ethylhexyl)phthalate	90	90	**0.1 J**	NA	NA	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	**9.8**
	Carbazole	NS	NS	**0.11**	NA	NA	**1.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	0.07 U	NA	NA	0.63 U	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Acenaphthene	1,000	1,000	0.07 U	NA	NA	**0.88**	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Acenaphthylene	600	10	0.07 U	NA	NA	0.63 U	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Anthracene	1,000	1,000	0.14 U	NA	NA	**2**	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Benzo(a)anthracene	7	7	**0.62**	NA	NA	**6.5**	NA	NA	NA	NA	NA	NA	NA	NA	**0.94**
	Benzo(a)pyrene	2	2	**0.55**	NA	NA	**6**	NA	NA	NA	NA	NA	NA	NA	NA	**0.93**
	Benzo(b)fluoranthene	7	7	**0.73**	NA	NA	**9**	NA	NA	NA	NA	NA	NA	NA	NA	**0.82**
	Benzo(g,h,i)perylene	1,000	1,000	**0.15**	NA	NA	**1.9**	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Benzo(k)fluoranthene	70	70	**0.31**	NA	NA	**3.4**	NA	NA	NA	NA	NA	NA	NA	NA	**0.51**
	Chrysene	70	70	**0.55**	NA	NA	**4.8**	NA	NA	NA	NA	NA	NA	NA	NA	**0.66**
	Dibenz(a,h)anthracene	0.7	0.7	0.07 U	NA	NA	0.63 U	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Fluoranthene	1,000	1,000	**1.3**	NA	NA	**15**	NA	NA	NA	NA	NA	NA	NA	NA	**2.1**
	Fluorene	1,000	1,000	0.07 U	NA	NA	**0.74**	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Indeno(1,2,3-cd)pyrene	7	7	**0.19**	NA	NA	**1.9**	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	2-Methylnaphthalene	80	300	0.07 U	NA	NA	0.63 U	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Naphthalene	20	500	0.07 U	NA	NA	0.63 U	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U
	Phenanthrene	500	500	**0.66**	NA	NA	**10**	NA	NA	NA	NA	NA	NA	NA	NA	0.76 U
	Pyrene	1,000	1,000	**0.74**	NA	NA	**9.9**	NA	NA	NA	NA	NA	NA	NA	NA	**1.6**

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HH3		HH4	HH4+HI4	HH5	HH5+HI5	HH7	HH8	HH8+HG8	HH9	HH9+HI9	HH10	HH10+HI10
		Sample Depth (ft.):		0-1.5	1.5-3	1-3	1-3	0.75-3	0.75-3	1.25-3	0.5-3	0.5-3	1-3	0.75-3	1.5-3	1-3
		Sample Date:		2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/29/2004	12/29/2004
		S-1/GW-2	S-1/GW-3													
PCB Aroclors																
(mg/kg)	Aroclor 1248	1	1	0.12 U	0.138 U	0.113 U	NA	0.06 U	NA	0.06 U	1.19 U	NA	0.059 U	NA	0.058 U	NA
	Aroclor 1254	1	1	**0.653**	**5.37**	**4.95**	NA	**2.39**	NA	**3.4**	**3.654**	NA	**2.37**	NA	**0.638**	NA
	Aroclor 1260	1	1	0.12 U	0.138 U	0.113 U	NA	0.06 U	NA	0.06 U	1.19 U	NA	0.059 U	NA	0.058 U	NA
	Aroclor 1262	1	1	0.12 U	0.138 U	0.113 U	NA	**0.298**	NA	**0.284**	1.19 U	NA	**0.334**	NA	**0.132**	NA
	Aroclor 1268	1	1	0.12 U	0.138 U	0.113 U	NA	0.06 U	NA	0.06 U	1.19 U	NA	0.059 U	NA	0.058 U	NA
	Total PCBs	1	1	**0.653**	**5.37**	**4.95**	NA	**2.688**	NA	**3.684**	**3.654**	NA	**2.704**	NA	**0.770**	NA
Metals																
	Arsenic	20	20	**1.44**	NA	NA	**9.07**	NA	**3.01**	NA	NA	**22**	NA	**5.65**	NA	**3.87**
	Barium	1,000	1,000	**523**	NA	NA	**1,210**	NA	**358**	NA	NA	**5,110**	NA	**1,370**	NA	**567**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**1.14**	NA	NA	**11**	NA	**3.51**	NA	NA	**12**	NA	**5.65**	NA	**2.79**
	Chromium	100	100	**8.01**	NA	NA	**177**	NA	**27**	NA	NA	**356**	NA	**137**	NA	**65**
	Lead	200	200	**693**	NA	NA	**2,280**	NA	**568**	NA	NA	**2,200**	NA	**829**	NA	**278**
	Mercury	20	20	**0.073**	NA	NA	**1.02**	NA	**0.691**	NA	NA	**0.708**	NA	**0.953**	NA	**0.453**
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	0.1 U	NA	NA	0.11 U	NA	0.72 U	NA	NA	0.94 U	NA	0.8 U	NA	0.72 U
	Silver	100	100	0.05 U	NA	NA	**1.02**	NA	0.36 U	NA	NA	**2.17**	NA	**0.4**	NA	0.36 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

N/A - Not applicable.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as a

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HI2.5	HI2.5+HJ2.5	HI3	HI3+HH3	HI4	HI5	HI6	HI6+HH6	HI7+HJ7	HI7	HI8	HI9	HI10
		Sample Depth (ft.):		1-2	0-2	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-2	0.75-3	0.75-3	1-3
		Sample Date:		2/22/2005	2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/29/2004
		S-1/GW-2	S-1/GW-3													
VOCs (mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA	0.9 U	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	0.67 U	NA	0.72 U	NA	NA	NA	0.06 U	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	**0.73 JB**	NA	2.2 U	NA	NA	NA	**0.19 B**	NA	NA	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	NA	0.67 U	NA	0.72 U	NA	NA	NA	0.06 U	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	**2.6**	NA	**0.92 J**	NA	NA	NA	0.18 U	NA	NA	NA	NA	NA
	Carbazole	NS	NS	NA	**13**	NA	**4**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	**7.2**	NA	**2.1**	NA	NA	NA	**0.56**	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	**14**	NA	**2.1**	NA	NA	NA	**1.1**	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	0.67 U	NA	**2.5**	NA	NA	NA	**0.074**	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	**22**	NA	**10**	NA	NA	NA	**1.9**	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	**40**	NA	**26**	NA	NA	NA	**3.6**	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	**33**	NA	**21**	NA	NA	NA	**2.8**	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	**45**	NA	**32**	NA	NA	NA	**4.2**	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	**7.7**	NA	**4.7**	NA	NA	NA	**1.2**	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	**13**	NA	**6.8**	NA	NA	NA	**1.4**	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	**33**	NA	**20**	NA	NA	NA	**2.7**	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	**3.3**	NA	0.72 U	NA	NA	NA	0.06 U	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	**73**	NA	**69**	NA	NA	NA	**6.8**	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	**11**	NA	**2.2**	NA	NA	NA	**0.8**	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	**9.8**	NA	**6.1**	NA	NA	NA	**1.4**	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	**4.5**	NA	0.72 U	NA	NA	NA	**0.25**	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	**12**	NA	**1**	NA	NA	NA	**0.76**	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	**84**	NA	**45**	NA	NA	NA	**6.1**	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	**58**	NA	**45**	NA	NA	NA	**6.5**	NA	NA	NA	NA	NA

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HI2.5	HI2.5+HJ2.5	HI3	HI3+HH3	HI4	HI5	HI6	HI6+HH6	HI7+HJ7	HI7	HI8	HI9	HI10
			Sample Depth (ft.):	1-2	0-2	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-2	0.75-3	0.75-3	1-3
			Sample Date:	2/22/2005	2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/29/2004
		S-1/GW-2	S-1/GW-3													
PCB Aroclors																
(mg/kg)	Aroclor 1248	1	1	0.137 U	NA	0.154 U	NA	0.122 U	0.06 U	0.059 U	NA	NA	0.073 U	0.055 U	0.058 U	1.12 U
	Aroclor 1254	1	1	**0.94**	NA	**5.35**	NA	**4.44**	**3.88**	**3.29**	NA	NA	**2.06**	**2.09**	**4.15**	**10.4**
	Aroclor 1260	1	1	0.137 U	NA	0.154 U	NA	0.122 U	0.06 U	0.059 U	NA	NA	0.073 U	0.055 U	0.058 U	1.12 U
	Aroclor 1262	1	1	0.137 U	NA	0.154 U	NA	0.122 U	**3.58**	**1.07**	NA	NA	**0.43**	**0.372**	**0.565**	1.12 U
	Aroclor 1268	1	1	0.137 U	NA	0.154 U	NA	0.122 U	0.06 U	0.059 U	NA	NA	0.073 U	0.055 U	0.058 U	1.12 U
	Total PCBs	1	1	**0.94**	NA	**5.35**	NA	**4.44**	**7.46**	**4.36**	NA	NA	**2.49**	**2.462**	**4.715**	**10.4**
Metals																
	Arsenic	20	20	NA	**4.3**	NA	**7.93**	NA	NA	NA	**4.74**	**8.3**	NA	NA	NA	NA
	Barium	1,000	1,000	NA	**572**	NA	**595**	NA	NA	NA	**833**	**903**	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	**4.53**	NA	**7.17**	NA	NA	NA	**2.98**	**4.31**	NA	NA	NA	NA
	Chromium	100	100	NA	**62**	NA	**81**	NA	NA	NA	**66**	**84**	NA	NA	NA	NA
	Lead	200	200	NA	**866**	NA	**4,380**	NA	NA	NA	**398**	**796**	NA	NA	NA	NA
	Mercury	20	20	NA	**0.845**	NA	**0.608**	NA	NA	NA	**0.324**	**1.3**	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	0.13 U	NA	0.14 U	NA	NA	NA	0.68 U	**3.42**	NA	NA	NA	NA
	Silver	100	100	NA	**0.71**	NA	**0.53**	NA	NA	NA	**0.41**	**0.57**	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

N/A - Not applicable.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as a

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HI-10A		HI-10B		HI-10C		HI-10E	HJ2.5		HJ3	HJ4	HJ4+HK4	HJ5
		Sample Depth (ft.):		0-1	1-3	0-1	1-3	0-1	1-2	1-3	0-2	2-3	2.5-3	1.5-3	0.5-3	2-3
		Sample Date:		3/11/2009	3/11/2009	3/11/2009	3/11/2009	3/11/2009	3/11/2009	3/11/2009	2/22/2005	2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004
		S-1/GW-2	S-1/GW-3													
VOCs																
(mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH																
(mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																
(mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	**0.095 JB**	NA	NA	NA	1.8 U	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	**0.078 J**	NA	NA	NA	1.8 U	NA
	Carbazole	NS	NS	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.23**	NA	NA	NA	**1.5**	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	**0.22**	NA	NA	NA	**1.3**	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.31**	NA	NA	NA	0.59 U	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**0.092**	NA	NA	NA	0.59 U	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	**0.08**	NA	NA	NA	0.59 U	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	**0.2**	NA	NA	NA	**1.3**	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**0.39**	NA	NA	NA	**2.9**	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.11**	NA	NA	NA	0.59 U	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	**0.23**	NA	NA	NA	**1.7**	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**0.39**	NA	NA	NA	**2.9**	NA

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HI-10A		HI-10B		HI-10C		HI-10E	HJ2.5		HJ3	HJ4	HJ4+HK4	HJ5
		Sample Depth (ft.):		0-1	1-3	0-1	1-3	0-1	1-2	1-3	0-2	2-3	2.5-3	1.5-3	0.5-3	2-3
		Sample Date:		3/11/2009	3/11/2009	3/11/2009	3/11/2009	3/11/2009	3/11/2009	3/11/2009	2/22/2005	2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004
		S-1/GW-2	S-1/GW-3													
PCB Aroclors																
(mg/kg)	Aroclor 1248	1	1	0.190 U	0.126 U	0.366 U	0.0577 U	0.0589 U	0.0560 U	0.0620 UJ	0.13 U	0.13 U	0.117 U	0.123 U	NA	0.066 U
	Aroclor 1254	1	1	**2.95 J**	**1.80 J**	**6.02 J**	**0.743 J**	**1.14 J**	**0.756 J**	**0.800 J**	**0.73**	**2.74**	**0.209**	**0.77**	NA	**0.612**
	Aroclor 1260	1	1	0.190 U	0.126 U	0.366 U	**0.297 J**	**0.328 J**	0.0560 U	**0.161 J**	0.13 U	0.13 U	0.117 U	0.123 U	NA	0.066 U
	Aroclor 1262	1	1	NA	NA	NA	NA	NA	NA	NA	0.13 U	0.13 U	0.117 U	0.123 U	NA	**0.257**
	Aroclor 1268	1	1	NA	NA	NA	NA	NA	NA	NA	0.13 U	0.13 U	0.117 U	0.123 U	NA	0.066 U
	Total PCBs	1	1	**2.95 J**	**1.80 J**	**6.02 J**	**1.04 J**	**1.468 J**	**0.756 J**	**0.961 J**	**0.73**	**2.74**	**0.209**	**0.77**	NA	**0.869**
Metals																
	Arsenic	20	20	NA	NA	NA	NA	NA	NA	NA	**0.56**	NA	NA	NA	**4.62**	NA
	Barium	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**27**	NA	NA	NA	**593**	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	NA	NA	NA	NA	NA	NA	**0.8**	NA	NA	NA	**3.14**	NA
	Chromium	100	100	NA	NA	NA	NA	NA	NA	NA	**10**	NA	NA	NA	**66**	NA
	Lead	200	200	NA	NA	NA	NA	NA	NA	NA	**35**	NA	NA	NA	**359**	NA
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	**0.044**	NA	NA	NA	**0.32**	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA	0.11 U	NA
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	0.06 U	NA	NA	NA	**0.22**	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as a
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HJ5+HK5	HJ6	HJ7	HJ8	HJ8+HI8		HJ9	HJ9+HK8	HJ10	HJ-10A	HJ-10B	HJ-10C	
		Sample Depth (ft.):		1-3	1-2.5	1-3	0.5-2.5	0.5-3	0.5-3	1-3	0.5-2.5	1-3	1-3	1-3	0-1	1-3
		Sample Date:		12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/29/2004	3/11/2009	3/11/2009	3/11/2009	3/11/2009
		S-1/GW-2	S-1/GW-3						Field Dup							
VOCs (mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Benzoic Acid	1,000*	1,000*	4.6 U	NA	NA	NA	0.89 U	0.89 U	NA	NA	4.2 U	NA	NA	NA	NA
	Dimethyl phthalate	50	600	**0.97**	NA	NA	NA	0.059 U	0.059 U	NA	NA	0.28 U	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	**0.41 JB**	NA	NA	NA	**0.21 B**	**0.52 B**	NA	NA	**5.6 B**	NA	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	0.31 U	NA	NA	NA	**0.29**	**0.33**	NA	NA	0.28 U	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	0.92 U	NA	NA	NA	**7.0**	**5.6**	NA	NA	**5.3**	NA	NA	NA	NA
	Carbazole	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	0.31 U	NA	NA	NA	**0.27**	**0.14**	NA	NA	0.28 U	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	**3.9**	NA	NA	NA	**0.42**	**0.26**	NA	NA	0.28 U	NA	NA	NA	NA
	Acenaphthylene	600	10	**2.2**	NA	NA	NA	**0.097**	**0.087**	NA	NA	0.28 U	NA	NA	NA	NA
	Anthracene	1,000	1,000	**8.1**	NA	NA	NA	**0.86**	**0.77**	NA	NA	**3**	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	**16**	NA	NA	NA	**2.8**	**2.6**	NA	NA	**1.6**	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	**9.7**	NA	NA	NA	**2.3**	**4.7**	NA	NA	**1.5**	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	**9.8**	NA	NA	NA	**3.3**	**6.5**	NA	NA	**1.5**	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	**2.8**	NA	NA	NA	**1.2**	**2.5**	NA	NA	0.28 U	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	**6.5**	NA	NA	NA	**0.85**	**2.3**	NA	NA	**1.1**	NA	NA	NA	NA
	Chrysene	70	70	**14**	NA	NA	NA	**2.2**	**1.9**	NA	NA	**1.3**	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.31 U	NA	NA	NA	0.059 U	0.059 U	NA	NA	0.28 U	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**30**	NA	NA	NA	**5.2**	**4.7**	NA	NA	**3.8**	NA	NA	NA	NA
	Fluorene	1,000	1,000	**2.9**	NA	NA	NA	**0.4**	**0.24**	NA	NA	0.28 U	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	**3.1**	NA	NA	NA	**1.3**	**2.6**	NA	NA	0.28 U	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	**3.9**	NA	NA	NA	**0.13**	0.059 U	NA	NA	0.28 U	NA	NA	NA	NA
	Naphthalene	20	500	**1.8**	NA	NA	NA	**0.26**	**0.092**	NA	NA	0.28 U	NA	NA	NA	NA
	Phenanthrene	500	500	**33**	NA	NA	NA	**4.2**	**3**	NA	NA	**2.5**	NA	NA	NA	NA
	Pyrene	1,000	1,000	**37**	NA	NA	NA	**5.2**	**4.3**	NA	NA	**3.1**	NA	NA	NA	NA

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HJ5+HK5	HJ6	HJ7	HJ8	HJ8+HI8		HJ9	HJ9+HK8	HJ10	HJ-10A	HJ-10B	HJ-10C	
			Sample Depth (ft.):	1-3	1-2.5	1-3	0.5-2.5	0.5-3	0.5-3	1-3	0.5-2.5	1-3	1-3	1-3	0-1	1-3
			Sample Date:	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/29/2004	3/11/2009	3/11/2009	3/11/2009	3/11/2009
		S-1/GW-2	S-1/GW-3						Field Dup							
PCB Aroclors																
(mg/kg)	Aroclor 1248	1	1	NA	0.056 U	0.067 U	0.058 U	NA	NA	0.067 U	NA	0.059 U	0.0579 UJ	0.0607 UJ	0.176 U	0.684 U
	Aroclor 1254	1	1	NA	**0.682**	**2.04**	**0.52**	NA	NA	**2.62**	NA	**0.444**	**0.364 J**	**0.963 J**	**1.89 J**	**10.2 J**
	Aroclor 1260	1	1	NA	0.056 U	0.067 U	0.058 U	NA	NA	0.067 U	NA	0.059 U	**0.193 J**	**0.254 J**	0.176 U	0.684 U
	Aroclor 1262	1	1	NA	0.056 U	**0.428**	**0.22**	NA	NA	**0.603**	NA	**0.285**	NA	NA	NA	NA
	Aroclor 1268	1	1	NA	**1.12**	0.067 U	0.058 U	NA	NA	0.067 U	NA	0.059 U	NA	NA	NA	NA
	Total PCBs	1	1	NA	**1.802**	**2.468**	**0.74**	NA	NA	**3.223**	NA	**0.729**	**0.557 J**	**1.217 J**	**1.89 J**	**10.2 J**
Metals																
	Arsenic	20	20	**4**	NA	NA	NA	**11**	**5.01**	NA	**5.94**	**2.53**	NA	NA	NA	NA
	Barium	1,000	1,000	**788**	NA	NA	NA	**3,640**	**787**	NA	**1,510**	**169**	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**3.56**	NA	NA	NA	**18**	**5.29**	NA	**3.73**	**4.65**	NA	NA	**0.52**	**14.9**
	Chromium	100	100	**58**	NA	NA	NA	**741**	**116**	NA	**206**	**192**	NA	NA	**17.6**	**332**
	Lead	200	200	**400**	NA	NA	NA	**1,780**	**1,250**	NA	**526**	**436**	NA	NA	**98.5**	**2,690**
	Mercury	20	20	**0.422**	NA	NA	NA	**1.36**	**0.755**	NA	**0.532**	**1.02**	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	0.63 U	NA	NA	NA	0.78 U	0.72 U	NA	0.76 U	0.68 U	NA	NA	NA	NA
	Silver	100	100	0.31 U	NA	NA	NA	**2.33**	**1**	NA	**0.38**	0.34 U	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

N/A - Not applicable.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as a

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HJ-10D		HJ-10F		HK2.5	HK2.5+HM2.5	HK4	HK5	HK6		HK6+HJ6	HK7	HK7+HL7
		Sample Depth (ft.):		0-1	1-3	0-1	1-3	0.5-3	0.5-3	0.5-3	1-3	0.25-3	0.25-3	0.25-3	2-3	1-3
		Sample Date:		3/11/2009	3/11/2009	3/11/2009	3/11/2009	2/22/2005	2/22/2005	2/22/2005	12/28/2004	12/28/2004	12/28/2004 Field Dup	12/28/2004	12/28/2004	12/28/2004
		S-1/GW-2	S-1/GW-3													
VOCs (mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA
	Carbazole	NS	NS	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	**0.96**	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	**1.3**	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	**0.76**	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	**1.7**	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	**1.2**	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	**1.2**	NA	NA	NA	NA	NA	NA	NA

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HJ-10D		HJ-10F		HK2.5	HK2.5+HM2.5	HK4	HK5	HK6		HK6+HJ6	HK7	HK7+HL7
		Sample Depth (ft.):		0-1	1-3	0-1	1-3	0.5-3	0.5-3	0.5-3	1-3	0.25-3	0.25-3	0.25-3	2-3	1-3
		Sample Date:		3/11/2009	3/11/2009	3/11/2009	3/11/2009	2/22/2005	2/22/2005	2/22/2005	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004
		S-1/GW-2	S-1/GW-3										Field Dup			
PCB Aroclors																
(mg/kg)	Aroclor 1248	1	1	0.0633 U	0.0748 U	0.143 U	0.0658 U	0.144 U	NA	0.109 U	0.053 U	1.26 U	1.27 U	NA	0.07 U	NA
	Aroclor 1254	1	1	**0.103 J**	**0.696 J**	**1.93 J**	0.0658 U	**9.32**	NA	**0.926**	**0.242**	1.26 U	**1.62**	NA	**0.296**	NA
	Aroclor 1260	1	1	**0.0787 J**	**0.313 J**	**0.857 J**	0.0658 U	0.144 U	NA	0.109 U	0.053 U	1.26 U	1.27 U	NA	0.07 U	NA
	Aroclor 1262	1	1	NA	NA	NA	NA	0.144 U	NA	0.109 U	0.053 U	1.26 U	1.27 U	NA	0.07 U	NA
	Aroclor 1268	1	1	NA	NA	NA	NA	0.144 U	NA	0.109 U	0.053 U	1.26 U	1.27 U	NA	0.07 U	NA
	Total PCBs	1	1	**0.1817 J**	**1.009 J**	**2.787 J**	0.0658 U	**9.32**	NA	**0.926**	**0.242**	2.5 U	**1.62**	NA	**0.296**	NA
Metals																
	Arsenic	20	20	NA	NA	NA	NA	NA	**0.97**	NA	NA	NA	NA	**35**	NA	**1.77**
	Barium	1,000	1,000	NA	NA	NA	NA	NA	**167**	NA	NA	NA	NA	**638**	NA	**106**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**0.55**	**19.2**	**3.06**	0.34 U	NA	**4.22**	NA	NA	NA	NA	**12**	NA	**1.68**
	Chromium	100	100	**19.3**	**368**	**133**	**11.8**	NA	**36**	NA	NA	NA	NA	**476**	NA	**19**
	Lead	200	200	**106**	**3,120**	**922**	**8.69**	NA	**379**	NA	NA	NA	NA	**3,900**	NA	**230**
	Mercury	20	20	NA	NA	NA	NA	NA	**0.501**	NA	NA	NA	NA	**4.29**	NA	**0.226**
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA	NA	0.91 U	NA	0.8 U
	Silver	100	100	NA	NA	NA	NA	NA	**0.25**	NA	NA	NA	NA	**2.82**	NA	**0.4**
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

N/A - Not applicable.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as a

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HK8	HL3	HL3+HJ3	HL4		HL7	HM2.5	HM3		HS-2
			Sample Depth (ft.):	1-2	0.25-3	0.25-3	2-3	2-3	1-1.5	1-2	0.75-1.5	0.75-1.5	0-0.5
			Sample Date:	12/28/2004	2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004	2/22/2005	2/22/2005	2/22/2005	9/9/2004
		S-1/GW-2	S-1/GW-3					Field Dup				Field Dup	
VOCs (mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	**0.92 JB**	2 U	NA	NA	NA	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	1.7 U	2 U	NA	NA	NA	NA	NA	NA
	Carbazole	NS	NS	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	0.57 U	**0.68**	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	**1.8**	**3.4**	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	**1.3**	**2.5**	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	**2**	**4.4**	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	0.57 U	**1.2**	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	**1.6**	**2.5**	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	**2.9**	**6.3**	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	**2.6**	**3.5**	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	**2.8**	**4.4**	NA	NA	NA	NA	NA	NA

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HK8	HL3	HL3+HJ3	HL4		HL7	HM2.5	HM3		HS-2
			Sample Depth (ft.):	1-2	0.25-3	0.25-3	2-3	2-3	1-1.5	1-2	0.75-1.5	0.75-1.5	0-0.5
			Sample Date:	12/28/2004	2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004	2/22/2005	2/22/2005	2/22/2005	9/9/2004
		S-1/GW-2	S-1/GW-3					Field Dup				Field Dup	
PCB Aroclors													
(mg/kg)	Aroclor 1248	1	1	0.064 U	0.116 U	NA	0.149 U	NA	1.15 U	0.128 U	0.141 U	0.153 U	1.09 U
	Aroclor 1254	1	1	**0.367**	**1.62**	NA	**5.63**	NA	1.15 U	**0.28**	**0.634**	**0.78**	**6.51**
	Aroclor 1260	1	1	0.064 U	0.116 U	NA	0.149 U	NA	1.15 U	0.128 U	0.141 U	0.153 U	1.09 U
	Aroclor 1262	1	1	**0.185**	0.116 U	NA	0.149 U	NA	1.15 U	0.128 U	0.141 U	0.153 U	1.09 U
	Aroclor 1268	1	1	0.064 U	0.116 U	NA	0.149 U	NA	1.15 U	0.128 U	0.141 U	0.153 U	1.09 U
	Total PCBs	1	1	**0.552**	**1.62**	NA	**5.63**	NA	2.3 U	**0.28**	**0.634**	**0.78**	**6.51**
Metals													
	Arsenic	20	20	NA	NA	**1.22**	**5.81**	**5.93**	NA	NA	NA	NA	NA
	Barium	1,000	1,000	NA	NA	**43**	**1,870**	**1,980**	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	NA	**0.92**	**7.85**	**6.03**	NA	NA	NA	NA	NA
	Chromium	100	100	NA	NA	**14**	**200**	**146**	NA	NA	NA	NA	NA
	Lead	200	200	NA	NA	**75**	**1,640**	**1,020**	NA	NA	NA	NA	NA
	Mercury	20	20	NA	NA	**0.078**	**0.96**	**0.343**	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	0.1 U	0.12 U	0.11 U	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	0.05 U	**0.74**	**0.38**	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as a
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-350			VSS-1		VSS-2	VSS-15	SS-58	SS-59		SS-60	SS-61	SS-62
		Sample Depth (ft.):		0.5	5	8	0-0.5	0.5-1	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
		Sample Date:		8/21/2008	8/21/2008	8/21/2008	7/23/2001	7/23/2001	7/23/2001	7/23/2001	12/2/2008	12/2/2008	12/2/2008	12/2/2008	12/2/2008	12/2/2008
		S-1/GW-2	S-1/GW-3										Field Dup			
VOCs (mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	**10**	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	**12**	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	0.238 U	0.182 U	NA	0.50 U	NA	NA	0.213 U	0.211 U	0.211 U	0.221 U	0.199 U	0.206 U
	Acenaphthylene	600	10	NA	0.238 U	0.182 U	NA	0.50 U	NA	NA	0.213 U	0.211 U	0.211 U	0.221 U	0.199 U	0.206 U
	Anthracene	1,000	1,000	NA	0.238 U	0.182 U	NA	**0.70**	NA	NA	0.213 U	0.211 U	0.211 U	0.221 U	0.199 U	0.206 U
	Benzo(a)anthracene	7	7	NA	0.238 U	0.182 U	NA	**1.0**	NA	NA	0.213 U	0.211 U	0.211 U	**0.268**	**0.798**	0.206 U
	Benzo(a)pyrene	2	2	NA	0.238 U	0.182 U	NA	**1.2**	NA	NA	0.213 U	0.211 U	0.211 U	**0.252**	**0.651**	0.206 U
	Benzo(b)fluoranthene	7	7	NA	0.238 U	0.182 U	NA	**0.80**	NA	NA	0.213 U	0.211 U	0.211 U	**0.300**	**0.704**	0.206 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	0.238 U	0.182 U	NA	**1.4**	NA	NA	0.213 U	0.211 U	0.211 U	**0.240**	**0.403**	0.206 U
	Benzo(k)fluoranthene	70	70	NA	0.238 U	0.182 U	NA	**0.70**	NA	NA	0.213 U	0.211 U	0.211 U	0.221 U	**0.294**	0.206 U
	Chrysene	70	70	NA	0.238 U	0.182 U	NA	**1.1**	NA	NA	0.213 U	0.211 U	0.211 U	**0.277**	**0.936**	0.206 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.238 U	0.182 U	NA	**1.2**	NA	NA	0.213 U	0.211 U	0.211 U	0.221 U	0.199 U	0.206 U
	Fluoranthene	1,000	1,000	NA	0.238 U	0.182 U	NA	**2.4**	NA	NA	0.213 U	**0.232**	**0.251**	**0.453**	**1.03**	**0.298**
	Fluorene	1,000	1,000	NA	0.238 U	0.182 U	NA	0.50 U	NA	NA	0.213 U	0.211 U	0.211 U	0.221 U	0.199 U	0.206 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	0.238 U	0.182 U	NA	0.50 U	NA	NA	0.213 U	0.211 U	0.211 U	**0.244**	**0.465**	0.206 U
	Naphthalene	20	500	NA	0.238 U	0.182 U	NA	0.50 U	NA	NA	0.213 U	0.211 U	0.211 U	0.221 U	0.199 U	0.206 U
	Phenanthrene	500	500	NA	0.238 U	0.182 U	NA	**2.4**	NA	NA	0.213 U	0.211 U	**0.305**	**0.299**	**0.962**	0.206 U
	Pyrene	1,000	1,000	NA	0.238 U	0.182 U	NA	**2.2**	NA	NA	0.213 U	**0.286**	**0.307**	**0.537**	**1.42**	**0.344**
SVOCs (mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Carbazole	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-8
Summary of Analytical Detected Results for Soil Samples
HS-8: Fenced Solar Park
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-350			VSS-1		VSS-2	VSS-15	SS-58	SS-59		SS-60	SS-61	SS-62
		Sample Depth (ft.):		0.5	5	8	0-0.5	0.5-1	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
		Sample Date:		8/21/2008	8/21/2008	8/21/2008	7/23/2001	7/23/2001	7/23/2001	7/23/2001	12/2/2008	12/2/2008	12/2/2008	12/2/2008	12/2/2008	12/2/2008
		S-1/GW-2	S-1/GW-3										Field Dup			
PCB Aroclors																
(mg/kg)	Aroclor 1248	1	1	0.0545 U	0.0717 U	0.0531 U	0.100 U	0.100 U	0.100 U	0.100 U	0.0578 U	0.0591 U	0.0619 U	0.0651 U	0.0543 U	0.0750 U
	Aroclor 1254	1	1	0.0545 U	**0.604 J**	0.0531 U	0.100 U	0.100 U	0.100 U	0.100 U	0.0578 U	**0.372 J**	**0.365 J**	**0.397 J**	0.0543 U	**0.676 J**
	Aroclor 1260	1	1	0.0545 U	**0.258 J**	0.0531 U	0.100 U	0.100 U	0.100 U	0.100 U	0.0578 U	**0.139 J**	**0.133 J**	**0.304 J**	**0.199 J**	**0.181 J**
	Aroclor 1262	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Aroclor 1268	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	1	1	0.0545 U	**0.862 J**	0.0531 U	0.100 U	0.100 U	0.100 U	0.100 U	0.0578 U	**0.511 J**	**0.498 J**	**0.701 J**	**0.199 J**	**0.857 J**
Metals																
	Arsenic	20	20	NA	**59.8**	2.73 U	**2.26**	**2.31**	**2.53**	**1.63**	3.19 U	3.17 U	3.16 U	3.31 U	**3.34**	3.09 U
	Barium	1,000	1,000	NA	**7,430**	**19.3**	**28**	**55**	**29**	**89**	**21.4**	**127**	**92.2**	**159**	**50.8**	**153**
	Beryllium	90	90	NA	**0.61**	0.28 U	NA	NA	NA	NA	0.32 U	0.32 U	0.32 U	0.34 U	0.30 U	0.31 U
	Cadmium	70	70	NA	**4.74**	0.28 U	0.33 U	**0.45**	0.38 U	0.34 U	0.32 U	**0.49**	**0.46**	**1.55**	0.30 U	**0.44**
	Chromium	100	100	NA	**1,370**	**8.20**	**7.50**	**12**	**7.03**	**35**	**9.21**	**13.7**	**11.5**	**25.4**	**17.9**	**17.6**
	Lead	200	200	NA	**638**	**3.83**	**81**	**92**	**47**	**51**	**7.87**	**144**	**113**	**186**	**68.0**	**95.3**
	Mercury	20	20	NA	**0.356**	0.011 U	0.07 U	0.07 U	0.08 U	**0.17**	**0.027**	**0.510**	**0.511**	**0.259**	**0.088**	**0.128**
	Nickel	600	600	NA	**167**	**4.73**	NA	NA	NA	NA	**6.01**	**5.03**	**4.25**	**7.74**	**8.81**	**6.05**
	Selenium	400	400	NA	7.12 U	5.46 U	0.66 U	0.70 U	0.77 U	0.68 U	6.38 U	6.33 U	6.31 U	6.61 U	5.96 U	6.18 U
	Silver	100	100	NA	**31.5**	**1.50**	0.33 U	0.35 U	0.38 U	0.34 U	0.64 U	0.64 U	0.64 U	0.67 U	0.60 U	0.62 U
	Vanadium	400	400	NA	**602**	**9.23**	NA	NA	NA	NA	**15.0**	**17.3**	**16.5**	**25.5**	**21.5**	**19.0**
	Zinc	1,000	1,000	NA	**1,300**	**19.6**	NA	NA	NA	NA	**20.5**	**82.6**	**65.2**	**143**	**60.1**	**72.1**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

N/A - Not applicable.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as a

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HA29	HA29+HB29	HB25	HB25+HB26	HB26				HB27	HB28	HB28+HB27	HB29		COMP SS-13-AC,AD,AE,AF	COMP SS-13-AS,AT,AU,AV		COMP SS-13-G,H,I,J
			Sample Depth (ft.):	1-2.5	1-3	1-3	0.5-3	0.5-3	1-3	1-3	3-5	1-3	1.5-3	1-3	1-3	1-3	0.5-4	0.5-4	0.5-4	0.5-4
			Sample Date:	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	4/15/2010	4/15/2010	4/15/2010	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/28/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004
		S-1/GW-2	S-1/GW-3							Field Dup						Field Dup			Field Dup	
VOCs																				
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																				
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																				
(mg/kg)	4-Methylphenol	200*	5*	NA	**0.074**	NA	0.062 U	NA	NA	NA	NA	NA	NA	0.064 U	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	0.06 U	NA	0.062 U	NA	NA	NA	NA	NA	NA	0.064 U	NA	NA	0.4 U	0.42 U	0.42 U	0.39 U
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	**0.43**	NA	**0.19**	NA	NA	NA	NA	NA	NA	**0.1 J**	NA	NA	0.8 U	0.83 U	0.83 U	0.78 U
	Dibenzofuran	10*	10*	NA	**0.98**	NA	**0.25**	NA	NA	NA	NA	NA	NA	**0.35**	NA	NA	**0.62**	0.42 U	**0.5**	0.39 U
	Acenaphthene	1,000	1,000	NA	**1.6**	NA	**0.42**	NA	**0.31**	0.44 U	1.2 U	NA	NA	**0.49**	NA	NA	0.4 U	0.42 U	**0.85**	0.39 U
	Acenaphthylene	600	10	NA	**0.27**	NA	**0.17**	NA	0.20 U	0.44 U	1.2 U	NA	NA	**0.12**	NA	NA	**0.64**	**0.42**	**0.52**	0.39 U
	Anthracene	1,000	1,000	NA	**4**	NA	**1.4**	NA	**1.2**	**0.78**	1.2 U	NA	NA	**2.3**	NA	NA	**1.1**	**0.85**	**2.8**	**1**
	Benzo(a)anthracene	7	7	NA	**5**	NA	**4.8**	NA	**3.9**	**2.4**	1.2 U	NA	NA	**5.5**	NA	NA	**1.7**	**2**	**5.1**	**2.2**
	Benzo(a)pyrene	2	2	NA	**6.4**	NA	**3.7**	NA	**3.2**	**2.2**	1.2 U	NA	NA	**4.7**	NA	NA	**0.93**	**1.9**	**4.4**	**2**
	Benzo(b)fluoranthene	7	7	NA	**5.1**	NA	**6.1**	NA	**4.3**	**2.9**	1.2 U	NA	NA	**7.5**	NA	NA	**1**	**2.1**	**4.9**	**2**
	Benzo(g,h,i)perylene	1,000	1,000	NA	**2.1**	NA	**1.4**	NA	**1.1**	**0.75**	1.2 U	NA	NA	**1.2**	NA	NA	**1**	**1.4**	**2.8**	**1.5**
	Benzo(k)fluoranthene	70	70	NA	**3.3**	NA	**1.9**	NA	**1.7**	**1.2**	1.2 U	NA	NA	**2.8**	NA	NA	**1.6**	**1.9**	**3.1**	**1.8**
	Chrysene	70	70	NA	**7.2**	NA	**3.7**	NA	**4.2**	**2.6**	1.2 U	NA	NA	**4.1**	NA	NA	**1.6**	**2.1**	**5.1**	**2.2**
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.06 U	NA	0.062 U	NA	**0.34**	0.44 U	1.2 U	NA	NA	**0.5**	NA	NA	**0.45**	**0.62**	**1.4**	**0.76**
	Fluoranthene	1,000	1,000	NA	**9.5**	NA	**7.8**	NA	**6.5**	**4.3**	1.2 U	NA	NA	**11**	NA	NA	**4.4**	**4.7**	**14**	**5.1**
	Fluorene	1,000	1,000	NA	**1.6**	NA	**0.52**	NA	**0.33**	0.44 U	1.2 U	NA	NA	**0.69**	NA	NA	**0.58**	0.42 U	**0.93**	0.39 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	**2.4**	NA	**1.5**	NA	**1.4**	**0.98**	1.2 U	NA	NA	**1.4**	NA	NA	**0.95**	**1.2**	**2.7**	**1.4**
	2-Methylnaphthalene	80	300	NA	**0.38**	NA	**0.11**	NA	0.20 U	0.44 U	1.2 U	NA	NA	**0.096**	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	**0.64**	NA	**0.14**	NA	0.20 U	0.44 U	1.2 U	NA	NA	**0.13**	NA	NA	0.4 U	0.42 U	0.42 U	0.39 U
	Phenanthrene	500	500	NA	**7.7**	NA	**5.8**	NA	**4.6**	**3.3**	1.2 U	NA	NA	**7.4**	NA	NA	**4.4**	**3.2**	**11**	**3.6**
	Pyrene	1,000	1,000	NA	**9.4**	NA	**7.8**	NA	**5.1**	**2.6**	1.2 U	NA	NA	**19**	NA	NA	**4.0**	**4.5**	**13**	**5**

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte																			
		Sample Location:		HA29	HA29+HB29	HB25	HB25+HB26	HB26				HB27	HB28	HB28+HB27	HB29		COMP SS-13-AC,AD,AE,AF	COMP SS-13-AS,AT,AU,AV		COMP SS-13-G,H,I,J
		Sample Depth (ft.):		1-2.5	1-3	1-3	0.5-3	0.5-3	1-3	1-3	3-5	1-3	1.5-3	1-3	1-3	1-3	0.5-4	0.5-4	0.5-4	0.5-4
		Sample Date:		12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	4/15/2010	4/15/2010 Field Dup	4/15/2010	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/28/2004 Field Dup	9/2/2004	9/2/2004	9/2/2004 Field Dup	9/2/2004
		S-1/GW-2	S-1/GW-3																	
PCB Aroclors																				
(mg/kg)	Total PCBs	1	1	**2.63**	NA	2.49 U	NA	**5.168**	**0.63**	**0.87**	**0.70**	**3.369**	**2.796**	NA	**6.476**	**1.724**	NA	NA	NA	NA
PCB Congeners																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	**1.82 J**	**6.47 J**	**16.62 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																				
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																				
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	24 U	5.2 U	5.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	NA	**9.58**	NA	**14**	NA	**23**	**22**	**9.1**	NA	NA	**9.19**	NA	NA	**10**	**17**	**17**	**19**
	Barium	1,000	1,000	NA	**742**	NA	**1,010**	NA	**900**	**1,000**	**540**	NA	NA	**789**	NA	NA	**140**	**400**	**230**	**500**
	Beryllium	90	90	NA	NA	NA	NA	NA	**0.44**	**0.49**	**0.67**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	**5.94**	NA	**7.14**	NA	**3.5**	**3.7**	**11**	NA	NA	**5.82**	NA	NA	**2.1**	**2.6**	**2.5**	**2.4**
	Chromium (III)	1000	1000	NA	**61**	NA	**91**	NA	**75**	**69**	**46**	NA	NA	**66**	NA	NA	**22**	**44**	**42**	**73**
	Lead	200	200	NA	**847**	NA	**1,790**	NA	**1,100**	**1,300**	**4,300**	NA	NA	**1,310**	NA	NA	**530**	**860**	**1,600**	**1,100**
	Mercury	20	20	NA	**1.37**	NA	**0.715**	NA	**0.84**	**0.52**	**0.11**	NA	NA	**1.44**	NA	NA	**0.46**	**0.95**	**1.1**	**0.73**
	Nickel	600	600	NA	NA	NA	NA	NA	**54**	**39**	**31**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	0.7 U	NA	0.82 U	NA	6.0 U	6.4 U	6.9 U	NA	NA	0.84 U	NA	NA	2.4 U	2.4 U	**3.1**	12 U
	Silver	100	100	NA	**0.7**	NA	**1.64**	NA	**0.90**	0.64 U	**75**	NA	NA	**0.76**	NA	NA	0.48 U	**1.1**	**1**	**1**
	Vanadium	400	400	NA	NA	NA	NA	NA	**36**	**41**	**28**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	**980**	**1,200**	**410**	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			COMP SS-13-E,L,K,B	COMP SS-13-M,N,O,P	COMP SS-13-U,Z,AA,AB	COMP SS-13-V,W, X, Y	SS-13-A	SS-13-AB	SS-13-AC	SS-13-AD	SS-13-AE	SS-13-AF	SS-13-AG	SS-13-AI	SS-13-AL	SS-13-AM	SS-13-AQ	SS-13-AR	SS-13-AS
		Sample Location:																		
		Sample Depth (ft.):		0.5-4	1-4	1-4	0.5-4	0.5-4	2.5-4	2-4	1-4	1-4	0.5-4	1-4	1-4	1-4	1-4	1-4	0.5-1.5	0.5-4
		Sample Date:		9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004
		S-1/GW-2	S-1/GW-3																	
VOCs																				
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																				
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																				
(mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	0.4 U	0.45 U	2.1 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	0.8 U	0.9 U	4.3 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	0.4 U	0.45 U	2.1 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	0.4 U	**0.56**	2.1 U	**0.55**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	0.4 U	0.45 U	2.1 U	**1.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	**0.85**	**1.3**	2.1 U	**2.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	**2**	**2.8**	2.1 U	**3.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	**1.8**	**2.4**	2.1 U	**2.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	**1.9**	**2.4**	2.1 U	**2.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	**1.3**	**1.6**	2.1 U	**2.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	**1.5**	**2.2**	2.1 U	**3.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	**2**	**2.8**	2.1 U	**4.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	**0.64**	**0.72**	2.1 U	**1.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**4.3**	**6.5**	**4**	**8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	0.4 U	**0.52**	2.1 U	**1.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	**1.2**	**1.4**	2.1 U	**2.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	0.4 U	0.45 U	2.1 U	**40**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	**2.3**	**5.2**	**2.9**	**7.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	**4.4**	**5.9**	**3.7**	**8.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte																			
			Sample Location:	COMP SS-13-E,L,K,B	COMP SS-13-M,N,O,P	COMP SS-13-U,Z,AA,AB	COMP SS-13-V,W, X, Y	SS-13-A	SS-13-AB	SS-13-AC	SS-13-AD	SS-13-AE	SS-13-AF	SS-13-AG	SS-13-AI	SS-13-AL	SS-13-AM	SS-13-AQ	SS-13-AR	SS-13-AS
			Sample Depth (ft.):	0.5-4	1-4	1-4	0.5-4	0.5-4	2.5-4	2-4	1-4	1-4	0.5-4	1-4	1-4	1-4	1-4	1-4	0.5-1.5	0.5-4
			Sample Date:	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004
		S-1/GW-2	S-1/GW-3																	
PCB Aroclors																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	0.0379 U	**0.0988**	**0.539**	0.0476 U	**0.172**	**12.6**	**0.0584**	**0.931**	**4.56**	**2.236**	**5.48**	**0.667**	**0.669**
PCB Congeners																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																				
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																				
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	**48**	**16**	**27**	**10**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	**22**	**380**	**390**	**380**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**2.6**	**2.7**	**3.3**	**4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium (III)	1000	1000	**53**	**36**	**38**	**39**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	200	200	**720**	**1,300**	**1,500**	**1,000**	**2,200**	**2,200**	**320**	**160**	**370**	**1,100**	**4.6**	**1,400**	**970**	**2,100**	**720**	**560**	**440**
	Mercury	20	20	**76**	**0.79**	**0.5**	**1.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	2.4 U	2.7 U	2.6 U	2.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	**0.77**	**0.89**	**1.3**	**0.54**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte																			
		Sample Location:		SS-13-AT	SS-13-AU	SS-13-AV	SS-13-AW		SS-13-B	SS-13-C	SS-13-D	SS-13-E	SS-13-F	SS-13-G	SS-13-H	SS-13-I	SS-13-J	SS-13-L	SS-13-M	SS-13-N
		Sample Depth (ft.):		1-4	1-4	1-4	1-4	1-4	0.5-4	1-4	1-4	1-4	0.5-4	0.5-4	1-4	1-4	2-4	0.5-4	1-4	1-4
		Sample Date:		9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004
		S-1/GW-2	S-1/GW-3					Field Dup												
VOCs																				
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																				
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																				
(mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte																		
			Sample Location:	SS-13-AT	SS-13-AU	SS-13-AV	SS-13-AW		SS-13-B	SS-13-C	SS-13-D	SS-13-E	SS-13-F	SS-13-G	SS-13-H	SS-13-I	SS-13-J	SS-13-L	SS-13-M	SS-13-N
			Sample Depth (ft.):	1-4	1-4	1-4	1-4	1-4	0.5-4	1-4	1-4	1-4	0.5-4	0.5-4	1-4	1-4	2-4	0.5-4	1-4	1-4
			Sample Date:	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004
		S-1/GW-2	S-1/GW-3					Field Dup												
PCB Aroclors																				
(mg/kg)	Total PCBs	1	1	**1.56**	**0.2194 .**	**0.373**	**1.66**	**0.955**	**0.644**	**0.2661**	0.0406 U	0.045 U	**0.0731**	0.0351 U	**0.4536**	**1.842**	**2.75**	**0.715**	**0.0926**	0.0427 U
PCB Congeners																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																				
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																				
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium (III)	1000	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	200	200	**4,200**	**840**	**540**	**990**	**1,000**	**930**	**930**	**380**	**490**	**660**	**38**	**9,700**	**2,300**	**1,600**	**480**	**950**	**1,300**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SS-13-O	SS-13-P	SS-13-V	SS-13-W	SS-13-X	SS-13-Y		SB-349				VSS-13	HB12	HB12+HB16	HB16	HC12	HC13
			Sample Depth (ft.):	1-4	1-4	0.5-1.5	1-4	0.5-4	0.5-4	0.5-4	8	8	11	14	1-2	2.5-3	2.5-3	2.5-3	2-3	1.5-3
			Sample Date:	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	8/21/2008	8/21/2008	8/21/2008	8/21/2008	7/23/2001	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004
		S-1/GW-2	S-1/GW-3							Field Dup		Field Dup								
VOCs																				
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																				
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**59**	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**31**	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.0**	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.8**	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.0**	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.6**	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.3**	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.90**	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.0**	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.2**	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.4**	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3.4**	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.1**	NA	NA	NA	NA	NA
SVOCs																				
(mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.53 U	NA	0.32 U	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.53 U	NA	0.32 U	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.6 U	NA	0.97 U	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.0**	NA	0.32 U	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.240 U	0.206 U	0.627 U	NA	**1.7**	NA	0.32 U	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	0.240 U	0.206 U	0.627 U	NA	0.53 U	NA	**2.9**	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**0.251**	**0.466**	0.627 U	NA	**3.9**	NA	**0.56**	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.771**	**1.24**	0.627 U	NA	**5.2**	NA	**4.2**	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	**0.715**	**1.12**	0.627 U	NA	**3.3**	NA	**5.4**	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.762**	**1.13**	0.627 U	NA	**4.7**	NA	**5.4**	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**0.649**	**0.864**	0.627 U	NA	**1.7**	NA	**1.8**	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	**0.296**	**0.442**	0.627 U	NA	**1.4**	NA	**2.4**	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	**0.851**	**1.26**	0.627 U	NA	**3.9**	NA	**2.8**	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	0.240 U	0.206 U	0.627 U	NA	0.53 U	NA	0.32 U	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**1.53**	**2.56**	0.627 U	NA	**12**	NA	**7**	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.240 U	0.206 U	0.627 U	NA	**1.6**	NA	0.32 U	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.679**	**0.960**	0.627 U	NA	**2.3**	NA	0.32 U	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	0.240 U	0.206 U	0.627 U	NA	0.53 U	NA	0.32 U	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	0.240 U	0.206 U	0.627 U	NA	**0.59**	NA	**0.43**	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	**1.19**	**2.00**	0.627 U	NA	**12**	NA	**2.3**	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**1.69**	**2.61**	0.627 U	NA	**8.4**	NA	**6.8**	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			Sample Location:	SS-13-O	SS-13-P	SS-13-V	SS-13-W	SS-13-X	SS-13-Y		SB-349				VSS-13	HB12	HB12+HB16	HB16	HC12	HC13
				Sample Depth (ft.):	1-4	1-4	0.5-1.5	1-4	0.5-4	0.5-4	0.5-4	8	8	11	14	1-2	2.5-3	2.5-3	2.5-3	2-3	1.5-3
				Sample Date:	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	8/21/2008	8/21/2008	8/21/2008	8/21/2008	7/23/2001	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004
		S-1/GW-2	S-1/GW-3								Field Dup		Field Dup								
PCB Aroclors																					
(mg/kg)	Total PCBs	1	1		**0.0436**	0.0463 U	**0.1731**	**0.1393**	**0.0779**	**0.967**	**0.593**	**0.174 J**	**0.504 J**	0.186 UJ	NA	**0.657**	**1.64**	NA	**4.598**	**4.953**	**0.763**
PCB Congeners																					
(mg/kg)	Total PCBs	1	1		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																					
(mg/kg)	Total PCBs	1	1		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																					
(mg/kg)	Gasoline Range Organics	1,000	1,000		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																					
(mg/kg)	Antimony	20	20		NA	NA	NA	NA	NA	NA	NA	5.75 U	4.93 U	15.1 U	4.75 U	NA	NA	NA	NA	NA	NA
	Arsenic	20	20		NA	NA	NA	NA	NA	NA	NA	**10.9**	**10.8**	**14.5**	2.97 U	**8.89**	NA	**30**	NA	NA	NA
	Barium	1,000	1,000		NA	NA	NA	NA	NA	NA	NA	**212**	**147**	**152**	5.94 U	**255**	NA	**4,000**	NA	NA	NA
	Beryllium	90	90		NA	NA	NA	NA	NA	NA	NA	**0.46**	**0.33**	0.94 U	0.30 U	NA	NA	NA	NA	NA	NA
	Cadmium	70	70		NA	NA	NA	NA	NA	NA	NA	**1.74**	**0.63**	0.94 U	0.30 U	**1.38**	NA	**9.68**	NA	NA	NA
	Chromium (III)	1000	1000		NA	NA	NA	NA	NA	NA	NA	**22.7**	**23.3**	**27.0**	**2.90**	**18**	NA	**272**	NA	NA	NA
	Lead	200	200		**420**	**380**	**48**	**11,000**	**3,900**	**610**	**730**	**571**	**374**	**207**	**2.75**	**777**	NA	**5,230**	NA	NA	NA
	Mercury	20	20		NA	NA	NA	NA	NA	NA	NA	**0.098**	**0.140**	**0.304**	0.016 U	**0.24**	NA	**0.913**	NA	NA	NA
	Nickel	600	600		NA	NA	NA	NA	NA	NA	NA	**48.1**	**23.1**	**39.3**	**1.96**	NA	NA	NA	NA	NA	NA
	Selenium	400	400		NA	NA	NA	NA	NA	NA	NA	7.19 U	6.16 U	18.8 U	5.94 U	0.71 U	NA	0.84 U	NA	NA	NA
	Silver	100	100		NA	NA	NA	NA	NA	NA	NA	**6.99**	**11.0**	**8.92**	0.60 U	0.35 U	NA	**1.68**	NA	NA	NA
	Vanadium	400	400		NA	NA	NA	NA	NA	NA	NA	**24.3**	**19.6**	**27.7**	5.94 U	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000		NA	NA	NA	NA	NA	NA	NA	**2,670**	**385**	**665**	**7.34**	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			HC13+HC12+ HD12	HC14	HC15	HC16	HC16+HC15+ HC14	HD12		HD13+HD14+ HD15	HD14	HD-14A	HD-14B		HD-14C	HD-14D	HD15	HRA33	
		Sample Location:																		
		Sample Depth (ft.):		1-3	2.5-3	2-3	1.5-3	1.5-3	1-3	1-3	1.5-3	2-3	1-3	1-3	1-3	1-3	1-3	1.5-3	1-3	1-3
		Sample Date:		12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004 Field Dup	12/29/2004	12/29/2004	3/10/2009	3/10/2009	3/10/2009 Field Dup	3/10/2009	3/10/2009	12/29/2004	2/22/2006	2/22/2006 Field Dup
		S-1/GW-2	S-1/GW-3																	
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.33**	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	4-Methylphenol	200*	5*	0.33 U	NA	NA	NA	0.6 U	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	0.33 U	NA	NA	NA	**1.5**	NA	NA	**0.57**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	1 U	NA	NA	NA	**3.2**	NA	NA	**21**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	0.33 U	NA	NA	NA	**1.2**	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	0.33 U	NA	NA	NA	**1.8**	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	**2.6**	NA	NA	NA	**2.3**	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	0.33 U	NA	NA	NA	**6.8**	NA	NA	**0.69**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	**2.7**	NA	NA	NA	**31**	NA	NA	**2.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	**8.1**	NA	NA	NA	**30**	NA	NA	**2.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	**7.8**	NA	NA	NA	**42**	NA	NA	**3.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	**1.5**	NA	NA	NA	**13**	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	**3.3**	NA	NA	NA	**14**	NA	NA	**0.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	**1.9**	NA	NA	NA	**26**	NA	NA	**2.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.33 U	NA	NA	NA	0.6 U	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**3**	NA	NA	NA	**56**	NA	NA	**4.4**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	0.33 U	NA	NA	NA	**2.3**	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	**3.1**	NA	NA	NA	**14**	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	0.33 U	NA	NA	NA	0.6 U	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	0.33 U	NA	NA	NA	**1**	NA	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	**0.69**	NA	NA	NA	**30**	NA	NA	**2.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	**2.8**	NA	NA	NA	**64**	NA	NA	**4**	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			HC13+HC12+ HD12	HC14	HC15	HC16	HC16+HC15+ HC14	HD12		HD13+HD14+ HD15	HD14	HD-14A	HD-14B		HD-14C	HD-14D	HD15	HRA33	
		Sample Location:																		
		Sample Depth (ft.):		1-3	2.5-3	2-3	1.5-3	1.5-3	1-3	1-3	1.5-3	2-3	1-3	1-3	1-3	1-3	1-3	1.5-3	1-3	1-3
		Sample Date:		12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004 Field Dup	12/29/2004	12/29/2004	3/10/2009	3/10/2009	3/10/2009 Field Dup	3/10/2009	3/10/2009	12/29/2004	2/22/2006	2/22/2006 Field Dup
		S-1/GW-2	S-1/GW-3																	
PCB Aroclors																				
(mg/kg)	Total PCBs	1	1	NA	**0.36**	**11.04**	**0.387**	NA	**8.175**	**1.574**	NA	**17.823**	**0.985 J**	**2.04 J**	**1.92 J**	**1.32 J**	**18.9 J**	**3.089**	**0.28**	**0.15**
PCB Congeners																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																				
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**12.3**	NA
Metals																				
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	**8.87**	NA	NA	NA	**46**	NA	NA	**94**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	**854**	NA	NA	NA	**15,400**	NA	NA	**5,850**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**6.27**	NA	NA	NA	**22**	NA	NA	**21**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium (III)	1000	1000	**231**	NA	NA	NA	**1,430**	NA	NA	**2,050**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	200	200	**1,110**	NA	NA	NA	**2,650**	NA	NA	**1,460**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mercury	20	20	**1.09**	NA	NA	NA	**1.51**	NA	NA	**2.89**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	0.9 U	NA	NA	NA	0.8 U	NA	NA	0.81 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	**1.7**	NA	NA	NA	**1.2**	NA	NA	**1.61**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HRC-33	HRC-33A	HRC-33B	HRC-33C	HRC-33D		HRC-33E	HRC-33F	HRC-33I	HRC-33J	HRC-33L	HRC-33M	HRC-33N	HRE33	HRG-33	SB-273	
			Sample Depth (ft.):	0.67-2	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	0.5-3	1-3	5.5	8
			Sample Date:	2/22/2006	2/27/2009	2/27/2009	2/27/2009	2/27/2009	2/27/2009	2/27/2009	2/27/2009	3/24/2009	3/24/2009	4/3/2009	4/3/2009	4/3/2009	2/22/2006	2/22/2006	7/16/2008	7/16/2008
		S-1/GW-2	S-1/GW-3						Field Dup											
VOCs																				
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																				
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.372**	0.182 U
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.261 U	0.182 U
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.340**	0.182 U
SVOCs																				
(mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.207 U	**0.633**	2.03 U	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.243**	0.208 U	2.03 U	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.828**	**0.939**	2.03 U	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.21**	**2.52**	**3.90**	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.04**	**2.39**	**3.25**	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.66**	**3.04**	**4.02**	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.797**	**1.11**	2.03 U	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.975**	**1.09**	2.03 U	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.24**	**2.90**	**4.22**	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.228**	**0.301**	2.03 U	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3.83**	**6.21**	**6.33**	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.317**	**0.736**	2.03 U	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.05**	**1.43**	**2.13**	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.207 U	**0.932**	2.03 U	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.16**	**6.51**	**8.01**	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.10**	**3.97**	**7.44**	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HRC-33	HRC-33A	HRC-33B	HRC-33C	HRC-33D		HRC-33E	HRC-33F	HRC-33I	HRC-33J	HRC-33L	HRC-33M	HRC-33N	HRE33	HRG-33	SB-273	
			Sample Depth (ft.):	0.67-2	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	0.5-3	1-3	5.5	8
			Sample Date:	2/22/2006	2/27/2009	2/27/2009	2/27/2009	2/27/2009	2/27/2009	2/27/2009	2/27/2009	3/24/2009	3/24/2009	4/3/2009	4/3/2009	4/3/2009	2/22/2006	2/22/2006	7/16/2008	7/16/2008
		S-1/GW-2	S-1/GW-3						Field Dup											
PCB Aroclors																				
(mg/kg)	Total PCBs	1	1	**40**	**19.34 J**	**1.25 J**	**0.446 J**	**3.798 J**	**0.245 J**	**15.22 J**	**14.39 J**	**4.113 J**	**1.808 J**	NA	NA	NA	0.22 U	**0.53**	**0.248 J**	0.0536 U
PCB Congeners																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																				
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																				
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	R	R
	Arsenic	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**11.0**	**5.40**	**10.1**	NA	NA	**10.6**	**3.14**
	Barium	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**229**	**122**	**349**	NA	NA	**251**	**16.8**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.40 U	0.28 U
	Cadmium	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.97**	**1.61**	**11.3**	NA	NA	**6.12**	0.28 U
	Chromium (III)	1000	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**15.8**	**14.2**	**28.3**	NA	NA	**11.3**	**7.29**
	Lead	200	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**979**	**780**	**10,000**	NA	NA	**456**	**2.92**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.243**	0.021 U
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**15.8**	**5.14**
	Selenium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.83 U	5.46 U
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**6.62**	**1.90**
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**22.9**	**8.06**
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**397**	**23.4**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-274			SB-275		SB-276		SB-277		SB-278	
		Sample Depth (ft.):		4	4	8	4	9.5	4	9.5	4	9	4	6
		Sample Date:		7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/17/2008	7/17/2008
		S-1/GW-2	S-1/GW-3		Field Dup									
VOCs														
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH														
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	2.08 U	2.15 U	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Acenaphthene	1,000	1,000	2.08 U	2.15 U	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Acenaphthylene	600	10	2.08 U	2.15 U	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Anthracene	1,000	1,000	**4.21**	**7.85**	0.207 U	**0.293**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Benzo(a)anthracene	7	7	**26.6**	**35.9**	0.207 U	**1.45**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Benzo(a)pyrene	2	2	**22.2**	**29.5**	0.207 U	**1.13**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Benzo(b)fluoranthene	7	7	**26.0**	**31.3**	0.207 U	**1.12**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	**15.2**	**21.3**	0.207 U	**0.809**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Benzo(k)fluoranthene	70	70	**9.49**	**15.1**	0.207 U	**0.334**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Chrysene	70	70	**16.3**	**32.3**	0.207 U	**1.75**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	**4.49**	**6.41**	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Fluoranthene	1,000	1,000	**99.7**	**71.3**	0.207 U	**2.00**	0.193 U	NA	NA	**0.235**	0.191 U	NA	NA
	Fluorene	1,000	1,000	2.08 U	**3.43**	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	**17.3**	**24.3**	0.207 U	**0.753**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Naphthalene	20	500	2.08 U	2.15 U	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Phenanthrene	500	500	**8.89**	**17.9**	0.207 U	**1.48**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA
	Pyrene	1,000	1,000	**41.5**	**63.0**	0.207 U	**2.41**	0.193 U	NA	NA	**0.316**	0.191 U	NA	NA
SVOCs														
(mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-274			SB-275		SB-276		SB-277		SB-278	
		Sample Depth (ft.):		4	4	8	4	9.5	4	9.5	4	9	4	6
		Sample Date:		7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/17/2008	7/17/2008
		S-1/GW-2	S-1/GW-3		Field Dup									
PCB Aroclors														
(mg/kg)	Total PCBs	1	1	**1.099 J**	**0.892 J**	0.0544 U	**0.125 J**	0.0580 U	**0.0999 J**	0.0587 U	**15.2 J**	0.0576 U	**1.37 J**	0.189 UJ
PCB Congeners														
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs														
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO														
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals														
(mg/kg)	Antimony	20	20	R	R	R	R	R	NA	NA	4.84 U	4.58 U	NA	NA
	Arsenic	20	20	**38.9**	**41.6**	3.10 U	**16.1**	2.90 U	NA	NA	**16.7**	2.87 U	NA	NA
	Barium	1,000	1,000	**1,240**	**464**	**13.7**	**422**	**7.90**	NA	NA	**265**	**11.4**	NA	NA
	Beryllium	90	90	0.32 U	0.33 U	0.31 U	**0.38**	0.29 U	NA	NA	0.31 U	0.29 U	NA	NA
	Cadmium	70	70	**3.40**	**3.97**	0.31 U	**0.59**	0.29 U	NA	NA	**2.08**	0.29 U	NA	NA
	Chromium (III)	1000	1000	**44.3**	**48.1**	**4.94**	**11.0**	**3.44**	NA	NA	**16.9**	**4.30**	NA	NA
	Lead	200	200	**1,750**	**1,450**	**4.97**	**330**	**3.48**	NA	NA	**977**	**3.99**	NA	NA
	Mercury	20	20	**1.27**	**3.26**	0.015 U	**0.256**	0.014 U	NA	NA	**0.207**	0.017 U	NA	NA
	Nickel	600	600	**113**	**43.6**	**2.22**	**14.9**	**2.25**	NA	NA	**15.0**	**4.44**	NA	NA
	Selenium	400	400	6.22 U	6.45 U	6.20 U	6.37 U	5.79 U	NA	NA	6.05 U	5.73 U	NA	NA
	Silver	100	100	**45.5**	**38.6**	**0.66**	**3.31**	**0.95**	NA	NA	**6.65**	**1.04**	NA	NA
	Vanadium	400	400	**20.6**	**23.5**	6.20 U	**31.2**	5.79 U	NA	NA	**29.6**	**6.79**	NA	NA
	Zinc	1,000	1,000	**835**	**815**	**9.54**	**200**	**7.88**	NA	NA	**250**	**9.97**	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-279		SB-280		SB-281			SB-282		SB-283			SB-284		SB-285	
		Sample Depth (ft.):		4	11	4	9.5	4	4	8	3.5	8	3.5	3.5	6	3	5	3.5	7.5
		Sample Date:		7/23/2008	7/23/2008	7/23/2008	7/23/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008
		S-1/GW-2	S-1/GW-3						Field Dup					Field Dup					
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	**0.743**	0.195 U	NA	NA	**0.249**	**0.614**	0.725 U	NA	NA	1.03 U	2.08 U	0.567 U	NA	NA	1.02 U	0.178 U
	Acenaphthene	1,000	1,000	0.207 U	0.195 U	NA	NA	0.193 U	0.486 U	0.725 U	NA	NA	**1.43**	2.08 U	0.567 U	NA	NA	1.02 U	0.178 U
	Acenaphthylene	600	10	**0.615**	0.195 U	NA	NA	0.193 U	0.486 U	0.725 U	NA	NA	1.03 U	2.08 U	0.567 U	NA	NA	1.02 U	0.178 U
	Anthracene	1,000	1,000	**0.592**	0.195 U	NA	NA	0.193 U	0.486 U	0.725 U	NA	NA	**3.28**	**4.77**	0.567 U	NA	NA	1.02 U	0.178 U
	Benzo(a)anthracene	7	7	**3.04**	0.195 U	NA	NA	**0.376**	**0.613**	0.725 U	NA	NA	**7.90**	**10.4**	0.567 U	NA	NA	**1.31**	0.178 U
	Benzo(a)pyrene	2	2	**2.70**	0.195 U	NA	NA	**0.374**	**0.593**	0.725 U	NA	NA	**7.20**	**9.50**	0.567 U	NA	NA	**1.07**	0.178 U
	Benzo(b)fluoranthene	7	7	**4.64**	0.195 U	NA	NA	0.193 U	**1.02**	0.725 U	NA	NA	**7.36**	**9.39**	0.567 U	NA	NA	1.02 U	0.178 U
	Benzo(g,h,i)perylene	1,000	1,000	**2.39**	0.195 U	NA	NA	**0.392**	0.486 U	0.725 U	NA	NA	**5.07**	**8.99**	0.567 U	NA	NA	1.02 U	0.178 U
	Benzo(k)fluoranthene	70	70	**1.70**	0.195 U	NA	NA	0.193 U	0.486 U	0.725 U	NA	NA	**2.93**	**4.22**	0.567 U	NA	NA	1.02 U	0.178 U
	Chrysene	70	70	**4.41**	0.195 U	NA	NA	**0.535**	**0.785**	0.725 U	NA	NA	**8.08**	**10.4**	0.567 U	NA	NA	**1.27**	0.178 U
	Dibenz(a,h)anthracene	0.7	0.7	**0.770**	0.195 U	NA	NA	0.193 U	0.486 U	0.725 U	NA	NA	**1.39**	**2.27**	0.567 U	NA	NA	1.02 U	0.178 U
	Fluoranthene	1,000	1,000	**5.99**	0.195 U	NA	NA	**0.807**	**1.40**	0.725 U	NA	NA	**14.3**	**20.5**	0.567 U	NA	NA	**2.06**	0.178 U
	Fluorene	1,000	1,000	0.207 U	0.195 U	NA	NA	0.193 U	0.486 U	0.725 U	NA	NA	**1.79**	**2.42**	0.567 U	NA	NA	1.02 U	0.178 U
	Indeno(1,2,3-cd)pyrene	7	7	**2.89**	0.195 U	NA	NA	**0.301**	0.486 U	0.725 U	NA	NA	**5.81**	**9.27**	0.567 U	NA	NA	1.02 U	0.178 U
	Naphthalene	20	500	**0.523**	0.195 U	NA	NA	**0.402**	**2.15**	0.725 U	NA	NA	1.03 U	2.08 U	0.567 U	NA	NA	1.02 U	0.178 U
	Phenanthrene	500	500	**1.72**	0.195 U	NA	NA	**0.513**	**1.34**	0.725 U	NA	NA	**14.0**	**20.0**	0.567 U	NA	NA	**3.60**	0.178 U
	Pyrene	1,000	1,000	**5.08**	0.195 U	NA	NA	**0.675**	**1.04**	0.725 U	NA	NA	**14.6**	**20.1**	0.567 U	NA	NA	**3.82**	0.178 U
SVOCs (mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-279		SB-280		SB-281			SB-282		SB-283			SB-284		SB-285	
		Sample Depth (ft.):		4	11	4	9.5	4	4	8	3.5	8	3.5	3.5	6	3	5	3.5	7.5
		Sample Date:		7/23/2008	7/23/2008	7/23/2008	7/23/2008	7/21/2008	7/21/2008 Field Dup	7/21/2008	7/21/2008	7/21/2008	7/17/2008	7/17/2008 Field Dup	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008
		S-1/GW-2	S-1/GW-3																
PCB Aroclors																			
(mg/kg)	Total PCBs	1	1	**0.4701 J**	0.0564 U	**0.378 J**	0.126 U	**1.30 J**	**0.474 J**	0.234 UJ	**0.0725 J**	0.229 UJ	**0.813 J**	**1.091 J**	0.147 U	**0.768 J**	0.207 UJ	**7.50 J**	0.0553 U
PCB Congeners																			
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																			
(mg/kg)	Total PCBs	1	1	NA	NA	0.074 U	NA	NA	NA	NA	NA	NA	**0.045**	NA	NA	NA	NA	NA	NA
GRO																			
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																			
(mg/kg)	Antimony	20	20	4.96 U	4.68 U	4.84 U	8.74 U	R	R	R	NA	NA	R	R	R	NA	NA	**226**	4.26 U
	Arsenic	20	20	**41.5**	2.93 U	**21.3**	**9.02**	**44.5**	**27.1**	10.9 U	NA	NA	**19.8**	**18.8**	**13.5**	NA	NA	**26.6**	2.66 U
	Barium	1,000	1,000	**644**	**8.05**	**470**	**24.8**	**671**	**675**	**147**	NA	NA	**558**	**544**	**198**	NA	NA	**986**	**20.2**
	Beryllium	90	90	**0.71**	0.30 U	**1.03**	**0.73**	**0.70**	**0.52**	1.09 U	NA	NA	0.31 U	0.32 U	0.86 U	NA	NA	0.31 U	0.27 U
	Cadmium	70	70	**4.39**	0.30 U	**9.10**	0.55 U	**4.25**	**2.90**	1.09 U	NA	NA	**3.93**	**4.65**	0.86 U	NA	NA	**14.8**	0.27 U
	Chromium (III)	1000	1000	**75.6**	**3.77**	**23.2**	**15.2**	**149**	**124**	**7.78**	NA	NA	**30.4**	**26.6**	**9.55**	NA	NA	**280**	**3.44**
	Lead	200	200	**2,060**	**36.2**	**1,980**	**5.61**	**4,940**	**4,970**	**8.87**	NA	NA	**1,450**	**1,680**	**13.5**	NA	NA	**1,140**	**3.20**
	Mercury	20	20	**0.917**	0.013 U	**0.527**	0.045 U	**0.352**	**0.449**	0.095 U	NA	NA	**1.17**	**1.30**	**0.191**	NA	NA	**2.26**	0.017 U
	Nickel	600	600	**35.9**	**2.27**	**15.0**	**19.6**	**25.6**	**28.2**	2.18 U	NA	NA	**21.5**	**20.2**	**4.75**	NA	NA	**55.7**	**2.43**
	Selenium	400	400	6.20 U	5.85 U	6.05 U	11.0 U	5.77 U	5.83 U	21.8 U	NA	NA	6.18 U	6.23 U	17.1 U	NA	NA	6.07 U	5.32 U
	Silver	100	100	**12.3**	0.59 U	**8.25**	1.10 U	**9.83**	**25.2**	2.18 U	NA	NA	**17.7**	**14.4**	**2.14**	NA	NA	**23.3**	**0.85**
	Vanadium	400	400	**25.5**	5.85 U	**20.0**	**21.2**	**19.4**	**18.7**	21.8 U	NA	NA	**22.9**	**23.3**	17.1 U	NA	NA	**311**	5.32 U
	Zinc	1,000	1,000	**1,340**	**10.6**	**1,770**	**40.1**	**1,660**	**1,520**	**58.6**	NA	NA	**1,450**	**1,370**	**32.7**	NA	NA	**2,210**	**14.7**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SB-286		SB-287		SB-288		SB-289		SB-290		SB-291		SB-292		SB-293		
			Sample Depth (ft.):	4	9	4	9	4	9	3.5	6	2.5	6	2	6	2	5	6.5	9	12
			Sample Date:	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008
		S-1/GW-2	S-1/GW-3																	
VOCs																				
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																				
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	0.981 U	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Acenaphthene	1,000	1,000	NA	NA	**2.64**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Acenaphthylene	600	10	NA	NA	0.981 U	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Anthracene	1,000	1,000	NA	NA	**5.78**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Benzo(a)anthracene	7	7	NA	NA	**10.2**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Benzo(a)pyrene	2	2	NA	NA	**8.80**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Benzo(b)fluoranthene	7	7	NA	NA	**9.21**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	**5.58**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Benzo(k)fluoranthene	70	70	NA	NA	**3.54**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Chrysene	70	70	NA	NA	**9.65**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	0.981 U	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Fluoranthene	1,000	1,000	NA	NA	**18.8**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Fluorene	1,000	1,000	NA	NA	**3.16**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	**6.63**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Naphthalene	20	500	NA	NA	**1.57**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Phenanthrene	500	500	NA	NA	**21.2**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
	Pyrene	1,000	1,000	NA	NA	**18.0**	0.212 U	NA	NA	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA
SVOCs																				
(mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SB-286		SB-287		SB-288		SB-289		SB-290		SB-291		SB-292		SB-293		
			Sample Depth (ft.):	4	9	4	9	4	9	3.5	6	2.5	6	2	6	2	5	6.5	9	12
			Sample Date:	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008
		S-1/GW-2	S-1/GW-3																	
PCB Aroclors																				
(mg/kg)	Total PCBs	1	1	**7.19 J**	**0.232 J**	**1.779 J**	0.0611 U	**0.455 J**	0.0575 U	**2.93 J**	**0.184 J**	**0.127 J**	0.0532 U	**0.127 J**	0.0533 U	0.0519 U	0.0527 U	0.0684 U	0.202 UJ	NA
PCB Congeners																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																				
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																				
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																				
(mg/kg)	Antimony	20	20	NA	NA	4.71 U	5.08 U	NA	NA	4.69 U	12.2 U	NA	NA	NA	NA	NA	NA	R	R	4.62 U
	Arsenic	20	20	NA	NA	**31.9**	3.18 U	NA	NA	**14.6**	**39.8**	NA	NA	NA	NA	NA	NA	**16.1**	**31.6**	2.89 U
	Barium	1,000	1,000	NA	NA	**1,810**	**7.35**	NA	NA	**717**	**326**	NA	NA	NA	NA	NA	NA	**438**	**266**	**15.8**
	Beryllium	90	90	NA	NA	0.30 U	0.32 U	NA	NA	0.30 U	0.76 U	NA	NA	NA	NA	NA	NA	**0.86**	**1.42**	0.29 U
	Cadmium	70	70	NA	NA	**84.3**	0.32 U	NA	NA	**2.91**	**1.59**	NA	NA	NA	NA	NA	NA	**0.61**	**16.2**	0.29 U
	Chromium (III)	1000	1000	NA	NA	**302**	**3.30**	NA	NA	**44.4**	**42.6**	NA	NA	NA	NA	NA	NA	**14.3**	**23.8**	**4.74**
	Lead	200	200	NA	NA	**3,110**	**3.07**	NA	NA	**1,730**	**60.6**	NA	NA	NA	NA	NA	NA	**396**	**848**	**3.20**
	Mercury	20	20	NA	NA	**0.773**	0.016 U	NA	NA	**0.818**	**0.247**	NA	NA	NA	NA	NA	NA	**0.212**	**0.389**	0.022 U
	Nickel	600	600	NA	NA	**83.2**	**4.14**	NA	NA	**18.5**	**48.0**	NA	NA	NA	NA	NA	NA	**14.0**	**25.9**	**2.76**
	Selenium	400	400	NA	NA	5.89 U	6.35 U	NA	NA	5.87 U	15.2 U	NA	NA	NA	NA	NA	NA	6.65 U	21.6 U	5.77 U
	Silver	100	100	NA	NA	**28.4**	**1.16**	NA	NA	**6.44**	**18.0**	NA	NA	NA	NA	NA	NA	**2.97**	**21.5**	0.58 U
	Vanadium	400	400	NA	NA	**45.0**	6.35 U	NA	NA	**66.8**	15.2 U	NA	NA	NA	NA	NA	NA	**33.8**	**25.5**	**7.68**
	Zinc	1,000	1,000	NA	NA	**3,540**	**12.3**	NA	NA	**671**	**372**	NA	NA	NA	NA	NA	NA	**185**	**4,500**	**11.1**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-294			SB-295		SB-296		
		Sample Depth (ft.):		4	8.5	12	5.5	9	5	5	10
		Sample Date:		7/21/2008	7/21/2008	7/21/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008
		S-1/GW-2	S-1/GW-3							Field Dup	
VOCs											
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA
EPH											
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Chrysene	70	70	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Naphthalene	20	500	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Phenanthrene	500	500	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	0.233 U	0.226 U	0.198 U
SVOCs											
(mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			SB-294			SB-295		SB-296		
	Sample Location:										
	Sample Depth (ft.):			4	8.5	12	5.5	9	5	5	10
	Sample Date:			7/21/2008	7/21/2008	7/21/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008 Field Dup	7/22/2008
		S-1/GW-2	S-1/GW-3								
PCB Aroclors											
(mg/kg)	Total PCBs	1	1	0.0649 U	0.162 UJ	NA	0.0798 U	0.0531 U	0.0676 U	0.0711 U	0.0597 U
PCB Congeners											
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs											
(mg/kg)	Total PCBs	1	1	NA	NA	NA	**0.057**	NA	NA	NA	NA
GRO											
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA
Metals											
(mg/kg)	Antimony	20	20	R	R	4.73 U	NA	NA	R	R	R
	Arsenic	20	20	**40.6**	**14.0**	**4.27**	NA	NA	**10.3**	**10.5**	2.96 U
	Barium	1,000	1,000	**1,920**	**170**	**63.9**	NA	NA	**314**	**242**	5.92 U
	Beryllium	90	90	**0.70**	0.93 U	0.30 U	NA	NA	**0.66**	**0.64**	0.30 U
	Cadmium	70	70	**2.10**	**3.14**	**2.75**	NA	NA	**5.55**	**2.29**	0.30 U
	Chromium (III)	1000	1000	**36.5**	**14.5**	**9.77**	NA	NA	**16.2**	**22.4**	**2.80**
	Lead	200	200	**3,260**	**790**	**257**	NA	NA	**353**	**436**	**2.01**
	Mercury	20	20	**1.34**	**0.118**	**0.041**	NA	NA	**0.143**	**0.372**	0.020 U
	Nickel	600	600	**31.8**	**13.7**	**8.03**	NA	NA	**14.1**	**11.7**	**2.46**
	Selenium	400	400	6.20 U	18.5 U	5.92 U	NA	NA	6.99 U	6.77 U	5.92 U
	Silver	100	100	**16.0**	**6.15**	0.60 U	NA	NA	**4.28**	**7.99**	0.60 U
	Vanadium	400	400	**33.5**	18.5 U	**8.72**	NA	NA	**24.9**	**23.2**	5.92 U
	Zinc	1,000	1,000	**894**	**2,050**	**1,000**	NA	NA	**288**	**169**	**13.4**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SB-297			SB-298		SB-299		SB-300		SB-301		SB-302	
			Sample Depth (ft.):	6	8	11	4	8	4	8	4	8	7	10.5	2.5	8
			Sample Date:	7/22/2008	7/22/2008	7/22/2008	8/4/2008	8/4/2008	8/4/2008	8/4/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008
		S-1/GW-2	S-1/GW-3													
VOCs																
(mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Acenaphthylene	600	10	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Anthracene	1,000	1,000	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	**0.266**	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	**0.228**	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	**0.260**	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Chrysene	70	70	**0.299**	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**0.674**	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Fluorene	1,000	1,000	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Naphthalene	20	500	0.228 U	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Phenanthrene	500	500	**0.608**	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
	Pyrene	1,000	1,000	**0.414**	0.600 U	NA	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA
SVOCs																
(mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SB-297			SB-298		SB-299		SB-300		SB-301		SB-302	
			Sample Depth (ft.):	6	8	11	4	8	4	8	4	8	7	10.5	2.5	8
			Sample Date:	7/22/2008	7/22/2008	7/22/2008	8/4/2008	8/4/2008	8/4/2008	8/4/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008
		S-1/GW-2	S-1/GW-3													
PCB Aroclors																
(mg/kg)	Total PCBs	1	1	0.0732 U	0.187 UJ	NA	0.0630 U	0.255 UJ	0.0666 U	0.206 UJ	0.0636 U	0.235 UJ	0.0648 U	0.0795 U	0.0640 U	0.205 UJ
PCB Congeners																
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	0.081 U	NA	NA	NA	NA	NA
GRO																
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																
(mg/kg)	Antimony	20	20	R	R	4.71 U	5.51 U	19.1 U	NA	NA	R	R	NA	NA	R	R
	Arsenic	20	20	**14.9**	9.00 U	2.94 U	**17.1**	12.0 U	NA	NA	**9.93**	11.4 U	NA	NA	**8.84**	10.7 U
	Barium	1,000	1,000	**432**	**94.9**	**8.16**	**407**	**61.7**	NA	NA	**275**	**63.2**	NA	NA	**280**	**31.1**
	Beryllium	90	90	**1.01**	0.90 U	0.30 U	**0.83**	1.20 U	NA	NA	**0.75**	1.14 U	NA	NA	**0.84**	1.07 U
	Cadmium	70	70	**1.53**	**8.36**	0.30 U	**0.58**	1.20 U	NA	NA	**0.50**	1.14 U	NA	NA	**0.51**	1.07 U
	Chromium (III)	1000	1000	**16.2**	**3.36**	**3.70**	**15.4**	**4.90**	NA	NA	**12.1**	**3.31**	NA	NA	**9.81**	**2.17**
	Lead	200	200	**1,500**	**50.6**	**2.76**	**869**	**12.2**	NA	NA	**142**	**9.62**	NA	NA	**2,440**	**4.73**
	Mercury	20	20	**0.214**	**0.128**	0.018 U	**0.222**	**0.174**	NA	NA	**0.507**	**0.215**	NA	NA	**0.094**	0.084 U
	Nickel	600	600	**17.3**	**11.9**	**3.07**	**14.8**	**3.03**	NA	NA	**13.3**	2.27 U	NA	NA	**11.6**	2.13 U
	Selenium	400	400	6.83 U	18.0 U	5.88 U	6.88 U	23.9 U	NA	NA	6.74 U	22.7 U	NA	NA	6.25 U	21.3 U
	Silver	100	100	**1.89**	1.80 U	0.59 U	**6.58**	2.39 U	NA	NA	**1.14**	2.27 U	NA	NA	**1.37**	2.13 U
	Vanadium	400	400	**22.6**	18.0 U	5.88 U	**41.4**	23.9 U	NA	NA	**28.5**	22.7 U	NA	NA	**35.9**	21.3 U
	Zinc	1,000	1,000	**267**	**1,310**	**10.7**	**213**	**40.2**	NA	NA	**237**	**93.9**	NA	NA	**181**	**27.8**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SB-303		SB-304		SB-305		SB-307			SB-308	SB-308A	SB-308F	SB-308H	SB-308I	SB-309	
			Sample Depth (ft.):	5	10	5	8	4	9	3	6	9	6	3-4	3-4	3-4	3-4	4	8
			Sample Date:	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/23/2008	7/23/2008	7/23/2008	7/23/2008	5/21/2009	5/20/2009	5/20/2009	5/21/2009	7/23/2008	7/23/2008
		S-1/GW-2	S-1/GW-3																
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**1.0**	0.19 U	0.37 U	0.19 U	NA	NA
	Acenaphthene	1,000	1,000	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**2.3**	0.19 U	0.37 U	0.19 U	NA	NA
	Acenaphthylene	600	10	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	0.19 U	**0.64**	0.37 U	0.19 U	NA	NA
	Anthracene	1,000	1,000	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**3.9**	**0.84**	0.37 U	**0.34**	NA	NA
	Benzo(a)anthracene	7	7	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**5.1**	**3.9**	0.37 U	**0.63**	NA	NA
	Benzo(a)pyrene	2	2	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**4.2**	**4.5**	0.37 U	**0.49**	NA	NA
	Benzo(b)fluoranthene	7	7	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**4.5**	**4.8**	0.37 U	**0.62**	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**2.6**	**1.7**	0.37 U	**0.53**	NA	NA
	Benzo(k)fluoranthene	70	70	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**2.0**	**1.9**	0.37 U	**0.26**	NA	NA
	Chrysene	70	70	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**5.1**	**4.1**	0.37 U	**0.66**	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**0.61**	**0.46**	0.37 U	**0.21**	NA	NA
	Fluoranthene	1,000	1,000	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	**1.05**	**11**	**7.5**	0.37 U	**1.6**	NA	NA
	Fluorene	1,000	1,000	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**2.9**	**0.20**	0.37 U	0.19 U	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**3.2**	**2.0**	**0.50**	**0.59**	NA	NA
	Naphthalene	20	500	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U	**1.4**	**0.29**	0.37 U	**0.32**	NA	NA
	Phenanthrene	500	500	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	**0.785**	**17**	**4.2**	0.37 U	**1.3**	NA	NA
	Pyrene	1,000	1,000	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	**0.799**	**11**	**8.6**	0.37 U	**1.4**	NA	NA
SVOCs (mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-303		SB-304		SB-305		SB-307			SB-308	SB-308A	SB-308F	SB-308H	SB-308I	SB-309	
		Sample Depth (ft.):		5	10	5	8	4	9	3	6	9	6	3-4	3-4	3-4	3-4	4	8
		Sample Date:		7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/23/2008	7/23/2008	7/23/2008	7/23/2008	5/21/2009	5/20/2009	5/20/2009	5/21/2009	7/23/2008	7/23/2008
		S-1/GW-2	S-1/GW-3																
PCB Aroclors																			
(mg/kg)	Total PCBs	1	1	0.0689 U	0.273 UJ	0.0670 U	0.211 UJ	0.0611 U	0.0593 U	0.0649 U	0.245 UJ	NA	0.192 UJ	NA	NA	NA	NA	0.0822 U	**0.698 J**
PCB Congeners																			
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																			
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																			
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																			
(mg/kg)	Antimony	20	20	R	22.4 U	NA	NA	5.12 U	4.85 U	5.05 U	20.9 U	4.73 U	16.8 U	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	**31.9**	14.0 U	NA	NA	**8.68**	3.04 U	**5.99**	13.1 U	2.96 U	10.5 U	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	**1,960**	**44.4**	NA	NA	**702**	**6.83**	**373**	**85.1**	5.92 U	**50.5**	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	**1.45**	1.40 U	NA	NA	**1.23**	0.31 U	**0.85**	1.31 U	0.30 U	1.05 U	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**1.34**	1.40 U	NA	NA	**1.55**	0.31 U	**0.76**	**4.43**	0.30 U	1.05 U	NA	NA	NA	NA	NA	NA
	Chromium (III)	1000	1000	**24.4**	**8.56**	NA	NA	**18.3**	**2.88**	**11.6**	**7.18**	**1.61**	2.10 U	NA	NA	NA	NA	NA	NA
	Lead	200	200	**1,820**	4.19 U	NA	NA	**3,970**	**7.80**	**589**	**281**	**2.36**	**5.22**	NA	NA	NA	NA	NA	NA
	Mercury	20	20	**0.488**	0.140 U	NA	NA	0.028 U	0.014 U	**0.074**	0.115 U	0.016 U	**0.104**	NA	NA	NA	NA	NA	NA
	Nickel	600	600	**27.3**	**5.69**	NA	NA	**14.7**	**2.40**	**35.2**	**5.74**	**1.20**	2.10 U	NA	NA	NA	NA	NA	NA
	Selenium	400	400	8.35 U	28.0 U	NA	NA	6.40 U	6.07 U	6.31 U	26.1 U	5.92 U	21.0 U	NA	NA	NA	NA	NA	NA
	Silver	100	100	**2.82**	2.80 U	NA	NA	0.64 U	0.61 U	0.64 U	**4.67**	0.60 U	2.10 U	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	**50.6**	28.0 U	NA	NA	**32.8**	6.07 U	**160**	26.1 U	5.92 U	21.0 U	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	**564**	**13.4**	NA	NA	**435**	**8.99**	**343**	**1,300**	**8.26**	**17.3**	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-310		SB-311			SB-312		SB-313		SB-364			VSS-3	NBHS-2		
		Sample Depth (ft.):		3	7	6	6	9	5	9	5	8	1-3	6	9.5	1-2	1.5	3.5	5
		Sample Date:		7/23/2008	7/23/2008	7/23/2008	7/23/2008	7/23/2008	8/5/2008	8/5/2008	8/4/2008	8/4/2008	3/4/2009	3/4/2009	3/4/2009	7/23/2001	8/4/2008	8/4/2008	8/4/2008
		S-1/GW-2	S-1/GW-3				Field Dup												
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**76**	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	**1.3**	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Chrysene	70	70	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	**1.2**	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Naphthalene	20	500	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Phenanthrene	500	500	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	1.16 U	0.232 U	0.652 U	0.187 U	0.174 U	NA	NA	NA	NA	NA	0.50 U	NA	NA	NA
SVOCs (mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.051 U	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.051 U	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.35**	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.11 J**	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.051 U	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**4.16**	0.497 U	0.051 U	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**0.785**	0.497 U	0.051 U	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**16.8**	0.497 U	0.051 U	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**27.1**	**0.746**	**0.073**	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**21.3**	**0.532**	0.051 U	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**23.4**	**0.866**	**0.058**	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**8.46**	0.497 U	0.051 U	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**10.0**	0.497 U	0.051 U	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**24.4**	**0.790**	**0.054**	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**1.61**	0.497 U	0.051 U	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**46.9**	**1.57**	**0.13**	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**5.09**	0.497 U	0.051 U	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**11.1**	0.497 U	0.051 U	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**2.32**	0.497 U	0.051 U	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**3.37**	0.497 U	0.051 U	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**59.6**	**1.18**	**0.12**	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.174 U	**57.3**	**1.25**	**0.20**	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-310		SB-311			SB-312		SB-313		SB-364			VSS-3	NBHS-2		
		Sample Depth (ft.):		3	7	6	6	9	5	9	5	8	1-3	6	9.5	1-2	1.5	3.5	5
		Sample Date:		7/23/2008	7/23/2008	7/23/2008	7/23/2008	7/23/2008	8/5/2008	8/5/2008	8/4/2008	8/4/2008	3/4/2009	3/4/2009	3/4/2009	7/23/2001	8/4/2008	8/4/2008	8/4/2008
		S-1/GW-2	S-1/GW-3				Field Dup												
PCB Aroclors																			
(mg/kg)	Total PCBs	1	1	**0.175 J**	0.253 UJ	0.0667 U	0.0706 U	0.183 UJ	**19.7 J**	0.0500 U	**6.32 J**	0.0529 U	0.0516 U	**1.70 J**	0.208 UJ	0.100 U	0.0500 U	0.0501 U	0.0535 U
PCB Congeners																			
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																			
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO																			
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																			
(mg/kg)	Antimony	20	20	5.11 U	19.3 U	5.54 U	5.56 U	15.7 U	4.47 U	4.16 U	NA	NA	4.18 U	4.98 U	12.0 U	NA	NA	NA	NA
	Arsenic	20	20	**9.39**	12.1 U	**14.9**	**18.0**	9.77 U	2.80 U	2.60 U	NA	NA	2.61 U	**10.8**	7.45 U	**1.52**	NA	NA	NA
	Barium	1,000	1,000	**287**	24.1 U	**384**	**356**	**23.7**	**5.90**	**8.82**	NA	NA	**8.58**	**533**	**178**	**11**	NA	NA	NA
	Beryllium	90	90	**0.86**	1.21 U	**0.55**	**0.59**	0.98 U	0.28 U	0.26 U	NA	NA	0.27 U	0.32 U	0.75 U	NA	NA	NA	NA
	Cadmium	70	70	**0.46**	1.21 U	**1.71**	**1.71**	0.98 U	0.28 U	0.26 U	NA	NA	0.27 U	**2.32**	**2.03**	0.32 U	NA	NA	NA
	Chromium (III)	1000	1000	**11.0**	**10.8**	**24.6**	**40.8**	**11.5**	**2.06**	**4.05**	NA	NA	**2.34**	**35.4**	**9.17**	**3.74**	NA	NA	NA
	Lead	200	200	**443**	**3.91**	**1,970**	**912**	**4.51**	**2.97**	**4.88**	NA	NA	**4.61**	**2,350**	**85.8**	**8.89**	NA	NA	NA
	Mercury	20	20	**2.08**	0.105 U	**0.218**	**0.215**	0.078 U	0.020 U	0.017 U	NA	NA	0.017 U	**0.322**	**0.144**	0.07 U	NA	NA	NA
	Nickel	600	600	**13.0**	**8.83**	**17.2**	**31.3**	**9.47**	**2.37**	**3.40**	NA	NA	**2.24**	**19.1**	**7.67**	NA	NA	NA	NA
	Selenium	400	400	6.39 U	24.1 U	6.92 U	6.95 U	19.6 U	5.59 U	5.20 U	NA	NA	5.22 U	6.22 U	14.9 U	0.64 U	NA	NA	NA
	Silver	100	100	**1.18**	2.41 U	**10.7**	**12.5**	1.96 U	**0.57**	**0.71**	NA	NA	0.53 U	**1.03**	1.49 U	0.32 U	NA	NA	NA
	Vanadium	400	400	**20.7**	24.1 U	**22.1**	**23.5**	19.6 U	5.59 U	**5.53**	NA	NA	5.22 U	**34.4**	14.9 U	NA	NA	NA	NA
	Zinc	1,000	1,000	**76.4**	**14.3**	**851**	**592**	**21.3**	**9.50**	**10.2**	NA	NA	**10.0**	**738**	**483**	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		NBHS-3		NBHS-4			
		Sample Depth (ft.):		4	6	2	6	6	8
		Sample Date:		7/30/2008	7/30/2008	7/31/2008	7/31/2008	7/31/2008	7/31/2008
		S-1/GW-2	S-1/GW-3					Field Dup	
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	0.181 U	0.186 U	0.174 U
	Acenaphthene	1,000	1,000	NA	NA	NA	0.181 U	**0.349**	0.174 U
	Acenaphthylene	600	10	NA	NA	NA	0.181 U	0.186 U	0.174 U
	Anthracene	1,000	1,000	NA	NA	NA	0.181 U	**0.797**	0.174 U
	Benzo(a)anthracene	7	7	NA	NA	NA	0.181 U	**1.87**	0.174 U
	Benzo(a)pyrene	2	2	NA	NA	NA	0.181 U	**1.64**	0.174 U
	Benzo(b)fluoranthene	7	7	NA	NA	NA	0.181 U	**1.90**	0.174 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	0.181 U	**1.08**	0.174 U
	Benzo(k)fluoranthene	70	70	NA	NA	NA	0.181 U	**0.634**	0.174 U
	Chrysene	70	70	NA	NA	NA	0.181 U	**1.76**	0.174 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	0.181 U	**0.324**	0.174 U
	Fluoranthene	1,000	1,000	NA	NA	NA	0.181 U	**3.55**	0.174 U
	Fluorene	1,000	1,000	NA	NA	NA	0.181 U	**0.438**	0.174 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	0.181 U	**1.29**	0.174 U
	Naphthalene	20	500	NA	NA	NA	0.181 U	0.186 U	0.174 U
	Phenanthrene	500	500	NA	NA	NA	0.181 U	**3.80**	0.174 U
	Pyrene	1,000	1,000	NA	NA	NA	0.181 U	**3.48**	0.174 U
SVOCs (mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		NBHS-3		NBHS-4			
		Sample Depth (ft.):		4	6	2	6	6	8
		Sample Date:		7/30/2008	7/30/2008	7/31/2008	7/31/2008	7/31/2008 Field Dup	7/31/2008
		S-1/GW-2	S-1/GW-3						
PCB Aroclors									
(mg/kg)	Total PCBs	1	1	**0.147 J**	0.0520 U	0.0559 U	0.0513 U	0.0508 U	0.0518 U
PCB Congeners									
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA
PCB Homologs									
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA
GRO									
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA
Metals									
(mg/kg)	Antimony	20	20	NA	NA	NA	4.33 U	4.46 U	4.18 U
	Arsenic	20	20	NA	NA	NA	2.71 U	**2.86**	**3.31**
	Barium	1,000	1,000	NA	NA	NA	**15.0**	**19.7**	**13.4**
	Beryllium	90	90	NA	NA	NA	0.28 U	0.28 U	0.27 U
	Cadmium	70	70	NA	NA	NA	0.28 U	0.28 U	0.27 U
	Chromium (III)	1000	1000	NA	NA	NA	**5.33**	**8.46**	**5.29**
	Lead	200	200	NA	NA	NA	**9.74**	**15.7**	**2.86**
	Mercury	20	20	NA	NA	NA	**0.022**	**0.027**	**0.645**
	Nickel	600	600	NA	NA	NA	**3.75**	**5.91**	**3.02**
	Selenium	400	400	NA	NA	NA	5.42 U	5.58 U	5.22 U
	Silver	100	100	NA	NA	NA	0.55 U	**0.62**	**0.65**
	Vanadium	400	400	NA	NA	NA	**7.46**	**10.5**	**9.32**
	Zinc	1,000	1,000	NA	NA	NA	**19.0**	**25.3**	**16.3**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		NBHS-5		NBHS-6		NBHS-7		NBHS-8		HE-44B	
		Sample Depth (ft.):		4	8	3	6	3	7	2.5	6	0-1	1-3
		Sample Date:		7/30/2008	7/30/2008	7/28/2008	7/28/2008	7/29/2008	7/29/2008	7/28/2008	7/28/2008	3/31/2009	3/31/2009
		S-1/GW-2	S-1/GW-3										
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH (mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
SVOCs (mg/kg)	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2-9
Summary of Analytical Detected Results for Soil Samples
HS-9: Beneath Pavement/Building Areas
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	NBHS-5		NBHS-6		NBHS-7		NBHS-8		HE-44B	
			Sample Depth (ft.):	4	8	3	6	3	7	2.5	6	0-1	1-3
			Sample Date:	7/30/2008	7/30/2008	7/28/2008	7/28/2008	7/29/2008	7/29/2008	7/28/2008	7/28/2008	3/31/2009	3/31/2009
		S-1/GW-2	S-1/GW-3										
PCB Aroclors													
(mg/kg)	Total PCBs	1	1	**0.192 J**	0.0599 U	**1.13 J**	0.0553 U	**0.183 J**	0.0532 U	0.0510 U	**0.0687 J**	**0.349 J**	**1.63 J**
PCB Congeners													
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs													
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO													
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals													
(mg/kg)	Antimony	20	20	4.22 U	4.80 U	4.28 U	4.55 U	4.24 U	4.50 U	NA	NA	NA	NA
	Arsenic	20	20	2.64 U	3.00 U	**4.17**	2.85 U	2.65 U	2.82 U	NA	NA	NA	NA
	Barium	1,000	1,000	**27.9**	**14.2**	**308**	**9.10**	**31.7**	5.63 U	NA	NA	NA	NA
	Beryllium	90	90	0.27 U	0.30 U	0.27 U	0.29 U	0.27 U	0.29 U	NA	NA	NA	NA
	Cadmium	70	70	0.27 U	0.30 U	**0.90**	0.29 U	0.27 U	0.29 U	NA	NA	**0.80**	**0.99**
	Chromium (III)	1000	1000	**6.40**	**5.38**	**31.0**	**4.53**	**7.39**	**2.26**	NA	NA	NA	NA
	Lead	200	200	**4.05**	**3.46**	**322**	**2.99**	**13.7**	**2.03**	NA	NA	**990**	**292**
	Mercury	20	20	0.015 U	0.016 U	**0.183**	0.022 U	**0.018**	0.017 U	NA	NA	NA	NA
	Nickel	600	600	**5.45**	**3.85**	**9.14**	**2.33**	**5.35**	**1.49**	NA	NA	NA	NA
	Selenium	400	400	5.28 U	5.99 U	5.35 U	5.69 U	5.30 U	5.63 U	NA	NA	NA	NA
	Silver	100	100	**1.05**	0.60 U	**1.59**	0.57 U	**0.70**	0.57 U	NA	NA	NA	NA
	Vanadium	400	400	**8.08**	**8.25**	**17.6**	5.69 U	**9.48**	5.63 U	NA	NA	NA	NA
	Zinc	1,000	1,000	**13.0**	**11.4**	**315**	**11.2**	**24.0**	**10.4**	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

TABLE 2-10
Summary of Analytical Results for Soil Samples
HS-10: Tree Belts
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HA-19D		HA-19S	HA33	HA33+HA35	HA35	HA-36	HA38	HA38+HA40	HA40		HA41+HA42	HA42	HA43	HA43+HA44	HA-43/44	
		Sample Depth (ft.):		0-1	1-3	1-3	1-3	1-3	1-1.5	1-3	1-3	0.5-3	0.5-3	0.5-3	0.75-3	0.5-3	0.75-3	0.75-3	0-1	1-2
		Sample Date:		5/19/2009	5/19/2009	7/7/2009	1/11/2005	1/11/2005	1/11/2005	4/7/2009	1/11/2005	1/11/2005	1/11/2005	1/11/2005	1/11/2005	1/11/2005	1/11/2005	1/11/2005	06/07/2011	06/07/2011
		S-1/GW-2	S-1/GW-3											Field Dup						
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	0.83 U	NA	NA	NA	**0.3 JB**	NA	NA	0.87 U	NA	NA	0.84 U	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	0.83 U	NA	NA	NA	0.82 U	NA	NA	0.87 U	NA	NA	0.84 U	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	0.28 U	NA	NA	NA	**0.7**	NA	NA	0.29 U	NA	NA	0.28 U	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	0.28 U	NA	0.178 U	NA	**1.5**	NA	NA	0.29 U	NA	NA	**0.4**	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	**0.36**	NA	0.178 U	NA	**0.3**	NA	NA	0.29 U	NA	NA	**0.63**	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	**1.1**	NA	0.178 U	NA	**3.7**	NA	NA	**0.56**	NA	NA	**1.8**	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	**3.3**	NA	0.178 U	NA	**8.2**	NA	NA	**1.4**	NA	NA	**3.9**	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	**2.5**	NA	0.178 U	NA	**5.3**	NA	NA	**1**	NA	NA	**2.5**	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	**3.4**	NA	0.178 U	NA	**7.1**	NA	NA	**1.4**	NA	NA	**3.2**	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	**1.2**	NA	0.178 U	NA	**2.1**	NA	NA	**0.43**	NA	NA	**0.97**	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	**0.97**	NA	0.178 U	NA	**2.1**	NA	NA	**0.29**	NA	NA	**0.8**	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	**2.9**	NA	0.178 U	NA	**6.5**	NA	NA	**1.3**	NA	NA	**3.4**	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	0.28 U	NA	0.178 U	NA	**0.85**	NA	NA	0.29 U	NA	NA	0.28 U	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	**8.4**	NA	0.178 U	NA	**23**	NA	NA	**3**	NA	NA	**8**	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	0.28 U	NA	0.178 U	NA	**1.1**	NA	NA	0.29 U	NA	NA	**0.88**	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	**1.3**	NA	0.178 U	NA	**2.4**	NA	NA	**0.44**	NA	NA	**1**	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	0.28 U	NA	0.178 U	NA	**0.53**	NA	NA	0.29 U	NA	NA	**0.57**	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	0.28 U	NA	0.178 U	NA	**0.68**	NA	NA	0.29 U	NA	NA	0.28 U	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	**5**	NA	0.178 U	NA	**19**	NA	NA	**2.2**	NA	NA	**12**	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	**7**	NA	0.178 U	NA	**17**	NA	NA	**2.9**	NA	NA	**8.1**	NA	NA
PCB Aroclors (mg/kg)	Total PCBs	1	1	**0.0799**	**1.32 J**	NA	**0.142**	NA	**2.601**	**0.181 J**	**1.34**	NA	**0.804**	**0.579**	NA	**1.88**	**0.167**	NA	NA	NA
PCB Congeners (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.261**	**0.180**
PCB Homologs (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																				
	Arsenic	20	20	**7.9**	2.7 U	NA	NA	**2.6**	NA	2.67 U	NA	**3.48**	NA	NA	**4.4**	NA	NA	**2.15**	NA	NA
	Barium	1,000	1,000	**360**	**35**	NA	NA	**107**	NA	**12.4**	NA	**167**	NA	NA	**210**	NA	NA	**71**	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**2.4**	**0.28**	NA	NA	**0.95**	NA	0.27 U	NA	**1.08**	NA	NA	**2.21**	NA	NA	**1.19**	NA	NA
	Chromium (III)	1000	1000	**16**	**4.3**	NA	NA	**7.55**	NA	**2.79**	NA	**7.23**	NA	NA	**15**	NA	NA	**5.22**	NA	NA
	Lead	200	200	**150**	**25**	**870**	NA	**209**	NA	**6.49**	NA	**216**	NA	NA	**360**	NA	NA	**533**	NA	NA
	Mercury	20	20	NA	NA	NA	NA	**0.106**	NA	NA	NA	0.01 U	NA	NA	**0.369**	NA	NA	**0.286**	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	NA	0.11 U	NA	NA	NA	0.11 U	NA	NA	0.11 U	NA	NA	0.11 U	NA	NA
	Silver	100	100	NA	NA	NA	NA	**0.77**	NA	NA	NA	**0.16**	NA	NA	**0.17**	NA	NA	**0.15**	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

TABLE 2-10
Summary of Analytical Results for Soil Samples
HS-10: Tree Belts
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HA44	HB-23 E/N/W		HB-23G		HB-23H		HB-23M	HB-23N		HB31+HB32	HB32	HB33	HB33+HB36	HB36	HB37	HB37+HB38
		Sample Depth (ft.):		0.75-3	0-1	1-3	0-1	1-3	0-1	1-3	1-3	1-3	1-3	0.5-3	0.5-3	0.2-3	0.2-3	0.5-3	0.5-3	0.2-3
		Sample Date:		1/11/2005	7/13/2011	7/13/2011	3/10/2009	3/10/2009	3/10/2009	3/10/2009	4/9/2009	4/9/2009	4/9/2009	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004
		S-1/GW-2	S-1/GW-3										Field Dup							
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.24 B**	NA	NA	**0.39 B**	NA	NA	**0.13 JB**
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.12 J**	NA	NA	**0.14 J**	NA	NA	0.16 U
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U	NA	NA	0.055 U
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.076**	NA	NA	**0.1**	NA	NA	**0.14**
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U	NA	NA	**0.074**
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.26**	NA	NA	**0.32**	NA	NA	**0.57**
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.95**	NA	NA	**0.95**	NA	NA	**1.5**
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.9**	NA	NA	**0.93**	NA	NA	**1.4**
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.7**	NA	NA	**1.5**	NA	NA	**2**
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U	NA	NA	**0.57**
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.47**	NA	NA	**0.42**	NA	NA	**0.64**
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.77**	NA	NA	**0.81**	NA	NA	**1.3**
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U	NA	NA	0.055 U
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.8**	NA	NA	**1.9**	NA	NA	**2.6**
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06 U	NA	NA	**0.11**	NA	NA	**0.16**
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06 U	NA	NA	**0.3**	NA	NA	**0.59**
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U	NA	NA	0.055 U
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U	NA	NA	0.055 U
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.2**	NA	NA	**1.3**	NA	NA	**1.6**
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.3**	NA	NA	**2.1**	NA	NA	**6.3**
PCB Aroclors (mg/kg)	Total PCBs	1	1	**0.446**	**0.40**	**1.3**	**0.943 J**	**4.94 J**	**2.53 J**	**0.0843 J**	NA	NA	NA	NA	**0.751**	**1.408**	NA	**0.352**	2.22 U	NA
PCB Congeners (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals	Arsenic	20	20	NA	NA	NA	2.90 U	**6.77**	**3.42**	**17.7**	NA	NA	NA	**6.99**	NA	NA	**3.35**	NA	NA	**3.8**
	Barium	1,000	1,000	NA	**54**	**240**	**55.1**	**297**	**343**	**269**	NA	NA	NA	**282**	NA	NA	**132**	NA	NA	**52**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	**8.6**	**15**	0.29 U	**1.28**	**0.61**	**3.31**	NA	NA	NA	**2.03**	NA	NA	**1.83**	NA	NA	**1.04**
	Chromium (III)	1000	1000	NA	**87**	**770**	**15.4**	**29.7**	**26.9**	**36.8**	NA	NA	NA	**17**	NA	NA	**9.07**	NA	NA	**11**
	Lead	200	200	NA	NA	NA	**88.4**	**423**	**220**	**548**	**9.97**	**110**	**121**	**376**	NA	NA	**219**	NA	NA	**68**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.228**	NA	NA	**0.205**	NA	NA	0.065 U
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.75 U	NA	NA	0.76 U	NA	NA	0.69 U
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.53**	NA	NA	0.38 U	NA	NA	0.35 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

TABLE 2-10
Summary of Analytical Results for Soil Samples
HS-10: Tree Belts
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HB38	HB-39A		HB-39D		HB-40H	HB41+HB42	HB42	HB43	HB43+HB44	HB44	HC-22C		HC-22E	HC-22H	HC23	HRK-33A
			Sample Depth (ft.):	0.2-3	0-1	1-3	0-1	1-3	1-3	0.2-3	0.2-3	1.5-3	0.5-3	0.5-3	0-1	1-3	1-3	1-3	1-3	1-3
			Sample Date:	12/30/2004	6/16/2009	6/16/2009	6/16/2009	6/16/2009	6/16/2009	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	5/21/2009	5/21/2009	5/21/2009	5/21/2009	12/29/2004	4/2/2009
		S-1/GW-2	S-1/GW-3																	
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	**0.32 B**	NA	NA	0.17 U	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	**0.1 J**	NA	NA	**0.14 J**	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	0.058 U	NA	NA	0.057 U	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	0.058 U	NA	NA	**0.065**	NA	NA	NA	NA	NA	NA	0.212 U
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	**0.13**	NA	NA	**0.13**	NA	NA	NA	NA	NA	NA	0.212 U
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	**0.18**	NA	NA	**0.27**	NA	NA	NA	NA	NA	NA	**0.257**
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	**0.71**	NA	NA	**1.1**	NA	NA	NA	NA	NA	NA	**1.00**
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	**0.81**	NA	NA	**1**	NA	NA	NA	NA	NA	NA	**1.21**
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	**1.2**	NA	NA	**1.6**	NA	NA	NA	NA	NA	NA	**1.55**
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	**0.27**	NA	NA	**0.45**	NA	NA	NA	NA	NA	NA	**0.634**
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	**0.34**	NA	NA	**0.53**	NA	NA	NA	NA	NA	NA	**0.608**
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	**0.67**	NA	NA	**1**	NA	NA	NA	NA	NA	NA	**1.20**
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	0.058 U	NA	NA	0.057 U	NA	NA	NA	NA	NA	NA	0.212 U
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	**1.4**	NA	NA	0.057 U	NA	NA	NA	NA	NA	NA	**2.57**
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	0.058 U	NA	NA	**0.1**	NA	NA	NA	NA	NA	NA	0.212 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	**0.31**	NA	NA	**0.49**	NA	NA	NA	NA	NA	NA	**0.739**
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	0.058 U	NA	NA	0.057 U	NA	NA	NA	NA	NA	NA	0.212 U
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	0.058 U	NA	NA	0.057 U	NA	NA	NA	NA	NA	NA	0.212 U
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	**0.85**	NA	NA	**1.6**	NA	NA	NA	NA	NA	NA	**1.42**
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	**1.4**	NA	NA	**3.9**	NA	NA	NA	NA	NA	NA	**1.87**
PCB Aroclors (mg/kg)	Total PCBs	1	1	**0.152**	NA	NA	NA	NA	NA	NA	**0.476**	**0.326**	NA	**0.517**	**0.991 J**	**1.09 J**	0.0540 U	NA	**6.542**	**0.148 J**
PCB Congeners (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals	Arsenic	20	20	NA	**4.1**	**10**	**7.3**	**19**	**10**	**12**	NA	NA	**2.72**	NA	2.8 U	**16**	NA	NA	NA	**65.2**
	Barium	1,000	1,000	NA	**82**	**230**	**300**	**390**	**300**	**123**	NA	NA	**46**	NA	**38**	**440**	NA	NA	NA	**984**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	**0.66**	**1.1**	**1.8**	**0.85**	**1.1**	**2.5**	NA	NA	**1.12**	NA	0.28 U	**0.83**	NA	NA	NA	**1.85**
	Chromium (III)	1000	1000	NA	**11**	**20**	**17**	**9.4**	**43**	**8.51**	NA	NA	**6.57**	NA	**7.5**	**11**	NA	NA	NA	**17.90**
	Lead	200	200	NA	**200**	**350**	**540**	**260**	**380**	**304**	NA	NA	**176**	NA	**44**	**210**	**41**	**460**	NA	**1,150**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	**0.799**	NA	NA	**0.547**	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	NA	NA	NA	0.68 U	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	NA	NA	NA	0.34 U	NA	NA	0.3 U	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.

VOCs - Volatile Organic Compounds.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

* - TRC developed standards.

TABLE 2-10
Summary of Analytical Results for Soil Samples
HS-10: Tree Belts
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HRM-23	HRM-23	HRM-25	HRN26		HRN-26	HRN28	HRO-30		HRO-33	HRP.5-33	HRP31	HS-8	SB-01	
		Sample Depth (ft.):		2-3	1-3	1.5-3	0.5-3	0.5-3	1-3	1.5-3	1.5-3	1-3	2-3	1.5-3	1.5-3	0-0.5	1	3
		Sample Date:		2/21/2006	4/7/2009	2/21/2006	2/22/2006	2/22/2006	4/7/2009	2/22/2006	2/22/2006	4/7/2009	2/22/2006	2/22/2006	2/22/2006	9/9/2004	3/31/2008	3/31/2008
		S-1/GW-2	S-1/GW-3					Field Dup										
VOCs																		
(mg/kg)	Naphthalene	20	500	NA	NA	**0.45**	NA	NA	NA	NA	NA	NA	NA	0.075 U	NA	NA	NA	NA
SVOCs																		
(mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	0.219 U	NA	NA	NA	0.212 U	NA	NA	**1.27**	NA	NA	NA	NA	0.18 U	0.18 U
	Acenaphthylene	600	10	NA	0.219 U	NA	NA	NA	0.212 U	NA	NA	0.378 U	NA	NA	NA	NA	0.18 U	0.18 U
	Anthracene	1,000	1,000	NA	0.219 U	NA	NA	NA	**0.405**	NA	NA	**4.12**	NA	NA	NA	NA	0.18 U	0.18 U
	Benzo(a)anthracene	7	7	NA	**0.771**	NA	NA	NA	**0.958**	NA	NA	**10.3**	NA	NA	NA	NA	0.18 U	0.18 U
	Benzo(a)pyrene	2	2	NA	**0.830**	NA	NA	NA	**0.816**	NA	NA	**8.37**	NA	NA	NA	NA	0.18 U	0.18 U
	Benzo(b)fluoranthene	7	7	NA	**0.887**	NA	NA	NA	**0.916**	NA	NA	**8.97**	NA	NA	NA	NA	**0.20**	0.18 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	**0.501**	NA	NA	NA	**0.623**	NA	NA	**2.68**	NA	NA	NA	NA	0.18 U	0.18 U
	Benzo(k)fluoranthene	70	70	NA	**0.363**	NA	NA	NA	**0.345**	NA	NA	**3.53**	NA	NA	NA	NA	0.18 U	0.18 U
	Chrysene	70	70	NA	**0.797**	NA	NA	NA	**1.09**	NA	NA	**10.4**	NA	NA	NA	NA	0.18 U	0.18 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.219 U	NA	NA	NA	0.212 U	NA	NA	0.378 U	NA	NA	NA	NA	0.18 U	0.18 U
	Fluoranthene	1,000	1,000	NA	**1.01**	NA	NA	NA	**1.60**	NA	NA	**17.0**	NA	NA	NA	NA	**0.23**	0.18 U
	Fluorene	1,000	1,000	NA	0.219 U	NA	NA	NA	0.212 U	NA	NA	**1.98**	NA	NA	NA	NA	0.18 U	0.18 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	**0.656**	NA	NA	NA	**0.755**	NA	NA	**3.41**	NA	NA	NA	NA	0.18 U	0.18 U
	2-Methylnaphthalene	80	300	NA	0.219 U	NA	NA	NA	0.212 U	NA	NA	**1.27**	NA	NA	NA	NA	0.18 U	0.18 U
	Naphthalene	20	500	NA	0.219 U	NA	NA	NA	0.212 U	NA	NA	**0.621**	NA	NA	NA	NA	0.18 U	0.18 U
	Phenanthrene	500	500	NA	**0.687**	NA	NA	NA	**1.96**	NA	NA	**22.2**	NA	NA	NA	NA	0.18 U	0.18 U
	Pyrene	1,000	1,000	NA	**1.36**	NA	NA	NA	**2.11**	NA	NA	**26.7**	NA	NA	NA	NA	**0.27**	0.18 U
PCB Aroclors																		
(mg/kg)	Total PCBs	1	1	0.035 U	0.0557 U	**0.119**	**0.23**	**0.22**	**0.128 J**	0.27 U	**0.208**	0.0605 U	0.23 U	0.24 U	0.26 U	0.24 U	0.0520 U	0.0523 U
PCB Congeners																		
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs																		
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																		
	Arsenic	20	20	NA	**7.13**	NA	NA	NA	**10.8**	NA	NA	**8.37**	NA	NA	NA	NA	2.63 U	2.60 U
	Barium	1,000	1,000	NA	**255**	NA	NA	NA	**581**	NA	NA	**122**	NA	NA	NA	NA	**11.0**	**9.31**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.27**	0.26 U
	Cadmium	70	70	NA	**0.46**	NA	NA	NA	**0.46**	NA	NA	**0.89**	NA	NA	NA	NA	0.27 U	0.26 U
	Chromium (III)	1000	1000	NA	**8.80**	NA	NA	NA	**15.1**	NA	NA	**9.50**	NA	NA	NA	NA	**3.85**	**3.09**
	Lead	200	200	NA	**214**	NA	NA	NA	**587**	NA	NA	**189**	NA	NA	NA	NA	**35.1**	**11.1**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.014**	0.013 U
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3.84**	**3.23**
	Selenium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.25 U	5.20 U
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.53 U	0.52 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.32**	5.20 U
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**23.1**	**15.2**
GRO																		
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	3.6 U	NA	NA	NA	NA	NA	NA	NA	3.7 U	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
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PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

TABLE 2-10
Summary of Analytical Results for Soil Samples
HS-10: Tree Belts
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-02		SB-03		SB-04			SB-05		HB-270	SB-270J	SB-270U	SB-271		
		Sample Depth (ft.):		1	3	1	3	1	3.5	3.5	1	8	9.5	1-3	1-3	1	3.5	10
		Sample Date:		3/31/2008	3/31/2008	3/31/2008	3/31/2008	3/31/2008	3/31/2008	3/31/2008	3/31/2008	3/31/2008	7/16/2008	6/16/2009	7/6/2009	7/16/2008	7/16/2008	7/16/2008
		S-1/GW-2	S-1/GW-3							Field Dup								
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Acenaphthylene	600	10	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Anthracene	1,000	1,000	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Benzo(a)anthracene	7	7	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Benzo(a)pyrene	2	2	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Benzo(b)fluoranthene	7	7	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Benzo(g,h,i)perylene	1,000	1,000	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.425 U	NA	NA	NA	0.441 U	0.439 U
	Benzo(k)fluoranthene	70	70	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Chrysene	70	70	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Dibenz(a,h)anthracene	0.7	0.7	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.425 U	NA	NA	NA	0.441 U	0.439 U
	Fluoranthene	1,000	1,000	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Fluorene	1,000	1,000	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Indeno(1,2,3-cd)pyrene	7	7	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.425 U	NA	NA	NA	0.441 U	0.439 U
	2-Methylnaphthalene	80	300	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Naphthalene	20	500	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Phenanthrene	500	500	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
	Pyrene	1,000	1,000	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	NA	0.221 U	0.220 U
PCB Aroclors (mg/kg)	Total PCBs	1	1	0.0520 U	0.0500 U	0.0502 U	0.0500 U	0.0523 U	0.0512 U	0.0508 U	0.0534 U	0.0517 U	0.0596 U	NA	NA	0.0500 U	0.0654 U	0.0670 U
PCB Congeners (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.016 U	NA
PCB Homologs (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.081 U	NA
Metals	Arsenic	20	20	2.62 U	2.60 U	2.62 U	2.60 U	2.65 U	2.58 U	2.60 U	2.69 U	2.62 U	**4.20**	NA	NA	NA	**10.5**	**4.05**
	Barium	1,000	1,000	**7.41**	**5.50**	**8.49**	**6.24**	**14.6**	**7.58**	**7.14**	**12.2**	5.24 U	**17.6**	NA	NA	NA	**194**	**9.16**
	Beryllium	90	90	0.27 U	0.26 U	0.27 U	0.26 U	0.27 U	0.26 U	0.26 U	0.27 U	0.27 U	0.32 U	NA	NA	NA	0.34 U	0.33 U
	Cadmium	70	70	0.27 U	0.26 U	0.27 U	0.26 U	0.27 U	0.26 U	0.26 U	0.27 U	0.27 U	0.32 U	NA	NA	NA	0.34 U	0.33 U
	Chromium (III)	1000	1000	**4.11**	**3.55**	**3.38**	**2.96**	**6.30**	**2.93**	**3.42**	**7.70**	**2.75**	**7.56**	NA	NA	NA	**7.03**	**4.03**
	Lead	200	200	**42.8**	**4.76**	**18.1**	**6.42**	**12.1**	**14.9**	**14.8**	**27.9**	**3.45**	**4.54**	**240**	**330**	NA	**126**	**2.50**
	Mercury	20	20	**0.014**	0.014 U	0.013 U	0.010 U	**0.017**	0.014 U	0.019 U	**0.025**	0.010 U	0.012 U	NA	NA	NA	**0.101**	0.018 U
	Nickel	600	600	**3.48**	**3.76**	**3.38**	**3.18**	**4.93**	**3.02**	**3.39**	**5.92**	**2.16**	**6.83**	NA	NA	NA	**12.8**	**4.55**
	Selenium	400	400	5.24 U	5.20 U	5.23 U	5.20 U	5.30 U	5.16 U	5.20 U	5.38 U	5.24 U	6.37 U	NA	NA	NA	6.62 U	6.58 U
	Silver	100	100	0.53 U	0.52 U	0.53 U	0.52 U	0.53 U	0.52 U	0.52 U	0.54 U	0.53 U	**1.64**	NA	NA	NA	**2.44**	**1.20**
	Vanadium	400	400	5.24 U	5.20 U	5.23 U	5.20 U	**8.81**	5.16 U	5.20 U	**8.65**	5.24 U	**12.4**	NA	NA	NA	**27.7**	**7.26**
	Zinc	1,000	1,000	**20.4**	**15.6**	**23.0**	**14.5**	**23.2**	**18.1**	**18.4**	**23.4**	**9.35**	**22.4**	NA	NA	NA	**54.2**	**16.6**
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.

VOCs - Volatile Organic Compounds.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

* - TRC developed standards.

TABLE 2-10
Summary of Analytical Results for Soil Samples
HS-10: Tree Belts
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-272			SB-306			SB-359					SB-359		SB-368	
		Sample Depth (ft.):		1	3	10	1	4	7	0-1	1-3	4	8	12	0-1	1-3	0-1	1-2.5
		Sample Date:		7/16/2008	7/16/2008	7/16/2008	7/23/2008	7/23/2008	7/23/2008	3/4/2009	3/4/2009	3/4/2009	3/4/2009	3/4/2009	06/08/2011	06/08/2011	7/15/2011	7/15/2011
		S-1/GW-2	S-1/GW-3															
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Acenaphthylene	600	10	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Anthracene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Benzo(a)anthracene	7	7	NA	0.216 U	0.202 U	NA	NA	NA	**0.353**	0.230 U	**0.255**	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Benzo(a)pyrene	2	2	NA	0.216 U	0.202 U	NA	NA	NA	**0.276**	0.230 U	**0.290**	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Benzo(b)fluoranthene	7	7	NA	0.216 U	0.202 U	NA	NA	NA	**0.345**	0.230 U	**0.514**	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Benzo(k)fluoranthene	70	70	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Chrysene	70	70	NA	0.216 U	0.202 U	NA	NA	NA	**0.389**	0.230 U	**0.298**	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Fluoranthene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	**0.572**	0.230 U	**0.382**	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Fluorene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	**0.246**	1.41 U	NA	NA	NA	0.19 U	0.19 U
	2-Methylnaphthalene	80	300	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Naphthalene	20	500	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Phenanthrene	500	500	NA	0.216 U	0.202 U	NA	NA	NA	**0.530**	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U
	Pyrene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	**0.543**	0.230 U	**0.366**	1.41 U	NA	NA	NA	0.19 U	0.19 U
PCB Aroclors (mg/kg)	Total PCBs	1	1	**0.578 J**	0.0685 U	0.0580 U	**0.107 J**	0.0656 U	0.182 UJ	**0.0635 J**	0.0558 U	0.0599 U	0.395 UJ	NA	NA	NA	0.11 U	0.11 U
PCB Congeners (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0594**	**0.0056**	NA	NA
PCB Homologs (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals	Arsenic	20	20	NA	**19.0**	**3.47**	NA	NA	NA	**4.15**	**6.07**	**65.5**	**195**	3.15 U	NA	NA	2.8 U	2.7 U
	Barium	1,000	1,000	NA	**497**	6.04 U	NA	NA	NA	**31.6**	**76.1**	**391**	**1,490**	**8.27**	NA	NA	**17**	**18**
	Beryllium	90	90	NA	**0.52**	0.31 U	NA	NA	NA	0.31 U	0.35 U	**0.86**	**5.13**	0.32 U	NA	NA	0.28 U	0.27 U
	Cadmium	70	70	NA	**0.39**	0.31 U	NA	NA	NA	0.31 U	0.35 U	**2.33**	**8.81**	0.32 U	NA	NA	0.28 U	0.27 U
	Chromium (III)	1000	1000	NA	**14.6**	**3.27**	NA	NA	NA	**8.34**	**13.7**	**15.2**	**92.5**	**4.21**	NA	NA	**6.0**	**9.4**
	Lead	200	200	NA	**247**	**2.37**	NA	NA	NA	**129**	**49.6**	**802**	**2,710**	**2.18**	NA	NA	**17**	**11**
	Mercury	20	20	NA	**0.176**	0.012 U	NA	NA	NA	**0.039**	**0.056**	**0.959**	0.150 U	0.012 U	NA	NA	**0.030**	**0.029**
	Nickel	600	600	NA	**22.0**	**4.25**	NA	NA	NA	**4.25**	**7.89**	**18.4**	**94.1**	**3.14**	NA	NA	**3.3**	**4.7**
	Selenium	400	400	NA	6.47 U	6.04 U	NA	NA	NA	6.10 U	6.89 U	**28.1**	**99.4**	6.29 U	NA	NA	5.7 U	5.5 U
	Silver	100	100	NA	**7.99**	**2.14**	NA	NA	NA	0.61 U	0.69 U	0.73 U	4.21 U	0.63 U	NA	NA	0.57 U	0.55 U
	Vanadium	400	400	NA	**44.2**	6.04 U	NA	NA	NA	**9.97**	**22.3**	**32.5**	**174**	6.29 U	NA	NA	**13**	**15**
	Zinc	1,000	1,000	NA	**74.9**	**14.8**	NA	NA	NA	**58.9**	**89.6**	**772**	**2,980**	**13.8**	NA	NA	**19**	**16**
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit.

UJ - Estimated non-detect.

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.

VOCs - Volatile Organic Compounds.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

* - TRC developed standards.

TABLE 2-10
Summary of Analytical Results for Soil Samples
HS-10: Tree Belts
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-369		SB-370			SB-LSD-1			SB-LSD-2				SB-LSD-3	TREE-DS-1		TREE-DS-2	
		Sample Depth (ft.):		0-1	1-3	0-1	1-3	1-3	0-1	1-3	3-4	0-1	1-3	1-3	3-4	4-5	0-1	1-3	0-1	1-3
		Sample Date:		7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	5/12/2010	5/12/2010	5/12/2010	5/12/2010	5/12/2010	5/12/2010	5/12/2010	5/12/2010	8/24/2011	8/24/2011	8/24/2011	8/24/2011
		S-1/GW-2	S-1/GW-3					Field Dup						Field Dup						
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	0.19 U	0.19 U	0.61 U	0.24 U	0.24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Aroclors (mg/kg)	Total PCBs	1	1	0.11 U	0.11 U	0.18 U	0.14 U	0.14 U	**0.0685**	0.0521 U	**0.838**	**0.131**	**0.731**	**0.688**	**0.738**	0.0599 U	**0.25**	**2.1**	**0.34**	**0.34**
PCB Congeners (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals	Arsenic	20	20	2.8 U	2.8 U	4.5 U	3.5 U	3.4 U	NA	NA	NA	NA	NA	NA	NA	NA	**2.9**	**3.9**	**2.7**	2.5 U
	Barium	1,000	1,000	**16**	**23**	**44**	**25**	**24**	NA	NA	NA	NA	NA	NA	NA	NA	**97**	**500**	**470**	**1,200**
	Beryllium	90	90	0.28 U	0.28 U	0.45 U	0.35 U	0.34 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	0.28 U	0.28 U	0.45 U	0.35 U	0.34 U	NA	NA	NA	NA	NA	NA	NA	NA	**0.58**	**2.2**	**1.0**	**2.3**
	Chromium (III)	1000	1000	**6.1**	**7.8**	**12**	**13**	**13**	NA	NA	NA	NA	NA	NA	NA	NA	**14**	**58**	**44**	**110**
	Lead	200	200	**15**	**6.8**	**68**	**15**	**18**	NA	NA	NA	NA	NA	NA	NA	NA	**96**	**570**	**210**	**1,700**
	Mercury	20	20	**0.029**	0.027 U	**0.080**	**0.037**	**0.038**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	**3.1**	**5.9**	**6.8**	**5.5**	**5.4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	5.7 U	5.6 U	8.9 U	7.0 U	6.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	0.57 U	0.56 U	0.89 U	0.70 U	0.69 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	**11**	**13**	**22**	**22**	**25**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	**17**	**13**	**49**	**24**	**25**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

TABLE 2-10
Summary of Analytical Results for Soil Samples
HS-10: Tree Belts
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		TREE-HS-1		TREE-HS-2		TREE-HS-3		TREE-HS-4		TREE-TI-1		TREE-TI-2		TREE-TI-3		TI-3E		TI-3N
		Sample Depth (ft.):		0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	0-1	0-1
		Sample Date:		8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/22/2011	8/22/2011	8/25/2011	8/25/2011	8/25/2011	8/25/2011	9/26/2011	9/26/2011 Field Dup	9/26/2011
		S-1/GW-2	S-1/GW-3																	
VOCs (mg/kg)	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Aroclors (mg/kg)	Total PCBs	1	1	**0.16**	**1.6**	**2.7**	**11**	**5.1**	**1.7**	**1.2**	**0.42**	0.12 U	0.11 U	**0.15**	**0.16**	**20**	**2.5**	**3.53**	**3.473**	**0.115**
PCB Congeners (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB Homologs (mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals	Arsenic	20	20	2.6 U	**4.2**	**3.2**	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.8 U	2.6 U	2.7 U	2.6 U	**6.7**	**12**	NA	NA	NA
	Barium	1,000	1,000	**25**	**1,200**	**93**	**32**	**14**	**11**	**16**	**18**	**15**	**6.4**	**46**	**14**	**2,500**	**7,000**	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**0.27**	**0.97**	**0.65**	**0.27**	0.26 U	0.26 U	0.26 U	0.26 U	0.28 U	0.26 U	0.27 U	0.26 U	**5.3**	**5.2**	NA	NA	NA
	Chromium (III)	1000	1000	**6.7**	**14**	**10**	**7.5**	**5.1**	**5.3**	**5.2**	**6.4**	**5.0**	**2.1**	**8.6**	**3.4**	**260**	**390**	NA	NA	NA
	Lead	200	200	**46**	**320**	**210**	**62**	**14**	**6.7**	**19**	**6.8**	**16**	**5.8**	**49**	**13**	**790**	**3,000**	NA	NA	NA
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

TABLE 2-10
Summary of Analytical Results for Soil Samples
HS-10: Tree Belts
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location: / Sample Depth (ft.): / Sample Date:		TI-3S 0-1 9/26/2011	TI-3W 0-1 9/26/2011
		S-1/GW-2	S-1/GW-3		
VOCs (mg/kg)	Naphthalene	20	500	NA	NA
SVOCs (mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA
	Dibenzofuran	10*	10*	NA	NA
	Acenaphthene	1,000	1,000	NA	NA
	Acenaphthylene	600	10	NA	NA
	Anthracene	1,000	1,000	NA	NA
	Benzo(a)anthracene	7	7	NA	NA
	Benzo(a)pyrene	2	2	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA
	Chrysene	70	70	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA
	Fluoranthene	1,000	1,000	NA	NA
	Fluorene	1,000	1,000	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA
	2-Methylnaphthalene	80	300	NA	NA
	Naphthalene	20	500	NA	NA
	Phenanthrene	500	500	NA	NA
	Pyrene	1,000	1,000	NA	NA
PCB Aroclors (mg/kg)	Total PCBs	1	1	**1.167**	**0.270**
PCB Congeners (mg/kg)	Total PCBs	1	1	NA	NA
PCB Homologs (mg/kg)	Total PCBs	1	1	NA	NA
Metals	Arsenic	20	20	NA	NA
	Barium	1,000	1,000	NA	NA
	Beryllium	90	90	NA	NA
	Cadmium	70	70	NA	NA
	Chromium (III)	1000	1000	NA	NA
	Lead	200	200	NA	NA
	Mercury	20	20	NA	NA
	Nickel	600	600	NA	NA
	Selenium	400	400	NA	NA
	Silver	100	100	NA	NA
	Vanadium	400	400	NA	NA
	Zinc	1,000	1,000	NA	NA
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed Method 1 standards, as applicable.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

TABLE 2-11
Summary of Analytical Results for Dioxin Investigation Soil Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte					HA-43/44		HB-22A	HB-22J		HB-22K	
					Sample Depth (ft.):	0-1	1-2	1-3	0-1	1-3	0-1	1-3
					Sample Date:	06/07/2011	06/07/2011	10/20/2011 & 02/21/2014	02/21/2014	02/21/2014	02/21/2014	02/21/2014
		S-1/GW-2	S-1/GW-3	S-2/GW-2	S-2/GW-3							
PCB Congeners												
(mg/kg)	**Total PCBs[(a)]**	2	2	3	3	NA	NA	NA	NA	NA	NA	NA
	Total PCBs[(b)]	2	2	3	3	**2.6E-01**	**1.8E-01**	NA	NA	NA	NA	NA
	Dioxin-like PCB TEQs (ND=0 EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**4.4E-07**	**2.7E-07**	**1.2E-05**	**9.1E-06**	**3.0E-05**	**5.4E-06**	**6.6E-05**
	Dioxin-like PCB TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**1.8E-06**	**1.2E-06**	**1.3E-05**	**9.1E-06**	**3.0E-05**	**7.7E-06**	**6.7E-05**
Dioxins												
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**7.9E-06**	**9.2E-06**	**6.5E-06**	**1.1E-05**	**8.4E-05**	**1.5E-05**	**8.8E-05**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**8.0E-06**	**9.3E-06**	**6.6E-06**	**1.1E-05**	**8.4E-05**	**1.6E-05**	**8.8E-05**
TEQ Summation**												
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**8.3E-06**	**9.4E-06**	**1.9E-05**	**2.0E-05**	**1.1E-04**	**2.0E-05**	**1.5E-04**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**9.8E-06**	**1.1E-05**	**1.9E-05**	**2.0E-05**	**1.1E-04**	**2.4E-05**	**1.5E-04**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

J - Estimated value.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit. When this happens, the result is referred to as a "non-detect," or "ND."

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed MassDEP Method 1 standards.

Values shown in Bold and shaded type exceed TSCA but are less than the listed Method 1 standards.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection limit (referred to as "ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions were used for results below detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

(a) - Calculated by summation of PCB homolog groups.

(b) - Calculated by summation of individual congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

TABLE 2-11
Summary of Analytical Results for Dioxin Investigation Soil Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte					Sample ID:	HB-22D	HB-26			HF-14	HF-31D	HF-40
						Sample Depth (ft.):	1-3	1-3	1-3	3-5	3-4	4-6	3-5
						Sample Date:	10/20/2011 &	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010
		S-1/GW-2	S-1/GW-3	S-2/GW-2	S-2/GW-3		02/21/2014		Field Dup				
PCB Congeners													
(mg/kg)	**Total PCBs[(a)]**	2	2	3	3		NA	**1.82 J**	**6.47 J**	**16.62 J**	**1.15 J**	**0.082 J**	**0.098 J**
	Total PCBs[(b)]	2	2	3	3		NA	**1.82 J**	**6.47 J**	**16.63 J**	**1.15 J**	**0.082 J**	**0.098 J**
	Dioxin-like PCB TEQs (ND=0 EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05		**2.1E-06**	**3.9E-05 J**	**1.2E-04 J**	**3.2E-05 J**	**1.8E-06 J**	**2.0E-06 J**	**1.6E-06 J**
	Dioxin-like PCB TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05		**2.2E-06**	**3.9E-05 J**	**1.2E-04 J**	**3.6E-05 J**	**4.4E-06 J**	**2.0E-06 J**	**1.7E-06 J**
Dioxins													
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05		**5.1E-05**	**1.1E-04**	**8.2E-05**	**4.3E-05**	**6.8E-05**	**1.4E-05**	**1.2E-04**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05		**5.1E-05**	**1.1E-04**	**8.2E-05**	**4.3E-05**	**6.8E-05**	**1.4E-05**	**1.2E-04**
TEQ Summation**													
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05		**5.3E-05**	**1.5E-04**	**2.1E-04**	**7.5E-05**	**7.0E-05**	**1.6E-05**	**1.2E-04**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05		**5.3E-05**	**1.5E-04**	**2.1E-04**	**7.9E-05**	**7.2E-05**	**1.6E-05**	**1.2E-04**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of t
met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

J - Estimated value.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit. When this happens, the result is referred to as a "non-detect," or "ND."

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed MassDEP Method 1 standards.

Values shown in Bold and shaded type exceed TSCA but are less than the listed Method 1 standards.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congener
human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometin
"dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the Worlc
mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ e
underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection
"ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions w
detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

(a) - Calculated by summation of PCB homolog groups.

(b) - Calculated by summation of individual congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

TABLE 2-11
Summary of Analytical Results for Dioxin Investigation Soil Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte					Sample ID:	HG-2			PG-6		SB-359		SB-362	
						Sample Depth (ft.):	0-1	1-3	5-7	0-1	1-3	0-1	1-3	0-1	1-3
						Sample Date:	4/15/2010	4/15/2010	4/15/2010	06/10/2011	06/10/2011	06/08/2011	06/08/2011	06/08/2011	06/08/2011
		S-1/GW-2	S-1/GW-3	S-2/GW-2	S-2/GW-3										
PCB Congeners															
(mg/kg)	**Total PCBs[(a)]**	2	2	3	3	**0.255 J**	**4.90 J**	**3.73 J**	NA	NA	NA	NA	NA	NA
	Total PCBs[(b)]	2	2	3	3	**0.255 J**	**4.90 J**	**3.73 J**	**1.7E-03**	**5.9E-03**	**5.9E-02**	**5.6E-03**	**7.8E-01**	**2.8E-01**
	Dioxin-like PCB TEQs (ND=0 EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**4.8E-06 J**	**1.1E-04 J**	**7.3E-05 J**	**4.0E-09**	**2.2E-08**	**1.2E-07**	**1.0E-08**	**2.6E-06**	**7.8E-07**
	Dioxin-like PCB TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**4.8E-06 J**	**1.1E-04 J**	**7.3E-05 J**	**1.2E-07**	**1.7E-07**	**4.5E-07**	**1.6E-07**	**5.8E-06**	**3.2E-06**
Dioxins															
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**9.7E-06**	**7.9E-05**	**6.0E-05**	**7.0E-08**	**1.7E-07**	**4.8E-06**	**8.8E-07**	**4.0E-06**	**3.6E-06**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**9.7E-06**	**7.9E-05**	**6.0E-05**	**1.9E-07**	**2.9E-07**	**4.9E-06**	**1.5E-06**	**4.1E-06**	**3.8E-06**
TEQ Summation**															
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**1.4E-05**	**1.9E-04**	**1.3E-04**	**7.4E-08**	**1.9E-07**	**4.9E-06**	**9.7E-07**	**6.6E-06**	**4.4E-06**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**1.5E-05**	**1.9E-04**	**1.3E-04**	**3.1E-07**	**4.6E-07**	**5.3E-06**	**1.7E-06**	**9.9E-06**	**7.0E-06**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of t
met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

J - Estimated value.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit. When this happens, the result is referred to as a "non-detect," or "ND."

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed MassDEP Method 1 standards.

Values shown in Bold and shaded type exceed TSCA but are less than the listed Method 1 standards.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congener
human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometin
"dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the Worl
mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ e
underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection
"ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions w
detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

(a) - Calculated by summation of PCB homolog groups.

(b) - Calculated by summation of individual congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

TABLE 2-11
Summary of Analytical Results for Dioxin Investigation Soil Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte					Sample ID:	SB-365		SS-28		SS-38		SS-52	
						Sample Depth (ft.):	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3
						Sample Date:	06/07/2011	06/07/2011	06/08/2011	06/08/2011	06/08/2011	06/08/2011	06/08/2011	06/08/2011
		S-1/GW-2	S-1/GW-3	S-2/GW-2	S-2/GW-3									
PCB Congeners														
(mg/kg)	**Total PCBs[(a)]**	2	2	3	3	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs[(b)]	2	2	3	3	**2.4E-02**	**3.9E-01**	**5.4E-01**	**2.3E-02**	**1.1E+00**	**6.3E-02**	**1.0E+00**	**1.4E+00**
	Dioxin-like PCB TEQs (ND=0 EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**3.0E-08**	**1.5E-06**	**2.3E-06**	**5.4E-08**	**4.4E-06**	**2.8E-07**	**3.4E-06**	**4.0E-06**
	Dioxin-like PCB TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**1.3E-06**	**2.6E-06**	**5.2E-06**	**2.8E-07**	**9.9E-06**	**5.2E-07**	**6.3E-06**	**9.8E-06**
Dioxins													
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**1.5E-06**	**3.7E-07**	**8.4E-06**	**8.0E-07**	**3.0E-05**	**3.5E-06**	**4.5E-06**	**9.3E-06**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**1.6E-06**	**5.2E-07**	**8.5E-06**	**9.2E-07**	**3.1E-05**	**3.7E-06**	**4.6E-06**	**9.4E-06**
TEQ Summation**													
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**1.5E-06**	**1.9E-06**	**1.1E-05**	**8.6E-07**	**3.5E-05**	**3.7E-06**	**7.9E-06**	**1.3E-05**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**2.9E-06**	**3.1E-06**	**1.4E-05**	**1.2E-06**	**4.1E-05**	**4.2E-06**	**1.1E-05**	**1.9E-05**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of t
met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

J - Estimated value.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit. When this happens, the result is referred to as a "non-detect," or "ND."

Values in **Bold** indicate the compound was detected.

Values shown in Bold and shaded type exceed one or more of the listed MassDEP Method 1 standards.

Values shown in Bold and shaded type exceed TSCA but are less than the listed Method 1 standards.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congener
human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometin
"dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the Worlc
mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ e
underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection
"ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions w
detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

(a) - Calculated by summation of PCB homolog groups.

(b) - Calculated by summation of individual congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

TABLE 2-12
Summary of Analytical Results for Groundwater Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample ID:	MW-4						MW-5													MW-5D							MW-6		
			Depth to Water (ft-toc):	2.25						2.10													1.50							1.69		
			Screened Interval:	2 to 12						2 to 12													14 to 19							2 to 12		
			Groundwater Classification	GW-2/GW-3						GW-2/GW-3													GW-3							GW-2/GW-3		
			Filter Size (micron)^:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample Date:	8/19/2008	8/19/2008	1/6/2010	2/17/2010	4/9/2010	9/13/2010	8/19/2008	1/6/2010	1/6/2010	2/17/2010	4/8/2010	9/10/2010	3/8/2011	4/11/2011	4/29/2011	8/24/2011	2/27/2012	4/10/2012	12/14/2012	9/10/2010	4/8/2011	4/28/2011	8/24/2011	2/27/2012	4/10/2012	12/14/2012	8/19/2008	1/7/2010	2/18/2010
		GW-2	GW-3		Field Dup							Field Dup																				
VOCs																																
(ug/L)	Acetone	50,000	50,000	NA	NA	50 U	5.0 U	5.0 U	5.0 U	NA	50 U	50 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	50 U	5.0 U
	tert-Amyl Methyl Ether (TAME)	NS	NS	NA	NA	0.50 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	2.0 U
	Benzene	1,000	10,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	1.0 U	1.0 U	0.50 U	0.50 U	0.50 U	0.50 U	NA	1.0 U	1.0 U
	Bromobenzene	NS	NS	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	Bromochloromethane	NS	NS	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	Bromodichloromethane	6	50,000	NA	NA	5.0 U	1.0 U	1.0 U	1.0 U	NA	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	5.0 U	1.0 U
	Bromoform	700	50,000	NA	NA	10 U	2.0 U	2.0 U	2.0 U	NA	10 U	10 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	10 U	2.0 U
	Bromomethane	7	800	NA	NA	2.0 U	5.0 U	5.0 U	2.0 U	NA	2.0 U	2.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	5.0 U
	2-Butanone (MEK)	50,000	50,000	NA	NA	20 U	5.0 U	5.0 U	5.0 U	NA	20 U	20 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	20 U	5.0 U
	n-Butylbenzene	4,000[1]	50,000[1]	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	sec-Butylbenzene	4,000[1]	50,000[1]	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	tert-Butylbenzene	4,000[1]	50,000[1]	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	tert-Butyl Ethyl Ether (TBEE)	NS	NS	NA	NA	0.50 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	2.0 U
	Carbon Disulfide	NS	NS	NA	NA	5.0 U	2.0 U	2.0 U	2.0 U	NA	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	5.0 U	2.0 U
	Carbon Tetrachloride	2	5,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	Chlorobenzene	200	1,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	Chlorodibromomethane	20	50,000	NA	NA	10 U	1.0 U	1.0 U	1.0 U	NA	10 U	10 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U
	Chloroethane	NS	NS	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U
	Chloroform	50	20,000	NA	NA	2.0 U	1.0 U	1.0 U	1.0 U	NA	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	2.0 U	1.0 U
	Chloromethane	NS	NS	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U
	2-Chlorotoluene	NS	NS	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	4-Chlorotoluene	NS	NS	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	1,2-Dibromo-3-chloropropane (DBCP)	NS	NS	NA	NA	10 U	5.0 U	5.0 U	2.0 U	NA	10 U	10 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	10 U	5.0 U
	1,2-Dibromoethane (EDB)	2	50,000	NA	NA	0.50 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	2.0 U
	Dibromomethane	NS	NS	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	1,2-Dichlorobenzene	8,000	2,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	1,3-Dichlorobenzene	6,000	50,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	1,4-Dichlorobenzene	60	8,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	Dichlorodifluoromethane (Freon 12)	NS	NS	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U
	1,1-Dichloroethane	2,000	20,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	1,2-Dichloroethane	5	20,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	1,1-Dichloroethylene	80	30,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	cis-1,2-Dichloroethylene	20	50,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	**3.7**	**4.1**	**5.9**	**3.2**	**7.1**	**3.8**	**4.0**	**5.1**	**3.1**	**8.3**	**4.0**	**9.7**	1.0 U	1.0 U	1.0 U	**6.3**	**7.4**	**5.7**	**1.3**	NA	1.0 U	1.0 U
	trans-1,2-Dichloroethylene	80	50,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	1,2-Dichloropropane	3	50,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	1,3-Dichloropropane	NS	NS	NA	NA	0.50 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	2.0 U
	2,2-Dichloropropane	NS	NS	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	1,1-Dichloropropene	NS	NS	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U
	cis-1,3-Dichloropropene	10[2]	200[2]	NA	NA	5.0 U	0.50 U	0.50 U	0.50 U	NA	5.0 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	NA	5.0 U	0.50 U
	trans-1,3-Dichloropropene	10[2]	200[2]	NA	NA	5.0 U	0.50 U	0.50 U	0.50 U	NA	5.0 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	NA	5.0 U	0.50 U
	Diethyl Ether	NS	NS	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U
	Diisopropyl Ether (DIPE)	NS	NS	NA	NA	0.50 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	0.50 U	2.0 U
	1,4-Dioxane	6,000	50,000	NA	NA	50 U	250 U	250 U	250 U	NA	50 U	50 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	NA	50 U	250 U
	Ethylbenzene	20,000	5,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	Hexachlorobutadiene	50	3,000	NA	NA	1.0 U	0.60 U	0.60 U	0.60 U	NA	1.0 U	1.0 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	NA	1.0 U	0.60 U
	2-Hexanone (MBK)	NS	NS	NA	NA	10 U	5.0 U	5.0 U	5.0 U	NA	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	10 U	5.0 U
	Isopropylbenzene (Cumene)	4,000[1]	50,000[1]	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	p-Isopropyltoluene (p-Cymene)	4,000[1]	50,000[1]	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	Methyl tert-Butyl Ether (MTBE)	50,000	50,000	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	Methylene Chloride	2,000	50,000	NA	NA	5.0 U	5.0 U	5.0 U	2.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	5.0 U	5.0 U
	4-Methyl-2-pentanone (MIBK)	50,000	50,000	NA	NA	10 U	5.0 U	5.0 U	5.0 U	NA	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	10 U	5.0 U
	Naphthalene	700	20,000	NA	NA	2.0 U	5.0 U	5.0 U	2.0 U	NA	2.0 U	2.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	5.0 U
	n-Propylbenzene	4,000[1]	50,000[1]	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	Styrene	100	6,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	1,1,1,2-Tetrachloroethane	10	50,000	NA	NA	5.0 U	1.0 U	1.0 U	1.0 U	NA	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	5.0 U	1.0 U
	1,1,2,2-Tetrachloroethane	9	50,000	NA	NA	0.50 U	1.0 U	1.0 U	1.0 U	NA	0.50 U	0.50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	0.50 U	1.0 U
	Tetrachloroethylene	50	30,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	Tetrahydrofuran	NS	NS	NA	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	10 U	10 U
	Toluene	50,000	40,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	1,2,3-Trichlorobenzene	NS	NS	NA	NA	5.0 U	2.0 U	2.0 U	2.0 U	NA	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	5.0 U	2.0 U
	1,2,4-Trichlorobenzene	200	50,000	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	1,1,1-Trichloroethane	4,000	20,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	1,1,2-Trichloroethane	900	50,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	Trichloroethylene	5	5,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**2.8**	**2.1**	**4.4**	1.0 U	**5.3**	**2.9**	**1.8**	**1.1**	**3.4**	**3.5**	**31**	**7.5**	**5.9**	**1.1**	NA	1.0 U	1.0 U
	Trichlorofluoromethane (Freon 11)	NS	NS	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U
	1,2,3-Trichloropropane	NS	NS	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U
	1,2,4-Trimethylbenzene	4,000[1]	50,000[1]	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	1,3,5-Trimethylbenzene	4,000[1]	50,000[1]	NA	NA	1.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	1.0 U	2.0 U
	Vinyl Chloride	2	50,000	NA	NA	2.0 U	1.0 U	1.0 U	1.0 U	NA	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	2.0 U	1.0 U
	m+p Xylene	3,000	50,000	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U
	o-Xylene	3,000	50,000	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U

TABLE 2-12
Summary of Analytical Results for Groundwater Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample ID:	MW-4						MW-5													MW-5D							MW-6		
			Depth to Water (ft-toc):	2.25						2.10													1.50							1.69		
			Screened Interval:	2 to 12						2 to 12													14 to 19							2 to 12		
			Groundwater Classification	GW-2/GW-3						GW-2/GW-3													GW-3							GW-2/GW-3		
			Filter Size (micron)^:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample Date:	8/19/2008	8/19/2008	1/6/2010	2/17/2010	4/9/2010	9/13/2010	8/19/2008	1/6/2010	1/6/2010	2/17/2010	4/8/2010	9/10/2010	3/8/2011	4/11/2011	4/29/2011	8/24/2011	2/27/2012	4/10/2012	12/14/2012	9/10/2010	4/8/2011	4/28/2011	8/24/2011	2/27/2012	4/10/2012	12/14/2012	8/19/2008	1/7/2010	2/18/2010
		GW-2	GW-3		Field Dup							Field Dup																				
PAHs																																
(ug/L)	Acenaphthene	NS	10,000	0.30 U	0.30 U	NA	NA	NA	NA	0.30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.30 U	NA	NA
	Acenaphthylene	10,000	40	0.30 U	0.30 U	NA	NA	NA	NA	0.30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.30 U	NA	NA
	Anthracene	NS	30	0.20 U	0.20 U	NA	NA	NA	NA	0.20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	NA	NA
	Benzo(a)anthracene	NS	1,000	0.05 U	0.05 U	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA
	Benzo(a)pyrene	NS	500	0.10 U	0.10 U	NA	NA	NA	NA	0.10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.10 U	NA	NA
	Benzo(b)fluoranthene	NS	400	0.05 U	0.05 U	NA	NA	NA	NA	0.05 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	NA
	Benzo(g,h,i)perylene	NS	20	0.50 U	0.50 U	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA
	Benzo(k)fluoranthene	NS	100	0.20 U	0.20 U	NA	NA	NA	NA	0.20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	NA	NA
	Chrysene	NS	70	0.20 U	0.20 U	NA	NA	NA	NA	0.20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	NA	NA
	Dibenz(a,h)anthracene	NS	40	0.50 U	0.50 U	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA
	Fluoranthene	NS	200	0.50 U	0.50 U	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA
	Fluorene	NS	40	1.0 U	1.0 U	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	NA	NA
	Indeno(1,2,3-cd)pyrene	NS	100	0.50 U	0.50 U	NA	NA	NA	NA	0.50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	NA	NA
	2-Methylnaphthalene	2,000	20,000	1.0 U	1.0 U	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	NA	NA
	Naphthalene	700	20,000	1.0 U	1.0 U	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	NA	NA
	Phenanthrene	NS	10,000	0.05 U	0.05 U	NA	NA	NA	NA	**0.18**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.09**	NA	NA
	Pyrene	NS	20	1.0 U	1.0 U	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	NA	NA
PCBs																																
(ug/L)	Aroclor 1016	5	10	0.0500 U	0.0500 U	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	0.0521 U	0.050 U	0.0500 U	0.25 U	NA	NA	NA	0.0500 U	0.050 U	0.0500 U	0.25 U	0.0500 U	NA	NA
	Aroclor 1221	5	10	0.0500 U	0.0500 U	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	0.0521 U	0.050 U	**0.0202 J**	0.25 U	NA	NA	NA	0.0500 U	0.050 U	0.0500 U	0.25 U	0.0500 U	NA	NA
	Aroclor 1232	5	10	0.0500 U	0.0500 U	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	0.0521 U	0.050 U	0.0500 U	0.25 U	NA	NA	NA	0.0500 U	0.050 U	0.0500 U	0.25 U	0.0500 U	NA	NA
	Aroclor 1242	5	10	0.0500 U	0.0500 U	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	0.0521 U	0.050 U	0.0500 U	0.25 U	NA	NA	NA	0.0500 U	0.050 U	0.0500 U	0.25 U	0.0500 U	NA	NA
	Aroclor 1248	5	10	0.0500 U	0.0500 U	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	**0.129**	**0.0595**	**0.0727 J**	0.25 U	NA	NA	NA	0.0500 U	0.050 U	0.0500 U	0.25 U	0.0500 U	NA	NA
	Aroclor 1254	5	10	0.0500 U	0.0500 U	NA	NA	NA	NA	**0.0731 J**	NA	NA	NA	NA	NA	NA	NA	NA	0.0521 U	**0.0319 J**	**0.0373 J**	0.25 U	NA	NA	NA	0.0500 U	**0.0283 J**	0.0500 U	0.25 U	0.0500 U	NA	NA
	Aroclor 1260	5	10	0.0500 U	0.0500 U	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	0.0521 U	0.050 U	0.0500 U	0.25 U	NA	NA	NA	0.0500 U	0.050 U	0.0500 U	0.25 U	0.0500 U	NA	NA
	Aroclor 1262	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.25 U	NA	NA	NA	NA	NA	NA	0.25 U	NA	NA	NA
	Aroclor 1268	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.25 U	NA	NA	NA	NA	NA	NA	0.25 U	NA	NA	NA
	Total PCBs	5	10	0.0500 U	0.0500 U	NA	NA	NA	NA	**0.0731 J**	NA	NA	NA	NA	NA	NA	NA	NA	**0.129**	**0.0914 J**	**0.1302 J**	0.25 U	NA	NA	NA	0.0500 U	**0.0283 J**	0.0500 U	0.25 U	0.0500 U	NA	NA
Total Petroleum Hydrocarbons																																
(ug/L)	Total Petroleum Hydrocarbons (C9-C44)	5,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals, total																																
(ug/L)	Antimony	NS	8,000	3.0 U	3.0 U	NA	NA	NA	NA	3.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0 U	NA	NA
	Arsenic	NS	900	**7.0**	5.0 U	NA	NA	NA	NA	**15.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**13.0**	NA	NA
	Barium	NS	50,000	50 U	50 U	NA	NA	NA	NA	**122**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 U	NA	NA
	Beryllium	NS	200	2.0 U	2.0 U	NA	NA	NA	NA	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0 U	NA	NA
	Cadmium	NS	4	2.5 U	2.5 U	NA	NA	NA	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5 U	NA	NA
	Chromium	NS	300	5.0 U	5.0 U	NA	NA	NA	NA	**52.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
	Lead	NS	10	7.5 U	7.5 U	NA	NA	NA	NA	**19.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5 U	NA	NA
	Mercury	NS	20	0.10 U	0.10 U	NA	NA	NA	NA	0.10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.10 U	NA	NA
	Nickel	NS	200	5.0 U	5.0 U	NA	NA	NA	NA	**20.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
	Selenium	NS	100	30 U	30 U	NA	NA	NA	NA	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30 U	NA	NA
	Silver	NS	7	3.0 U	3.0 U	NA	NA	NA	NA	**5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3.0**	NA	NA
	Thallium	NS	3,000	1.0 U	1.0 U	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	NA	NA
	Vanadium	NS	4,000	25 U	25 U	NA	NA	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	25 U	NA	NA
	Zinc	NS	900	**12.0**	**16.0**	NA	NA	NA	NA	**68.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**110**	NA	NA
Metals, dissolved																																
(ug/L)	Antimony	NS	8,000	3.0 U	3.0 U	NA	NA	NA	NA	3.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0 U	NA	NA
	Arsenic	NS	900	10 U	10 U	NA	NA	NA	NA	**10**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**10**	NA	NA
	Barium	NS	50,000	50 U	50 U	NA	NA	NA	NA	**64.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 U	NA	NA
	Beryllium	NS	200	2.0 U	2.0 U	NA	NA	NA	NA	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0 U	NA	NA
	Cadmium	NS	4	2.5 U	2.5 U	NA	NA	NA	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5 U	NA	NA
	Chromium	NS	300	5.0 U	5.0 U	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
	Lead	NS	10	8.0 U	8.0 U	NA	NA	NA	NA	8.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.0 U	NA	NA
	Mercury	NS	20	0.10 U	0.10 U	NA	NA	NA	NA	0.10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.10 U	NA	NA
	Nickel	NS	200	5.0 U	5.0 U	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA
	Selenium	NS	100	30 U	30 U	NA	NA	NA	NA	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30 U	NA	NA
	Silver	NS	7	2.5 U	2.5 U	NA	NA	NA	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.6**	NA	NA
	Thallium	NS	3,000	1.0 U	1.0 U	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	NA	NA
	Vanadium	NS	4,000	50 U	50 U	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 U	NA	NA
	Zinc	NS	900	**11**	**119**	NA	NA	NA	NA	**10**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA
General Chemistry																																
(ug/L)	Nitrogen, Nitrate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	NA	**280**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sulfate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10,000 U	NA	NA	NA	NA	NA	NA	NA	**10,000**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total Organic Carbon	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**6,800**	NA	NA	NA	NA	NA	NA	NA	**2,900**	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
ug/L - micrograms per liter.
B - Compound detected in associated method blank
J - Estimated value.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No MassDEP standards exist for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Method 1 standards.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
(1) - MassDEP Method 1 standards for C9-C10 aromatic hydrocarbons used.
(2) - MassDEP Method 1 standards for 1,3-Dichloropropene used.
^ - 0.45 micron filtration done in field; 0.20 and 2.0 micron filtration performed in lab.
* - Sample collected on 4/10/2012 for PCB analysis was broken and was recollected on 4/18/2012.
** - Lab filtered sample using a 2.0 micron filter and then filtered a second time using a 0.20 micron filter.

TABLE 2-12
Summary of Analytical Results for Groundwater Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample ID:	MW-7							MW-7D		MW-8A	MW-8B	MW-11			MW-12	MW-13	MW-14	MW-15	MW-16		MW-17	MW-18					MW-19	MW-20	
			Depth to Water (ft-toc):	9.03							9.20		4.31	6.12 (9/14/10)	1.56			6.95 (1/20/11)	1.02	0.82	6.19	1.00		7.02	1.60					6.55	13.60	
			Screened Interval:	7 to 17							21 to 31		3 to 13	3 to 13	2 to 12			5 to 15	1.5 to 11.5	1.5 to 11.5	6 to 15	1.5 to 11.5		6 to 16	1.5 to 11.5					3 to 13	12 to 22	
			Groundwater Classification	GW-3							GW-3		GW-3	GW-3	GW-2/GW-3			GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3		GW-2/GW-3	GW-2/GW-3					GW-3	GW-2/GW-3	
			Filter Size (micron)^:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample Date:	9/16/2008	1/7/2010	2/17/2010	2/17/2010	4/7/2010	9/9/2010	10/22/2010	9/9/2010	9/9/2010	2/18/2010	9/16/2008	2/19/2010	4/7/2010	9/13/2010	2/18/2010	2/19/2010	2/19/2010	2/18/2010	2/19/2010	4/28/2011	2/18/2010	2/18/2010	4/9/2010	9/13/2010	4/28/2011	4/10/2012	2/18/2010	4/8/2010	9/10/2010
		GW-2	GW-3				Field Dup					Field Dup																				
VOCs																																
(ug/L)	Acetone	50,000	50,000	NA	50 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
	tert-Amyl Methyl Ether (TAME)	NS	NS	NA	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Benzene	1,000	10,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	1.0 U	1.0 U	1.0 U
	Bromobenzene	NS	NS	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Bromochloromethane	NS	NS	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Bromodichloromethane	6	50,000	NA	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Bromoform	700	50,000	NA	10 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Bromomethane	7	800	NA	2.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	5.0 U	NA	5.0 U	5.0 U	2.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	5.0 U	5.0 U	2.0 U
	2-Butanone (MEK)	50,000	50,000	NA	20 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
	n-Butylbenzene	4,000[1]	50,000[1]	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	sec-Butylbenzene	4,000[1]	50,000[1]	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	tert-Butylbenzene	4,000[1]	50,000[1]	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	tert-Butyl Ethyl Ether (TBEE)	NS	NS	NA	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Carbon Disulfide	NS	NS	NA	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	**2.3**	2.0 U	2.0 U	2.0 U
	Carbon Tetrachloride	2	5,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Chlorobenzene	200	1,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Chlorodibromomethane	20	50,000	NA	10 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Chloroethane	NS	NS	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Chloroform	50	20,000	NA	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Chloromethane	NS	NS	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	2-Chlorotoluene	NS	NS	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	4-Chlorotoluene	NS	NS	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,2-Dibromo-3-chloropropane (DBCP)	NS	NS	NA	10 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	5.0 U	NA	5.0 U	5.0 U	2.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	5.0 U	5.0 U	2.0 U
	1,2-Dibromoethane (EDB)	2	50,000	NA	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Dibromomethane	NS	NS	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,2-Dichlorobenzene	8,000	2,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,3-Dichlorobenzene	6,000	50,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,4-Dichlorobenzene	60	8,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Dichlorodifluoromethane (Freon 12)	NS	NS	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,1-Dichloroethane	2,000	20,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**3.9**	**2.9**	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,2-Dichloroethane	5	20,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,1-Dichloroethylene	80	30,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-Dichloroethylene	20	50,000	NA	**20**	**30**	**30**	**9.6**	**47**	**49**	**2.2**	**1.8**	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.5**	**1.8**
	trans-1,2-Dichloroethylene	80	50,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,2-Dichloropropane	3	50,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,3-Dichloropropane	NS	NS	NA	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	2,2-Dichloropropane	NS	NS	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,1-Dichloropropene	NS	NS	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	cis-1,3-Dichloropropene	10[2]	200[2]	NA	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
	trans-1,3-Dichloropropene	10[2]	200[2]	NA	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
	Diethyl Ether	NS	NS	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Diisopropyl Ether (DIPE)	NS	NS	NA	0.50 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,4-Dioxane	6,000	50,000	NA	50 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
	Ethylbenzene	20,000	5,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Hexachlorobutadiene	50	3,000	NA	1.0 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	NA	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
	2-Hexanone (MBK)	NS	NS	NA	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
	Isopropylbenzene (Cumene)	4,000[1]	50,000[1]	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	p-Isopropyltoluene (p-Cymene)	4,000[1]	50,000[1]	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Methyl tert-Butyl Ether (MTBE)	50,000	50,000	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Methylene Chloride	2,000	50,000	NA	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	5.0 U	NA	5.0 U	5.0 U	2.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	5.0 U	5.0 U	2.0 U
	4-Methyl-2-pentanone (MIBK)	50,000	50,000	NA	10 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
	Naphthalene	700	20,000	NA	2.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	5.0 U	5.0 U	5.0 U	NA	5.0 U	5.0 U	2.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	2.0 U	5.0 U	5.0 U	5.0 U
	n-Propylbenzene	4,000[1]	50,000[1]	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Styrene	100	6,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,1,1,2-Tetrachloroethane	10	50,000	NA	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,1,2,2-Tetrachloroethane	9	50,000	NA	0.50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Tetrachloroethylene	50	30,000	NA	**63**	**60**	**64**	**64**	**25**	**26**	**1.3**	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Tetrahydrofuran	NS	NS	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5.0 U	10 U	10 U	10 U	10 U	5.0 U	5.0 U	10 U	10 U	10 U
	Toluene	50,000	40,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,2,3-Trichlorobenzene	NS	NS	NA	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,2,4-Trichlorobenzene	200	50,000	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,1,1-Trichloroethane	4,000	20,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**3.9**	**2.7**	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	1,1,2-Trichloroethane	900	50,000	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Trichloroethylene	5	5,000	NA	**6.8**	**5.8**	**6.5**	**4.5**	**14**	1.0 U	**13**	**10**	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.5**	1.0 U
	Trichlorofluoromethane (Freon 11)	NS	NS	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,2,3-Trichloropropane	NS	NS	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,2,4-Trimethylbenzene	4,000[1]	50,000[1]	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	1,3,5-Trimethylbenzene	4,000[1]	50,000[1]	NA	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

TABLE 2-12
Summary of Analytical Results for Groundwater Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample ID:	MW-7							MW-7D		MW-8A	MW-8B	MW-11			MW-12	MW-13	MW-14	MW-15	MW-16		MW-17	MW-18					MW-19	MW-20	
			Depth to Water (ft-toc):	9.03							9.20		4.31	6.12 (9/14/10)	1.56			6.95 (1/20/11)	1.02	0.82	6.19	1.00		7.02	1.60					6.55	13.60	
			Screened Interval:	7 to 17							21 to 31		3 to 13	3 to 13	2 to 12			5 to 15	1.5 to 11.5	1.5 to 11.5	6 to 15	1.5 to 11.5		6 to 16	1.5 to 11.5					3 to 13	12 to 22	
			Groundwater Classification	GW-3							GW-3		GW-3	GW-3	GW-2/GW-3			GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3		GW-2/GW-3	GW-2/GW-3					GW-3	GW-2/GW-3	
			Filter Size (micron)^:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample Date:	9/16/2008	1/7/2010	2/17/2010	2/17/2010	4/7/2010	9/9/2010	10/22/2010	9/9/2010	9/9/2010	2/18/2010	9/16/2008	2/19/2010	4/7/2010	9/13/2010	2/18/2010	2/19/2010	2/19/2010	2/18/2010	2/19/2010	4/28/2011	2/18/2010	2/18/2010	4/9/2010	9/13/2010	4/28/2011	4/10/2012	2/18/2010	4/8/2010	9/10/2010
		GW-2	GW-3				Field Dup					Field Dup																				
PAHs																																
(ug/L)	Acenaphthene	NS	10,000	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	10,000	40	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	NS	30	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	NS	1,000	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	NS	500	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	NS	400	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	NS	20	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	NS	100	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	NS	70	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	NS	40	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	NS	200	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	NS	40	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	NS	100	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	2,000	20,000	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	700	20,000	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	NS	10,000	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	NS	20	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs																																
(ug/L)	Aroclor 1016	5	10	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA
	Aroclor 1221	5	10	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA
	Aroclor 1232	5	10	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA
	Aroclor 1242	5	10	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA
	Aroclor 1248	5	10	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA
	Aroclor 1254	5	10	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA
	Aroclor 1260	5	10	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA
	Aroclor 1262	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Aroclor 1268	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	5	10	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	NA	NA
Total Petroleum Hydrocarbons																																
(ug/L)	Total Petroleum Hydrocarbons (C9-C44)	5,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals, total																																
(ug/L)	Antimony	NS	8,000	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	NS	900	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	NS	50,000	**254**	NA	NA	NA	NA	NA	NA	NA	NA	NA	250 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Beryllium	NS	200	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	NS	4	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium	NS	300	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	NS	10	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mercury	NS	20	0.10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	NS	200	**29.4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	NS	100	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	NS	7	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Thallium	NS	3,000	1.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.29**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	NS	4,000	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	NS	900	**894**	NA	NA	NA	NA	NA	NA	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals, dissolved																																
(ug/L)	Antimony	NS	8,000	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	NS	900	**2.41**	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	NS	50,000	250 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	250 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Beryllium	NS	200	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	NS	4	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium	NS	300	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	NS	10	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mercury	NS	20	0.10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	NS	200	**27.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	NS	100	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	NS	7	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Thallium	NS	3,000	1.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	NS	4,000	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	NS	900	**870**	NA	NA	NA	NA	NA	NA	NA	NA	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
General Chemistry																																
(ug/L)	Nitrogen, Nitrate	NS	NS	NA	NA	NA	NA	NA	100 U	NA	100 U	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Sulfate	NS	NS	NA	NA	NA	NA	NA	**25,000**	NA	**20,000**	**20,000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total Organic Carbon	NS	NS	NA	NA	NA	NA	NA	**7,400**	NA	**6,100**	**6,100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
ug/L - micrograms per liter.
B - Compound detected in associated method blank
J - Estimated value.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No MassDEP standards exist for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Method 1 standards.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
(1) - MassDEP Method 1 standards for C9-C10 aromatic hydrocarbons used.
(2) - MassDEP Method 1 standards for 1,3-Dichloropropene used.
^ - 0.45 micron filtration done in field; 0.20 and 2.0 micron filtration performed in lab.
* - Sample collected on 4/10/2012 for PCB analysis was broken and was recollected on 4/18/2012.
** - Lab filtered sample using a 2.0 micron filter and then filtered a second time using a 0.20 micron filter.

TABLE 2-12
Summary of Analytical Results for Groundwater Samples
New Bedford High School
New Bedford, Massachusetts

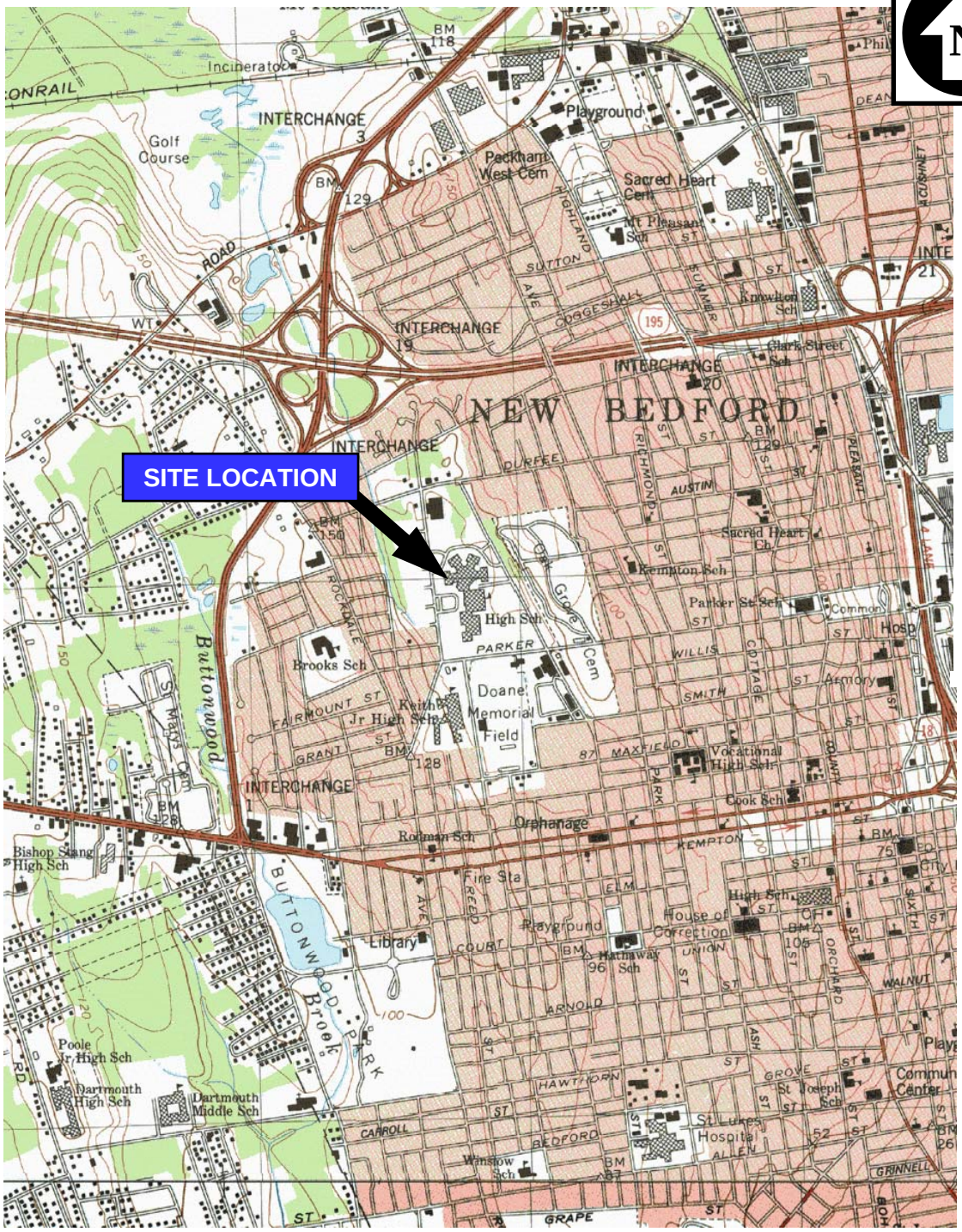
Analysis	Analyte		Sample ID:	**MW-21**		**MW-22**			**MW-23**		**MW-24**				**MW-25**	**MW-26**	**MW-29**		**MW-30**	**MW-HH-13**			**MW-HRC-33**		
			Depth to Water (ft-toc):	9.95		8.24			7.35		8.02				7.11	6.05	3.45		7.95	4.61 (1/20/11)			3.85 (6/24/11)		
			Screened Interval:	10 to 20		4 to 14			2 to 12		4 to 14				4 to 16	3.5 to 13.5	2 to 12		5 to 15	4 to 14			4 to 14		
			Groundwater Classification	GW-3		GW-3			GW-3		GW-3				GW-3	GW-3	GW-2/GW-3		GW-2/GW-3	GW-3			GW-3		
			Filter Size (micron)^:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample Date:	4/8/2010	9/13/2010	4/8/2010	4/8/2010	9/13/2010	4/8/2010	9/13/2010	4/8/2010	9/10/2010	10/21/2010	10/21/2010	9/8/2010	9/8/2010	9/10/2010	4/10/2012	10/22/2010	4/23/2009	4/23/2009	2/18/2010	4/23/2009	4/23/2009	2/17/2010
		GW-2	GW-3				Field Dup							Field Dup							Field Dup			Field Dup	
VOCs																									
(ug/L)	Acetone	50,000	50,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	NA	5.0 U	NA	NA	5.0 U
	tert-Amyl Methyl Ether (TAME)	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Benzene	1,000	10,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Bromobenzene	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Bromochloromethane	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Bromodichloromethane	6	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Bromoform	700	50,000	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Bromomethane	7	800	5.0 U	2.0 U	5.0 U	5.0 U	2.0 U	5.0 U	2.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	5.0 U	NA	NA	5.0 U
	2-Butanone (MEK)	50,000	50,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	NA	5.0 U	NA	NA	5.0 U
	n-Butylbenzene	4,000(1)	50,000(1)	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	sec-Butylbenzene	4,000(1)	50,000(1)	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	tert-Butylbenzene	4,000(1)	50,000(1)	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	tert-Butyl Ethyl Ether (TBEE)	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Carbon Disulfide	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Carbon Tetrachloride	2	5,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Chlorobenzene	200	1,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Chlorodibromomethane	20	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Chloroethane	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Chloroform	50	20,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Chloromethane	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	2-Chlorotoluene	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	4-Chlorotoluene	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,2-Dibromo-3-chloropropane (DBCP)	NS	NS	5.0 U	2.0 U	5.0 U	5.0 U	2.0 U	5.0 U	2.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	5.0 U	NA	NA	5.0 U
	1,2-Dibromoethane (EDB)	2	50,000	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Dibromomethane	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,2-Dichlorobenzene	8,000	2,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,3-Dichlorobenzene	6,000	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,4-Dichlorobenzene	60	8,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Dichlorodifluoromethane (Freon 12)	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,1-Dichloroethane	2,000	20,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,2-Dichloroethane	5	20,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,1-Dichloroethylene	80	30,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	cis-1,2-Dichloroethylene	20	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.8**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	trans-1,2-Dichloroethylene	80	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,2-Dichloropropane	3	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,3-Dichloropropane	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	2,2-Dichloropropane	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,1-Dichloropropene	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	cis-1,3-Dichloropropene	10(2)	200(2)	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	NA	NA	0.50 U	NA	NA	0.50 U
	trans-1,3-Dichloropropene	10(2)	200(2)	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	NA	NA	0.50 U	NA	NA	0.50 U
	Diethyl Ether	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Diisopropyl Ether (DIPE)	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,4-Dioxane	6,000	50,000	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	NA	NA	250 U	NA	NA	250 U
	Ethylbenzene	20,000	5,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Hexachlorobutadiene	50	3,000	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	NA	NA	0.60 U	NA	NA	0.60 U
	2-Hexanone (MBK)	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	NA	5.0 U	NA	NA	5.0 U
	Isopropylbenzene (Cumene)	4,000(1)	50,000(1)	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	p-Isopropyltoluene (p-Cymene)	4,000(1)	50,000(1)	2.0 U	2.0 U	**6.2**	**6.2**	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Methyl tert-Butyl Ether (MTBE)	50,000	50,000	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Methylene Chloride	2,000	50,000	5.0 U	2.0 U	5.0 U	5.0 U	2.0 U	5.0 U	2.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	5.0 U	NA	NA	5.0 U
	4-Methyl-2-pentanone (MIBK)	50,000	50,000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	NA	5.0 U	NA	NA	5.0 U
	Naphthalene	700	20,000	5.0 U	2.0 U	5.0 U	5.0 U	2.0 U	5.0 U	2.0 U	5.0 U	5.0 U	2.0 U	2.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	NA	NA	5.0 U	NA	NA	5.0 U
	n-Propylbenzene	4,000(1)	50,000(1)	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Styrene	100	6,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,1,1,2-Tetrachloroethane	10	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,1,2,2-Tetrachloroethane	9	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Tetrachloroethylene	50	30,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Tetrahydrofuran	NS	NS	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5.0 U	10 U	NA	NA	10 U	NA	NA	10 U
	Toluene	50,000	40,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,2,3-Trichlorobenzene	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,2,4-Trichlorobenzene	200	50,000	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,1,1-Trichloroethane	4,000	20,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	1,1,2-Trichloroethane	900	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Trichloroethylene	5	5,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.2**	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	Trichlorofluoromethane (Freon 11)	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,2,3-Trichloropropane	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,2,4-Trimethylbenzene	4,000(1)	50,000(1)	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	1,3,5-Trimethylbenzene	4,000(1)	50,000(1)	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	Vinyl Chloride	2	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**4.8**	**1.5**	**1.2**	**1.2**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
	m+p Xylene	3,000	50,000	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	2.0 U	NA	NA	2.0 U
	o-Xylene	3,000	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U

TABLE 2-12
Summary of Analytical Results for Groundwater Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample ID:	**MW-21**		**MW-22**			**MW-23**		**MW-24**				**MW-25**	**MW-26**	**MW-29**		**MW-30**	**MW-HH-13**			**MW-HRC-33**		
			Depth to Water (ft-toc):	9.95		8.24			7.35		8.02				7.11	6.05	3.45		7.95	4.61 (1/20/11)			3.85 (6/24/11)		
			Screened Interval:	10 to 20		4 to 14			2 to 12		4 to 14				4 to 16	3.5 to 13.5	2 to 12		5 to 15	4 to 14			4 to 14		
			Groundwater Classification	GW-3		GW-3			GW-3		GW-3				GW-3	GW-3	GW-2/GW-3		GW-2/GW-3	GW-3			GW-3		
			Filter Size (micron)^:	N/A		N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample Date:	4/8/2010	9/13/2010	4/8/2010	4/8/2010	9/13/2010	4/8/2010	9/13/2010	4/8/2010	9/10/2010	10/21/2010	10/21/2010	9/8/2010	9/8/2010	9/10/2010	4/10/2012	10/22/2010	4/23/2009	4/23/2009	2/18/2010	4/23/2009	4/23/2009	2/17/2010
		GW-2	GW-3				Field Dup							Field Dup							Field Dup			Field Dup	
PAHs																									
(ug/L)	Acenaphthene	NS	10,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.30 U	0.30 U	NA	0.30 U	NA	NA
	Acenaphthylene	10,000	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.30 U	0.30 U	NA	0.30 U	NA	NA
	Anthracene	NS	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	0.20 U	NA	0.20 U	NA	NA
	Benzo(a)anthracene	NS	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	NA	0.05 U	NA	NA
	Benzo(a)pyrene	NS	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.10 U	0.10 U	NA	0.10 U	NA	NA
	Benzo(b)fluoranthene	NS	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	NA	0.05 U	NA	NA
	Benzo(g,h,i)perylene	NS	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	0.50 U	NA	0.50 U	NA	NA
	Benzo(k)fluoranthene	NS	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	0.20 U	NA	0.20 U	NA	NA
	Chrysene	NS	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	0.20 U	NA	0.20 U	NA	NA
	Dibenz(a,h)anthracene	NS	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	0.20 U	NA	0.20 U	NA	NA
	Fluoranthene	NS	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.50 U	0.50 U	NA	0.50 U	NA	NA
	Fluorene	NS	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	1.0 U	NA	NA
	Indeno(1,2,3-cd)pyrene	NS	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.20 U	0.20 U	NA	0.20 U	NA	NA
	2-Methylnaphthalene	2,000	20,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	1.0 U	NA	NA
	Naphthalene	700	20,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	1.0 U	NA	NA
	Phenanthrene	NS	10,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	NA	0.05 U	NA	NA
	Pyrene	NS	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	NA	1.0 U	NA	NA
PCBs																									
(ug/L)	Aroclor 1016	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA
	Aroclor 1221	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA
	Aroclor 1232	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA
	Aroclor 1242	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA
	Aroclor 1248	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0329 J**	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA
	Aroclor 1254	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0371 J**	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA
	Aroclor 1260	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0500 U	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA
	Aroclor 1262	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Aroclor 1268	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs	5	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0700 J**	NA	0.050 U	NA	NA	0.050 U	0.050 U	NA
Total Petroleum Hydrocarbons																									
(ug/L)	Total Petroleum Hydrocarbons (C9-C44)	5,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals, total																									
(ug/L)	Antimony	NS	8,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	40.0 U	40.0 U	NA	40.0 U	NA	NA
	Arsenic	NS	900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	5.0 U	NA	5.0 U	NA	NA
	Barium	NS	50,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5,570**	**5,710**	NA	**157**	NA	NA
	Beryllium	NS	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0 U	2.0 U	NA	2.0 U	NA	NA
	Cadmium	NS	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5 U	2.5 U	NA	2.5 U	NA	NA
	Chromium	NS	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	5.0 U	NA	5.0 U	NA	NA
	Lead	NS	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5 U	7.5 U	NA	**10.5**	NA	NA
	Mercury	NS	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.10 U	0.10 U	NA	0.10 U	NA	NA
	Nickel	NS	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	5.0 U	NA	5.0 U	NA	NA
	Selenium	NS	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30.0 U	30.0 U	NA	30.0 U	NA	NA
	Silver	NS	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0 U	3.0 U	NA	3.0 U	NA	NA
	Thallium	NS	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30.0 U	30.0 U	NA	30.0 U	NA	NA
	Vanadium	NS	4,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	25.0 U	25.0 U	NA	25.0 U	NA	NA
	Zinc	NS	900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**17.0**	**20.0**	NA	**300**	NA	NA
Metals, dissolved																									
(ug/L)	Antimony	NS	8,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	40.0 U	40.0 U	NA	40.0 U	NA	NA
	Arsenic	NS	900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	5.0 U	NA	5.0 U	NA	NA
	Barium	NS	50,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5,340**	**5,490**	NA	**141**	NA	NA
	Beryllium	NS	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0 U	2.0 U	NA	2.0 U	NA	NA
	Cadmium	NS	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5 U	2.5 U	NA	2.5 U	NA	NA
	Chromium	NS	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	5.0 U	NA	5.0 U	NA	NA
	Lead	NS	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5 U	7.5 U	NA	7.5 U	NA	NA
	Mercury	NS	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.10 U	0.10 U	NA	0.10 U	NA	NA
	Nickel	NS	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	5.0 U	NA	5.0 U	NA	NA
	Selenium	NS	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30.0 U	30.0 U	NA	30.0 U	NA	NA
	Silver	NS	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0 U	3.0 U	NA	3.0 U	NA	NA
	Thallium	NS	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30.0 U	30.0 U	NA	30.0 U	NA	NA
	Vanadium	NS	4,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	25.0 U	25.0 U	NA	25.0 U	NA	NA
	Zinc	NS	900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**14.0**	**15.0**	NA	**270**	NA	NA
General Chemistry																									
(ug/L)	Nitrogen, Nitrate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**110**	**110**	NA	NA	NA	NA	NA	NA	NA
	Sulfate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10,000 U	10,000 U	NA	NA	NA	NA	NA	NA	NA
	Total Organic Carbon	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4,700**	**4,700**	NA	NA	NA	NA	NA	NA	NA

Notes:
ug/L - micrograms per liter.
B - Compound detected in associated method blank
J - Estimated value.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No MassDEP standards exist for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
Values shown in Bold and shaded type exceed one or more of the listed MassDEP Method 1 standards.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
(1) - MassDEP Method 1 standards for C9-C10 aromatic hydrocarbons used.
(2) - MassDEP Method 1 standards for 1,3-Dichloropropene used.
^ - 0.45 micron filtration done in field; 0.20 and 2.0 micron filtration performed in lab.
* - Sample collected on 4/10/2012 for PCB analysis was broken and was recollected on 4/18/2012.
** - Lab filtered sample using a 2.0 micron filter and then filtered a second time using a 0.20 micron filter.

FIGURES



BASE MAP IS A PORTION OF THE FOLLOWING 7.5' X 15' USGS TOPOGRAPHIC QUADRANGLES: NEW BEDFORD NORTH, MA, 1979; NEW BEDFORD SOUTH, MA 1977

0 1000 2000 3000

scale in feet

QUADRANGLE LOCATION

NEW BEDFORD HIGH SCHOOL
NEW BEDFORD, MASSACHUSETTS

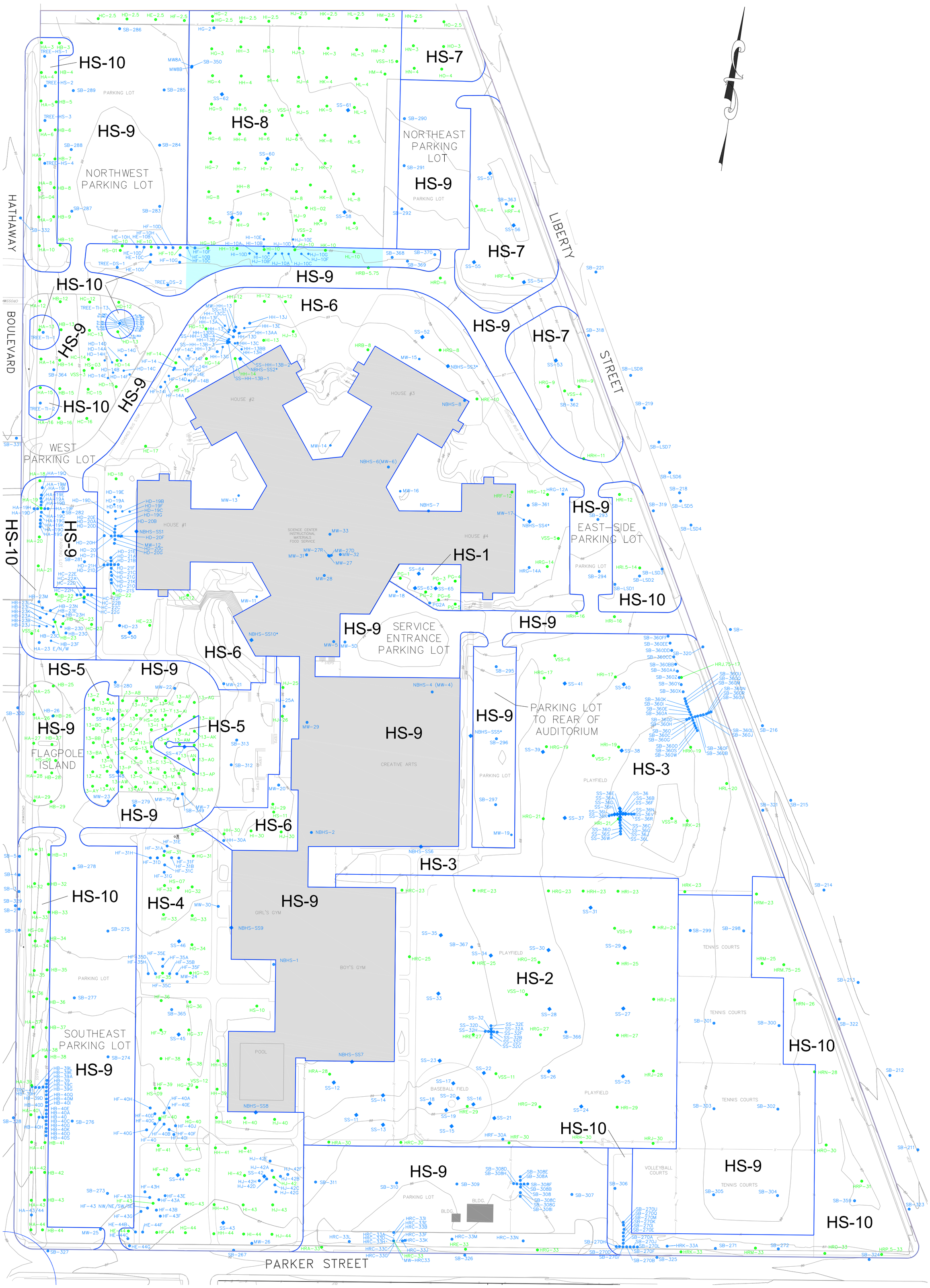
SITE LOCATION MAP

TRC
Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
978-970-5600

FIGURE 1

Drawn: HWB	SCALE: AS SHOWN
Checked: DS	Date: OCT 2008

T:\E_CAD\115058\TOPO NBHS.ppt



NOTES:

1. MAP PREPARED BASED ON DRAWINGS AND SURVEY DATA PROVIDED BY LAND PLANNING, INC. OF HANSON, MASSACHUSETTS.

2. ALL TRC SAMPLING LOCATIONS SURVEYED BY LAND PLANNING, INC. OF HANSON, MASSACHUSETTS.

3. BETA SAMPLE LOCATIONS ARE APPROXIMATE AND BASED ON THE FIGURE PROVIDED IN THE JUNE 9, 2006 "SUMMARY OF ANALYTICAL DATA, NEW BEDFORD HIGH SCHOOL, NEW BEDFORD, MASSACHUSETTS" BY BETA GROUP, INC. OF NORWOOD, MASSACHUSETTS.

LEGEND:

- TRC SAMPLE LOCATIONS
- VHB/BETA SAMPLE LOCATIONS
- HS-9 — EXPOSURE POINT AREA/DESIGNATION
- SOIL SAMPLES CORRESPONDING WITH SOIL BORINGS LOCATED WITHIN SHADED PORTION OF HS-10 EXPOSURE POINT AREA WERE EXCAVATED AND GRADED INTO THE HS-8 EXPOSURE POINT AREA.

NEW BEDFORD HIGH SCHOOL
PERMANENT SOLUTION WITH CONDITIONS STATEMENT
NEW BEDFORD, MASSACHUSETTS

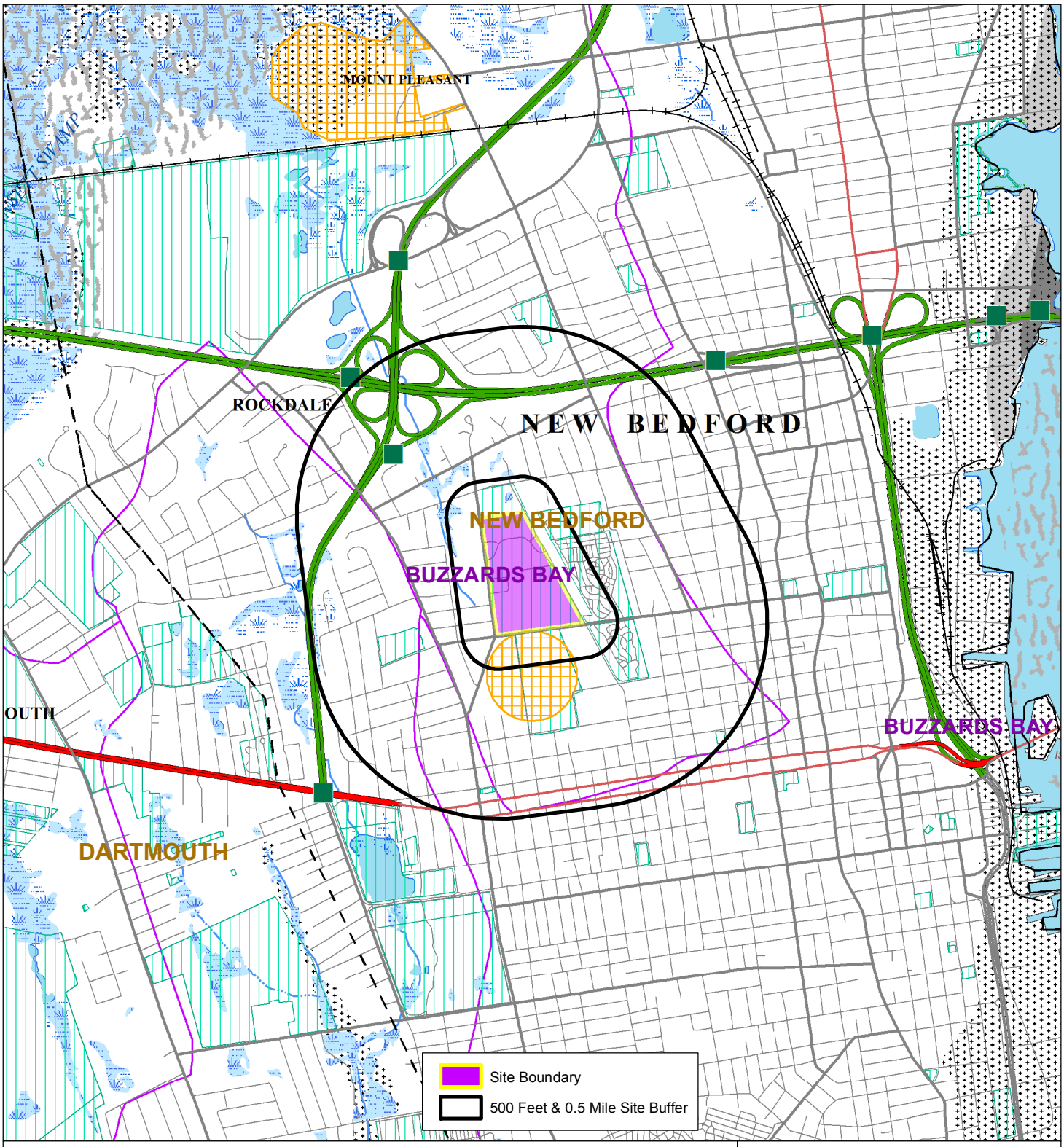
NEW BEDFORD HIGH SCHOOL
EXPOSURE POINT AREAS AND SAMPLE LOCATION MAP

TRC
Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
(978) 970-5600

FIGURE 2

DRAWN BY: HWB
CHECKED BY: DNP
DATE: SEPT 29 2014

FILE: T:\E_CAD\115058\NBHS PERM SOLUTION 9-29-14.dwg



Roads: Limited Access, Multi-Lane, Major/Minor, Track, Trail
Railroad, Pipline, Powerline
Major Basin, Sub Basin, Perennial Stream, Intermittent Stream, Shoreline, Man made Shore, Dam, Aqueduct
Wetland, Salt Wetland, Submerged Wetland, Open Water, Reservoir, Tidal Flat/Shoal
Potentially Productive Aquifers: Medium, High Yield
Non-Potential Drinking Water Source Area: Medium, High Yield
EPA Sole Source Aquifer, FEMA 100 Yr. Floodplain, DEP Solid Waste Facility
Approved Zone II, IWPA, Surface Water Supply Zone A
Protected Open Space, ACEC
Priority Habitat, Certified Vernal Pool
Boundaries: County and Town
Public Water Supplies: Ground, Surface, Non-Community (NTNC, TNC)

Source: MassGIS/EOEA

TRC
Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
978-970-5600

FIGURE 3

MASSDEP PRIORITY RESOURCES MAP
NEW BEDFORD HIGH SCHOOL
NEW BEDFORD, MA

0 1,000 2,000
Feet

SEPT 2014

APPENDIX A

LIMITATIONS

LIMITATIONS

1. TRC Environmental Corporation's (TRC's) study was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and TRC observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. TRC's findings and conclusions must be considered not as scientific certainties, but rather as our professional opinion concerning the significance of the limited data gathered during the course of the study. No other warranty, express or implied is made. Specifically, TRC does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by TRC during its study. Additionally, TRC makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a Massachusetts Department of Environmental Protection (MassDEP) audit.

2. This study and report have been prepared on behalf of and for the exclusive use of the MassDEP and the City of New Bedford, solely for use in an environmental response actions at the New Bedford High School (NBHS) Campus in New Bedford, Massachusetts ("Site") under the Massachusetts Contingency Plan (MCP - 310 CMR 40.0000). This report and the findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party, nor used by any other party in whole or in part, without the prior written consent of TRC.

3. The observations described in this report were made under the conditions stated therein. The conclusions presented in the report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services or the time and budgetary constraints imposed by Client. The work described in this report was carried out in accordance with the Terms and Conditions referenced in our proposal.

4. In preparing this report, TRC has relied on certain information provided by state and local officials and other parties referenced therein, and on information contained in the files of state and/or local agencies available to TRC at the time of the study. Although there may have been some degree of overlap in the information provided by these various sources, TRC did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

5. In the event that the Client or others authorized to use this report obtain information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to TRC's attention forthwith. TRC will evaluate such information and, on the basis of that evaluation, may modify the conclusions stated in this report.

6. The purpose of this report was to assess the Site with respect to the requirements of the MCP. No specific attempt was made to check on the compliance of present or past owners or operators of the Site with federal, state, or local laws and regulations, environmental or otherwise.

7. The conclusions and recommendations contained in this report are based in part upon the data obtained from a limited number of soil samples obtained from widely spread subsurface explorations. The nature and extent of variations between these explorations may not become evident until further exploration. If variations or other latent conditions then appear evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

8. Where quantitative laboratory analyses have been conducted by an outside laboratory, TRC has relied upon the data provided, and has not conducted an independent evaluation of the reliability of these data.

9. The conclusions and recommendations contained in this report are based in part upon various types of chemical data and are contingent upon their validity. These data have been reviewed and interpretations made in the report. As may be indicated within the report, some of these data may be preliminary "screening" level data, and should be confirmed with quantitative analyses if more specific information is necessary. Moreover, it should be noted that variations in the types and concentrations of chemicals and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional chemical data become available in the future, these data should be reviewed by TRC and the conclusions and recommendations presented herein modified accordingly.

10. Chemical analyses have been performed for specific parameters during the course of this Site assessment, as described in the text. However, it should be noted that additional chemicals not searched for during the current study may be present at the Site.

11. TRC's risk evaluation was performed in accordance with generally accepted practices of the MassDEP and other consultants undertaking similar studies. The findings of the risk evaluation are dependent on numerous assumptions and uncertainties inherent in the risk assessment process. Sources of uncertainty may include the description of Site conditions and the nature and extent of chemical distribution and the use of toxicity information. Consequently, the findings of the risk assessment are not an absolute characterization of actual risks, but rather serve to highlight potential sources of risk at the Site. Although the range of uncertainties has not been quantified, the use of conservative assumptions and parameters throughout the assessment would be expected to err on the side of protection of human health and the environment.

APPENDIX B

COPY OF THE NOTICE OF ACTIVITY AND USE LIMITATION

NOTICE OF ACTIVITY AND USE LIMITATION
New Bedford High School Campus

New Bedford, Massachusetts
Release Tracking Number (RTN) 4-15685

Prepared for:

City of New Bedford
133 William Street
New Bedford, Massachusetts 02740

Prepared by:

TRC Environmental Corporation
Wannalancit Mills
650 Suffolk Street
Lowell, Massachusetts 01854
(978) 970-5600

January 2016

TABLE OF CONTENTS

Form 1075

Exhibit A – Legal Description of Property Containing Area Subject to AUL

Exhibit A-1 - Legal Descriptions of AUL Portions of the Property

Exhibit B – Sketch Plan Showing AUL Areas

Exhibit C – Activity and Use Limitation Opinion

Exhibit D – Documentation of signatory authority

Notification to Property Owner(s) 310 CMR 40.1074(1)(e)

AUL Notification 30-Day Waiver

FORM 1075

Form 1075

Note: Pursuant to 310 CMR 40.1074(5), upon transfer of any interest in or a right to use the property or a portion thereof that is subject to this Notice of Activity and Use Limitation, the Notice of Activity and Use Limitation shall be incorporated either in full or by reference into all future deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer. Within 30 days of so incorporating the Notice of Activity and Use Limitation in a deed that is recorded or registered, a copy of such deed shall be submitted to the Department of Environmental Protection.

NOTICE OF ACTIVITY AND USE LIMITATION
M.G.L. c. 21E, § 6 and 310 CMR 40.0000

Disposal Site Name: Parker Street Waste Site
DEP Release Tracking No.(s): 4-15685, 4-21847, 4-21872, 4-22409, 4-23526

This Notice of Activity and Use Limitation ("Notice") is made as of this _____ day of _____, 2016, by the City of New Bedford School Department and the City of New Bedford, 133 Williams Street, New Bedford, Bristol County, Massachusetts, together with his/her/its/their successors and assigns (collectively "Owner").

W I T N E S S E T H:

WHEREAS, the City of New Bedford School Department and the City of New Bedford, are the owner(s) in fee simple of those certain parcel(s) of land located in New Bedford, Bristol County, Massachusetts with the buildings and improvements thereon, pursuant to deeds recorded with the Bristol Registry of Deeds in Book 1566, Page 1138, and Book 182, Page 47;

WHEREAS, said parcel(s) of land, which is more particularly bounded and described in Exhibit A, attached hereto and made a part hereof ("Property") is subject to this Notice of Activity and Use Limitation. The Property is shown on a plan recorded in the Bristol County Registry of Deeds in Plan Book _____, Plan _____;

WHEREAS, the Property comprises all of a disposal site as the result of a release(s) of oil and/or hazardous material. Exhibit B is a sketch plan showing the relationship of the Property subject to this Notice of Activity and Use Limitation to the boundaries of said disposal site existing within the limits of the Property and to the extent such boundaries have been established. Exhibit B is attached hereto and made a part hereof; and

WHEREAS, one or more response actions have been selected for the Parker Street Waste Site in accordance with M.G.L. c. 21E ("Chapter 21E") and the Massachusetts Contingency Plan, 310 CMR 40.0000 ("MCP"). Said response actions are based upon (a) the restriction of human access to and contact with oil and/or hazardous material in soil and/or (b) the restriction of certain activities occurring in, on, through, over or under the Property. A description of the basis for such restrictions, and the oil and/or hazardous material release event(s) or site history that resulted in the contaminated media subject to the Notice of Activity and Use Limitation is attached hereto as Exhibit C and made a part hereof;

NOW, THEREFORE, notice is hereby given that the activity and use limitations set forth in this Notice of Activity and Use Limitation are as follows:

1. Activities and Uses Consistent with Maintaining No Significant Risk Conditions. The following Activities and Uses are consistent with maintaining a Permanent Solution and a condition of No Significant Risk and, as such, may occur on the Property pursuant to 310 CMR 40.0000:

(i) (Fenced solar park) Use of the area as a solar park;

(ii) (NBHS campus, except fenced solar park) Any recreational, public, educational, institutional, commercial, industrial, or construction activities and uses that do not cause and/or result in the direct contact with, disturbance of, and/or relocation of the soil/fill located deeper than three feet below grade in landscaped areas or soil/fill at any depth below asphalt pavement, concrete pavement, sidewalks, court surfaces or building floors;

(iii) Emergency repairs of existing utilities not to exceed a two day duration;

(iv) Such other activities and uses not identified below as being Activities and Uses Inconsistent with the AUL; and

(v) Such other activities or uses which, in the Opinion of a Licensed Site Professional (LSP), licensed by the Commonwealth of Massachusetts Board of Registration of Hazardous Waste Site Cleanup Professionals, shall present no greater risk of harm to health, safety, public welfare or the environment than the activities and uses set forth in this Section.

2. Activities and Uses Inconsistent with Maintaining No Significant Risk Conditions. The following Activities and Uses are inconsistent with maintaining a (select one) a Permanent Solution and a condition of No Significant Risk pursuant to 310 CMR 40.0000, and, as such, may not occur on the Property:

(i) (Fenced solar park) Uses other than the use as a solar park without a site-specific evaluation by an LSP:

(ii) (Fenced solar park) Excavation activities that exceed a two day duration that result in exposing soil/fill below the crushed stone located above the geotextile fabric without a site-specific evaluation by an LSP;

(iii) (Fenced solar park) Relocation of soil/fill from any depth below the geotextile fabric to another location within the Site without LSP review and approval;

(iv) (Fenced solar park) Gardening of agricultural crops for human consumption using PS-P Site soil [does not include enclosed planters, raised beds, or tree vaults filled with pre-characterized soil and separated from underlying PS-P Site soil, which may be allowed subject to review and approval by an LSP];

(v) (Fenced solar park) Other private, public, commercial, industrial or construction activities or uses not permitted by Section 1 of this Notice that result in the direct contact with, or disturbance of, the soil/fill from depths below the crushed stone located above the geotextile fabric without supervision of an LSP and the Massachusetts Contingency Plan (310 CMR 40.0000) of MCP.

(vi) (NBHS campus, except fenced solar park) Single or multi-family residential use;

(vii) (NBHS campus, except fenced solar park) Activities that result in exposing soil/fill below concrete floors, asphalt pavement, concrete pavement, sidewalks, court surfaces or other paved surfaces without a site specific evaluation by an LSP;

(viii) (NBHS campus, except fenced solar park) Relocation of any soil/fill from depths greater than 3 feet from the Site to another location within the PS-P Site without LSP review and approval;

(ix) (NBHS campus, except fenced solar park) Gardening of agricultural crops for human consumption using Site soil [does not include enclosed planters, raised beds, or tree vaults filled with pre-characterized soil and separated from underlying PS-P Site soil, which may be allowed subject to review and approval by an LSP]; and

(x) (NBHS campus, except fenced solar park) Other private, public, commercial, industrial or construction activities or uses not permitted by Section 1 of this Notice that result in the direct contact with, or disturbance of, the soil/fill from depths greater than three feet from the PS-P Site without supervision of an LSP and the Massachusetts Contingency Plan (310 CMR 40.0000) of MCP.

3. Obligations and Conditions. The following obligations and/or conditions are necessary and shall be undertaken and/or maintained at the Property to maintain a Permanent Solution and a condition of No Significant Risk:

(i) (Fenced solar park) Maintain the physical integrity of the crushed stone located above the geotextile fabric;

(ii) (Fenced solar park) Maintain the physical integrity of the fence surrounding the solar park;

(iii) (Fenced solar park) A Health and Safety Plan (HASP) must be prepared by a Certified Industrial Hygienist (CIH) or other qualified individual sufficiently trained in worker health and safety requirements and implemented prior to the commencement of any activity that is likely to disturb soil/fill immediately below the crushed stone located above the geotextile fabric, except for emergency utility work that is less than a two day duration. Activities conducted immediately below the crushed stone located above the geotextile fabric should be planned with an LSP. The HASP should specify the chemicals at the PS-P Site, the types of media present, the extent of impacts, the potential routes of exposure, the appropriate level of personal protective equipment, the type of monitoring required, worker safety monitoring, and hazard communication. Workers must be informed of the requirements of the HASP, and the plan must be available on-Site throughout the course of the project;

(iv) (Fenced solar park) Excavation/disturbance of soil/fill below the crushed stone located above the geotextile fabric that exceed a two day duration requires site-specific evaluation by an LSP, who will evaluate if such activity can proceed and maintain a condition of No Significant Risk.

(v) (NBHS campus, except fenced solar park) Maintain the physical integrity of all asphalt pavement, concrete pavement, sidewalks, and court surfaces or other paved surfaces;

(vi) (NBHS campus, except fenced solar park) Maintain the physical integrity of all interior building floors;

(vii) (NBHS campus, except fenced solar park) A Health and Safety Plan (HASP) must be prepared by a Certified Industrial Hygienist (CIH) or other qualified individual sufficiently trained in worker health and safety requirements and implemented prior to the commencement of any activity that is likely to disturb soil/fill greater than 3 feet in landscaped areas or immediately below pavement within the AUL area except for emergency utility work that is less than a two day duration. Activities conducted greater than 3 feet in depth or immediately below pavement should be planned with an LSP. The HASP should specify the chemicals at the PS-P Site, the types of media present, the extent of impacts, the potential routes of exposure, the appropriate level of personal protective equipment, the type of monitoring required, worker safety monitoring, and hazard communication. Workers must be informed of the requirements of the HASP, and the plan must be available on-site throughout the course of the project;

(viii) (NBHS campus, except fenced portion of solar park) Excavation/disturbance of soil/fill below three feet and/or below concrete floors, asphalt pavement, concrete pavement, sidewalks, court surfaces or other paved surfaces and buildings requires site-specific evaluation by an LSP, who will evaluate if such activity can proceed and maintain a condition of No Significant Risk.

(ix) No fill/soil is to be relocated from the PS-P Site to an off-site (property) location without LSP review and approval.

4. Proposed Changes in Activities and Uses. Any proposed changes in activities and uses at the Property which may result in higher levels of exposure to oil and/or hazardous material than currently exist shall be evaluated by a Licensed Site Professional who shall render an Opinion, in accordance with 310 CMR 40.1080, as to whether the proposed changes are inconsistent with maintaining a Permanent Solution and a condition of No Significant Risk. Any and all requirements set forth in the Opinion to meet the objective of this Notice shall be satisfied before any such activity or use is commenced.

5. Violation of a Permanent or Temporary Solution. The activities, uses and/or exposures upon which this Notice is based shall not change at any time to cause a significant risk of harm to health, safety, public welfare, or the environment or to create substantial hazards due to exposure to oil and/or hazardous material without the prior evaluation by a Licensed Site Professional in accordance with 310 CMR 40.1080, and without additional response actions, if necessary, to maintain a condition of No Significant Risk.

   If the activities, uses, and/or exposures upon which this Notice is based change without the prior evaluation and additional response actions determined to be necessary by a Licensed Site Professional in accordance with 310 CMR 40.1080, the owner or operator of the Property subject to this Notice at the time that the activities, uses and/or exposures change, shall comply with the requirements set forth in 310 CMR 40.0020.

6. Incorporation Into Deeds, Mortgages, Leases, and Instruments of Transfer. This Notice shall be incorporated either in full or by reference into all future deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer, whereby an interest in and/or a right to use the Property or a portion thereof is conveyed in accordance with 310 CMR 40.1074(5).

   Owner hereby authorizes and consents to the filing and recordation and/or registration of this Notice, said Notice to become effective when executed under seal by the undersigned Licensed Site Professional, and recorded and/or registered with the appropriate Registry(ies) of Deeds and/or Land Registration Office(s).

   In all other respects the terms of the Notice of Activity and Use Limitation remain unchanged.]

WITNESS the execution hereof under seal this _____ day of _____, 20____.

_____

Pia Durkin, Superintendent of Schools

_____

Mayor Jonathan F. Mitchell

Form 1075: continued

COMMONWEALTH OF MASSACHUSETTS

Bristol, ss _____, 2016

On this ____ day of _____, 2016, before me, the undersigned notary public, personally appeared Pia Durkin, proved to me through satisfactory evidence of identification, which were _____, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that (he) (she) signed it voluntarily for its stated purpose.

as Superintendent of Schools for the City of New Bedford

_____ (official signature and seal of notary)

COMMONWEALTH OF MASSACHUSETTS

Bristol, ss _____, 2016

On this ____ day of _____, 2016, before me, the undersigned notary public, personally appeared Jonathan F. Mitchell, proved to me through satisfactory evidence of identification, which were _____, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that (he) (she) signed it voluntarily for its stated purpose.

as Mayor of the City of New Bedford

_____ (official signature and seal of notary)

The undersigned Licensed Site Professional hereby certifies that in his Opinion this Notice of Activity and Use Limitation is consistent with a Permanent Solution and maintaining a condition of No Significant Risk.

Date: _____

_____
David M. Sullivan
[LSP SEAL]

COMMONWEALTH OF MASSACHUSETTS

Middlesex, ss _____, 2016

On this ____ day of _____, 2016, before me, the undersigned notary public, personally appeared David M. Sullivan, proved to me through satisfactory evidence of identification, which were _____, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that (he) (she) signed it voluntarily for its stated purpose.

_____ (official signature and seal of notary)

Upon recording, return to:

City of New Bedford
133 William Street
New Bedford, MA 02740

EXHIBIT A

Legal Description of Property

LEGAL DESCRIPTION

New Bedford High School Property

NEW BEDFORD, MASSACHUSETTS

Beginning at a corner in the northerly property line between the land of the City of New Bedford, New Bedford High School Campus, and the Commonwealth of Massachusetts;

THENCE: N 82° 34' 00" E a distance of 382.7'+/- to a point in the southerly side line of Liberty Street;

THENCE: S 28° 16' 30" E a distance of 1,810.4'+/- along the southerly side line of Liberty Street to a point at the corner of Parker Street;

THENCE: S 82° 26' 50" W a distance of 1,205.9'+/- along the northerly side line of Parker Street to a point;

THENCE: Northwesterly on a curve to the right, with a radius of 25', a length of 39.3'+/- to a point in the easterly sideline of Hathaway Boulevard;

THENCE: N 07° 34' 04" W a distance of 1,670.3'+/- along the easterly side line of Hathaway Boulevard to a point;

THENCE: N 82° 25' 56" E a distance of 206.06'+/- to the point of beginning.

Said site boundary area contains 35.39 +/- acres is shown on a plan entitled: "Activity And Use Limitation Plan Of Land Located On Hathaway Boulevard, Parker Street & Liberty Street New Bedford, Massachusetts" dated: October 30, 2015; Prepared by Land Planning, Inc.; to be recorded at the Bristol County Registry of Deeds Southern District.

EXHIBIT A-1

Legal Descriptions of AUL Portions of the Property

LEGAL DESCRIPTION

New Bedford High School Campus AUL Area

NEW BEDFORD, MASSACHUSETTS

Beginning at a corner in the northerly property line between the land of the City of New Bedford, New Bedford High School Campus, and the Commonwealth of Massachusetts;

THENCE: S 07° 32' 12" E a distance of 306.0' to a point;

THENCE: N 82° 57' 26" E a distance of 290.6' to a point;

THENCE: N 06° 42' 02" W a distance of 308.0' to a point;

THENCE: N 82° 34' 00" E a distance of 87.6' to a point in the southerly side line of Liberty Street;

THENCE: S 28° 16' 30" E a distance of 1,810.4'+/- along the southerly side line of Liberty Street to a point at the corner of Parker Street;

THENCE: S 82° 26' 50" W a distance of 1,205.9'+/- along the northerly side line of Parker Street to a point;

THENCE: Northwesterly on a curve to the right, with a radius of 25', a length of 39.3'+/- to a point in the easterly sideline of Hathaway Boulevard;

THENCE: N 07° 34' 04" W a distance of 1,670.3'+/- along the easterly side line of Hathaway Boulevard to a point;

THENCE: N 82° 25' 56" E a distance of 206.06'+/- to the point of beginning.

Said AUL area contains 33.33 +/- acres is shown on a plan entitled: "Activity And Use Limitation Plan Of Land Located On Hathaway Boulevard, Parker Street & Liberty Street New Bedford, Massachusetts" dated: October 30, 2015; Prepared by Land Planning, Inc.; to be recorded at the Bristol County Registry of Deeds Southern District.

LEGAL DESCRIPTION

Fenced Solar Park AUL Area

NEW BEDFORD, MASSACHUSETTS

Beginning at a corner in the northerly property line between the land of the City of New Bedford, NBHS Campus and land of the Commonwealth of Massachusetts;

THENCE: S 07° 32’ 12” E a distance of 306.0’ to a point;

THENCE: N 82° 57’ 26” E a distance of 290.6’ to a point;

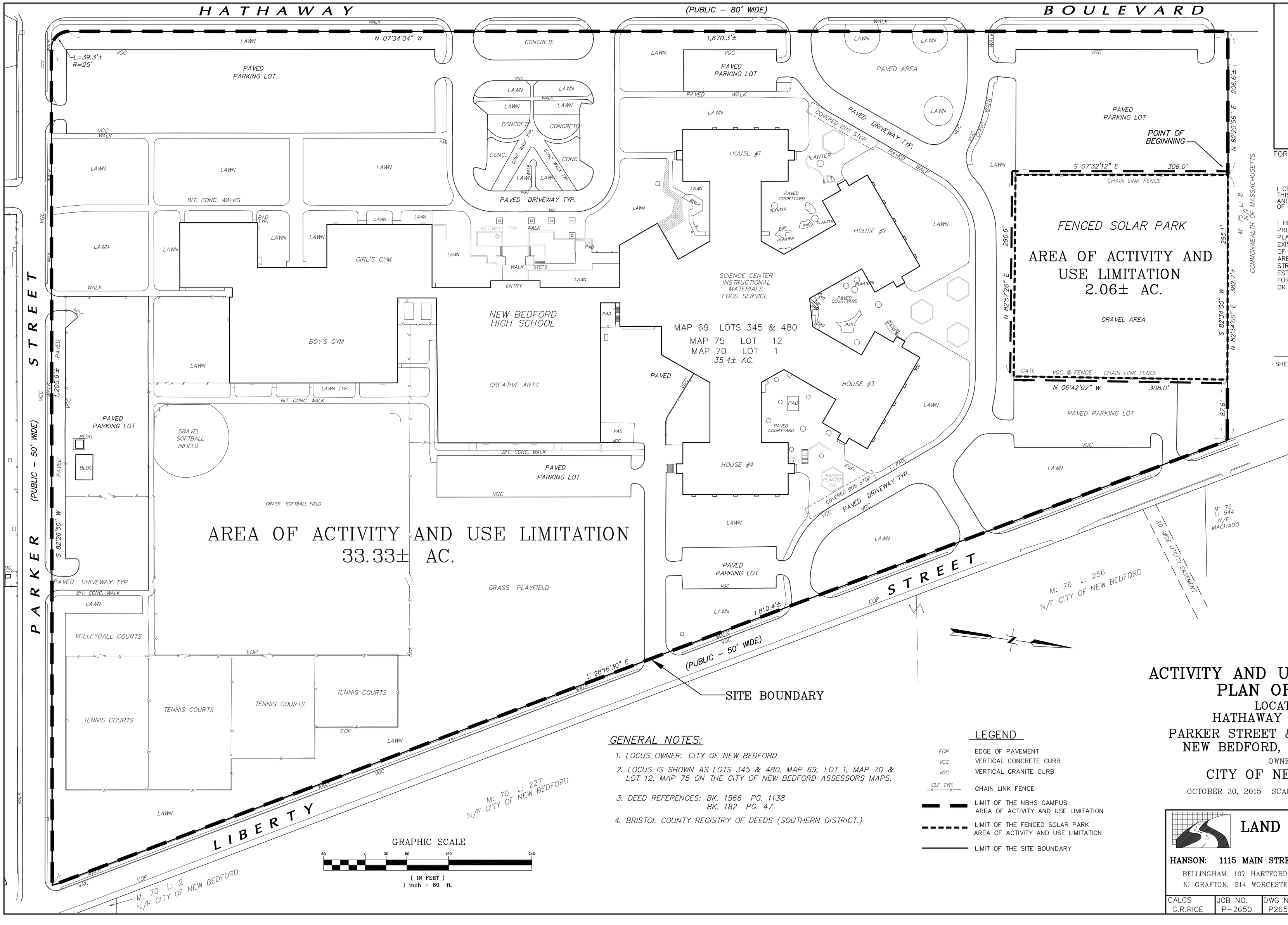
THENCE: N 06° 42’ 02” W a distance of 308.0’ to a point;

THENCE: S 82° 34’ 00” W a distance of 295.1’+/- to the point of beginning.

Said AUL area contains 2.06- +/- acres is shown on a plan entitled: “Activity And Use Limitation Plan Of Land Located On Hathaway Boulevard, Parker Street & Liberty Street New Bedford, Massachusetts” dated: October 30, 2015; Prepared by Land Planning, Inc.; to be recorded at the Bristol County Registry of Deeds Southern District.

EXHIBIT B

Sketch Plan Showing AUL Area



FOR REGISTRY OF DEEDS USE ONLY

I CERTIFY THAT THE PREPARATION OF THIS PLAN CONFORMS TO THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS.

I HEREBY CERTIFY THAT THE PROPERTY LINES SHOWN ON THIS PLAN ARE THE LINES DIVIDING EXISTING OWNERSHIPS, AND THE LINES OF THE STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW LINES FOR DIVISION OF EXISTING OWNERSHIP OR FOR NEW WAYS ARE SHOWN.

DATE:

SHELDON ROBERT PHINNEY P.L.S. #33608

GENERAL NOTES:

1. LOCUS OWNER: CITY OF NEW BEDFORD
2. LOCUS IS SHOWN AS LOTS 345 & 480, MAP 69; LOT 1, MAP 70 & LOT 12, MAP 75 ON THE CITY OF NEW BEDFORD ASSESSORS MAPS.
3. DEED REFERENCES: BK. 1566 PG. 1138
   BK. 182 PG. 47
4. BRISTOL COUNTY REGISTRY OF DEEDS (SOUTHERN DISTRICT.)

LEGEND

EOP	EDGE OF PAVEMENT
VCC	VERTICAL CONCRETE CURB
VGC	VERTICAL GRANITE CURB
—X—CLF TYP.—X—	CHAIN LINK FENCE
	LIMIT OF THE NBHS CAMPUS AREA OF ACTIVITY AND USE LIMITATION
	LIMIT OF THE FENCED SOLAR PARK AREA OF ACTIVITY AND USE LIMITATION
	LIMIT OF THE SITE BOUNDARY

ACTIVITY AND USE LIMITATION PLAN OF LAND

LOCATED ON
HATHAWAY BOULEVARD,
PARKER STREET & LIBERTY STREET
NEW BEDFORD, MASSACHUSETTS

OWNED BY

CITY OF NEW BEDFORD

OCTOBER 30, 2015 SCALE: 60 FEET TO AN INCH

LAND PLANNING, INC.

HANSON: 1115 MAIN STREET 02341 (781) 294-4144
BELLINGHAM: 167 HARTFORD AVE. 02019 (508) 966-4130
N. GRAFTON: 214 WORCESTER ST. 01536 (508) 839-9526

CALCS	JOB NO.	DWG NAME	SHEET NO.
G.R.RICE	P-2650	P2650-NBHS-AUL	1 OF 1

EXHIBIT C

Activity and Use Limitation Opinion

Activity and Use Limitation Opinion
New Bedford High School Campus, RTN 4-15685

Introduction

In accordance with the requirements of 310 CMR 40.1074, this Activity and Use Limitation (AUL) Opinion has been prepared for the parcel of land located at 230 Hathaway Boulevard, Bristol County, New Bedford, Massachusetts (the Property), and owned by the City of New Bedford, 133 William Street, Bristol County, New Bedford, Massachusetts. As of the date of this Activity and Use Limitation Opinion, the Property is the location of a City of New Bedford High School (NBHS) campus, which includes a Solar Park.

This property is owned by:

The City of New Bedford
133 William Street
New Bedford, Massachusetts 02740
Contact: Mayor Jonathan F. Mitchell
(508) 979-1410

The purpose of this AUL Opinion is to support a Partial Permanent Solution (PS-P). ***This AUL applies to the NBHS campus, including the area used as a fenced solar park (hereinafter the PS-P Site).***

Site Description

The *PS-P* Site, consists of the NBHS building which is a single 529,192 square foot building (with a footprint of approximately 233,903 square feet) surrounded by paved parking areas, lawn and landscaped areas for recreational use, and paved tennis courts. Approximately 45-percent of the *PS-P* Site is covered by impervious surfaces (e.g., pavement or building). An ice skating rink and isolated wetland area, located along Hathaway Boulevard and Durfee and Liberty Streets, exist beyond the northern boundary of the *PS-P* Site. The NBHS building has three main sections: (1) the gym; (2) the auditorium; and (3) the "Houses". The gym is located at the southern end of the NBHS campus. The grassy area in front (west) of the gym is used for outdoor gym classes. Fenced playing fields (a volleyball court, baseball field, and basketball and tennis courts) are located to the rear (east) of the gym. To the north of the gym is the main entrance to the high school, marked by a flag pole and traffic circle. The auditorium is housed in this central portion of the NBHS building. An unfenced field, used as a practice area, is located to the rear (east) of the auditorium. Further to the north within the NBHS building are the classrooms, arranged as a series of four "Houses" (A-Block) around a central core (B-Block). The grassy outdoor area to the east of the "Houses" is a congregating area for students. The fenced area to the north of the "Houses", between two large parking lots, has been developed as a solar park.

The solar park area is surrounded by a permanent eight foot high chain-link security fence, with lockable access gates. Impacted soil within the top three feet of the southern (landscaped) portion of the solar park was excavated and placed within the fenced portion of the solar park, and six

inches of washed, crushed stone was placed across the solar park area to prevent fugitive dust release.

The PS-P Site, subject to this AUL, is an approximately 34.6-acre area within the area managed under RTN-15685. The PS-P Site is identified by the City of New Bedford Assessor as the following parcels: map 75 block 12, map 69 block 345, map 69 block 460, and map 70 block 1. The PS-P Site is located on the north side of Parker Street between Hathaway Boulevard to the west and Liberty Street to the east, and south of the Hetland Rink property.

Site History

Based on review of historical United State Geological Survey (USGS) topographic maps from 1941 and 1949, wetlands were located at the PS-P Site prior to land disturbance and filling activity. On the 1941 (1936 survey data) map and 1949 (1948 survey data) map, the PS-P Site was still illustrated as wetland.

Based on review of historical aerial photographs, the PS-P Site was subject to land disturbance or disposal activity between and during at least the 1930s and 1970s; other portions of the area covered by RTN 4-15685 were subject to land disturbance and disposal activities into at least the 1970s. The chemical profile of fill materials found at some locations included in RTN 4-15685 are similar to those of industrial landfills indicating that the fill material is associated with dumping from industrial sources, intermixed or combined with fill material meeting the definition of historic fill under the MCP. NBHS was constructed between 1970 and 1972. Materials dredged from New Bedford during the construction of the "Hurricane Dike" were reportedly transported to the Site and used to stabilize the site for construction of the NBHS (NVS Report). Soil/fill displaced for construction of the building's foundation was reportedly transported across Hathaway Boulevard to what was then vacant land (the present-day location of the Keith Middle School [KMS]). During a 2000 environmental investigation prior to the construction of KMS, concentrations of polychlorinated biphenyls (PCBs) above regulatory reporting criteria were detected, triggering a reporting condition to the Massachusetts Department of Environmental Protection (MassDEP). MassDEP assigned RTN 4-15685 to the Parker Street Waste Site

Environmental Investigations

In July 2001, Vanasse Hangen Brustlin, Incorporated (VHB) collected 22 soil samples from 15 sampling locations at the PS-P Site (VHB, 2001). All samples were analyzed for PCBs, Resource Conservation and Recovery Act (RCRA) 8 metals, and three of the samples were also analyzed for semi-volatile organic compounds (SVOCs), and extractable petroleum hydrocarbons (EPH).

Subsurface environmental investigations were conducted at the PS-P Site between September 2004 and February 2006. During that time, BETA advanced 343 soil borings and collected 12 surface soil samples (0-6 inches) at the PS-P Site. Of these 343 sampling locations, BETA observed fill at 276 locations. BETA identified the presence of the following chemicals: PCBs, metals (arsenic, barium cadmium, chromium, lead, and/or mercury), and Polycyclic Aromatic Hydrocarbons (PAH)s (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene,

benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene, and/or pyrene).

The following summarizes investigation activities performed by TRC on Behalf of the City of New Bedford. A detailed description of investigative activities is included in the *Phase II Comprehensive Site Assessment New Bedford High School Campus* dated April 6, 2011 (hereinafter "Phase II").

The majority of TRC's environmental investigations consisted of GeoProbe® direct push soil borings using track-, truck-, or dolly-mounted drill rigs to sample soil and observe subsurface soil conditions. Surface soil samples were collected using hand tools. Soil sampling was the primary means of identifying and delineating Site impacts. In addition, TRC installed and sampled seven monitoring wells at the PS-P Site in 2008 and 2009 to evaluate metals, PCBs, and PAHs in PS-P Site groundwater.

The investigative approach was intended to evaluate the presence or absence of fill and the horizontal and vertical extent of such fill or related impacts. In general, soil borings were advanced and soil samples were collected until native overburden was encountered unless refusal was encountered first. Where native material was submitted for laboratory analysis, two samples of native material from two different depths were typically collected to characterize the native horizon. The lower native sample was retained for analysis contingent upon the results of the upper native horizon analysis in an attempt to delineate the vertical extent of impacts, if present, without having to remobilize sampling teams. The contingent native material was not analyzed if the native material interval above it was found to be below MCP Method 1 S-1 soil standards based on laboratory analysis or as otherwise directed by the LSP. Some relatively shallow soil samples were also collected to supplement data previously collected by others to close potential data gaps and support an evaluation of potential human health risks.

Additional soil sampling was conducted to refine the delineation of impacted areas in support of remedial planning. Based on prior sampling results, delineation soil sampling was conducted along concentric rings (i.e., step-out sampling) surrounding sampling locations identified for potential excavation. Initial (i.e., inner ring) delineation samples were sent for laboratory analysis for potential contaminants of concern (COCs). Based on the laboratory analytical results associated with inner ring delineation samples, additional (outer ring) samples were analyzed. Supplemental investigation and step-out delineation sampling activities were conducted within each Exposure Point (EP) Area to identify the lateral and vertical extent of excavation to achieve the remedial goal (i.e., Exposure Point Concentrations (EPC)s less than or equal to Method 1/Method 2 S-1 soil standards, which were later verified via Method 3). Based on the risk characterization results, the supplemental sampling investigations were focused on a vertical depth of up to three feet below ground surface, targeting surface soils considered to be accessible under the MCP. The excavation limits for targeted locations were determined by recalculating the EPCs for each EP after the samples within the excavation boundaries were eliminated from the data set and replaced with the results from the delineation sampling, confirming that a Condition of No Significant Risk had been achieved for the EPs following excavation.

Dioxin Investigative Sampling

Soil sampling for polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and dioxin-like PCBs, which are collectively referred to as dioxins or dioxin-like compounds, was carried out across the NBHS Campus. Sampling and analytical procedures are outlined in the *Proposed New Bedford High School Dioxin Investigation Technical Approach Memorandum* from TRC to the City dated, March 30, 2010. On April 15, 2010 a total of sixteen samples were collected from five sampling locations and analyzed for dioxins (SW-846 Method 8290) and PCB congeners (SW-846 Method 1668A) by Analytical Perspectives of Wilmington, North Carolina. All samples were also analyzed for PCBs Aroclors by Pace Analytical, Incorporated (Pace; formerly Northeast Analytical, Incorporated) of Schenectady, New York and PAHs, MCP metals and mercury by Con-Test Analytical Laboratory (Con-Test) of East Longmeadow, Massachusetts.

Dioxin and dioxin-like compounds may be formed as part of a combustion process under appropriate conditions. Data collected to date indicate that ash is present in impacted fill at the PS-P Site. The five sampling locations targeted were previously sampled locations that were identified as being likely to have the highest concentrations of dioxins and dioxin-like compounds based on a review of available soil data. The soil data indicate that PCBs are the only chlorinated dioxin/dibenzofuran precursor compounds at the Site. There is no other indication in the available analytical data of the presence of any other chlorinated organic compounds with the potential to serve as chlorinated dioxin/dibenzofuran precursors in significant concentrations, based on available data for volatile organic compounds (VOCs), SVOCs, pesticides, and PCBs.

The evaluation of target sample locations was based on the review of existing chemical signatures and geographic coverage within the population of previous soil sample locations. The soil sampling program was designed to collect samples from biased high ("worst case") locations at the PS-P Site. Soil sample locations with concentrations greater than regulatory limits for PCBs, PAHs, and/or metals were selected for review. Sample locations were selected based on the presence of ash/cinders, metals enrichment, and PAHs; PCB concentrations greater than regulatory limits; and to provide geographic coverage. The conservative high- biased sampling approach was intended to avoid underestimating risk from exposure to dioxins in Site soil and, in all likelihood, resulted in overestimating risk. At each location, 0 to 1 foot interval and 1 to 3 foot interval samples were collected. A second 0 to 1 foot interval sample, targeting the historic fill, was also collected at each location during the initial investigation of dioxins and dioxin-like compounds.

At the request of MassDEP, additional dioxin investigative sampling was performed as outlined in the *Proposed NBHS Dioxin Follow-up Sampling – Technical Approach* from TRC to the City dated April 13, 2011. On June 7-10, 2011, soil investigative sampling was conducted for PCDDs, and PCDFs and PCB congeners. A total of eighteen samples was collected from nine sample locations and analyzed for chlorinated dioxins (SW-846 Method 8290A) and PCB congeners (SW-846 Method 1668A) by Cape Fear Analytical, LLC (Cape Fear) of Wilmington, North Carolina. The sampling locations included previous sample locations estimated as worst case scenarios based on a review of available soil data collected, and locations that provide data that are representative of potential exposures across the PS-P Site. At each sample location, a

sample was taken of the top one foot soil interval, and the one to three foot soil interval. Sample locations are identified on Figure 2.

Additional dioxin investigative sampling was performed on October 20, 2011 to delineate dioxin impacted soils in the vicinity of sample location HB-22 from 1-3 feet below surface. Samples were collected at eleven locations in a grid pattern having a 2.5 foot lateral separation for first two grids and a 5 foot lateral separation for the third grid. Consistent with previous delineation activities, an iterative step-out soil sampling approach was employed. Soil samples were submitted to Cape Fear for chlorinated dioxins analysis (SW-846 Method 8290A). Based on a review of the analytical results and using MCP risk assessment procedures, soil samples HB-22A, HB-22B, HB-22C and HB-22D were determined to represent appropriate excavation bounds.

Following the delineation and subsequent soil excavation, the MassDEP adopted EPA's 2012 reference dose (RfD) for risk estimation of dioxin-like compounds as total toxic equivalents (TEQs) in Method 3 risk characterizations. Consequently, non-cancer health effects associated with the total TEQ EPC became associated with an unacceptable risk for soil exposures within the 0 to 3 foot interval at the NBHS Campus, for the daycare child scenario. The issue primarily resulted from the small size of the total TEQ data set for the 0 to 3 foot soil depth interval as a result of the execution of the RAM-related spot excavation program, coupled with the variability in the remaining data set. The post-excavation data set resulted in an EPC, derived using a 95% UCL of the arithmetic mean, associated with an exposure dose greater than the reference dose for non-cancer health effects for this scenario.

As a result of the updated reference dose, and consistent with discussions between the City and MassDEP, it was deemed appropriate to conduct additional soil investigation activities in the vicinity of location HB-22 in support of supplemental excavation activities. The additional investigation was initiated on February 21, 2014. Land Planning, Incorporated of Hansen, Massachusetts (Land Planning) marked the previous HB-22 excavation limits (i.e., soil sampling locations HB-22A through HB-22D), allowing for pre-marking of supplemental soil boring ("step-out") locations. Step-out soil boring locations extended at 2.5 foot intervals east of location HB-22B (i.e., HB-22F, HB-22J, HB-22N and HB-22R) and south of location HB-22C (i.e., HB-22G, HB-22K, HB-22O and HB-22S). Step-out sampling was not necessary for the HB-22A and HB-22D sampling locations to the west and north, since the total TEQ concentrations identified there were associated with hazard quotients for the daycare child scenario below risk thresholds for non-cancer health effects. Following utility clearance activities (i.e., Dig-Safe® and municipal notification), a total of eight soil borings were advanced by New England Geotech of Jamestown, Rhode Island on February 21, 2014.

Soil samples were submitted to Cape Fear for PCB Congener (EPA Method 1668A - World Health Organization [WHO] list) and/or dioxin/furan (EPA Method 8290A) analyses (see Table 2-11). A total of 18 soil samples were collected for potential laboratory analysis. Soil samples were collected from the 1 to 3 foot interval at soil sampling locations HB-22A and HB-22B for PCB Congener analysis. Sample volume was retained from the 0 to 1 foot and 1 to 3 foot intervals at each of the remaining eight soil boring locations; however only samples HB-22F (1-3') and HB-22G (1-3') were initially analyzed for PCB Congeners and dioxins/furans. The remaining sample volume was retained for contingency analysis, pending receipt and review of

the initial HB-22F (1-3') and HB-22G (1-3') analytical results. Additional samples were authorized at the discretion of the LSP of Record.

Based on the supplemental soil sampling results, an updated EPC, based on the 95% UCL on the arithmetic mean, was determined to be associated with a hazard quotient below the threshold for non-cancer health effects in the daycare child scenario. The updated risk calculations indicated that a Condition of No Significant Risk in support of a permanent solution for the NBHS Campus was achieved following the additional soil removal activities carried out in April 2014, as described below.

Groundwater Investigation

Following installation, groundwater samples were collected from seven on-Site monitoring wells. Groundwater samples were collected on the following dates; August 19, 2008 (MW-4 through MW-6), September 16, 2008 (MW-7 and MW-8B), and April 23, 2009 (MW-HH-13, MW-HRC-33). Additional groundwater investigations were performed in connection with the IRA Substantial Release Migration/Critical Exposure Pathway response actions in the vicinity of the Mechanical Room, as discussed in the Phase II. The groundwater data collected from 2010 to 2012 from monitoring wells outside the Mechanical Room (MW-11, MW-12, MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23, MW-24, MW-25, MW-26, MW-29 and MW-30) as part of the IRA Substantial Release Migration/Critical Exposure Pathway response actions were also used in the risk characterization.

Groundwater samples were collected following EPA Region I low stress (low flow) sampling guidelines (USEPA, 2010). During purging activities, water quality parameters were monitored using a YSI 600XL Sonde and 650 MDS data logger and a LaMotte 2020 turbidity meter. Groundwater samples were collected after water quality parameters had stabilized in accordance with the low flow guidance, or after one hour of purging if parameters did not stabilize. A modification of the low flow guidance was the use of peristaltic pumps to collect the samples.

Nature of Site Conditions

The PS-P Site is underlain by topsoil and up to approximately 8 feet of anthropogenic fill material that includes sandy material with ash. In places, the ash fill includes broken glass, brick fragments, rubber, slag, coal, cinders, plastic and/or metallic fragments. Location of the top and bottom of fill material is varied throughout the PS-P Site, ranging from 0.5 to 8.0 feet below ground surface. In some places no fill was identified. Anthropogenic fill materials are underlain by approximately 0.25 to 6.0 feet of native dark brown organic peat material, mixed with silt and clay in places from the wetland that predates the development of the area. Native soils below the organic peat layer are characterized by gray fine silty sands with trace gravel and/or medium sand in places.

Groundwater at the PS-P Site flows predominantly to the southeast at a gradient of about $2x10^{-3}$ ft/hr. The groundwater aquifer is unconfined and is present about 10 feet below ground surface. The unconfined aquifer is composed of ash fill, organic peat, and/or glacial outwash sediments (listed from the ground surface down, as typically observed). The aquifer thickness is not known. This aquifer is not considered potentially productive.

Based on literature values, the peat layer is expected to exhibit low hydraulic conductivity, on the range of 10^{-6} to 10^{-3} centimeters per second (cm/sec) while glacial outwash deposits having relatively less fine material could exhibit a hydraulic conductivity range of 10^{-3} to 15 cm/sec. The hydraulic conductivity of the ash fill material is more difficult to estimate, since the material is heterogeneous in nature and typical approximate ranges of such fill are not found in the available technical references; however, a study of the hydraulic conductivity of ash-sand mixtures indicates that the hydraulic conductivity of the ash fill could be as low as approximately 4.4×10^{-5} cm/sec with higher hydraulic conductivities (10^{-1} cm/sec) possible depending on the relative amounts of sand and ash. Since the deposition is fairly loose, based on observations made during boring advancement, the hydraulic conductivity of the fill material is estimated to be higher relative to the underlying peat layer.

The City receives an average of 48.36 inches of precipitation annually (http://www.ncdc.noaa.gov/, 1981-2010). Infiltration of rainwater to the aquifer is expected to be lower at the PS-P Site relative to other nearby areas given that the PS-P Site has more impervious surfaces. There are no surface water bodies on the PS-P Site.

Environmental site investigations were performed to characterize the nature and extent of impacts at the PS-P Site. The results of the environmental site investigations are described in detail in the following reports:

- *Phase II Comprehensive Site Assessment, New Bedford High School Campus at the Parker Street Waste Site, New Bedford, Massachusetts.* Prepared for the City of New Bedford. Prepared by TRC, Lowell, Massachusetts. April 2011.

- *Release Abatement Measure Completion Report, Soil Excavation and Removal at New Bedford High School, New Bedford, Massachusetts. Release Tracking Number 4-15685.* Prepared by: TRC Environmental Corporation, Lowell, Massachusetts June 2014.

In general, the horizontal and vertical extent of PAHs, metals, and PCBs in soil at the Site is generally consistent with the presence of fill-related material. The horizontal and vertical extent of soil impacts detected above MCP Method 1 S-1 soil standards has been characterized via laboratory analysis and field screening (visual, olfactory, jar headspace, and professional judgment). For soil from the 0 to 1 foot horizon, data indicate that the surficial soils were comparatively less impacted or un-impacted.

The results of the analysis of groundwater at all locations of the NBHS portion of the Site for PAHs, PCBs, both total and dissolved MCP metals and mercury indicated that all compounds are below applicable MCP Method 1 standards, with the exception of total lead at MW-5 and MW-HRC-33, which exceeds the GW-3 standard. The total lead concentration is most likely attributable to the lead being adsorbed to, or contained in, particulates in the groundwater sample, and not likely to be dissolved phase lead impacts. In general, the lack of groundwater impacts from the impacts associated with fill (PAHs, PCBs, metals) is consistent with the chemical properties, namely the high sorption potential and limited potential to leach, and/or low solubility of the chemicals.

Conceptual Site Model

Prior to construction of NBHS in the early 1970s, much of the PS-P Site was occupied by a wetland. From approximately the 1930s and into the 1970s, portions of the PS-P Site were subject to land disturbance and disposal activities.

During the construction of NBHS, organic wetland materials and much of the refuse dumped over the years were removed from the PS-P Site and replaced with a fill material. Some of the fill material appears to be associated with dumping from industrial sources, intermixed or combined with fill material. In addition, materials dredged from New Bedford during the construction of the "Hurricane Dike" were reportedly transported to the PS-P Site and used to stabilize the PS-P Site for construction of the NBHS.

Chemicals of concern identified in the PS-P Site soils are consistent with those attributable to industrial wastes (PCBs, antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, vanadium, zinc, various PAHs, and dioxin-like compounds) and historic fill (e.g., coal, coal ash, wood ash and vehicle emission related PAHs, lead, and metals associated with coal). Groundwater monitoring has indicated that these chemicals have not migrated from PS-P Site soil to groundwater.

Chemicals of concern identified in the PS-P Site groundwater include chlorinated VOCs (principally tetrachloroethene and vinyl chloride) found in the vicinity of monitoring well MW-7. The source of the chlorinated VOCs near MW-7 is unknown but it is presumed to be related to historical disposal at the PS-P Site. The extent of chlorinated VOCs in groundwater is limited. These compounds have not been detected in significant concentrations in any of the surrounding monitoring wells (MW-20, MW-22, MW-23, MW-24 and MW-30. Notably, MW-20 and MW-30 are located between MW-7 and NBHS. It is possible that organic materials (peat) observed during construction of MW-7 have served to limit the migration in groundwater as the chlorinated VOCs preferentially adsorb to the organic carbon present in the peat.

TRC has investigated potential preferential migration of groundwater in the vicinity of MW-7 into a north-south running storm sewer line that is located between MW-7 and NBHS. The findings of this investigation were not conclusive. While this may or may not provide a minor transport mechanism for chlorinated VOCs in groundwater, it does not represent a potential preferential pathway for chlorinated VOCs to enter indoor air at NBHS because there are no drain lines connecting the storm drain system to the interior of NBHS.

The groundwater impacts in the vicinity of MW-7 are not contiguous to and are separate from the VOC impacts in the vicinity of the mechanical room in the NBHS building, which are administratively tracked under RTN 4-22409.

Site investigations completed by TRC and others were consistent with the above summarized Conceptual Site Model and identified PCBs, PAHs, metals, dioxin-like compounds and a localized VOC area near MW-7.

Summary of Remedy

To bring the PS-P Site remedial activities to closure, the potential risks associated with PS-P Site soils were mitigated by remediation activities performed as Immediate Response Actions (IRAs) and a Release Abatement Measure (RAM). Over 7,956 cubic yards of impacted soil were removed as part of IRA and RAM activities to achieve the Partial Permanent Solution with Conditions. A Method 3 risk characterization was used to characterize human health risk at the PS-P Site, which determined that a Condition of No Significant Risk has been achieved for the top three feet of soil in unpaved areas.

Reason for Activity and Use Limitation

TRC performed a Method 3 Risk Characterization to evaluate the potential risk posed by conditions at the PS-P Site. The Risk Characterization concluded that the PS-P Site poses No Significant Risk to health, safety, public welfare, or the environment under current conditions where exposure to the soil is managed (since soil/fill remains at the PS-P Site below three feet and at shallower depths beneath exposure barriers). However, a Significant Risk would exist without such management restrictions. Therefore, in order to ensure that such exposures do not occur and that a condition of No Significant Risk be maintained for future activities and uses, an AUL is required to restrict certain activities and uses of the Property.

Barriers to Exposure

A portion of the Property is covered by paving, concrete or buildings. The impervious surfaces isolate and prevent exposure to the underlying fill. The majority of the exterior area of the facility is landscaped. Soils that contribute to EPCs posing a current human health risk in the top three feet of soil at the PS-P Site have been excavated and removed from the PS-P Site, leaving a three foot layer of soil with EPCs that do not pose a significant risk to human health.

In the solar park area in the northern portion of the PS-P Site, a permanent eight foot high chain-link security fence, with lockable access gates was installed to surround the solar park, impacted soil within the top three feet of the southern (landscaped) portion of the solar park was excavated and placed within the fenced portion of the solar park, and six inches of washed, crushed stone was placed across the solar park area to prevent fugitive dust release. Soils within the solar park area do not pose a risk to intermittent workers who may be present at the solar park performing periodic maintenance or repairs.

The potential risks associated with the PS-P Site soil were mitigated by the aforementioned risk reduction measures, including spot excavations and the installation of a security fence around the solar park area, and by placing an AUL to prevent potential exposure to soils below the top three feet in the landscaped areas outside the solar park fence, and restricting uses other than a solar park in the fenced solar park area.

Activities and Uses Consistent with the AUL Opinion

(i) (Fenced solar park) Use of the area as a solar park;

(ii) (NBHS campus, except fenced solar park) Any recreational, public, educational,

institutional, commercial, industrial, or construction activities and uses that do not cause and/or result in the direct contact with, disturbance of, and/or relocation of the soil/fill located deeper than three feet below grade in landscaped areas or soil/fill at any depth below asphalt pavement, concrete pavement, sidewalks, court surfaces or building floors;

(iii) Emergency repairs of existing utilities not to exceed a two day duration;

(iv) Such other activities and uses not identified below as being Activities and Uses Inconsistent with the AUL; and

(v) Such other activities or uses which, in the Opinion of a Licensed Site Professional (LSP), licensed by the Commonwealth of Massachusetts Board of Registration of Hazardous Waste Site Cleanup Professionals, shall present no greater risk of harm to health, safety, public welfare or the environment than the activities and uses set forth in this Section.

Activities and Uses Inconsistent with the AUL Opinion

(i) (Fenced solar park) Uses other than the use as a solar park without a site-specific evaluation by an LSP:

(ii) (Fenced solar park) Excavation activities that exceed a two day duration that result in exposing soil/fill below the crushed stone located above the geotextile fabric without a site-specific evaluation by an LSP;

(iii) (Fenced solar park) Relocation of soil/fill from any depth below the geotextile fabric to another location within the Site without LSP review and approval;

(iv) (Fenced solar park) Gardening of agricultural crops for human consumption using PS-P Site soil [does not include enclosed planters, raised beds, or tree vaults filled with pre-characterized soil and separated from underlying PS-P Site soil, which may be allowed subject to review and approval by an LSP];

(v) (Fenced solar park) Other private, public, commercial, industrial or construction activities or uses not permitted by Section 1 of this Notice that result in the direct contact with, or disturbance of, the soil/fill from depths below the crushed stone located above the geotextile fabric without supervision of an LSP and the Massachusetts Contingency Plan (310 CMR 40.0000) of MCP.

(vi) (NBHS campus, except fenced solar park) Single or multi-family residential use;

(vii) (NBHS campus, except fenced solar park) Activities that result in exposing soil/fill below concrete floors, asphalt pavement, concrete pavement, sidewalks, court surfaces or other paved surfaces without a site specific evaluation by an LSP;

(viii) (NBHS campus, except fenced solar park) Relocation of any soil/fill from depths greater than 3 feet from the Site to another location within the PS-P Site without LSP review and approval;

(ix) (NBHS campus, except fenced solar park) Gardening of agricultural crops for human consumption using Site soil [does not include enclosed planters, raised beds, or tree vaults filled with pre-characterized soil and separated from

underlying PS-P Site soil, which may be allowed subject to review and approval by an LSP]; and

(x) (NBHS campus, except fenced solar park) Other private, public, commercial, industrial or construction activities or uses not permitted by Section 1 of this Notice that result in the direct contact with, or disturbance of, the soil/fill from depths greater than three feet from the PS-P Site without supervision of an LSP and the Massachusetts Contingency Plan (310 CMR 40.0000) of MCP.

Obligations and Conditions

(i) (Fenced solar park) Maintain the physical integrity of the crushed stone located above the geotextile fabric;

(ii) (Fenced solar park) Maintain the physical integrity of the fence surrounding the solar park;

(iii) (Fenced solar park) A Health and Safety Plan (HASP) must be prepared by a Certified Industrial Hygienist (CIH) or other qualified individual sufficiently trained in worker health and safety requirements and implemented prior to the commencement of any activity that is likely to disturb soil/fill immediately below the crushed stone located above the geotextile fabric, except for emergency utility work that is less than a two day duration. Activities conducted immediately below the crushed stone located above the geotextile fabric should be planned with an LSP. The HASP should specify the chemicals at the PS-P Site, the types of media present, the extent of impacts, the potential routes of exposure, the appropriate level of personal protective equipment, the type of monitoring required, worker safety monitoring, and hazard communication. Workers must be informed of the requirements of the HASP, and the plan must be available on-Site throughout the course of the project;

(iv) (Fenced solar park) Excavation/disturbance of soil/fill below the crushed stone located above the geotextile fabric that exceed a two day duration requires site-specific evaluation by an LSP, who will evaluate if such activity can proceed and maintain a condition of No Significant Risk.

(v) (NBHS campus, except fenced solar park) Maintain the physical integrity of all asphalt pavement, concrete pavement, sidewalks, and court surfaces or other paved surfaces;

(vi) (NBHS campus, except fenced solar park) Maintain the physical integrity of all interior building floors;

(vii) (NBHS campus, except fenced solar park) A Health and Safety Plan (HASP) must be prepared by a Certified Industrial Hygienist (CIH) or other qualified individual sufficiently trained in worker health and safety requirements and implemented prior to the commencement of any activity that is likely to disturb soil/fill greater than 3 feet in landscaped areas or immediately below pavement within the AUL area except for emergency utility work that is less than a two day duration. Activities conducted greater than 3 feet in depth or immediately below pavement should be planned with an LSP. The HASP should specify the chemicals at the

PS-P Site, the types of media present, the extent of impacts, the potential routes of exposure, the appropriate level of personal protective equipment, the type of monitoring required, worker safety monitoring, and hazard communication. Workers must be informed of the requirements of the HASP, and the plan must be available on-site throughout the course of the project;

(viii) (NBHS campus, except fenced portion of solar park) Excavation/disturbance of soil/fill below three feet and/or below concrete floors, asphalt pavement, concrete pavement, sidewalks, court surfaces or other paved surfaces and buildings requires site-specific evaluation by an LSP, who will evaluate if such activity can proceed and maintain a condition of No Significant Risk.

(ix) No fill/soil is to be relocated from the PS-P Site to an off-site (property) location without LSP review and approval.

Agreement to Reference Notice of AUL

In accordance with 310 CMR 40.1074(2)(h), the City of New Bedford and its successors and assigns agree to reference the AUL in all deeds, easements, mortgages, leases, licenses, occupancy agreements, or any other agreements which convey an interest in and/or a right to use the property subject to the AUL.

Procedures for Changing Permitted Site Activities and Uses

In accordance with 310 CMR 40.1074(2)(i), a description of the procedures to be followed to ensure that changes in permitted activities and/or uses meet the objectives of the AUL is provided below:

Any proposed changes in activities and/or uses within the AUL boundaries that may result in higher levels of exposure to oil and/or hazardous material than currently exist must be evaluated by an LSP. The LSP will render an Opinion, consistent with 310 CMR 40.1080, as to whether the proposed changes will result in a significant risk of harm to human health, safety, public welfare, or the environment. Any and all requirements set forth above to meet the objective of the AUL will be satisfied before any proposed changes in activity and/or use are initiated.

Prepared by:

TRC Environmental Corporation

David M. Sullivan, LSP
Licensed Site Professional No. 1488
Date:_____

EXHIBIT D

Documentation of Signatory Authority

DOCUMENTATION OF SIGNATORY AUTHORITY

I, Jonathon F. Mitchell, do hearby certify that I am the Mayor of the City of New Bedford, and the Chairman of the School Committee for the City of New Bedford, a duly elected School Committee for the City of New Bedford, having a principal office at 455 County Street, New Bedford, Massachusetts, and that I have been duly authorized and am presently serving in that capacity in accordance with the laws of the Commonwealth of Massachusetts and the rules and regulations of the New Bedford School Committee.

I further certify that as of this date, Dr. Pia Durkin, the current duly appointed superintendent of Schools of the City of New Bedford, and, pursuant to a vote of the School Committee on _____, is duly authorized to execute the forgoing document on behalf of the School Committee.

In Witness Whereof, I have hereunto set my hand and seal of the City on this ___day of _____, 2016.

_____
Mayor / Chairman

THE COMMONWEALTH OF MASSACHUSETTS
_____,ss

On this ___ day of _____, 2016 before me, the undersigned notary public, personally appeared John F. Mitchell, proved to me though satisfactory evidence of identification, which was photographic identification with a signature issued by a federal or state governmental agency, oath or affirmation of a credible witness, personal knowledge of the undersigned, to be the person whose name is signed on the preceding or attached documents in my presence.

(*Official seal*)

_____
_____, Notary Public
My Commission Expires:

Notification to Property Owner(s)

310 CMR 40.1074(1)(e)

_____,2016

<u>Certified Mail, Return Receipt Requested</u>

Pia Durkin
New Bedford Public Schools
455 County Street
New Bedford, Massachusetts 02740-5194

Re: Activity and Use Limitation (AUL) Notification
New Bedford High School
New Bedford, Massachusetts
RTN 4-15685

Dear Dr. Pia Durkin:

The purpose of this letter is to inform you that a Notice of Activity and Use Limitation (AUL) will be placed on the property at New Bedford in New Bedford, Massachusetts (New Bedford High School). New Bedford High School is part of the Site being managed under RTN 4-15685. The Massachusetts Contingency Plan (MCP) regulations (310 CMR 40.1074(1)(e)) require notification to all current holders of any record interest in the property subject to the proposed AUL. It is our understanding that other than the City of New Bedford, there are no other record interest holders on the property.

The soil impacts at the New Bedford High School Site include lead, arsenic, cadmium, polyaromatic hydrocarbons (PAHs), polychlorinated biphenys (PCBs) and dioxin. Remedial response actions consisting soil excavations and exposure barriers designed to achieve exposure point concentrations (EPCs) acceptable for current and foreseeable future uses in the top three feet of soil were conducted at the Site.

In _____2016, a Partial Permanent Solution will be submitted on behalf of the City of New Bedford for the New Bedford High School Campus. The Permanent Solution uses an AUL placed on the property to limit exposure to soil/fill and limit certain types of activities (e.g., residential use).

TRC's risk characterization concluded that the top 3 feet of soil, deeper soil horizons, and paved/covered surfaces must be managed consistent with the AUL prepared for the Site under a progressive soil management approach that provides considerable flexibility for day-to-day activities at New Bedford High School.

Subsequent to implementation of the AUL at New Bedford High School, the following are ***permitted*** activities.

(i) (Fenced solar park) Use of the area as a solar park;

(ii) (NBHS campus, except fenced solar park) Any recreational, public, educational, institutional, commercial, industrial, or construction activities and uses that do not cause and/or result in the direct contact with, disturbance of, and/or relocation of the soil/fill located deeper than three feet below grade in landscaped areas or soil/fill at any depth below asphalt pavement, concrete pavement, sidewalks, court surfaces or building floors;

(iii) Emergency repairs of existing utilities not to exceed a two day duration;

(iv) Such other activities and uses not identified below as being Activities and Uses Inconsistent with the AUL; and

(v) Such other activities or uses which, in the Opinion of a Licensed Site Professional (LSP), licensed by the Commonwealth of Massachusetts Board of Registration of Hazardous Waste Site Cleanup Professionals, shall present no greater risk of harm to health, safety, public welfare or the environment than the activities and uses set forth in this Section.

Subsequent to implementation of the AUL at Walsh Field, the following are ***prohibited*** activities.

(i) (Fenced solar park) Uses other than the use as a solar park without a site-specific evaluation by an LSP:

(ii) (Fenced solar park) Excavation activities that exceed a two day duration that result in exposing soil/fill below the crushed stone located above the geotextile fabric without a site-specific evaluation by an LSP;

(iii) (Fenced solar park) Relocation of soil/fill from any depth below the geotextile fabric to another location within the Site without LSP review and approval;

(iv) (Fenced solar park) Gardening of agricultural crops for human consumption using PS-P Site soil [does not include enclosed planters, raised beds, or tree vaults filled with pre-characterized soil and separated from underlying PS-P Site soil, which may be allowed subject to review and approval by an LSP];

(v) (Fenced solar park) Other private, public, commercial, industrial or construction activities or uses not permitted by Section 1 of this Notice that result in the direct contact with, or disturbance of, the soil/fill from depths below the crushed stone located above the geotextile fabric without supervision of an LSP and the Massachusetts Contingency Plan (310 CMR 40.0000) of MCP.

(vi) (NBHS campus, except fenced solar park) Single or multi-family residential use;

(vii) (NBHS campus, except fenced solar park) Activities that result in exposing soil/fill below concrete floors, asphalt pavement, concrete pavement, sidewalks, court surfaces or other paved surfaces without a site specific evaluation by an LSP;

(viii) (NBHS campus, except fenced solar park) Relocation of any soil/fill from depths greater than 3 feet from the Site to another location within the PS-P Site without LSP review and approval;

(ix) (NBHS campus, except fenced solar park) Gardening of agricultural crops for human consumption using Site soil [does not include enclosed planters, raised beds, or tree vaults filled with pre-characterized soil and separated from underlying PS-P Site soil, which may be allowed subject to review and approval by an LSP]; and

(x) (NBHS campus, except fenced solar park) Other private, public, commercial, industrial or construction activities or uses not permitted by Section 1 of this Notice that result in the direct contact with, or disturbance of, the soil/fill from depths greater than three feet from the PS-P Site without supervision of an LSP and the Massachusetts Contingency Plan (310 CMR 40.0000) of MCP.

The following outlines ***obligations and conditions*** under the AUL.

(i) (Fenced solar park) Maintain the physical integrity of the crushed stone located above the geotextile fabric;

(ii) (Fenced solar park) Maintain the physical integrity of the fence surrounding the solar park;

(iii) (Fenced solar park) A Health and Safety Plan (HASP) must be prepared by a Certified Industrial Hygienist (CIH) or other qualified individual sufficiently trained in worker health and safety requirements and implemented prior to the commencement of any activity that is likely to disturb soil/fill immediately below the crushed stone located above the geotextile fabric, except for emergency utility work that is less than a two day duration. Activities conducted immediately below the crushed stone located above the geotextile fabric should be planned with an LSP. The HASP should specify the chemicals at the PS-P Site, the types of media present, the extent of impacts, the potential routes of exposure, the appropriate level of personal protective equipment, the type of monitoring required, worker safety monitoring, and hazard communication. Workers must be informed of the requirements of the HASP, and the plan must be available on-Site throughout the course of the project;

(iv) (Fenced solar park) Excavation/disturbance of soil/fill below the crushed stone located above the geotextile fabric that exceed a two day duration requires site-specific evaluation by an LSP, who will evaluate if such activity can proceed and maintain a condition of No Significant Risk.

(v) (NBHS campus, except fenced solar park) Maintain the physical integrity of all asphalt pavement, concrete pavement, sidewalks, and court surfaces or other paved surfaces;

(vi) (NBHS campus, except fenced solar park) Maintain the physical integrity of all interior building floors;

(vii) (NBHS campus, except fenced solar park) A Health and Safety Plan (HASP) must be prepared by a Certified Industrial Hygienist (CIH) or other qualified individual sufficiently trained in worker health and safety requirements and implemented prior to the commencement of any activity that is likely to disturb soil/fill greater than 3 feet in landscaped areas or immediately below pavement within the AUL area except for emergency utility work that is less than a two day duration. Activities conducted greater than 3 feet in depth or immediately below pavement should be planned with an LSP. The HASP should specify the chemicals at the PS-P Site, the types of media present, the extent of impacts, the potential routes of exposure, the appropriate level of personal protective equipment, the type of monitoring required, worker safety monitoring, and hazard communication. Workers must be informed of the requirements of the HASP, and the plan must be available on-site throughout the course of the project;

(viii) (NBHS campus, except fenced portion of solar park) Excavation/disturbance of soil/fill below three feet and/or below concrete floors, asphalt pavement, concrete pavement, sidewalks, court surfaces or other paved surfaces and buildings requires site-specific evaluation by an LSP, who will evaluate if such activity can proceed and maintain a condition of No Significant Risk.

(ix) No fill/soil is to be relocated from the PS-P Site to an off-site (property) location without LSP review and approval.

Action Required by the Property Owner

MCP regulations require a 30-day notification of the anticipated AUL restrictions to be sent to the current holders of record interest, prior to recording the AUL restrictions on the deed. However, the MCP also allows a waiver of the 30-day waiting period, providing the party receiving the notification provides a written waiver of the 30-day waiting period. The AUL will be recorded on the property, on or before, _____2016

Please sign and return the attached AUL Notification Waiver Form to my attention _____2016. If you have any questions concerning this AUL notification, please contact TRC at (978) 656-3565. Thank you.

Sincerely,

TRC Environmental Corporation

David M. Sullivan, LSP
Senior Project Manager

AUL 30-Day Notification Waiver

AUL 30-DAY NOTIFICATION WAIVER

I, _____, acknowledge that on _____, the City of New Bedford, Massachusetts received a notice that an Activity and Use Limitation (AUL) will be placed on the following property:

New Bedford High School
New Bedford, Massachusetts

As allowed by Massachusetts Contingency Plan (MCP) regulations (310 CMR 40.1074(1)(e) and 310 CMR 40.1074(f)), this waiver is granted to TRC Environmental Corporation, by the owner, the City of New Bedford, allowing less than 30 days for the AUL waiting period.

_____ _____
Signature Date

_____
Name (Printed)

_____
Title

APPENDIX C

RISK ASSESSMENT SUPPORTING DOCUMENTATION

APPENDIX C-1

MEDIUM-SPECIFIC SAMPLING DATA

Table C-1.1. Summary of Analytical Results for Soil Samples - HS-1
New Bedford High School
New Bedford, Massachusett

Analysis	Analyte	Sample Location:		PG-1	PG-2	PG-2A	PG-3		PG-4	PG-5	PG-6				SS-63	SS-64	SS-65
		Sample Depth (ft.):		0-0.5	0-0.5	1-3	0-0.5	0.5-1.5	0-0.5	0-0.5	0-0.5	0.5-3	0-1	1-3	0-0.5	0-0.5	0-0.5
		Sample Date:		2/22/2006	2/22/2006	4/7/2009	2/22/2006	2/22/2006	2/22/2006	2/22/2006	2/22/2006	2/22/2006	6/10/2011	6/10/2011	12/15/2008	12/15/2008	12/15/2008
		S-1/GW-2	S-1/GW-3														
PAHs																	
(mg/kg)	Dibenzofuran	10*	10*	NA	NA	NA	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Acenaphthylene	600	10	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Anthracene	1,000	1,000	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Benzo(a)anthracene	7	7	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Benzo(a)pyrene	2	2	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Benzo(b)fluoranthene	7	7	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Benzo(k)fluoranthene	70	70	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Chrysene	70	70	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Fluoranthene	1,000	1,000	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Fluorene	1,000	1,000	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	2-Methylnaphthalene	80	300	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Naphthalene	20	500	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Phenanthrene	500	500	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
	Pyrene	1,000	1,000	NA	NA	0.185 U	NA	0.57 U	NA	NA	0.57 U	0.056 U	NA	NA	0.202 U	0.310 U	0.250 U
PCB Aroclors																	
(mg/kg)	Aroclor 1016/1242	1	1	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
	Aroclor 1016	1	1	NA	NA	0.0558 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Aroclor 1221	1	1	0.2 U	0.2 U	0.0558 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
	Aroclor 1232	1	1	0.1 U	0.1 U	0.0558 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
	Aroclor 1242	1	1	NA	NA	0.0558 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Aroclor 1248	1	1	0.1 U	0.1 U	0.0558 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
	Aroclor 1254	1	1	0.1 U	0.1 U	0.0558 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
	Aroclor 1260	1	1	0.1 U	0.1 U	0.0558 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
	Aroclor 1262	1	1	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
	Aroclor 1268	1	1	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	NA
	Total PCBs	1	1	0.2 U	0.2 U	0.0558 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA
PCB Congeners																	
	Total PCBs	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.00172**	**0.00589**	NA	NA	NA
Metals																	
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.84 U	7.43 U	5.99 U
	Arsenic	20	20	NA	NA	2.78 U	NA	**1.22**	NA	NA	NA	**0.786**	NA	NA	3.02 U	4.64 U	3.75 U
	Barium	1,000	1,000	NA	NA	**7.39**	NA	**43**	NA	NA	NA	**4.93**	NA	NA	**15.5**	**18.8**	**41.2**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.31 U	0.47 U	0.38 U
	Cadmium	70	70	NA	NA	0.28 U	NA	**0.36**	NA	NA	NA	0.36 U	NA	NA	0.31 U	0.47 U	0.38 U
	Chromium	100	100	NA	NA	**2.74**	NA	**26**	NA	NA	NA	**1.72**	NA	NA	**3.84**	**5.45**	**8.43**
	Lead	200	200	NA	NA	**3.64**	NA	**3.24**	NA	NA	NA	**2.93**	NA	NA	**6.35**	**15.7**	**16.9**
	Mercury	20	20	NA	NA	NA	NA	0.074 U	NA	NA	NA	0.075 U	NA	NA	0.014 U	0.024 U	0.031 U
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.02**	**4.51**	**10.4**
	Selenium	400	400	NA	NA	NA	NA	0.72 U	NA	NA	NA	0.71 U	NA	NA	6.04 U	9.28 U	7.49 U
	Silver	100	100	NA	NA	NA	NA	0.36 U	NA	NA	NA	0.36 U	NA	NA	0.61 U	0.93 U	0.75 U
	Thallium	8	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.63 U	5.57 U	4.50 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**7.21**	9.28 U	**11.9**
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**26.0**	**27.6**	**32.3**

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
Data are based on the "Summary of Analytical Data, New Bedford High School" dated June 9, 2006, BETA Group, Inc.
* - TRC developed standards.

Table C-1.2. Summary of Analytical Results for Soil Samples - HS-2
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			Sample Location:	HRA30	HRE-29		HRF-30	HRF-30A	HRG23	HRG25		HRG27		HRG29
				Sample Depth (ft.):	0.75-1	0.67-1	1-3	1-2	1-3	2.5-3	0.5-3	1-3	0.5-3	1-3	0.75-1
				Sample Date:	2/22/2006	2/22/2006	4/7/2009	2/22/2006	4/7/2009	2/21/2006	2/21/2006	4/7/2009	2/21/2006	4/7/2009	2/22/2006
		S-1/GW-2	S-1/GW-3												
VOCs															
(mg/kg)	1,2,4-Trichlorobenzene	6	700		NA	NA	NA	NA	NA	NA	0.062 U	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*		NA	NA	NA	NA	NA	NA	0.062 U	NA	NA	NA	NA
PAHs															
(mg/kg)	Acenaphthene	1,000	1,000		NA	NA	0.183 U	NA	0.191 U	NA	NA	0.190 U	NA	0.188 U	NA
	Acenaphthylene	600	10		NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.193**	NA	0.188 U	NA
	Anthracene	1,000	1,000		NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.658**	NA	0.188 U	NA
	Benzo(a)anthracene	7	7		NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.86**	NA	0.188 U	NA
	Benzo(a)pyrene	2	2		NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.73**	NA	0.188 U	NA
	Benzo(b)fluoranthene	7	7		NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.85**	NA	0.188 U	NA
	Benzo(g,h,i)perylene	1,000	1,000		NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.02**	NA	0.188 U	NA
	Benzo(k)fluoranthene	70	70		NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.710**	NA	0.188 U	NA
	Chrysene	70	70		NA	NA	0.183 U	NA	0.191 U	NA	NA	**2.36**	NA	0.188 U	NA
	Dibenz(a,h)anthracene	0.7	0.7		NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.321**	NA	0.188 U	NA
	Fluoranthene	1,000	1,000		NA	NA	0.183 U	NA	0.230	NA	NA	**3.11**	NA	0.188 U	NA
	Fluorene	1,000	1,000		NA	NA	0.183 U	NA	0.191 U	NA	NA	**0.386**	NA	0.188 U	NA
	Indeno(1,2,3-cd)pyrene	7	7		NA	NA	0.183 U	NA	0.191 U	NA	NA	**1.26**	NA	0.188 U	NA
	2-Methylnaphthalene	80	300		NA	NA	0.183 U	NA	0.191 U	NA	NA	0.190 U	NA	0.188 U	NA
	Naphthalene	20	500		NA	NA	0.183 U	NA	0.191 U	NA	**0.15**	0.190 U	NA	0.188 U	NA
	Phenanthrene	500	500		NA	NA	0.183 U	NA	0.234	NA	NA	**4.38**	NA	0.188 U	NA
	Pyrene	1,000	1,000		NA	NA	0.183 U	NA	0.370	NA	NA	**4.37**	NA	0.188 U	NA
PCBs															
(mg/kg)	Total PCBs	1	1		**1.93**	**0.82**	0.0527 U	**1.1**	**0.234 J**	0.31 U	**0.3**	0.0559 U	**3.79**	0.0548 U	**0.64**
Metals															
(mg/kg)	Arsenic	20	20		NA	NA	2.74 U	NA	2.86 U	NA	NA	**9.74**	NA	2.81 U	NA
	Barium	1,000	1,000		NA	NA	**6.64**	NA	**11.1**	NA	NA	**74.8**	NA	**15.2**	NA
	Beryllium	90	90		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70		NA	NA	0.28 U	NA	0.29 U	NA	NA	**0.53**	NA	0.29 U	NA
	Chromium (III)	1,000	1,000		NA	NA	**1.96**	NA	**2.13**	NA	NA	**8.61**	NA	**2.84**	NA
	Lead	200	200		NA	NA	**3.51**	NA	**5.77**	NA	NA	**315**	NA	**7.06**	NA
	Mercury	20	20		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GRO															
(mg/kg)	Gasoline Range Organics	1,000	1,000		NA	NA	NA	NA	NA	NA	**17.3**	**17.3**	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
TSCA - Toxic Substances Control Act criteria.
* - TRC developed standards.

Table C-1.2. Summary of Analytical Results for Soil Samples - HS-2
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			Sample Location:	HRG-29	HRI23	HRI27	HRI29	HRJ-26	HRJ-30	NBHS-SS-7	SB-366			
				Sample Depth (ft.):	1-3	2-3	1.25-3	1.5-3	2.5-4	2-3.5	0-0.5	1	1-3	4	7
				Sample Date:	4/7/2009	2/21/2006	2/21/2006	2/21/2006	2/21/2006	2/21/2006	8/6/2008	2/26/2009	2/26/2009	2/26/2009	2/26/2009
		S-1/GW-2	S-1/GW-3		combo										
VOCs															
(mg/kg)	1,2,4-Trichlorobenzene	6	700		NA	NA	NA	**0.17**	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*		NA	NA	NA	**0.21**	NA	NA	NA	NA	NA	NA	NA
PAHs															
(mg/kg)	Acenaphthene	1,000	1,000		0.1895 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10		0.1895 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000		0.1895 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7		**0.5255**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2		**0.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7		**0.5115**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000		**0.4475**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70		**0.158 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70		**0.587**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7		0.1895 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000		**0.7415**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000		0.1895 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7		**0.483**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300		0.1895 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500		0.1895 U	NA	NA	**0.26**	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500		**0.778**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000		**1.295**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs															
(mg/kg)	Total PCBs	1	1		0.0570 U	0.28 U	0.22 U	0.25 U	**0.52**	**0.42**	**0.102 J**	**0.282 J**	**0.345 J**	0.0587 U	0.220 UJ
Metals															
(mg/kg)	Arsenic	20	20		2.835 U	NA	NA	NA	NA	NA	NA	**3.68**	2.68 U	**12.0**	9.97 U
	Barium	1,000	1,000		**28**	NA	NA	NA	NA	NA	NA	**40.4**	**21.7**	**783**	**153**
	Beryllium	90	90		NA	NA	NA	NA	NA	NA	NA	0.33 U	0.27 U	**0.64**	1.00 U
	Cadmium	70	70		0.29 U	NA	NA	NA	NA	NA	NA	0.33 U	0.27 U	**9.17**	1.00 U
	Chromium (III)	1,000	1,000		**11.0**	NA	NA	NA	NA	NA	NA	**19.3**	**2.77**	**44.3**	**3.27**
	Lead	200	200		**70.2**	NA	NA	NA	NA	NA	NA	**28.3**	**37.5**	**2,360**	**56.2**
	Mercury	20	20		NA	NA	NA	NA	NA	NA	NA	**0.051**	**0.016**	**0.420**	**0.134**
	Nickel	600	600		NA	NA	NA	NA	NA	NA	NA	**8.83**	**2.57**	**15.7**	**14.4**
	Silver	100	100		NA	NA	NA	NA	NA	NA	NA	0.66 U	0.54 U	0.60 U	2.00 U
	Vanadium	400	400		NA	NA	NA	NA	NA	NA	NA	**18.4**	5.35 U	**23.2**	20.0 U
	Zinc	1,000	1,000		NA	NA	NA	NA	NA	NA	NA	**33.7**	**28.2**	**958**	**375**
GRO															
(mg/kg)	Gasoline Range Organics	1,000	1,000		NA	NA	NA	**9.4**	NA	NA	NA	NA	NA	NA	NA

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PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
TSCA - Toxic Substances Control Act criteria.
* - TRC developed standards.

Table C-1.2. Summary of Analytical Results for Soil Samples - HS-2
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-367				SS-9	SS-10		SS-11	SS-11	
		Sample Depth (ft.):		1	1-3	5-6	8-9	0-0.5	0-0.5	0.5-1	0-0.5	0.5	2
		Sample Date:		2/26/2009	2/26/2009	2/26/2009	2/26/2009	7/23/2001	7/23/2001	7/23/2001	7/23/2001	8/6/2008	8/6/2008
		S-1/GW-2	S-1/GW-3										
VOCs													
(mg/kg)	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs													
(mg/kg)	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.308**
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.299**
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.292**
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.257**
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.313**
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.627**
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.255**
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	0.182 U
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.673**
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.173 U	**0.725**
PCBs													
(mg/kg)	Total PCBs	1	1	**0.116 J**	**0.0687 J**	0.0698 U	0.140 U	0.100 U	**0.111**	**0.116**	0.100 U	0.0500 U	**0.598 J**
Metals													
(mg/kg)	Arsenic	20	20	3.06 U	2.70 U	**22.1**	4.18 U	**2.06**	**1.61**	**2.29**	**1.85**	2.59 U	**2.87**
	Barium	1,000	1,000	**41.8**	**29.7**	**382**	**14.6**	**18**	**19**	**23**	**27**	5.18 U	**84.3**
	Beryllium	90	90	0.31 U	0.27 U	**0.61**	0.42 U	NA	NA	NA	NA	0.26 U	0.28 U
	Cadmium	70	70	**0.38**	0.27 U	**0.70**	0.42 U	0.40 U	0.35 U	**0.42**	0.33 U	0.26 U	**0.43**
	Chromium (III)	1,000	1,000	**10.0**	**4.19**	**27.2**	**7.33**	**5.03**	**4.13**	**5.28**	**9.76**	**2.02**	**9.51**
	Lead	200	200	**65.0**	**36.1**	**425**	**2.91**	**27**	**43**	0.35 U	**16**	**1.86**	**137**
	Mercury	20	20	**0.093**	**0.064**	**0.092**	0.034 U	0.08 U	**0.09**	**0.19**	0.07 U	0.015 U	**0.087**
	Nickel	600	600	**4.27**	**3.31**	**49.3**	**6.13**	NA	NA	NA	NA	**1.52**	**5.15**
	Silver	100	100	0.62 U	0.54 U	0.70 U	0.84 U	0.40 U	0.35 U	0.35 U	0.33 U	0.52 U	**0.85**
	Vanadium	400	400	**11.4**	5.40 U	**56.1**	**8.36**	NA	NA	NA	NA	5.18 U	**7.30**
	Zinc	1,000	1,000	**50.5**	**25.1**	**323**	**25.8**	NA	NA	NA	NA	**4.57**	**67.9**
GRO													
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
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N/A - Not applicable.
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Table C-1.2. Summary of Analytical Results for Soil Samples - HS-2
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SS-12		SS-13		SS-14		SS-15		SS-16		
			Sample Depth (ft.):	0.5	2	0.5	1.5	0.5	2	0.5	2	0.5	1	2
			Sample Date:	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/6/2008
		S-1/GW-2	S-1/GW-3											
VOCs														
(mg/kg)	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs														
(mg/kg)	Acenaphthene	1,000	1,000	0.180 U	0.177 U	0.202 U	**0.197**	0.205 U	0.178 U	0.180 U	0.177 U	0.179 U	**0.200**	0.172 U
	Acenaphthylene	600	10	0.180 U	0.177 U	0.202 U	**0.329**	0.205 U	0.178 U	0.180 U	0.177 U	0.179 U	0.182 U	0.172 U
	Anthracene	1,000	1,000	0.180 U	0.177 U	0.202 U	**1.21**	0.205 U	0.178 U	0.180 U	0.177 U	0.179 U	**0.845**	0.172 U
	Benzo(a)anthracene	7	7	0.180 U	0.177 U	0.202 U	**3.40**	0.205 U	**0.210**	0.180 U	0.177 U	0.179 U	**2.30**	0.172 U
	Benzo(a)pyrene	2	2	0.180 U	0.177 U	0.202 U	**2.16**	0.205 U	**0.217**	0.180 U	0.177 U	0.179 U	**1.99**	0.172 U
	Benzo(b)fluoranthene	7	7	0.180 U	0.177 U	0.202 U	**2.41**	0.205 U	**0.186**	0.180 U	0.177 U	0.179 U	**2.11**	0.172 U
	Benzo(g,h,i)perylene	1,000	1,000	0.180 U	0.177 U	0.202 U	**1.20**	0.205 U	**0.200**	0.180 U	0.177 U	0.179 U	**1.06**	0.172 U
	Benzo(k)fluoranthene	70	70	0.180 U	0.177 U	0.202 U	**1.73**	0.205 U	0.178 U	0.180 U	0.177 U	0.179 U	**0.978**	0.172 U
	Chrysene	70	70	0.180 U	0.177 U	0.202 U	**2.55**	0.205 U	**0.212**	0.180 U	0.177 U	0.179 U	**2.12**	0.172 U
	Dibenz(a,h)anthracene	0.7	0.7	0.180 U	0.177 U	0.202 U	**0.240**	0.205 U	0.178 U	0.180 U	0.177 U	0.179 U	**0.303**	0.172 U
	Fluoranthene	1,000	1,000	**0.309**	0.177 U	**0.218**	**6.71**	0.205 U	**0.431**	0.180 U	0.177 U	0.179 U	**3.96**	0.172 U
	Fluorene	1,000	1,000	0.180 U	0.177 U	0.202 U	**0.442**	0.205 U	0.178 U	0.180 U	0.177 U	0.179 U	**0.412**	0.172 U
	Indeno(1,2,3-cd)pyrene	7	7	0.180 U	0.177 U	0.202 U	**1.57**	0.205 U	**0.181**	0.180 U	0.177 U	0.179 U	**1.24**	0.172 U
	2-Methylnaphthalene	80	300	0.180 U	0.177 U	0.202 U	0.180 U	0.205 U	0.178 U	0.180 U	0.177 U	0.179 U	0.182 U	0.172 U
	Naphthalene	20	500	0.180 U	0.177 U	0.202 U	0.180 U	0.205 U	0.178 U	0.180 U	0.177 U	0.179 U	0.182 U	0.172 U
	Phenanthrene	500	500	**0.193**	0.177 U	0.202 U	**5.85**	0.205 U	**0.280**	0.180 U	0.177 U	0.179 U	**3.25**	0.172 U
	Pyrene	1,000	1,000	**0.330**	0.177 U	0.202 U	**5.53**	0.205 U	**0.428**	0.180 U	0.177 U	0.179 U	**3.41**	0.172 U
PCBs														
(mg/kg)	Total PCBs	1	1	**0.679 J**	0.0511 U	**0.1607 J**	**1.945 J**	0.0575 U	**0.945 J**	0.0528 U	**0.0873 J**	0.0526 U	**3.5 J**	0.0500 U
Metals														
(mg/kg)	Arsenic	20	20	2.69 U	2.65 U	3.03 U	**3.87**	**4.46**	2.66 U	**4.36**	2.66 U	**4.75**	**5.70**	2.58 U
	Barium	1,000	1,000	**9.17**	**11.9**	**19.5**	**77.6**	**88.2**	**53.0**	**167**	**15.9**	**209**	**130**	**7.08**
	Beryllium	90	90	0.27 U	0.27 U	0.31 U	0.27 U	0.31 U	0.27 U	0.27 U	0.27 U	0.27 U	0.28 U	0.26 U
	Cadmium	70	70	0.27 U	0.27 U	0.31 U	**0.74**	**1.09**	**0.36**	**0.29**	0.27 U	0.27 U	**1.68**	0.26 U
	Chromium (III)	1,000	1,000	**2.58**	**1.92**	**5.74**	**13.0**	**15.6**	**5.27**	**54.6**	**2.34**	**58.6**	**15.4**	**2.09**
	Lead	200	200	**42.9**	**4.03**	**43.2**	**338**	**363**	**58.8**	**0.97**	**13.7**	0.81 U	**342**	**4.07**
	Mercury	20	20	**0.031**	0.019 U	**0.061**	**0.368**	**0.050**	**0.127**	0.013 U	**0.181**	0.015 U	**0.313**	0.020 U
	Nickel	600	600	**1.53**	**2.07**	**3.04**	**8.23**	**10.0**	**3.98**	**33.6**	**2.25**	**29.1**	**10.0**	**1.87**
	Silver	100	100	0.54 U	0.53 U	**0.86**	**1.16**	**1.31**	**0.86**	**5.35**	**0.54**	**3.05**	**1.36**	0.52 U
	Vanadium	400	400	5.38 U	5.30 U	**10.3**	**14.9**	**18.7**	**5.70**	**39.1**	5.31 U	**49.2**	**14.1**	5.16 U
	Zinc	1,000	1,000	**19.7**	**14.2**	**38.4**	**129**	**151**	**64.0**	**24.0**	**14.9**	**30.0**	**190**	**6.75**
GRO														
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
TSCA - Toxic Substances Control Act criteria.
* - TRC developed standards.

Table C-1.2. Summary of Analytical Results for Soil Samples - HS-2
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SS-17		SS-18		SS-19			SS-20		
		Sample Depth (ft.):		0.5	1.5	0.5	2	0.5	1	2	0.5	1	2
		Sample Date:		8/6/2008	8/6/2008	8/6/2008	8/6/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008 combo	8/7/2008
		S-1/GW-2	S-1/GW-3										
VOCs (mg/kg)	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs (mg/kg)	Acenaphthene	1,000	1,000	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U
	Acenaphthylene	600	10	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U
	Anthracene	1,000	1,000	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**0.964**	0.170 U	0.178 U	0.184 U	0.173 U
	Benzo(a)anthracene	7	7	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**2.15**	0.170 U	0.178 U	**0.473**	0.173 U
	Benzo(a)pyrene	2	2	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**1.89**	0.170 U	0.178 U	**0.458**	0.173 U
	Benzo(b)fluoranthene	7	7	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**2.24**	0.170 U	0.178 U	**0.553**	0.173 U
	Benzo(g,h,i)perylene	1,000	1,000	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**1.43**	0.170 U	0.178 U	**0.24275 J**	0.173 U
	Benzo(k)fluoranthene	70	70	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	**0.14675 J**	0.173 U
	Chrysene	70	70	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**2.13**	0.170 U	0.178 U	**0.460**	0.173 U
	Dibenz(a,h)anthracene	0.7	0.7	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U
	Fluoranthene	1,000	1,000	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**5.06**	0.170 U	0.178 U	**0.7525**	0.173 U
	Fluorene	1,000	1,000	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U
	Indeno(1,2,3-cd)pyrene	7	7	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**1.51**	0.170 U	0.178 U	**0.25825 J**	0.173 U
	2-Methylnaphthalene	80	300	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U
	Naphthalene	20	500	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	0.933 U	0.170 U	0.178 U	0.184 U	0.173 U
	Phenanthrene	500	500	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**4.42**	0.170 U	0.178 U	**0.412**	0.173 U
	Pyrene	1,000	1,000	0.180 U	0.174 U	0.178 U	0.171 U	0.176 U	**4.48**	0.170 U	0.178 U	**1.03**	0.173 U
PCBs (mg/kg)	Total PCBs	1	1	0.0518 U	0.0507 U	0.0502 U	0.0500 U	0.0512 U	**4.93 J**	0.0500 U	0.0519 U	**0.5 J**	0.0502 U
Metals (mg/kg)	Arsenic	20	20	**4.87**	2.61 U	**4.61**	2.56 U	**4.23**	**8.07**	2.55 U	**4.65**	**3.245**	2.59 U
	Barium	1,000	1,000	**202**	**11.3**	**181**	**6.92**	**204**	**437**	**11.2**	**244**	**50.15**	**9.38**
	Beryllium	90	90	0.27 U	0.27 U	0.27 U	0.26 U	0.27 U	0.28 U	**0.47**	0.27 U	0.28 U	0.26 U
	Cadmium	70	70	0.27 U	0.27 U	0.27 U	0.26 U	0.27 U	**5.29**	0.26 U	0.27 U	**2.74**	0.26 U
	Chromium (III)	1,000	1,000	**54.9**	**2.85**	**59.0**	**1.94**	**68.1**	**30.2**	**2.24**	**66.7**	**12.35**	**2.15**
	Lead	200	200	0.81 U	**2.78**	**0.87**	**2.31**	**4.02**	**671**	**4.41**	**1.75**	**78.65**	**2.82**
	Mercury	20	20	0.015 U	0.021 U	0.024 U	0.017 U	0.020 U	**0.616**	**0.017**	0.026 U	**0.0835**	0.019 U
	Nickel	600	600	**23.3**	**2.12**	**25.1**	**2.42**	**30.9**	**21.4**	**2.70**	**29.5**	**7.765**	**2.41**
	Silver	100	100	**2.07**	0.53 U	**1.11**	**0.98**	**4.93**	**5.89**	**1.38**	**5.31**	**2.725**	**1.07**
	Vanadium	400	400	**48.0**	5.22 U	**47.2**	5.12 U	**50.3**	**24.6**	5.10 U	**59.3**	**15.35**	5.17 U
	Zinc	1,000	1,000	**30.4**	**8.27**	**30.5**	**7.51**	**49.6**	**562**	**9.06**	**39.4**	**80.3**	**8.34**
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
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NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
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Values in **Bold** indicate the compound was detected.
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PAHs - Polynuclear Aromatic Hydrocarbons.
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GRO - Gasoline Range Organics.
TSCA - Toxic Substances Control Act criteria.
* - TRC developed standards.

Table C-1.2. Summary of Analytical Results for Soil Samples - HS-2
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SS-21		SS-22		SS-23		SS-24			SS-25	
			Sample Depth (ft.):	0.5	2	0.5	1.5	0.5	2	0.5	1.5	1-3	0.5	1.5
			Sample Date:	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	3/31/2009	8/7/2008	8/7/2008
		S-1/GW-2	S-1/GW-3											
VOCs														
(mg/kg)	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs														
(mg/kg)	Acenaphthene	1,000	1,000	0.201 U	**1.93**	0.191 U	0.181 U	0.196 U	0.176 U	0.198 U	0.184 U	**0.920**	0.200 U	0.189 U
	Acenaphthylene	600	10	0.201 U	0.181 U	0.191 U	0.181 U	0.196 U	0.176 U	0.198 U	0.184 U	**2.40**	0.200 U	0.189 U
	Anthracene	1,000	1,000	0.201 U	**3.19**	0.191 U	**0.182**	0.196 U	0.176 U	0.198 U	0.184 U	**4.11**	0.200 U	0.189 U
	Benzo(a)anthracene	7	7	**0.398**	**4.16**	0.191 U	**0.789**	0.196 U	0.176 U	0.198 U	0.184 U	**6.33**	0.200 U	**0.216**
	Benzo(a)pyrene	2	2	**0.381**	**3.93**	0.191 U	**0.749**	0.196 U	0.176 U	0.198 U	0.184 U	**5.28**	0.200 U	**0.214**
	Benzo(b)fluoranthene	7	7	**0.453**	**4.01**	0.191 U	**0.843**	0.196 U	0.176 U	0.198 U	0.184 U	**6.09**	0.200 U	0.189 U
	Benzo(g,h,i)perylene	1,000	1,000	**0.303**	**3.13**	0.191 U	**0.508**	0.196 U	0.176 U	0.198 U	0.184 U	**2.47**	0.200 U	0.189 U
	Benzo(k)fluoranthene	70	70	0.201 U	**1.66**	0.191 U	**0.325**	0.196 U	0.176 U	0.198 U	0.184 U	**2.42**	0.200 U	0.189 U
	Chrysene	70	70	**0.404**	**4.05**	0.191 U	**0.795**	0.196 U	0.176 U	0.198 U	0.184 U	**5.98**	0.200 U	**0.237**
	Dibenz(a,h)anthracene	0.7	0.7	0.201 U	**0.722**	0.191 U	0.181 U	0.196 U	0.176 U	0.198 U	0.184 U	**0.780**	0.200 U	0.189 U
	Fluoranthene	1,000	1,000	**0.826**	**10.3**	0.191 U	**1.31**	0.196 U	0.176 U	**0.266**	0.184 U	**12.1**	0.200 U	**0.353**
	Fluorene	1,000	1,000	0.201 U	**1.37**	0.191 U	0.181 U	0.196 U	0.176 U	0.198 U	0.184 U	**3.20**	0.200 U	0.189 U
	Indeno(1,2,3-cd)pyrene	7	7	**0.334**	**3.41**	0.191 U	**0.585**	0.196 U	0.176 U	0.198 U	0.184 U	**3.35**	0.200 U	0.189 U
	2-Methylnaphthalene	80	300	0.201 U	**0.392**	0.191 U	0.181 U	0.196 U	0.176 U	0.198 U	0.184 U	**1.52**	0.200 U	0.189 U
	Naphthalene	20	500	0.201 U	**0.658**	0.191 U	0.181 U	0.196 U	0.176 U	0.198 U	0.184 U	**2.55**	0.200 U	0.189 U
	Phenanthrene	500	500	**0.610**	**11.2**	0.191 U	**0.853**	0.196 U	0.176 U	0.198 U	0.184 U	**18.9**	0.200 U	0.189 U
	Pyrene	1,000	1,000	**0.897**	**11.2**	**0.209**	**1.43**	0.196 U	0.176 U	**0.278**	0.184 U	**11.1**	0.200 U	**0.412**
PCBs														
(mg/kg)	Total PCBs	1	1	**0.486 J**	**0.269 J**	0.0543 U	**0.796 J**	0.0590 U	0.0522 U	0.0545 U	0.0524 U	0.0599 U	0.0592 U	**0.2852 J**
Metals														
(mg/kg)	Arsenic	20	20	**4.51**	2.72 U	**3.80**	**4.12**	**3.55**	2.64 U	**3.19**	2.76 U	**7.05**	**3.42**	**3.96**
	Barium	1,000	1,000	**56.4**	**14.9**	**36.4**	**174**	**39.2**	**9.27**	**22.2**	**14.4**	**277**	**26.8**	**63.2**
	Beryllium	90	90	0.31 U	0.28 U	0.29 U	0.28 U	0.30 U	0.27 U	0.30 U	0.28 U	NA	0.30 U	0.29 U
	Cadmium	70	70	**0.89**	0.28 U	0.29 U	**1.74**	0.30 U	0.27 U	0.30 U	0.28 U	**1.28**	0.30 U	**0.69**
	Chromium (III)	1,000	1,000	**17.6**	**3.09**	**14.7**	**11.8**	**16.7**	**2.11**	**8.84**	**2.41**	**11.9**	**15.7**	**10.5**
	Lead	200	200	**115**	**19.1**	**36.1**	**355**	**21.9**	**3.50**	**31.5**	**9.45**	**401**	**24.3**	**141**
	Mercury	20	20	**0.117**	**0.021**	**0.050**	**0.263**	**0.044**	0.020 U	**0.056**	0.022 U	NA	**0.046**	**0.165**
	Nickel	600	600	**9.71**	**3.39**	**8.27**	**9.98**	**9.02**	**2.57**	**6.17**	**2.79**	NA	**7.33**	**5.30**
	Silver	100	100	**4.36**	**1.31**	**2.78**	**3.11**	**2.56**	**1.04**	**1.91**	**1.17**	NA	**1.12**	**0.79**
	Vanadium	400	400	**19.6**	5.43 U	**19.9**	**11.6**	**20.3**	5.28 U	**14.3**	5.52 U	NA	**17.0**	**11.2**
	Zinc	1,000	1,000	**84.4**	**23.4**	**33.2**	**174**	**25.1**	**7.90**	**21.8**	**17.1**	NA	**24.3**	**140**
GRO														
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
TSCA - Toxic Substances Control Act criteria.
* - TRC developed standards.

Table C-1.2. Summary of Analytical Results for Soil Samples - HS-2
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SS-26			SS-27			SS-28		SS-28		SS-29	
		Sample Depth (ft.):		0.5	1.5	2	0.5	2	1-3	0.5	1.5	0-1	1-3	0.5	2
		Sample Date:		8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	3/31/2009	8/7/2008	8/7/2008 combo	6/8/2011	6/8/2011	8/7/2008	8/7/2008
		S-1/GW-2	S-1/GW-3												
VOCs															
(mg/kg)	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs															
(mg/kg)	Acenaphthene	1,000	1,000	0.204 U	**0.652**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Acenaphthylene	600	10	0.204 U	**0.271**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Anthracene	1,000	1,000	0.204 U	**2.23**	0.176 U	0.188 U	0.196 U	**0.224**	0.203 U	**0.15425 J**	NA	NA	0.200 U	0.208 U
	Benzo(a)anthracene	7	7	0.204 U	**3.86**	0.176 U	0.188 U	**0.273**	**1.44**	**0.394**	**0.6735**	NA	NA	0.200 U	0.208 U
	Benzo(a)pyrene	2	2	0.204 U	**3.09**	0.176 U	0.188 U	**0.254**	**1.26**	**0.372**	**0.628**	NA	NA	0.200 U	0.208 U
	Benzo(b)fluoranthene	7	7	0.204 U	**3.10**	0.176 U	0.188 U	**0.298**	**1.85**	0.203 U	**0.6815**	NA	NA	0.200 U	0.208 U
	Benzo(g,h,i)perylene	1,000	1,000	0.204 U	**2.49**	0.176 U	0.188 U	0.196 U	**0.712**	**0.352**	**0.462**	NA	NA	0.200 U	0.208 U
	Benzo(k)fluoranthene	70	70	0.204 U	**1.26**	0.176 U	0.188 U	0.196 U	**0.640**	0.203 U	**0.2445**	NA	NA	0.200 U	0.208 U
	Chrysene	70	70	0.204 U	**3.53**	0.176 U	0.188 U	**0.291**	**1.67**	**0.378**	**0.6845**	NA	NA	0.200 U	0.208 U
	Dibenz(a,h)anthracene	0.7	0.7	0.204 U	**0.675**	0.176 U	0.188 U	0.196 U	**0.204**	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Fluoranthene	1,000	1,000	0.204 U	**8.39**	0.176 U	0.188 U	**0.549**	**2.76**	**0.670**	**1.27**	NA	NA	0.200 U	0.208 U
	Fluorene	1,000	1,000	0.204 U	**1.07**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Indeno(1,2,3-cd)pyrene	7	7	0.204 U	**2.83**	0.176 U	0.188 U	**0.243**	**0.965**	**0.382**	**0.5405**	NA	NA	0.200 U	0.208 U
	2-Methylnaphthalene	80	300	0.204 U	**0.487**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Naphthalene	20	500	0.204 U	**0.584**	0.176 U	0.188 U	0.196 U	0.200 U	0.203 U	0.192 U	NA	NA	0.200 U	0.208 U
	Phenanthrene	500	500	0.204 U	**8.55**	0.176 U	0.188 U	**0.350**	**1.54**	**0.640**	**0.8955**	NA	NA	0.200 U	0.208 U
	Pyrene	1,000	1,000	0.204 U	**7.93**	0.176 U	0.188 U	**0.521**	**2.75**	**0.729**	**1.185**	NA	NA	0.200 U	0.208 U
PCBs															
(mg/kg)	Total PCBs	1	1	0.0567 U	**1.653 J**	0.0519 U	**0.0882 J**	**0.637 J**	**0.197 J**	**4.19 J**	**2.25 J**	**0.544**	**0.0233**	0.0578 U	**0.432 J**
Metals															
(mg/kg)	Arsenic	20	20	**3.23**	**7.53**	2.64 U	2.82 U	**3.46**	**5.68**	3.04 U	**5.45**	NA	NA	2.99 U	**8.34**
	Barium	1,000	1,000	**29.1**	**157**	**14.2**	**19.3**	**151**	**325**	**27.2**	**117.5**	NA	NA	**17.1**	**296**
	Beryllium	90	90	0.31 U	**0.29**	0.27 U	0.29 U	0.30 U	NA	0.31 U	**0.2175 J**	NA	NA	0.30 U	**0.82**
	Cadmium	70	70	0.31 U	**2.43**	0.27 U	**0.42**	**0.73**	**1.17**	**0.39**	**1.69**	NA	NA	0.30 U	**0.72**
	Chromium (III)	1,000	1,000	**16.9**	**13.5**	**2.24**	**6.33**	**7.85**	**7.09**	**6.99**	**13.65**	NA	NA	**5.19**	**13.0**
	Lead	200	200	**21.4**	**537**	**10.4**	**40.3**	**284**	**890**	**64.3**	**387**	NA	NA	**26.9**	**426**
	Mercury	20	20	**0.057**	**1.02**	**0.027**	**0.052**	**0.147**	NA	**0.107**	**0.725**	NA	NA	**0.059**	**0.792**
	Nickel	600	600	**7.64**	**25.7**	**2.65**	**4.76**	**6.56**	NA	**4.56**	**8.655**	NA	NA	**3.28**	**12.4**
	Silver	100	100	**1.04**	**2.66**	**1.20**	**1.29**	**0.98**	NA	**0.89**	**1.58**	NA	NA	**0.68**	**1.19**
	Vanadium	400	400	**17.1**	**10.7**	5.27 U	**10.1**	**8.33**	NA	**11.1**	**11.5**	NA	NA	**9.87**	**23.4**
	Zinc	1,000	1,000	**22.7**	**279**	**28.1**	**79.7**	**244**	NA	**41.1**	**187.5**	NA	NA	**21.7**	**218**
GRO															
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
TSCA - Toxic Substances Control Act criteria.
* - TRC developed standards.

Table C-1.2. Summary of Analytical Results for Soil Samples - HS-2
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SS-30		SS-31			SS-32	SS-32	SS-33		SS-34		SS-35		
		Sample Depth (ft.):		0.5	1.5	0.5	2	1-3	0-1	1-3	0.5	2	0.5	2	0.5	1.5	1-3
		Sample Date:		8/7/2008	8/7/2008	8/7/2008	8/7/2008	3/31/2009	2/27/2009	2/26/2009	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	8/7/2008	3/31/2009
		S-1/GW-2	S-1/GW-3					combo	combo	combo							
VOCs																	
(mg/kg)	1,2,4-Trichlorobenzene	6	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs																	
(mg/kg)	Acenaphthene	1,000	1,000	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	**0.184**
	Acenaphthylene	600	10	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	0.177 U
	Anthracene	1,000	1,000	0.188 U	**0.663**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**0.350**	0.195 U	0.177 U	0.197 U	**0.420**	**0.510**
	Benzo(a)anthracene	7	7	0.188 U	**0.965**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**0.704**	0.195 U	0.177 U	0.197 U	**0.764**	**1.15**
	Benzo(a)pyrene	2	2	0.188 U	**0.758**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**0.662**	0.195 U	0.177 U	0.197 U	**0.647**	**1.11**
	Benzo(b)fluoranthene	7	7	0.188 U	**0.751**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**0.711**	0.195 U	0.177 U	0.197 U	**0.653**	**1.17**
	Benzo(g,h,i)perylene	1,000	1,000	0.188 U	**0.454**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**0.436**	0.195 U	0.177 U	0.197 U	**0.328**	**0.737**
	Benzo(k)fluoranthene	70	70	0.188 U	**0.372**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**0.281**	0.195 U	0.177 U	0.197 U	**0.276**	**0.407**
	Chrysene	70	70	0.188 U	**0.875**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**0.686**	0.195 U	0.177 U	0.197 U	**0.723**	**1.25**
	Dibenz(a,h)anthracene	0.7	0.7	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	0.177 U
	Fluoranthene	1,000	1,000	0.188 U	**2.59**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**1.53**	0.195 U	0.177 U	0.197 U	**1.68**	**2.39**
	Fluorene	1,000	1,000	0.188 U	**0.286**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	**0.208**
	Indeno(1,2,3-cd)pyrene	7	7	0.188 U	**0.559**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**0.473**	0.195 U	0.177 U	0.197 U	**0.405**	**0.793**
	2-Methylnaphthalene	80	300	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	0.177 U
	Naphthalene	20	500	0.188 U	0.175 U	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	0.184 U	0.195 U	0.177 U	0.197 U	0.184 U	0.177 U
	Phenanthrene	500	500	0.188 U	**3.01**	0.195 U	0.212 U	0.1905 U	NA	NA	0.203 U	**1.27**	0.195 U	0.177 U	0.197 U	**1.74**	**3.21**
	Pyrene	1,000	1,000	0.188 U	**1.91**	0.195 U	0.212 U	**0.15275 J**	NA	NA	0.203 U	**1.33**	0.195 U	0.177 U	0.197 U	**1.46**	**3.37**
PCBs																	
(mg/kg)	Total PCBs	1	1	0.0566 U	0.0506 U	**0.0664 J**	0.0592 U	0.0563 U	**0.1338**	**0.385**	**0.103 J**	**0.538 J**	**0.160 J**	0.0525 U	**0.161 J**	**0.685 J**	0.0529 U
Metals																	
(mg/kg)	Arsenic	20	20	2.82 U	2.62 U	**2.99**	**9.18**	**5.82**	NA	NA	3.04 U	2.75 U	**3.09**	2.66 U	2.96 U	**5.15**	2.66 U
	Barium	1,000	1,000	**18.2**	**14.9**	**18.6**	**197**	**136**	NA	NA	**22.2**	**63.4**	**26.2**	**15.9**	**20.3**	**37.8**	**24.4**
	Beryllium	90	90	0.29 U	0.27 U	0.30 U	0.32 U	NA	NA	NA	0.31 U	0.28 U	0.30 U	0.27 U	0.30 U	0.28 U	NA
	Cadmium	70	70	0.29 U	0.27 U	0.30 U	**0.82**	**0.2225 J**	NA	NA	0.31 U	0.28 U	0.30 U	0.27 U	0.30 U	0.28 U	0.27 U
	Chromium (III)	1,000	1,000	**6.54**	**2.76**	**5.66**	**10.5**	**7.11**	NA	NA	**6.02**	**6.69**	**6.53**	**2.32**	**5.02**	**7.74**	**4.10**
	Lead	200	200	**22.7**	**52.4**	**31.7**	**302**	**219**	NA	NA	**37.0**	**130**	**90.4**	**4.28**	**37.1**	**109**	**45.0**
	Mercury	20	20	**0.047**	**0.018**	**0.057**	**0.233**	NA	NA	NA	**0.084**	**0.315**	**0.084**	0.022 U	**0.063**	**0.162**	NA
	Nickel	600	600	**4.67**	**3.09**	**6.18**	**12.7**	NA	NA	NA	**4.71**	**5.77**	**5.39**	**2.67**	**3.76**	**5.45**	NA
	Silver	100	100	**2.01**	**1.26**	**1.89**	**3.47**	NA	NA	NA	**1.86**	**1.70**	**2.44**	**1.15**	**1.70**	**2.12**	NA
	Vanadium	400	400	**12.3**	**5.34**	**11.9**	**25.9**	NA	NA	NA	**11.8**	**8.77**	**13.0**	5.31 U	**10.9**	**10.1**	NA
	Zinc	1,000	1,000	**21.0**	**28.6**	**26.9**	**93.6**	NA	NA	NA	**33.9**	**70.3**	**39.9**	**10.6**	**26.8**	**57.0**	NA
GRO																	
(mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
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NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No standard available for this compound.
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Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
TSCA - Toxic Substances Control Act criteria.
* - TRC developed standards.

Table C-1.3. Summary of Analytical Results for Soil Samples - HS-3
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HRG17		HRG21	HRI-17		HRI-19	HRJ.75-17	HRK-19	HRK-21		HRK23
		Sample Depth (ft.):		2.5-3	1-3	2.5-3	2-3	1-3	1.5-2.5	1-2.5	1-3	1-3	1-3	0.5-3
		Sample Date:		2/21/2006	4/7/2009	2/21/2006	2/21/2006	4/7/2009	2/21/2006	2/21/2006	2/21/2006	2/21/2006 combo	4/7/2009	2/21/2006
		S-1/GW-2	S-1/GW-3											
VOCs														
(mg/kg)	Benzene	40	40	NA	NA	NA	NA	NA	NA	**0.036**	NA	NA	NA	NA
	Toluene	500	500	NA	NA	NA	NA	NA	NA	**0.041**	NA	NA	NA	NA
	1,2,4-Trimethylbenzene	100(1)	100(1)	NA	NA	NA	NA	NA	NA	**0.046**	NA	NA	NA	NA
PAHs														
(mg/kg)	Acenaphthene	1,000	1,000	NA	0.182 U	NA	NA	0.196 U	NA	NA	NA	NA	**0.332**	NA
	Acenaphthylene	600	10	NA	0.182 U	NA	NA	0.196 U	NA	NA	NA	NA	0.255 U	NA
	Anthracene	1,000	1,000	NA	0.182 U	NA	NA	**0.613**	NA	NA	NA	NA	**0.972**	NA
	Benzo(a)anthracene	7	7	NA	0.182 U	NA	NA	**1.97**	NA	NA	NA	NA	**1.72**	NA
	Benzo(a)pyrene	2	2	NA	0.182 U	NA	NA	**1.89**	NA	NA	NA	NA	**1.51**	NA
	Benzo(b)fluoranthene	7	7	NA	0.182 U	NA	NA	**2.13**	NA	NA	NA	NA	**1.76**	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	0.182 U	NA	NA	**0.865**	NA	NA	NA	NA	**0.902**	NA
	Benzo(k)fluoranthene	70	70	NA	0.182 U	NA	NA	**0.851**	NA	NA	NA	NA	**0.657**	NA
	Chrysene	70	70	NA	0.182 U	NA	NA	**2.01**	NA	NA	NA	NA	**1.84**	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.182 U	NA	NA	**0.266**	NA	NA	NA	NA	**0.273**	NA
	Fluoranthene	1,000	1,000	NA	0.182 U	NA	NA	**3.12**	NA	NA	NA	NA	**3.47**	NA
	Fluorene	1,000	1,000	NA	0.182 U	NA	NA	0.196 U	NA	NA	NA	NA	**0.453**	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	0.182 U	NA	NA	**1.16**	NA	NA	NA	NA	**1.17**	NA
	Naphthalene	20	500	NA	0.182 U	NA	NA	0.196 U	NA	**11**	NA	NA	**0.367**	NA
	Phenanthrene	500	500	NA	0.182 U	NA	NA	**2.60**	NA	NA	NA	NA	**4.69**	NA
	Pyrene	1,000	1,000	NA	0.182 U	NA	NA	**3.64**	NA	NA	NA	NA	**3.59**	NA
PCBs														
(mg/kg)	Total PCBs	1	1	0.22 U	**0.162 J**	**0.15**	**0.34**	**0.0940 J**	**0.23**	**0.76**	0.04 U	0.039 U	0.0655 U	0.25 U
Metals														
(mg/kg)	Arsenic	20	20	NA	2.72 U	NA	NA	**3.74**	NA	NA	NA	NA	**8.02**	NA
	Barium	1,000	1,000	NA	**9.14**	NA	NA	**106**	NA	NA	NA	NA	**223**	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	0.28 U	NA	NA	**0.46**	NA	NA	NA	NA	**1.45**	NA
	Chromium (III)	1,000	1,000	NA	**2.20**	NA	NA	**6.57**	NA	NA	NA	NA	**8.23**	NA
	Lead	200	200	NA	**11.6**	NA	NA	**218**	NA	NA	NA	NA	**96.6**	NA
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
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J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
* - TRC developed standards.
(1) - MassDEP standards for C9-C10 aromatics used.

Table C-1.3. Summary of Analytical Results for Soil Samples - HS-3
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		NBHS-SS-5	NBHS-SS-6	SS-6	SS-7	SS-8	SB-360		SB-360	SS-36	SS-37	
		Sample Depth (ft.):		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	5	8	1-3	1-3	0.5	2
		Sample Date:		8/6/2008	8/6/2008	7/23/2001	7/23/2001	7/23/2001	3/4/2009	3/4/2009	3/4/2009	3/9/2009	8/8/2008	8/8/2008
		S-1/GW-2	S-1/GW-3								combo	combo		combo
VOCs														
(mg/kg)	Benzene	40	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Toluene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,4-Trimethylbenzene	100(1)	100(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs														
(mg/kg)	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**0.259 J**
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**0.482 J**
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**4.23**
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**6.12**
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**6.76**
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**7.26**
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**3.92**
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**1.212 J**
	Chrysene	70	70	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**5.45**
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**0.552 J**
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**17.1**
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**0.792 J**
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**5.32**
	Naphthalene	20	500	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**0.176 J**
	Phenanthrene	500	500	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**18.2**
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	0.301 U	0.230 U	NA	NA	0.192 U	**13.8**
PCBs														
(mg/kg)	Total PCBs	1	1	**0.0956 J**	0.0524 U	0.100 U	0.100 U	0.100 U	0.0822 U	0.0578 U	NA	NA	0.0551 U	**0.152 J**
Metals														
(mg/kg)	Arsenic	20	20	NA	NA	**1.61**	**2.37**	**3.48**	**14.5**	3.45 U	NA	NA	**4.09**	**4.79**
	Barium	1,000	1,000	NA	NA	**12**	**27**	**66**	**760**	**10.0**	**376**	NA	**13.0**	**94.35**
	Beryllium	90	90	NA	NA	NA	NA	NA	**0.97**	0.35 U	NA	NA	0.29 U	0.285 U
	Cadmium	70	70	NA	NA	0.35 U	0.38 U	**0.41**	**1.21**	0.35 U	NA	NA	0.29 U	**0.36**
	Chromium (III)	1,000	1,000	NA	NA	**4.59**	**5.09**	**6.45**	**16.6**	**4.30**	**10.7**	NA	**5.68**	**7.18**
	Lead	200	200	NA	NA	**18**	**65**	**162**	**6,870**	**5.53**	**342**	**243**	**14.7**	**286**
	Mercury	20	20	NA	NA	0.07 U	0.08 U	**0.40**	**0.275**	**0.016**	NA	NA	**0.039**	**0.27**
	Nickel	600	600	NA	NA	NA	NA	NA	**21.5**	**4.54**	NA	NA	**4.00**	**6.73**
	Silver	100	100	NA	NA	0.35 U	0.38 U	0.37 U	0.91 U	0.69 U	NA	NA	**1.69**	**2.38**
	Vanadium	400	400	NA	NA	NA	NA	NA	**49.4**	6.89 U	NA	NA	**10.1**	**12.2**
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	**423**	**30.7**	NA	NA	**17.7**	**112.5**

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PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
* - TRC developed standards.
(1) - MassDEP standards for C9-C10 aromatics used.

Table C-1.3. Summary of Analytical Results for Soil Samples - HS-3
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SS-38			SS-38		SS-39			SS-40		SS-41	
		Sample Depth (ft.):		0.5	1.5	1-3	0-1	1-3	0.5	2	1-3	0.5	2	0.5	2
		Sample Date:		8/8/2008	8/8/2008	3/31/2009	6/8/2011	6/8/2011	8/8/2008	8/8/2008	3/31/2009	8/8/2008	8/8/2008	8/8/2008	8/8/2008
		S-1/GW-2	S-1/GW-3												
VOCs															
(mg/kg)	Benzene	40	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Toluene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,2,4-Trimethylbenzene	100(1)	100(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PAHs															
(mg/kg)	Acenaphthene	1,000	1,000	0.198 U	0.197 U	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	0.210 U	0.188 U	0.175 U
	Acenaphthylene	600	10	0.198 U	0.197 U	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	0.210 U	0.188 U	0.175 U
	Anthracene	1,000	1,000	0.198 U	0.197 U	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**0.362**	0.188 U	0.175 U
	Benzo(a)anthracene	7	7	0.198 U	**0.258**	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**1.15**	0.188 U	0.175 U
	Benzo(a)pyrene	2	2	0.198 U	**0.317**	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**1.11**	0.188 U	0.175 U
	Benzo(b)fluoranthene	7	7	0.198 U	**0.382**	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**1.25**	0.188 U	0.175 U
	Benzo(g,h,i)perylene	1,000	1,000	0.198 U	**0.303**	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**0.851**	0.188 U	0.175 U
	Benzo(k)fluoranthene	70	70	0.198 U	0.197 U	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**0.494**	0.188 U	0.175 U
	Chrysene	70	70	0.198 U	**0.323**	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**1.17**	0.188 U	0.175 U
	Dibenz(a,h)anthracene	0.7	0.7	0.198 U	0.197 U	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**0.217**	0.188 U	0.175 U
	Fluoranthene	1,000	1,000	**0.275**	**0.349**	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**2.40**	0.188 U	0.175 U
	Fluorene	1,000	1,000	0.198 U	0.197 U	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	0.210 U	0.188 U	0.175 U
	Indeno(1,2,3-cd)pyrene	7	7	0.198 U	**0.305**	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**0.929**	0.188 U	0.175 U
	Naphthalene	20	500	0.198 U	0.197 U	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	0.210 U	0.188 U	0.175 U
	Phenanthrene	500	500	0.198 U	**0.254**	0.214 U	NA	NA	0.187 U	0.175 U	0.183 U	0.195 U	**1.71**	0.188 U	0.175 U
	Pyrene	1,000	1,000	**0.281**	**0.346**	0.214 U	NA	NA	0.187 U	0.175 U	**0.193**	0.195 U	**2.49**	0.188 U	0.175 U
PCBs															
(mg/kg)	Total PCBs	1	1	**0.611 J**	**0.580 J**	0.0640 U	**1.11**	**0.06**	0.0541 U	0.0562 U	0.0501 U	0.0589 U	**0.618 J**	0.0539 U	0.0516 U
Metals															
(mg/kg)	Arsenic	20	20	**4.10**	**16.0**	**14.6**	NA	NA	2.80 U	2.62 U	2.74 U	2.93 U	**7.24**	**2.97**	2.62 U
	Barium	1,000	1,000	**58.6**	**311**	**801**	NA	NA	**9.21**	**5.94**	**45.2**	**13.4**	**410**	**9.05**	**6.93**
	Beryllium	90	90	0.30 U	**0.79**	NA	NA	NA	0.28 U	0.27 U	NA	0.30 U	**0.43**	0.29 U	0.27 U
	Cadmium	70	70	**0.47**	**1.05**	**0.86**	NA	NA	0.28 U	0.27 U	**0.52**	0.30 U	**1.53**	0.29 U	0.27 U
	Chromium (III)	1,000	1,000	**6.89**	**12.6**	**18.0**	NA	NA	**5.06**	**2.52**	**4.64**	**5.66**	**15.4**	**5.21**	**3.01**
	Lead	200	200	**167**	**605**	**865**	NA	NA	**8.45**	**2.93**	**103**	**13.9**	**819**	**9.69**	**12.1**
	Mercury	20	20	**0.175**	**0.280**	NA	NA	NA	**0.026**	0.013 U	NA	**0.032**	**0.654**	**0.037**	0.018 U
	Nickel	600	600	**3.95**	**11.2**	NA	NA	NA	**3.32**	**2.23**	NA	**3.01**	**10.7**	**2.93**	**2.45**
	Silver	100	100	**0.81**	**1.00**	NA	NA	NA	**0.85**	0.53 U	NA	**0.82**	**1.05**	**1.04**	**0.52**
	Vanadium	400	400	**10.9**	**18.6**	NA	NA	NA	**9.18**	5.24 U	NA	**9.43**	**20.9**	**7.92**	5.23 U
	Zinc	1,000	1,000	**101**	**269**	NA	NA	NA	**10.4**	**8.18**	NA	**16.4**	**506**	**11.3**	**11.9**

Notes:
All units in mg/kg unless otherwise specified.
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline Range Organics.
* - TRC developed standards.
(1) - MassDEP standards for C9-C10 aromatics used.

Table C-1.4. Summary of Analytical Results for Soil Samples - HS-4
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HE-44		HF-31	HF-31	HF-31D	HF35	HF-35	HF-35	HF-38	HF40	HF-40	HF-40	HF-43	HF-43
		Sample Depth (ft.):		0-1	1-3	0-1	1-3	4-6	2.5-3.5	0-1	1-3	1-3	3-5	0-1	1-3	0-1	1-3
		Sample Date:		3/31/2009	3/31/2009	4/2/2009	4/2/2009	4/15/2010	12/30/2004	4/1/2009	4/1/2009	4/2/2009	4/15/2010	3/10/2009	3/10/2009	4/1/2009	7/11/2011
		S-1/GW-2	S-1/GW-3														
SVOCs																	
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	2.1 U	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	**8.9**	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	**3.9**	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	**0.68**	NA	NA	NA	0.176 U	**7.0**	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	**0.64**	NA	NA	NA	0.176 U	**13**	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	**0.98**	NA	NA	NA	0.176 U	**12**	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	**8.6**	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	**4.1**	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	**0.66**	NA	NA	NA	0.176 U	**9.6**	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	2.1 U	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	**0.90**	NA	NA	NA	0.176 J:\P	**30**	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	**2.3**	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	**7.9**	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	2.1 U	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	0.45 U	NA	NA	NA	0.176 U	**17**	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	**1.0**	NA	NA	NA	0.176 U	**37**	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	**0.64**	NA	NA	NA	0.176 U	**27**	NA	NA	NA	NA
PCBs																	
(mg/kg)	Total PCBs	1	1	0.0571 U	**0.756 J**	**0.976 J**	**1.601 J**	**0.082 J**	**1.844**	**0.07705 J**	**0.76388 J**	0.0524 U	**12**	**0.2245 J**	**2.6035 J**	**0.16638 J**	**2**
Metals																	
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	5.2 U	NA	NA	NA	NA	**7.1**	NA	NA	NA	NA
	Arsenic	20	20	NA	NA	NA	NA	**8.8**	NA	NA	NA	2.64 U	**12**	NA	NA	NA	NA
	Barium	1,000	1,000	NA	NA	NA	NA	**380**	NA	NA	NA	**14.7**	**560**	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	**0.81**	NA	NA	NA	NA	**0.48**	NA	NA	NA	NA
	Cadmium	70	70	0.29 U	**0.42**	**0.46**	**0.48**	**0.69**	NA	0.2875 U	**0.93**	0.27 U	**3.7**	0.30 U	0.763	**0.19**	**0.74**
	Chromium (III)	1,000	1,000	NA	NA	NA	NA	**20**	NA	NA	NA	**2.50**	**33**	NA	NA	NA	NA
	Lead	200	200	**239.5**	**354**	**136.9**	**166**	**480**	NA	**27.5**	**342**	**3.58**	**770**	**40.9**	**158.6**	**49.6**	**289.4**
	Mercury	20	20	NA	NA	NA	NA	**0.40**	NA	NA	NA	NA	**0.24**	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	**43**	NA	NA	NA	NA	**21**	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	NA	**1.2**	NA	NA	NA	NA	0.62 U	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	**32**	NA	NA	NA	NA	**19**	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	**220**	NA	NA	NA	NA	**580**	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.4. Summary of Analytical Results for Soil Samples - HS-4
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HF44	HF44+HG44	HG-31	HG44	HH43	HH43+HI42	HH44	HH44+HI44	HI42	HI43	HI44	HJ-42	HJ-42
			Sample Depth (ft.):	0.5-3	0.5-3	1-3	1-3	1.5-3	1.5-3	2.5-3	1-3	2.5-3	1.5-3	1-3	0-1	1-3
			Sample Date:	12/30/2004	12/30/2004	4/2/2009	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	4/2/2009	4/2/2009
		S-1/GW-2	S-1/GW-3													
SVOCs																
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	0.057 U	NA	NA	NA	**0.078**	NA	0.059 U	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	0.17 U	NA	NA	NA	0.19 U	NA	0.18 U	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	**0.31**	0.179 U	NA	NA	0.064 U	NA	0.059 U	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	**0.12**	0.179 U	NA	NA	0.064 U	NA	**0.11**	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	**4**	0.179 U	NA	NA	0.064 U	NA	**0.21**	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	**7.9**	0.179 U	NA	NA	**0.15**	NA	**1.2**	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	**6.9**	0.179 U	NA	NA	0.064 U	NA	**1.3**	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	**8.9**	0.179 U	NA	NA	**0.2**	NA	**1.7**	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	**1.7**	0.179 U	NA	NA	0.064 U	NA	**0.43**	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	**3.3**	0.179 U	NA	NA	0.064 U	NA	**0.52**	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	**6.7**	0.179 U	NA	NA	**0.16**	NA	**1.1**	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	**0.71**	0.179 U	NA	NA	0.064 U	NA	0.059 U	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	**15**	0.179 U	NA	NA	**0.27**	NA	**2.1**	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	**0.22**	0.179 U	NA	NA	0.064 U	NA	0.059 U	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	**1.8**	0.179 U	NA	NA	0.064 U	NA	**0.47**	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	**0.079**	0.179 U	NA	NA	0.064 U	NA	0.059 U	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	**0.092**	0.179 U	NA	NA	0.064 U	NA	0.059 U	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	**1.2**	0.179 U	NA	NA	**0.22**	NA	**0.93**	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	**15**	0.179 U	NA	NA	**0.41**	NA	**2.7**	NA	NA	NA	NA	NA
PCBs																
(mg/kg)	Total PCBs	1	1	2.17 U	NA	**0.0615 J**	**0.844**	**1.191**	NA	**0.157**	NA	**0.693**	2.63 U	**1.5**	0.0539 U	**0.31875 J**
Metals																
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	NA	**3.66**	2.68 U	NA	NA	**5.25**	NA	**4.87**	NA	NA	NA	NA	NA
	Barium	1,000	1,000	NA	**86**	**28.2**	NA	NA	**344**	NA	**135**	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	**0.83**	0.27 U	NA	NA	**1.78**	NA	**2.24**	NA	NA	NA	0.28 U	0.77
	Chromium (III)	1,000	1,000	NA	**7.31**	**3.64**	NA	NA	**36**	NA	**9.3**	NA	NA	NA	NA	NA
	Lead	200	200	NA	**149**	**45.8**	NA	NA	**665**	NA	**351**	NA	NA	NA	**8.73**	**73.6**
	Mercury	20	20	NA	**0.147**	NA	NA	NA	**0.223**	NA	**0.15**	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	0.34 U	NA	NA	NA	0.39 U	NA	0.32 U	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
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NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.4. Summary of Analytical Results for Soil Samples - HS-4
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			HJ44	HJ44+HI43	HS-7	HS-9	HS-10	SB-267			SB-365				
		Sample Location:		HJ44	HJ44+HI43	HS-7	HS-9	HS-10	SB-267			SB-365				
		Sample Depth (ft.):		2.75-3	1.5-3	0-0.5	0-0.5	0-0.5	1	3.5	9	0-1	1-3	5-7	9	12
		Sample Date:		12/30/2004	12/30/2004	9/9/2004	9/9/2004	9/9/2004	7/14/2008	7/14/2008	7/14/2008	3/4/2009	3/4/2009	3/4/2009 combo	3/4/2009	3/4/2009
		S-1/GW-2	S-1/GW-3													
SVOCs																
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	0.06 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	**0.076 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	**0.58875 J**	0.897 U	NA
	Acenaphthylene	600	10	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	0.4745 U	0.897 U	NA
	Anthracene	1,000	1,000	NA	**0.14**	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	**1.15875 J**	0.897 U	NA
	Benzo(a)anthracene	7	7	NA	**0.51**	NA	NA	NA	**0.260**	0.207 U	0.199 U	0.188 U	0.178 U	**3.52**	0.897 U	NA
	Benzo(a)pyrene	2	2	NA	**0.5**	NA	NA	NA	**0.271**	0.207 U	0.199 U	0.188 U	0.178 U	**2.91**	0.897 U	NA
	Benzo(b)fluoranthene	7	7	NA	**0.71**	NA	NA	NA	**0.343**	**0.275**	0.199 U	0.188 U	0.178 U	**4.24**	0.897 U	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	**0.27**	NA	NA	NA	0.338 U	0.413 U	0.397 U	0.188 U	0.178 U	**0.58525 J**	0.897 U	NA
	Benzo(k)fluoranthene	70	70	NA	**0.25**	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	**0.90875 J**	0.897 U	NA
	Chrysene	70	70	NA	**0.44**	NA	NA	NA	**0.325**	**0.682**	0.199 U	0.188 U	0.178 U	**3.46**	0.897 U	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.06 U	NA	NA	NA	0.338 U	0.413 U	0.397 U	0.188 U	0.178 U	0.4745 U	0.897 U	NA
	Fluoranthene	1,000	1,000	NA	**0.92**	NA	NA	NA	**0.523**	0.207 U	0.199 U	0.188 U	0.178 U	**7.37**	0.897 U	NA
	Fluorene	1,000	1,000	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	**0.69875 J**	0.897 U	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	0.06 U	NA	NA	NA	0.338 U	0.413 U	0.397 U	0.188 U	0.178 U	**0.70875 J**	0.897 U	NA
	2-Methylnaphthalene	80	300	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	0.4745 U	0.897 U	NA
	Naphthalene	20	500	NA	0.06 U	NA	NA	NA	0.169 U	0.207 U	0.199 U	0.188 U	0.178 U	0.4745 U	0.897 U	NA
	Phenanthrene	500	500	NA	**0.7**	NA	NA	NA	**0.230**	**0.846**	0.199 U	0.188 U	0.178 U	**9.22**	0.897 U	NA
	Pyrene	1,000	1,000	NA	**1.5**	NA	NA	NA	**0.585**	**0.289**	0.199 U	0.188 U	0.178 U	**5.67**	0.897 U	NA
PCBs																
(mg/kg)	Total PCBs	1	1	**1.323**	NA	0.23 U	0.22 U	0.22 U	0.0500 U	0.0586 U	0.0584 U	0.0574 U	0.0518 U	**0.690 J**	0.266 UJ	0.0576 U
Metals																
(mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	R	R	R	4.50 U	4.27 U	5.69 U	21.6 U	NA
	Arsenic	20	20	NA	**3.85**	NA	NA	NA	**3.19**	**14.3**	**4.84**	2.82 U	2.67 U	**53.4**	13.5 U	NA
	Barium	1,000	1,000	NA	**176**	NA	NA	NA	**14.0**	**200**	**7.59**	**17.7**	**10.9**	**1,128**	**181**	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	0.26 U	0.31 U	0.30 U	0.29 U	0.27 U	0.36 U	1.35 U	NA
	Cadmium	70	70	NA	**1.96**	NA	NA	NA	0.26 U	0.31 U	0.30 U	0.29 U	0.27 U	**5.59**	1.35 U	NA
	Chromium (III)	1,000	1,000	NA	**11**	NA	NA	NA	**5.14**	**5.30**	**3.81**	**6.20**	**2.04**	**36.3**	**7.14**	NA
	Lead	200	200	NA	**447**	NA	NA	NA	**47.9**	**209**	**3.13**	**15.7**	**3.05**	**1590**	**19.0**	NA
	Mercury	20	20	NA	**0.103**	NA	NA	NA	**0.079**	**0.078**	0.012 U	**0.049**	0.014 U	**0.632**	**0.163**	NA
	Nickel	600	600	NA	NA	NA	NA	NA	**3.98**	**11.7**	**4.02**	**3.16**	**2.89**	**46.3**	**4.26**	NA
	Silver	100	100	NA	0.34 U	NA	NA	NA	**2.22**	**3.94**	**1.17**	0.57 U	0.54 U	**2.7575 J**	2.69 U	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	**10.6**	**18.3**	5.95 U	**9.87**	5.34 U	**219**	26.9 U	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	**33.8**	**25.3**	**14.1**	**28.6**	**16.3**	**993**	**96.3**	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.4. Summary of Analytical Results for Soil Samples - HS-4
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-365		NBHS-1		NBHS-SS-8	NBHS-SS-9	SS-12		SS-42	SS-43	SS-44	SS-45	SS-46
		Sample Depth (ft.):		0-1	1-3	8	12	0-0.5	0-0.5	0-0.5	1-2	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
		Sample Date:		6/8/2011	6/8/2011	7/29/2008	7/29/2008	8/6/2008	8/6/2008	7/23/2001	7/23/2001	12/2/2008	12/2/2008	12/2/2008	12/2/2008	12/2/2008
		S-1/GW-2	S-1/GW-3					combo								
SVOCs																
(mg/kg)	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	**0.321**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Acenaphthylene	600	10	NA	NA	0.200 U	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Anthracene	1,000	1,000	NA	NA	**0.929**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Benzo(a)anthracene	7	7	NA	NA	**3.21**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Benzo(a)pyrene	2	2	NA	NA	**2.86**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Benzo(b)fluoranthene	7	7	NA	NA	**3.42**	0.665 U	NA	NA	NA	NA	0.199 U	**0.257**	0.201 U	0.207 U	0.206 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	**2.30**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Benzo(k)fluoranthene	70	70	NA	NA	**1.07**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Chrysene	70	70	NA	NA	**3.08**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	**0.643**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Fluoranthene	1,000	1,000	NA	NA	**3.87**	0.665 U	NA	NA	NA	NA	0.199 U	**0.437**	0.201 U	0.207 U	0.206 U
	Fluorene	1,000	1,000	NA	NA	**0.401**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	**2.60**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	2-Methylnaphthalene	80	300	NA	NA	0.200 U	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Naphthalene	20	500	NA	NA	**0.290**	0.665 U	NA	NA	NA	NA	0.199 U	0.199 U	0.201 U	0.207 U	0.206 U
	Phenanthrene	500	500	NA	NA	**3.78**	0.665 U	NA	NA	NA	NA	0.199 U	**0.344**	0.201 U	0.207 U	0.206 U
	Pyrene	1,000	1,000	NA	NA	**5.35**	0.665 U	NA	NA	NA	NA	0.199 U	**0.258**	0.201 U	0.207 U	0.206 U
PCBs																
(mg/kg)	Total PCBs	1	1	**0.0243**	**0.386**	**1.809 J**	0.230 UJ	0.05265 U	0.0508 U	0.100 U	**0.497**	0.0549 U	0.0581 U	0.0598 U	0.0580 U	0.0617 U
Metals																
(mg/kg)	Antimony	20	20	NA	NA	4.80 U	16.0 U	NA	NA	NA	NA	4.76 U	4.77 U	4.81 U	4.97 U	4.94 U
	Arsenic	20	20	NA	NA	**34.0**	9.97 U	NA	NA	**2.20**	**3.89**	**3.00**	2.98 U	3.01 U	**3.29**	**3.33**
	Barium	1,000	1,000	NA	NA	**370**	**39.5**	NA	NA	**25**	**119**	**17.5**	**29.1**	**17.7**	**24.9**	**21.3**
	Beryllium	90	90	NA	NA	0.30 U	1.00 U	NA	NA	NA	NA	0.30 U	0.30 U	0.31 U	0.32 U	0.31 U
	Cadmium	70	70	NA	NA	**8.78**	1.00 U	NA	NA	0.37 U	**0.81**	0.30 U	0.30 U	0.31 U	0.32 U	0.31 U
	Chromium (III)	1,000	1,000	NA	NA	**154**	**13.7**	NA	NA	**5.52**	**96**	**5.29**	**7.92**	**4.87**	**7.13**	**7.08**
	Lead	200	200	NA	NA	**2,780**	**12.1**	NA	NA	**26**	**87**	**17.5**	**55.2**	**22.2**	**23.4**	**21.1**
	Mercury	20	20	NA	NA	**0.423**	0.089 U	NA	NA	0.07 U	**0.17**	**0.044**	**0.046**	**0.041**	**0.049**	**0.040**
	Nickel	600	600	NA	NA	**173**	**9.95**	NA	NA	NA	NA	**2.64**	**4.20**	**2.28**	**3.39**	**3.17**
	Silver	100	100	NA	NA	**29.0**	2.00 U	NA	NA	0.37 U	0.34 U	0.60 U	0.60 U	0.61 U	0.63 U	0.62 U
	Vanadium	400	400	NA	NA	**18.2**	20.0 U	NA	NA	NA	NA	**11.7**	**12.7**	**10.6**	**13.5**	**14.5**
	Zinc	1,000	1,000	NA	NA	**1670**	**28.7**	NA	NA	NA	NA	**27.7**	**54.9**	**36.9**	**30.4**	**31.5**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.5. Summary of Analytical Results for Soil Samples - HS-5
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		COMP SS-13-A,F,S,T	COMP SS-13 - AG, AK, AO, AR	COMP SS-13-AQ, AM,AN,AJ,AL	COMP SS-13-AW,AX,AY,AZ	COMP SS-13-Q,R,C,D	SS-13-AJ	SS-13-AN	SS-13-AO	SS-13-K
		Sample Depth (ft.):		>3	>3	>3	>3	>3	>3	>3	>3	>3
		Sample Date:		9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004
		S-1/GW-2	S-1/GW-3									
SVOCs												
(mg/kg)	Dibenzofuran	10*	10*	**2.9**	0.38 U	2.1 U	0.43 U	**0.56**	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	**2.6**	0.38 U	2.1 U	0.43 U	0.37 U	NA	NA	NA	NA
	Acenaphthylene	600	10	2.1 U	0.38 U	2.1 U	**1.4**	**4**	NA	NA	NA	NA
	Anthracene	1,000	1,000	**10**	**0.63**	**4.6**	**3.9**	**2.2**	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	**17**	**1.4**	**6.9**	**3.4**	**10**	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	**7.7**	**0.95**	**5.8**	**3.3**	**11**	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	**13**	**1.2**	**5.6**	**2.2**	**8.4**	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	**6.2**	**1.1**	**3.8**	**3.2**	**6.3**	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	**13**	**1.4**	**5**	**3.6**	**14**	NA	NA	NA	NA
	Chrysene	70	70	**16**	**1.5**	**6.2**	**1.2**	**11**	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	**2.7**	**0.44**	2.1 U	**9.4**	**2.5**	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**47**	**3.3**	**19**	**0.53**	**33**	NA	NA	NA	NA
	Fluorene	1,000	1,000	**3.9**	0.38 U	**3**	**2**	**1.1**	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	**6**	**0.94**	**3.4**	NA	**5.6**	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	2.1 U	0.38 U	2.1 U	**0.55**	0.37 U	NA	NA	NA	NA
	Phenanthrene	500	500	**42**	**2.4**	**19**	**5.8**	**14**	NA	NA	NA	NA
	Pyrene	1,000	1,000	**38**	**3.1**	**16**	**8.2**	**25**	NA	NA	NA	NA
PCB Aroclors												
(mg/kg)	Total PCBs	1	1	NA	NA	NA	NA	NA	**1.06**	**1.57**	**4.87**	**0.133**
Metals												
(mg/kg)	Arsenic	20	20	**31**	**6.8**	**10**	**19**	**6**	NA	NA	NA	NA
	Barium	1,000	1,000	**130**	**230**	**310**	**250**	**120**	NA	NA	NA	NA
	Cadmium	70	70	**2.4**	**1.2**	**2**	**1.7**	**1**	NA	NA	NA	NA
	Chromium (III)	1,000	1,000	**17**	**22**	**27**	**32**	**8.9**	NA	NA	NA	NA
	Lead	200	200	**590**	**450**	**750**	**640**	**560**	**960**	**1,800**	**1,200**	**72**
	Mercury	20	20	**0.54**	**0.42**	**0.95**	**0.76**	**0.32**	NA	NA	NA	NA
	Silver	100	100	**0.59**	**0.56**	**1.1**	**0.59**	0.44 U	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
J - Estimated value; below quantitation limit.
B - Detected in associated laboratory method blank.
Values in **Bold** indicate the compound was detected.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.6. Summary of Analytical Results for Soil Samples - HS-6
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HD-19		HD-20F	HD-21F	HD22			HD23			HF14	HF-14H	
		Sample Depth (ft.):		0-1	1-3	1-3	1-3	1-3	0-1	1-3	2-3	0-1	1-3	3-4	0-1	1-3
		Sample Date:		3/9/2009	3/9/2009	5/19/2009	5/20/2009	12/29/2004	4/9/2009	4/9/2009	12/29/2004	3/31/2009	3/31/2009	4/15/2010	3/11/2009	3/11/2009
		S-1/GW-2	S-1/GW-3	combo	combo											combo
SVOCs																
(mg/kg)	Acenaphthene	1,000	1,000	0.196 U	0.192 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	**0.217**	**0.59**	0.198 U	0.179 U
	Anthracene	1,000	1,000	0.196 U	**0.2**	NA	0.18 U	NA	**0.241**	**0.423**	NA	0.190 U	**0.626**	**0.93**	0.198 U	0.179 U
	Benzo(a)anthracene	7	7	**0.20**	**0.42**	NA	0.18 U	NA	**0.566**	**1.35**	NA	0.190 U	**1.24**	**2.4**	0.198 U	**0.215**
	Benzo(a)pyrene	2	2	**0.20**	**0.38**	NA	0.18 U	NA	**0.493**	**1.22**	NA	0.190 U	**1.01**	**2.2**	0.198 U	**0.2285**
	Benzo(b)fluoranthene	7	7	**0.24**	**0.50**	NA	0.18 U	NA	**0.658**	**1.66**	NA	0.190 U	**1.03**	**3.1**	0.198 U	**0.234**
	Benzo(g,h,i)perylene	1,000	1,000	0.196 U	**0.21**	NA	0.18 U	NA	**0.218**	**0.577**	NA	0.190 U	**0.362**	**0.74**	0.198 U	**0.1905**
	Benzo(k)fluoranthene	70	70	**0.14**	**0.25017**	NA	0.18 U	NA	**0.239**	**0.622**	NA	0.190 U	**0.352**	**1.2**	0.198 U	0.179 U
	Chrysene	70	70	**0.20**	**0.42**	NA	0.18 U	NA	**0.551**	**1.35**	NA	0.190 U	**1.30**	**2.7**	0.198 U	**0.229**
	Dibenz(a,h)anthracene	0.7	0.7	0.196 U	0.192 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	0.206 U	0.46 U	0.198 U	0.179 U
	Fluoranthene	1,000	1,000	**0.49**	**1.26**	NA	0.18 U	NA	**0.992**	**2.32**	NA	**0.193**	**1.45**	**5.6**	0.198 U	**0.312**
	Fluorene	1,000	1,000	0.196 U	0.192 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	**0.291**	**0.52**	0.198 U	0.179 U
	Indeno(1,2,3-cd)pyrene	7	7	0.196 U	**0.26**	NA	0.18 U	NA	**0.293**	**0.694**	NA	0.190 U	**0.430**	**0.97**	0.198 U	**0.199**
	2-Methylnaphthalene	80	300	0.196 U	0.192 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	0.206 U	0.46 U	0.198 U	0.179 U
	Naphthalene	20	500	0.196 U	0.192 U	NA	0.18 U	NA	0.199 U	0.191 U	NA	0.190 U	0.206 U	**0.50**	0.198 U	0.179 U
	Phenanthrene	500	500	**0.25**	**0.78983**	NA	0.18 U	NA	**0.980**	**1.80**	NA	**0.204**	**3.28**	**4.4**	0.198 U	**0.2295**
	Pyrene	1,000	1,000	**0.34**	**0.81**	NA	0.18 U	NA	**0.849**	**1.71**	NA	**0.264**	**2.22**	**2.1**	0.198 U	**0.3805**
PCB Aroclors																
(mg/kg)	Total PCBs	1	1	**0.16585**	**0.2166**	NA	NA	**5.444**	**0.132 J**	**2.42 J**	**4.158**	NA	NA	**1.15 J**	**0.129 J**	**1.362**
Metals																
(mg/kg)	Arsenic	20	20	**2.20**	**3.8**	2.8 U	2.7 U	NA	**3.49**	**5.30**	NA	**3.08**	**17.4**	**14**	2.97 U	2.73 U
	Barium	1,000	1,000	**95.7**	**159.1**	**86**	**13**	NA	**58.8**	**218**	NA	**36.5**	**385**	**4,400**	**22.6**	**23.4**
	Beryllium	90	90	0.30 U	0.29 U	NA	NA	NA	NA	NA	NA	NA	NA	**0.48**	NA	NA
	Cadmium	70	70	**0.45**	**0.59**	**0.29**	0.27 U	NA	**0.38**	**1.26**	NA	0.29 U	**1.35**	**1.5**	0.30 U	0.275 U
	Chromium (III)	1,000	1,000	**12.5**	**88.5**	NA	**2.1**	NA	**10.9**	**22.9**	NA	**7.09**	**28.8**	**480**	**5.55**	**5.105**
	Lead	200	200	**127.267**	**210.773**	**74**	**4.6**	NA	**74.6**	**234**	NA	**31.7**	**928**	**800**	**18.1**	**53.15**
	Mercury	20	20	**0.21**	**0.17**	NA	NA	NA	NA	NA	NA	NA	NA	**0.34**	**0.045**	**0.022**
	Nickel	600	600	**4.69**	**9.3**	NA	NA	NA	NA	NA	NA	NA	NA	**49**	NA	NA
	Vanadium	400	400	**13.0**	**28.4**	NA	NA	NA	NA	NA	NA	NA	NA	**210**	NA	NA
	Zinc	1,000	1,000	**111.633**	**90.9**	NA	NA	NA	NA	NA	NA	NA	NA	**360**	NA	NA
	Chromium (VI)	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.6. Summary of Analytical Results for Soil Samples - HS-6
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HH-13		HH-30A	HJ-25A	HRE-10	HRG-12A	HRG-14A	HS-11	HS-12	NBHS-SS-1	NBHS-SS-2	NBHS-SS-3
			Sample Depth (ft.):	0-1	1-3	1-3	1-3	1-3	1-3	1-3	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
			Sample Date:	3/11/2009	3/11/2009	4/2/2009	4/1/2009	3/31/2009	4/1/2009	4/1/2009	9/9/2004	9/9/2004	8/6/2008	8/6/2008	8/6/2008
		S-1/GW-2	S-1/GW-3	combo	combo										
SVOCs															
(mg/kg)	Acenaphthene	1,000	1,000	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	0.175 U	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	**0.195**	0.180 U	0.177 U	0.175 U	0.177 U	NA	NA	NA	NA	NA
PCB Aroclors															
(mg/kg)	Total PCBs	1	1	NA	**17.735**	**0.0702 J**	0.0510 U	**0.521 J**	0.0520 U	0.0520 U	**0.131**	**0.438**	0.0567 U	**0.260 J**	**0.316 J**
Metals															
(mg/kg)	Arsenic	20	20	**2.40**	16.1	2.62 U	2.69 U	2.65 U	2.62 U	2.66 U	NA	NA	NA	NA	NA
	Barium	1,000	1,000	**154**	**3,293**	**15.4**	**6.73**	**19.3**	**28.1**	**6.91**	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**0.32**	**4.04**	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	NA	NA	NA	NA	NA
	Chromium (III)	1,000	1,000	**20.0**	**1,458**	**2.39**	**2.02**	**4.28**	**3.04**	**2.31**	NA	NA	NA	NA	NA
	Lead	200	200	**73.6**	**567**	**8.29**	**3.19**	**11.3**	**4.12**	**1.75**	NA	NA	NA	NA	NA
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium (VI)	100	100	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.6. Summary of Analytical Results for Soil Samples - HS-6
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			Sample Location:	NBHS-SS-4	NBHS-SS-10	SB-361			SS-5	SS-50	SS-52		SS-52	
				Sample Depth (ft.):	0-0.5	0-0.5	0-1	1-3	6.5	0-0.5	0-0.5	0-0.5	1-3	0-1	1-3
				Sample Date:	8/6/2008	8/6/2008	3/4/2009	3/4/2009	3/4/2009	7/23/2001	12/2/2008	12/2/2008	3/31/2009	06/08/2011	06/08/2011
		S-1/GW-2	S-1/GW-3												
SVOCs															
(mg/kg)	Acenaphthene	1,000	1,000	NA	NA	0.174 U	0.176 U	0.178 U	NA	**0.257**	0.208 U	**0.542**	NA	NA
	Anthracene	1,000	1,000	NA	NA	0.174 U	0.176 U	0.178 U	NA	**0.900**	0.208 U	**1.62**	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	0.174 U	0.176 U	0.178 U	NA	**2.03**	0.208 U	**1.42**	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	0.174 U	0.176 U	0.178 U	NA	**1.65**	0.208 U	**1.17**	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	0.174 U	0.176 U	0.178 U	NA	**2.05**	0.208 U	**1.37**	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	0.174 U	0.176 U	0.178 U	NA	**0.905**	0.208 U	**0.448**	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	0.174 U	0.176 U	0.178 U	NA	**0.872**	0.208 U	**0.539**	NA	NA
	Chrysene	70	70	NA	NA	0.174 U	0.176 U	0.178 U	NA	**1.80**	0.208 U	**1.38**	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	0.174 U	0.176 U	0.178 U	NA	**0.221**	0.208 U	0.187 U	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	0.174 U	0.176 U	0.178 U	NA	**4.32**	0.208 U	**2.70**	NA	NA
	Fluorene	1,000	1,000	NA	NA	0.174 U	0.176 U	0.178 U	NA	**0.380**	0.208 U	**0.944**	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	0.174 U	0.176 U	0.178 U	NA	**0.973**	0.208 U	**0.588**	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	0.174 U	0.176 U	0.178 U	NA	0.210 U	0.208 U	**0.274**	NA	NA
	Naphthalene	20	500	NA	NA	0.174 U	0.176 U	0.178 U	NA	0.210 U	0.208 U	**0.505**	NA	NA
	Phenanthrene	500	500	NA	NA	0.174 U	0.176 U	0.178 U	NA	**3.06**	0.208 U	**4.30**	NA	NA
	Pyrene	1,000	1,000	NA	NA	0.174 U	0.176 U	0.178 U	NA	**4.79**	0.208 U	**2.95**	NA	NA
PCB Aroclors															
(mg/kg)	Total PCBs	1	1	0.0554 U	**0.192 J**	0.0526 U	0.0531 U	0.0532 U	0.100 U	**0.939 J**	**0.179 J**	**3.18 J**	**1.02**	**1.41**
Metals															
(mg/kg)	Arsenic	20	20	NA	NA	2.61 U	2.64 U	2.67 U	**1.18**	**4.96**	3.11 U	2.81 U	NA	NA
	Barium	1,000	1,000	NA	NA	**12.1**	**6.42**	**8.99**	**10**	**69.9**	**21.0**	**43.0**	NA	NA
	Beryllium	90	90	NA	NA	0.27 U	0.27 U	0.27 U	NA	0.32 U	0.32 U	NA	NA	NA
	Cadmium	70	70	NA	NA	0.27 U	0.27 U	0.27 U	0.35 U	**0.42**	0.32 U	0.29 U	NA	NA
	Chromium (III)	1,000	1,000	NA	NA	**2.70**	**1.68**	**3.02**	**2.92**	**11.7**	**5.24**	**10.1**	NA	NA
	Lead	200	200	NA	NA	**11.7**	**2.12**	**3.67**	**11**	**73.0**	**19.4**	**36.5**	NA	NA
	Mercury	20	20	NA	NA	**0.016**	0.012 U	0.016 U	0.07 U	**0.102**	**0.046**	NA	NA	NA
	Nickel	600	600	NA	NA	**2.19**	**1.90**	**2.79**	NA	**5.09**	**2.24**	NA	NA	NA
	Vanadium	400	400	NA	NA	5.22 U	5.27 U	5.34 U	NA	**18.3**	**9.82**	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	**12.6**	**6.73**	**12.0**	NA	**60.2**	**23.1**	NA	NA	NA
	Chromium (VI)	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
NS - No standard available for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.7. Summary of Analytical Results for Soil Samples - HS-7
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HN3	HN3+HM3	HO2.5	HO2.5+HO3	HO3	VSS-4	SS-53	SS-54	SS-55	SS-56	SS-57	SB-362						SB-363		
			Sample Depth (ft.):	1-2	0.75-2	0.5-1.5	0.5-1.5	0.5-1.25	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-1	1-3	5	6.5	0-1	1-3	0-1	1-3	5
			Sample Date:	2/22/2005	2/22/2005	2/22/2005	2/22/2005	2/22/2005	7/23/2001	12/2/2008	12/2/2008	12/2/2008	12/2/2008	12/2/2008	3/4/2009	3/4/2009	3/4/2009	3/4/2009	06/08/2011	06/08/2011	3/4/2009	3/4/2009	3/4/2009
		S-1/GW-2	S-1/GW-3																				
PAHs																							
(mg/kg)	Benzo(a)anthracene	7	7	NA	0.62 U	NA	NA	NA	NA	**0.228**	0.211 U	0.208 U	0.213 U	0.214 U	**0.395**	0.221 U	**0.246**	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Benzo(a)pyrene	2	2	NA	0.62 U	NA	NA	NA	NA	**0.216**	0.211 U	0.208 U	0.213 U	0.214 U	**0.348**	0.221 U	**0.215**	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Benzo(b)fluoranthene	7	7	NA	**0.76**	NA	NA	NA	NA	**0.269**	0.211 U	0.208 U	0.213 U	0.214 U	**0.410**	0.221 U	**0.244**	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Chrysene	70	70	NA	0.62 U	NA	NA	NA	NA	**0.207**	0.211 U	0.208 U	0.213 U	0.214 U	**0.417**	0.221 U	**0.272**	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Fluoranthene	1,000	1,000	NA	0.62 U	NA	NA	NA	NA	**0.732**	0.211 U	0.208 U	0.213 U	0.214 U	**0.696**	**0.343**	**0.431**	0.507 U	NA	NA	**0.640**	0.195 U	0.184 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	0.62 U	NA	NA	NA	NA	0.207 U	0.211 U	0.208 U	0.213 U	0.214 U	**0.192**	0.221 U	0.214 U	0.507 U	NA	NA	0.459 U	0.195 U	0.184 U
	Phenanthrene	500	500	NA	0.62 U	NA	NA	NA	NA	**0.252**	0.211 U	0.208 U	0.213 U	0.214 U	**0.621**	**0.264**	**0.501**	0.507 U	NA	NA	**0.607**	0.195 U	0.184 U
	Pyrene	1,000	1,000	NA	0.62 U	NA	NA	NA	NA	**0.567**	0.211 U	0.208 U	0.213 U	0.214 U	**0.793**	**0.270**	**0.530**	0.507 U	NA	NA	**0.573**	0.195 U	0.184 U
PCBs																							
(mg/kg)	Total PCBs	1	1	**0.48**	NA	**0.22**	NA	0.227 U	0.100 U	**0.429 J**	**0.2189 J**	**0.148 J**	0.0648 U	0.0597 U	**0.509 J**	**0.0904 J**	**0.154 J**	0.155 U	**0.776**	**0.276**	**0.283 J**	0.0582 U	0.0528 U
Metals																							
(mg/kg)	Arsenic	20	20	NA	**0.88**	NA	**0.87**	NA	**1.52**	3.11 U	**3.55**	**3.92**	**4.50**	**3.32**	**5.37**	**9.86**	**6.59**	**12.6**	NA	NA	**5.18**	**4.48**	2.75 U
	Barium	1,000	1,000	NA	**29**	NA	**52**	NA	**11**	**60.4**	**40.2**	**28.1**	**40.8**	**23.6**	**173**	**271**	**269**	**135**	NA	NA	**187**	**16.9**	**8.77**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	0.32 U	0.32 U	0.32 U	0.32 U	0.33 U	0.29 U	**1.11**	**0.70**	**1.56**	NA	NA	0.35 U	0.30 U	0.28 U
	Cadmium	70	70	NA	**0.98**	NA	**1.26**	NA	0.32 U	**0.34**	**0.33**	0.32 U	0.32 U	0.33 U	**0.84**	**0.59**	**1.35**	**5.77**	NA	NA	**2.78**	0.30 U	0.28 U
	Chromium (III)	1,000	1,000	NA	**13**	NA	**16**	NA	**3.74**	**10.6**	**9.16**	**8.59**	**14.2**	**10.9**	**15.0**	**21.5**	**18.8**	**47.7**	NA	NA	**34.1**	**10.8**	**3.63**
	Lead	200	200	NA	**53**	NA	**40**	NA	**8.89**	**67.2**	**54.4**	**89.4**	**67.2**	**30.7**	**277**	**487**	**448**	**319**	NA	NA	**292**	**5.35**	**1.00**
	Mercury	20	20	NA	**0.059**	NA	**0.099**	NA	0.07 U	**0.070**	**0.063**	**0.088**	**0.149**	**0.052**	**0.213**	**0.088**	**0.120**	**0.183**	NA	NA	**0.211**	**0.048**	0.016 U
	Nickel	600	600	NA	NA	NA	NA	NA	NA	**4.99**	**4.42**	**4.52**	**8.62**	**5.21**	**9.37**	**18.0**	**10.5**	**40.3**	NA	NA	**8.03**	**5.02**	**2.36**
	Silver	100	100	NA	0.06 U	NA	**0.22**	NA	0.32 U	0.63 U	0.64 U	0.63 U	0.64 U	0.65 U	0.58 U	0.67 U	0.65 U	1.52 U	NA	NA	0.69 U	0.59 U	0.55 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	**15.5**	**17.2**	**17.3**	**21.4**	**18.6**	**18.3**	**25.1**	**19.4**	**17.8**	NA	NA	**24.4**	**14.3**	**5.62**
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	**47.5**	**47.4**	**34.2**	**39.4**	**29.9**	**191**	**99.6**	**264**	**703**	NA	NA	**181**	**20.7**	**7.66**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

J - Estimated value.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

PAHs - Polynuclear Aromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

Table C-1.8. Summary of Analytical Results for Soil Samples - HS-8
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HF-10B		HG2				HG2.5	HG2.5+HH2.5	HG3		HG4		HG4+HG3	HG3+HG4
		Sample Depth (ft.):		0-1	1-3	1-3	0-1	1-3	5-7	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
		Sample Date:		4/3/2009	4/3/2009	12/29/2004	4/15/2010	4/15/2010	4/15/2010	2/22/2005	2/22/2005	12/29/2004	2/22/2005	12/29/2004	2/22/2005	12/29/2004	2/22/2005
		S-1/GW-2	S-1/GW-3														
VOCs																	
(mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	**1.2**	NA	NA	NA	NA	NA	NA	NA	NA
VPH																	
(mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	**51**	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	**25**	NA	NA	NA	NA	NA	NA	NA	NA
EPH																	
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	**160**	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	**120**	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																	
(mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	4.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	NA
	Dimethyl phthalate	50	600	NA	NA	0.32 U	NA	NA	NA	NA	0.63 U	NA	NA	NA	NA	1.3 U	0.65 U
	Di-n-butylphthalate	NS	NS	NA	NA	**0.41 JB**	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	4 U	1.9 U
	Butyl benzyl phthalate	NS	NS	NA	NA	0.32 U	NA	NA	NA	NA	0.63 U	NA	NA	NA	NA	1.3 U	0.65 U
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	0.96 U	NA	NA	NA	NA	**23**	NA	NA	NA	NA	4 U	1.9 U
	Carbazole	NS	NS	NA	NA	NA	NA	NA	NA	NA	**1.1**	NA	NA	NA	NA	NA	**0.74**
	Dibenzofuran	10*	10*	NA	NA	0.32 U	NA	NA	NA	NA	0.63 U	NA	NA	NA	NA	1.3 U	0.65 U
	Acenaphthene	1,000	1,000	0.199 U	**113**	0.32 U	0.20 U	**2.5**	0.42 U	NA	**0.91**	NA	NA	NA	NA	1.3 U	0.65 U
	Acenaphthylene	600	10	0.199 U	1.68 U	0.32 U	0.20 U	1.7 U	0.42 U	NA	0.63 U	NA	NA	NA	NA	**10**	0.65 U
	Anthracene	1,000	1,000	0.199 U	**190**	**0.69**	0.20 U	**4.0**	**1.2**	NA	**2.2**	NA	NA	NA	NA	1.3 U	**1.1**
	Benzo(a)anthracene	7	7	0.199 U	**167**	**2.4**	0.20 U	**10**	**2.5**	NA	**10**	NA	NA	NA	NA	**2.7**	**2.6**
	Benzo(a)pyrene	2	2	0.199 U	**133**	**2.2**	0.20 U	**9.0**	**2.3**	NA	**8.9**	NA	NA	NA	NA	1.3 U	**2.0**
	Benzo(b)fluoranthene	7	7	0.199 U	**183**	**2.2**	0.20 U	**11**	**3.2**	NA	**13**	NA	NA	NA	NA	1.3 U	**3.2**
	Benzo(g,h,i)perylene	1,000	1,000	0.199 U	**58.3**	0.32 U	0.20 U	**4.6**	**1.6**	NA	**2**	NA	NA	NA	NA	1.3 U	0.65 U
	Benzo(k)fluoranthene	70	70	0.199 U	**75.7**	**1.5**	0.20 U	1.7 U	**1.2**	NA	**4.5**	NA	NA	NA	NA	1.3 U	**0.81**
	Chrysene	70	70	0.199 U	**171**	**1.9**	0.20 U	**11**	**2.9**	NA	**7.8**	NA	NA	NA	NA	**2.1**	**1.8**
	Dibenz(a,h)anthracene	0.7	0.7	0.199 U	**17.2**	0.32 U	0.20 U	1.7 U	0.42 U	NA	0.63 U	NA	NA	NA	NA	1.3 U	0.65 U
	Fluoranthene	1,000	1,000	**0.257**	**443**	**5.6**	0.20 U	**21**	**5.7**	NA	**23**	NA	NA	NA	NA	**5.1**	**6**
	Fluorene	1,000	1,000	0.199 U	**121**	0.32 U	0.20 U	**1.9**	**0.74**	NA	**0.83**	NA	NA	NA	NA	1.3 U	**0.77**
	Indeno(1,2,3-cd)pyrene	7	7	0.199 U	**56.9**	0.32 U	0.20 U	**5.7**	**1.7**	NA	**2.7**	NA	NA	NA	NA	1.3 U	0.65 U
	2-Methylnaphthalene	80	300	0.199 U	**47.8**	0.32 U	0.20 U	1.7 U	0.42 U	NA	0.63 U	NA	NA	NA	NA	1.3 U	0.65 U
	Naphthalene	20	500	0.199 U	**76.0**	0.32 U	0.20 U	1.7 U	0.42 U	NA	0.63 U	NA	NA	NA	NA	1.3 U	**1.3**
	Phenanthrene	500	500	**0.203**	**710**	**3.4**	0.20 U	**17**	**4.7**	NA	**11**	NA	NA	NA	NA	1.3 U	**5.4**
	Pyrene	1,000	1,000	**0.386**	**280**	**4.5**	**0.30**	**14**	**5.4**	NA	**12**	NA	NA	NA	NA	**5.5**	**3.6**
PCB Aroclors																	
(mg/kg)	Total PCBs	1	1	**0.607 J**	**17.96 J**	**4.834**	**0.255 J**	**5 J**	**4.0**	**19.8**	NA	**1.719**	**12.13**	**0.143**	**3.7**	NA	NA
TEQ Summation**																	
(mg/kg)	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	NA	NA	NA	**1.5E-05**	**1.9E-04**	**1.3E-04**	NA	NA	NA	NA	NA	NA	NA	NA
Metals																	
(mg/kg)	Arsenic	20	20	**3.66**	**19.3**	**5.21**	3.0 U	**8.0**	**3.3**	NA	**8.56**	NA	NA	NA	NA	**5.98**	**3.36**
	Barium	1,000	1,000	**371**	**1,310**	**975**	**56**	**810**	**190**	NA	**873**	NA	NA	NA	NA	**734**	**316**
	Beryllium	90	90	NA	NA	NA	0.30 U	0.31 U	0.31 U	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**0.71**	**29.3**	**4.61**	**1.1**	**2.7**	**2.7**	NA	**7.94**	NA	NA	NA	NA	**10**	**2.09**
	Chromium (III)	1,000	1,000	**25.7**	**119**	**320**	**11**	**97**	**47**	NA	**59**	NA	NA	NA	NA	**94**	**22**
	Lead	200	200	**118**	**16,100**	**413**	**220**	**1,900**	**320**	NA	**765**	NA	NA	NA	NA	**1,140**	**354**
	Mercury	20	20	NA	NA	**0.749**	**0.085**	**1.6**	**0.15**	NA	**0.405**	NA	NA	NA	NA	**0.92**	**0.344**
	Nickel	600	600	NA	NA	NA	**7.3**	**29**	**25**	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	0.74 U	5.9 U	6.1 U	6.2 U	NA	0.12 U	NA	NA	NA	NA	0.81 U	0.12 U
	Silver	100	100	NA	NA	0.37 U	0.59 U	0.61 U	0.62 U	NA	**0.4**	NA	NA	NA	NA	**0.65**	**0.16**
	Vanadium	400	400	NA	NA	NA	**12**	**60**	**28**	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	**77**	**580**	**340**	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection limit (referred to as "ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions were used for results below detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-1.8. Summary of Analytical Results for Soil Samples - HS-8
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HG5	HG6	HG6+HG5	HG7	HG7+HH7	HG8	HG9	HG10	HG10+HG9	HH2.5	HH3		HH4	HH4+HI4	HH5
		Sample Depth (ft.):		0.5-3	0.5-3	0.5-3	0.75-3	0.75-3	1.5-3	1.5-3	2-3	1.5-3	1.5-3	0-1.5	1.5-3	1-3	1-3	0.75-3
		Sample Date:		12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	2/22/2005	2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004
		S-1/GW-2	S-1/GW-3							combo								
VOCs																		
(mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH																		
(mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																		
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																		
(mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA	NA	**2.4**	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	**0.35**	NA	0.07 U	NA	NA	0.63 U	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	**1 B**	NA	**0.21 B**	NA	NA	1.9 U	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA	0.07 U	NA	NA	0.63 U	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	**1**	NA	**0.1 J**	NA	NA	1.9 U	NA
	Carbazole	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.11**	NA	NA	**1.5**	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	**0.079**	NA	0.07 U	NA	NA	0.63 U	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	**0.12**	NA	0.07 U	NA	NA	**0.88**	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	**0.064**	NA	0.07 U	NA	NA	0.63 U	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	**0.31**	NA	0.14 U	NA	NA	**2**	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	**1.1**	NA	**0.62**	NA	NA	**6.5**	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	**1.1**	NA	**0.55**	NA	NA	**6**	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	**1.7**	NA	**0.73**	NA	NA	**9**	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	**0.57**	NA	**0.15**	NA	NA	**1.9**	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	**0.39**	NA	**0.31**	NA	NA	**3.4**	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	**0.93**	NA	**0.55**	NA	NA	**4.8**	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA	0.07 U	NA	NA	0.63 U	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	**1.9**	NA	**1.3**	NA	NA	**15**	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA	0.07 U	NA	NA	**0.74**	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA	**0.19**	NA	NA	**1.9**	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	0.062 U	NA	0.07 U	NA	NA	0.63 U	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	**0.069**	NA	0.07 U	NA	NA	0.63 U	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	**1.4**	NA	**0.66**	NA	NA	**10**	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	**4.3**	NA	**0.74**	NA	NA	**9.9**	NA
PCB Aroclors																		
(mg/kg)	Total PCBs	1	1	2.45 U	**0.746**	NA	**2.11**	NA	**3.53**	**2.9**	**1.884**	NA	**14.3**	**0.653**	**5.37**	**4.95**	NA	**2.688**
TEQ Summation**																		
(mg/kg)	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																		
(mg/kg)	Arsenic	20	20	NA	NA	**3.17**	NA	**10**	NA	NA	NA	**9.02**	NA	**1.44**	NA	NA	**9.07**	NA
	Barium	1,000	1,000	NA	NA	**179**	NA	**1,710**	NA	NA	NA	**752**	NA	**523**	NA	NA	**1,210**	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	NA	**4.26**	NA	**6.34**	NA	NA	NA	**7.46**	NA	**1.14**	NA	NA	**11**	NA
	Chromium (III)	1,000	1,000	NA	NA	**13**	NA	**150**	NA	NA	NA	**80**	NA	**8.01**	NA	NA	**177**	NA
	Lead	200	200	NA	NA	**419**	NA	**1,070**	NA	NA	NA	**1,430**	NA	**693**	NA	NA	**2,280**	NA
	Mercury	20	20	NA	NA	**0.386**	NA	**17**	NA	NA	NA	**1.57**	NA	**0.073**	NA	NA	**1.02**	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	0.77 U	NA	**2.22**	NA	NA	NA	0.82 U	NA	0.1 U	NA	NA	0.11 U	NA
	Silver	100	100	NA	NA	0.39 U	NA	**1.35**	NA	NA	NA	**6.4**	NA	0.05 U	NA	NA	**1.02**	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a co
met. This value represents the theoretical maximum possible content of dioxins and furans in t

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NA - Sample not analyzed for the listed analyte.

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PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing con
human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tet
"dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like co
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underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-
"ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change on
detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-1.8. Summary of Analytical Results for Soil Samples - HS-8
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HH5+HI5	HH7	HH8	HH8+HG8	HH9	HH9+HI9	HH10	HH10+HI10	HI2.5	HI2.5+HJ2.5	HI3	HI3+HH3	HI4	HI5	HI6
		Sample Depth (ft.):		0.75-3	1.25-3	0.5-3	0.5-3	1-3	0.75-3	1.5-3	1-3	1-2	0-2	1-3	1-3	1-3	1-3	1-3
		Sample Date:		12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/29/2004	12/29/2004	2/22/2005	2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004	12/28/2004
		S-1/GW-2	S-1/GW-3															
VOCs																		
(mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH																		
(mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																		
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																		
(mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA	4.2 U	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	0.67 U	NA	0.72 U	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	**0.3 JB**	NA	**0.73 JB**	NA	2.2 U	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	0.67 U	NA	0.72 U	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	**9.8**	NA	**2.6**	NA	**0.92 J**	NA	NA	NA
	Carbazole	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	**13**	NA	**4**	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	**7.2**	NA	**2.1**	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	**14**	NA	**2.1**	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	0.67 U	NA	**2.5**	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	**22**	NA	**10**	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.94**	NA	**40**	NA	**26**	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	**0.93**	NA	**33**	NA	**21**	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	**0.82**	NA	**45**	NA	**32**	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	**7.7**	NA	**4.7**	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	**0.51**	NA	**13**	NA	**6.8**	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	**0.66**	NA	**33**	NA	**20**	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	**3.3**	NA	0.72 U	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**2.1**	NA	**73**	NA	**69**	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	**11**	NA	**2.2**	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	**9.8**	NA	**6.1**	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	**4.5**	NA	0.72 U	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	**12**	NA	**1**	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	0.76 U	NA	**84**	NA	**45**	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	**1.6**	NA	**58**	NA	**45**	NA	NA	NA
PCB Aroclors																		
(mg/kg)	Total PCBs	1	1	NA	**3.684**	**3.654**	NA	**2.704**	NA	**0.770**	NA	**0.94**	NA	**5.35**	NA	**4.44**	**7.46**	**4.36**
TEQ Summation**																		
(mg/kg)	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																		
(mg/kg)	Arsenic	20	20	**3.01**	NA	NA	**22**	NA	**5.65**	NA	**3.87**	NA	**4.3**	NA	**7.93**	NA	NA	NA
	Barium	1,000	1,000	**358**	NA	NA	**5,110**	NA	**1,370**	NA	**567**	NA	**572**	NA	**595**	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**3.51**	NA	NA	**12**	NA	**5.65**	NA	**2.79**	NA	**4.53**	NA	**7.17**	NA	NA	NA
	Chromium (III)	1,000	1,000	**27**	NA	NA	**356**	NA	**137**	NA	**65**	NA	**62**	NA	**81**	NA	NA	NA
	Lead	200	200	**568**	NA	NA	**2,200**	NA	**829**	NA	**278**	NA	**866**	NA	**4,380**	NA	NA	NA
	Mercury	20	20	**0.691**	NA	NA	**0.708**	NA	**0.953**	NA	**0.453**	NA	**0.845**	NA	**0.608**	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	0.72 U	NA	NA	0.94 U	NA	0.8 U	NA	0.72 U	NA	0.13 U	NA	0.14 U	NA	NA	NA
	Silver	100	100	0.36 U	NA	NA	**2.17**	NA	**0.4**	NA	0.36 U	NA	**0.71**	NA	**0.53**	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

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TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing con
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"dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like co
mathematically change concentrations of the individual congeners into a single equivalent
underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-
"ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change on
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** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-1.8. Summary of Analytical Results for Soil Samples - HS-8
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			Sample Location:	HI6+HH6	HI7+HJ7	HI7	HI8	HI9	HI10	HI10	HJ2.5		HJ3	HJ4	HJ4+HK4	HJ5	HJ5+HK5
				Sample Depth (ft.):	1-3	1-3	1-2	0.75-3	0.75-3	1-3	0-1	0-2	2-3	2.5-3	1.5-3	0.5-3	2-3	1-3
				Sample Date:	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	2004&2009	2009	2/22/2005	2/22/2005	2/22/2005	2/22/2005	2/22/2005	12/28/2004	12/28/2004
		S-1/GW-2	S-1/GW-3							combo	combo							
VOCs																		
(mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH																		
(mg/kg)	C9-C10 Aromatics	100	100		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																		
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																		
(mg/kg)	Benzoic Acid	1,000*	1,000*		0.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.6 U
	Dimethyl phthalate	50	600		0.06 U	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	**0.97**
	Di-n-butylphthalate	NS	NS		**0.19 B**	NA	NA	NA	NA	NA	NA	**0.095 JB**	NA	NA	NA	1.8 U	NA	**0.41 JB**
	Butyl benzyl phthalate	NS	NS		0.06 U	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	0.31 U
	bis(2-Ethylhexyl)phthalate	90	90		0.18 U	NA	NA	NA	NA	NA	NA	**0.078 J**	NA	NA	NA	1.8 U	NA	0.92 U
	Carbazole	NS	NS		NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	NA
	Dibenzofuran	10*	10*		**0.56**	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	0.31 U
	Acenaphthene	1,000	1,000		**1.1**	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	**3.9**
	Acenaphthylene	600	10		**0.074**	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	**2.2**
	Anthracene	1,000	1,000		**1.9**	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	**8.1**
	Benzo(a)anthracene	7	7		**3.6**	NA	NA	NA	NA	NA	NA	**0.23**	NA	NA	NA	**1.5**	NA	**16**
	Benzo(a)pyrene	2	2		**2.8**	NA	NA	NA	NA	NA	NA	**0.22**	NA	NA	NA	**1.3**	NA	**9.7**
	Benzo(b)fluoranthene	7	7		**4.2**	NA	NA	NA	NA	NA	NA	**0.31**	NA	NA	NA	0.59 U	NA	**9.8**
	Benzo(g,h,i)perylene	1,000	1,000		**1.2**	NA	NA	NA	NA	NA	NA	**0.092**	NA	NA	NA	0.59 U	NA	**2.8**
	Benzo(k)fluoranthene	70	70		**1.4**	NA	NA	NA	NA	NA	NA	**0.08**	NA	NA	NA	0.59 U	NA	**6.5**
	Chrysene	70	70		**2.7**	NA	NA	NA	NA	NA	NA	**0.2**	NA	NA	NA	**1.3**	NA	**14**
	Dibenz(a,h)anthracene	0.7	0.7		0.06 U	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	0.31 U
	Fluoranthene	1,000	1,000		**6.8**	NA	NA	NA	NA	NA	NA	**0.39**	NA	NA	NA	**2.9**	NA	**30**
	Fluorene	1,000	1,000		**0.8**	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	**2.9**
	Indeno(1,2,3-cd)pyrene	7	7		**1.4**	NA	NA	NA	NA	NA	NA	**0.11**	NA	NA	NA	0.59 U	NA	**3.1**
	2-Methylnaphthalene	80	300		**0.25**	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	**3.9**
	Naphthalene	20	500		**0.76**	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA	0.59 U	NA	**1.8**
	Phenanthrene	500	500		**6.1**	NA	NA	NA	NA	NA	NA	**0.23**	NA	NA	NA	**1.7**	NA	**33**
	Pyrene	1,000	1,000		**6.5**	NA	NA	NA	NA	NA	NA	**0.39**	NA	NA	NA	**2.9**	NA	**37**
PCB Aroclors																		
(mg/kg)	Total PCBs	1	1		NA	NA	**2.49**	**2.462**	**4.715**	**2.99 J**	**3.48 J**	**0.73**	**2.74**	**0.209**	**0.77**	NA	**0.869**	NA
TEQ Summation**																		
(mg/kg)	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																		
(mg/kg)	Arsenic	20	20		**4.74**	**8.3**	NA	NA	NA	NA	NA	**0.56**	NA	NA	NA	**4.62**	NA	**4**
	Barium	1,000	1,000		**833**	**903**	NA	NA	NA	NA	NA	**27**	NA	NA	NA	**593**	NA	**788**
	Beryllium	90	90		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70		**2.98**	**4.31**	NA	NA	NA	NA	NA	**0.8**	NA	NA	NA	**3.14**	NA	**3.56**
	Chromium (III)	1,000	1,000		**66**	**84**	NA	NA	NA	NA	NA	**10**	NA	NA	NA	**66**	NA	**58**
	Lead	200	200		**398**	**796**	NA	NA	NA	NA	NA	**35**	NA	NA	NA	**359**	NA	**400**
	Mercury	20	20		**0.324**	**1.3**	NA	NA	NA	NA	NA	**0.044**	NA	NA	NA	**0.32**	NA	**0.422**
	Nickel	600	600		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400		0.68 U	**3.42**	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA	0.11 U	NA	0.63 U
	Silver	100	100		**0.41**	**0.57**	NA	NA	NA	NA	NA	0.06 U	NA	NA	NA	**0.22**	NA	0.31 U
	Vanadium	400	400		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a c
met. This value represents the theoretical maximum possible content of dioxins and furans in t

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing con
human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tet
"dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like co
mathematically change concentrations of the individual congeners into a single equivalent
underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-
"ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change on
detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-1.8. Summary of Analytical Results for Soil Samples - HS-8
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HJ6	HJ7	HJ8	HJ8+HI8	HJ9	HJ9+HK8	HJ10	HJ-10	HK2.5	HK2.5+HM2.5	HK4	HK5	HK6	HK6+HJ6	HK7
		Sample Depth (ft.):		1-2.5	1-3	0.5-2.5	0.5-3	1-3	0.5-2.5	1-3	0-1	0.5-3	0.5-3	0.5-3	1-3	0.25-3	0.25-3	2-3
		Sample Date:		12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	12/28/2004	2004&2009	2009	2/22/2005	2/22/2005	2/22/2005	12/28/2004	12/28/2004	12/28/2004	12/28/2004
		S-1/GW-2	S-1/GW-3				combo			combo	combo					combo		
VOCs																		
(mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH																		
(mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																		
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																		
(mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	0.89 U	NA	NA	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	0.059 U	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	**0.52 B**	NA	NA	**5.6 B**	NA	NA	1.8 U	NA	NA	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	NA	**0.31**	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	**6.3**	NA	NA	**5.3**	NA	NA	1.8 U	NA	NA	NA	NA	NA
	Carbazole	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	**0.205**	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	**0.34**	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	**0.092**	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	**0.815**	NA	NA	**3**	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	**2.7**	NA	NA	**1.6**	NA	NA	**0.96**	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	**4.7**	NA	NA	**1.5**	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	**6.5**	NA	NA	**1.5**	NA	NA	**1.3**	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	**2.5**	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	**2.3**	NA	NA	**1.1**	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	**2.05**	NA	NA	**1.3**	NA	NA	**0.76**	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	0.059 U	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	**4.95**	NA	NA	**3.8**	NA	NA	**1.7**	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	**0.32**	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	**2.6**	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	**0.07975 J**	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	**0.26**	NA	NA	0.28 U	NA	NA	0.59 U	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	**3.6**	NA	NA	**2.5**	NA	NA	**1.2**	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	**4.75**	NA	NA	**3.1**	NA	NA	**1.2**	NA	NA	NA	NA	NA
PCB Aroclors																		
(mg/kg)	Total PCBs	1	1	**1.802**	**2.468**	**0.74**	NA	**3.223**	NA	**2.29 J**	**1.61 J**	**9.32**	NA	**0.926**	**0.242**	**1.435 J**	NA	**0.296**
TEQ Summation**																		
(mg/kg)	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																		
(mg/kg)	Arsenic	20	20	NA	NA	NA	**11**	NA	**5.94**	**2.53**	NA	NA	**0.97**	NA	NA	NA	**35**	NA
	Barium	1,000	1,000	NA	NA	NA	**3,640**	NA	**1,510**	**169**	NA	NA	**167**	NA	NA	NA	**638**	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	NA	NA	**18**	NA	**3.73**	**9.73**	**1.38**	NA	**4.22**	NA	NA	NA	**12**	NA
	Chromium (III)	1,000	1,000	NA	NA	NA	**741**	NA	**206**	**226**	**56.6**	NA	**36**	NA	NA	NA	**476**	NA
	Lead	200	200	NA	NA	NA	**1,515**	NA	**526**	**1564**	**376**	NA	**379**	NA	NA	NA	**3,900**	NA
	Mercury	20	20	NA	NA	NA	**1.0575**	NA	**0.532**	**1.02**	NA	NA	**0.501**	NA	NA	NA	**4.29**	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	0.75 U	NA	0.76 U	0.68 U	NA	NA	0.1 U	NA	NA	NA	0.91 U	NA
	Silver	100	100	NA	NA	NA	**2.33**	NA	**0.38**	0.34 U	NA	NA	**0.25**	NA	NA	NA	**2.82**	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a co
met. This value represents the theoretical maximum possible content of dioxins and furans in t

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PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing con
human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tet
"dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like co
mathematically change concentrations of the individual congeners into a single equivalent
underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-
"ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change on
detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-1.8. Summary of Analytical Results for Soil Samples - HS-8
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HK7+HL7	HK8	HL3	HL3+HJ3	HL4	HL7	HM2.5	HM3	HS-2	SB-350			VSS-1	
			Sample Depth (ft.):	1-3	1-2	0.25-3	0.25-3	2-3	1-1.5	1-2	0.75-1.5	0-0.5	0.5	5	8	0-0.5	0.5-1
			Sample Date:	12/28/2004	12/28/2004	2/22/2005	2/22/2005	2/22/2005	12/28/2004	2/22/2005	2/22/2005	9/9/2004	8/21/2008	8/21/2008	8/21/2008	7/23/2001	7/23/2001
		S-1/GW-2	S-1/GW-3					combo			combo						
VOCs																	
(mg/kg)	p-Isopropyltoluene (p-Cymene)	100(1)	100(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH																	
(mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EPH																	
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**10**
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**12**
SVOCs																	
(mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	**0.92 JB**	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	1.7 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Carbazole	NS	NS	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	0.50 U
	Acenaphthylene	600	10	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	0.50 U
	Anthracene	1,000	1,000	NA	NA	NA	0.57 U	**0.68**	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**0.70**
	Benzo(a)anthracene	7	7	NA	NA	NA	**1.8**	**3.4**	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**1.0**
	Benzo(a)pyrene	2	2	NA	NA	NA	**1.3**	**2.5**	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**1.2**
	Benzo(b)fluoranthene	7	7	NA	NA	NA	**2**	**4.4**	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**0.80**
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**1.4**
	Benzo(k)fluoranthene	70	70	NA	NA	NA	0.57 U	**1.2**	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**0.70**
	Chrysene	70	70	NA	NA	NA	**1.6**	**2.5**	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**1.1**
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**1.2**
	Fluoranthene	1,000	1,000	NA	NA	NA	**2.9**	**6.3**	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**2.4**
	Fluorene	1,000	1,000	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	0.50 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	0.50 U
	2-Methylnaphthalene	80	300	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	0.50 U
	Naphthalene	20	500	NA	NA	NA	0.57 U	0.68 U	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	0.50 U
	Phenanthrene	500	500	NA	NA	NA	**2.6**	**3.5**	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**2.4**
	Pyrene	1,000	1,000	NA	NA	NA	**2.8**	**4.4**	NA	NA	NA	NA	NA	0.238 U	0.182 U	NA	**2.2**
PCB Aroclors																	
(mg/kg)	Total PCBs	1	1	NA	**0.552**	**1.62**	NA	**5.63**	2.3 U	**0.28**	**0.707**	**6.51**	0.0545 U	**0.862 J**	0.0531 U	0.100 U	0.100 U
TEQ Summation**																	
(mg/kg)	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																	
(mg/kg)	Arsenic	20	20	**1.77**	NA	NA	**1.22**	**5.87**	NA	NA	NA	NA	NA	**59.8**	2.73 U	**2.26**	**2.31**
	Barium	1,000	1,000	**106**	NA	NA	**43**	**1,925**	NA	NA	NA	NA	NA	**7,430**	**19.3**	**28**	**55**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.61**	0.28 U	NA	NA
	Cadmium	70	70	**1.68**	NA	NA	**0.92**	**6.94**	NA	NA	NA	NA	NA	**4.74**	0.28 U	0.33 U	**0.45**
	Chromium (III)	1,000	1,000	**19**	NA	NA	**14**	**173**	NA	NA	NA	NA	NA	**1,370**	**8.20**	**7.50**	**12**
	Lead	200	200	**230**	NA	NA	**75**	**1,330**	NA	NA	NA	NA	NA	**638**	**3.83**	**81**	**92**
	Mercury	20	20	**0.226**	NA	NA	**0.078**	**0.96**	NA	NA	NA	NA	NA	**0.356**	0.011 U	0.07 U	0.07 U
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**167**	**4.73**	NA	NA
	Selenium	400	400	0.8 U	NA	NA	0.1 U	0.115 U	NA	NA	NA	NA	NA	7.12 U	5.46 U	0.66 U	0.70 U
	Silver	100	100	**0.4**	NA	NA	0.05 U	**0.56**	NA	NA	NA	NA	NA	**31.5**	**1.50**	0.33 U	0.35 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**602**	**9.23**	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1,300**	**19.6**	NA	NA

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a c
met. This value represents the theoretical maximum possible content of dioxins and furans in t

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing con
human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tet
"dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like co
mathematically change concentrations of the individual congeners into a single equivalent
underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-
"ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change on
detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-1.8. Summary of Analytical Results for Soil Samples - HS-8
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		VSS-2	VSS-15	SS-58	SS-59	SS-60	SS-61	SS-62
		Sample Depth (ft.):		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
		Sample Date:		7/23/2001	7/23/2001	12/2/2008	12/2/2008	12/2/2008	12/2/2008	12/2/2008
		S-1/GW-2	S-1/GW-3				combo			
VOCs										
(mg/kg)	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	NA	NA	NA	NA	NA	NA	NA
VPH										
(mg/kg)	C9-C10 Aromatics	100	100	NA	NA	NA	NA	NA	NA	NA
	C9-C12 Aliphatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA
EPH										
(mg/kg)	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA
SVOCs										
(mg/kg)	Benzoic Acid	1,000*	1,000*	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA
	Butyl benzyl phthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA
	Carbazole	NS	NS	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	0.213 U	0.211 U	0.221 U	0.199 U	0.206 U
	Acenaphthylene	600	10	NA	NA	0.213 U	0.211 U	0.221 U	0.199 U	0.206 U
	Anthracene	1,000	1,000	NA	NA	0.213 U	0.211 U	0.221 U	0.199 U	0.206 U
	Benzo(a)anthracene	7	7	NA	NA	0.213 U	0.211 U	**0.268**	**0.798**	0.206 U
	Benzo(a)pyrene	2	2	NA	NA	0.213 U	0.211 U	**0.252**	**0.651**	0.206 U
	Benzo(b)fluoranthene	7	7	NA	NA	0.213 U	0.211 U	**0.300**	**0.704**	0.206 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	0.213 U	0.211 U	**0.240**	**0.403**	0.206 U
	Benzo(k)fluoranthene	70	70	NA	NA	0.213 U	0.211 U	0.221 U	**0.294**	0.206 U
	Chrysene	70	70	NA	NA	0.213 U	0.211 U	**0.277**	**0.936**	0.206 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	0.213 U	0.211 U	0.221 U	0.199 U	0.206 U
	Fluoranthene	1,000	1,000	NA	NA	0.213 U	**0.2415**	**0.453**	**1.03**	**0.298**
	Fluorene	1,000	1,000	NA	NA	0.213 U	0.211 U	0.221 U	0.199 U	0.206 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	0.213 U	0.211 U	**0.244**	**0.465**	0.206 U
	2-Methylnaphthalene	80	300	NA	NA	0.213 U	0.211 U	0.221 U	0.199 U	0.206 U
	Naphthalene	20	500	NA	NA	0.213 U	0.211 U	0.221 U	0.199 U	0.206 U
	Phenanthrene	500	500	NA	NA	0.213 U	**0.20525 J**	**0.299**	**0.962**	0.206 U
	Pyrene	1,000	1,000	NA	NA	0.213 U	**0.2965**	**0.537**	**1.42**	**0.344**
PCB Aroclors										
(mg/kg)	Total PCBs	1	1	0.100 U	0.100 U	0.0578 U	**0.5045 J**	**0.701 J**	**0.199 J**	**0.857 J**
TEQ Summation**										
(mg/kg)	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	NA	NA	NA	NA	NA	NA	NA
Metals										
(mg/kg)	Arsenic	20	20	**2.53**	**1.63**	3.19 U	3.165 U	3.31 U	**3.34**	3.09 U
	Barium	1,000	1,000	**29**	**89**	**21.4**	**109.6**	**159**	**50.8**	**153**
	Beryllium	90	90	NA	NA	0.32 U	0.32 U	0.34 U	0.30 U	0.31 U
	Cadmium	70	70	0.38 U	0.34 U	0.32 U	**0.475**	**1.55**	0.30 U	**0.44**
	Chromium (III)	1,000	1,000	**7.03**	**35**	**9.21**	**12.6**	**25.4**	**17.9**	**17.6**
	Lead	200	200	**47**	**51**	**7.87**	**128.5**	**186**	**68.0**	**95.3**
	Mercury	20	20	0.08 U	**0.17**	**0.027**	**0.511**	**0.259**	**0.088**	**0.128**
	Nickel	600	600	NA	NA	**6.01**	**4.64**	**7.74**	**8.81**	**6.05**
	Selenium	400	400	0.77 U	0.68 U	6.38 U	6.32 U	6.61 U	5.96 U	6.18 U
	Silver	100	100	0.38 U	0.34 U	0.64 U	0.64 U	0.67 U	0.60 U	0.62 U
	Vanadium	400	400	NA	NA	**15.0**	**16.9**	**25.5**	**21.5**	**19.0**
	Zinc	1,000	1,000	NA	NA	**20.5**	**73.9**	**143**	**60.1**	**72.1**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

B - Detected in associated laboratory method blank.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a co
met. This value represents the theoretical maximum possible content of dioxins and furans in t

J - Estimated value; below quantitation limit.

NA - Sample not analyzed for the listed analyte.

NS - No standard available for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing con
human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tet
"dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like co
mathematically change concentrations of the individual congeners into a single equivalent
underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-
"ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change on
detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HA29	HA29+HB29	HB25	HB25+HB26	HB26			HB27	HB28	HB28+HB27	HB29	COMP SS-13-AC,AD,AE,AF	COMP SS-13-AS,AT,AU,AV	COMP SS-13-G,H,I,J	COMP SS-13-E,L,K,B	COMP SS-13-M,N,O,P	COMP SS-13-U,Z,AA,AB
		Sample Depth (ft.):		1-2.5	1-3	1-3	0.5-3	0.5-3	1-3	3-5	1-3	1.5-3	1-3	1-3	0.5-4	0.5-4	0.5-4	0.5-4	1-4	1-4
		Sample Date:		12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	4/15/2010 combo	4/15/2010	12/30/2004	12/30/2004	12/30/2004	12/30/2004 combo	9/2/2004	9/2/2004 combo	9/2/2004	9/2/2004	9/2/2004	9/2/2004
		S-1/GW-2	S-1/GW-3																	
EPH																				
	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																				
	4-Methylphenol	200*	5*	NA	**0.074**	NA	0.062 U	NA	NA	NA	NA	NA	0.064 U	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	0.06 U	NA	0.062 U	NA	NA	NA	NA	NA	0.064 U	NA	0.4 U	0.42 U	0.39 U	0.4 U	0.45 U	2.1 U
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	**0.43**	NA	**0.19**	NA	NA	NA	NA	NA	**0.1 J**	NA	0.8 U	0.83 U	0.78 U	0.8 U	0.9 U	4.3 U
	Dibenzofuran	10*	10*	NA	**0.98**	NA	**0.25**	NA	NA	NA	NA	NA	**0.35**	NA	**0.62**	**0.355 J**	0.39 U	0.4 U	0.45 U	2.1 U
	Acenaphthene	1,000	1,000	NA	**1.6**	NA	**0.42**	NA	**0.265 J**	1.2 U	NA	NA	**0.49**	NA	0.4 U	**0.53 J**	0.39 U	0.4 U	**0.56**	2.1 U
	Acenaphthylene	600	10	NA	**0.27**	NA	**0.17**	NA	0.32 U	1.2 U	NA	NA	**0.12**	NA	**0.64**	**0.47**	0.39 U	0.4 U	0.45 U	2.1 U
	Anthracene	1,000	1,000	NA	**4**	NA	**1.4**	NA	**0.99**	1.2 U	NA	NA	**2.3**	NA	**1.1**	**2.8**	**1**	**0.85**	**1.3**	2.1 U
	Benzo(a)anthracene	7	7	NA	**5**	NA	**4.8**	NA	**3.15**	1.2 U	NA	NA	**5.5**	NA	**1.7**	**5.1**	**2.2**	**2**	**2.8**	2.1 U
	Benzo(a)pyrene	2	2	NA	**6.4**	NA	**3.7**	NA	**2.7**	1.2 U	NA	NA	**4.7**	NA	**0.93**	**4.4**	**2**	**1.8**	**2.4**	2.1 U
	Benzo(b)fluoranthene	7	7	NA	**5.1**	NA	**6.1**	NA	**3.6**	1.2 U	NA	NA	**7.5**	NA	**1**	**4.9**	**2**	**1.9**	**2.4**	2.1 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	**2.1**	NA	**1.4**	NA	**0.925**	1.2 U	NA	NA	**1.2**	NA	**1**	**2.8**	**1.5**	**1.3**	**1.6**	2.1 U
	Benzo(k)fluoranthene	70	70	NA	**3.3**	NA	**1.9**	NA	**1.45**	1.2 U	NA	NA	**2.8**	NA	**1.6**	**3.1**	**1.8**	**1.5**	**2.2**	2.1 U
	Chrysene	70	70	NA	**7.2**	NA	**3.7**	NA	**3.4**	1.2 U	NA	NA	**4.1**	NA	**1.6**	**5.1**	**2.2**	**2**	**2.8**	2.1 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.06 U	NA	0.062 U	NA	**0.28 J**	1.2 U	NA	NA	**0.5**	NA	**0.45**	**1.4**	**0.76**	**0.64**	**0.72**	2.1 U
	Fluoranthene	1,000	1,000	NA	**9.5**	NA	**7.8**	NA	**5.4**	1.2 U	NA	NA	**11**	NA	**4.4**	**14**	**5.1**	**4.3**	**6.5**	**4**
	Fluorene	1,000	1,000	NA	**1.6**	NA	**0.52**	NA	**0.275 J**	1.2 U	NA	NA	**0.69**	NA	**0.58**	**0.57 J**	0.39 U	0.4 U	**0.52**	2.1 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	**2.4**	NA	**1.5**	NA	**1.19**	1.2 U	NA	NA	**1.4**	NA	**0.95**	**2.7**	**1.4**	**1.2**	**1.4**	2.1 U
	2-Methylnaphthalene	80	300	NA	**0.38**	NA	**0.11**	NA	0.32 U	1.2 U	NA	NA	**0.096**	NA	NA	NA	NA	0.4 U	NA	NA
	Naphthalene	20	500	NA	**0.64**	NA	**0.14**	NA	0.32 U	1.2 U	NA	NA	**0.13**	NA	0.4 U	0.42 U	0.39 U	0.4 U	0.45 U	2.1 U
	Phenanthrene	500	500	NA	**7.7**	NA	**5.8**	NA	**3.95**	1.2 U	NA	NA	**7.4**	NA	**4.4**	**11**	**3.6**	**2.3**	**5.2**	**2.9**
	Pyrene	1,000	1,000	NA	**9.4**	NA	**7.8**	NA	**3.85**	1.2 U	NA	NA	**19**	NA	**4.0**	**13**	**5**	**4.4**	**5.9**	**3.7**
PCBs (mg/kg)	Total PCBs	1	1	**2.63**	NA	2.49 U	NA	**5.168**	**6.47 J**	**16.62 J**	**3.369**	**2.796**	NA	**6.476**	NA	NA	NA	NA	NA	NA
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	15 U	5.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	NA	**9.58**	NA	**14**	NA	**23**	**9.1**	NA	NA	**9.19**	NA	**10**	**17**	**19**	**48**	**16**	**27**
	Barium	1,000	1,000	NA	**742**	NA	**1,010**	NA	**950**	**540**	NA	NA	**789**	NA	**140**	**315**	**500**	**22**	**380**	**390**
	Beryllium	90	90	NA	NA	NA	NA	NA	**0**	**0.67**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	**5.94**	NA	**7.14**	NA	**4**	**11**	NA	NA	**5.82**	NA	**2.1**	**2.55**	**2.4**	**2.6**	**2.7**	**3.3**
	Chromium (III)	1000	1000	NA	**61**	NA	**91**	NA	**72**	**46**	NA	NA	**66**	NA	**22**	**43**	**73**	**53**	**36**	**38**
	Lead	200	200	NA	**847**	NA	**1,790**	NA	**1,200**	**4,300**	NA	NA	**1,310**	NA	**530**	**1600**	**1,100**	**720**	**1,300**	**1,500**
	Mercury	20	20	NA	**1.37**	NA	**0.715**	NA	**1**	**0.11**	NA	NA	**1.44**	NA	**0.46**	**1.025**	**0.73**	**76**	**0.79**	**0.5**
	Nickel	600	600	NA	NA	NA	NA	NA	**47**	**31**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	0.7 U	NA	0.82 U	NA	6 U	6.9 U	NA	NA	0.84 U	NA	2.4 U	**2.15 J**	12 U	2.4 U	2.7 U	2.6 U
	Silver	100	100	NA	**0.7**	NA	**1.64**	NA	**1 J**	**75**	NA	NA	**0.76**	NA	0.48 U	**1.05**	**1**	**0.77**	**0.89**	**1.3**
	Vanadium	400	400	NA	NA	NA	NA	NA	**39**	**28**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	**1090**	**410**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte			COMP SS-13-V,W, X, Y	SS-13-A	SS-13-AB	SS-13-AC	SS-13-AD	SS-13-AE	SS-13-AF	SS-13-AG	SS-13-AI	SS-13-AL	SS-13-AM	SS-13-AQ	SS-13-AR	SS-13-AS	SS-13-AT	SS-13-AU	SS-13-AV	SS-13-AW	SS-13-B
		Sample Location:																				
		Sample Depth (ft.):		0.5-4	0.5-4	2.5-4	2-4	1-4	1-4	0.5-4	1-4	1-4	1-4	1-4	1-4	0.5-1.5	0.5-4	1-4	1-4	1-4	1-4	0.5-4
		Sample Date:		9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004 combo	9/2/2004
		S-1/GW-2	S-1/GW-3																			
EPH																						
	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																						
	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	**0.55**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	**1.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	**2.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	**3.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	**2.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	**2.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	**2.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	**3.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	**4.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	**1.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	**1.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	**2.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	**40**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	**7.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	**8.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)	Total PCBs	1	1	NA	0.0379 U	**0.0988**	**0.539**	0.0476 U	**0.172**	**12.6**	**0.0584**	**0.931**	**4.56**	**2.236**	**5.48**	**0.667**	**0.669**	**1.56**	**0.2194 .**	**0.373**	**1.3075**	**0.644**
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	**10**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	**380**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium (III)	1000	1000	**39**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	200	200	**1,000**	**2,200**	**2,200**	**320**	**160**	**370**	**1,100**	**4.6**	**1,400**	**970**	**2,100**	**720**	**560**	**440**	**4,200**	**840**	**540**	**995**	**930**
	Mercury	20	20	**1.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	2.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	**0.54**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SS-13-C	SS-13-D	SS-13-E	SS-13-F	SS-13-G	SS-13-H	SS-13-I	SS-13-J	SS-13-L	SS-13-M	SS-13-N	SS-13-O	SS-13-P	SS-13-V	SS-13-W	SS-13-X	SS-13-Y	SB-349		
			Sample Depth (ft.):	1-4	1-4	1-4	0.5-4	0.5-4	1-4	1-4	2-4	0.5-4	1-4	1-4	1-4	1-4	0.5-1.5	1-4	0.5-4	0.5-4	8	11	14
			Sample Date:	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004	9/2/2004 combo	8/21/2008 combo	8/21/2008	8/21/2008
		S-1/GW-2	S-1/GW-3																				
EPH																							
	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																							
	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.223 U	0.627 U	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.223 U	0.627 U	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.466**	0.627 U	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.24**	0.627 U	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.12**	0.627 U	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.946**	0.627 U	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.7565**	0.627 U	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.369**	0.627 U	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.0555**	0.627 U	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.223 U	0.627 U	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.56**	0.627 U	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.223 U	0.627 U	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.8195**	0.627 U	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.223 U	0.627 U	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.223 U	0.627 U	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2**	0.627 U	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.61**	0.627 U	NA
PCBs (mg/kg)	Total PCBs	1	1	**0.2661**	0.0406 U	0.045 U	**0.0731**	0.0351 U	**0.4536**	**1.842**	**2.75**	**0.715**	**0.0926**	0.0427 U	**0.0436**	0.0463 U	**0.1731**	**0.1393**	**0.0779**	**0.78**	**0.504 J**	0.186 UJ	NA
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.34 U	15.1 U	4.75 U
	Arsenic	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**10.85**	**14.5**	2.97 U
	Barium	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**179.5**	**152**	5.94 U
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.395**	0.94 U	0.30 U
	Cadmium	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.74**	0.94 U	0.30 U
	Chromium (III)	1000	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**23**	**27.0**	**2.90**
	Lead	200	200	**930**	**380**	**490**	**660**	**38**	**9,700**	**2,300**	**1,600**	**480**	**950**	**1,300**	**420**	**380**	**48**	**11,000**	**3,900**	**670**	**472.5**	**207**	**2.75**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.119**	**0.304**	0.016 U
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**48.1**	**39.3**	**1.96**
	Selenium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.675 U	18.8 U	5.94 U
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**11**	**8.92**	0.60 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**21.95**	**27.7**	5.94 U
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2,670**	**665**	**7.34**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
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R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	VSS-13	HB12	HB12+HB16	HB16	HC12	HC13	HC13+HC12+ HD12	HC14	HC15	HC16	HC16+HC15+ HC14	HD12	HD13+HD14+ HD15	HD14	HD-14D	HD15	HRA33	HRC-33	HRC-33A
			Sample Depth (ft.):	1-2	2.5-3	2.5-3	2.5-3	2-3	1.5-3	1-3	2.5-3	2-3	1.5-3	1.5-3	1-3	1.5-3	2-3	1-3	1.5-3	1-3	0.67-2	1-3
			Sample Date:	7/23/2001	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004	12/29/2004 combo	12/29/2004	12/29/2004	3/10/2009 combo	12/29/2004	2/22/2006 combo	2/22/2006	2/27/2009 combo
		S-1/GW-2	S-1/GW-3																			
EPH																						
	C19 - C36 Aliphatics	3,000	3,000	**59**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	**31**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																						
	4-Methylphenol	200*	5*	0.53 U	NA	0.32 U	NA	NA	NA	0.33 U	NA	NA	NA	0.6 U	NA	0.32 U	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	0.53 U	NA	0.32 U	NA	NA	NA	0.33 U	NA	NA	NA	**1.5**	NA	**0.57**	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	1.6 U	NA	0.97 U	NA	NA	NA	1 U	NA	NA	NA	**3.2**	NA	**21**	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	**1.0**	NA	0.32 U	NA	NA	NA	0.33 U	NA	NA	NA	**1.2**	NA	0.32 U	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	**1.7**	NA	0.32 U	NA	NA	NA	0.33 U	NA	NA	NA	**1.8**	NA	0.32 U	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	0.50 U	NA	**2.9**	NA	NA	NA	**2.6**	NA	NA	NA	**2.3**	NA	0.32 U	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	**3.9**	NA	**0.56**	NA	NA	NA	0.33 U	NA	NA	NA	**6.8**	NA	**0.69**	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	**5.2**	NA	**4.2**	NA	NA	NA	**2.7**	NA	NA	NA	**31**	NA	**2.3**	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	**3.3**	NA	**5.4**	NA	NA	NA	**8.1**	NA	NA	NA	**30**	NA	**2.5**	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	**4.7**	NA	**5.4**	NA	NA	NA	**7.8**	NA	NA	NA	**42**	NA	**3.1**	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	**1.7**	NA	**1.8**	NA	NA	NA	**1.5**	NA	NA	NA	**13**	NA	0.32 U	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	**1.4**	NA	**2.4**	NA	NA	NA	**3.3**	NA	NA	NA	**14**	NA	**0.9**	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	**3.9**	NA	**2.8**	NA	NA	NA	**1.9**	NA	NA	NA	**26**	NA	**2.1**	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	**1.2**	NA	0.32 U	NA	NA	NA	0.33 U	NA	NA	NA	0.6 U	NA	0.32 U	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**12**	NA	**7**	NA	NA	NA	**3**	NA	NA	NA	**56**	NA	**4.4**	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	**1.6**	NA	0.32 U	NA	NA	NA	0.33 U	NA	NA	NA	**2.3**	NA	0.32 U	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	**2.3**	NA	0.32 U	NA	NA	NA	**3.1**	NA	NA	NA	**14**	NA	0.32 U	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	0.50 U	NA	0.32 U	NA	NA	NA	0.33 U	NA	NA	NA	0.6 U	NA	0.32 U	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	**0.59**	NA	**0.43**	NA	NA	NA	0.33 U	NA	NA	NA	**1**	NA	0.32 U	NA	NA	NA	**0.33**	NA	NA
	Phenanthrene	500	500	**12**	NA	**2.3**	NA	NA	NA	**0.69**	NA	NA	NA	**30**	NA	**2.9**	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	**8.4**	NA	**6.8**	NA	NA	NA	**2.8**	NA	NA	NA	**64**	NA	**4**	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)	Total PCBs	1	1	**0.657**	**1.64**	NA	**4.598**	**4.953**	**0.763**	NA	**0.36**	**11.04**	**0.387**	NA	**8.175**	NA	**17.823**	**5.80 J**	**3.089**	**0.215**	**40**	**7.55 J**
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**12.3**	NA	NA
Metals (mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	**8.89**	NA	**30**	NA	NA	NA	**8.87**	NA	NA	NA	**46**	NA	**94**	NA	NA	NA	NA	NA	NA
	Barium	1,000	1,000	**255**	NA	**4,000**	NA	NA	NA	**854**	NA	NA	NA	**15,400**	NA	**5,850**	NA	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**1.38**	NA	**9.68**	NA	NA	NA	**6.27**	NA	NA	NA	**22**	NA	**21**	NA	NA	NA	NA	NA	NA
	Chromium (III)	1000	1000	**18**	NA	**272**	NA	NA	NA	**231**	NA	NA	NA	**1,430**	NA	**2,050**	NA	NA	NA	NA	NA	NA
	Lead	200	200	**777**	NA	**5,230**	NA	NA	NA	**1,110**	NA	NA	NA	**2,650**	NA	**1,460**	NA	NA	NA	NA	NA	NA
	Mercury	20	20	**0.24**	NA	**0.913**	NA	NA	NA	**1.09**	NA	NA	NA	**1.51**	NA	**2.89**	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	0.71 U	NA	0.84 U	NA	NA	NA	0.9 U	NA	NA	NA	0.8 U	NA	0.81 U	NA	NA	NA	NA	NA	NA
	Silver	100	100	0.35 U	NA	**1.68**	NA	NA	NA	**1.7**	NA	NA	NA	**1.2**	NA	**1.61**	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HRC-33L	HRC-33M	HRC-33N	HRE33	HRG-33	SB-273		SB-274		SB-275		SB-276		SB-277		SB-278		SB-279	
			Sample Depth (ft.):	1-3	1-3	1-3	0.5-3	1-3	5.5	8	4	8	4	9.5	4	9.5	4	9	4	6	4	11
			Sample Date:	4/3/2009	4/3/2009	4/3/2009	2/22/2006	2/22/2006	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/16/2008	7/17/2008	7/17/2008	7/23/2008	7/23/2008
		S-1/GW-2	S-1/GW-3								combo											
EPH																						
	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																						
	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	0.207 U	**0.633**	2.03 U	NA	NA	0.261 U	0.182 U	2.115 U	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	0.207 U	0.195 U
	Acenaphthylene	600	10	**0.243**	0.208 U	2.03 U	NA	NA	0.261 U	0.182 U	2.115 U	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**0.615**	0.195 U
	Anthracene	1,000	1,000	**0.828**	**0.939**	2.03 U	NA	NA	0.261 U	0.182 U	**7.85**	0.207 U	**0.293**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**0.592**	0.195 U
	Benzo(a)anthracene	7	7	**2.21**	**2.52**	**3.90**	NA	NA	0.261 U	0.182 U	**31.25**	0.207 U	**1.45**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**3.04**	0.195 U
	Benzo(a)pyrene	2	2	**2.04**	**2.39**	**3.25**	NA	NA	0.261 U	0.182 U	**25.85**	0.207 U	**1.13**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**2.70**	0.195 U
	Benzo(b)fluoranthene	7	7	**2.66**	**3.04**	**4.02**	NA	NA	0.261 U	0.182 U	**28.7**	0.207 U	**1.12**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**4.64**	0.195 U
	Benzo(g,h,i)perylene	1,000	1,000	**0.797**	**1.11**	2.03 U	NA	NA	0.261 U	0.182 U	**18.25**	0.207 U	**0.809**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**2.39**	0.195 U
	Benzo(k)fluoranthene	70	70	**0.975**	**1.09**	2.03 U	NA	NA	0.261 U	0.182 U	**15.1**	0.207 U	**0.334**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**1.70**	0.195 U
	Chrysene	70	70	**2.24**	**2.90**	**4.22**	NA	NA	0.261 U	0.182 U	**32.3**	0.207 U	**1.75**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**4.41**	0.195 U
	Dibenz(a,h)anthracene	0.7	0.7	**0.228**	**0.301**	2.03 U	NA	NA	0.261 U	0.182 U	**5.45**	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**0.770**	0.195 U
	Fluoranthene	1,000	1,000	**3.83**	**6.21**	**6.33**	NA	NA	**0.372**	0.182 U	**85.5**	0.207 U	**2.00**	0.193 U	NA	NA	**0.235**	0.191 U	NA	NA	**5.99**	0.195 U
	Fluorene	1,000	1,000	**0.317**	**0.736**	2.03 U	NA	NA	0.261 U	0.182 U	**2.235 J**	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	0.207 U	0.195 U
	Indeno(1,2,3-cd)pyrene	7	7	**1.05**	**1.43**	**2.13**	NA	NA	0.261 U	0.182 U	**20.8**	0.207 U	**0.753**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**2.89**	0.195 U
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	0.261 U	0.182 U	2.115 U	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**0.743**	0.195 U
	Naphthalene	20	500	0.207 U	**0.932**	2.03 U	NA	NA	0.261 U	0.182 U	2.115 U	0.207 U	0.213 U	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**0.523**	0.195 U
	Phenanthrene	500	500	**4.16**	**6.51**	**8.01**	NA	NA	0.261 U	0.182 U	**17.9**	0.207 U	**1.48**	0.193 U	NA	NA	0.202 U	0.191 U	NA	NA	**1.72**	0.195 U
	Pyrene	1,000	1,000	**4.10**	**3.97**	**7.44**	NA	NA	**0.340**	0.182 U	**63**	0.207 U	**2.41**	0.193 U	NA	NA	**0.316**	0.191 U	NA	NA	**5.08**	0.195 U
PCBs (mg/kg)	Total PCBs	1	1	NA	NA	NA	0.22 U	**0.53**	**0.248 J**	0.0536 U	**0.9955 J**	0.0544 U	**0.125 J**	0.0580 U	**0.0999 J**	0.0587 U	**15.2 J**	0.0576 U	**1.37 J**	0.189 UJ	**0.4701 J**	0.0564 U
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Antimony	20	20	NA	NA	NA	NA	NA	R	R	R	R	R	R	NA	NA	4.84 U	4.58 U	NA	NA	4.96 U	4.68 U
	Arsenic	20	20	**11.0**	**5.40**	**10.1**	NA	NA	**10.6**	**3.14**	**40.25**	3.10 U	**16.1**	2.90 U	NA	NA	**16.7**	2.87 U	NA	NA	**41.5**	2.93 U
	Barium	1,000	1,000	**229**	**122**	**349**	NA	NA	**251**	**16.8**	**1,240**	**13.7**	**422**	**7.90**	NA	NA	**265**	**11.4**	NA	NA	**644**	**8.05**
	Beryllium	90	90	NA	NA	NA	NA	NA	0.40 U	0.28 U	0.325 U	0.31 U	**0.38**	0.29 U	NA	NA	0.31 U	0.29 U	NA	NA	**0.71**	0.30 U
	Cadmium	70	70	**1.97**	**1.61**	**11.3**	NA	NA	**6.12**	0.28 U	**3.69**	0.31 U	**0.59**	0.29 U	NA	NA	**2.08**	0.29 U	NA	NA	**4.39**	0.30 U
	Chromium (III)	1000	1000	**15.8**	**14.2**	**28.3**	NA	NA	**11.3**	**7.29**	**46.2**	**4.94**	**11.0**	**3.44**	NA	NA	**16.9**	**4.30**	NA	NA	**75.6**	**3.77**
	Lead	200	200	**979**	**780**	**10,000**	NA	NA	**456**	**2.92**	**1,600**	**4.97**	**330**	**3.48**	NA	NA	**977**	**3.99**	NA	NA	**2,060**	**36.2**
	Mercury	20	20	NA	NA	NA	NA	NA	**0.243**	0.021 U	**3.26**	0.015 U	**0.256**	0.014 U	NA	NA	**0.207**	0.017 U	NA	NA	**0.917**	0.013 U
	Nickel	600	600	NA	NA	NA	NA	NA	**15.8**	**5.14**	**113**	**2.22**	**14.9**	**2.25**	NA	NA	**15.0**	**4.44**	NA	NA	**35.9**	**2.27**
	Selenium	400	400	NA	NA	NA	NA	NA	7.83 U	5.46 U	6.335 U	6.20 U	6.37 U	5.79 U	NA	NA	6.05 U	5.73 U	NA	NA	6.20 U	5.85 U
	Silver	100	100	NA	NA	NA	NA	NA	**6.62**	**1.90**	**42.05**	**0.66**	**3.31**	**0.95**	NA	NA	**6.65**	**1.04**	NA	NA	**12.3**	0.59 U
	Vanadium	400	400	NA	NA	NA	NA	NA	**22.9**	**8.06**	**22.05**	6.20 U	**31.2**	5.79 U	NA	NA	**29.6**	**6.79**	NA	NA	**25.5**	5.85 U
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	**397**	**23.4**	**825**	**9.54**	**200**	**7.88**	NA	NA	**250**	**9.97**	NA	NA	**1,340**	**10.6**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-280		SB-281		SB-282		SB-283		SB-284		SB-285		SB-286		SB-287		SB-288	
		Sample Depth (ft.):		4	9.5	4	8	3.5	8	3.5	6	3	5	3.5	7.5	4	9	4	9	4	9
		Sample Date:		7/23/2008	7/23/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008	7/17/2008
		S-1/GW-2	S-1/GW-3			combo				combo											
EPH																					
	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																					
	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	0.3395 U	0.725 U	NA	NA	**1.235 J**	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	**2.64**	0.212 U	NA	NA
	Acenaphthylene	600	10	NA	NA	0.3395 U	0.725 U	NA	NA	1.555 U	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	0.981 U	0.212 U	NA	NA
	Anthracene	1,000	1,000	NA	NA	0.3395 U	0.725 U	NA	NA	**4.025**	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	**5.78**	0.212 U	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	**0.613**	0.725 U	NA	NA	**9.15**	0.567 U	NA	NA	**1.31**	0.178 U	NA	NA	**10.2**	0.212 U	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	**0.593**	0.725 U	NA	NA	**8.35**	0.567 U	NA	NA	**1.07**	0.178 U	NA	NA	**8.80**	0.212 U	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	**0.55825 J**	0.725 U	NA	NA	**8.375**	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	**9.21**	0.212 U	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	**0.3175 J**	0.725 U	NA	NA	**8.99**	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	**5.58**	0.212 U	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	0.3395 U	0.725 U	NA	NA	**3.575**	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	**3.54**	0.212 U	NA	NA
	Chrysene	70	70	NA	NA	**0.66**	0.725 U	NA	NA	**9.24**	0.567 U	NA	NA	**1.27**	0.178 U	NA	NA	**9.65**	0.212 U	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	0.3395 U	0.725 U	NA	NA	**2.27**	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	0.981 U	0.212 U	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	**1.4**	0.725 U	NA	NA	**17.4**	0.567 U	NA	NA	**2.06**	0.178 U	NA	NA	**18.8**	0.212 U	NA	NA
	Fluorene	1,000	1,000	NA	NA	0.3395 U	0.725 U	NA	NA	**2.105**	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	**3.16**	0.212 U	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	**0.272 J**	0.725 U	NA	NA	**9.27**	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	**6.63**	0.212 U	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	**0.614**	0.725 U	NA	NA	1.555 U	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	0.981 U	0.212 U	NA	NA
	Naphthalene	20	500	NA	NA	**2.15**	0.725 U	NA	NA	1.555 U	0.567 U	NA	NA	1.02 U	0.178 U	NA	NA	**1.57**	0.212 U	NA	NA
	Phenanthrene	500	500	NA	NA	**1.34**	0.725 U	NA	NA	**17.0**	0.567 U	NA	NA	**3.60**	0.178 U	NA	NA	**21.2**	0.212 U	NA	NA
	Pyrene	1,000	1,000	NA	NA	**1.04**	0.725 U	NA	NA	**17.35**	0.567 U	NA	NA	**3.82**	0.178 U	NA	NA	**18.0**	0.212 U	NA	NA
PCBs (mg/kg)	Total PCBs	1	1	**0.378 J**	0.126 U	**1.30 J**	0.234 UJ	**0.0725 J**	0.229 UJ	**0.952 J**	0.147 U	**0.768 J**	0.207 UJ	**7.50 J**	0.0553 U	**7.19 J**	**0.232 J**	**1.779 J**	0.0611 U	**0.455 J**	0.0575 U
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Antimony	20	20	4.84 U	8.74 U	R	R	NA	NA	R	R	NA	NA	**226**	4.26 U	NA	NA	4.71 U	5.08 U	NA	NA
	Arsenic	20	20	**21.3**	**9.02**	**35.8**	10.9 U	NA	NA	**19.3**	**13.5**	NA	NA	**26.6**	2.66 U	NA	NA	**31.9**	3.18 U	NA	NA
	Barium	1,000	1,000	**470**	**24.8**	**673**	**147**	NA	NA	**551**	**198**	NA	NA	**986**	**20.2**	NA	NA	**1,810**	**7.35**	NA	NA
	Beryllium	90	90	**1.03**	**0.73**	**0.61**	1.09 U	NA	NA	0.315 U	0.86 U	NA	NA	0.31 U	0.27 U	NA	NA	0.30 U	0.32 U	NA	NA
	Cadmium	70	70	**9.10**	0.55 U	**3.575**	1.09 U	NA	NA	**4.29**	0.86 U	NA	NA	**14.8**	0.27 U	NA	NA	**84.3**	0.32 U	NA	NA
	Chromium (III)	1000	1000	**23.2**	**15.2**	**136.5**	**7.78**	NA	NA	**28.5**	**9.55**	NA	NA	**280**	**3.44**	NA	NA	**302**	**3.30**	NA	NA
	Lead	200	200	**1,980**	**5.61**	**4,955**	**8.87**	NA	NA	**1,565**	**13.5**	NA	NA	**1,140**	**3.20**	NA	NA	**3,110**	**3.07**	NA	NA
	Mercury	20	20	**0.527**	0.045 U	**0.4005**	0.095 U	NA	NA	**1.235**	**0.191**	NA	NA	**2.26**	0.017 U	NA	NA	**0.773**	0.016 U	NA	NA
	Nickel	600	600	**15.0**	**19.6**	**26.9**	2.18 U	NA	NA	**20.85**	**4.75**	NA	NA	**55.7**	**2.43**	NA	NA	**83.2**	**4.14**	NA	NA
	Selenium	400	400	6.05 U	11.0 U	5.8 U	21.8 U	NA	NA	6.205 U	17.1 U	NA	NA	6.07 U	5.32 U	NA	NA	5.89 U	6.35 U	NA	NA
	Silver	100	100	**8.25**	1.10 U	**25.2**	2.18 U	NA	NA	**16.05**	**2.14**	NA	NA	**23.3**	**0.85**	NA	NA	**28.4**	**1.16**	NA	NA
	Vanadium	400	400	**20.0**	**21.2**	**19.05**	21.8 U	NA	NA	**23.1**	17.1 U	NA	NA	**311**	5.32 U	NA	NA	**45.0**	6.35 U	NA	NA
	Zinc	1,000	1,000	**1,770**	**40.1**	**1,590**	**58.6**	NA	NA	**1,410**	**32.7**	NA	NA	**2,210**	**14.7**	NA	NA	**3,540**	**12.3**	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SB-289		SB-290		SB-291		SB-292		SB-293			SB-294			SB-295		SB-296		SB-297		
			Sample Depth (ft.):	3.5	6	2.5	6	2	6	2	5	6.5	9	12	4	8.5	12	5.5	9	5	10	6	8	11
			Sample Date:	7/17/2008	7/17/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/21/2008	7/22/2008	7/22/2008	7/22/2008 combo	7/22/2008	7/22/2008	7/22/2008	7/22/2008
		S-1/GW-2	S-1/GW-3																					
EPH																								
	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																								
	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	Acenaphthylene	600	10	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	Anthracene	1,000	1,000	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	Benzo(a)anthracene	7	7	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	**0.266**	0.600 U	NA
	Benzo(a)pyrene	2	2	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	**0.228**	0.600 U	NA
	Benzo(b)fluoranthene	7	7	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	**0.260**	0.600 U	NA
	Benzo(g,h,i)perylene	1,000	1,000	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	Benzo(k)fluoranthene	70	70	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	Chrysene	70	70	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	**0.299**	0.600 U	NA
	Dibenz(a,h)anthracene	0.7	0.7	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	Fluoranthene	1,000	1,000	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	**0.674**	0.600 U	NA
	Fluorene	1,000	1,000	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	Indeno(1,2,3-cd)pyrene	7	7	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	2-Methylnaphthalene	80	300	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	Naphthalene	20	500	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	0.228 U	0.600 U	NA
	Phenanthrene	500	500	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	**0.608**	0.600 U	NA
	Pyrene	1,000	1,000	1.96 U	0.507 U	NA	NA	NA	NA	NA	NA	0.222 U	0.719 U	NA	NA	NA	NA	NA	NA	0.2295 U	0.198 U	**0.414**	0.600 U	NA
PCBs (mg/kg)	Total PCBs	1	1	**2.93 J**	**0.184 J**	**0.127 J**	0.0532 U	**0.127 J**	0.0533 U	0.0519 U	0.0527 U	0.0684 U	0.202 UJ	NA	0.0649 U	0.162 UJ	NA	**0.057**	0.0531 U	0.06935 U	0.0597 U	0.0732 U	0.187 UJ	NA
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Antimony	20	20	4.69 U	12.2 U	NA	NA	NA	NA	NA	NA	R	R	4.62 U	R	R	4.73 U	NA	NA	R	R	R	R	4.71 U
	Arsenic	20	20	**14.6**	**39.8**	NA	NA	NA	NA	NA	NA	**16.1**	**31.6**	2.89 U	**40.6**	**14.0**	**4.27**	NA	NA	**10.4**	2.96 U	**14.9**	9.00 U	2.94 U
	Barium	1,000	1,000	**717**	**326**	NA	NA	NA	NA	NA	NA	**438**	**266**	**15.8**	**1,920**	**170**	**63.9**	NA	NA	**278**	5.92 U	**432**	**94.9**	**8.16**
	Beryllium	90	90	0.30 U	0.76 U	NA	NA	NA	NA	NA	NA	**0.86**	**1.42**	0.29 U	**0.70**	0.93 U	0.30 U	NA	NA	**0.65**	0.30 U	**1.01**	0.90 U	0.30 U
	Cadmium	70	70	**2.91**	**1.59**	NA	NA	NA	NA	NA	NA	**0.61**	**16.2**	0.29 U	**2.10**	**3.14**	**2.75**	NA	NA	**5.55**	0.30 U	**1.53**	**8.36**	0.30 U
	Chromium (III)	1000	1000	**44.4**	**42.6**	NA	NA	NA	NA	NA	NA	**14.3**	**23.8**	**4.74**	**36.5**	**14.5**	**9.77**	NA	NA	**19.3**	**2.80**	**16.2**	**3.36**	**3.70**
	Lead	200	200	**1,730**	**60.6**	NA	NA	NA	NA	NA	NA	**396**	**848**	**3.20**	**3,260**	**790**	**257**	NA	NA	**394.5**	**2.01**	**1,500**	**50.6**	**2.76**
	Mercury	20	20	**0.818**	**0.247**	NA	NA	NA	NA	NA	NA	**0.212**	**0.389**	0.022 U	**1.34**	**0.118**	**0.041**	NA	NA	**0.372**	0.020 U	**0.214**	**0.128**	0.018 U
	Nickel	600	600	**18.5**	**48.0**	NA	NA	NA	NA	NA	NA	**14.0**	**25.9**	**2.76**	**31.8**	**13.7**	**8.03**	NA	NA	**12.9**	**2.46**	**17.3**	**11.9**	**3.07**
	Selenium	400	400	5.87 U	15.2 U	NA	NA	NA	NA	NA	NA	6.65 U	21.6 U	5.77 U	6.20 U	18.5 U	5.92 U	NA	NA	6.88 U	5.92 U	6.83 U	18.0 U	5.88 U
	Silver	100	100	**6.44**	**18.0**	NA	NA	NA	NA	NA	NA	**2.97**	**21.5**	0.58 U	**16.0**	**6.15**	0.60 U	NA	NA	**7.99**	0.60 U	**1.89**	1.80 U	0.59 U
	Vanadium	400	400	**66.8**	15.2 U	NA	NA	NA	NA	NA	NA	**33.8**	**25.5**	**7.68**	**33.5**	18.5 U	**8.72**	NA	NA	**24.05**	5.92 U	**22.6**	18.0 U	5.88 U
	Zinc	1,000	1,000	**671**	**372**	NA	NA	NA	NA	NA	NA	**185**	**4,500**	**11.1**	**894**	**2,050**	**1,000**	NA	NA	**228.5**	**13.4**	**267**	**1,310**	**10.7**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SB-298		SB-299		SB-300		SB-301		SB-302		SB-303		SB-304		SB-305		SB-307			SB-308
			Sample Depth (ft.):	4	8	4	8	4	8	7	10.5	2.5	8	5	10	5	8	4	9	3	6	9	6
			Sample Date:	8/4/2008	8/4/2008	8/4/2008	8/4/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/22/2008	7/23/2008	7/23/2008	7/23/2008	7/23/2008
		S-1/GW-2	S-1/GW-3																				
EPH																							
	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																							
	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Acenaphthylene	600	10	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Anthracene	1,000	1,000	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Chrysene	70	70	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	**1.05**
	Fluorene	1,000	1,000	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Naphthalene	20	500	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	0.698 U
	Phenanthrene	500	500	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	**0.785**
	Pyrene	1,000	1,000	NA	NA	NA	NA	0.216 U	0.755 U	NA	NA	NA	NA	0.279 U	0.932 U	NA	NA	NA	NA	NA	NA	NA	**0.799**
PCBs (mg/kg)	Total PCBs	1	1	0.0630 U	0.255 UJ	0.0666 U	0.206 UJ	0.0636 U	0.235 UJ	0.0648 U	0.0795 U	0.0640 U	0.205 UJ	0.0689 U	0.273 UJ	0.0670 U	0.211 UJ	0.0611 U	0.0593 U	0.0649 U	0.245 UJ	NA	0.192 UJ
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Antimony	20	20	5.51 U	19.1 U	NA	NA	R	R	NA	NA	R	R	R	22.4 U	NA	NA	5.12 U	4.85 U	5.05 U	20.9 U	4.73 U	16.8 U
	Arsenic	20	20	**17.1**	12.0 U	NA	NA	**9.93**	11.4 U	NA	NA	**8.84**	10.7 U	**31.9**	14.0 U	NA	NA	**8.68**	3.04 U	**5.99**	13.1 U	2.96 U	10.5 U
	Barium	1,000	1,000	**407**	**61.7**	NA	NA	**275**	**63.2**	NA	NA	**280**	**31.1**	**1,960**	**44.4**	NA	NA	**702**	**6.83**	**373**	**85.1**	5.92 U	**50.5**
	Beryllium	90	90	**0.83**	1.20 U	NA	NA	**0.75**	1.14 U	NA	NA	**0.84**	1.07 U	**1.45**	1.40 U	NA	NA	**1.23**	0.31 U	**0.85**	1.31 U	0.30 U	1.05 U
	Cadmium	70	70	**0.58**	1.20 U	NA	NA	**0.50**	1.14 U	NA	NA	**0.51**	1.07 U	**1.34**	1.40 U	NA	NA	**1.55**	0.31 U	**0.76**	**4.43**	0.30 U	1.05 U
	Chromium (III)	1000	1000	**15.4**	**4.90**	NA	NA	**12.1**	**3.31**	NA	NA	**9.81**	**2.17**	**24.4**	**8.56**	NA	NA	**18.3**	**2.88**	**11.6**	**7.18**	**1.61**	2.10 U
	Lead	200	200	**869**	**12.2**	NA	NA	**142**	**9.62**	NA	NA	**2,440**	**4.73**	**1,820**	4.19 U	NA	NA	**3,970**	**7.80**	**589**	**281**	**2.36**	**5.22**
	Mercury	20	20	**0.222**	**0.174**	NA	NA	**0.507**	**0.215**	NA	NA	**0.094**	0.084 U	**0.488**	0.140 U	NA	NA	0.028 U	0.014 U	**0.074**	0.115 U	0.016 U	**0.104**
	Nickel	600	600	**14.8**	**3.03**	NA	NA	**13.3**	2.27 U	NA	NA	**11.6**	2.13 U	**27.3**	**5.69**	NA	NA	**14.7**	**2.40**	**35.2**	**5.74**	**1.20**	2.10 U
	Selenium	400	400	6.88 U	23.9 U	NA	NA	6.74 U	22.7 U	NA	NA	6.25 U	21.3 U	8.35 U	28.0 U	NA	NA	6.40 U	6.07 U	6.31 U	26.1 U	5.92 U	21.0 U
	Silver	100	100	**6.58**	2.39 U	NA	NA	**1.14**	2.27 U	NA	NA	**1.37**	2.13 U	**2.82**	2.80 U	NA	NA	0.64 U	0.61 U	0.64 U	**4.67**	0.60 U	2.10 U
	Vanadium	400	400	**41.4**	23.9 U	NA	NA	**28.5**	22.7 U	NA	NA	**35.9**	21.3 U	**50.6**	28.0 U	NA	NA	**32.8**	6.07 U	**160**	26.1 U	5.92 U	21.0 U
	Zinc	1,000	1,000	**213**	**40.2**	NA	NA	**237**	**93.9**	NA	NA	**181**	**27.8**	**564**	**13.4**	NA	NA	**435**	**8.99**	**343**	**1,300**	**8.26**	**17.3**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	SB-308	SB-309		SB-310		SB-311		SB-312		SB-313		SB-364			VSS-3	NBHS-2			NBHS-3	
			Sample Depth (ft.):	3-4	4	8	3	7	6	9	5	9	5	8	1-3	6	9.5	1-2	1.5	3.5	5	4	6
			Sample Date:	5/21/2009	7/23/2008	7/23/2008	7/23/2008	7/23/2008	7/23/2008	7/23/2008	8/5/2008	8/5/2008	8/4/2008	8/4/2008	3/4/2009	3/4/2009	3/4/2009	7/23/2001	8/4/2008	8/4/2008	8/4/2008	7/30/2008	7/30/2008
		S-1/GW-2	S-1/GW-3	combo					combo														
EPH																							
	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**76**	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA	NA
SVOCs																							
	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.051 U	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.051 U	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.35**	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.11 J**	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.051 U	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	**0.66875**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**4.16**	0.497 U	0.051 U	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	**0.25375**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**0.785**	0.497 U	0.051 U	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	**1.31625**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**16.8**	0.497 U	0.051 U	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	**2.45375**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**27.1**	**0.746**	**0.073**	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	**2.34375**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**21.3**	**0.532**	0.051 U	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	**2.52625**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**23.4**	**0.866**	**0.058**	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	**1.25375**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**8.46**	0.497 U	**1.3**	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	**1.08625**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**10.0**	0.497 U	0.051 U	NA	NA	NA	NA	NA
	Chrysene	70	70	**2.51125**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**24.4**	**0.790**	**0.054**	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	**0.36625**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**1.61**	0.497 U	**1.2**	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	**5.07125**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**46.9**	**1.57**	**0.13**	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	**0.845**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**5.09**	0.497 U	0.051 U	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	**1.5725**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**11.1**	0.497 U	0.051 U	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	**0.34375**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**2.32**	0.497 U	0.051 U	NA	NA	NA	NA	NA
	Naphthalene	20	500	**0.54875**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**3.37**	0.497 U	0.051 U	NA	NA	NA	NA	NA
	Phenanthrene	500	500	**5.67125**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**59.6**	**1.18**	**0.12**	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	**5.29625**	NA	NA	NA	NA	0.696 U	0.652 U	0.187 U	0.174 U	NA	NA	0.174 U	**57.3**	**1.25**	**0.20**	NA	NA	NA	NA	NA
PCBs (mg/kg)	Total PCBs	1	1	NA	0.0822 U	**0.698 J**	**0.175 J**	0.253 UJ	0.06865 U	0.183 UJ	**19.7 J**	0.0500 U	**6.32 J**	0.0529 U	0.0516 U	**1.70 J**	0.208 UJ	0.100 U	0.0500 U	0.0501 U	0.0535 U	**0.147 J**	0.0520 U
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Antimony	20	20	NA	NA	NA	5.11 U	19.3 U	5.55 U	15.7 U	4.47 U	4.16 U	NA	NA	4.18 U	4.98 U	12.0 U	NA	NA	NA	NA	NA	NA
	Arsenic	20	20	NA	NA	NA	**9.39**	12.1 U	**16.45**	9.77 U	2.80 U	2.60 U	NA	NA	2.61 U	**10.8**	7.45 U	**1.52**	NA	NA	NA	NA	NA
	Barium	1,000	1,000	NA	NA	NA	**287**	24.1 U	**370**	**23.7**	**5.90**	**8.82**	NA	NA	**8.58**	**533**	**178**	**11**	NA	NA	NA	NA	NA
	Beryllium	90	90	NA	NA	NA	**0.86**	1.21 U	**0.57**	0.98 U	0.28 U	0.26 U	NA	NA	0.27 U	0.32 U	0.75 U	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	NA	NA	**0.46**	1.21 U	**1.71**	0.98 U	0.28 U	0.26 U	NA	NA	0.27 U	**2.32**	**2.03**	0.32 U	NA	NA	NA	NA	NA
	Chromium (III)	1000	1000	NA	NA	NA	**11.0**	**10.8**	**40.8**	**11.5**	**2.06**	**4.05**	NA	NA	**2.34**	**35.4**	**9.17**	**3.74**	NA	NA	NA	NA	NA
	Lead	200	200	NA	NA	NA	**443**	**3.91**	**1,970**	**4.51**	**2.97**	**4.88**	NA	NA	**4.61**	**2,350**	**85.8**	**8.89**	NA	NA	NA	NA	NA
	Mercury	20	20	NA	NA	NA	**2.08**	0.105 U	**0.2165**	0.078 U	0.020 U	0.017 U	NA	NA	0.017 U	**0.322**	**0.144**	0.07 U	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	**13.0**	**8.83**	**31.3**	**9.47**	**2.37**	**3.40**	NA	NA	**2.24**	**19.1**	**7.67**	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	6.39 U	24.1 U	6.935 U	19.6 U	5.59 U	5.20 U	NA	NA	5.22 U	6.22 U	14.9 U	0.64 U	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	**1.18**	2.41 U	**11.6**	1.96 U	**0.57**	**0.71**	NA	NA	0.53 U	**1.03**	1.49 U	0.32 U	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	**20.7**	24.1 U	**22.8**	19.6 U	5.59 U	**5.53**	NA	NA	5.22 U	**34.4**	14.9 U	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	**76.4**	**14.3**	**721.5**	**21.3**	**9.50**	**10.2**	NA	NA	**10.0**	**738**	**483**	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.9. Summary of Analytical Results for Soil Samples - HS-9
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	NBHS-4			NBHS-5		NBHS-6		NBHS-7		NBHS-8		HE-44B	
			Sample Depth (ft.):	2	6	8	4	8	3	6	3	7	2.5	6	0-1	1-3
			Sample Date:	7/31/2008	7/31/2008	7/31/2008	7/30/2008	7/30/2008	7/28/2008	7/28/2008	7/29/2008	7/29/2008	7/28/2008	7/28/2008	3/31/2009	3/31/2009
		S-1/GW-2	S-1/GW-3		combo											
EPH																
	C19 - C36 Aliphatics	3,000	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	C11 - C22 Aromatics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs																
	4-Methylphenol	200*	5*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dimethyl phthalate	50	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	**0.21975 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	0.1835 U	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	**0.44375 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	**0.98025 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	**0.86525 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	**0.99525 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	**0.58525 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	**0.36225 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Chrysene	70	70	NA	**0.92525 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	**0.20725 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	**1.82025 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	**0.26425 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	**0.69025 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	0.1835 U	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Naphthalene	20	500	NA	0.1835 U	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Phenanthrene	500	500	NA	**1.94525 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	**1.78525 J**	0.174 U	NA	NA	NA	NA	0.177 U	0.188 U	NA	NA	NA	NA
PCBs (mg/kg)	Total PCBs	1	1	0.0559 U	0.05105 U	0.0518 U	**0.192 J**	0.0599 U	**1.13 J**	0.0553 U	**0.183 J**	0.0532 U	0.0510 U	**0.0687 J**	**0.349 J**	**1.63 J**
GRO (mg/kg)	Gasoline Range Organics	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Antimony	20	20	NA	4.395 U	4.18 U	4.22 U	4.80 U	4.28 U	4.55 U	4.24 U	4.50 U	NA	NA	NA	NA
	Arsenic	20	20	NA	**2.1075 J**	**3.31**	2.64 U	3.00 U	**4.17**	2.85 U	2.65 U	2.82 U	NA	NA	NA	NA
	Barium	1,000	1,000	NA	**17.4**	**13.4**	**27.9**	**14.2**	**308**	**9.10**	**31.7**	5.63 U	NA	NA	NA	NA
	Beryllium	90	90	NA	0.28 U	0.27 U	0.27 U	0.30 U	0.27 U	0.29 U	0.27 U	0.29 U	NA	NA	NA	NA
	Cadmium	70	70	NA	0.28 U	0.27 U	0.27 U	0.30 U	**0.90**	0.29 U	0.27 U	0.29 U	NA	NA	**0.80**	**0.99**
	Chromium (III)	1000	1000	NA	**8.46**	**5.29**	**6.40**	**5.38**	**31.0**	**4.53**	**7.39**	**2.26**	NA	NA	NA	NA
	Lead	200	200	NA	**15.7**	**2.86**	**4.05**	**3.46**	**322**	**2.99**	**13.7**	**2.03**	NA	NA	**990**	**292**
	Mercury	20	20	NA	**0.0245**	**0.645**	0.015 U	0.016 U	**0.183**	0.022 U	**0.018**	0.017 U	NA	NA	NA	NA
	Nickel	600	600	NA	**5.91**	**3.02**	**5.45**	**3.85**	**9.14**	**2.33**	**5.35**	**1.49**	NA	NA	NA	NA
	Selenium	400	400	NA	5.5 U	5.22 U	5.28 U	5.99 U	5.35 U	5.69 U	5.30 U	5.63 U	NA	NA	NA	NA
	Silver	100	100	NA	**0.4475 J**	**0.65**	**1.05**	0.60 U	**1.59**	0.57 U	**0.70**	0.57 U	NA	NA	NA	NA
	Vanadium	400	400	NA	**8.98**	**9.32**	**8.08**	**8.25**	**17.6**	5.69 U	**9.48**	5.63 U	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	**22.2**	**16.3**	**13.0**	**11.4**	**315**	**11.2**	**24.0**	**10.4**	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
R - Rejected data point during validation.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
EPH - Extractable Petroleum Hydrocarbons.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.

Table C-1.10. Summary of Analytical Results for Soil Samples - HS-10
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HA-19		HA33	HA33+HA35	HA35	HA-36	HA38	HA38+HA40	HA40	HA41+HA42	HA42	HA43	HA43+HA44	HA-43/44		HA44	HB-23		HB31+HB32	HB32	HB33	HB33+HB36
		Sample Depth (ft.):		0-1	1-3	1-3	1-3	1-1.5	1-3	1-3	0.5-3	0.5-3	0.75-3	0.5-3	0.75-3	0.75-3	0-1	1-2	0.75-3	0-1	1-3	0.5-3	0.5-3	0.2-3	0.2-3
		Sample Date:		5/19/2009	5/19/2009	1/11/2005	1/11/2005	1/11/2005	4/7/2009	1/11/2005	1/11/2005	1/11/2005	1/11/2005	1/11/2005	1/11/2005	1/11/2005	06/07/2011	06/07/2011	1/11/2005	7/13/2011	3/10/2009	12/30/2004	12/30/2004	12/30/2004	12/30/2004
		S-1/GW-2	S-1/GW-3		combo							combo								combo	combo				
SVOCs																									
(mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	0.83 U	NA	NA	NA	**0.3 JB**	NA	0.87 U	NA	NA	0.84 U	NA	NA	NA	NA	NA	**0.24 B**	NA	NA	**0.39 B**
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	0.83 U	NA	NA	NA	0.82 U	NA	0.87 U	NA	NA	0.84 U	NA	NA	NA	NA	NA	**0.12 J**	NA	NA	**0.14 J**
	Dibenzofuran	10*	10*	NA	NA	NA	0.28 U	NA	NA	NA	**0.7**	NA	0.29 U	NA	NA	0.28 U	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U
	Acenaphthene	1,000	1,000	NA	NA	NA	0.28 U	NA	0.178 U	NA	**1.5**	NA	0.29 U	NA	NA	**0.4**	NA	NA	NA	NA	NA	**0.076**	NA	NA	**0.1**
	Acenaphthylene	600	10	NA	NA	NA	**0.36**	NA	0.178 U	NA	**0.3**	NA	0.29 U	NA	NA	**0.63**	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U
	Anthracene	1,000	1,000	NA	NA	NA	**1.1**	NA	0.178 U	NA	**3.7**	NA	**0.56**	NA	NA	**1.8**	NA	NA	NA	NA	NA	**0.26**	NA	NA	**0.32**
	Benzo(a)anthracene	7	7	NA	NA	NA	**3.3**	NA	0.178 U	NA	**8.2**	NA	**1.4**	NA	NA	**3.9**	NA	NA	NA	NA	NA	**0.95**	NA	NA	**0.95**
	Benzo(a)pyrene	2	2	NA	NA	NA	**2.5**	NA	0.178 U	NA	**5.3**	NA	**1**	NA	NA	**2.5**	NA	NA	NA	NA	NA	**0.9**	NA	NA	**0.93**
	Benzo(b)fluoranthene	7	7	NA	NA	NA	**3.4**	NA	0.178 U	NA	**7.1**	NA	**1.4**	NA	NA	**3.2**	NA	NA	NA	NA	NA	**1.7**	NA	NA	**1.5**
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	**1.2**	NA	0.178 U	NA	**2.1**	NA	**0.43**	NA	NA	**0.97**	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U
	Benzo(k)fluoranthene	70	70	NA	NA	NA	**0.97**	NA	0.178 U	NA	**2.1**	NA	**0.29**	NA	NA	**0.8**	NA	NA	NA	NA	NA	**0.47**	NA	NA	**0.42**
	Chrysene	70	70	NA	NA	NA	**2.9**	NA	0.178 U	NA	**6.5**	NA	**1.3**	NA	NA	**3.4**	NA	NA	NA	NA	NA	**0.77**	NA	NA	**0.81**
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	0.28 U	NA	0.178 U	NA	**0.85**	NA	0.29 U	NA	NA	0.28 U	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U
	Fluoranthene	1,000	1,000	NA	NA	NA	**8.4**	NA	0.178 U	NA	**23**	NA	**3**	NA	NA	**8**	NA	NA	NA	NA	NA	**1.8**	NA	NA	**1.9**
	Fluorene	1,000	1,000	NA	NA	NA	0.28 U	NA	0.178 U	NA	**1.1**	NA	0.29 U	NA	NA	**0.88**	NA	NA	NA	NA	NA	0.06 U	NA	NA	**0.11**
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	**1.3**	NA	0.178 U	NA	**2.4**	NA	**0.44**	NA	NA	**1**	NA	NA	NA	NA	NA	0.06 U	NA	NA	**0.3**
	2-Methylnaphthalene	80	300	NA	NA	NA	0.28 U	NA	0.178 U	NA	**0.53**	NA	0.29 U	NA	NA	**0.57**	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U
	Naphthalene	20	500	NA	NA	NA	0.28 U	NA	0.178 U	NA	**0.68**	NA	0.29 U	NA	NA	0.28 U	NA	NA	NA	NA	NA	0.06 U	NA	NA	0.058 U
	Phenanthrene	500	500	NA	NA	NA	**5**	NA	0.178 U	NA	**19**	NA	**2.2**	NA	NA	**12**	NA	NA	NA	NA	NA	**1.2**	NA	NA	**1.3**
	Pyrene	1,000	1,000	NA	NA	NA	**7**	NA	0.178 U	NA	**17**	NA	**2.9**	NA	NA	**8.1**	NA	NA	NA	NA	NA	**2.3**	NA	NA	**2.1**
PCBs																									
(mg/kg)	Total PCBs	1	1	**0.0799**	**1.32 J**	**0.142**	NA	**2.601**	**0.181 J**	**1.34**	NA	**0.6915**	NA	**1.88**	**0.167**	NA	**0.261**	**0.180**	**0.446**	**1.29 J**	**2.11 J**	NA	**0.751**	**1.408**	NA
Metals																									
	Arsenic	20	20	**7.9**	2.7 U	NA	**2.6**	NA	2.67 U	NA	**3.48**	NA	**4.4**	NA	NA	**2.15**	NA	NA	NA	**2.44**	**12.24**	**6.99**	NA	NA	**3.35**
	Barium	1,000	1,000	**360**	**35**	NA	**107**	NA	**12.4**	NA	**167**	NA	**210**	NA	NA	**71**	NA	NA	NA	**150.7**	**268.7**	**282**	NA	NA	**132**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	**2.4**	**0.28**	NA	**0.95**	NA	0.27 U	NA	**1.08**	NA	**2.21**	NA	NA	**1.19**	NA	NA	NA	**3.12**	**6.53**	**2.03**	NA	NA	**1.83**
	Chromium (III)	1000	1000	**16**	**4.3**	NA	**7.55**	NA	**2.79**	NA	**7.23**	NA	**15**	NA	NA	**5.22**	NA	NA	NA	**43**	**278.8**	**17**	NA	NA	**9.07**
	Lead	200	200	**150**	**447.5**	NA	**209**	NA	**6.49**	NA	**216**	NA	**360**	NA	NA	**533**	NA	NA	NA	**154.2**	**274**	**376**	NA	NA	**219**
	Mercury	20	20	NA	NA	NA	**0.106**	NA	NA	NA	0.01 U	NA	**0.369**	NA	NA	**0.286**	NA	NA	NA	NA	NA	**0.228**	NA	NA	**0.205**
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	0.11 U	NA	NA	NA	0.11 U	NA	0.11 U	NA	NA	0.11 U	NA	NA	NA	NA	NA	0.75 U	NA	NA	0.76 U
	Silver	100	100	NA	NA	NA	**0.77**	NA	NA	NA	**0.16**	NA	**0.17**	NA	NA	**0.15**	NA	NA	NA	NA	NA	**0.53**	NA	NA	0.38 U
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.10. Summary of Analytical Results for Soil Samples - HS-10
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample Location:	HB36	HB37	HB37+HB38	HB38	HB-39		HB-40H	HB41+HB42	HB42	HB43	HB43+HB44	HB44	HC-22		HC23	HRK-33A	HRM-23	HRM-23	HRM-25	HRN26	HRN-26	HRN28
			Sample Depth (ft.):	0.5-3	0.5-3	0.2-3	0.2-3	0-1	1-3	1-3	0.2-3	0.2-3	1.5-3	0.5-3	0.5-3	0-1	1-3	1-3	1-3	2-3	1-3	1.5-3	0.5-3	1-3	1.5-3
			Sample Date:	12/30/2004	12/30/2004	12/30/2004	12/30/2004	6/16/2009	6/16/2009	6/16/2009	12/30/2004	12/30/2004	12/30/2004	12/30/2004	12/30/2004	5/21/2009	5/21/2009	12/29/2004	4/2/2009	2/21/2006	4/7/2009	2/21/2006	2/22/2006	4/7/2009	2/22/2006
		S-1/GW-2	S-1/GW-3					combo	combo								combo						combo		
SVOCs																									
(mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	**0.13 JB**	NA	NA	NA	NA	**0.32 B**	NA	NA	0.17 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	0.16 U	NA	NA	NA	NA	**0.1 J**	NA	NA	**0.14 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	0.055 U	NA	NA	NA	NA	0.058 U	NA	NA	0.057 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	**0.14**	NA	NA	NA	NA	0.058 U	NA	NA	**0.065**	NA	NA	NA	NA	0.212 U	NA	0.219 U	NA	NA	0.212 U	NA
	Acenaphthylene	600	10	NA	NA	**0.074**	NA	NA	NA	NA	**0.13**	NA	NA	**0.13**	NA	NA	NA	NA	0.212 U	NA	0.219 U	NA	NA	0.212 U	NA
	Anthracene	1,000	1,000	NA	NA	**0.57**	NA	NA	NA	NA	**0.18**	NA	NA	**0.27**	NA	NA	NA	NA	**0.257**	NA	0.219 U	NA	NA	**0.405**	NA
	Benzo(a)anthracene	7	7	NA	NA	**1.5**	NA	NA	NA	NA	**0.71**	NA	NA	**1.1**	NA	NA	NA	NA	**1.00**	NA	**0.771**	NA	NA	**0.958**	NA
	Benzo(a)pyrene	2	2	NA	NA	**1.4**	NA	NA	NA	NA	**0.81**	NA	NA	**1**	NA	NA	NA	NA	**1.21**	NA	**0.830**	NA	NA	**0.816**	NA
	Benzo(b)fluoranthene	7	7	NA	NA	**2**	NA	NA	NA	NA	**1.2**	NA	NA	**1.6**	NA	NA	NA	NA	**1.55**	NA	**0.887**	NA	NA	**0.916**	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	**0.57**	NA	NA	NA	NA	**0.27**	NA	NA	**0.45**	NA	NA	NA	NA	**0.634**	NA	**0.501**	NA	NA	**0.623**	NA
	Benzo(k)fluoranthene	70	70	NA	NA	**0.64**	NA	NA	NA	NA	**0.34**	NA	NA	**0.53**	NA	NA	NA	NA	**0.608**	NA	**0.363**	NA	NA	**0.345**	NA
	Chrysene	70	70	NA	NA	**1.3**	NA	NA	NA	NA	**0.67**	NA	NA	**1**	NA	NA	NA	NA	**1.20**	NA	**0.797**	NA	NA	**1.09**	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	0.055 U	NA	NA	NA	NA	0.058 U	NA	NA	0.057 U	NA	NA	NA	NA	0.212 U	NA	0.219 U	NA	NA	0.212 U	NA
	Fluoranthene	1,000	1,000	NA	NA	**2.6**	NA	NA	NA	NA	**1.4**	NA	NA	0.057 U	NA	NA	NA	NA	**2.57**	NA	**1.01**	NA	NA	**1.60**	NA
	Fluorene	1,000	1,000	NA	NA	**0.16**	NA	NA	NA	NA	0.058 U	NA	NA	**0.1**	NA	NA	NA	NA	0.212 U	NA	0.219 U	NA	NA	0.212 U	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	**0.59**	NA	NA	NA	NA	**0.31**	NA	NA	**0.49**	NA	NA	NA	NA	**0.739**	NA	**0.656**	NA	NA	**0.755**	NA
	2-Methylnaphthalene	80	300	NA	NA	0.055 U	NA	NA	NA	NA	0.058 U	NA	NA	0.057 U	NA	NA	NA	NA	0.212 U	NA	0.219 U	NA	NA	0.212 U	NA
	Naphthalene	20	500	NA	NA	0.055 U	NA	NA	NA	NA	0.058 U	NA	NA	0.057 U	NA	NA	NA	NA	0.212 U	NA	0.219 U	**0.45**	NA	0.212 U	NA
	Phenanthrene	500	500	NA	NA	**1.6**	NA	NA	NA	NA	**0.85**	NA	NA	**1.6**	NA	NA	NA	NA	**1.42**	NA	**0.687**	NA	NA	**1.96**	NA
	Pyrene	1,000	1,000	NA	NA	**6.3**	NA	NA	NA	NA	**1.4**	NA	NA	**3.9**	NA	NA	NA	NA	**1.87**	NA	**1.36**	NA	NA	**2.11**	NA
PCBs																									
(mg/kg)	Total PCBs	1	1	**0.352**	2.22 U	NA	**0.152**	NA	NA	NA	NA	**0.476**	**0.326**	NA	**0.517**	**0.991 J**	**0.5585 J**	**6.542**	**0.148 J**	0.035 U	0.0557 U	**0.119**	**0.225**	**0.128 J**	0.27 U
Metals																									
	Arsenic	20	20	NA	NA	**3.8**	NA	**5.7**	**14.5**	**10**	**12**	NA	NA	**2.72**	NA	2.8 U	**16**	NA	**65.2**	NA	**7.13**	NA	NA	**10.8**	NA
	Barium	1,000	1,000	NA	NA	**52**	NA	**191**	**310**	**300**	**123**	NA	NA	**46**	NA	**38**	**440**	NA	**984**	NA	**255**	NA	NA	**581**	NA
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	NA	**1.04**	NA	**1.23**	**0.975**	**1.1**	**2.5**	NA	NA	**1.12**	NA	0.28 U	**0.83**	NA	**1.85**	NA	**0.46**	NA	NA	**0.46**	NA
	Chromium (III)	1000	1000	NA	NA	**11**	NA	**14**	**14.7**	**43**	**8.51**	NA	NA	**6.57**	NA	**7.5**	**11**	NA	**17.90**	NA	**8.80**	NA	NA	**15.1**	NA
	Lead	200	200	NA	NA	**68**	NA	**370**	**305**	**380**	**304**	NA	NA	**176**	NA	**44**	**237**	NA	**1,150**	NA	**214**	NA	NA	**587**	NA
	Mercury	20	20	NA	NA	0.065 U	NA	NA	NA	NA	**0.799**	NA	NA	**0.547**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	0.69 U	NA	NA	NA	NA	0.68 U	NA	NA	0.59 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	0.35 U	NA	NA	NA	NA	0.34 U	NA	NA	0.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.10. Summary of Analytical Results for Soil Samples - HS-10
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		HRO-30		HRO-33	HRP.5-33	HRP31	HS-8	SB-01		SB-02		SB-03		SB-04		SB-05		HB-270	SB-270	SB-271		
		Sample Depth (ft.):		1.5-3	1-3	2-3	1.5-3	1.5-3	0-0.5	1	3	1	3	1	3	1	3.5	1	8	9.5	1-3	1	3.5	10
		Sample Date:		2/22/2006	4/7/2009	2/22/2006	2/22/2006	2/22/2006	9/9/2004	3/31/2008	3/31/2008	3/31/2008	3/31/2008	3/31/2008	3/31/2008	3/31/2008	3/31/2008 combo	3/31/2008	3/31/2008	7/16/2008	6/16/2009 combo	7/16/2008	7/16/2008	7/16/2008
		S-1/GW-2	S-1/GW-3																					
SVOCs																								
(mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	**1.27**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Acenaphthylene	600	10	NA	0.378 U	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Anthracene	1,000	1,000	NA	**4.12**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Benzo(a)anthracene	7	7	NA	**10.3**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Benzo(a)pyrene	2	2	NA	**8.37**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Benzo(b)fluoranthene	7	7	NA	**8.97**	NA	NA	NA	NA	**0.20**	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Benzo(g,h,i)perylene	1,000	1,000	NA	**2.68**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.425 U	NA	NA	0.441 U	0.439 U
	Benzo(k)fluoranthene	70	70	NA	**3.53**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Chrysene	70	70	NA	**10.4**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.378 U	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.425 U	NA	NA	0.441 U	0.439 U
	Fluoranthene	1,000	1,000	NA	**17.0**	NA	NA	NA	NA	**0.23**	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Fluorene	1,000	1,000	NA	**1.98**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Indeno(1,2,3-cd)pyrene	7	7	NA	**3.41**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.425 U	NA	NA	0.441 U	0.439 U
	2-Methylnaphthalene	80	300	NA	**1.27**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Naphthalene	20	500	NA	**0.621**	NA	0.075 U	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Phenanthrene	500	500	NA	**22.2**	NA	NA	NA	NA	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
	Pyrene	1,000	1,000	NA	**26.7**	NA	NA	NA	NA	**0.27**	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.213 U	NA	NA	0.221 U	0.220 U
PCBs																								
(mg/kg)	Total PCBs	1	1	**0.208**	0.0605 U	0.23 U	0.24 U	0.26 U	0.24 U	0.0520 U	0.0523 U	0.0520 U	0.0500 U	0.0502 U	0.0500 U	0.0523 U	0.051 U	0.0534 U	0.0517 U	0.0596 U	NA	0.0500 U	0.016 U	0.0670 U
Metals																								
	Arsenic	20	20	NA	**8.37**	NA	NA	NA	NA	2.63 U	2.60 U	2.62 U	2.60 U	2.62 U	2.60 U	2.65 U	2.59 U	2.69 U	2.62 U	**4.20**	NA	NA	**10.5**	**4.05**
	Barium	1,000	1,000	NA	**122**	NA	NA	NA	NA	**11.0**	**9.31**	**7.41**	**5.50**	**8.49**	**6.24**	**14.6**	**7.36**	**12.2**	5.24 U	**17.6**	NA	NA	**194**	**9.16**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	**0.27**	0.26 U	0.27 U	0.26 U	0.27 U	0.26 U	0.27 U	0.26 U	0.27 U	0.27 U	0.32 U	NA	NA	0.34 U	0.33 U
	Cadmium	70	70	NA	**0.89**	NA	NA	NA	NA	0.27 U	0.26 U	0.27 U	0.26 U	0.27 U	0.26 U	0.27 U	0.26 U	0.27 U	0.27 U	0.32 U	NA	NA	0.34 U	0.33 U
	Chromium (III)	1000	1000	NA	**9.50**	NA	NA	NA	NA	**3.85**	**3.09**	**4.11**	**3.55**	**3.38**	**2.96**	**6.30**	**3.175**	**7.70**	**2.75**	**7.56**	NA	NA	**7.03**	**4.03**
	Lead	200	200	NA	**189**	NA	NA	NA	NA	**35.1**	**11.1**	**42.8**	**4.76**	**18.1**	**6.42**	**12.1**	**14.85**	**27.9**	**3.45**	**4.54**	**285**	NA	**126**	**2.50**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	**0.014**	0.013 U	**0.014**	0.014 U	0.013 U	0.010 U	**0.017**	0.0165 U	**0.025**	0.010 U	0.012 U	NA	NA	**0.101**	0.018 U
	Nickel	600	600	NA	NA	NA	NA	NA	NA	**3.84**	**3.23**	**3.48**	**3.76**	**3.38**	**3.18**	**4.93**	**3.205**	**5.92**	**2.16**	**6.83**	NA	NA	**12.8**	**4.55**
	Selenium	400	400	NA	NA	NA	NA	NA	NA	5.25 U	5.20 U	5.24 U	5.20 U	5.23 U	5.20 U	5.30 U	5.18 U	5.38 U	5.24 U	6.37 U	NA	NA	6.62 U	6.58 U
	Silver	100	100	NA	NA	NA	NA	NA	NA	0.53 U	0.52 U	0.53 U	0.52 U	0.53 U	0.52 U	0.53 U	0.52 U	0.54 U	0.53 U	**1.64**	NA	NA	**2.44**	**1.20**
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	**5.32**	5.20 U	5.24 U	5.20 U	5.23 U	5.20 U	**8.81**	5.18 U	**8.65**	5.24 U	**12.4**	NA	NA	**27.7**	**7.26**
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	**23.1**	**15.2**	**20.4**	**15.6**	**23.0**	**14.5**	**23.2**	**18.25**	**23.4**	**9.35**	**22.4**	NA	NA	**54.2**	**16.6**

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.10. Summary of Analytical Results for Soil Samples - HS-10
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-272			SB-306			SB-359					SB-359		SB-368		SB-369		SB-370		SB-LSD-1		
		Sample Depth (ft.):		1	3	10	1	4	7	0-1	1-3	4	8	12	0-1	1-3	0-1	1-2.5	0-1	1-3	0-1	1-3	0-1	1-3	3-4
		Sample Date:		7/16/2008	7/16/2008	7/16/2008	7/23/2008	7/23/2008	7/23/2008	3/4/2009	3/4/2009	3/4/2009	3/4/2009	3/4/2009	06/08/2011	06/08/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011	7/15/2011 combo	5/12/2010	5/12/2010	5/12/2010
		S-1/GW-2	S-1/GW-3																						
SVOCs																									
(mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Acenaphthylene	600	10	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Anthracene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	0.216 U	0.202 U	NA	NA	NA	**0.353**	0.230 U	**0.255**	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	0.216 U	0.202 U	NA	NA	NA	**0.276**	0.230 U	**0.290**	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	0.216 U	0.202 U	NA	NA	NA	**0.345**	0.230 U	**0.514**	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Chrysene	70	70	NA	0.216 U	0.202 U	NA	NA	NA	**0.389**	0.230 U	**0.298**	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	**0.572**	0.230 U	**0.382**	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Fluorene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	**0.246**	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Naphthalene	20	500	NA	0.216 U	0.202 U	NA	NA	NA	0.204 U	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Phenanthrene	500	500	NA	0.216 U	0.202 U	NA	NA	NA	**0.530**	0.230 U	0.241 U	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
	Pyrene	1,000	1,000	NA	0.216 U	0.202 U	NA	NA	NA	**0.543**	0.230 U	**0.366**	1.41 U	NA	NA	NA	0.19 U	0.19 U	0.19 U	0.19 U	0.61 U	0.24 U	NA	NA	NA
PCBs																									
(mg/kg)	Total PCBs	1	1	**0.578 J**	0.0685 U	0.0580 U	**0.107 J**	0.0656 U	0.182 UJ	**0.0635 J**	0.0558 U	0.0599 U	0.395 UJ	NA	**0.0594**	**0.0056**	0.11 U	0.11 U	0.11 U	0.11 U	0.18 U	0.14 U	**0.0685**	0.0521 U	**0.838**
Metals																									
	Arsenic	20	20	NA	**19.0**	**3.47**	NA	NA	NA	**4.15**	**6.07**	**65.5**	**195**	3.15 U	NA	NA	2.8 U	2.7 U	2.8 U	2.8 U	4.5 U	3.45 U	NA	NA	NA
	Barium	1,000	1,000	NA	**497**	6.04 U	NA	NA	NA	**31.6**	**76.1**	**391**	**1,490**	**8.27**	NA	NA	**17**	**18**	**16**	**23**	**44**	**24.5**	NA	NA	NA
	Beryllium	90	90	NA	**0.52**	0.31 U	NA	NA	NA	0.31 U	0.35 U	**0.86**	**5.13**	0.32 U	NA	NA	0.28 U	0.27 U	0.28 U	0.28 U	0.45 U	0.345 U	NA	NA	NA
	Cadmium	70	70	NA	**0.39**	0.31 U	NA	NA	NA	0.31 U	0.35 U	**2.33**	**8.81**	0.32 U	NA	NA	0.28 U	0.27 U	0.28 U	0.28 U	0.45 U	0.345 U	NA	NA	NA
	Chromium (III)	1000	1000	NA	**14.6**	**3.27**	NA	NA	NA	**8.34**	**13.7**	**15.2**	**92.5**	**4.21**	NA	NA	**6.0**	**9.4**	**6.1**	**7.8**	**12**	**13**	NA	NA	NA
	Lead	200	200	NA	**247**	**2.37**	NA	NA	NA	**129**	**49.6**	**802**	**2,710**	**2.18**	NA	NA	**17**	**11**	**15**	**6.8**	**68**	**16.5**	NA	NA	NA
	Mercury	20	20	NA	**0.176**	0.012 U	NA	NA	NA	**0.039**	**0.056**	**0.959**	0.150 U	0.012 U	NA	NA	**0.030**	**0.029**	**0.029**	0.027 U	**0.080**	**0.0375**	NA	NA	NA
	Nickel	600	600	NA	**22.0**	**4.25**	NA	NA	NA	**4.25**	**7.89**	**18.4**	**94.1**	**3.14**	NA	NA	**3.3**	**4.7**	**3.1**	**5.9**	**6.8**	**5.45**	NA	NA	NA
	Selenium	400	400	NA	6.47 U	6.04 U	NA	NA	NA	6.10 U	6.89 U	**28.1**	**99.4**	6.29 U	NA	NA	5.7 U	5.5 U	5.7 U	5.6 U	8.9 U	6.95 U	NA	NA	NA
	Silver	100	100	NA	**7.99**	**2.14**	NA	NA	NA	0.61 U	0.69 U	0.73 U	4.21 U	0.63 U	NA	NA	0.57 U	0.55 U	0.57 U	0.56 U	0.89 U	0.695 U	NA	NA	NA
	Vanadium	400	400	NA	**44.2**	6.04 U	NA	NA	NA	**9.97**	**22.3**	**32.5**	**174**	6.29 U	NA	NA	**13**	**15**	**11**	**13**	**22**	**23.5**	NA	NA	NA
	Zinc	1,000	1,000	NA	**74.9**	**14.8**	NA	NA	NA	**58.9**	**89.6**	**772**	**2,980**	**13.8**	NA	NA	**19**	**16**	**17**	**13**	**49**	**24.5**	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.10. Summary of Analytical Results for Soil Samples - HS-10
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample Location:		SB-LSD-2			SB-LSD-3	TREE-DS-1		TREE-DS-2		TREE-HS-1		TREE-HS-2		TREE-HS-3		TREE-HS-4		TREE-TI-1		TREE-TI-2		TREE-TI-3	
		Sample Depth (ft.):		0-1	1-3	3-4	4-5	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3
		Sample Date:		5/12/2010	5/12/2010	5/12/2010	5/12/2010	8/24/2011	8/24/2011	8/24/2011	8/24/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/22/2011	8/22/2011	8/25/2011	8/25/2011	8/25/2011	8/25/2011
		S-1/GW-2	S-1/GW-3		combo																			combo	
SVOCs																									
(mg/kg)	Di-n-butylphthalate	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	bis(2-Ethylhexyl)phthalate	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenzofuran	10*	10*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthylene	600	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Anthracene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)anthracene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(a)pyrene	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(b)fluoranthene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(g,h,i)perylene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzo(k)fluoranthene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chrysene	70	70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dibenz(a,h)anthracene	0.7	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluorene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	7	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2-Methylnaphthalene	80	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Naphthalene	20	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Phenanthrene	500	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs																									
(mg/kg)	Total PCBs	1	1	**0.131**	**0.7095**	**0.738**	0.0599 U	**0.25**	**2.1**	**0.34**	**0.34**	**0.16**	**1.6**	**2.7**	**11**	**5.1**	**1.7**	**1.2**	**0.42**	0.12 U	0.11 U	**0.15**	**0.16**	**5.01**	**2.5**
Metals																									
	Arsenic	20	20	NA	NA	NA	NA	**2.9**	**3.9**	**2.7**	2.5 U	2.6 U	**4.2**	**3.2**	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.8 U	2.6 U	2.7 U	2.6 U	**6.7**	**12**
	Barium	1,000	1,000	NA	NA	NA	NA	**97**	**500**	**470**	**1,200**	**25**	**1,200**	**93**	**32**	**14**	**11**	**16**	**18**	**15**	**6.4**	**46**	**14**	**2,500**	**7,000**
	Beryllium	90	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cadmium	70	70	NA	NA	NA	NA	**0.58**	**2.2**	**1.0**	**2.3**	**0.27**	**0.97**	**0.65**	**0.27**	0.26 U	0.26 U	0.26 U	0.26 U	0.28 U	0.26 U	0.27 U	0.26 U	**5.3**	**5.2**
	Chromium (III)	1000	1000	NA	NA	NA	NA	**14**	**58**	**44**	**110**	**6.7**	**14**	**10**	**7.5**	**5.1**	**5.3**	**5.2**	**6.4**	**5.0**	**2.1**	**8.6**	**3.4**	**260**	**390**
	Lead	200	200	NA	NA	NA	NA	**96**	**570**	**210**	**1,700**	**46**	**320**	**210**	**62**	**14**	**6.7**	**19**	**6.8**	**16**	**5.8**	**49**	**13**	**790**	**3,000**
	Mercury	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vanadium	400	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	1,000	1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
B - Detected in associated laboratory method blank.
J - Estimated value; below quantitation limit.
NA - Sample not analyzed for the listed analyte.
U - Compound was not detected at specified quantitation limit.
UJ - Estimated non-detect.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
SVOCs - Semivolatile Organic Compounds.
PCBs - Polychlorinated Biphenyls.
* - TRC developed standards.

Table C-1.11. Summary of Analytical Results for Dioxin Investigation Soil Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte				Sample ID:	HA-43/44		HB-22		HB-26		HF-14	HF-31D	HF-40	PG-6	
					Sample Depth (ft.):	0-1	1-2	0-1	1-3	1-3	3-5	3-4	4-6	3-5	0-1	1-3
					Sample Date:	06/07/2011	06/07/2011	2/21/2014	10/20/2011 & 02/21/2014	4/15/2010	4/15/2010	4/15/2010	4/15/2010	4/15/2010	06/10/2011	06/10/2011
		S-1/GW-2	S-1/GW-3	S-2/GW-2	S-2/GW-3			combo J, K	combo A, J, K, D	combo						
PCB Congeners																
(mg/kg)	**Total PCBs[(a)]**	2	2	3	3	NA	NA	NA	NA	**6.47 J**	**16.62 J**	**1.15 J**	**0.082 J**	**0.098 J**	NA	NA
	Total PCBs[(b)]	2	2	3	3	**2.6E-01**	**1.8E-01**	NA	NA	**6.47 J**	**16.63 J**	**1.15 J**	**0.082 J**	**0.098 J**	**1.7E-03**	**5.9E-03**
	Dioxin-like PCB TEQs (ND=0 EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**4.4E-07**	**2.7E-07**	**7.3E-06**	**2.8E-05**	**1.2E-04 J**	**3.2E-05 J**	**1.8E-06 J**	**2.0E-06 J**	**1.6E-06 J**	**4.0E-09**	**2.2E-08**
	Dioxin-like PCB TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**1.8E-06**	**1.2E-06**	**8.4E-06**	**2.8E-05**	**1.2E-04 J**	**3.6E-05 J**	**4.4E-06 J**	**2.0E-06 J**	**1.7E-06 J**	**1.2E-07**	**1.7E-07**
Dioxins																
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**7.9E-06**	**9.2E-06**	**1.3E-05**	**5.7E-05**	**9.7E-05**	**4.3E-05**	**6.8E-05**	**1.4E-05**	**1.2E-04**	**7.0E-08**	**1.7E-07**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**8.0E-06**	**9.3E-06**	**1.4E-05**	**5.7E-05**	**9.7E-05**	**4.3E-05**	**6.8E-05**	**1.4E-05**	**1.2E-04**	**1.9E-07**	**2.9E-07**
TEQ Summation**																
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**8.3E-06**	**9.4E-06**	**2.0E-05**	**8.5E-05**	**1.8E-04**	**7.5E-05**	**7.0E-05**	**1.6E-05**	**1.2E-04**	**7.4E-08**	**1.9E-07**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**9.8E-06**	**1.1E-05**	**2.2E-05**	**8.5E-05**	**1.8E-04**	**7.9E-05**	**7.2E-05**	**1.6E-05**	**1.2E-04**	**3.1E-07**	**4.6E-07**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

J - Estimated value.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit. When this happens, the result is referred to as a "non-detect," or "ND."

Values in **Bold** indicate the compound was detected.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection limit (referred to as "ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions were used for results below detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

(a) - Calculated by summation of PCB homolog groups.

(b) - Calculated by summation of individual congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Under pavement

Table C-1.11. Summary of Analytical Results for Dioxin Investigation Soil Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte				Sample ID:	SB-359		SB-362		SB-365		SS-28		SS-38		SS-52	
					Sample Depth (ft.):	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3	0-1	1-3
					Sample Date:	06/08/2011	06/08/2011	06/08/2011	06/08/2011	06/07/2011	06/07/2011	06/08/2011	06/08/2011	06/08/2011	06/08/2011	06/08/2011	06/08/2011
		S-1/GW-2	S-1/GW-3	S-2/GW-2	S-2/GW-3												
PCB Congeners																	
(mg/kg)	**Total PCBs[(a)]**	2	2	3	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total PCBs[(b)]	2	2	3	3	**5.9E-02**	**5.6E-03**	**7.8E-01**	**2.8E-01**	**2.4E-02**	**3.9E-01**	**5.4E-01**	**2.3E-02**	**1.1E+00**	**6.3E-02**	**1.0E+00**	**1.4E+00**
	Dioxin-like PCB TEQs (ND=0 EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**1.2E-07**	**1.0E-08**	**2.6E-06**	**7.8E-07**	**3.0E-08**	**1.5E-06**	**2.3E-06**	**5.4E-08**	**4.4E-06**	**2.8E-07**	**3.4E-06**	**4.0E-06**
	Dioxin-like PCB TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**4.5E-07**	**1.6E-07**	**5.8E-06**	**3.2E-06**	**1.3E-06**	**2.6E-06**	**5.2E-06**	**2.8E-07**	**9.9E-06**	**5.2E-07**	**6.3E-06**	**9.8E-06**
Dioxins																	
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**4.8E-06**	**8.8E-07**	**4.0E-06**	**3.6E-06**	**1.5E-06**	**3.7E-07**	**8.4E-06**	**8.0E-07**	**3.0E-05**	**3.5E-06**	**4.5E-06**	**9.3E-06**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**4.9E-06**	**1.5E-06**	**4.1E-06**	**3.8E-06**	**1.6E-06**	**5.2E-07**	**8.5E-06**	**9.2E-07**	**3.1E-05**	**3.7E-06**	**4.6E-06**	**9.4E-06**
TEQ Summation**																	
(mg/kg)	**TEQs (ND=0; EMPC=EMPC)**	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**4.9E-06**	**9.7E-07**	**6.6E-06**	**4.4E-06**	**1.5E-06**	**1.9E-06**	**1.1E-05**	**8.6E-07**	**3.5E-05**	**3.7E-06**	**7.9E-06**	**1.3E-05**
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-05	5.0E-05	**5.3E-06**	**1.7E-06**	**9.9E-06**	**7.0E-06**	**2.9E-06**	**3.1E-06**	**1.4E-05**	**1.2E-06**	**4.1E-05**	**4.2E-06**	**1.1E-05**	**1.9E-05**

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

J - Estimated value.

NA - Sample not analyzed for the listed analyte.

U - Compound was not detected at specified quantitation limit. When this happens, the result is referred to as a "non-detect," or "ND."

Values in **Bold** indicate the compound was detected.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are use mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection limit (referred to as "ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions were used for results below detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

(a) - Calculated by summation of PCB homolog groups.

(b) - Calculated by summation of individual congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-1.12. Summary of Analytical Results for Shallow Groundwater Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample ID:	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8A**	**MW-8B**	**MW-11**	**MW-12**	**MW-13**	**MW-14**	**MW-15**	**MW-16**	**MW-17**	**MW-18**
			Depth to Water (ft-toc):	2.25	2.10	1.69	9.03	4.31	6.12 (9/14/10)	1.56	6.95 (1/20/11)	1.02	0.82	6.19	1.00	7.02	1.60
			Screened Interval:	2 to 12	2 to 12	2 to 12	7 to 17	3 to 13	3 to 13	2 to 12	5 to 15	1.5 to 11.5	1.5 to 11.5	6 to 15	1.5 to 11.5	6 to 16	1.5 to 11.5
			Groundwater Classification	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-3	GW-3	GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3	GW-2/GW-3
			Filter Size (micron)^:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample Date:	8/2008-9/2010	8/2008-12/2012	8/2008-2/2010	9/2008-12/2010	2/18/2010	9/16/2008	2/2010-9/2010	2/18/2010	2/19/2010	2/19/2010	2/18/2010	2/2010-4/2011	2/18/2010	2/2010-4/2012
		GW-2	GW-3	combo													
VOCs																	
(ug/L)	Carbon Disulfide	NS	NS	2.8 U	2.3 U	3.5 U	2.6 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	**1.3**
	cis-1,2-Dichloroethylene	20	50,000	1.0 U	**5.3**	1.0 U	**31.1**	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	p-Isopropyltoluene (p-Cymene)	4,000(1)	50,000(1)	1.8 U	1.9 U	1.5 U	1.8 U	2.0 U	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Tetrachloroethylene	50	30,000	1.0 U	1.0 U	1.0 U	**48.0**	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Trichloroethylene	5	5,000	1.0 U	**2.0**	1.0 U	**6.4**	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Vinyl Chloride	2	50,000	1.3 U	1.1 U	1.5 U	**3.9**	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
PAHs																	
(ug/L)	Phenanthrene	NS	10,000	0.05 U	**0.18**	**0.09**	5.0 U	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA
PCBs																	
(ug/L)	Total PCBs	5	10	0.0500 U	**0.1097**	0.0500 U	0.0500 U	NA	0.0500 U	NA	NA	NA	NA	NA	NA	NA	0.05 U
Metals																	
(ug/L)	Arsenic	NS	900	**4.8**	**15.0**	**13.0**	**2.41**	NA	2.0 U	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	NS	50,000	50 U	**122**	50 U	**254**	NA	250 U	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium	NS	300	5.0 U	**52.0**	5.0 U	50 U	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	NS	10	7.5 U	**19.2**	7.5 U	5.0 U	NA	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA
	Nickel	NS	200	5.0 U	**20.0**	5.0 U	**29.4**	NA	25 U	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	NS	7	3.0 U	**5.0**	**3.0**	2.5 U	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA
	Thallium	NS	3,000	1.0 U	1.0 U	1.0 U	1.0 U	NA	**1.29**	NA	NA	NA	NA	NA	NA	NA	NA
	Zinc	NS	900	**119**	**68.0**	**110**	**894**	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

ug/L - micrograms per liter.

NA - Sample not analyzed for the listed analyte.

N/A - Not applicable.

NS - No MassDEP standards exist for this compound.

U - Compound was not detected at specified quantitation limit.

Values in **Bold** indicate the compound was detected.

VOCs - Volatile Organic Compounds.

PAHs - Polynuclear Aromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

(1) - MassDEP Method 1 standards for C9-C10 aromatic hydrocarbons used.

Table C-1.12. Summary of Analytical Results for Shallow Groundwater Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte		Sample ID:	**MW-19**	**MW-20**	**MW-21**	**MW-22**	**MW-23**	**MW-24**	**MW-25**	**MW-26**	**MW-29**	**MW-30**	**MW-HH-13**	**MW-HRC-33**
			Depth to Water (ft-toc):	6.55	13.60	9.95	8.24	7.35	8.02	7.11	6.05	3.45	7.95	4.61 (1/20/11)	3.85 (6/24/11)
			Screened Interval:	3 to 13	12 to 22	10 to 20	4 to 14	2 to 12	4 to 14	4 to 16	3.5 to 13.5	2 to 12	5 to 15	4 to 14	4 to 14
			Groundwater Classification	GW-3	GW-2/GW-3	GW-3	GW-3	GW-3	GW-3	GW-3	GW-3	GW-2/GW-3	GW-2/GW-3	GW-3	GW-3
			Filter Size (micron)^:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample Date:	2/18/2010	4/2010-9/2010	4/2010-9/2010	4/2010-9/2010	4/2010-9/2010	/2010-10/2010	9/8/2010	9/8/2010	9/2010-4/2012	10/22/2010	4/2009-2/2010	4/2009-2/2010
		GW-2	GW-3												
VOCs															
(ug/L)	Carbon Disulfide	NS	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	cis-1,2-Dichloroethylene	20	50,000	1.0 U	**1.65**	1.0 U	1.0 U	1.0 U	**0.93333**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	p-Isopropyltoluene (p-Cymene)	4,000(1)	50,000(1)	2.0 U	2.0 U	2.0 U	**3.6**	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Tetrachloroethylene	50	30,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Trichloroethylene	5	5,000	1.0 U	**1.0**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.85**	1.0 U	1.0 U	1.0 U
	Vinyl Chloride	2	50,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**2.5**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
PAHs															
(ug/L)	Phenanthrene	NS	10,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	0.05 U
PCBs															
(ug/L)	Total PCBs	5	10	NA	NA	NA	NA	NA	NA	NA	NA	**0.0700 J**	NA	0.050 U	0.050 U
Metals															
(ug/L)	Arsenic	NS	900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	5.0 U
	Barium	NS	50,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5,640**	**157**
	Chromium	NS	300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	5.0 U
	Lead	NS	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5 U	**10.5**
	Nickel	NS	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U	5.0 U
	Silver	NS	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.0 U	3.0 U
	Thallium	NS	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30.0 U	30.0 U
	Zinc	NS	900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**18.5**	**300**

Notes:
ug/L - micrograms per liter.
NA - Sample not analyzed for the listed analyte.
N/A - Not applicable.
NS - No MassDEP standards exist for this compound.
U - Compound was not detected at specified quantitation limit.
Values in **Bold** indicate the compound was detected.
VOCs - Volatile Organic Compounds.
PAHs - Polynuclear Aromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
(1) - MassDEP Method 1 standards for C9-C10 aromatic hydrocarbons used.

APPENDIX C-2

SUMMARY STATISTICS FOR SOIL AND GROUNDWATER SAMPLES

Table C-2.1. Summary Statistics for Soil Samples - HS-1, 0-1 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PCBs																
	Total PCBs	1	1	100	NA	1	1	100.0%	0.00172	0.00172	PG-6	--	--	1.7E-03	1.7E-03	Maximum of detects
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	9	9	100.0%	3.1E-07	4.1E-05	SS-38	--	--	1.3E-05	2.1E-05	95% Student's-t UCL
Metals																
	Barium	1,000	1,000	10,000	50	3	3	100.0%	15.5	41.2	SS-65	--	--	2.5E+01	NA	Below background
	Chromium (III)	1,000	1,000	10,000	30	3	3	100.0%	3.84	8.43	SS-65	--	--	5.9E+00	NA	Below background
	Lead	200	200	6,000	100	3	3	100.0%	6.35	16.9	SS-65	--	--	1.3E+01	NA	Below background
	Nickel	600	600	10,000	20	3	3	100.0%	4.02	10.4	SS-65	--	--	6.3E+00	NA	Below background
	Vanadium	400	400	7,000	30	3	2	66.7%	7.21	11.9	SS-65	9.28	9.28	7.9E+00	NA	Below background
	Zinc	1,000	1,000	10,000	100	3	3	100.0%	26	32.3	SS-65	--	--	2.9E+01	NA	Below background

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

NA - Not applicable or not available.

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.2. Summary Statistics for Soil Samples - HS-2, 0-1 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PAHs																
	Acenaphthene	1,000	1,000	10,000	0.5	27	1	3.7%	0.2	0.2	SS-16	0.173	0.933	1.1E-01	NA	Below Background
	Anthracene	1,000	1,000	10,000	1	27	2	7.4%	0.845	0.964	SS-19	0.173	0.205	1.6E-01	NA	Below Background
	Benzo(a)anthracene	7	7	3,000	2	27	5	18.5%	0.394	2.3	SS-16	0.173	0.205	2.9E-01	2.9E-01	Mean
	Benzo(a)pyrene	2	2	300	2	27	5	18.5%	0.372	1.99	SS-16	0.173	0.205	2.7E-01	NA	Below Background
	Benzo(b)fluoranthene	7	7	3,000	2	27	4	14.8%	0.453	2.24	SS-19	0.173	0.205	2.8E-01	2.8E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	27	5	18.5%	0.24275	1.43	SS-19	0.173	0.205	2.0E-01	2.0E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	27	2	7.4%	0.14675	0.978	SS-16	0.173	0.933	1.4E-01	NA	Below Background
	Chrysene	70	70	10,000	2	27	5	18.5%	0.378	2.13	SS-19	0.173	0.205	2.8E-01	2.8E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	27	1	3.7%	0.303	0.303	SS-16	0.173	0.933	1.2E-01	NA	Below Background
	Fluoranthene	1,000	1,000	10,000	4	27	8	29.6%	0.218	5.06	SS-19	0.173	0.205	5.1E-01	5.1E-01	Mean
	Fluorene	1,000	1,000	10,000	1	27	1	3.7%	0.412	0.412	SS-16	0.173	0.933	1.2E-01	NA	Below Background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	27	5	18.5%	0.25825	1.51	SS-19	0.173	0.205	2.2E-01	2.2E-01	Mean
	Phenanthrene	500	500	10,000	3	27	6	22.2%	0.193	4.42	SS-19	0.173	0.205	4.3E-01	4.3E-01	Mean
	Pyrene	1,000	1,000	10,000	4	27	8	29.6%	0.209	4.48	SS-19	0.173	0.205	4.9E-01	4.9E-01	Mean
PCBs																
	Total PCBs	1	1	100	NA	39	22	56.4%	0.0664	4.93	SS-19	0.05	0.1	5.2E-01	5.2E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	9	9	100.0%	3.1E-07	4.1E-05	SS-38	--	--	1.3E-05	2.1E-05	95% Student's-t UCL
Metals																
	Arsenic	20	20	500	20	33	23	69.7%	1.61	8.07	SS-19	2.59	3.06	3.1E+00	NA	Below Background
	Barium	1,000	1,000	10,000	50	33	32	97.0%	9.17	437	SS-19	5.18	5.18	7.6E+01	7.6E+01	Mean
	Cadmium	70	70	1000	2	33	10	30.3%	0.29	5.29	SS-19	0.26	0.4	5.2E-01	5.2E-01	Mean
	Chromium (III)	1,000	1,000	2,000	30	33	33	100.0%	2.02	68.1	SS-19	--	--	1.9E+01	1.9E+01	Mean
	Lead	200	200	6,000	100	33	30	90.9%	0.87	671	SS-19	0.35	0.81	7.1E+01	7.1E+01	Mean
	Mercury	20	20	300	0.3	33	24	72.7%	0.031	0.616	SS-19	0.013	0.08	8.0E-02	8.0E-02	Mean
	Nickel	600	600	10,000	20	29	29	100.0%	1.52	33.6	SS-15	--	--	1.1E+01	1.1E+01	Mean
	Silver	100	100	2,000	0.6	33	25	75.8%	0.68	5.89	SS-19	0.33	0.66	1.9E+00	1.9E+00	Mean
	Vanadium	400	400	7,000	30	29	27	93.1%	9.87	59.3	SS-20	5.18	5.38	2.1E+01	2.1E+01	Mean
	Zinc	1,000	1,000	10,000	100	29	29	100.0%	4.57	562	SS-19	--	--	6.3E+01	6.3E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

VOCs - Volatile Organic Compounds.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

GRO - Gasoline-Range Organics.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.3. Summary Statistics for Soil Samples - HS-3, 0-1 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3		Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PAHs																
	Fluoranthene	1,000	1,000	10,000	4	5	1	20.0%	0.275	0.275	SS-38	0.187	0.195	1.3E-01	NA	Below background
	Pyrene	1,000	1,000	10,000	4	5	1	20.0%	0.281	0.281	SS-38	0.187	0.195	1.3E-01	NA	Below background
PCBs																
	Total PCBs	1	1	100	NA	11	3	27.3%	0.0956	1.11	SS-38	0.0524	0.1	1.9E-01	1.9E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	9	9	100.0%	3.1E-07	4.1E-05	SS-38	--	--	1.3E-05	2.1E-05	95% Student's-t UCL
Metals																
	Arsenic	20	20	500	20	8	6	75.0%	1.61	4.1	SS-38	2.8	2.93	2.7E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	8	8	100.0%	9.05	66	SS-8	--	--	2.6E+01	2.6E+01	Mean
	Cadmium	70	70	1000	2	8	2	25.0%	0.41	0.47	SS-38	0.28	0.38	2.3E-01	NA	Below background
	Chromium (III)	1,000	1,000	10,000	30	8	8	100.0%	4.59	6.89	SS-38	--	--	5.6E+00	NA	Below background
	Lead	200	200	6,000	100	8	8	100.0%	8.45	167	SS-38	--	--	5.7E+01	5.7E+01	Mean
	Mercury	20	20	300	0.3	8	6	75.0%	0.026	0.4	SS-8	0.07	0.08	9.8E-02	9.8E-02	Mean
	Nickel	600	600	10,000	20	5	5	100.0%	2.93	4	SS-37	--	--	3.4E+00	NA	Below background
	Silver	100	100	2,000	0.6	8	5	62.5%	0.81	1.69	SS-37	0.35	0.38	7.2E-01	7.2E-01	Mean
	Vanadium	400	400	7,000	30	5	5	100.0%	7.92	10.9	SS-38	--	--	9.5E+00	NA	Below background
	Zinc	1,000	1,000	10,000	100	5	5	100.0%	10.4	101	SS-38	--	--	3.1E+01	3.1E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

NA - Not available or not applicable.

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

VOCs - Volatile Organic Compounds.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

GRO - Gasoline-Range Organics.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.4. Summary Statistics for Soil Samples - HS-4, 0-1 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Benzo(a)anthracene	7	7	3,000	2	7	1	14.3%	0.26	0.26	SB-267	0.188	0.207	1.2E-01	NA	Below background
	Benzo(a)pyrene	2	2	300	2	7	1	14.3%	0.271	0.271	SB-267	0.188	0.207	1.2E-01	NA	Below background
	Benzo(b)fluoranthene	7	7	3,000	2	7	2	28.6%	0.257	0.343	SB-267	0.188	0.207	1.6E-01	NA	Below background
	Chrysene	70	70	10,000	2	7	1	14.3%	0.325	0.325	SB-267	0.188	0.207	1.3E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	7	2	28.6%	0.437	0.523	SB-267	0.188	0.207	2.1E-01	NA	Below background
	Phenanthrene	500	500	10,000	3	7	2	28.6%	0.23	0.344	SS-43	0.188	0.207	1.5E-01	NA	Below background
	Pyrene	1,000	1,000	10,000	4	7	2	28.6%	0.258	0.585	SB-267	0.188	0.207	1.9E-01	NA	Below background
PCBs																
	Total PCBs	1	1	100	NA	20	5	25.0%	0.0243	0.9755	HF-31	0.05	0.23	1.1E-01	1.1E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	9	9	100.0%	3.1E-07	4.1E-05	SS-38	--	--	1.3E-05	2.1E-05	95% Student's-t UCL
Metals																
	Arsenic	20	20	500	20	8	5	62.5%	2.2	3.33	SS-46	2.82	3.01	2.4E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	8	8	100.0%	14	29.1	SS-43	--	--	2.1E+01	NA	Below background
	Cadmium	70	70	1000	2	14	2	14.3%	0.19	0.46	HF-31	0.26	0.37	1.8E-01	NA	Below background
	Chromium (III)	1,000	1,000	10,000	30	8	8	100.0%	4.87	7.92	SS-43	--	--	6.1E+00	NA	Below background
	Lead	200	200	6,000	100	14	14	100.0%	8.725	239.5	HE-44	--	--	5.2E+01	5.2E+01	Mean
	Mercury	20	20	300	0.3	8	7	87.5%	0.04	0.079	SB-267	0.07	0.07	4.8E-02	NA	Below background
	Nickel	600	600	10,000	20	7	7	100.0%	2.28	4.2	SS-43	--	--	3.3E+00	NA	Below background
	Silver	100	100	2,000	0.6	8	1	12.5%	2.22	2.22	SB-267	0.37	0.63	5.3E-01	5.3E-01	Mean
	Vanadium	400	400	7,000	30	7	7	100.0%	9.87	14.5	SS-46	--	--	1.2E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	7	7	100.0%	27.7	54.9	SS-43	--	--	3.5E+01	NA	Below background

Notes:
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
Background - Background Concentration for natural soil.
UCL* - Upper Concentration Limit.
UCL - Upper Confidence Limit.
EPC - Exposure Point Concentration.
PCBs - Polychlorinated Biphenyls.
SVOCs - Semi-volatile Organic Compounds.
EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.
TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.
TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.
** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.5. Summary Statistics for Soil Samples - HS-6, 0-1 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Acenaphthene	1,000	1,000	10,000	0.5	7	1	14.3%	0.257	0.257	SS-50	0.174	0.208	1.2E-01	NA	Below background
	Anthracene	1,000	1,000	10,000	1	7	2	28.6%	0.241	0.9	SS-50	0.174	0.208	2.3E-01	NA	Below background
	Benzo(a)anthracene	7	7	3,000	2	7	3	42.9%	0.2008333	2.03	SS-50	0.174	0.208	4.5E-01	4.5E-01	Mean
	Benzo(a)pyrene	2	2	300	2	7	3	42.9%	0.2031667	1.65	SS-50	0.174	0.208	3.9E-01	NA	Below background
	Benzo(b)fluoranthene	7	7	3,000	2	7	3	42.9%	0.2351667	2.05	SS-50	0.174	0.208	4.8E-01	4.8E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	7	2	28.6%	0.218	0.905	SS-50	0.174	0.208	2.3E-01	NA	Below background
	Benzo(k)fluoranthene	70	70	10,000	1	7	3	42.9%	0.1378333	0.872	SS-50	0.174	0.208	2.3E-01	NA	Below background
	Chrysene	70	70	10,000	2	7	3	42.9%	0.2011667	1.8	SS-50	0.174	0.208	4.2E-01	NA	Below background
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	7	1	14.3%	0.221	0.221	SS-50	0.174	0.208	1.1E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	7	4	57.1%	0.193	4.32	SS-50	0.174	0.208	9.0E-01	9.0E-01	Mean
	Fluorene	1,000	1,000	10,000	1	7	1	14.3%	0.38	0.38	SS-50	0.174	0.208	1.4E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	7	2	28.6%	0.293	0.973	SS-50	0.174	0.208	2.5E-01	NA	Below background
	Phenanthrene	500	500	10,000	3	7	4	57.1%	0.204	3.06	SS-50	0.174	0.208	6.8E-01	6.8E-01	Mean
	Pyrene	1,000	1,000	10,000	4	7	4	57.1%	0.264	4.79	SS-50	0.174	0.208	9.3E-01	9.3E-01	Mean
PCB Aroclors																
	Total PCBs	1	1	100	NA	15	11	73.3%	0.129	1.02	SS-52	0.0526	0.1	2.7E-01	2.7E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.2E-05	9	9	100.0%	3.1E-07	4.1E-05	SS-38	--	--	1.3E-05	2.1E-05	95% Student's-t UCL
Metals																
	Arsenic	20	20	500	20	9	6	66.7%	1.18	4.96	SS-50	2.61	3.11	2.4E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	9	9	100.0%	10	154.1	HH-13E	--	--	5.3E+01	5.3E+01	Mean
	Cadmium	70	70	1000	2	9	4	44.4%	0.31875	0.45	HD-19	0.27	0.35	2.6E-01	NA	Below background
	Chromium (III)	1,000	1,000	10,000	30	9	9	100.0%	2.7	20.0	HH-13E	--	--	8.7E+00	NA	Below background
	Lead	200	200	6,000	100	9	9	100.0%	11	127.3	HD-19	--	--	4.9E+01	4.9E+01	Mean
	Mercury	20	20	300	0.3	6	5	83.3%	0.016	0.21	HD-19	0.07	0.07	7.6E-02	NA	Below background
	Nickel	600	600	10,000	20	4	4	100.0%	2.19	5.09	SS-50	--	--	3.6E+00	NA	Below background
	Vanadium	400	400	7,000	30	4	3	75.0%	9.82	18.3	SS-50	5.22	5.22	1.1E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	4	4	100.0%	12.6	111.6	HD-19	--	--	5.2E+01	5.2E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

NA - Not available or not applicable.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.6. Summary Statistics for Soil Samples - HS-7, 0-1 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PAHs																
	Benzo(a)anthracene	7	7	3,000	2	7	2	28.6%	0.228	0.395	SB-362	0.208	0.459	1.8E-01	NA	Below background
	Benzo(a)pyrene	2	2	300	2	7	2	28.6%	0.216	0.348	SB-362	0.208	0.459	1.7E-01	NA	Below background
	Benzo(b)fluoranthene	7	7	3,000	2	7	2	28.6%	0.269	0.41	SB-362	0.208	0.459	1.9E-01	NA	Below background
	Chrysene	70	70	10,000	2	7	2	28.6%	0.207	0.417	SB-362	0.208	0.459	1.8E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	7	3	42.9%	0.64	0.732	SS-53	0.208	0.214	3.6E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	7	1	14.3%	0.192	0.192	SB-362	0.207	0.459	1.4E-01	NA	Below background
	Phenanthrene	500	500	10,000	3	7	3	42.9%	0.252	0.621	SB-362	0.208	0.214	2.7E-01	NA	Below background
	Pyrene	1,000	1,000	10,000	4	7	3	42.9%	0.567	0.793	SB-362	0.208	0.214	3.4E-01	NA	Below background
PCBs																
	Total PCBs	1	1	100	NS	9	6	66.7%	0.148	0.776	SB-362	0.0597	0.1	2.8E-01	2.8E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	9	9	100.0%	3.1E-07	4.1E-05	SS-38	--	--	1.3E-05	2.1E-05	95% Student's-t UCL
Metals																
	Arsenic	20	20	500	20	8	7	87.5%	1.52	5.37	SB-362	3.11	3.11	3.6E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	8	8	100.0%	11	187	SB-363	--	--	7.1E+01	7.1E+01	Mean
	Cadmium	70	70	1000	2	8	4	50.0%	0.33	2.78	SB-363	0.32	0.33	6.2E-01	6.2E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	8	8	100.0%	3.74	34.1	SB-363	--	--	1.3E+01	1.3E+01	Mean
	Lead	200	200	6,000	100	8	8	100.0%	8.89	292	SB-363	--	--	1.1E+02	1.1E+02	Mean
	Mercury	20	20	300	0.3	8	7	87.5%	0.052	0.213	SB-362	0.07	0.07	1.1E-01	NA	Below background
	Nickel	600	600	10,000	20	7	7	100.0%	4.42	9.37	SB-362	--	--	6.5E+00	NA	Below background
	Vanadium	400	400	7,000	30	7	7	100.0%	15.5	24.4	SB-363	--	--	1.9E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	7	7	100.0%	29.9	191	SB-362	--	--	8.1E+01	8.1E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.7. Summary Statistics for Soil Samples - HS-8, 0-1 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Di-n-butylphthalate	NS	NS	NS	NA	1	1	100.0%	0.095	0.095	HJ2.5	--	--	9.5E-02	9.5E-02	Maximum of detects
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	1	1	100.0%	0.078	0.078	HJ2.5	--	--	7.8E-02	7.8E-02	Maximum of detects
	Benzo(a)anthracene	7	7	3,000	2	8	3	37.5%	0.23	0.798	SS-61	0.199	0.213	2.3E-01	NA	Below background
	Benzo(a)pyrene	2	2	300	2	8	3	37.5%	0.22	0.651	SS-61	0.199	0.213	2.0E-01	NA	Below background
	Benzo(b)fluoranthene	7	7	3,000	2	8	3	37.5%	0.3	0.704	SS-61	0.199	0.213	2.3E-01	NA	Below background
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	8	3	37.5%	0.092	0.403	SS-61	0.199	0.213	1.6E-01	NA	Below background
	Benzo(k)fluoranthene	70	70	10,000	1	8	2	25.0%	0.08	0.294	SS-61	0.199	0.221	1.2E-01	NA	Below background
	Chrysene	70	70	10,000	2	8	3	37.5%	0.2	0.936	SS-61	0.199	0.213	2.4E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	8	6	75.0%	0.2415	1.03	SS-61	0.2	0.213	3.6E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	8	3	37.5%	0.11	0.465	SS-61	0.199	0.213	1.7E-01	NA	Below background
	Phenanthrene	500	500	10,000	3	8	5	62.5%	0.203	0.962	SS-61	0.2	0.213	2.8E-01	NA	Below background
	Pyrene	1,000	1,000	10,000	4	8	7	87.5%	0.2965	1.42	SS-61	0.213	0.213	4.7E-01	NA	Below background
PCB Aroclors																
	Total PCBs	1	1	100	NA	15	10	66.7%	0.199	6.51	HS-2	0.0545	0.1	1.0E+00	1.0E+00	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	1	1	100.0%	1.45E-05	1.5E-05	HG-2	--	--	1.5E-05	1.5E-05	Maximum of detects
Metals																
	Arsenic	20	20	500	20	11	6	54.5%	0.56	3.66	HF-10B	3	3.31	2.0E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	11	11	100.0%	21.4	371	HF-10B	--	--	9.9E+01	9.9E+01	Mean
	Cadmium	70	70	1000	2	12	7	58.3%	0.44	1.55	SS-60	0.3	0.38	6.1E-01	6.1E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	12	12	100.0%	7.03	56.6	HJ-10	--	--	2.0E+01	2.0E+01	Mean
	Lead	200	200	6000	100	12	12	100.0%	7.87	375.5	HJ-10	--	--	1.2E+02	1.2E+02	Mean
	Mercury	20	20	300	0.3	10	8	80.0%	0.027	0.51	SS-59	0.07	0.08	1.4E-01	1.4E-01	Mean
	Nickel	600	600	10000	20	6	6	100.0%	4.64	8.81	SS-61	--	--	6.8E+00	NA	Below background
	Vanadium	400	400	7,000	30	6	6	100.0%	12	25.5	SS-60	--	--	1.8E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	6	6	100.0%	20.5	143	SS-60	--	--	7.4E+01	7.4E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

NA - Not available or applicable.

NS - No standard available for this compound.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection limit (referred to as "ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions were used for results below detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

Background - Background Concentration for natural soil.

EPC - Exposure point concentration.

Table C-2.8. Summary Statistics for Soil Samples - HS-10, 0-1 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Benzo(a)anthracene	7	7	3,000	2	9	1	11.1%	0.353	0.353	SB-359	0.18	0.61	1.4E-01	NA	Below background
	Benzo(a)pyrene	2	2	300	2	9	1	11.1%	0.276	0.276	SB-359	0.18	0.61	1.4E-01	NA	Below background
	Benzo(b)fluoranthene	7	7	3,000	2	9	2	22.2%	0.2	0.345	SB-359	0.18	0.61	1.6E-01	NA	Below background
	Chrysene	70	70	10,000	2	9	1	11.1%	0.389	0.389	SB-359	0.18	0.61	1.5E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	9	2	22.2%	0.23	0.572	SB-359	0.18	0.61	1.8E-01	NA	Below background
	Phenanthrene	500	500	10,000	3	9	1	11.1%	0.53	0.53	SB-359	0.18	0.61	1.6E-01	NA	Below background
	Pyrene	1,000	1,000	10,000	4	9	2	22.2%	0.27	0.543	SB-359	0.18	0.61	1.9E-01	NA	Below background
PCBs																
	Total PCBs	1	1	100	NA	29	18	62.1%	0.0594	5.1	TREE-HS-3	0.05	0.24	6.6E-01	6.6E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	9	9	100.0%	3.1E-07	4.1E-05	SS-38	--	--	1.3E-05	2.1E-05	95% Student's-t UCL
Metals																
	Arsenic	20	20	500	20	22	8	36.4%	2.435	7.9	HA-19	2.6	4.5	2.5E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	22	22	100.0%	7.41	2500	TREE-TI-3	--	--	1.9E+02	1.9E+02	Mean
	Beryllium	90	90	2,000	0.4	9	1	11.1%	0.27	0.27	SB-01	0.27	0.45	1.6E-01	NA	Below background
	Cadmium	70	70	1000	2	22	8	36.4%	0.27	5.3	TREE-TI-3	0.26	0.45	7.5E-01	7.5E-01	Mean
	Chromium (III)	1000	1000	10000	30	22	22	100.0%	3.38	260	TREE-TI-3	--	--	2.3E+01	2.3E+01	Mean
	Lead	200	200	6000	100	22	22	100.0%	12.1	790	TREE-TI-3	--	--	1.2E+02	1.2E+02	Mean
	Mercury	20	20	300	0.3	9	8	88.9%	0.014	0.08	SB-370	0.013	0.013	2.8E-02	NA	Below background
	Nickel	600	600	10000	20	9	9	100.0%	3.1	6.8	SB-370	--	--	4.3E+00	NA	Below background
	Vanadium	400	400	7,000	30	9	7	77.8%	5.32	22	SB-370	5.23	5.24	9.3E+00	NA	Below background
	Zinc	1,000	1,000	10,000	100	9	9	100.0%	17	58.9	SB-359	--	--	2.9E+01	NA	Below background

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

NA - Not available.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EPC - Exposure Point Concentration.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

* - TRC-developed standard.

Table C-2.9. Summary Statistics for Soil Samples - HS-1, 0-3 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PCBs																
	Total PCBs	1	1	100	NA	2	2	100.0%	0.00172	0.00589	PG-6	--	--	3.8E-03	5.9E-03	Maximum of detects
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	18	18	100.0%	3.1E-07	8.5E-05	HB-22	--	--	1.4E-05	2.6E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	6	2	33.3%	0.786	1.22	PG-3	2.78	4.64	1.5E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	6	6	100.0%	4.93	43	PG-3	--	--	2.2E+01	NA	Below background
	Cadmium	70	70	1000	2	6	1	16.7%	0.36	0.36	PG-3	0.28	0.47	2.1E-01	NA	Below background
	Chromium (III)	1,000	1,000	10,000	30	6	6	100.0%	1.72	26	PG-3	--	--	8.0E+00	NA	Below background
	Lead	200	200	6,000	100	6	6	100.0%	2.93	16.9	SS-65	--	--	8.1E+00	NA	Below background
	Nickel	600	600	10,000	20	3	3	100.0%	4.02	10.4	SS-65	--	--	6.3E+00	NA	Below background
	Vanadium	400	400	7,000	30	3	2	66.7%	7.21	11.9	SS-65	9.28	9.28	7.9E+00	NA	Below background
	Zinc	1,000	1,000	10,000	100	3	3	100.0%	26	32.3	SS-65	--	--	2.9E+01	NA	Below background

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

NA - Not applicable or not available.

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.10. Summary Statistics for Soil Samples - HS-2, 0-3 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
VOCs																
	1,2,4-Trichlorobenzene	6	700	10,000	NA	2	1	50.0%	0.17	0.17	HRI29	0.062	0.062	1.0E-01	1.7E-01	Maximum of detects
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	2	1	50.0%	0.21	0.21	HRI29	0.062	0.062	1.2E-01	2.1E-01	Maximum of detects
PAHs																
	Acenaphthene	1,000	1,000	10,000	0.5	61	6	9.8%	0.184	1.93	SS-21	0.17	0.933	1.6E-01	1.6E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	61	4	6.6%	0.193	2.4	SS-24	0.17	0.933	1.5E-01	1.5E-01	Mean
	Anthracene	1,000	1,000	10,000	1	61	14	23.0%	0.15425	4.11	SS-24	0.17	0.212	3.3E-01	3.3E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	61	22	36.1%	0.21	6.33	SS-24	0.17	0.212	6.1E-01	6.1E-01	Mean
	Benzo(a)pyrene	2	2	300	2	61	22	36.1%	0.214	5.28	SS-24	0.17	0.212	5.3E-01	5.3E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	61	20	32.8%	0.186	6.09	SS-24	0.17	0.212	5.7E-01	5.7E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	61	20	32.8%	0.2	3.13	SS-21	0.17	0.212	3.6E-01	3.6E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	61	15	24.6%	0.14675	2.42	SS-24	0.17	0.933	2.7E-01	2.7E-01	Mean
	Chrysene	70	70	10,000	2	61	22	36.1%	0.212	5.98	SS-24	0.17	0.212	5.9E-01	5.9E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	61	7	11.5%	0.204	0.78	SS-24	0.17	0.933	1.4E-01	1.4E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	61	26	42.6%	0.218	12.1	SS-24	0.17	0.212	1.2E+00	1.2E+00	Mean
	Fluorene	1,000	1,000	10,000	1	61	8	13.1%	0.208	3.2	SS-24	0.17	0.933	2.1E-01	2.1E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	61	21	34.4%	0.181	3.41	SS-21	0.17	0.212	4.2E-01	4.2E-01	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	61	3	4.9%	0.392	1.52	SS-24	0.17	0.933	1.3E-01	1.3E-01	Mean
	Naphthalene	20	500	10,000	0.5	63	5	7.9%	0.15	2.55	SS-24	0.17	0.933	1.6E-01	1.6E-01	Mean
	Phenanthrene	500	500	10,000	3	61	23	37.7%	0.193	18.9	SS-24	0.17	0.212	1.3E+00	1.3E+00	Mean
	Pyrene	1,000	1,000	10,000	4	61	27	44.3%	0.15275	11.2	SS-21	0.17	0.212	1.2E+00	1.2E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	85	45	52.9%	0.0233	4.93	SS-19	0.05	0.31	4.6E-01	4.6E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	18	18	100.0%	3.1E-07	8.5E-05	HB-22	--	--	1.4E-05	2.6E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	69	37	53.6%	1.61	9.74	HRG25	2.55	3.06	3.1E+00	NA	Below Background
	Barium	1,000	1,000	10,000	50	69	68	98.6%	6.64	437	SS-19	5.18	5.18	7.3E+01	7.3E+01	Mean
	Beryllium	90	90	2,000	0.4	56	4	7.1%	0.2175	0.82	SS-29	0.26	0.33	1.6E-01	1.6E-01	Mean
	Cadmium	70	70	1000	2	69	24	34.8%	0.2225	5.29	SS-19	0.26	0.4	4.9E-01	4.9E-01	Mean
	Chromium (III)	1,000	1,000	2,000	30	69	69	100.0%	1.92	68.1	SS-19	--	--	1.2E+01	1.2E+01	Mean
	Lead	200	200	6,000	100	69	66	95.7%	0.87	890	SS-27	0.35	0.81	1.1E+02	1.1E+02	Mean
	Mercury	20	20	300	0.3	60	43	71.7%	0.016	1.02	SS-26	0.013	0.08	1.2E-01	1.2E-01	Mean
	Nickel	600	600	10,000	20	56	56	100.0%	1.52	33.6	SS-15	--	--	8.5E+00	8.5E+00	Mean
	Silver	100	100	2,000	0.6	60	47	78.3%	0.54	5.89	SS-19	0.33	0.66	1.6E+00	1.6E+00	Mean
	Vanadium	400	400	7,000	30	56	40	71.4%	5.34	59.3	SS-20	5.1	5.52	1.4E+01	1.4E+01	Mean
	Zinc	1,000	1,000	10,000	100	56	56	100.0%	4.57	562	SS-19	--	--	6.8E+01	6.8E+01	Mean
GRO																
	Gasoline Range Organics	1,000	1,000	10,000	NA	3	3	100.0%	9.4	17.3	HRG25	--	--	1.5E+01	1.5E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).
Background - Background Concentration for natural soil.
UCL* - Upper Concentration Limit.
EPC - Exposure Point Concentration.
VOCs - Volatile Organic Compounds.
PAHs - Polyaromatic Hydrocarbons.
PCBs - Polychlorinated Biphenyls.
GRO - Gasoline-Range Organics.
* TRC-developed standard.
NA - Not available.
EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.
TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.
TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.
** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.11. Summary Statistics for Soil Samples - HS-3, 0-3 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
VOCs																
	Benzene	40	40	10,000	NA	1	1	100.0%	0.036	0.036	HRJ.75-17	--	--	3.6E-02	3.6E-02	Maximum of detects
	Toluene	500	500	10,000	NA	1	1	100.0%	0.041	0.041	HRJ.75-17	--	--	4.1E-02	4.1E-02	Maximum of detects
	1,2,4-Trimethylbenzene	100(1)	100(1)	5000 (1)	NA	1	1	100.0%	0.046	0.046	HRJ.75-17	--	--	4.6E-02	4.6E-02	Maximum of detects
PAHs																
	Acenaphthene	1,000	1,000	10,000	0.5	15	2	13.3%	0.259	0.332	HRK-21	0.175	0.214	1.2E-01	NA	Below background
	Acenaphthylene	600	10	10,000	0.5	15	1	6.7%	0.482	0.482	SS-37	0.175	0.255	1.2E-01	NA	Below background
	Anthracene	1,000	1,000	10,000	1	15	4	26.7%	0.362	4.23	SS-37	0.175	0.214	4.8E-01	4.8E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	15	5	33.3%	0.258	6.12	SS-37	0.175	0.214	8.1E-01	8.1E-01	Mean
	Benzo(a)pyrene	2	2	300	2	15	5	33.3%	0.317	6.76	SS-37	0.175	0.214	8.4E-01	8.4E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	15	5	33.3%	0.382	7.26	SS-37	0.175	0.214	9.2E-01	9.2E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	15	5	33.3%	0.303	3.92	SS-37	0.175	0.214	5.2E-01	5.2E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	15	4	26.7%	0.494	1.212	SS-37	0.175	0.214	2.8E-01	2.8E-01	Mean
	Chrysene	70	70	10,000	2	15	5	33.3%	0.323	5.45	SS-37	0.175	0.214	7.8E-01	7.8E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	15	4	26.7%	0.217	0.552	SS-37	0.175	0.214	1.6E-01	1.6E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	15	6	40.0%	0.275	17.1	SS-37	0.175	0.214	1.8E+00	1.8E+00	Mean
	Fluorene	1,000	1,000	10,000	1	15	2	13.3%	0.453	0.792	SS-37	0.175	0.214	1.7E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	15	5	33.3%	0.305	5.32	SS-37	0.175	0.214	6.6E-01	6.6E-01	Mean
	Naphthalene	20	500	10,000	0.5	16	3	18.8%	0.176	11	HRJ.75-17	0.175	0.214	8.0E-01	8.0E-01	Mean
	Phenanthrene	500	500	10,000	3	15	5	33.3%	0.254	18.2	SS-37	0.175	0.214	1.9E+00	1.9E+00	Mean
	Pyrene	1,000	1,000	10,000	4	15	7	46.7%	0.193	13.8	SS-37	0.175	0.214	1.7E+00	1.7E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	30	13	43.3%	0.0631	1.11	SS-38	0.039	0.25	1.9E-01	1.9E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	18	18	100.0%	3.1E-07	8.5E-05	HB-22	--	--	1.4E-05	2.6E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	18	12	66.7%	1.61	16	SS-38	2.62	2.93	4.5E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	19	19	100.0%	5.94	801	SS-38	--	--	1.4E+02	1.4E+02	Mean
	Beryllium	90	90	2,000	0.4	10	2	20.0%	0.43	0.79	SS-38	0.27	0.3	2.4E-01	2.4E-01	Mean
	Cadmium	70	70	1000	2	18	9	50.0%	0.36	1.53	SS-40	0.27	0.38	4.7E-01	NA	Below background
	Chromium (III)	1,000	1,000	10,000	30	19	19	100.0%	2.2	18	SS-38	--	--	7.1E+00	NA	Below background
	Lead	200	200	6,000	100	20	20	100.0%	2.93	865	SS-38	--	--	2.0E+02	2.0E+02	Mean
	Mercury	20	20	300	0.3	13	9	69.2%	0.026	0.654	SS-40	0.013	0.08	1.5E-01	1.5E-01	Mean
	Nickel	600	600	10,000	20	10	10	100.0%	2.23	11.2	SS-38	--	--	5.1E+00	NA	Below background
	Silver	100	100	2,000	0.6	13	9	69.2%	0.52	2.38	SS-37	0.35	0.53	8.4E-01	8.4E-01	Mean
	Vanadium	400	400	7,000	30	10	8	80.0%	7.92	20.9	SS-40	5.23	5.24	1.0E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	10	10	100.0%	8.18	506	SS-40	--	--	1.1E+02	1.1E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

NA - Not available or not applicable.

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

VOCs - Volatile Organic Compounds.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

GRO - Gasoline-Range Organics.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

(1) - Values for C9-C10 aromatics used.

Table C-2.12. Summary Statistics for Soil Samples - HS-4, 0-3 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	NA	4	1	25.0%	0.078	0.078	HH43+HI42	0.057	0.06	4.2E-02	7.8E-02	Maximum of detects
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	4	1	25.0%	0.076	0.076	HJ44+HI43	0.17	0.19	8.7E-02	7.6E-02	Maximum of detects
	Acenaphthene	1,000	1,000	10,000	0.5	14	1	7.1%	0.31	0.31	HF44+HG44	0.059	0.207	9.7E-02	NA	Below background
	Acenaphthylene	600	10	10,000	0.5	14	2	14.3%	0.11	0.12	HF44+HG44	0.06	0.207	8.9E-02	NA	Below background
	Anthracene	1,000	1,000	10,000	1	14	3	21.4%	0.14	4	HF44+HG44	0.064	0.207	3.8E-01	3.8E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	14	5	35.7%	0.15	7.9	HF44+HG44	0.176	0.207	7.8E-01	7.8E-01	Mean
	Benzo(a)pyrene	2	2	300	2	14	4	28.6%	0.271	6.9	HF44+HG44	0.064	0.207	7.0E-01	7.0E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	14	6	42.9%	0.2	8.9	HF44+HG44	0.176	0.207	9.2E-01	9.2E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	14	3	21.4%	0.27	1.7	HF44+HG44	0.064	0.338	2.5E-01	2.5E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	14	3	21.4%	0.25	3.3	HF44+HG44	0.064	0.207	3.6E-01	3.6E-01	Mean
	Chrysene	70	70	10,000	2	14	5	35.7%	0.16	6.7	HF44+HG44	0.176	0.207	6.9E-01	6.9E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	14	1	7.1%	0.71	0.71	HF44+HG44	0.059	0.338	1.3E-01	1.3E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	14	6	42.9%	0.27	15	HF44+HG44	0.176	0.207	1.4E+00	1.4E+00	Mean
	Fluorene	1,000	1,000	10,000	1	14	1	7.1%	0.22	0.22	HF44+HG44	0.059	0.207	9.0E-02	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	14	2	14.3%	0.47	1.8	HF44+HG44	0.06	0.338	2.4E-01	2.4E-01	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	14	1	7.1%	0.079	0.079	HF44+HG44	0.059	0.207	8.0E-02	NA	Below background
	Naphthalene	20	500	10,000	0.5	14	1	7.1%	0.092	0.092	HF44+HG44	0.059	0.207	8.1E-02	NA	Below background
	Phenanthrene	500	500	10,000	3	14	6	42.9%	0.22	1.2	HF44+HG44	0.176	0.207	3.1E-01	NA	Below background
	Pyrene	1,000	1,000	10,000	4	14	6	42.9%	0.258	15	HF44+HG44	0.176	0.207	1.5E+00	1.5E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	40	21	52.5%	0.0243	2.6035	HF-40	0.05	2.63	5.4E-01	5.4E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	18	18	100.0%	3.1E-07	8.5E-05	HB-22	--	--	1.4E-05	2.6E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	16	10	62.5%	2.2	5.25	HH43+HI42	2.64	3.01	2.8E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	16	16	100.0%	10.9	344	HH43+HI42	--	--	6.8E+01	6.8E+01	Mean
	Cadmium	70	70	1000	2	28	13	46.4%	0.19	2.24	HH44+HI44	0.26	0.37	5.2E-01	5.2E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	16	16	100.0%	2.04	96	SS-12	--	--	1.4E+01	1.4E+01	Mean
	Lead	200	200	6,000	100	28	28	100.0%	3.05	665	HH43+HI42	--	--	1.4E+02	1.4E+02	Mean
	Mercury	20	20	300	0.3	14	12	85.7%	0.04	0.223	HH43+HI42	0.014	0.07	8.5E-02	NA	Below background
	Nickel	600	600	10,000	20	8	8	100.0%	2.28	4.2	SS-43	--	--	3.2E+00	NA	Below background
	Silver	100	100	2,000	0.6	14	1	7.1%	2.22	2.22	SB-267	0.32	0.63	3.8E-01	3.8E-01	Mean
	Vanadium	400	400	7,000	30	8	7	87.5%	9.87	14.5	SS-46	5.34	5.34	1.1E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	8	8	100.0%	16.3	54.9	SS-43	--	--	3.3E+01	NA	Below background

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

NA - Not available.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

* - TRC-developed standard.

Table C-2.13. Summary Statistics for Soil Samples - HS-6, 0-3 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Acenaphthene	1,000	1,000	10,000	0.5	19	3	15.8%	0.217	0.542	SS-52	0.174	0.208	1.3E-01	1.3E-01	Mean
	Anthracene	1,000	1,000	10,000	1	19	6	31.6%	0.2201667	1.62	SS-52	0.174	0.208	2.7E-01	2.7E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	19	8	42.1%	0.2008333	2.03	SS-50	0.174	0.208	4.4E-01	4.4E-01	Mean
	Benzo(a)pyrene	2	2	300	2	19	8	42.1%	0.2031667	1.65	SS-50	0.174	0.208	3.9E-01	NA	Below background
	Benzo(b)fluoranthene	7	7	3,000	2	19	8	42.1%	0.234	2.05	SS-50	0.174	0.208	4.6E-01	4.6E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	19	7	36.8%	0.1905	0.905	SS-50	0.174	0.208	2.1E-01	NA	Below background
	Benzo(k)fluoranthene	70	70	10,000	1	19	7	36.8%	0.1378333	0.872	SS-50	0.174	0.208	2.2E-01	NA	Below background
	Chrysene	70	70	10,000	2	19	8	42.1%	0.2011667	1.8	SS-50	0.174	0.208	4.3E-01	NA	Below background
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	19	1	5.3%	0.221	0.221	SS-50	0.174	0.208	1.0E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	19	9	47.4%	0.193	4.32	SS-50	0.174	0.208	7.9E-01	7.9E-01	Mean
	Fluorene	1,000	1,000	10,000	1	19	3	15.8%	0.291	0.944	SS-52	0.174	0.208	1.6E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	19	7	36.8%	0.199	0.973	SS-50	0.174	0.208	2.4E-01	NA	Below background
	2-Methylnaphthalene	80	300	5,000	0.5	19	1	5.3%	0.274	0.274	SS-52	0.174	0.21	1.0E-01	NA	Below background
	Naphthalene	20	500	10,000	0.5	19	1	5.3%	0.505	0.505	SS-52	0.174	0.21	1.2E-01	1.2E-01	Mean
	Phenanthrene	500	500	10,000	3	19	9	47.4%	0.204	4.3	SS-52	0.174	0.208	8.3E-01	8.3E-01	Mean
	Pyrene	1,000	1,000	10,000	4	19	10	52.6%	0.195	4.79	SS-50	0.174	0.208	8.1E-01	8.1E-01	Mean
PCB Aroclors																
	Total PCBs	1	1	100	NA	29	21	72.4%	0.0702	17.74	HH-13	0.051	0.1	1.4E+00	4.2E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.2E-05	18	18	100.0%	3.1E-07	8.5E-05	HB-22	--	--	1.4E-05	2.6E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	23	10	43.5%	1.18	17.4	HD23	2.61	3.11	3.4E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	23	23	100.0%	6.42	3293	HH-13	--	--	2.1E+02	2.1E+02	Mean
	Cadmium	70	70	1000	2	23	9	39.1%	0.29	4.0	HH-13	0.27	0.35	4.8E-01	4.8E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	22	22	100.0%	1.68	1458	HH-13	--	--	7.8E+01	1.5E+03	Maximum of detects
	Lead	200	200	6,000	100	23	23	100.0%	1.75	928	HD23	--	--	1.1E+02	1.1E+02	Mean
	Mercury	20	20	300	0.3	9	7	77.8%	0.016	0.21	HD-19	0.012	0.07	7.2E-02	NA	Below background
	Nickel	600	600	10,000	20	6	6	100.0%	1.9	9.28	HD23	--	--	4.2E+00	NA	Below background
	Vanadium	400	400	7,000	30	6	4	66.7%	9.82	28.4	HD-19	5.22	5.27	1.2E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	6	6	100.0%	6.73	111.6	HD-19	--	--	5.1E+01	5.1E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

NA - Not available or not applicable.

UCL* - Upper Concentration Limit.

UCL - Upper Cinfidence Limit.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.14. Summary Statistics for Soil Samples - HS-7, 0-3 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PAHs																
	Benzo(a)anthracene	7	7	3,000	2	10	2	20.0%	0.228	0.395	SB-362	0.195	0.62	1.8E-01	NA	Below background
	Benzo(a)pyrene	2	2	300	2	10	2	20.0%	0.216	0.348	SB-362	0.195	0.62	1.7E-01	NA	Below background
	Benzo(b)fluoranthene	7	7	3,000	2	10	3	30.0%	0.269	0.76	HN3+HM3	0.195	0.459	2.3E-01	NA	Below background
	Chrysene	70	70	10,000	2	10	2	20.0%	0.207	0.417	SB-362	0.195	0.62	1.8E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	10	4	40.0%	0.343	0.732	SS-53	0.195	0.62	3.2E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	10	1	10.0%	0.192	0.192	SB-362	0.195	0.62	1.5E-01	NA	Below background
	Phenanthrene	500	500	10,000	3	10	4	40.0%	0.252	0.621	SB-362	0.195	0.62	2.6E-01	NA	Below background
	Pyrene	1,000	1,000	10,000	4	10	4	40.0%	0.27	0.793	SB-362	0.195	0.62	3.0E-01	NA	Below background
PCBs																
	Total PCBs	1	1	100	NS	15	10	66.7%	0.0904	0.776	SB-362	0.0582	0.227	2.5E-01	2.5E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	18	18	100.0%	3.1E-07	8.5E-05	HB-22	--	--	1.4E-05	2.6E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	12	11	91.7%	0.87	9.86	SB-362	3.11	3.11	3.8E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	12	12	100.0%	11	271	SB-362	--	--	7.8E+01	7.8E+01	Mean
	Beryllium	90	90	2,000	0.4	9	1	11.1%	1.11	1.11	SB-362	0.29	0.35	2.6E-01	2.6E-01	Mean
	Cadmium	70	70	1000	2	12	7	58.3%	0.33	2.78	SB-363	0.3	0.33	6.6E-01	6.6E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	12	12	100.0%	3.74	34.1	SB-363	--	--	1.4E+01	1.4E+01	Mean
	Lead	200	200	6,000	100	12	12	100.0%	5.35	487	SB-362	--	--	1.2E+02	1.2E+02	Mean
	Mercury	20	20	300	0.3	12	11	91.7%	0.048	0.213	SB-362	0.07	0.07	9.8E-02	NA	Below background
	Nickel	600	600	10,000	20	9	9	100.0%	4.42	18	SB-362	--	--	7.6E+00	NA	Below background
	Silver	100	100	2,000	0.6	12	1	8.3%	0.22	0.22	HO2.5+HO3	0.06	0.69	2.7E-01	NA	Below background
	Vanadium	400	400	7,000	30	9	9	100.0%	14.3	25.1	SB-362	--	--	1.9E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	9	9	100.0%	20.7	191	SB-362	--	--	7.7E+01	7.7E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.15. Summary Statistics for Soil Samples - HS-8, 0-3 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
EPH																
	C19 - C36 Aliphatics	3,000	3,000	20,000	NA	1	1	100.0%	10	10	VSS-1	--	--	1.0E+01	1.0E+01	Maximum of Detects
	C11 - C22 Aromatics	1,000	1,000	10,000	NA	1	1	100.0%	12	12	VSS-1	--	--	1.2E+01	1.2E+01	Maximum of Detects
SVOCs																
	Benzoic Acid	1,000*	1,000*	NS	1,000*	8	1	12.5%	2.4	2.4	HG10+HG9	0.89	20	2.8E+00	2.4E+00	Maximum of Detects
	Dimethyl phthalate	50	600	10,000	NA	19	2	10.5%	0.35	0.97	HJ5+HK5	0.056	1.3	2.8E-01	2.8E-01	Mean
	Di-n-butylphthalate	NS	NS	NS	NA	19	11	57.9%	0.095	5.6	HJ10	1.8	4	1.0E+00	1.0E+00	Mean
	Butyl benzyl phthalate	NS	NS	NS	NA	19	1	5.3%	0.31	0.31	HJ8+HI8	0.056	1.3	2.4E-01	2.4E-01	Mean
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	19	9	47.4%	0.078	23	HG2.5+HH2.5	0.18	4	3.0E+00	3.0E+00	Mean
	Carbazole	NS	NS	NS	NA	11	6	54.5%	0.11	13	HI2.5+HJ2.5	0.056	0.68	2.0E+00	2.0E+00	Mean
	Dibenzofuran	10*	10*	NS	NA	19	5	26.3%	0.079	7.2	HI2.5+HJ2.5	0.056	1.3	7.2E-01	7.2E-01	Mean
	Acenaphthene	1,000	1,000	10,000	0.5	29	10	34.5%	0.12	113	HF-10B	0.056	1.3	4.9E+00	4.9E+00	Mean
	Acenaphthylene	600	10	10,000	0.5	29	6	20.7%	0.064	10	HG4+HG3	0.056	1.7	7.1E-01	7.1E-01	Mean
	Anthracene	1,000	1,000	10,000	1	29	15	51.7%	0.31	190	HF-10B	0.056	1.3	8.6E+00	8.6E+00	Mean
	Benzo(a)anthracene	7	7	3,000	2	29	24	82.8%	0.23	167	HF-10B	0.199	0.213	1.0E+01	3.6E+01	95% Chebyshev (Mean, Sd) UCL
	Benzo(a)pyrene	2	2	300	2	29	22	75.9%	0.22	133	HF-10B	0.199	1.3	8.5E+00	2.9E+01	95% Chebyshev (Mean, Sd) UCL
	Benzo(b)fluoranthene	7	7	3,000	2	29	22	75.9%	0.3	183	HF-10B	0.199	1.3	1.2E+01	3.9E+01	95% Chebyshev (Mean, Sd) UCL
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	29	15	51.7%	0.092	58.3	HF-10B	0.199	1.3	3.2E+00	3.2E+00	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	29	18	62.1%	0.08	75.7	HF-10B	0.199	1.7	4.3E+00	4.3E+00	Mean
	Chrysene	70	70	10,000	2	29	24	82.8%	0.2	171	HF-10B	0.199	0.213	9.8E+00	9.8E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	29	3	10.3%	1.2	17.2	HF-10B	0.056	1.7	9.4E-01	3.5E+00	95% Chebyshev (Mean, Sd) UCL
	Fluoranthene	1,000	1,000	10,000	4	29	27	93.1%	0.2415	443	HF-10B	0.2	0.213	2.5E+01	2.5E+01	Mean
	Fluorene	1,000	1,000	10,000	1	29	10	34.5%	0.32	121	HF-10B	0.056	1.3	5.0E+00	5.0E+00	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	29	13	44.8%	0.11	56.9	HF-10B	0.062	1.3	3.3E+00	3.3E+00	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	29	5	17.2%	0.07975	47.8	HF-10B	0.056	1.7	2.1E+00	2.1E+00	Mean
	Naphthalene	20	500	10,000	0.5	29	8	27.6%	0.069	76	HF-10B	0.056	1.7	3.4E+00	3.4E+00	Mean
	Phenanthrene	500	500	10,000	3	29	24	82.8%	0.203	710	HF-10B	0.2	1.3	3.3E+01	3.3E+01	Mean
	Pyrene	1,000	1,000	10,000	4	29	28	96.6%	0.2965	280	HF-10B	0.213	0.213	1.8E+01	1.8E+01	Mean
PCB Aroclors																
	Total PCBs	1	1	100	NA	68	60	88.2%	0.143	19.8	HG2.5	0.0545	2.45	3.0E+00	3.9E+00	95% Approximate Gamma UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	2	2	100.0%	1.45E-05	1.9E-04	HG2	--	--	1.0E-04	1.9E-04	Maximum of Detects
Metals																
	Arsenic	20	20	500	20	41	36	87.8%	0.56	35	HK6+HJ6	3	3.31	5.9E+00	5.9E+00	Mean
	Barium	1,000	1,000	10,000	50	41	41	100.0%	21.4	5110	HH8+HG8	--	--	7.4E+02	7.4E+02	Mean
	Cadmium	70	70	1000	2	42	37	88.1%	0.44	29.3	HF-10B	0.3	0.38	4.8E+00	4.8E+00	Mean
	Chromium (III)	1,000	1,000	10,000	30	42	42	100.0%	7.03	741	HJ8+HI8	--	--	1.0E+02	1.0E+02	Mean
	Lead	200	200	6000	100	42	42	100.0%	7.87	16100	HF-10B	--	--	1.2E+03	1.7E+03	95% Approximate Gamma UCL
	Mercury	20	20	300	0.3	39	36	92.3%	0.027	17	HG7+HH7	0.07	0.08	1.0E+00	1.0E+00	Mean
	Nickel	600	600	10000	20	7	7	100.0%	4.64	29	HG2	--	--	9.9E+00	9.9E+00	Mean
	Selenium	400	400	7000	0.5	39	2	5.1%	2.22	3.42	HI7+HJ7	0.1	6.61	9.0E-01	9.0E-01	Mean
	Silver	100	100	2000	0.6	39	19	48.7%	0.16	6.4	HG10+HG9	0.05	0.67	6.6E-01	6.6E-01	Mean
	Vanadium	400	400	7,000	30	7	7	100.0%	12	60	HG2	--	--	2.4E+01	2.4E+01	Mean
	Zinc	1,000	1,000	10,000	100	7	7	100.0%	20.5	580	HG2	--	--	1.5E+02	1.5E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

NA - Not available or applicable.

NS - No standard available for this compound.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection limit (referred to as "ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions were used for results below detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

Background - Background Concentration for natural soil.

EPC - Exposure point concentration.

Table C-2.16. Summary Statistics for Soil Samples - HS-10, 0-3 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Di-n-butylphthalate	NS	NS	NS	NA	9	5	55.6%	0.13	0.39	HB33+HB36	0.17	0.87	3.0E-01	3.0E-01	Mean
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	9	4	44.4%	0.1	0.14	HB33+HB36	0.16	0.87	2.5E-01	1.4E-01	Maximum of detects
	Dibenzofuran	10*	10*	NS	NA	9	1	11.1%	0.7	0.7	HA38+HA40	0.055	0.29	1.4E-01	1.4E-01	Mean
	Acenaphthene	1,000	1,000	10,000	0.5	31	7	22.6%	0.065	1.5	HA38+HA40	0.058	0.61	2.0E-01	2.0E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	31	6	19.4%	0.074	0.63	HA43+HA44	0.058	0.61	1.4E-01	1.4E-01	Mean
	Anthracene	1,000	1,000	10,000	1	31	12	38.7%	0.18	4.12	HRO-30	0.178	0.61	5.0E-01	5.0E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	31	14	45.2%	0.353	10.3	HRO-30	0.178	0.61	1.2E+00	1.2E+00	Mean
	Benzo(a)pyrene	2	2	300	2	31	14	45.2%	0.276	8.37	HRO-30	0.178	0.61	9.6E-01	9.6E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	31	15	48.4%	0.2	8.97	HRO-30	0.178	0.61	1.2E+00	1.2E+00	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	31	11	35.5%	0.27	2.68	HRO-30	0.058	0.61	4.0E-01	4.0E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	31	13	41.9%	0.29	3.53	HRO-30	0.178	0.61	4.3E-01	4.3E-01	Mean
	Chrysene	70	70	10,000	2	31	14	45.2%	0.389	10.4	HRO-30	0.178	0.61	1.1E+00	1.1E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	31	1	3.2%	0.85	0.85	HA38+HA40	0.055	0.61	1.2E-01	1.2E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	31	14	45.2%	0.23	23	HA38+HA40	0.057	0.61	2.4E+00	2.4E+00	Mean
	Fluorene	1,000	1,000	10,000	1	31	6	19.4%	0.1	1.98	HRO-30	0.058	0.61	2.2E-01	2.2E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	31	12	38.7%	0.3	3.41	HRO-30	0.06	0.61	4.6E-01	4.6E-01	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	31	3	9.7%	0.53	1.27	HRO-30	0.055	0.61	1.6E-01	1.6E-01	Mean
	Naphthalene	20	500	10,000	0.5	33	3	9.1%	0.45	0.68	HA38+HA40	0.055	0.61	1.4E-01	1.4E-01	Mean
	Phenanthrene	500	500	10,000	3	31	14	45.2%	0.53	22.2	HRO-30	0.178	0.61	2.4E+00	2.4E+00	Mean
	Pyrene	1,000	1,000	10,000	4	31	15	48.4%	0.27	26.7	HRO-30	0.178	0.61	2.8E+00	2.8E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	82	53	64.6%	0.00555	11	TREE-HS-2	0.035	2.22	7.9E-01	1.6E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	18	18	100.0%	3.1E-07	8.5E-05	HB-22	--	--	1.4E-05	2.6E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	58	30	51.7%	2.15	65.2	HRK-33A	2.5	4.5	5.3E+00	5.3E+00	Mean
	Barium	1,000	1,000	10,000	50	58	58	100.0%	5.5	7000	TREE-TI-3	--	--	3.3E+02	3.3E+02	Mean
	Beryllium	90	90	2,000	0.4	17	2	11.8%	0.27	0.52	SB-272	0.26	0.45	1.8E-01	1.8E-01	Mean
	Cadmium	70	70	1000	2	58	32	55.2%	0.27	6.53	HB-23	0.26	0.45	9.8E-01	9.8E-01	Mean
	Chromium (III)	1000	1000	10000	30	58	58	100.0%	2.1	390	TREE-TI-3	--	--	2.9E+01	2.9E+01	Mean
	Lead	200	200	6000	100	59	59	100.0%	4.76	3000	TREE-TI-3	--	--	2.6E+02	3.5E+02	95% Approximate Gamma UCL
	Mercury	20	20	300	0.3	26	19	73.1%	0.014	0.799	HB41+HB42	0.01	0.065	1.2E-01	1.2E-01	Mean
	Nickel	600	600	10000	20	17	17	100.0%	3.1	22	SB-272	--	--	5.6E+00	5.6E+00	Mean
	Silver	100	100	2000	0.6	26	6	23.1%	0.15	7.99	SB-272	0.3	0.89	5.8E-01	5.8E-01	Mean
	Vanadium	400	400	7,000	30	17	12	70.6%	5.32	44.2	SB-272	5.2	5.24	1.2E+01	1.2E+01	Mean
	Zinc	1,000	1,000	10,000	100	17	17	100.0%	13	89.6	SB-359	--	--	3.1E+01	3.1E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

NA - Not available.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EPC - Exposure Point Concentration.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

* - TRC-developed standard.

Table C-2.17. Summary Statistics for Soil Samples - HS-2, 0-6 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
VOCs																
	1,2,4-Trichlorobenzene	6	700	10,000	NA	2	1	50.0%	0.17	0.17	HRI29	0.062	0.062	1.0E-01	1.7E-01	Maximum of detects
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	2	1	50.0%	0.21	0.21	HRI29	0.062	0.062	1.2E-01	2.1E-01	Maximum of detects
PAHs																
	Acenaphthene	1,000	1,000	10,000	0.5	61	6	9.8%	0.184	1.93	SS-24	0.17	0.933	1.6E-01	1.6E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	61	4	6.6%	0.193	2.4	SS-24	0.17	0.933	1.5E-01	1.5E-01	Mean
	Anthracene	1,000	1,000	10,000	1	61	14	23.0%	0.15425	4.11	SS-24	0.17	0.212	3.3E-01	3.3E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	61	22	36.1%	0.21	6.33	SS-24	0.17	0.212	6.1E-01	6.1E-01	Mean
	Benzo(a)pyrene	2	2	300	2	61	22	36.1%	0.214	5.28	SS-24	0.17	0.212	5.3E-01	5.3E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	61	20	32.8%	0.186	6.09	SS-24	0.17	0.212	5.7E-01	5.7E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	61	20	32.8%	0.2	3.13	SS-21	0.17	0.212	3.6E-01	3.6E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	61	15	24.6%	0.14675	2.42	SS-24	0.17	0.933	2.7E-01	2.7E-01	Mean
	Chrysene	70	70	10,000	2	61	22	36.1%	0.212	5.98	SS-24	0.17	0.212	5.9E-01	5.9E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	61	7	11.5%	0.204	0.78	SS-24	0.17	0.933	1.4E-01	1.4E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	61	26	42.6%	0.218	12.1	SS-24	0.17	0.212	1.2E+00	1.2E+00	Mean
	Fluorene	1,000	1,000	10,000	1	61	8	13.1%	0.208	3.2	SS-24	0.17	0.933	2.1E-01	2.1E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	61	21	34.4%	0.181	3.41	SS-21	0.17	0.212	4.2E-01	4.2E-01	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	61	3	4.9%	0.392	1.52	SS-24	0.17	0.933	1.3E-01	1.3E-01	Mean
	Naphthalene	20	500	10,000	0.5	63	5	7.9%	0.15	2.55	SS-24	0.17	0.933	1.6E-01	1.6E-01	Mean
	Phenanthrene	500	500	10,000	3	61	23	37.7%	0.193	18.9	SS-24	0.17	0.212	1.3E+00	1.3E+00	Mean
	Pyrene	1,000	1,000	10,000	4	61	27	44.3%	0.15275	11.2	SS-24	0.17	0.212	1.2E+00	1.2E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	88	46	52.3%	0.0233	4.93	SS-19	0.05	0.31	4.5E-01	4.5E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	71	39	54.9%	1.61	22.1	SB-367	2.55	3.06	3.5E+00	3.5E+00	Mean
	Barium	1,000	1,000	10,000	50	71	70	98.6%	6.64	783	SB-366	5.18	5.18	8.8E+01	8.8E+01	Mean
	Beryllium	90	90	2,000	0.4	58	6	10.3%	0.2175	0.82	SS-29	0.26	0.33	1.8E-01	1.8E-01	Mean
	Cadmium	70	70	1000	2	71	26	36.6%	0.2225	9.17	SB-366	0.26	0.4	6.1E-01	6.1E-01	Mean
	Chromium (III)	1,000	1,000	2,000	30	71	71	100.0%	1.92	68.1	SS-19	--	--	1.3E+01	1.3E+01	Mean
	Lead	200	200	6,000	100	71	68	95.8%	0.87	2360	SB-366	0.35	0.81	1.5E+02	6.0E+02	95% H-UCL
	Mercury	20	20	300	0.3	62	45	72.6%	0.016	1.02	SS-26	0.013	0.08	1.3E-01	1.3E-01	Mean
	Nickel	600	600	10,000	20	58	58	100.0%	1.52	49.3	SB-367	--	--	9.3E+00	9.3E+00	Mean
	Silver	100	100	2,000	0.6	62	47	75.8%	0.54	5.89	SS-19	0.33	0.7	1.5E+00	1.5E+00	Mean
	Vanadium	400	400	7,000	30	58	42	72.4%	5.34	59.3	SS-20	5.1	5.52	1.5E+01	1.5E+01	Mean
	Zinc	1,000	1,000	10,000	100	58	58	100.0%	4.57	958	SB-366	--	--	8.8E+01	8.8E+01	Mean
GRO																
	Gasoline Range Organics	1,000	1,000	10,000	NA	3	3	100.0%	9.4	17.3	HRG25	--	--	1.5E+01	1.5E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

VOCs - Volatile Organic Compounds.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

GRO - Gasoline-Range Organics.

* TRC-developed standard.

NA - Not available.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.18. Summary Statistics for Soil Samples - HS-3, 0-6 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
VOCs																
	Benzene	40	40	10,000	NA	1	1	100.0%	0.036	0.036	HRJ.75-17	--	--	3.6E-02	3.6E-02	Maximum of detects
	Toluene	500	500	10,000	NA	1	1	100.0%	0.041	0.041	HRJ.75-17	--	--	4.1E-02	4.1E-02	Maximum of detects
	1,2,4-Trimethylbenzene	100(1)	100(1)	5000 (1)	NA	1	1	100.0%	0.046	0.046	HRJ.75-17	--	--	4.6E-02	4.6E-02	Maximum of detects
PAHs																
	Acenaphthene	1,000	1,000	10,000	0.5	16	2	12.5%	0.259	0.332	HRK-21	0.175	0.301	1.2E-01	NA	Below background
	Acenaphthylene	600	10	10,000	0.5	16	1	6.3%	0.482	0.482	SS-37	0.175	0.301	1.3E-01	NA	Below background
	Anthracene	1,000	1,000	10,000	1	16	4	25.0%	0.362	4.23	SS-37	0.175	0.301	4.6E-01	4.6E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	16	5	31.3%	0.258	6.12	SS-37	0.175	0.301	7.7E-01	7.7E-01	Mean
	Benzo(a)pyrene	2	2	300	2	16	5	31.3%	0.317	6.76	SS-37	0.175	0.301	7.9E-01	7.9E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	16	5	31.3%	0.382	7.26	SS-37	0.175	0.301	8.7E-01	8.7E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	16	5	31.3%	0.303	3.92	SS-37	0.175	0.301	5.0E-01	5.0E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	16	4	25.0%	0.494	1.212	SS-37	0.175	0.301	2.8E-01	2.8E-01	Mean
	Chrysene	70	70	10,000	2	16	5	31.3%	0.323	5.45	SS-37	0.175	0.301	7.4E-01	7.4E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	16	4	25.0%	0.217	0.552	SS-37	0.175	0.301	1.6E-01	1.6E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	16	6	37.5%	0.275	17.1	SS-37	0.175	0.301	1.7E+00	1.7E+00	Mean
	Fluorene	1,000	1,000	10,000	1	16	2	12.5%	0.453	0.792	SS-37	0.175	0.301	1.7E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	16	5	31.3%	0.305	5.32	SS-37	0.175	0.301	6.2E-01	6.2E-01	Mean
	Naphthalene	20	500	10,000	0.5	17	3	17.6%	0.176	11	HRJ.75-17	0.175	0.301	7.6E-01	7.6E-01	Mean
	Phenanthrene	500	500	10,000	3	16	5	31.3%	0.254	18.2	SS-37	0.175	0.301	1.8E+00	1.8E+00	Mean
	Pyrene	1,000	1,000	10,000	4	16	7	43.8%	0.193	13.8	SS-37	0.175	0.301	1.6E+00	1.6E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	31	13	41.9%	0.0631	1.11	SS-38	0.039	0.25	1.8E-01	1.8E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	19	13	68.4%	1.61	16	SS-38	2.62	2.93	5.0E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	20	20	100.0%	5.94	801	SS-38	--	--	1.7E+02	1.7E+02	Mean
	Beryllium	90	90	2,000	0.4	11	3	27.3%	0.43	0.97	SB-360	0.27	0.3	3.0E-01	3.0E-01	Mean
	Cadmium	70	70	1000	2	19	10	52.6%	0.36	1.53	SS-40	0.27	0.38	5.1E-01	NA	Below background
	Chromium (III)	1,000	1,000	10,000	30	20	20	100.0%	2.2	18	SS-38	--	--	7.6E+00	NA	Below background
	Lead	200	200	6,000	100	21	21	100.0%	2.93	6870	SB-360	--	--	5.2E+02	1.2E+03	95% Adjusted Gamma UCL
	Mercury	20	20	300	0.3	14	10	71.4%	0.026	0.654	SS-40	0.013	0.08	1.6E-01	1.6E-01	Mean
	Nickel	600	600	10,000	20	11	11	100.0%	2.23	21.5	SB-360	--	--	6.5E+00	6.5E+00	Mean
	Silver	100	100	2,000	0.6	14	9	64.3%	0.52	2.38	SS-37	0.35	0.91	8.2E-01	8.2E-01	Mean
	Vanadium	400	400	7,000	30	11	9	81.8%	7.92	49.4	SB-360	5.23	5.24	1.4E+01	1.4E+01	Mean
	Zinc	1,000	1,000	10,000	100	11	11	100.0%	8.18	506	SS-40	--	--	1.4E+02	1.4E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

NA - Not available or not applicable.

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

VOCs - Volatile Organic Compounds.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

GRO - Gasoline-Range Organics.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

(1) - Values for C9-C10 aromatics used.

Table C-2.19. Summary Statistics for Soil Samples - HS-4, 0-6 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	NA	4	1	25.0%	0.078	0.078	HH43+HI42	0.057	0.06	4.2E-02	7.8E-02	Maximum of detects
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	4	1	25.0%	0.076	0.076	HJ44+HI43	0.17	0.19	8.7E-02	7.6E-02	Maximum of detects
	Acenaphthene	1,000	1,000	10,000	0.5	18	2	11.1%	0.31	0.58875	SB-365	0.059	2.1	1.8E-01	1.8E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	18	3	16.7%	0.11	8.9	HF40	0.06	0.4745	5.9E-01	5.9E-01	Mean
	Anthracene	1,000	1,000	10,000	1	18	5	27.8%	0.14	4	HF44+HG44	0.064	0.45	6.0E-01	6.0E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	18	8	44.4%	0.15	7.9	HF44+HG44	0.176	0.207	1.2E+00	1.2E+00	Mean
	Benzo(a)pyrene	2	2	300	2	18	7	38.9%	0.271	13	HF40	0.064	0.207	1.5E+00	1.5E+00	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	18	10	55.6%	0.2	12	HF40	0.176	0.207	1.7E+00	1.7E+00	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	18	5	27.8%	0.27	8.6	HF40	0.064	0.45	7.3E-01	7.3E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	18	5	27.8%	0.25	4.1	HF40	0.064	0.45	5.8E-01	5.8E-01	Mean
	Chrysene	70	70	10,000	2	18	9	50.0%	0.16	9.6	HF40	0.176	0.207	1.3E+00	1.3E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	18	1	5.6%	0.71	0.71	HF44+HG44	0.059	2.1	2.0E-01	2.0E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	18	9	50.0%	0.27	30	HF40	0.176	0.207	3.2E+00	3.2E+00	Mean
	Fluorene	1,000	1,000	10,000	1	18	3	16.7%	0.22	2.3	HF40	0.059	0.45	2.5E-01	2.5E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	18	4	22.2%	0.47	7.9	HF40	0.06	0.45	6.9E-01	6.9E-01	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	18	1	5.6%	0.079	0.079	HF44+HG44	0.059	2.1	1.5E-01	NA	Below background
	Naphthalene	20	500	10,000	0.5	18	2	11.1%	0.092	17	HF40	0.059	0.4745	1.0E+00	1.0E+00	Mean
	Phenanthrene	500	500	10,000	3	18	10	55.6%	0.22	37	HF40	0.176	0.207	2.9E+00	2.9E+00	Mean
	Pyrene	1,000	1,000	10,000	4	18	10	55.6%	0.258	27	HF40	0.176	0.207	3.0E+00	3.0E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	44	24	54.5%	0.0243	12	HF40	0.05	2.63	7.8E-01	2.0E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Antimony	20	20	300	1	10	1	10.0%	7.1	7.1	HF40	4.27	5.69	2.9E+00	2.9E+00	Mean
	Arsenic	20	20	500	20	20	14	70.0%	2.2	53.4	SB-365	2.64	3.01	6.7E+00	6.7E+00	Mean
	Barium	1,000	1,000	10,000	50	20	20	100.0%	10.9	1127.5	SB-365	--	--	1.7E+02	1.7E+02	Mean
	Beryllium	90	90	2,000	0.4	12	2	16.7%	0.48	0.81	HF-31D	0.26	0.36	2.3E-01	2.3E-01	Mean
	Cadmium	70	70	1000	2	32	16	50.0%	0.19	5.59	SB-365	0.26	0.37	7.7E-01	7.7E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	20	20	100.0%	2.04	96	SS-12	--	--	1.6E+01	1.6E+01	Mean
	Lead	200	200	6,000	100	32	32	100.0%	3.05	1590	SB-365	--	--	2.2E+02	3.4E+02	95% Adjusted Gamma UCL
	Mercury	20	20	300	0.3	18	16	88.9%	0.04	0.632	SB-365	0.014	0.07	1.4E-01	1.4E-01	Mean
	Nickel	600	600	10,000	20	12	12	100.0%	2.28	46.3	SB-365	--	--	1.2E+01	1.2E+01	Mean
	Silver	100	100	2,000	0.6	18	4	22.2%	1.2	3.94	SB-267	0.32	0.63	7.5E-01	7.5E-01	Mean
	Vanadium	400	400	7,000	30	12	11	91.7%	9.87	219	SB-365	5.34	5.34	3.1E+01	3.1E+01	Mean
	Zinc	1,000	1,000	10,000	100	12	12	100.0%	16.3	992.5	SB-365	--	--	1.7E+02	1.7E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

NA - Not available.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EPC - Exposure Point Concentration.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

* - TRC-developed standard.

Table C-2.20. Summary Statistics for Soil Samples - HS-6, 0-6 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Acenaphthene	1,000	1,000	10,000	0.5	20	4	20.0%	0.217	0.59	HF14	0.174	0.208	1.5E-01	1.5E-01	Mean
	Anthracene	1,000	1,000	10,000	1	20	7	35.0%	0.2201667	1.62	SS-52	0.174	0.208	3.1E-01	3.1E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	20	9	45.0%	0.2008333	2.4	HF14	0.174	0.208	5.4E-01	5.4E-01	Mean
	Benzo(a)pyrene	2	2	300	2	20	9	45.0%	0.2031667	2.2	HF14	0.174	0.208	4.8E-01	4.8E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	20	9	45.0%	0.234	3.1	HF14	0.174	0.208	5.9E-01	5.9E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	20	8	40.0%	0.1905	0.905	SS-50	0.174	0.208	2.4E-01	NA	Below background
	Benzo(k)fluoranthene	70	70	10,000	1	20	8	40.0%	0.1378333	1.2	HF14	0.174	0.208	2.7E-01	2.7E-01	Mean
	Chrysene	70	70	10,000	2	20	9	45.0%	0.2011667	2.7	HF14	0.174	0.208	5.5E-01	5.5E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	20	1	5.0%	0.221	0.221	SS-50	0.174	0.46	1.1E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	20	10	50.0%	0.193	5.6	HF14	0.174	0.208	1.0E+00	1.0E+00	Mean
	Fluorene	1,000	1,000	10,000	1	20	4	20.0%	0.291	0.944	SS-52	0.174	0.208	1.8E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	20	8	40.0%	0.199	0.973	SS-50	0.174	0.208	2.8E-01	NA	Below background
	2-Methylnaphthalene	80	300	5,000	0.5	20	1	5.0%	0.274	0.274	SS-52	0.174	0.46	1.1E-01	NA	Below background
	Naphthalene	20	500	10,000	0.5	20	2	10.0%	0.5	0.505	SS-52	0.174	0.21	1.3E-01	1.3E-01	Mean
	Phenanthrene	500	500	10,000	3	20	10	50.0%	0.204	4.4	HF14	0.174	0.208	1.0E+00	1.0E+00	Mean
	Pyrene	1,000	1,000	10,000	4	20	11	55.0%	0.195	4.79	SS-50	0.174	0.208	8.7E-01	8.7E-01	Mean
PCB Aroclors																
	Total PCBs	1	1	100	NA	30	22	73.3%	0.0702	17.74	HH-13	0.051	0.1	1.4E+00	4.1E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	24	11	45.8%	1.18	17.4	HD23	2.61	3.11	3.8E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	24	24	100.0%	6.42	4400	HF14	--	--	3.8E+02	3.8E+02	Mean
	Beryllium	90	90	2,000	0.4	7	1	14.3%	0.48	0.48	HF14	0.27	0.32	1.9E-01	1.9E-01	Mean
	Cadmium	70	70	1000	2	24	10	41.7%	0.29	4.0	HH-13	0.27	0.35	5.2E-01	5.2E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	23	23	100.0%	1.68	1458	HH-13	--	--	9.5E+01	9.5E+01	Mean
	Lead	200	200	6,000	100	24	24	100.0%	1.75	928	HD23	--	--	1.4E+02	1.4E+02	Mean
	Mercury	20	20	300	0.3	10	8	80.0%	0.016	0.34	HF14	0.012	0.07	9.9E-02	9.9E-02	Mean
	Nickel	600	600	10,000	20	7	7	100.0%	1.9	49	HF14	--	--	1.1E+01	1.1E+01	Mean
	Vanadium	400	400	7,000	30	7	5	71.4%	9.82	210	HF14	5.22	5.27	4.1E+01	4.1E+01	Mean
	Zinc	1,000	1,000	10,000	100	7	7	100.0%	6.73	360	HF14	--	--	9.5E+01	9.5E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

NA - Not available or not applicable.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.21. Summary Statistics for Soil Samples - HS-7, 0-6 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PAHs																
	Benzo(a)anthracene	7	7	3,000	2	12	3	25.0%	0.228	0.395	SB-362	0.184	0.62	1.8E-01	NA	Below background
	Benzo(a)pyrene	2	2	300	2	12	3	25.0%	0.215	0.348	SB-362	0.184	0.62	1.7E-01	NA	Below background
	Benzo(b)fluoranthene	7	7	3,000	2	12	4	33.3%	0.244	0.76	HN3+HM3	0.184	0.459	2.2E-01	NA	Below background
	Chrysene	70	70	10,000	2	12	3	25.0%	0.207	0.417	SB-362	0.184	0.62	1.8E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	12	5	41.7%	0.343	0.732	SS-53	0.184	0.62	3.1E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	12	1	8.3%	0.192	0.192	SB-362	0.184	0.62	1.4E-01	NA	Below background
	Phenanthrene	500	500	10,000	3	12	5	41.7%	0.252	0.621	SB-362	0.184	0.62	2.6E-01	NA	Below background
	Pyrene	1,000	1,000	10,000	4	12	5	41.7%	0.27	0.793	SB-362	0.184	0.62	3.0E-01	NA	Below background
PCBs																
	Total PCBs	1	1	100	NS	17	11	64.7%	0.0904	0.776	SB-362	0.0528	0.227	2.3E-01	2.3E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	14	12	85.7%	0.87	9.86	SB-362	2.75	3.11	3.8E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	14	14	100.0%	8.77	271	SB-362	--	--	8.6E+01	8.6E+01	Mean
	Beryllium	90	90	2,000	0.4	11	2	18.2%	0.7	1.11	SB-362	0.28	0.35	2.9E-01	2.9E-01	Mean
	Cadmium	70	70	1000	2	14	8	57.1%	0.33	2.78	SB-363	0.28	0.33	6.7E-01	6.7E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	14	14	100.0%	3.63	34.1	SB-363	--	--	1.4E+01	1.4E+01	Mean
	Lead	200	200	6,000	100	14	14	100.0%	1	487	SB-362	--	--	1.4E+02	3.1E+02	95% Adjusted Gamma UCL
	Mercury	20	20	300	0.3	14	12	85.7%	0.048	0.213	SB-362	0.016	0.07	9.3E-02	NA	Below background
	Nickel	600	600	10,000	20	11	11	100.0%	2.36	18	SB-362	--	--	7.4E+00	NA	Below background
	Silver	100	100	2,000	0.6	14	1	7.1%	0.22	0.22	HO2.5+HO3	0.06	0.69	2.8E-01	NA	Below background
	Vanadium	400	400	7,000	30	11	11	100.0%	5.62	25.1	SB-362	--	--	1.8E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	11	11	100.0%	7.66	264	SB-362	--	--	8.7E+01	8.7E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.22. Summary Statistics for Soil Samples - HS-8, 0-6 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
VOCs																
	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	5,000[1]	NA	1	1	100.0%	1.2	1.2	HG2	--	--	1.2E+00	1.2E+00	Maximum of Detects
VPH																
	C9-C10 Aromatics	100	100	5000	NA	1	1	100.0%	51	51	HG2	--	--	5.1E+01	5.1E+01	Maximum of Detects
	C9-C12 Aliphatics	1,000	1,000	20,000	NA	1	1	100.0%	25	25	HG2	--	--	2.5E+01	2.5E+01	Maximum of Detects
EPH																
	C19 - C36 Aliphatics	3,000	3,000	20,000	NA	2	2	100.0%	10	160	HG2	--	--	8.5E+01	1.6E+02	Maximum of Detects
	C11 - C22 Aromatics	1,000	1,000	10,000	NA	2	2	100.0%	12	120	HG2	--	--	6.6E+01	1.2E+02	Maximum of Detects
SVOCs																
	Benzoic Acid	1,000*	1,000*	NS	1,000*	8	1	12.5%	2.4	2.4	HG10+HG9	0.89	20	2.8E+00	2.4E+00	Maximum of Detects
	Dimethyl phthalate	50	600	10,000	NA	19	2	10.5%	0.35	0.97	HJ5+HK5	0.056	1.3	2.8E-01	2.8E-01	Mean
	Di-n-butylphthalate	NS	NS	NS	NA	19	11	57.9%	0.095	5.6	HJ10	1.8	4	1.0E+00	1.0E+00	Mean
	Butyl benzyl phthalate	NS	NS	NS	NA	19	1	5.3%	0.31	0.31	HJ8+HI8	0.056	1.3	2.4E-01	2.4E-01	Mean
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	19	9	47.4%	0.078	23	HG2.5+HH2.5	0.18	4	3.0E+00	3.0E+00	Mean
	Carbazole	NS	NS	NS	NA	11	6	54.5%	0.11	13	HI2.5+HJ2.5	0.056	0.68	2.0E+00	2.0E+00	Mean
	Dibenzofuran	10*	10*	NS	NA	19	5	26.3%	0.079	7.2	HI2.5+HJ2.5	0.056	1.3	7.2E-01	7.2E-01	Mean
	Acenaphthene	1,000	1,000	10,000	0.5	31	10	32.3%	0.12	113	HF-10B	0.056	1.3	4.6E+00	4.6E+00	Mean
	Acenaphthylene	600	10	10,000	0.5	31	6	19.4%	0.064	10	HG4+HG3	0.056	1.7	6.8E-01	6.8E-01	Mean
	Anthracene	1,000	1,000	10,000	1	31	16	51.6%	0.31	190	HF-10B	0.056	1.3	8.1E+00	8.1E+00	Mean
	Benzo(a)anthracene	7	7	3,000	2	31	25	80.6%	0.23	167	HF-10B	0.199	0.238	9.9E+00	3.4E+01	95% Chebyshev (Mean, Sd) UCL
	Benzo(a)pyrene	2	2	300	2	31	23	74.2%	0.22	133	HF-10B	0.199	1.3	8.0E+00	2.7E+01	95% Chebyshev (Mean, Sd) UCL
	Benzo(b)fluoranthene	7	7	3,000	2	31	23	74.2%	0.3	183	HF-10B	0.199	1.3	1.1E+01	3.7E+01	97.5% Chebyshev (Mean, Sd) UCL
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	31	16	51.6%	0.092	58.3	HF-10B	0.199	1.3	3.0E+00	3.0E+00	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	31	19	61.3%	0.08	75.7	HF-10B	0.199	1.7	4.0E+00	4.0E+00	Mean
	Chrysene	70	70	10,000	2	31	25	80.6%	0.2	171	HF-10B	0.199	0.238	9.3E+00	9.3E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	31	3	9.7%	1.2	17.2	HF-10B	0.056	1.7	8.9E-01	3.3E+00	95% Chebyshev (Mean, Sd) UCL
	Fluoranthene	1,000	1,000	10,000	4	31	28	90.3%	0.2415	443	HF-10B	0.2	0.238	2.4E+01	2.4E+01	Mean
	Fluorene	1,000	1,000	10,000	1	31	11	35.5%	0.32	121	HF-10B	0.056	1.3	4.7E+00	4.7E+00	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	31	14	45.2%	0.11	56.9	HF-10B	0.062	1.3	3.1E+00	3.1E+00	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	31	5	16.1%	0.07975	47.8	HF-10B	0.056	1.7	2.0E+00	2.0E+00	Mean
	Naphthalene	20	500	10,000	0.5	31	8	25.8%	0.069	76	HF-10B	0.056	1.7	3.2E+00	7.6E+01	Maximum of Detects
	Phenanthrene	500	500	10,000	3	31	25	80.6%	0.203	710	HF-10B	0.2	1.3	3.1E+01	3.1E+01	Mean
	Pyrene	1,000	1,000	10,000	4	31	29	93.5%	0.2965	280	HF-10B	0.213	0.238	1.7E+01	1.7E+01	Mean
PCB Aroclors																
	Total PCBs	1	1	100	NA	70	62	88.6%	0.143	19.8	HG2.5	0.0545	2.45	3.0E+00	3.8E+00	95% Approximate Gamma UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	3	3	100.0%	1.45E-05	1.9E-04	HG2	--	--	1.1E-04	1.9E-04	Maximum of Detects
Metals																
	Arsenic	20	20	500	20	43	38	88.4%	0.56	59.8	SB-350	3	3.31	7.0E+00	7.0E+00	Mean
	Barium	1,000	1,000	10,000	50	43	43	100.0%	21.4	7430	SB-350	--	--	8.8E+02	8.8E+02	Mean
	Beryllium	90	90	2,000	0.4	9	1	11.1%	0.61	0.61	SB-350	0.3	0.34	2.1E-01	2.1E-01	Mean
	Cadmium	70	70	1000	2	44	39	88.6%	0.44	29.3	HF-10B	0.3	0.38	4.7E+00	4.7E+00	Mean
	Chromium (III)	1,000	1,000	10,000	30	44	44	100.0%	7.03	1370	SB-350	--	--	1.3E+02	1.3E+02	Mean
	Lead	200	200	6000	100	44	44	100.0%	7.87	16100	SB-350	--	--	1.1E+03	1.6E+03	95% Approximate Gamma UCL
	Mercury	20	20	300	0.3	41	38	92.7%	0.027	17	HG7+HH7	0.07	0.08	1.0E+00	1.0E+00	Mean
	Nickel	600	600	10000	20	9	9	100.0%	4.64	167	SB-350	--	--	2.9E+01	2.9E+01	Mean
	Selenium	400	400	7000	0.5	41	2	4.9%	2.22	3.42	HI7+HJ7	0.1	7.12	1.0E+00	1.0E+00	Mean
	Silver	100	100	2000	0.6	41	20	48.8%	0.16	31.5	SB-350	0.05	0.67	1.4E+00	1.4E+00	Mean
	Vanadium	400	400	7,000	30	9	9	100.0%	12	602	SB-350	--	--	8.9E+01	8.9E+01	Mean
	Zinc	1,000	1,000	10,000	100	9	9	100.0%	20.5	1300	SB-350	--	--	3.0E+02	3.0E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

NA - Not available or applicable.

NS - No standard available for this compound.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection limit (referred to as "ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions were used for results below detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

Background - Background Concentration for natural soil.

EPC - Exposure point concentration.

Table C-2.23. Summary Statistics for Soil Samples - HS-9, 0-6 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
EPH																
	C19 - C36 Aliphatics	3,000	3,000	20,000	NA	2	2	100.0%	59	76	VSS-3	--	--	6.8E+01	7.6E+01	Maximum of detects
	C11 - C22 Aromatics	1,000	1,000	10,000	NA	2	1	50.0%	31	31	VSS-13	10	10	1.8E+01	3.1E+01	Maximum of detects
SVOCs																
	4-Methylphenol	200*	5*	NA	NA	9	1	11.1%	0.074	0.074	HA29+HB29	0.051	0.6	1.3E-01	7.4E-02	Maximum of detects
	Dimethyl phthalate	50	600	10,000	NA	16	2	12.5%	0.57	1.5	HC16+HC15+HC14	0.051	2.1	3.2E-01	3.2E-01	Mean
	Di-n-butylphthalate	NS	NS	NA	NA	2	1	50.0%	0.35	0.35	VSS-3	0.4	0.4	2.8E-01	3.5E-01	Maximum of detects
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	16	6	37.5%	0.1	21	HD13+HD14+HD15	0.78	4.3	2.0E+00	2.0E+00	Mean
	Dibenzofuran	10*	10*	NA	NA	16	7	43.8%	0.25	1.2	HC16+HC15+HC14	0.051	2.1	4.5E-01	4.5E-01	Mean
	Acenaphthene	1,000	1,000	10,000	0.5	45	15	33.3%	0.21975	4.16	SB-364	0.051	2.115	5.9E-01	5.9E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	45	13	28.9%	0.12	2.9	HB12+HB16	0.051	2.115	5.2E-01	5.2E-01	Mean
	Anthracene	1,000	1,000	10,000	1	45	24	53.3%	0.293	16.8	SB-364	0.051	2.1	1.7E+00	1.7E+00	Mean
	Benzo(a)anthracene	7	7	3,000	2	45	30	66.7%	0.073	31.25	SB-274	0.174	2.1	4.1E+00	4.1E+00	Mean
	Benzo(a)pyrene	2	2	300	2	45	29	64.4%	0.228	30	HC16+HC15+HC14	0.051	2.1	3.7E+00	5.5E+00	95% Adjusted Gamma UCL
	Benzo(b)fluoranthene	7	7	3,000	2	45	29	64.4%	0.058	42	HC16+HC15+HC14	0.174	2.1	4.3E+00	4.3E+00	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	45	26	57.8%	0.3175	18.25	SB-274	0.174	2.1	2.0E+00	2.0E+00	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	45	25	55.6%	0.334	15.1	SB-274	0.051	2.1	2.0E+00	2.0E+00	Mean
	Chrysene	70	70	10,000	2	45	30	66.7%	0.054	32.3	SB-274	0.174	2.1	3.9E+00	3.9E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	45	18	40.0%	0.20725	5.45	SB-274	0.06	2.1	6.1E-01	6.1E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	45	34	75.6%	0.13	85.5	SB-274	0.174	1.96	8.3E+00	8.3E+00	Mean
	Fluorene	1,000	1,000	10,000	1	45	18	40.0%	0.26425	5.09	SB-364	0.051	2.1	7.1E-01	7.1E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	45	25	55.6%	0.272	20.8	SB-274	0.051	2.1	2.2E+00	2.2E+00	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	36	7	19.4%	0.096	2.32	SB-364	0.051	2.115	3.6E-01	3.6E-01	Mean
	Naphthalene	20	500	10,000	0.5	46	14	30.4%	0.13	40	COMP SS-13-V,W, X, Y	0.051	2.115	1.4E+00	1.4E+00	Mean
	Phenanthrene	500	500	10,000	3	45	32	71.1%	0.12	59.6	SB-364	0.174	1.96	5.9E+00	5.9E+00	Mean
	Pyrene	1,000	1,000	10,000	4	45	34	75.6%	0.2	64	HC16+HC15+HC14	0.174	1.96	8.1E+00	8.1E+00	Mean
PCB Aroclors																
	Total PCBs	1	1	100	NA	124	83	66.9%	0.0436	40	HRC-33	0.0351	2.49	2.2E+00	4.1E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.2E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
GRO																
	Gasoline Range Organics	1,000	1,000	10,000	NA	1	1	100.0%	12.3	12.3	HRA33	--	--	1.2E+01	1.2E+01	Maximum of detects
Metals																
	Antimony	20	20	300	1	24	1	4.2%	226	226	SB-285	4.18	20.9	1.3E+01	2.3E+02	Maximum of detects
	Arsenic	20	20	500	20	55	48	87.3%	1.52	94	HD13+HD14+HD15	2.61	13.1	1.8E+01	2.2E+01	95% Adjusted Gamma UCL
	Barium	1,000	1,000	10,000	50	55	55	100.0%	5.9	15400	HC16+HC15+HC14	--	--	9.1E+02	9.1E+02	Mean
	Beryllium	90	90	2,000	0.4	36	17	47.2%	0.38	1.45	SB-303	0.27	1.31	5.0E-01	5.0E-01	Mean
	Cadmium	70	70	1000	2	57	48	84.2%	0.46	84.3	SB-287	0.27	1.05	5.2E+00	5.2E+00	Mean
	Chromium (III)	1,000	1,000	10,000	30	55	54	98.2%	2.06	2050	HD13+HD14+HD15	2.1	2.1	1.1E+02	1.1E+02	Mean
	Lead	200	200	6,000	100	92	92	100.0%	2.97	11000	SS-13-W	--	--	1.5E+03	2.4E+03	95% Chebyshev (Mean, Sd) UCL
	Mercury	20	20	300	0.3	52	45	86.5%	0.018	76	COMP SS-13-E,L,K,B	0.015	0.115	2.1E+00	2.1E+00	Mean
	Nickel	600	600	10,000	20	36	35	97.2%	2.24	113	SB-274	2.1	2.1	2.3E+01	2.3E+01	Mean
	Selenium	400	400	7,000	0.5	52	1	1.9%	2.15	2.15	COMP SS-13-AS,AT,AU,AV	0.64	26.1	3.0E+00	3.0E+00	Mean
	Silver	100	100	2,000	0.6	52	44	84.6%	0.4475	75	HB26	0.32	2.1	6.8E+00	6.8E+00	Mean
	Vanadium	400	400	7,000	30	36	29	80.6%	8.08	311	SB-285	5.22	26.1	3.6E+01	3.6E+01	Mean
	Zinc	1,000	1,000	10,000	100	36	36	100.0%	9.5	3540	SB-287	--	--	6.3E+02	6.3E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

NA - Not available.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

VOCs - Volatile Organic Compounds.

EPH - Extractable Petroleum Hydrocarbons.

GRO - Gasoline Range Organics.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

* TRC-derived standard.

Table C-2.24. Summary Statistics for Soil Samples - HS-10, 0-6 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Di-n-butylphthalate	NS	NS	NS	NA	9	5	55.6%	0.13	0.39	HB33+HB36	0.17	0.87	3.0E-01	3.0E-01	Mean
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	9	4	44.4%	0.1	0.14	HB33+HB36	0.16	0.87	2.5E-01	1.4E-01	Maximum of detects
	Dibenzofuran	10*	10*	NS	NA	9	1	11.1%	0.7	0.7	HA38+HA40	0.055	0.29	1.4E-01	1.4E-01	Mean
	Acenaphthene	1,000	1,000	10,000	0.5	34	7	20.6%	0.065	1.5	HA38+HA40	0.058	0.61	1.9E-01	1.9E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	34	6	17.6%	0.074	0.63	HA43+HA44	0.058	0.61	1.4E-01	1.4E-01	Mean
	Anthracene	1,000	1,000	10,000	1	34	12	35.3%	0.18	4.12	HRO-30	0.178	0.61	4.7E-01	4.7E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	34	15	44.1%	0.255	10.3	HRO-30	0.178	0.61	1.1E+00	1.1E+00	Mean
	Benzo(a)pyrene	2	2	300	2	34	15	44.1%	0.276	8.37	HRO-30	0.178	0.61	8.9E-01	8.9E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	34	16	47.1%	0.2	8.97	HRO-30	0.178	0.61	1.1E+00	1.1E+00	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	34	11	32.4%	0.27	2.68	HRO-30	0.058	0.61	3.8E-01	3.8E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	34	13	38.2%	0.29	3.53	HRO-30	0.178	0.61	4.0E-01	4.0E-01	Mean
	Chrysene	70	70	10,000	2	34	15	44.1%	0.298	10.4	HRO-30	0.178	0.61	1.0E+00	1.0E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	34	1	2.9%	0.85	0.85	HA38+HA40	0.055	0.61	1.3E-01	1.3E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	34	15	44.1%	0.23	23	HA38+HA40	0.057	0.61	2.2E+00	2.2E+00	Mean
	Fluorene	1,000	1,000	10,000	1	34	6	17.6%	0.1	1.98	HRO-30	0.058	0.61	2.1E-01	2.1E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	34	13	38.2%	0.246	3.41	HRO-30	0.06	0.61	4.4E-01	4.4E-01	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	34	3	8.8%	0.53	1.27	HRO-30	0.055	0.61	1.6E-01	1.6E-01	Mean
	Naphthalene	20	500	10,000	0.5	36	3	8.3%	0.45	0.68	HA38+HA40	0.055	0.61	1.4E-01	1.4E-01	Mean
	Phenanthrene	500	500	10,000	3	34	14	41.2%	0.53	22.2	HRO-30	0.178	0.61	2.2E+00	2.2E+00	Mean
	Pyrene	1,000	1,000	10,000	4	34	16	47.1%	0.27	26.7	HRO-30	0.178	0.61	2.5E+00	2.5E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	89	55	61.8%	0.00555	11	TREE-HS-2	0.016	2.22	7.5E-01	1.5E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	61	32	52.5%	2.15	65.5	SB-359	2.5	4.5	6.3E+00	6.3E+00	Mean
	Barium	1,000	1,000	10,000	50	61	61	100.0%	5.5	7000	TREE-TI-3	--	--	3.3E+02	3.3E+02	Mean
	Beryllium	90	90	2,000	0.4	20	3	15.0%	0.27	0.86	SB-359	0.26	0.45	2.1E-01	2.1E-01	Mean
	Cadmium	70	70	1000	2	61	33	54.1%	0.27	6.53	HB-23	0.26	0.45	9.8E-01	9.8E-01	Mean
	Chromium (III)	1000	1000	10000	30	61	61	100.0%	2.1	390	TREE-TI-3	--	--	2.8E+01	2.8E+01	Mean
	Lead	200	200	6000	100	62	62	100.0%	4.76	3000	TREE-TI-3	--	--	2.6E+02	3.5E+02	95% Approximate Gamma UCL
	Mercury	20	20	300	0.3	29	21	72.4%	0.014	0.959	SB-359	0.01	0.065	1.5E-01	1.5E-01	Mean
	Nickel	600	600	10000	20	20	20	100.0%	3.1	22	SB-272	--	--	6.5E+00	6.5E+00	Mean
	Selenium	400	400	7000	0.5	29	1	3.4%	28.1	28.1	SB-359	0.11	8.9	3.0E+00	3.0E+00	Mean
	Silver	100	100	2000	0.6	29	7	24.1%	0.15	7.99	SB-272	0.3	0.89	6.3E-01	6.3E-01	Mean
	Vanadium	400	400	7,000	30	20	14	70.0%	5.32	44.2	SB-272	5.18	5.24	1.4E+01	1.4E+01	Mean
	Zinc	1,000	1,000	10,000	100	20	20	100.0%	13	772	SB-359	--	--	6.8E+01	6.8E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

NA - Not available.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EPC - Exposure Point Concentration.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

* - TRC-developed standard.

Table C-2.25. Summary Statistics for Soil Samples - HS-1, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PCBs																
	Total PCBs	1	1	100	NA	2	2	100.0%	0.00172	0.00589	PG-6	--	--	3.8E-03	5.9E-03	Maximum of detects
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	6	2	33.3%	0.786	1.22	PG-3	2.78	4.64	1.5E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	6	6	100.0%	4.93	43	PG-3	--	--	2.2E+01	NA	Below background
	Cadmium	70	70	1000	2	6	1	16.7%	0.36	0.36	PG-3	0.28	0.47	2.1E-01	NA	Below background
	Chromium (III)	1,000	1,000	10,000	30	6	6	100.0%	1.72	26	PG-3	--	--	8.0E+00	NA	Below background
	Lead	200	200	6,000	100	6	6	100.0%	2.93	16.9	SS-65	--	--	8.1E+00	NA	Below background
	Nickel	600	600	10,000	20	3	3	100.0%	4.02	10.4	SS-65	--	--	6.3E+00	NA	Below background
	Vanadium	400	400	7,000	30	3	2	66.7%	7.21	11.9	SS-65	9.28	9.28	7.9E+00	NA	Below background
	Zinc	1,000	1,000	10,000	100	3	3	100.0%	26	32.3	SS-65	--	--	2.9E+01	NA	Below background

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

NA - Not applicable or not available.

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.26. Summary Statistics for Soil Samples - HS-2, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
VOCs																
	1,2,4-Trichlorobenzene	6	700	10,000	NA	2	1	50.0%	0.17	0.17	HRI29	0.062	0.062	1.0E-01	1.7E-01	Maximum of detects
	1,2,3-Trichlorobenzene	400*	20*	NA	NA	2	1	50.0%	0.21	0.21	HRI29	0.062	0.062	1.2E-01	2.1E-01	Maximum of detects
PAHs																
	Acenaphthene	1,000	1,000	10,000	0.5	61	6	9.8%	0.184	1.93	SS-21	0.17	0.933	1.6E-01	1.6E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	61	4	6.6%	0.193	2.4	SS-24	0.17	0.933	1.5E-01	1.5E-01	Mean
	Anthracene	1,000	1,000	10,000	1	61	14	23.0%	0.15425	4.11	SS-24	0.17	0.212	3.3E-01	3.3E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	61	22	36.1%	0.21	6.33	SS-24	0.17	0.212	6.1E-01	6.1E-01	Mean
	Benzo(a)pyrene	2	2	300	2	61	22	36.1%	0.214	5.28	SS-24	0.17	0.212	5.3E-01	5.3E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	61	20	32.8%	0.186	6.09	SS-24	0.17	0.212	5.7E-01	5.7E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	61	20	32.8%	0.2	3.13	SS-21	0.17	0.212	3.6E-01	3.6E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	61	15	24.6%	0.14675	2.42	SS-24	0.17	0.933	2.7E-01	2.7E-01	Mean
	Chrysene	70	70	10,000	2	61	22	36.1%	0.212	5.98	SS-24	0.17	0.212	5.9E-01	5.9E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	61	7	11.5%	0.204	0.78	SS-24	0.17	0.933	1.4E-01	1.4E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	61	26	42.6%	0.218	12.1	SS-24	0.17	0.212	1.2E+00	1.2E+00	Mean
	Fluorene	1,000	1,000	10,000	1	61	8	13.1%	0.208	3.2	SS-24	0.17	0.933	2.1E-01	2.1E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	61	21	34.4%	0.181	3.41	SS-21	0.17	0.212	4.2E-01	4.2E-01	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	61	3	4.9%	0.392	1.52	SS-24	0.17	0.933	1.3E-01	1.3E-01	Mean
	Naphthalene	20	500	10,000	0.5	63	5	7.9%	0.15	2.55	SS-24	0.17	0.933	1.6E-01	1.6E-01	Mean
	Phenanthrene	500	500	10,000	3	61	23	37.7%	0.193	18.9	SS-24	0.17	0.212	1.3E+00	1.3E+00	Mean
	Pyrene	1,000	1,000	10,000	4	61	27	44.3%	0.15275	11.2	SS-21	0.17	0.212	1.2E+00	1.2E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	90	46	51.1%	0.0233	4.93	SS-19	0.05	0.31	4.5E-01	4.5E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	73	39	53.4%	1.61	22.1	SB-367	2.55	9.97	3.5E+00	3.5E+00	Mean
	Barium	1,000	1,000	10,000	50	73	72	98.6%	6.64	783	SB-366	5.18	5.18	8.8E+01	8.8E+01	Mean
	Beryllium	90	90	2,000	0.4	60	6	10.0%	0.2175	0.82	SS-29	0.26	1	1.9E-01	1.9E-01	Mean
	Cadmium	70	70	1000	2	73	26	35.6%	0.2225	9.17	SB-366	0.26	1	6.1E-01	6.1E-01	Mean
	Chromium (III)	1,000	1,000	2,000	30	73	73	100.0%	1.92	68.1	SS-19	--	--	1.3E+01	1.3E+01	Mean
	Lead	200	200	6,000	100	73	70	95.9%	0.87	2360	SB-366	0.35	0.81	1.4E+02	5.6E+02	95% H-UCL
	Mercury	20	20	300	0.3	64	46	71.9%	0.016	1.02	SS-26	0.013	0.08	1.3E-01	1.3E-01	Mean
	Nickel	600	600	10,000	20	60	60	100.0%	1.52	49.3	SB-367	--	--	9.3E+00	9.3E+00	Mean
	Silver	100	100	2,000	0.6	64	47	73.4%	0.54	5.89	SS-19	0.33	2	1.5E+00	1.5E+00	Mean
	Vanadium	400	400	7,000	30	60	43	71.7%	5.34	59.3	SS-20	5.1	20	1.5E+01	1.5E+01	Mean
	Zinc	1,000	1,000	10,000	100	60	60	100.0%	4.57	958	SB-366	--	--	9.1E+01	9.1E+01	Mean
GRO																
	Gasoline Range Organics	1,000	1,000	10,000	NA	3	3	100.0%	9.4	17.3	HRG25	--	--	1.5E+01	1.5E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

VOCs - Volatile Organic Compounds.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

GRO - Gasoline-Range Organics.

* TRC-developed standard.

NA - Not available.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.27. Summary Statistics for Soil Samples - HS-3, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
VOCs																
	Benzene	40	40	10,000	NA	1	1	100.0%	0.036	0.036	HRJ.75-17	--	--	3.6E-02	3.6E-02	Maximum of detects
	Toluene	500	500	10,000	NA	1	1	100.0%	0.041	0.041	HRJ.75-17	--	--	4.1E-02	4.1E-02	Maximum of detects
	1,2,4-Trimethylbenzene	100(1)	100(1)	5000 (1)	NA	1	1	100.0%	0.046	0.046	HRJ.75-17	--	--	4.6E-02	4.6E-02	Maximum of detects
PAHs																
	Acenaphthene	1,000	1,000	10,000	0.5	17	2	11.8%	0.259	0.332	HRK-21	0.175	0.301	1.2E-01	NA	Below background
	Acenaphthylene	600	10	10,000	0.5	17	1	5.9%	0.482	0.482	SS-37	0.175	0.301	1.2E-01	NA	Below background
	Anthracene	1,000	1,000	10,000	1	17	4	23.5%	0.362	4.23	SS-37	0.175	0.301	4.4E-01	4.4E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	17	5	29.4%	0.258	6.12	SS-37	0.175	0.301	7.3E-01	7.3E-01	Mean
	Benzo(a)pyrene	2	2	300	2	17	5	29.4%	0.317	6.76	SS-37	0.175	0.301	7.5E-01	7.5E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	17	5	29.4%	0.382	7.26	SS-37	0.175	0.301	8.2E-01	8.2E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	17	5	29.4%	0.303	3.92	SS-37	0.175	0.301	4.7E-01	4.7E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	17	4	23.5%	0.494	1.212	SS-37	0.175	0.301	2.7E-01	2.7E-01	Mean
	Chrysene	70	70	10,000	2	17	5	29.4%	0.323	5.45	SS-37	0.175	0.301	7.1E-01	7.1E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	17	4	23.5%	0.217	0.552	SS-37	0.175	0.301	1.5E-01	1.5E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	17	6	35.3%	0.275	17.1	SS-37	0.175	0.301	1.6E+00	1.6E+00	Mean
	Fluorene	1,000	1,000	10,000	1	17	2	11.8%	0.453	0.792	SS-37	0.175	0.301	1.6E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	17	5	29.4%	0.305	5.32	SS-37	0.175	0.301	5.9E-01	5.9E-01	Mean
	Naphthalene	20	500	10,000	0.5	18	3	16.7%	0.176	11	HRJ.75-17	0.175	0.301	7.3E-01	7.3E-01	Mean
	Phenanthrene	500	500	10,000	3	17	5	29.4%	0.254	18.2	SS-37	0.175	0.301	1.7E+00	1.7E+00	Mean
	Pyrene	1,000	1,000	10,000	4	17	7	41.2%	0.193	13.8	SS-37	0.175	0.301	1.5E+00	1.5E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	32	13	40.6%	0.0631	1.11	SS-38	0.039	0.25	1.8E-01	1.8E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	20	13	65.0%	1.61	16	SS-38	2.62	3.45	4.9E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	21	21	100.0%	5.94	801	SS-38	--	--	1.6E+02	1.6E+02	Mean
	Beryllium	90	90	2,000	0.4	12	3	25.0%	0.43	0.97	SB-360	0.27	0.35	2.9E-01	2.9E-01	Mean
	Cadmium	70	70	1000	2	20	10	50.0%	0.36	1.53	SS-40	0.27	0.38	4.9E-01	NA	Below background
	Chromium (III)	1,000	1,000	10,000	30	21	21	100.0%	2.2	18	SS-38	--	--	7.5E+00	NA	Below background
	Lead	200	200	6,000	100	22	22	100.0%	2.93	6870	SB-360	--	--	5.0E+02	1.1E+03	95% Adjusted Gamma UCL
	Mercury	20	20	300	0.3	15	11	73.3%	0.016	0.654	SS-40	0.013	0.08	1.5E-01	1.5E-01	Mean
	Nickel	600	600	10,000	20	12	12	100.0%	2.23	21.5	SB-360	--	--	6.4E+00	6.4E+00	Mean
	Silver	100	100	2,000	0.6	15	9	60.0%	0.52	2.38	SS-37	0.35	0.91	7.8E-01	7.8E-01	Mean
	Vanadium	400	400	7,000	30	12	9	75.0%	7.92	49.4	SB-360	5.23	6.89	1.3E+01	1.3E+01	Mean
	Zinc	1,000	1,000	10,000	100	12	12	100.0%	8.18	506	SS-40	--	--	1.3E+02	1.3E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

NA - Not available or not applicable.

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

VOCs - Volatile Organic Compounds.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

GRO - Gasoline-Range Organics.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

(1) - Values for C9-C10 aromatics used.

Table C-2.28. Summary Statistics for Soil Samples - HS-4, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	4-Bromophenyl phenyl ether	0.3*	0.3*	NA	NA	4	1	25.0%	0.078	0.078	HH43+HI42	0.057	0.06	4.2E-02	7.8E-02	Maximum of detects
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	4	1	25.0%	0.076	0.076	HJ44+HI43	0.17	0.19	8.7E-02	7.6E-02	Maximum of detects
	Acenaphthene	1,000	1,000	10,000	0.5	22	3	13.6%	0.31	0.58875	SB-365	0.059	2.1	2.1E-01	2.1E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	22	3	13.6%	0.11	8.9	HF40	0.06	0.897	5.3E-01	5.3E-01	Mean
	Anthracene	1,000	1,000	10,000	1	22	6	27.3%	0.14	4	HF44+HG44	0.064	0.897	5.7E-01	5.7E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	22	9	40.9%	0.15	7.9	HF44+HG44	0.176	0.897	1.2E+00	1.2E+00	Mean
	Benzo(a)pyrene	2	2	300	2	22	8	36.4%	0.271	13	HF40	0.064	0.897	1.4E+00	1.4E+00	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	22	11	50.0%	0.2	12	HF40	0.176	0.897	1.6E+00	1.6E+00	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	22	6	27.3%	0.27	8.6	HF40	0.064	0.897	7.4E-01	7.4E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	22	6	27.3%	0.25	4.1	HF40	0.064	0.897	5.6E-01	5.6E-01	Mean
	Chrysene	70	70	10,000	2	22	10	45.5%	0.16	9.6	HF40	0.176	0.897	1.3E+00	1.3E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	22	2	9.1%	0.643	0.71	HF44+HG44	0.059	2.1	2.4E-01	2.4E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	22	10	45.5%	0.27	30	HF40	0.176	0.897	2.9E+00	2.9E+00	Mean
	Fluorene	1,000	1,000	10,000	1	22	4	18.2%	0.22	2.3	HF40	0.059	0.897	2.7E-01	2.7E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	22	5	22.7%	0.47	7.9	HF40	0.06	0.897	7.3E-01	7.3E-01	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	22	1	4.5%	0.079	0.079	HF44+HG44	0.059	2.1	1.7E-01	NA	Below background
	Naphthalene	20	500	10,000	0.5	22	3	13.6%	0.092	17	HF40	0.059	0.897	9.0E-01	9.0E-01	Mean
	Phenanthrene	500	500	10,000	3	22	11	50.0%	0.22	37	HF40	0.176	0.897	2.6E+00	2.6E+00	Mean
	Pyrene	1,000	1,000	10,000	4	22	11	50.0%	0.258	27	HF40	0.176	0.897	2.8E+00	2.8E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	49	25	51.0%	0.0243	12	HF40	0.05	2.63	7.4E-01	1.8E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Antimony	20	20	300	1	13	1	7.7%	7.1	7.1	HF40	4.27	21.6	3.9E+00	3.9E+00	Mean
	Arsenic	20	20	500	20	24	16	66.7%	2.2	53.4	SB-365	2.64	13.5	7.7E+00	7.7E+00	Mean
	Barium	1,000	1,000	10,000	50	24	24	100.0%	7.59	1127.5	SB-365	--	--	1.6E+02	1.6E+02	Mean
	Beryllium	90	90	2,000	0.4	16	2	12.5%	0.48	0.81	HF-31D	0.26	1.35	2.7E-01	2.7E-01	Mean
	Cadmium	70	70	1000	2	36	17	47.2%	0.19	8.78	NBHS-1	0.26	1.35	9.7E-01	9.7E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	24	24	100.0%	2.04	154	NBHS-1	--	--	2.0E+01	2.0E+01	Mean
	Lead	200	200	6,000	100	36	36	100.0%	3.05	2780	NBHS-1	--	--	2.7E+02	4.3E+02	95% Adjusted Gamma UCL
	Mercury	20	20	300	0.3	22	18	81.8%	0.04	0.632	SB-365	0.012	0.089	1.4E-01	1.4E-01	Mean
	Nickel	600	600	10,000	20	16	16	100.0%	2.28	173	NBHS-1	--	--	2.1E+01	2.1E+01	Mean
	Silver	100	100	2,000	0.6	22	6	27.3%	1.17	29	NBHS-1	0.32	2.69	2.1E+00	2.1E+00	Mean
	Vanadium	400	400	7,000	30	16	12	75.0%	9.87	219	SB-365	5.34	26.9	2.6E+01	2.6E+01	Mean
	Zinc	1,000	1,000	10,000	100	16	16	100.0%	14.1	1670	NBHS-1	--	--	2.4E+02	2.4E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

NA - Not available.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EPC - Exposure Point Concentration.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

* - TRC-developed standard.

Table C-2.29. Summary Statistics for Soil Samples - HS-5, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PAHs																
	Dibenzofuran	10*	10*	NA	NA	5	2	40.0%	0.56	2.9	COMP SS-13-A,F,S,T	0.38	2.1	9.8E-01	9.8E-01	Mean
	Acenaphthene	1,000	1,000	10,000	0.5	5	1	20.0%	2.6	2.6	COMP SS-13-A,F,S,T	0.37	2.1	8.5E-01	8.5E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	5	2	40.0%	1.4	4	COMP SS-13-Q,R,C,D	0.38	2.1	1.5E+00	1.5E+00	Mean
	Anthracene	1,000	1,000	10,000	1	5	5	100.0%	0.63	10	COMP SS-13-A,F,S,T	--	--	4.3E+00	4.3E+00	Mean
	Benzo(a)anthracene	7	7	3,000	2	5	5	100.0%	1.4	17	COMP SS-13-A,F,S,T	--	--	7.7E+00	1.7E+01	Maximum of detects
	Benzo(a)pyrene	2	2	300	2	5	5	100.0%	0.95	11	COMP SS-13-Q,R,C,D	--	--	5.8E+00	1.1E+01	Maximum of detects
	Benzo(b)fluoranthene	7	7	3,000	2	5	5	100.0%	1.2	13	COMP SS-13-A,F,S,T	--	--	6.1E+00	1.3E+01	Maximum of detects
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	5	5	100.0%	1.1	6.3	COMP SS-13-Q,R,C,D	--	--	4.1E+00	4.1E+00	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	5	5	100.0%	1.4	14	COMP SS-13-Q,R,C,D	--	--	7.4E+00	7.4E+00	Mean
	Chrysene	70	70	10,000	2	5	5	100.0%	1.2	16	COMP SS-13-A,F,S,T	--	--	7.2E+00	7.2E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	5	4	80.0%	0.44	9.4	COMP SS-13-AW,AX,AY,AZ	2.1	2.1	3.2E+00	9.4E+00	Maximum of detects
	Fluoranthene	1,000	1,000	10,000	4	5	5	100.0%	0.53	47	COMP SS-13-A,F,S,T	--	--	2.1E+01	2.1E+01	Mean
	Fluorene	1,000	1,000	10,000	1	5	4	80.0%	1.1	3.9	COMP SS-13-A,F,S,T	0.38	0.38	2.0E+00	2.0E+00	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	4	4	100.0%	0.94	6	COMP SS-13-A,F,S,T	--	--	4.0E+00	4.0E+00	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	5	1	20.0%	0.55	0.55	COMP SS-13-AW,AX,AY,AZ	0.37	2.1	6.0E-01	6.0E-01	Mean
	Phenanthrene	500	500	10,000	3	5	5	100.0%	2.4	42	COMP SS-13-A,F,S,T	--	--	1.7E+01	1.7E+01	Mean
	Pyrene	1,000	1,000	10,000	4	5	5	100.0%	3.1	38	COMP SS-13-A,F,S,T	--	--	1.8E+01	1.8E+01	Mean
PCBs																
	Total PCBs	1	1	100	NA	4	4	100.0%	0.133	4.87	SS-13-AO	--	--	1.9E+00	4.9E+00	Maximum of detects
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	5	5	100.0%	6	31	COMP SS-13-A,F,S,T	--	--	1.5E+01	1.5E+01	Mean
	Barium	1,000	1,000	10,000	50	5	5	100.0%	120	310	COMP SS-13-AQ, AM,AN,AJ,AL	--	--	2.1E+02	2.1E+02	Mean
	Cadmium	70	70	1000	2	5	5	100.0%	1	2.4	COMP SS-13-A,F,S,T	--	--	1.7E+00	1.7E+00	Mean
	Chromium (III)	1,000	1,000	10,000	30	5	5	100.0%	8.9	32	COMP SS-13-AW,AX,AY,AZ	--	--	2.1E+01	2.1E+01	Mean
	Lead	200	200	6,000	100	9	9	100.0%	72	1800	SS-13-AN	--	--	7.8E+02	1.8E+03	Maximum of detects
	Mercury	20	20	300	0.3	5	5	100.0%	0.32	0.95	COMP SS-13-AQ, AM,AN,AJ,AL	--	--	6.0E-01	6.0E-01	Mean
	Silver	100	100	2,000	0.6	5	4	80.0%	0.56	1.1	COMP SS-13-AQ, AM,AN,AJ,AL	0.44	0.44	6.1E-01	6.1E-01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

NA - Not available or not applicable.

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

VOCs - Volatile Organic Compounds.

PAH - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

GRO - Gasoline-Range Organics.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.30. Summary Statistics for Soil Samples - HS-6, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Acenaphthene	1,000	1,000	10,000	0.5	21	4	19.0%	0.217	0.59	HF14	0.174	0.208	1.5E-01	1.5E-01	Mean
	Anthracene	1,000	1,000	10,000	1	21	7	33.3%	0.2201667	1.62	SS-52	0.174	0.208	3.0E-01	3.0E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	21	9	42.9%	0.2008333	2.4	HF14	0.174	0.208	5.2E-01	5.2E-01	Mean
	Benzo(a)pyrene	2	2	300	2	21	9	42.9%	0.2031667	2.2	HF14	0.174	0.208	4.6E-01	4.6E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	21	9	42.9%	0.234	3.1	HF14	0.174	0.208	5.7E-01	5.7E-01	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	21	8	38.1%	0.1905	0.905	SS-50	0.174	0.208	2.3E-01	NA	Below background
	Benzo(k)fluoranthene	70	70	10,000	1	21	8	38.1%	0.1378333	1.2	HF14	0.174	0.208	2.6E-01	2.6E-01	Mean
	Chrysene	70	70	10,000	2	21	9	42.9%	0.2011667	2.7	HF14	0.174	0.208	5.3E-01	5.3E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	21	1	4.8%	0.221	0.221	SS-50	0.174	0.46	1.1E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	21	10	47.6%	0.193	5.6	HF14	0.174	0.208	9.8E-01	9.8E-01	Mean
	Fluorene	1,000	1,000	10,000	1	21	4	19.0%	0.291	0.944	SS-52	0.174	0.208	1.8E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	21	8	38.1%	0.199	0.973	SS-50	0.174	0.208	2.7E-01	NA	Below background
	2-Methylnaphthalene	80	300	5,000	0.5	21	1	4.8%	0.274	0.274	SS-52	0.174	0.46	1.1E-01	NA	Below background
	Naphthalene	20	500	10,000	0.5	21	2	9.5%	0.5	0.505	SS-52	0.174	0.21	1.3E-01	1.3E-01	Mean
	Phenanthrene	500	500	10,000	3	21	10	47.6%	0.204	4.4	HF14	0.174	0.208	9.7E-01	9.7E-01	Mean
	Pyrene	1,000	1,000	10,000	4	21	11	52.4%	0.195	4.79	SS-50	0.174	0.208	8.3E-01	8.3E-01	Mean
PCB Aroclors																
	Total PCBs	1	1	100	NA	31	22	71.0%	0.0702	17.74	HH-13	0.051	0.1	1.3E+00	3.9E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	25	11	44.0%	1.18	17.4	HD23	2.61	3.11	3.7E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	25	25	100.0%	6.42	4400	HF14	--	--	3.7E+02	3.7E+02	Mean
	Beryllium	90	90	2,000	0.4	8	1	12.5%	0.48	0.48	HF14	0.27	0.32	1.9E-01	1.9E-01	Mean
	Cadmium	70	70	1000	2	25	10	40.0%	0.29	4.0	HH-13	0.27	0.35	5.1E-01	5.1E-01	Mean
	Chromium (III)	1,000	1,000	10,000	30	24	24	100.0%	1.68	1458	HH-13	--	--	9.1E+01	9.1E+01	Mean
	Lead	200	200	6,000	100	25	25	100.0%	1.75	928	HD23	--	--	1.4E+02	1.4E+02	Mean
	Mercury	20	20	300	0.3	11	8	72.7%	0.016	0.34	HF14	0.012	0.07	9.1E-02	9.1E-02	Mean
	Nickel	600	600	10,000	20	8	8	100.0%	1.9	49	HF14	--	--	9.6E+00	9.6E+00	Mean
	Vanadium	400	400	7,000	30	8	5	62.5%	9.82	210	HF14	5.22	5.34	3.6E+01	3.6E+01	Mean
	Zinc	1,000	1,000	10,000	100	8	8	100.0%	6.73	360	HF14	--	--	8.5E+01	8.5E+01	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

NA - Not available or not applicable.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.31. Summary Statistics for Soil Samples - HS-7, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
PAHs																
	Benzo(a)anthracene	7	7	3,000	2	13	3	23.1%	0.228	0.395	SB-362	0.184	0.62	1.8E-01	NA	Below background
	Benzo(a)pyrene	2	2	300	2	13	3	23.1%	0.215	0.348	SB-362	0.184	0.62	1.8E-01	NA	Below background
	Benzo(b)fluoranthene	7	7	3,000	2	13	4	30.8%	0.244	0.76	HN3+HM3	0.184	0.507	2.2E-01	NA	Below background
	Chrysene	70	70	10,000	2	13	3	23.1%	0.207	0.417	SB-362	0.184	0.62	1.9E-01	NA	Below background
	Fluoranthene	1,000	1,000	10,000	4	13	5	38.5%	0.343	0.732	SS-53	0.184	0.62	3.1E-01	NA	Below background
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	13	1	7.7%	0.192	0.192	SB-362	0.184	0.62	1.5E-01	NA	Below background
	Phenanthrene	500	500	10,000	3	13	5	38.5%	0.252	0.621	SB-362	0.184	0.62	2.6E-01	NA	Below background
	Pyrene	1,000	1,000	10,000	4	13	5	38.5%	0.27	0.793	SB-362	0.184	0.62	3.0E-01	NA	Below background
PCBs																
	Total PCBs	1	1	100	NS	18	11	61.1%	0.0904	0.776	SB-362	0.0528	0.227	2.2E-01	2.2E-01	Mean
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	15	13	86.7%	0.87	12.6	SB-362	2.75	3.11	4.4E+00	NA	Below background
	Barium	1,000	1,000	10,000	50	15	15	100.0%	8.77	271	SB-362	--	--	9.0E+01	9.0E+01	Mean
	Beryllium	90	90	2,000	0.4	12	3	25.0%	0.7	1.56	SB-362	0.28	0.35	4.0E-01	4.0E-01	Mean
	Cadmium	70	70	1000	2	15	9	60.0%	0.33	5.77	SB-362	0.28	0.33	1.0E+00	1.0E+00	Mean
	Chromium (III)	1,000	1,000	10,000	30	15	15	100.0%	3.63	47.7	SB-362	--	--	1.6E+01	1.6E+01	Mean
	Lead	200	200	6,000	100	15	15	100.0%	1	487	SB-362	--	--	1.5E+02	3.2E+02	95% Adjusted Gamma UCL
	Mercury	20	20	300	0.3	15	13	86.7%	0.048	0.213	SB-362	0.016	0.07	9.9E-02	NA	Below background
	Nickel	600	600	10,000	20	12	12	100.0%	2.36	40.3	SB-362	--	--	1.0E+01	1.0E+01	Mean
	Silver	100	100	2,000	0.6	15	1	6.7%	0.22	0.22	HO2.5+HO3	0.06	1.52	3.1E-01	NA	Below background
	Vanadium	400	400	7,000	30	12	12	100.0%	5.62	25.1	SB-362	--	--	1.8E+01	NA	Below background
	Zinc	1,000	1,000	10,000	100	12	12	100.0%	7.66	703	SB-362	--	--	1.4E+02	1.4E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

EPC - Exposure Point Concentration.

PAHs - Polyaromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

Table C-2.32. Summary Statistics for Soil Samples - HS-8, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
VOCs																
	p-Isopropyltoluene (p-Cymene)	100[1]	100[1]	5,000[1]	NA	1	1	100.0%	1.2	1.2	HG2	--	--	1.2E+00	1.2E+00	Maximum of Detects
VPH																
	C9-C10 Aromatics	100	100	5000	NA	1	1	100.0%	51	51	HG2	--	--	5.1E+01	5.1E+01	Maximum of Detects
	C9-C12 Aliphatics	1,000	1,000	20,000	NA	1	1	100.0%	25	25	HG2	--	--	2.5E+01	2.5E+01	Maximum of Detects
EPH																
	C19 - C36 Aliphatics	3,000	3,000	20,000	NA	2	2	100.0%	10	160	HG2	--	--	8.5E+01	1.6E+02	Maximum of Detects
	C11 - C22 Aromatics	1,000	1,000	10,000	NA	2	2	100.0%	12	120	HG2	--	--	6.6E+01	1.2E+02	Maximum of Detects
SVOCs																
	Benzoic Acid	1,000*	1,000*	NS	1,000*	8	1	12.5%	2.4	2.4	HG10+HG9	0.89	20	2.8E+00	2.4E+00	Maximum of Detects
	Dimethyl phthalate	50	600	10,000	NA	19	2	10.5%	0.35	0.97	HJ5+HK5	0.056	1.3	2.8E-01	2.8E-01	Mean
	Di-n-butylphthalate	NS	NS	NS	NA	19	11	57.9%	0.095	5.6	HJ10	1.8	4	1.0E+00	1.0E+00	Mean
	Butyl benzyl phthalate	NS	NS	NS	NA	19	1	5.3%	0.31	0.31	HJ8+HI8	0.056	1.3	2.4E-01	2.4E-01	Mean
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	19	9	47.4%	0.078	23	HG2.5+HH2.5	0.18	4	3.0E+00	3.0E+00	Mean
	Carbazole	NS	NS	NS	NA	11	6	54.5%	0.11	13	HI2.5+HJ2.5	0.056	0.68	2.0E+00	2.0E+00	Mean
	Dibenzofuran	10*	10*	NS	NA	19	5	26.3%	0.079	7.2	HI2.5+HJ2.5	0.056	1.3	7.2E-01	7.2E-01	Mean
	Acenaphthene	1,000	1,000	10,000	0.5	32	10	31.3%	0.12	113	HF-10B	0.056	1.3	4.5E+00	4.5E+00	Mean
	Acenaphthylene	600	10	10,000	0.5	32	6	18.8%	0.064	10	HG4+HG3	0.056	1.7	6.6E-01	6.6E-01	Mean
	Anthracene	1,000	1,000	10,000	1	32	16	50.0%	0.31	190	HF-10B	0.056	1.3	7.9E+00	7.9E+00	Mean
	Benzo(a)anthracene	7	7	3,000	2	32	25	78.1%	0.23	167	HF-10B	0.182	0.238	9.6E+00	3.3E+01	95% Chebyshev (Mean, Sd) UCL
	Benzo(a)pyrene	2	2	300	2	32	23	71.9%	0.22	133	HF-10B	0.182	1.3	7.7E+00	2.6E+01	95% Chebyshev (Mean, Sd) UCL
	Benzo(b)fluoranthene	7	7	3,000	2	32	23	71.9%	0.3	183	HF-10B	0.182	1.3	1.1E+01	4.7E+01	97.5% Chebyshev (Mean, Sd) UCL
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	32	16	50.0%	0.092	58.3	HF-10B	0.182	1.3	2.9E+00	2.9E+00	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	32	19	59.4%	0.08	75.7	HF-10B	0.182	1.7	3.9E+00	3.9E+00	Mean
	Chrysene	70	70	10,000	2	32	25	78.1%	0.2	171	HF-10B	0.182	0.238	9.0E+00	9.0E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	32	3	9.4%	1.2	17.2	HF-10B	0.056	1.7	8.6E-01	3.2E+00	95% Chebyshev (Mean, Sd) UCL
	Fluoranthene	1,000	1,000	10,000	4	32	28	87.5%	0.2415	443	HF-10B	0.182	0.238	2.3E+01	2.3E+01	Mean
	Fluorene	1,000	1,000	10,000	1	32	11	34.4%	0.32	121	HF-10B	0.056	1.3	4.6E+00	4.6E+00	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	32	14	43.8%	0.11	56.9	HF-10B	0.062	1.3	3.0E+00	3.0E+00	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	32	5	15.6%	0.07975	47.8	HF-10B	0.056	1.7	2.0E+00	2.0E+00	Mean
	Naphthalene	20	500	10,000	0.5	32	8	25.0%	0.069	76	HF-10B	0.056	1.7	3.1E+00	7.6E+01	Maximum of Detects
	Phenanthrene	500	500	10,000	3	32	25	78.1%	0.203	710	HF-10B	0.182	1.3	3.0E+01	3.0E+01	Mean
	Pyrene	1,000	1,000	10,000	4	32	29	90.6%	0.2965	280	HF-10B	0.182	0.238	1.6E+01	1.6E+01	Mean
PCB Aroclors																
	Total PCBs	1	1	100	NA	71	62	87.3%	0.143	19.8	HG2.5	0.0531	2.45	2.9E+00	3.8E+00	95% Approximate Gamma UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	3	3	100.0%	1.45E-05	1.9E-04	HG2	--	--	1.1E-04	1.9E-04	Maximum of Detects
Metals																
	Arsenic	20	20	500	20	44	38	86.4%	0.56	59.8	SB-350	2.73	3.31	6.9E+00	6.9E+00	Mean
	Barium	1,000	1,000	10,000	50	44	44	100.0%	19.3	7430	SB-350	--	--	8.7E+02	8.7E+02	Mean
	Beryllium	90	90	2,000	0.4	10	1	10.0%	0.61	0.61	SB-350	0.28	0.34	2.0E-01	2.0E-01	Mean
	Cadmium	70	70	1000	2	45	39	86.7%	0.44	29.3	HF-10B	0.28	0.38	4.6E+00	4.6E+00	Mean
	Chromium (III)	1,000	1,000	10,000	30	45	45	100.0%	7.03	1370	SB-350	--	--	1.3E+02	1.3E+02	Mean
	Lead	200	200	6000	100	45	45	100.0%	3.83	16100	HF-10B	--	--	1.1E+03	1.6E+03	95% Approximate Gamma UCL
	Mercury	20	20	300	0.3	42	38	90.5%	0.027	17	HG7+HH7	0.011	0.08	9.8E-01	9.8E-01	Mean
	Nickel	600	600	10000	20	10	10	100.0%	4.64	167	SB-350	--	--	2.7E+01	2.7E+01	Mean
	Selenium	400	400	7000	0.5	42	2	4.8%	2.22	3.42	HI7+HJ7	0.1	7.12	1.1E+00	1.1E+00	Mean
	Silver	100	100	2000	0.6	42	21	50.0%	0.16	31.5	SB-350	0.05	0.67	1.4E+00	1.4E+00	Mean
	Vanadium	400	400	7,000	30	10	10	100.0%	9.23	602	SB-350	--	--	8.1E+01	8.1E+01	Mean
	Zinc	1,000	1,000	10,000	100	10	10	100.0%	19.6	1300	SB-350	--	--	2.7E+02	2.7E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

NA - Not available or applicable.

NS - No standard available for this compound.

SVOCs - Semivolatile Organic Compounds.

PCBs - Polychlorinated Biphenyls.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using Toxic Equivalency Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as either ½ the detection limit (referred to as "ND= DL/2") or by setting the concentration to 0 (referred to as "ND=0"). TEQs change only very slightly when these two different assumptions were used for results below detection limits. The higher TEQ (calculated using the ND=DL/2 assumption) was used to estimate the risk from dioxin-like congeners.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

Background - Background Concentration for natural soil.

EPC - Exposure point concentration.

Table C-2.33. Summary Statistics for Soil Samples - HS-9, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL*	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
EPH																
	C19 - C36 Aliphatics	3,000	3,000	20,000	NA	2	2	100.0%	59	76	VSS-3	--	--	6.8E+01	7.6E+01	Maximum of detects
	C11 - C22 Aromatics	1,000	1,000	10,000	NA	2	1	50.0%	31	31	VSS-13	10	10	1.8E+01	3.1E+01	Maximum of detects
SVOCs																
	4-Methylphenol	200*	5*	NA	NA	9	1	11.1%	0.074	0.074	HA29+HB29	0.051	0.6	1.3E-01	7.4E-02	Maximum of detects
	Dimethyl phthalate	50	600	10,000	NA	16	2	12.5%	0.57	1.5	HC16+HC15+HC14	0.051	2.1	3.2E-01	3.2E-01	Mean
	Di-n-butylphthalate	NS	NS	NA	NA	2	1	50.0%	0.35	0.35	VSS-3	0.4	0.4	2.8E-01	3.5E-01	Maximum of detects
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	16	6	37.5%	0.1	21	HD13+HD14+HD15	0.78	4.3	2.0E+00	2.0E+00	Mean
	Dibenzofuran	10*	10*	NA	NA	16	7	43.8%	0.25	1.2	HC16+HC15+HC14	0.051	2.1	4.5E-01	4.5E-01	Mean
	Acenaphthene	1,000	1,000	10,000	0.5	66	15	22.7%	0.21975	4.16	SB-364	0.051	2.115	4.6E-01	4.6E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	66	13	19.7%	0.12	2.9	HB12+HB16	0.051	2.115	4.1E-01	4.1E-01	Mean
	Anthracene	1,000	1,000	10,000	1	66	25	37.9%	0.293	16.8	SB-364	0.051	2.1	1.2E+00	1.2E+00	Mean
	Benzo(a)anthracene	7	7	3,000	2	66	32	48.5%	0.073	31.25	SB-274	0.174	2.1	2.9E+00	2.9E+00	Mean
	Benzo(a)pyrene	2	2	300	2	66	31	47.0%	0.228	30	HC16+HC15+HC14	0.051	2.1	2.6E+00	5.6E+00	95% Chebyshev (Mean, Sd) UCL
	Benzo(b)fluoranthene	7	7	3,000	2	66	31	47.0%	0.058	42	HC16+HC15+HC14	0.174	2.1	3.0E+00	3.0E+00	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	66	27	40.9%	0.3175	18.25	SB-274	0.174	2.1	1.4E+00	1.4E+00	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	66	26	39.4%	0.334	15.1	SB-274	0.051	2.1	1.4E+00	1.4E+00	Mean
	Chrysene	70	70	10,000	2	66	32	48.5%	0.054	32.3	SB-274	0.174	2.1	2.7E+00	2.7E+00	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300	0.5	66	18	27.3%	0.20725	5.45	SB-274	0.06	2.1	4.8E-01	4.8E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	66	36	54.5%	0.13	85.5	SB-274	0.174	1.96	5.7E+00	5.7E+00	Mean
	Fluorene	1,000	1,000	10,000	1	66	18	27.3%	0.26425	5.09	SB-364	0.051	2.1	5.5E-01	5.5E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	66	26	39.4%	0.272	20.8	SB-274	0.051	2.1	1.6E+00	1.6E+00	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	57	7	12.3%	0.096	2.32	SB-364	0.051	2.115	3.0E-01	3.0E-01	Mean
	Naphthalene	20	500	10,000	0.5	67	14	20.9%	0.13	40	COMP SS-13-V,W, X, Y	0.051	2.115	9.9E-01	4.0E+01	Maximum of detects
	Phenanthrene	500	500	10,000	3	66	34	51.5%	0.12	59.6	SB-364	0.174	1.96	4.1E+00	4.1E+00	Mean
	Pyrene	1,000	1,000	10,000	4	66	36	54.5%	0.2	64	HC16+HC15+HC14	0.174	1.96	5.7E+00	5.7E+00	Mean
PCB Aroclors																
	Total PCBs	1	1	100	NA	163	86	52.8%	0.0436	40	HRC-33	0.0351	2.49	1.7E+00	3.2E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.2E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
GRO																
	Gasoline Range Organics	1,000	1,000	10,000	NA	1	1	100.0%	12.3	12.3	HRA33	--	--	1.2E+01	1.2E+01	Maximum of detects
Metals																
	Antimony	20	20	300	1	46	1	2.2%	226	226	SB-285	4.16	22.4	8.6E+00	2.3E+02	Maximum of detects
	Arsenic	20	20	500	20	88	57	64.8%	1.52	94	HD13+HD14+HD15	2.6	14	1.3E+01	2.0E+01	95% Chebyshev (Mean, Sd) UCL
	Barium	1,000	1,000	10,000	50	88	83	94.3%	5.9	15400	HC16+HC15+HC14	5.63	24.1	5.9E+02	1.4E+03	95% Chebyshev (Mean, Sd) UCL
	Beryllium	90	90	2,000	0.4	69	21	30.4%	0.38	1.45	SB-303	0.26	1.4	4.3E-01	4.3E-01	Mean
	Cadmium	70	70	1000	2	90	55	61.1%	0.46	84.3	SB-287	0.26	1.4	3.7E+00	3.7E+00	Mean
	Chromium (III)	1,000	1,000	10,000	30	88	87	98.9%	1.61	2050	HD13+HD14+HD15	2.1	2.1	7.2E+01	7.2E+01	Mean
	Lead	200	200	6,000	100	125	124	99.2%	2.01	11000	SS-13-W	4.19	4.19	1.1E+03	1.8E+03	95% Chebyshev (Mean, Sd) UCL
	Mercury	20	20	300	0.3	85	56	65.9%	0.018	76	COMP SS-13-E,L,K,B	0.013	0.14	1.3E+00	1.3E+00	Mean
	Nickel	600	600	10,000	20	69	65	94.2%	1.2	113	SB-274	2.1	2.27	1.6E+01	1.6E+01	Mean
	Selenium	400	400	7,000	0.5	85	1	1.2%	2.15	2.15	COMP SS-13-AS,AT,AU,AV	0.64	28	4.1E+00	4.1E+00	Mean
	Silver	100	100	2,000	0.6	85	57	67.1%	0.4475	75	HB26	0.32	2.8	5.0E+00	5.0E+00	Mean
	Vanadium	400	400	7,000	30	69	41	59.4%	5.53	311	SB-285	5.22	28	2.3E+01	2.3E+01	Mean
	Zinc	1,000	1,000	10,000	100	69	69	100.0%	7.34	4500	SB-293	--	--	5.2E+02	5.2E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

NA - Not available.

EPC - Exposure Point Concentration.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

VOCs - Volatile Organic Compounds.

EPH - Extractable Petroleum Hydrocarbons.

GRO - Gasoline Range Organics.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

* TRC-derived standard.

Table C-2.34. Summary Statistics for Soil Samples - HS-10, 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	UCL	Background	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
SVOCs																
	Di-n-butylphthalate	NS	NS	NS	NA	9	5	55.6%	0.13	0.39	HB33+HB36	0.17	0.87	3.0E-01	3.0E-01	Mean
	bis(2-Ethylhexyl)phthalate	90	90	10,000	NA	9	4	44.4%	0.1	0.14	HB33+HB36	0.16	0.87	2.5E-01	1.4E-01	Maximum of detects
	Dibenzofuran	10*	10*	NS	NA	9	1	11.1%	0.7	0.7	HA38+HA40	0.055	0.29	1.4E-01	1.4E-01	Mean
	Acenaphthene	1,000	1,000	10,000	0.5	39	7	17.9%	0.065	1.5	HA38+HA40	0.058	1.41	1.9E-01	1.9E-01	Mean
	Acenaphthylene	600	10	10,000	0.5	39	6	15.4%	0.074	0.63	HA43+HA44	0.058	1.41	1.5E-01	1.5E-01	Mean
	Anthracene	1,000	1,000	10,000	1	39	12	30.8%	0.18	4.12	HRO-30	0.178	1.41	4.4E-01	4.4E-01	Mean
	Benzo(a)anthracene	7	7	3,000	2	39	15	38.5%	0.255	10.3	HRO-30	0.178	1.41	9.9E-01	9.9E-01	Mean
	Benzo(a)pyrene	2	2	300	2	39	15	38.5%	0.276	8.37	HRO-30	0.178	1.41	8.0E-01	8.0E-01	Mean
	Benzo(b)fluoranthene	7	7	3,000	2	39	16	41.0%	0.2	8.97	HRO-30	0.178	1.41	1.0E+00	1.0E+00	Mean
	Benzo(g,h,i)perylene	1,000	1,000	10,000	1	39	11	28.2%	0.27	2.68	HRO-30	0.058	1.41	3.6E-01	3.6E-01	Mean
	Benzo(k)fluoranthene	70	70	10,000	1	39	13	33.3%	0.29	3.53	HRO-30	0.178	1.41	3.8E-01	3.8E-01	Mean
	Chrysene	70	70	10,000	2	39	15	38.5%	0.298	10.4	HRO-30	0.178	1.41	9.2E-01	9.2E-01	Mean
	Dibenz(a,h)anthracene	0.7	0.7	300.0	0.5	39	1	2.6%	0.85	0.85	HA38+HA40	0.055	1.41	1.4E-01	1.4E-01	Mean
	Fluoranthene	1,000	1,000	10,000	4	39	15	38.5%	0.23	23	HA38+HA40	0.057	1.41	2.0E+00	2.0E+00	Mean
	Fluorene	1,000	1,000	10,000	1	39	6	15.4%	0.1	1.98	HRO-30	0.058	1.41	2.1E-01	2.1E-01	Mean
	Indeno(1,2,3-cd)pyrene	7	7	3,000	1	39	13	33.3%	0.246	3.41	HRO-30	0.06	1.41	4.2E-01	4.2E-01	Mean
	2-Methylnaphthalene	80	300	5,000	0.5	39	3	7.7%	0.53	1.27	HRO-30	0.055	1.41	1.7E-01	1.7E-01	Mean
	Naphthalene	20	500	10,000	0.5	41	3	7.3%	0.45	0.68	HA38+HA40	0.055	1.41	1.5E-01	1.5E-01	Mean
	Phenanthrene	500	500	10,000	3	39	14	35.9%	0.53	22.2	HRO-30	0.178	1.41	1.9E+00	1.9E+00	Mean
	Pyrene	1,000	1,000	10,000	4	39	16	41.0%	0.27	26.7	HRO-30	0.178	1.41	2.2E+00	2.2E+00	Mean
PCBs																
	Total PCBs	1	1	100	NA	95	55	57.9%	0.00555	11	TREE-HS-2	0.016	2.22	7.0E-01	1.4E+00	95% Chebyshev (Mean, Sd) UCL
TEQ Summation**																
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	5.0E-04	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL
Metals																
	Arsenic	20	20	500	20	67	36	53.7%	2.15	195	SB-359	2.5	4.5	8.8E+00	8.8E+00	Mean
	Barium	1,000	1,000	10,000	50	67	65	97.0%	5.5	7000	TREE-TI-3	5.24	6.04	3.2E+02	3.2E+02	Mean
	Beryllium	90	90	2,000	0.4	26	4	15.4%	0.27	5.13	SB-359	0.26	0.45	3.9E-01	3.9E-01	Mean
	Cadmium	70	70	1000	2	67	34	50.7%	0.27	8.81	SB-359	0.26	0.45	1.0E+00	1.0E+00	Mean
	Chromium (III)	1000	1000	10000	30	67	67	100.0%	2.1	390	TREE-TI-3	--	--	2.7E+01	2.7E+01	Mean
	Lead	200	200	6000	100	68	68	100.0%	2.18	3000	TREE-TI-3	--	--	2.8E+02	5.6E+02	95% Chebyshev (Mean, Sd) UCL
	Mercury	20	20	300	0.3	35	21	60.0%	0.014	0.959	SB-359	0.01	0.15	1.2E-01	1.2E-01	Mean
	Nickel	600	600	10000	20	26	26	100.0%	2.16	94.1	SB-359	--	--	9.4E+00	9.4E+00	Mean
	Selenium	400	400	7000	0.5	35	2	5.7%	28.1	99.4	SB-359	0.11	8.9	5.7E+00	5.7E+00	Mean
	Silver	100	100	2000	0.6	35	10	28.6%	0.15	7.99	SB-272	0.3	4.21	7.4E-01	7.4E-01	Mean
	Vanadium	400	400	7,000	30	26	17	65.4%	5.32	174	SB-359	5.18	6.29	1.8E+01	1.8E+01	Mean
	Zinc	1,000	1,000	10,000	100	26	26	100.0%	9.35	2980	SB-359	--	--	1.7E+02	1.7E+02	Mean

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

Background - Background Concentration for natural soil.

UCL* - Upper Concentration Limit.

UCL - Upper Confidence Limit.

NA - Not available.

PCBs - Polychlorinated Biphenyls.

SVOCs - Semi-volatile Organic Compounds.

EPC - Exposure Point Concentration.

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Values outlined exceed MassDEP background values for natural soil.

* - TRC-developed standard.

Table C-2.35. Summary Statistics for Dioxin Investigation Soil Samples -- 0-1 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
TEQ Summation**														
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	9	9	100.0%	3.1E-07	4.1E-05	SS-38	--	--	1.3E-05	2.1E-05	95% Student's-t UCL

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

* - ProUCL unable to calculate a reliable UCL that was less than the maximum concentration due to small sample size (i.e., less than 10 samples).

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-2.36. Summary Statistics for Dioxin Investigation Soil Samples -- 0-3 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
TEQ Summation**														
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	18	18	100.0%	3.1E-07	8.5E-05	HB-22	--	--	1.4E-05	2.6E-05	95% Adjusted Gamma UCL

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-2.37. Summary Statistics for Dioxin Investigation Soil Samples -- 0-6 and 0-15 Foot Interval
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	S-1/GW-2	S-1/GW-3	# of Samples	# of Detects	Freq. of Detects	Min. of Detects (mg/kg)	Max. of Detects (mg/kg)	Location of Max. Detected	Min. of Non-Detects (mg/kg)	Max. of Non-Detects (mg/kg)	Mean Concentration (mg/kg)	EPC (mg/kg)	EPC Rationale
TEQ Summation**														
	TEQs (ND=DL/2; EMPC=EMPC)	2.0E-05	2.0E-05	23	23	100.0%	3.1E-07	1.8E-04	HB-26	--	--	3.1E-05	5.7E-05	95% Adjusted Gamma UCL

Notes:

mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).

EMPC - Estimated Maximum Possible Concentration. An EMPC represents an upper bound on a congener concentration when all criteria for detection of the congener were not met. This value represents the theoretical maximum possible content of dioxins and furans in the sample.

TEQ – the Toxic Equivalent concentration (TEQ) for each sample. It is calculated by summing concentration data for all dioxin, furan, and PCB congeners that are believed to harm human health in the same way as the congener commonly referred to as dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin). These congeners are sometimes referred to as "dioxin-like." See the TRC memorandum for additional details.

TEQ is calculated for each sample using 2005 WHO Toxicity Equivalent Factors (TEFs) for each dioxin-like congener defined by MassDEP and the World Health Organization. TEFs are used to mathematically change concentrations of the individual congeners into a single equivalent concentration of dioxin. EMPCs were included in TEQ estimates to avoid underestimating exposure to dioxin-like congeners. Results below detection limits, or "non-detects" (NDs), were included as ½ the detection limit.

** - Sum of Dioxin-like PCB Congeners TEQ and Dioxins TEQ.

Table C-2.38. Summary Statistics for Shallow Groundwater Samples
New Bedford High School
New Bedford, Massachusetts

Analysis	Analyte	Sample ID: / Depth to Water (ft-toc): / Screened Interval: GW-2	GW-3	Background	UCL*	**# of** Samples	**# of** Detects	**Freq. of** Detects	**Min. of** Detects (ug/L)	**Max. of** Detects (ug/L)	**Location of** Max. Detected	**Min. of** Non-Detects (ug/L)	**Max. of** Non-Detects (ug/L)	**Mean** Concentration (ug/L)	EPC (ug/L)	EPC Rationale
VOCs																
	Carbon Disulfide	NS	NS	NA	NS	25	1	4.0%	1.26	1.26	MW-18	2	3.5	1.1E+00	1.3E+00	Maximum of detects
	cis-1,2-Dichloroethylene	20	50,000	NA	100,000	25	4	16.0%	0.93	31.12	MW-7	1	1	2.0E+00	3.1E+01	Maximum of detects
	p-Isopropyltoluene (p-Cymene)	4,000(1)	50,000(1)	NA	100,000(1)	25	1	4.0%	3.6	3.6	MW-22	1.5	2	1.1E+00	3.6E+00	Maximum of detects
	Tetrachloroethylene	50	30,000	NA	100,000	25	1	4.0%	48	48	MW-7	1	1	2.4E+00	4.8E+01	Maximum of detects
	Trichloroethylene	5	5,000	NA	50,000	25	4	16.0%	0.85	6.39	MW-7	1	1	8.3E-01	6.4E+00	Maximum of detects
	Vinyl Chloride	2	50,000	NA	100,000	25	2	8.0%	2.5	3.93	MW-7	1	1.5	7.3E-01	3.9E+00	Maximum of detects
PAHs																
	Phenanthrene	NS	10,000	NA	100,000	7	2	28.6%	0.09	0.18	MW-5	0.05	5	7.6E-01	1.8E-01	Maximum of detects
PCBs																
	Total PCBs	5	10	NA	100	9	2	22.2%	0.07	0.10974	MW-5	0.05	0.05	3.9E-02	1.1E-01	Maximum of detects
Metals																
	Arsenic	NS	900	5.5	9,000	7	4	57.1%	2.41	15	MW-5	2	5	5.9E+00	1.5E+01	Maximum of detects
	Barium	NS	50,000	NA	100,000	7	4	57.1%	122	5640	MW-HH-13	50	250	9.1E+02	5.6E+03	Maximum of detects
	Chromium	NS	300	4.9	3,000	7	1	14.3%	52	52	MW-5	5	50	1.6E+01	5.2E+01	Maximum of detects
	Lead	NS	10	8.8	150	7	2	28.6%	10.5	19.2	MW-5	5	7.5	6.6E+00	1.9E+01	Maximum of detects
	Nickel	NS	200	NA	2,000	7	2	28.6%	20	29.4	MW-7	5	25	1.0E+01	2.9E+01	Maximum of detects
	Silver	NS	7	4.7	1,000	7	2	28.6%	3	5	MW-5	2.5	3	2.1E+00	5.0E+00	Maximum of detects
	Thallium	NS	3,000	NA	30,000	7	1	14.3%	1.29	1.29	MW-8B	1	30	4.8E+00	1.3E+00	Maximum of detects
	Zinc	NS	900	NA	50,000	7	6	85.7%	18.5	894	MW-7	100	100	2.2E+02	8.9E+02	Maximum of detects

Notes:

ug/L - micrograms per liter.

NS - No MassDEP standards exist for this compound.

NA - Not Applicable.

VOCs - Volatile Organic Compounds.

PAHs - Polynuclear Aromatic Hydrocarbons.

PCBs - Polychlorinated Biphenyls.

EPC - Exposure Point Concentration.

UCL* - Upper Concentration Limit.

(1) - MassDEP Method 1 standards for C9-C10 aromatic hydrocarbons used.

APPENDIX C-3

PROUCL DOCUMENTATION FOR 95 PERCENT UPPER CONFIDENCE LIMITS

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			4/29/2014 12:46:38 PM								
5	From File			ProUCL_Import.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	mber of Bootstrap Operations			2000								
9												
10												
11	**Lead_EP2_0-15**											
12												
13	**General Statistics**											
14	Total Number of Observations					73	Number of Distinct Observations					71
15							Number of Missing Observations					17
16	Minimum					0.175	Mean					144.4
17	Maximum					2360	Median					37
18	SD					316.2	Std. Error of Mean					37.01
19	Coefficient of Variation					2.189	Skewness					5.203
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.48	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.324	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.104	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					206.1	95% Adjusted-CLT UCL (Chen-1995)					229.4
31							95% Modified-t UCL (Johnson-1978)					209.9
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					1.485	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.837	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.139	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.112	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					0.418	k star (bias corrected MLE)					0.41
42	Theta hat (MLE)					345.7	Theta star (bias corrected MLE)					352.5
43	nu hat (MLE)					61	nu star (bias corrected)					59.82
44	MLE Mean (bias corrected)					144.4	MLE Sd (bias corrected)					225.6
45							Approximate Chi Square Value (0.05)					43.04
46	Adjusted Level of Significance					0.0467	Adjusted Chi Square Value					42.75
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					200.8	95% Adjusted Gamma UCL (use when n<50)					202.1
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.97	**Shapiro Wilk Lognormal GOF Test**					
53	5% Shapiro Wilk P Value					0.236	Data appear Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.0904	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.104	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												

	A	B	C	D	E	F	G	H	I	J	K	L
58						Lognormal Statistics						
59					Minimum of Logged Data	-1.743				Mean of logged Data		3.409
60					Maximum of Logged Data	7.766				SD of logged Data		2.044
61												
62						Assuming Lognormal Distribution						
63					95% H-UCL	562.4				90% Chebyshev (MVUE) UCL		473.5
64					95% Chebyshev (MVUE) UCL	586.2				97.5% Chebyshev (MVUE) UCL		742.6
65					99% Chebyshev (MVUE) UCL	1050						
66												
67						Nonparametric Distribution Free UCL Statistics						
68						Data appear to follow a Discernible Distribution at 5% Significance Level						
69												
70						Nonparametric Distribution Free UCLs						
71					95% CLT UCL	205.3				95% Jackknife UCL		206.1
72					95% Standard Bootstrap UCL	204.6				95% Bootstrap-t UCL		251.6
73					95% Hall's Bootstrap UCL	461.3				95% Percentile Bootstrap UCL		210
74					95% BCA Bootstrap UCL	239.4						
75					90% Chebyshev(Mean, Sd) UCL	255.5				95% Chebyshev(Mean, Sd) UCL		305.8
76					97.5% Chebyshev(Mean, Sd) UCL	375.6				99% Chebyshev(Mean, Sd) UCL		512.7
77												
78						Suggested UCL to Use						
79					95% H-UCL	562.4						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	ProUCL computes and outputs H-statistic based UCLs for historical reasons only.											
87	H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.											
88	It is therefore recommended to avoid the use of H-statistic based 95% UCLs.											
89	se of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.											
90												
91	Lead_EP2_0-6											
92												
93						General Statistics						
94					Total Number of Observations	71				Number of Distinct Observations		69
95										Number of Missing Observations		17
96					Minimum	0.175				Mean		147.7
97					Maximum	2360				Median		37
98					SD	320.1				Std. Error of Mean		37.98
99					Coefficient of Variation	2.167				Skewness		5.135
100												
101						Normal GOF Test						
102					Shapiro Wilk Test Statistic	0.485				Shapiro Wilk GOF Test		
103					5% Shapiro Wilk P Value	0				Data Not Normal at 5% Significance Level		
104					Lilliefors Test Statistic	0.322				Lilliefors GOF Test		
105					5% Lilliefors Critical Value	0.105				Data Not Normal at 5% Significance Level		
106						Data Not Normal at 5% Significance Level						
107												
108						Assuming Normal Distribution						
109					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
110					95% Student's-t UCL	211				95% Adjusted-CLT UCL (Chen-1995)		234.9
111										95% Modified-t UCL (Johnson-1978)		214.8
112												

	A	B	C	D	E	F	G	H	I	J	K	L
113	Gamma GOF Test											
114					A-D Test Statistic	1.399	Anderson-Darling Gamma GOF Test					
115					5% A-D Critical Value	0.837	Data Not Gamma Distributed at 5% Significance Level					
116					K-S Test Statistic	0.146	Kolmogrov-Smirnoff Gamma GOF Test					
117					5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level					
118	Data Not Gamma Distributed at 5% Significance Level											
119												
120	Gamma Statistics											
121					k hat (MLE)	0.418	k star (bias corrected MLE)					0.41
122					Theta hat (MLE)	353.1	Theta star (bias corrected MLE)					360.2
123					nu hat (MLE)	59.39	nu star (bias corrected)					58.22
124					MLE Mean (bias corrected)	147.7	MLE Sd (bias corrected)					230.6
125							Approximate Chi Square Value (0.05)					41.68
126					Adjusted Level of Significance	0.0466	Adjusted Chi Square Value					41.39
127												
128	Assuming Gamma Distribution											
129	95% Approximate Gamma UCL (use when n>=50))					206.3	95% Adjusted Gamma UCL (use when n<50)					207.7
130												
131	Lognormal GOF Test											
132					Shapiro Wilk Test Statistic	0.97	Shapiro Wilk Lognormal GOF Test					
133					5% Shapiro Wilk P Value	0.239	Data appear Lognormal at 5% Significance Level					
134					Lilliefors Test Statistic	0.0905	Lilliefors Lognormal GOF Test					
135					5% Lilliefors Critical Value	0.105	Data appear Lognormal at 5% Significance Level					
136	Data appear Lognormal at 5% Significance Level											
137												
138	Lognormal Statistics											
139					Minimum of Logged Data	-1.743	Mean of logged Data					3.433
140					Maximum of Logged Data	7.766	SD of logged Data					2.052
141												
142	Assuming Lognormal Distribution											
143					95% H-UCL	595.7	90% Chebyshev (MVUE) UCL					496.3
144					95% Chebyshev (MVUE) UCL	615.4	97.5% Chebyshev (MVUE) UCL					780.6
145					99% Chebyshev (MVUE) UCL	1105						
146												
147	Nonparametric Distribution Free UCL Statistics											
148	Data appear to follow a Discernible Distribution at 5% Significance Level											
149												
150	Nonparametric Distribution Free UCLs											
151					95% CLT UCL	210.1	95% Jackknife UCL					211
152					95% Standard Bootstrap UCL	210	95% Bootstrap-t UCL					269.6
153					95% Hall's Bootstrap UCL	473.2	95% Percentile Bootstrap UCL					213.7
154					95% BCA Bootstrap UCL	244.4						
155					90% Chebyshev(Mean, Sd) UCL	261.6	95% Chebyshev(Mean, Sd) UCL					313.2
156					97.5% Chebyshev(Mean, Sd) UCL	384.9	99% Chebyshev(Mean, Sd) UCL					525.6
157												
158	Suggested UCL to Use											
159					95% H-UCL	595.7						
160												
161	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
162	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
163	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
164	For additional insight the user may want to consult a statistician.											
165												
166	ProUCL computes and outputs H-statistic based UCLs for historical reasons only.											
167	H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.											
168	It is therefore recommended to avoid the use of H-statistic based 95% UCLs.											
169	se of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.											
170												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			4/30/2014 8:45:12 AM								
5	From File			ProUCL_Import.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Lead_EP3_0-15											
12												
13	General Statistics											
14	Total Number of Observations					22	Number of Distinct Observations					22
15							Number of Missing Observations					12
16	Minimum					2.93	Mean					497.2
17	Maximum					6870	Median					99.8
18	SD					1446	Std. Error of Mean					308.4
19	Coefficient of Variation					2.909	Skewness					4.459
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.349	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.911	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.366	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.189	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					1028	95% Adjusted-CLT UCL (Chen-1995)					1318
31							95% Modified-t UCL (Johnson-1978)					1077
32												
33	Gamma GOF Test											
34	A-D Test Statistic					1.259	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.836	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.178	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.2	Detected data appear Gamma Distributed at 5% Significance Level					
38	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.355	k star (bias corrected MLE)					0.337
42	Theta hat (MLE)					1401	Theta star (bias corrected MLE)					1476
43	nu hat (MLE)					15.62	nu star (bias corrected)					14.82
44	MLE Mean (bias corrected)					497.2	MLE Sd (bias corrected)					856.7
45							Approximate Chi Square Value (0.05)					7.136
46	Adjusted Level of Significance					0.0386	Adjusted Chi Square Value					6.74
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50)					1033	95% Adjusted Gamma UCL (use when n<50)					1093
50												

	A	B	C	D	E	F	G	H	I	J	K	L
51	**Lognormal GOF Test**											
52					Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**					
53					5% Shapiro Wilk Critical Value	0.911	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.17	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.189	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	1.075				Mean of logged Data		4.319
60					Maximum of Logged Data	8.835				SD of logged Data		2.013
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	3618				90% Chebyshev (MVUE) UCL		1190
64					95% Chebyshev (MVUE) UCL	1523				97.5% Chebyshev (MVUE) UCL		1986
65					99% Chebyshev (MVUE) UCL	2895						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	1004				95% Jackknife UCL		1028
72					95% Standard Bootstrap UCL	999.7				95% Bootstrap-t UCL		3310
73					95% Hall's Bootstrap UCL	2688				95% Percentile Bootstrap UCL		1087
74					95% BCA Bootstrap UCL	1477						
75					90% Chebyshev(Mean, Sd) UCL	1422				95% Chebyshev(Mean, Sd) UCL		1841
76					97.5% Chebyshev(Mean, Sd) UCL	2423				99% Chebyshev(Mean, Sd) UCL		3565
77												
78	**Suggested UCL to Use**											
79					95% Adjusted Gamma UCL	1093						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Lead_EP3_0-6											
88												
89						General Statistics						
90					Total Number of Observations	21				Number of Distinct Observations		21
91										Number of Missing Observations		12
92					Minimum	2.93				Mean		520.6
93					Maximum	6870				Median		103
94					SD	1478				Std. Error of Mean		322.5
95					Coefficient of Variation	2.838				Skewness		4.36
96												
97						Normal GOF Test						
98					Shapiro Wilk Test Statistic	0.355				Shapiro Wilk GOF Test		
99					5% Shapiro Wilk Critical Value	0.908				Data Not Normal at 5% Significance Level		
100					Lilliefors Test Statistic	0.363				Lilliefors GOF Test		
101					5% Lilliefors Critical Value	0.193				Data Not Normal at 5% Significance Level		
102						Data Not Normal at 5% Significance Level						
103												
104						Assuming Normal Distribution						
105					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
106					95% Student's-t UCL	1077				95% Adjusted-CLT UCL (Chen-1995)		1379
107										95% Modified-t UCL (Johnson-1978)		1128
108												
109						Gamma GOF Test						
110					A-D Test Statistic	1.181				Anderson-Darling Gamma GOF Test		
111					5% A-D Critical Value	0.832				Data Not Gamma Distributed at 5% Significance Level		
112					K-S Test Statistic	0.183				Kolmogrov-Smirnoff Gamma GOF Test		
113					5% K-S Critical Value	0.204				Detected data appear Gamma Distributed at 5% Significance Level		
114						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
115												
116						Gamma Statistics						
117					k hat (MLE)	0.368				k star (bias corrected MLE)		0.347
118					Theta hat (MLE)	1415				Theta star (bias corrected MLE)		1499
119					nu hat (MLE)	15.46				nu star (bias corrected)		14.58
120					MLE Mean (bias corrected)	520.6				MLE Sd (bias corrected)		883.5
121										Approximate Chi Square Value (0.05)		6.972
122					Adjusted Level of Significance	0.0383				Adjusted Chi Square Value		6.57
123												
124						Assuming Gamma Distribution						
125					95% Approximate Gamma UCL (use when n>=50)	1089				95% Adjusted Gamma UCL (use when n<50)		1156
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.956				Shapiro Wilk Lognormal GOF Test		
129					5% Shapiro Wilk Critical Value	0.908				Data appear Lognormal at 5% Significance Level		
130					Lilliefors Test Statistic	0.165				Lilliefors Lognormal GOF Test		
131					5% Lilliefors Critical Value	0.193				Data appear Lognormal at 5% Significance Level		
132						Data appear Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	1.075				Mean of logged Data		4.443
136					Maximum of Logged Data	8.835				SD of logged Data		1.975
137												
138						Assuming Lognormal Distribution						
139					95% H-UCL	3646				90% Chebyshev (MVUE) UCL		1247
140					95% Chebyshev (MVUE) UCL	1595				97.5% Chebyshev (MVUE) UCL		2079
141					99% Chebyshev (MVUE) UCL	3029						
142												
143						Nonparametric Distribution Free UCL Statistics						
144						Data appear to follow a Discernible Distribution at 5% Significance Level						
145												

	A	B	C	D	E	F	G	H	I	J	K	L
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	1051				95% Jackknife UCL		1077
148					95% Standard Bootstrap UCL	1038				95% Bootstrap-t UCL		3404
149					95% Hall's Bootstrap UCL	2826				95% Percentile Bootstrap UCL		1156
150					95% BCA Bootstrap UCL	1505						
151					90% Chebyshev(Mean, Sd) UCL	1488				95% Chebyshev(Mean, Sd) UCL		1926
152					97.5% Chebyshev(Mean, Sd) UCL	2534				99% Chebyshev(Mean, Sd) UCL		3729
153												
154	**Suggested UCL to Use**											
155					95% Adjusted Gamma UCL	1156						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Lead_EP3_0-3**											
164												
165	**General Statistics**											
166					Total Number of Observations	20				Number of Distinct Observations		20
167										Number of Missing Observations		12
168					Minimum	2.93				Mean		203.1
169					Maximum	865				Median		99.8
170					SD	266				Std. Error of Mean		59.48
171					Coefficient of Variation	1.309				Skewness		1.647
172												
173	**Normal GOF Test**											
174					Shapiro Wilk Test Statistic	0.747				**Shapiro Wilk GOF Test**		
175					5% Shapiro Wilk Critical Value	0.905				Data Not Normal at 5% Significance Level		
176					Lilliefors Test Statistic	0.226				**Lilliefors GOF Test**		
177					5% Lilliefors Critical Value	0.198				Data Not Normal at 5% Significance Level		
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
182					95% Student's-t UCL	306				95% Adjusted-CLT UCL (Chen-1995)		324.4
183										95% Modified-t UCL (Johnson-1978)		309.7
184												
185	**Gamma GOF Test**											
186					A-D Test Statistic	0.571				**Anderson-Darling Gamma GOF Test**		
187					5% A-D Critical Value	0.796				Detected data appear Gamma Distributed at 5% Significance Level		
188					K-S Test Statistic	0.199				**Kolmogrov-Smirnoff Gamma GOF Test**		
189					5% K-S Critical Value	0.204				Detected data appear Gamma Distributed at 5% Significance Level		
190	**Detected data appear Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193					k hat (MLE)	0.571				k star (bias corrected MLE)		0.518
194					Theta hat (MLE)	356				Theta star (bias corrected MLE)		391.8
195					nu hat (MLE)	22.83				nu star (bias corrected)		20.74
196					MLE Mean (bias corrected)	203.1				MLE Sd (bias corrected)		282.1
197										Approximate Chi Square Value (0.05)		11.4
198					Adjusted Level of Significance	0.038				Adjusted Chi Square Value		10.85
199												

	A	B	C	D	E	F	G	H	I	J	K	L
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50)					369.7	95% Adjusted Gamma UCL (use when n<50)					388.2
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.927	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.905	Data appear Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.178	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.198	Data appear Lognormal at 5% Significance Level					
208	**Data appear Lognormal at 5% Significance Level**											
209												
210	**Lognormal Statistics**											
211	Minimum of Logged Data					1.075	Mean of logged Data					4.223
212	Maximum of Logged Data					6.763	SD of logged Data					1.743
213												
214	**Assuming Lognormal Distribution**											
215	95% H-UCL					1451	90% Chebyshev (MVUE) UCL					643.7
216	95% Chebyshev (MVUE) UCL					815.1	97.5% Chebyshev (MVUE) UCL					1053
217	99% Chebyshev (MVUE) UCL					1520						
218												
219	**Nonparametric Distribution Free UCL Statistics**											
220	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
221												
222	**Nonparametric Distribution Free UCLs**											
223	95% CLT UCL					301	95% Jackknife UCL					306
224	95% Standard Bootstrap UCL					298.9	95% Bootstrap-t UCL					357.1
225	95% Hall's Bootstrap UCL					333.7	95% Percentile Bootstrap UCL					305.5
226	95% BCA Bootstrap UCL					322.3						
227	90% Chebyshev(Mean, Sd) UCL					381.6	95% Chebyshev(Mean, Sd) UCL					462.4
228	97.5% Chebyshev(Mean, Sd) UCL					574.6	99% Chebyshev(Mean, Sd) UCL					795
229												
230	**Suggested UCL to Use**											
231	95% Adjusted Gamma UCL					388.2						
232												
233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
234	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
235	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
236	For additional insight the user may want to consult a statistician.											
237												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			4/30/2014 10:26:15 PM								
5	From File			ProUCL_Import.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Total PCBs_EP4_0-15											
12												
13	General Statistics											
14	Total Number of Observations					49	Number of Distinct Observations					47
15							Number of Missing Observations					4
16	Minimum					0.0243	Mean					0.742
17	Maximum					12	Median					0.115
18	SD					1.774	Std. Error of Mean					0.253
19	Coefficient of Variation					2.39	Skewness					5.566
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.416	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.947	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.343	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.127	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					1.168	95% Adjusted-CLT UCL (Chen-1995)					1.375
31							95% Modified-t UCL (Johnson-1978)					1.201
32												
33	Gamma GOF Test											
34	A-D Test Statistic					2.534	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.826	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.182	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.135	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.45	k star (bias corrected MLE)					0.436
42	Theta hat (MLE)					1.649	Theta star (bias corrected MLE)					1.701
43	nu hat (MLE)					44.13	nu star (bias corrected)					42.76
44	MLE Mean (bias corrected)					0.742	MLE Sd (bias corrected)					1.124
45							Approximate Chi Square Value (0.05)					28.77
46	Adjusted Level of Significance					0.0451	Adjusted Chi Square Value					28.42
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					1.103	95% Adjusted Gamma UCL (use when n<50)					1.117
50												

	A	B	C	D	E	F	G	H	I	J	K	L
51	**Lognormal GOF Test**											
52					Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk Lognormal GOF Test**					
53					5% Shapiro Wilk Critical Value	0.947	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.189	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.127	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-3.717				Mean of logged Data		-1.732
60					Maximum of Logged Data	2.485				SD of logged Data		1.744
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	1.836				90% Chebyshev (MVUE) UCL		1.536
64					95% Chebyshev (MVUE) UCL	1.891				97.5% Chebyshev (MVUE) UCL		2.384
65					99% Chebyshev (MVUE) UCL	3.352						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	1.159				95% Jackknife UCL		1.168
72					95% Standard Bootstrap UCL	1.142				95% Bootstrap-t UCL		1.789
73					95% Hall's Bootstrap UCL	2.744				95% Percentile Bootstrap UCL		1.176
74					95% BCA Bootstrap UCL	1.503						
75					90% Chebyshev(Mean, Sd) UCL	1.503				95% Chebyshev(Mean, Sd) UCL		1.847
76					97.5% Chebyshev(Mean, Sd) UCL	2.325				99% Chebyshev(Mean, Sd) UCL		3.265
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	1.847						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	**Lead_EP4_0-15**											
88												
89						**General Statistics**						
90					Total Number of Observations	36				Number of Distinct Observations		36
91										Number of Missing Observations		17
92					Minimum	3.05				Mean		270.3
93					Maximum	2780				Median		64.38
94					SD	528.2				Std. Error of Mean		88.03
95					Coefficient of Variation	1.954				Skewness		3.699
96												
97						**Normal GOF Test**						
98					Shapiro Wilk Test Statistic	0.531				**Shapiro Wilk GOF Test**		
99					5% Shapiro Wilk Critical Value	0.935				Data Not Normal at 5% Significance Level		
100					Lilliefors Test Statistic	0.306				**Lilliefors GOF Test**		
101					5% Lilliefors Critical Value	0.148				Data Not Normal at 5% Significance Level		
102						**Data Not Normal at 5% Significance Level**						
103												
104						**Assuming Normal Distribution**						
105					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
106					95% Student's-t UCL	419				95% Adjusted-CLT UCL (Chen-1995)		473.1
107										95% Modified-t UCL (Johnson-1978)		428.1
108												
109						**Gamma GOF Test**						
110					A-D Test Statistic	0.928				**Anderson-Darling Gamma GOF Test**		
111					5% A-D Critical Value	0.813				Data Not Gamma Distributed at 5% Significance Level		
112					K-S Test Statistic	0.15				**Kolmogrov-Smirnoff Gamma GOF Test**		
113					5% K-S Critical Value	0.155				Detected data appear Gamma Distributed at 5% Significance Level		
114						**Detected data follow Appr. Gamma Distribution at 5% Significance Level**						
115												
116						**Gamma Statistics**						
117					k hat (MLE)	0.498				k star (bias corrected MLE)		0.475
118					Theta hat (MLE)	543.3				Theta star (bias corrected MLE)		569.5
119					nu hat (MLE)	35.82				nu star (bias corrected)		34.17
120					MLE Mean (bias corrected)	270.3				MLE Sd (bias corrected)		392.3
121										Approximate Chi Square Value (0.05)		21.8
122					Adjusted Level of Significance	0.0428				Adjusted Chi Square Value		21.35
123												

	A	B	C	D	E	F	G	H	I	J	K	L
124	**Assuming Gamma Distribution**											
125	95% Approximate Gamma UCL (use when n>=50)					423.7	95% Adjusted Gamma UCL (use when n<50)					432.6
126												
127	**Lognormal GOF Test**											
128	Shapiro Wilk Test Statistic					0.974	**Shapiro Wilk Lognormal GOF Test**					
129	5% Shapiro Wilk Critical Value					0.935	Data appear Lognormal at 5% Significance Level					
130	Lilliefors Test Statistic					0.0815	**Lilliefors Lognormal GOF Test**					
131	5% Lilliefors Critical Value					0.148	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135	Minimum of Logged Data					1.115	Mean of logged Data					4.322
136	Maximum of Logged Data					7.93	SD of logged Data					1.726
137												
138	**Assuming Lognormal Distribution**											
139	95% H-UCL					879.3	90% Chebyshev (MVUE) UCL					655.4
140	95% Chebyshev (MVUE) UCL					814.5	97.5% Chebyshev (MVUE) UCL					1035
141	99% Chebyshev (MVUE) UCL					1469						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147	95% CLT UCL					415.1	95% Jackknife UCL					419
148	95% Standard Bootstrap UCL					414.2	95% Bootstrap-t UCL					624.1
149	95% Hall's Bootstrap UCL					1057	95% Percentile Bootstrap UCL					422.9
150	95% BCA Bootstrap UCL					502.5						
151	90% Chebyshev(Mean, Sd) UCL					534.4	95% Chebyshev(Mean, Sd) UCL					654
152	97.5% Chebyshev(Mean, Sd) UCL					820	99% Chebyshev(Mean, Sd) UCL					1146
153												
154	**Suggested UCL to Use**											
155	95% Adjusted Gamma UCL					432.6						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163												

	A	B	C	D	E	F	G	H	I	J	K	L
164	Total PCBs_EP4_0-6											
165												
166	General Statistics											
167					Total Number of Observations	44				Number of Distinct Observations		43
168										Number of Missing Observations		4
169					Minimum	0.0243				Mean		0.779
170					Maximum	12				Median		0.136
171					SD	1.856				Std. Error of Mean		0.28
172					Coefficient of Variation	2.384				Skewness		5.393
173												
174	Normal GOF Test											
175					Shapiro Wilk Test Statistic	0.415			Shapiro Wilk GOF Test			
176					5% Shapiro Wilk Critical Value	0.944			Data Not Normal at 5% Significance Level			
177					Lilliefors Test Statistic	0.342			Lilliefors GOF Test			
178					5% Lilliefors Critical Value	0.134			Data Not Normal at 5% Significance Level			
179	Data Not Normal at 5% Significance Level											
180												
181	Assuming Normal Distribution											
182	95% Normal UCL								95% UCLs (Adjusted for Skewness)			
183					95% Student's-t UCL	1.249				95% Adjusted-CLT UCL (Chen-1995)		1.482
184										95% Modified-t UCL (Johnson-1978)		1.287
185												
186	Gamma GOF Test											
187					A-D Test Statistic	2.144			Anderson-Darling Gamma GOF Test			
188					5% A-D Critical Value	0.825			Data Not Gamma Distributed at 5% Significance Level			
189					K-S Test Statistic	0.173			Kolmogrov-Smirnoff Gamma GOF Test			
190					5% K-S Critical Value	0.142			Data Not Gamma Distributed at 5% Significance Level			
191	Data Not Gamma Distributed at 5% Significance Level											
192												
193	Gamma Statistics											
194					k hat (MLE)	0.45				k star (bias corrected MLE)		0.434
195					Theta hat (MLE)	1.731				Theta star (bias corrected MLE)		1.793
196					nu hat (MLE)	39.58				nu star (bias corrected)		38.21
197					MLE Mean (bias corrected)	0.779				MLE Sd (bias corrected)		1.182
198										Approximate Chi Square Value (0.05)		25.06
199					Adjusted Level of Significance	0.0445				Adjusted Chi Square Value		24.69
200												
201	Assuming Gamma Distribution											
202					95% Approximate Gamma UCL (use when n>=50))	1.188				95% Adjusted Gamma UCL (use when n<50)		1.205
203												
204	Lognormal GOF Test											
205					Shapiro Wilk Test Statistic	0.88			Shapiro Wilk Lognormal GOF Test			
206					5% Shapiro Wilk Critical Value	0.944			Data Not Lognormal at 5% Significance Level			
207					Lilliefors Test Statistic	0.186			Lilliefors Lognormal GOF Test			
208					5% Lilliefors Critical Value	0.134			Data Not Lognormal at 5% Significance Level			
209	Data Not Lognormal at 5% Significance Level											
210												
211	Lognormal Statistics											
212					Minimum of Logged Data	-3.717				Mean of logged Data		-1.686
213					Maximum of Logged Data	2.485				SD of logged Data		1.763

	A	B	C	D	E	F	G	H	I	J	K	L
214												
215						Assuming Lognormal Distribution						
216					95% H-UCL	2.15				90% Chebyshev (MVUE) UCL		1.694
217					95% Chebyshev (MVUE) UCL	2.097				97.5% Chebyshev (MVUE) UCL		2.655
218					99% Chebyshev (MVUE) UCL	3.751						
219												
220						Nonparametric Distribution Free UCL Statistics						
221						Data do not follow a Discernible Distribution (0.05)						
222												
223						Nonparametric Distribution Free UCLs						
224					95% CLT UCL	1.239				95% Jackknife UCL		1.249
225					95% Standard Bootstrap UCL	1.242				95% Bootstrap-t UCL		1.981
226					95% Hall's Bootstrap UCL	2.964				95% Percentile Bootstrap UCL		1.292
227					95% BCA Bootstrap UCL	1.632						
228					90% Chebyshev(Mean, Sd) UCL	1.618				95% Chebyshev(Mean, Sd) UCL		1.998
229					97.5% Chebyshev(Mean, Sd) UCL	2.526				99% Chebyshev(Mean, Sd) UCL		3.563
230												
231						Suggested UCL to Use						
232					95% Chebyshev (Mean, Sd) UCL	1.998						
233												
234					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
235					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
236					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
237					For additional insight the user may want to consult a statistician.							
238												
239												
240	Lead_EP4_0-6											
241												
242						General Statistics						
243					Total Number of Observations	32				Number of Distinct Observations		32
244										Number of Missing Observations		16
245					Minimum	3.05				Mean		216.1
246					Maximum	1590				Median		80.28
247					SD	319.8				Std. Error of Mean		56.54
248					Coefficient of Variation	1.48				Skewness		2.926
249												
250						Normal GOF Test						
251					Shapiro Wilk Test Statistic	0.664				Shapiro Wilk GOF Test		
252					5% Shapiro Wilk Critical Value	0.93				Data Not Normal at 5% Significance Level		
253					Lilliefors Test Statistic	0.253				Lilliefors GOF Test		
254					5% Lilliefors Critical Value	0.157				Data Not Normal at 5% Significance Level		
255						Data Not Normal at 5% Significance Level						
256												
257						Assuming Normal Distribution						
258					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
259					95% Student's-t UCL	312				95% Adjusted-CLT UCL (Chen-1995)		340.4
260										95% Modified-t UCL (Johnson-1978)		316.9
261												
262						Gamma GOF Test						
263					A-D Test Statistic	0.479				Anderson-Darling Gamma GOF Test		
264					5% A-D Critical Value	0.798				Detected data appear Gamma Distributed at 5% Significance Level		
265					K-S Test Statistic	0.138				Kolmogrov-Smirnoff Gamma GOF Test		
266					5% K-S Critical Value	0.163				Detected data appear Gamma Distributed at 5% Significance Level		
267						Detected data appear Gamma Distributed at 5% Significance Level						
268												
269						Gamma Statistics						
270					k hat (MLE)	0.634				k star (bias corrected MLE)		0.595
271					Theta hat (MLE)	341				Theta star (bias corrected MLE)		363.1
272					nu hat (MLE)	40.56				nu star (bias corrected)		38.09
273					MLE Mean (bias corrected)	216.1				MLE Sd (bias corrected)		280.2
274										Approximate Chi Square Value (0.05)		24.96
275					Adjusted Level of Significance	0.0416				Adjusted Chi Square Value		24.39

	A	B	C	D	E	F	G	H	I	J	K	L
276												
277						**Assuming Gamma Distribution**						
278					95% Approximate Gamma UCL (use when n>=50)	329.9				95% Adjusted Gamma UCL (use when n<50)		337.6
279												
280						**Lognormal GOF Test**						
281					Shapiro Wilk Test Statistic	0.973			**Shapiro Wilk Lognormal GOF Test**			
282					5% Shapiro Wilk Critical Value	0.93			Data appear Lognormal at 5% Significance Level			
283					Lilliefors Test Statistic	0.0968			**Lilliefors Lognormal GOF Test**			
284					5% Lilliefors Critical Value	0.157			Data appear Lognormal at 5% Significance Level			
285						**Data appear Lognormal at 5% Significance Level**						
286												
287						**Lognormal Statistics**						
288					Minimum of Logged Data	1.115				Mean of logged Data		4.409
289					Maximum of Logged Data	7.371				SD of logged Data		1.562
290												
291						**Assuming Lognormal Distribution**						
292					95% H-UCL	678.2				90% Chebyshev (MVUE) UCL		531.4
293					95% Chebyshev (MVUE) UCL	655.5				97.5% Chebyshev (MVUE) UCL		827.7
294					99% Chebyshev (MVUE) UCL	1166						
295												
296						**Nonparametric Distribution Free UCL Statistics**						
297						**Data appear to follow a Discernible Distribution at 5% Significance Level**						
298												
299						**Nonparametric Distribution Free UCLs**						
300					95% CLT UCL	309.1				95% Jackknife UCL		312
301					95% Standard Bootstrap UCL	307.8				95% Bootstrap-t UCL		379.5
302					95% Hall's Bootstrap UCL	666.7				95% Percentile Bootstrap UCL		319
303					95% BCA Bootstrap UCL	353.1						
304					90% Chebyshev(Mean, Sd) UCL	385.7				95% Chebyshev(Mean, Sd) UCL		462.6
305					97.5% Chebyshev(Mean, Sd) UCL	569.2				99% Chebyshev(Mean, Sd) UCL		778.7
306												
307						**Suggested UCL to Use**						
308					95% Adjusted Gamma UCL	337.6						
309												
310					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
311					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
312					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
313					For additional insight the user may want to consult a statistician.							
314												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			5/2/2014 2:14:14 PM								
5	From File			ProUCL_Import.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	mber of Bootstrap Operations			2000								
9												
10												
11	**Total PCBs_EP6_0-15**											
12												
13	**General Statistics**											
14	Total Number of Observations					31	Number of Distinct Observations					30
15							Number of Missing Observations					5
16	Minimum					0.0255	Mean					1.349
17	Maximum					17.74	Median					0.192
18	SD					3.311	Std. Error of Mean					0.595
19	Coefficient of Variation					2.454	Skewness					4.377
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.438	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.929	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.345	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.159	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					2.359	95% Adjusted-CLT UCL (Chen-1995)					2.827
31							95% Modified-t UCL (Johnson-1978)					2.437
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					1.596	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.833	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.183	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.169	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					0.394	k star (bias corrected MLE)					0.377
42	Theta hat (MLE)					3.427	Theta star (bias corrected MLE)					3.578
43	nu hat (MLE)					24.41	nu star (bias corrected)					23.38
44	MLE Mean (bias corrected)					1.349	MLE Sd (bias corrected)					2.197
45							Approximate Chi Square Value (0.05)					13.38
46	Adjusted Level of Significance					0.0413	Adjusted Chi Square Value					12.96
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					2.358	95% Adjusted Gamma UCL (use when n<50)					2.435
50												

	A	B	C	D	E	F	G	H	I	J	K	L
51	**Lognormal GOF Test**											
52					Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk Lognormal GOF Test**					
53					5% Shapiro Wilk Critical Value	0.929	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.136	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level					
56	**Data appear Approximate Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-3.669				Mean of logged Data		-1.376
60					Maximum of Logged Data	2.876				SD of logged Data		1.88
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	5.135				90% Chebyshev (MVUE) UCL		3.028
64					95% Chebyshev (MVUE) UCL	3.817				97.5% Chebyshev (MVUE) UCL		4.911
65					99% Chebyshev (MVUE) UCL	7.061						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	2.328				95% Jackknife UCL		2.359
72					95% Standard Bootstrap UCL	2.317				95% Bootstrap-t UCL		4.195
73					95% Hall's Bootstrap UCL	5.71				95% Percentile Bootstrap UCL		2.451
74					95% BCA Bootstrap UCL	2.962						
75					90% Chebyshev(Mean, Sd) UCL	3.133				95% Chebyshev(Mean, Sd) UCL		3.942
76					97.5% Chebyshev(Mean, Sd) UCL	5.063				99% Chebyshev(Mean, Sd) UCL		7.266
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	3.942						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Total PCBs_EP6_0-6											
88												
89	General Statistics											
90					Total Number of Observations	30			Number of Distinct Observations			29
91									Number of Missing Observations			5
92					Minimum	0.0255			Mean			1.393
93					Maximum	17.74			Median			0.204
94					SD	3.358			Std. Error of Mean			0.613
95					Coefficient of Variation	2.41			Skewness			4.309
96												
97	Normal GOF Test											
98					Shapiro Wilk Test Statistic	0.444			Shapiro Wilk GOF Test			
99					5% Shapiro Wilk Critical Value	0.927			Data Not Normal at 5% Significance Level			
100					Lilliefors Test Statistic	0.342			Lilliefors GOF Test			
101					5% Lilliefors Critical Value	0.162			Data Not Normal at 5% Significance Level			
102	Data Not Normal at 5% Significance Level											
103												
104	Assuming Normal Distribution											
105			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
106					95% Student's-t UCL	2.435			95% Adjusted-CLT UCL (Chen-1995)			2.917
107									95% Modified-t UCL (Johnson-1978)			2.516
108												
109	Gamma GOF Test											
110					A-D Test Statistic	1.448			Anderson-Darling Gamma GOF Test			
111					5% A-D Critical Value	0.831			Data Not Gamma Distributed at 5% Significance Level			
112					K-S Test Statistic	0.181			Kolmogrov-Smirnoff Gamma GOF Test			
113					5% K-S Critical Value	0.171			Data Not Gamma Distributed at 5% Significance Level			
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	0.403			k star (bias corrected MLE)			0.385
118					Theta hat (MLE)	3.461			Theta star (bias corrected MLE)			3.624
119					nu hat (MLE)	24.15			nu star (bias corrected)			23.07
120					MLE Mean (bias corrected)	1.393			MLE Sd (bias corrected)			2.247
121									Approximate Chi Square Value (0.05)			13.15
122					Adjusted Level of Significance	0.041			Adjusted Chi Square Value			12.71
123												
124	Assuming Gamma Distribution											
125			95% Approximate Gamma UCL (use when n>=50))			2.446			95% Adjusted Gamma UCL (use when n<50)			2.529
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.935			Shapiro Wilk Lognormal GOF Test			
129					5% Shapiro Wilk Critical Value	0.927			Data appear Lognormal at 5% Significance Level			
130					Lilliefors Test Statistic	0.121			Lilliefors Lognormal GOF Test			
131					5% Lilliefors Critical Value	0.162			Data appear Lognormal at 5% Significance Level			
132	Data appear Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-3.669			Mean of logged Data			-1.301
136					Maximum of Logged Data	2.876			SD of logged Data			1.864
137												

	A	B	C	D	E	F	G	H	I	J	K	L
138	Assuming Lognormal Distribution											
139					95% H-UCL	5.607			90% Chebyshev (MVUE) UCL			3.17
140					95% Chebyshev (MVUE) UCL	3.995			97.5% Chebyshev (MVUE) UCL			5.141
141					99% Chebyshev (MVUE) UCL	7.393						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	2.402			95% Jackknife UCL			2.435
148					95% Standard Bootstrap UCL	2.384			95% Bootstrap-t UCL			4.243
149					95% Hall's Bootstrap UCL	5.871			95% Percentile Bootstrap UCL			2.538
150					95% BCA Bootstrap UCL	3.239						
151					90% Chebyshev(Mean, Sd) UCL	3.233			95% Chebyshev(Mean, Sd) UCL			4.066
152					97.5% Chebyshev(Mean, Sd) UCL	5.223			99% Chebyshev(Mean, Sd) UCL			7.494
153												
154	Suggested UCL to Use											
155					95% Chebyshev (Mean, Sd) UCL	4.066						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	Total PCBs_EP6_0-3											
164												
165	General Statistics											
166					Total Number of Observations	29			Number of Distinct Observations			28
167									Number of Missing Observations			5
168					Minimum	0.0255			Mean			1.402
169					Maximum	17.74			Median			0.192
170					SD	3.418			Std. Error of Mean			0.635
171					Coefficient of Variation	2.438			Skewness			4.238
172												
173	Normal GOF Test											
174					Shapiro Wilk Test Statistic	0.443			Shapiro Wilk GOF Test			
175					5% Shapiro Wilk Critical Value	0.926			Data Not Normal at 5% Significance Level			
176					Lilliefors Test Statistic	0.344			Lilliefors GOF Test			
177					5% Lilliefors Critical Value	0.165			Data Not Normal at 5% Significance Level			
178	Data Not Normal at 5% Significance Level											
179												
180	Assuming Normal Distribution											
181					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
182					95% Student's-t UCL	2.481			95% Adjusted-CLT UCL (Chen-1995)			2.979
183									95% Modified-t UCL (Johnson-1978)			2.565
184												
185	Gamma GOF Test											
186					A-D Test Statistic	1.572			Anderson-Darling Gamma GOF Test			
187					5% A-D Critical Value	0.836			Data Not Gamma Distributed at 5% Significance Level			
188					K-S Test Statistic	0.196			Kolmogrov-Smirnoff Gamma GOF Test			
189					5% K-S Critical Value	0.175			Data Not Gamma Distributed at 5% Significance Level			
190	Data Not Gamma Distributed at 5% Significance Level											

	A	B	C	D	E	F	G	H	I	J	K	L
191												
192						Gamma Statistics						
193					k hat (MLE)	0.391				k star (bias corrected MLE)		0.374
194					Theta hat (MLE)	3.584				Theta star (bias corrected MLE)		3.752
195					nu hat (MLE)	22.68				nu star (bias corrected)		21.67
196					MLE Mean (bias corrected)	1.402				MLE Sd (bias corrected)		2.293
197										Approximate Chi Square Value (0.05)		12.09
198					Adjusted Level of Significance	0.0407				Adjusted Chi Square Value		11.66
199												
200						Assuming Gamma Distribution						
201				95% Approximate Gamma UCL (use when n>=50))		2.512				95% Adjusted Gamma UCL (use when n<50)		2.605
202												
203						Lognormal GOF Test						
204					Shapiro Wilk Test Statistic	0.931				Shapiro Wilk Lognormal GOF Test		
205					5% Shapiro Wilk Critical Value	0.926				Data appear Lognormal at 5% Significance Level		
206					Lilliefors Test Statistic	0.122				Lilliefors Lognormal GOF Test		
207					5% Lilliefors Critical Value	0.165				Data appear Lognormal at 5% Significance Level		
208						Data appear Lognormal at 5% Significance Level						
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	-3.669				Mean of logged Data		-1.351
212					Maximum of Logged Data	2.876				SD of logged Data		1.877
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	5.634				90% Chebyshev (MVUE) UCL		3.101
216					95% Chebyshev (MVUE) UCL	3.916				97.5% Chebyshev (MVUE) UCL		5.046
217					99% Chebyshev (MVUE) UCL	7.267						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data appear to follow a Discernible Distribution at 5% Significance Level						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	2.446				95% Jackknife UCL		2.481
224					95% Standard Bootstrap UCL	2.428				95% Bootstrap-t UCL		4.318
225					95% Hall's Bootstrap UCL	5.994				95% Percentile Bootstrap UCL		2.56
226					95% BCA Bootstrap UCL	3.217						
227					90% Chebyshev(Mean, Sd) UCL	3.306				95% Chebyshev(Mean, Sd) UCL		4.168
228					97.5% Chebyshev(Mean, Sd) UCL	5.365				99% Chebyshev(Mean, Sd) UCL		7.716
229												
230						Suggested UCL to Use						
231					95% Chebyshev (Mean, Sd) UCL	4.168						
232												
233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
234	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
235	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
236	For additional insight the user may want to consult a statistician.											
237												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**UCL Statistics for Uncensored Full Data Sets**							
2												
3				User Selected Options								
4				Date/Time of Computation	5/1/2014 2:57:50 PM							
5				From File	ProUCL_Import.xls							
6				Full Precision	OFF							
7				Confidence Coefficient	95%							
8				mber of Bootstrap Operations	2000							
9												
10												
11	**Lead_EP7_0-15**											
12												
13					**General Statistics**							
14					Total Number of Observations	15			Number of Distinct Observations			14
15									Number of Missing Observations			5
16					Minimum	1			Mean			149.3
17					Maximum	487			Median			67.2
18					SD	167.4			Std. Error of Mean			43.23
19					Coefficient of Variation	1.121			Skewness			1.052
20												
21					**Normal GOF Test**							
22					Shapiro Wilk Test Statistic	0.796			**Shapiro Wilk GOF Test**			
23					5% Shapiro Wilk Critical Value	0.881			Data Not Normal at 5% Significance Level			
24					Lilliefors Test Statistic	0.306			**Lilliefors GOF Test**			
25					5% Lilliefors Critical Value	0.229			Data Not Normal at 5% Significance Level			
26					**Data Not Normal at 5% Significance Level**							
27												
28					**Assuming Normal Distribution**							
29					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
30					95% Student's-t UCL	225.5			95% Adjusted-CLT UCL (Chen-1995)			233
31									95% Modified-t UCL (Johnson-1978)			227.4
32												
33					**Gamma GOF Test**							
34					A-D Test Statistic	0.393			**Anderson-Darling Gamma GOF Test**			
35					5% A-D Critical Value	0.782			etected data appear Gamma Distributed at 5% Significance Lev			
36					K-S Test Statistic	0.164			**Kolmogrov-Smirnoff Gamma GOF Test**			
37					5% K-S Critical Value	0.232			etected data appear Gamma Distributed at 5% Significance Lev			
38					**Detected data appear Gamma Distributed at 5% Significance Level**							
39												
40					**Gamma Statistics**							
41					k hat (MLE)	0.659			k star (bias corrected MLE)			0.571
42					Theta hat (MLE)	226.8			Theta star (bias corrected MLE)			261.4
43					nu hat (MLE)	19.76			nu star (bias corrected)			17.14
44					MLE Mean (bias corrected)	149.3			MLE Sd (bias corrected)			197.6
45									Approximate Chi Square Value (0.05)			8.771
46					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value			8.043
47												
48					**Assuming Gamma Distribution**							
49					95% Approximate Gamma UCL (use when n>=50)	291.8			95% Adjusted Gamma UCL (use when n<50)			318.2
50												
51					**Lognormal GOF Test**							
52					Shapiro Wilk Test Statistic	0.915			**Shapiro Wilk Lognormal GOF Test**			
53					5% Shapiro Wilk Critical Value	0.881			Data appear Lognormal at 5% Significance Level			
54					Lilliefors Test Statistic	0.154			**Lilliefors Lognormal GOF Test**			
55					5% Lilliefors Critical Value	0.229			Data appear Lognormal at 5% Significance Level			
56					**Data appear Lognormal at 5% Significance Level**							
57												

	A	B	C	D	E	F	G	H	I	J	K	L
58						Lognormal Statistics						
59					Minimum of Logged Data	0				Mean of logged Data		4.081
60					Maximum of Logged Data	6.188				SD of logged Data		1.755
61												
62						Assuming Lognormal Distribution						
63					95% H-UCL	1883				90% Chebyshev (MVUE) UCL		574.2
64				95% Chebyshev (MVUE) UCL		732.8				97.5% Chebyshev (MVUE) UCL		953.1
65				99% Chebyshev (MVUE) UCL		1386						
66												
67						Nonparametric Distribution Free UCL Statistics						
68						Data appear to follow a Discernible Distribution at 5% Significance Level						
69												
70						Nonparametric Distribution Free UCLs						
71					95% CLT UCL	220.5				95% Jackknife UCL		225.5
72				95% Standard Bootstrap UCL		217.3				95% Bootstrap-t UCL		250.6
73				95% Hall's Bootstrap UCL		220.5				95% Percentile Bootstrap UCL		218.7
74				95% BCA Bootstrap UCL		231.1						
75				90% Chebyshev(Mean, Sd) UCL		279				95% Chebyshev(Mean, Sd) UCL		337.8
76				97.5% Chebyshev(Mean, Sd) UCL		419.3				99% Chebyshev(Mean, Sd) UCL		579.5
77												
78						Suggested UCL to Use						
79					95% Adjusted Gamma UCL	318.2						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	Lead_EP7_0-6											
88												
89						General Statistics						
90					Total Number of Observations	14				Number of Distinct Observations		13
91										Number of Missing Observations		5
92					Minimum	1				Mean		137.2
93					Maximum	487				Median		60.8
94					SD	166.8				Std. Error of Mean		44.58
95					Coefficient of Variation	1.216				Skewness		1.319
96												
97						Normal GOF Test						
98					Shapiro Wilk Test Statistic	0.758				Shapiro Wilk GOF Test		
99					5% Shapiro Wilk Critical Value	0.874				Data Not Normal at 5% Significance Level		
100					Lilliefors Test Statistic	0.327				Lilliefors GOF Test		
101					5% Lilliefors Critical Value	0.237				Data Not Normal at 5% Significance Level		
102						Data Not Normal at 5% Significance Level						
103												
104						Assuming Normal Distribution						
105					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
106					95% Student's-t UCL	216.2				95% Adjusted-CLT UCL (Chen-1995)		227.3
107										95% Modified-t UCL (Johnson-1978)		218.8
108												
109						Gamma GOF Test						
110					A-D Test Statistic	0.378				Anderson-Darling Gamma GOF Test		
111					5% A-D Critical Value	0.781				etected data appear Gamma Distributed at 5% Significance Lev		
112					K-S Test Statistic	0.171				Kolmogrov-Smirnoff Gamma GOF Test		
113					5% K-S Critical Value	0.239				etected data appear Gamma Distributed at 5% Significance Lev		
114						Detected data appear Gamma Distributed at 5% Significance Level						

	A	B	C	D	E	F	G	H	I	J	K	L
115												
116						Gamma Statistics						
117					k hat (MLE)	0.637				k star (bias corrected MLE)		0.548
118					Theta hat (MLE)	215.4				Theta star (bias corrected MLE)		250.3
119					nu hat (MLE)	17.84				nu star (bias corrected)		15.35
120					MLE Mean (bias corrected)	137.2				MLE Sd (bias corrected)		185.3
121										Approximate Chi Square Value (0.05)		7.506
122					Adjusted Level of Significance	0.0312				Adjusted Chi Square Value		6.789
123												
124						Assuming Gamma Distribution						
125				95% Approximate Gamma UCL (use when n>=50)		280.6				95% Adjusted Gamma UCL (use when n<50)		310.3
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.927				Shapiro Wilk Lognormal GOF Test		
129					5% Shapiro Wilk Critical Value	0.874				Data appear Lognormal at 5% Significance Level		
130					Lilliefors Test Statistic	0.166				Lilliefors Lognormal GOF Test		
131					5% Lilliefors Critical Value	0.237				Data appear Lognormal at 5% Significance Level		
132						Data appear Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	0				Mean of logged Data		3.96
136					Maximum of Logged Data	6.188				SD of logged Data		1.756
137												
138						Assuming Lognormal Distribution						
139					95% H-UCL	1886				90% Chebyshev (MVUE) UCL		509.6
140					95% Chebyshev (MVUE) UCL	651.5				97.5% Chebyshev (MVUE) UCL		848.4
141					99% Chebyshev (MVUE) UCL	1235						
142												
143						Nonparametric Distribution Free UCL Statistics						
144						Data appear to follow a Discernible Distribution at 5% Significance Level						
145												
146						Nonparametric Distribution Free UCLs						
147					95% CLT UCL	210.5				95% Jackknife UCL		216.2
148					95% Standard Bootstrap UCL	208				95% Bootstrap-t UCL		250.5
149					95% Hall's Bootstrap UCL	213.2				95% Percentile Bootstrap UCL		211.5
150					95% BCA Bootstrap UCL	221.3						
151					90% Chebyshev(Mean, Sd) UCL	271				95% Chebyshev(Mean, Sd) UCL		331.5
152					97.5% Chebyshev(Mean, Sd) UCL	415.6				99% Chebyshev(Mean, Sd) UCL		580.8
153												
154						Suggested UCL to Use						
155					95% Adjusted Gamma UCL	310.3						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			5/2/2014 2:32:41 PM								
5	From File			ProUCL_Import.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	mber of Bootstrap Operations			2000								
9												
10												
11	Benzo(a)anthracene_EP8_0-15											
12												
13	General Statistics											
14	Total Number of Observations					32	Number of Distinct Observations					30
15							Number of Missing Observations					62
16	Minimum					0.091	Mean					9.592
17	Maximum					167	Median					1.55
18	SD					29.94	Std. Error of Mean					5.293
19	Coefficient of Variation					3.121	Skewness					5.022
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.339	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.93	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.376	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.157	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					18.57	95% Adjusted-CLT UCL (Chen-1995)					23.32
31							95% Modified-t UCL (Johnson-1978)					19.35
32												
33	Gamma GOF Test											
34	A-D Test Statistic					2.097	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.844	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.247	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.168	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.349	k star (bias corrected MLE)					0.337
42	Theta hat (MLE)					27.5	Theta star (bias corrected MLE)					28.47
43	nu hat (MLE)					22.32	nu star (bias corrected)					21.56
44	MLE Mean (bias corrected)					9.592	MLE Sd (bias corrected)					16.52
45							Approximate Chi Square Value (0.05)					12.01
46	Adjusted Level of Significance					0.0416	Adjusted Chi Square Value					11.63
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					17.22	95% Adjusted Gamma UCL (use when n<50)					17.79
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.944	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value					0.93	Data appear Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.116	Lilliefors Lognormal GOF Test					
55	5% Lilliefors Critical Value					0.157	Data appear Lognormal at 5% Significance Level					
56	Data appear Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59	Minimum of Logged Data					-2.397	Mean of logged Data					0.332
60	Maximum of Logged Data					5.118	SD of logged Data					1.946
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	Assuming Lognormal Distribution											
63					95% H-UCL	34.3			90% Chebyshev (MVUE) UCL			19.1
64				95% Chebyshev (MVUE) UCL		24.14			97.5% Chebyshev (MVUE) UCL			31.13
65				99% Chebyshev (MVUE) UCL		44.87						
66												
67	Nonparametric Distribution Free UCL Statistics											
68	Data appear to follow a Discernible Distribution at 5% Significance Level											
69												
70	Nonparametric Distribution Free UCLs											
71					95% CLT UCL	18.3			95% Jackknife UCL			18.57
72				95% Standard Bootstrap UCL		17.96			95% Bootstrap-t UCL			49.49
73				95% Hall's Bootstrap UCL		47.33			95% Percentile Bootstrap UCL			19.34
74				95% BCA Bootstrap UCL		24.89						
75				90% Chebyshev(Mean, Sd) UCL		25.47			95% Chebyshev(Mean, Sd) UCL			32.66
76				97.5% Chebyshev(Mean, Sd) UCL		42.65			99% Chebyshev(Mean, Sd) UCL			62.26
77												
78	Suggested UCL to Use											
79				95% Chebyshev (Mean, Sd) UCL		32.66						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	Benzo(a)pyrene_EP8_0-15											
88												
89	General Statistics											
90				Total Number of Observations		32			Number of Distinct Observations			31
91									Number of Missing Observations			62
92				Minimum		0.091			Mean			7.743
93				Maximum		133			Median			1.25
94				SD		23.86			Std. Error of Mean			4.218
95				Coefficient of Variation		3.082			Skewness			5.003
96												
97	Normal GOF Test											
98				Shapiro Wilk Test Statistic		0.342			Shapiro Wilk GOF Test			
99				5% Shapiro Wilk Critical Value		0.93			Data Not Normal at 5% Significance Level			
100				Lilliefors Test Statistic		0.374			Lilliefors GOF Test			
101				5% Lilliefors Critical Value		0.157			Data Not Normal at 5% Significance Level			
102	Data Not Normal at 5% Significance Level											
103												
104	Assuming Normal Distribution											
105			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
106				95% Student's-t UCL		14.9			95% Adjusted-CLT UCL (Chen-1995)			18.67
107									95% Modified-t UCL (Johnson-1978)			15.52
108												
109	Gamma GOF Test											
110				A-D Test Statistic		2.068			Anderson-Darling Gamma GOF Test			
111				5% A-D Critical Value		0.842			Data Not Gamma Distributed at 5% Significance Level			
112				K-S Test Statistic		0.227			Kolmogrov-Smirnoff Gamma GOF Test			
113				5% K-S Critical Value		0.167			Data Not Gamma Distributed at 5% Significance Level			
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117				k hat (MLE)		0.357			k star (bias corrected MLE)			0.344
118				Theta hat (MLE)		21.71			Theta star (bias corrected MLE)			22.5
119				nu hat (MLE)		22.83			nu star (bias corrected)			22.02
120				MLE Mean (bias corrected)		7.743			MLE Sd (bias corrected)			13.2
121									Approximate Chi Square Value (0.05)			12.35
122				Adjusted Level of Significance		0.0416			Adjusted Chi Square Value			11.97

	A	B	C	D	E	F	G	H	I	J	K	L
123												
124						Assuming Gamma Distribution						
125				95% Approximate Gamma UCL (use when n>=50))		13.8		95% Adjusted Gamma UCL (use when n<50)				14.25
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.946		Shapiro Wilk Lognormal GOF Test				
129					5% Shapiro Wilk Critical Value	0.93		Data appear Lognormal at 5% Significance Level				
130					Lilliefors Test Statistic	0.106		Lilliefors Lognormal GOF Test				
131					5% Lilliefors Critical Value	0.157		Data appear Lognormal at 5% Significance Level				
132						Data appear Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	-2.397		Mean of logged Data				0.167
136					Maximum of Logged Data	4.89		SD of logged Data				1.896
137												
138						Assuming Lognormal Distribution						
139					95% H-UCL	24.94		90% Chebyshev (MVUE) UCL				14.63
140					95% Chebyshev (MVUE) UCL	18.44		97.5% Chebyshev (MVUE) UCL				23.73
141					99% Chebyshev (MVUE) UCL	34.12						
142												
143						Nonparametric Distribution Free UCL Statistics						
144						Data appear to follow a Discernible Distribution at 5% Significance Level						
145												
146						Nonparametric Distribution Free UCLs						
147					95% CLT UCL	14.68		95% Jackknife UCL				14.9
148					95% Standard Bootstrap UCL	14.84		95% Bootstrap-t UCL				40.5
149					95% Hall's Bootstrap UCL	39.3		95% Percentile Bootstrap UCL				15.87
150					95% BCA Bootstrap UCL	21.55						
151					90% Chebyshev(Mean, Sd) UCL	20.4		95% Chebyshev(Mean, Sd) UCL				26.13
152					97.5% Chebyshev(Mean, Sd) UCL	34.09		99% Chebyshev(Mean, Sd) UCL				49.71
153												
154						Suggested UCL to Use						
155					95% Chebyshev (Mean, Sd) UCL	26.13						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	Benzo(b)fluoranthene_EP8_0-15											
164												
165						General Statistics						
166					Total Number of Observations	32		Number of Distinct Observations				31
167								Number of Missing Observations				62
168					Minimum	0.091		Mean				10.57
169					Maximum	183		Median				1.4
170					SD	32.9		Std. Error of Mean				5.815
171					Coefficient of Variation	3.111		Skewness				4.984
172												
173						Normal GOF Test						
174					Shapiro Wilk Test Statistic	0.343		Shapiro Wilk GOF Test				
175					5% Shapiro Wilk Critical Value	0.93		Data Not Normal at 5% Significance Level				
176					Lilliefors Test Statistic	0.377		Lilliefors GOF Test				
177					5% Lilliefors Critical Value	0.157		Data Not Normal at 5% Significance Level				
178						Data Not Normal at 5% Significance Level						
179												
180						Assuming Normal Distribution						
181					95% Normal UCL			95% UCLs (Adjusted for Skewness)				
182					95% Student's-t UCL	20.43		95% Adjusted-CLT UCL (Chen-1995)				25.61
183								95% Modified-t UCL (Johnson-1978)				21.29

	A	B	C	D	E	F	G	H	I	J	K	L
184												
185						Gamma GOF Test						
186					A-D Test Statistic	1.97	Anderson-Darling Gamma GOF Test					
187					5% A-D Critical Value	0.847	Data Not Gamma Distributed at 5% Significance Level					
188					K-S Test Statistic	0.19	Kolmogrov-Smirnoff Gamma GOF Test					
189					5% K-S Critical Value	0.168	Data Not Gamma Distributed at 5% Significance Level					
190					Data Not Gamma Distributed at 5% Significance Level							
191												
192						Gamma Statistics						
193					k hat (MLE)	0.335	k star (bias corrected MLE)					0.324
194					Theta hat (MLE)	31.59	Theta star (bias corrected MLE)					32.62
195					nu hat (MLE)	21.42	nu star (bias corrected)					20.75
196					MLE Mean (bias corrected)	10.57	MLE Sd (bias corrected)					18.57
197							Approximate Chi Square Value (0.05)					11.4
198					Adjusted Level of Significance	0.0416	Adjusted Chi Square Value					11.03
199												
200						Assuming Gamma Distribution						
201					95% Approximate Gamma UCL (use when n>=50))	19.24	95% Adjusted Gamma UCL (use when n<50)					19.88
202												
203						Lognormal GOF Test						
204					Shapiro Wilk Test Statistic	0.948	Shapiro Wilk Lognormal GOF Test					
205					5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level					
206					Lilliefors Test Statistic	0.108	Lilliefors Lognormal GOF Test					
207					5% Lilliefors Critical Value	0.157	Data appear Lognormal at 5% Significance Level					
208					Data appear Lognormal at 5% Significance Level							
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	-2.397	Mean of logged Data					0.335
212					Maximum of Logged Data	5.209	SD of logged Data					2.012
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	42.48	90% Chebyshev (MVUE) UCL					21.98
216					95% Chebyshev (MVUE) UCL	27.87	97.5% Chebyshev (MVUE) UCL					36.05
217					99% Chebyshev (MVUE) UCL	52.12						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data appear to follow a Discernible Distribution at 5% Significance Level						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	20.14	95% Jackknife UCL					20.43
224					95% Standard Bootstrap UCL	19.85	95% Bootstrap-t UCL					50.85
225					95% Hall's Bootstrap UCL	49.59	95% Percentile Bootstrap UCL					21.28
226					95% BCA Bootstrap UCL	30.18						
227					90% Chebyshev(Mean, Sd) UCL	28.02	95% Chebyshev(Mean, Sd) UCL					35.92
228					97.5% Chebyshev(Mean, Sd) UCL	46.89	99% Chebyshev(Mean, Sd) UCL					68.43
229												
230						Suggested UCL to Use						
231					97.5% Chebyshev (Mean, Sd) UCL	46.89						
232												
233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
234	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
235	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
236	For additional insight the user may want to consult a statistician.											
237												
238												
239	Dibenz(a,h)anthracene_EP8_0-15											
240												
241						General Statistics						
242					Total Number of Observations	32	Number of Distinct Observations					28
243							Number of Missing Observations					62
244					Minimum	0.028	Mean					0.863

	A	B	C	D	E	F	G	H	I	J	K	L
245					Maximum	17.2					Median	0.148
246					SD	3.04					Std. Error of Mean	0.537
247					Coefficient of Variation	3.522					Skewness	5.345
248												
249					Normal GOF Test							
250					Shapiro Wilk Test Statistic	0.277	Shapiro Wilk GOF Test					
251					5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level					
252					Lilliefors Test Statistic	0.409	Lilliefors GOF Test					
253					5% Lilliefors Critical Value	0.157	Data Not Normal at 5% Significance Level					
254					Data Not Normal at 5% Significance Level							
255												
256					Assuming Normal Distribution							
257					95% Normal UCL		95% UCLs (Adjusted for Skewness)					
258					95% Student's-t UCL	1.774	95% Adjusted-CLT UCL (Chen-1995)					2.29
259							95% Modified-t UCL (Johnson-1978)					1.859
260												
261					Gamma GOF Test							
262					A-D Test Statistic	4.095	Anderson-Darling Gamma GOF Test					
263					5% A-D Critical Value	0.825	Data Not Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.334	Kolmogrov-Smirnoff Gamma GOF Test					
265					5% K-S Critical Value	0.166	Data Not Gamma Distributed at 5% Significance Level					
266					Data Not Gamma Distributed at 5% Significance Level							
267												
268					Gamma Statistics							
269					k hat (MLE)	0.434	k star (bias corrected MLE)					0.414
270					Theta hat (MLE)	1.99	Theta star (bias corrected MLE)					2.086
271					nu hat (MLE)	27.76	nu star (bias corrected)					26.49
272					MLE Mean (bias corrected)	0.863	MLE Sd (bias corrected)					1.342
273							Approximate Chi Square Value (0.05)					15.76
274					Adjusted Level of Significance	0.0416	Adjusted Chi Square Value					15.31
275												
276					Assuming Gamma Distribution							
277					95% Approximate Gamma UCL (use when n>=50))	1.451	95% Adjusted Gamma UCL (use when n<50)					1.493
278												
279					Lognormal GOF Test							
280					Shapiro Wilk Test Statistic	0.898	Shapiro Wilk Lognormal GOF Test					
281					5% Shapiro Wilk Critical Value	0.93	Data Not Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.168	Lilliefors Lognormal GOF Test					
283					5% Lilliefors Critical Value	0.157	Data Not Lognormal at 5% Significance Level					
284					Data Not Lognormal at 5% Significance Level							
285												
286					Lognormal Statistics							
287					Minimum of Logged Data	-3.576	Mean of logged Data					-1.645
288					Maximum of Logged Data	2.845	SD of logged Data					1.368
289												
290					Assuming Lognormal Distribution							
291					95% H-UCL	1.005	90% Chebyshev (MVUE) UCL					0.888
292					95% Chebyshev (MVUE) UCL	1.078	97.5% Chebyshev (MVUE) UCL					1.342
293					99% Chebyshev (MVUE) UCL	1.862						
294												
295					Nonparametric Distribution Free UCL Statistics							
296					Data do not follow a Discernible Distribution (0.05)							
297												
298					Nonparametric Distribution Free UCLs							
299					95% CLT UCL	1.747	95% Jackknife UCL					1.774
300					95% Standard Bootstrap UCL	1.743	95% Bootstrap-t UCL					9.511
301					95% Hall's Bootstrap UCL	5.356	95% Percentile Bootstrap UCL					1.876
302					95% BCA Bootstrap UCL	2.878						
303					90% Chebyshev(Mean, Sd) UCL	2.475	95% Chebyshev(Mean, Sd) UCL					3.206
304					97.5% Chebyshev(Mean, Sd) UCL	4.219	99% Chebyshev(Mean, Sd) UCL					6.21
305												

	A	B	C	D	E	F	G	H	I	J	K	L
306						Suggested UCL to Use						
307					95% Chebyshev (Mean, Sd) UCL	3.206						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											
313												
314												
315	Total PCBs_EP8_0-15											
316												
317						General Statistics						
318					Total Number of Observations	71			Number of Distinct Observations			67
319									Number of Missing Observations			23
320					Minimum	0.0266			Mean			2.95
321					Maximum	19.8			Median			1.719
322					SD	3.861			Std. Error of Mean			0.458
323					Coefficient of Variation	1.309			Skewness			2.648
324												
325						Normal GOF Test						
326					Shapiro Wilk Test Statistic	0.695			Shapiro Wilk GOF Test			
327					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
328					Lilliefors Test Statistic	0.225			Lilliefors GOF Test			
329					5% Lilliefors Critical Value	0.105			Data Not Normal at 5% Significance Level			
330						Data Not Normal at 5% Significance Level						
331												
332						Assuming Normal Distribution						
333					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
334					95% Student's-t UCL	3.714			95% Adjusted-CLT UCL (Chen-1995)			3.857
335									95% Modified-t UCL (Johnson-1978)			3.738
336												
337						Gamma GOF Test						
338					A-D Test Statistic	0.383			Anderson-Darling Gamma GOF Test			
339					5% A-D Critical Value	0.798			etected data appear Gamma Distributed at 5% Significance Lev			
340					K-S Test Statistic	0.0698			Kolmogrov-Smirnoff Gamma GOF Test			
341					5% K-S Critical Value	0.11			etected data appear Gamma Distributed at 5% Significance Lev			
342						Detected data appear Gamma Distributed at 5% Significance Level						
343												
344						Gamma Statistics						
345					k hat (MLE)	0.698			k star (bias corrected MLE)			0.678
346					Theta hat (MLE)	4.228			Theta star (bias corrected MLE)			4.353
347					nu hat (MLE)	99.08			nu star (bias corrected)			96.22
348					MLE Mean (bias corrected)	2.95			MLE Sd (bias corrected)			3.583
349									Approximate Chi Square Value (0.05)			74.6
350					Adjusted Level of Significance	0.0466			Adjusted Chi Square Value			74.2
351												
352						Assuming Gamma Distribution						
353					95% Approximate Gamma UCL (use when n>=50)	3.805			95% Adjusted Gamma UCL (use when n<50)			3.825
354												
355						Lognormal GOF Test						
356					Shapiro Wilk Test Statistic	0.926			Shapiro Wilk Lognormal GOF Test			
357					5% Shapiro Wilk P Value	3.2594E-4			Data Not Lognormal at 5% Significance Level			
358					Lilliefors Test Statistic	0.107			Lilliefors Lognormal GOF Test			
359					5% Lilliefors Critical Value	0.105			Data Not Lognormal at 5% Significance Level			
360						Data Not Lognormal at 5% Significance Level						
361												
362						Lognormal Statistics						
363					Minimum of Logged Data	-3.629			Mean of logged Data			0.215
364					Maximum of Logged Data	2.986			SD of logged Data			1.592
365												
366						Assuming Lognormal Distribution						

	A	B	C	D	E	F	G	H	I	J	K	L
367					95% H-UCL	7.645			90% Chebyshev (MVUE) UCL			7.583
368				95% Chebyshev (MVUE) UCL		9.099			97.5% Chebyshev (MVUE) UCL			11.2
369				99% Chebyshev (MVUE) UCL		15.33						
370												
371					Nonparametric Distribution Free UCL Statistics							
372					Data appear to follow a Discernible Distribution at 5% Significance Level							
373												
374					Nonparametric Distribution Free UCLs							
375					95% CLT UCL	3.704			95% Jackknife UCL			3.714
376				95% Standard Bootstrap UCL		3.694			95% Bootstrap-t UCL			3.93
377				95% Hall's Bootstrap UCL		3.933			95% Percentile Bootstrap UCL			3.757
378				95% BCA Bootstrap UCL		3.842						
379				90% Chebyshev(Mean, Sd) UCL		4.325			95% Chebyshev(Mean, Sd) UCL			4.947
380				97.5% Chebyshev(Mean, Sd) UCL		5.812			99% Chebyshev(Mean, Sd) UCL			7.509
381												
382					Suggested UCL to Use							
383				95% Approximate Gamma UCL		3.805						
384												
385	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
386	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
387	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
388	For additional insight the user may want to consult a statistician.											
389												
390												
391	Lead_EP8_0-15											
392												
393					General Statistics							
394				Total Number of Observations		45			Number of Distinct Observations			45
395									Number of Missing Observations			49
396				Minimum		3.83			Mean			1103
397				Maximum		16100			Median			400
398				SD		2474			Std. Error of Mean			368.8
399				Coefficient of Variation		2.243			Skewness			5.363
400												
401					Normal GOF Test							
402				Shapiro Wilk Test Statistic		0.416			Shapiro Wilk GOF Test			
403				5% Shapiro Wilk Critical Value		0.945			Data Not Normal at 5% Significance Level			
404				Lilliefors Test Statistic		0.328			Lilliefors GOF Test			
405				5% Lilliefors Critical Value		0.132			Data Not Normal at 5% Significance Level			
406					Data Not Normal at 5% Significance Level							
407												
408					Assuming Normal Distribution							
409				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
410				95% Student's-t UCL		1722			95% Adjusted-CLT UCL (Chen-1995)			2024
411									95% Modified-t UCL (Johnson-1978)			1772
412												
413					Gamma GOF Test							
414				A-D Test Statistic		0.969			Anderson-Darling Gamma GOF Test			
415				5% A-D Critical Value		0.807			Data Not Gamma Distributed at 5% Significance Level			
416				K-S Test Statistic		0.125			Kolmogrov-Smirnoff Gamma GOF Test			
417				5% K-S Critical Value		0.139			etected data appear Gamma Distributed at 5% Significance Lev			
418					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
419												
420					Gamma Statistics							
421				k hat (MLE)		0.573			k star (bias corrected MLE)			0.549
422				Theta hat (MLE)		1925			Theta star (bias corrected MLE)			2007
423				nu hat (MLE)		51.55			nu star (bias corrected)			49.45
424				MLE Mean (bias corrected)		1103			MLE Sd (bias corrected)			1488
425									Approximate Chi Square Value (0.05)			34.3
426				Adjusted Level of Significance		0.0447			Adjusted Chi Square Value			33.88
427												

	A	B	C	D	E	F	G	H	I	J	K	L
428						Assuming Gamma Distribution						
429					95% Approximate Gamma UCL (use when n>=50)	1590			95% Adjusted Gamma UCL (use when n<50)			1609
430												
431						Lognormal GOF Test						
432					Shapiro Wilk Test Statistic	0.976			Shapiro Wilk Lognormal GOF Test			
433					5% Shapiro Wilk Critical Value	0.945			Data appear Lognormal at 5% Significance Level			
434					Lilliefors Test Statistic	0.11			Lilliefors Lognormal GOF Test			
435					5% Lilliefors Critical Value	0.132			Data appear Lognormal at 5% Significance Level			
436						Data appear Lognormal at 5% Significance Level						
437												
438						Lognormal Statistics						
439					Minimum of Logged Data	1.343			Mean of logged Data			5.919
440					Maximum of Logged Data	9.687			SD of logged Data			1.602
441												
442						Assuming Lognormal Distribution						
443					95% H-UCL	2859			90% Chebyshev (MVUE) UCL			2482
444					95% Chebyshev (MVUE) UCL	3033			97.5% Chebyshev (MVUE) UCL			3798
445					99% Chebyshev (MVUE) UCL	5302						
446												
447						Nonparametric Distribution Free UCL Statistics						
448						Data appear to follow a Discernible Distribution at 5% Significance Level						
449												
450						Nonparametric Distribution Free UCLs						
451					95% CLT UCL	1709			95% Jackknife UCL			1722
452					95% Standard Bootstrap UCL	1697			95% Bootstrap-t UCL			2689
453					95% Hall's Bootstrap UCL	3882			95% Percentile Bootstrap UCL			1806
454					95% BCA Bootstrap UCL	2133						
455					90% Chebyshev(Mean, Sd) UCL	2209			95% Chebyshev(Mean, Sd) UCL			2710
456					97.5% Chebyshev(Mean, Sd) UCL	3406			99% Chebyshev(Mean, Sd) UCL			4772
457												
458						Suggested UCL to Use						
459					95% Adjusted Gamma UCL	1609						
460												
461	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
462	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
463	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
464	For additional insight the user may want to consult a statistician.											
465												
466												
467	Benzo(a)anthracene_EP8_0-6											
468												
469						General Statistics						
470					Total Number of Observations	31			Number of Distinct Observations			29
471									Number of Missing Observations			62
472					Minimum	0.0995			Mean			9.898
473					Maximum	167			Median			1.6
474					SD	30.38			Std. Error of Mean			5.457
475					Coefficient of Variation	3.07			Skewness			4.945
476												
477						Normal GOF Test						
478					Shapiro Wilk Test Statistic	0.343			Shapiro Wilk GOF Test			
479					5% Shapiro Wilk Critical Value	0.929			Data Not Normal at 5% Significance Level			
480					Lilliefors Test Statistic	0.374			Lilliefors GOF Test			
481					5% Lilliefors Critical Value	0.159			Data Not Normal at 5% Significance Level			
482						Data Not Normal at 5% Significance Level						
483												
484						Assuming Normal Distribution						
485					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
486					95% Student's-t UCL	19.16			95% Adjusted-CLT UCL (Chen-1995)			24.05
487									95% Modified-t UCL (Johnson-1978)			19.97
488												

	A	B	C	D	E	F	G	H	I	J	K	L
489						Gamma GOF Test						
490					A-D Test Statistic	2.027	Anderson-Darling Gamma GOF Test					
491					5% A-D Critical Value	0.841	Data Not Gamma Distributed at 5% Significance Level					
492					K-S Test Statistic	0.251	Kolmogrov-Smirnoff Gamma GOF Test					
493					5% K-S Critical Value	0.17	Data Not Gamma Distributed at 5% Significance Level					
494					Data Not Gamma Distributed at 5% Significance Level							
495												
496					Gamma Statistics							
497					k hat (MLE)	0.358	k star (bias corrected MLE)					0.345
498					Theta hat (MLE)	27.66	Theta star (bias corrected MLE)					28.72
499					nu hat (MLE)	22.19	nu star (bias corrected)					21.37
500					MLE Mean (bias corrected)	9.898	MLE Sd (bias corrected)					16.86
501							Approximate Chi Square Value (0.05)					11.87
502					Adjusted Level of Significance	0.0413	Adjusted Chi Square Value					11.47
503												
504					Assuming Gamma Distribution							
505					95% Approximate Gamma UCL (use when n>=50))	17.82	95% Adjusted Gamma UCL (use when n<50)					18.44
506												
507					Lognormal GOF Test							
508					Shapiro Wilk Test Statistic	0.949	Shapiro Wilk Lognormal GOF Test					
509					5% Shapiro Wilk Critical Value	0.929	Data appear Lognormal at 5% Significance Level					
510					Lilliefors Test Statistic	0.102	Lilliefors Lognormal GOF Test					
511					5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level					
512					Data appear Lognormal at 5% Significance Level							
513												
514					Lognormal Statistics							
515					Minimum of Logged Data	-2.308	Mean of logged Data					0.42
516					Maximum of Logged Data	5.118	SD of logged Data					1.912
517												
518					Assuming Lognormal Distribution							
519					95% H-UCL	34.21	90% Chebyshev (MVUE) UCL					19.5
520					95% Chebyshev (MVUE) UCL	24.62	97.5% Chebyshev (MVUE) UCL					31.73
521					99% Chebyshev (MVUE) UCL	45.69						
522												
523					Nonparametric Distribution Free UCL Statistics							
524					Data appear to follow a Discernible Distribution at 5% Significance Level							
525												
526					Nonparametric Distribution Free UCLs							
527					95% CLT UCL	18.87	95% Jackknife UCL					19.16
528					95% Standard Bootstrap UCL	18.86	95% Bootstrap-t UCL					48.86
529					95% Hall's Bootstrap UCL	48.17	95% Percentile Bootstrap UCL					20.11
530					95% BCA Bootstrap UCL	26.84						
531					90% Chebyshev(Mean, Sd) UCL	26.27	95% Chebyshev(Mean, Sd) UCL					33.69
532					97.5% Chebyshev(Mean, Sd) UCL	43.98	99% Chebyshev(Mean, Sd) UCL					64.2
533												
534					Suggested UCL to Use							
535					95% Chebyshev (Mean, Sd) UCL	33.69						
536												
537	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
538	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
539	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
540	For additional insight the user may want to consult a statistician.											
541												
542												
543	Benzo(a)pyrene_EP8_0-6											
544												
545					General Statistics							
546					Total Number of Observations	31	Number of Distinct Observations					30
547							Number of Missing Observations					62
548					Minimum	0.0995	Mean					7.99
549					Maximum	133	Median					1.3

	A	B	C	D	E	F	G	H	I	J	K	L
550					SD	24.22				Std. Error of Mean		4.349
551					Coefficient of Variation	3.031					Skewness	4.926
552												
553					Normal GOF Test							
554					Shapiro Wilk Test Statistic	0.347	Shapiro Wilk GOF Test					
555					5% Shapiro Wilk Critical Value	0.929	Data Not Normal at 5% Significance Level					
556					Lilliefors Test Statistic	0.375	Lilliefors GOF Test					
557					5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level					
558					Data Not Normal at 5% Significance Level							
559												
560					Assuming Normal Distribution							
561			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
562					95% Student's-t UCL	15.37	95% Adjusted-CLT UCL (Chen-1995)					19.26
563							95% Modified-t UCL (Johnson-1978)					16.01
564												
565					Gamma GOF Test							
566					A-D Test Statistic	1.98	Anderson-Darling Gamma GOF Test					
567					5% A-D Critical Value	0.84	Data Not Gamma Distributed at 5% Significance Level					
568					K-S Test Statistic	0.229	Kolmogrov-Smirnoff Gamma GOF Test					
569					5% K-S Critical Value	0.17	Data Not Gamma Distributed at 5% Significance Level					
570					Data Not Gamma Distributed at 5% Significance Level							
571												
572					Gamma Statistics							
573					k hat (MLE)	0.365	k star (bias corrected MLE)					0.351
574					Theta hat (MLE)	21.87	Theta star (bias corrected MLE)					22.73
575					nu hat (MLE)	22.65	nu star (bias corrected)					21.79
576					MLE Mean (bias corrected)	7.99	MLE Sd (bias corrected)					13.48
577							Approximate Chi Square Value (0.05)					12.18
578					Adjusted Level of Significance	0.0413	Adjusted Chi Square Value					11.78
579												
580					Assuming Gamma Distribution							
581					95% Approximate Gamma UCL (use when n>=50))	14.29	95% Adjusted Gamma UCL (use when n<50)					14.78
582												
583					Lognormal GOF Test							
584					Shapiro Wilk Test Statistic	0.951	Shapiro Wilk Lognormal GOF Test					
585					5% Shapiro Wilk Critical Value	0.929	Data appear Lognormal at 5% Significance Level					
586					Lilliefors Test Statistic	0.0921	Lilliefors Lognormal GOF Test					
587					5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level					
588					Data appear Lognormal at 5% Significance Level							
589												
590					Lognormal Statistics							
591					Minimum of Logged Data	-2.308	Mean of logged Data					0.25
592					Maximum of Logged Data	4.89	SD of logged Data					1.868
593												
594					Assuming Lognormal Distribution							
595					95% H-UCL	25.21	90% Chebyshev (MVUE) UCL					15.04
596					95% Chebyshev (MVUE) UCL	18.95	97.5% Chebyshev (MVUE) UCL					24.37
597					99% Chebyshev (MVUE) UCL	35.01						
598												
599					Nonparametric Distribution Free UCL Statistics							
600					Data appear to follow a Discernible Distribution at 5% Significance Level							
601												
602					Nonparametric Distribution Free UCLs							
603					95% CLT UCL	15.14	95% Jackknife UCL					15.37
604					95% Standard Bootstrap UCL	14.77	95% Bootstrap-t UCL					39.85
605					95% Hall's Bootstrap UCL	39.29	95% Percentile Bootstrap UCL					15.88
606					95% BCA Bootstrap UCL	21.72						
607					90% Chebyshev(Mean, Sd) UCL	21.04	95% Chebyshev(Mean, Sd) UCL					26.95
608					97.5% Chebyshev(Mean, Sd) UCL	35.15	99% Chebyshev(Mean, Sd) UCL					51.26
609												
610					Suggested UCL to Use							

	A	B	C	D	E	F	G	H	I	J	K	L
611					95% Chebyshev (Mean, Sd) UCL	26.95						
612												
613	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
614	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
615	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
616	For additional insight the user may want to consult a statistician.											
617												
618												
619	**Benzo(b)fluoranthene_EP8_0-6**											
620												
621	**General Statistics**											
622					Total Number of Observations	31			Number of Distinct Observations			30
623									Number of Missing Observations			62
624					Minimum	0.0995			Mean			10.91
625					Maximum	183			Median			1.5
626					SD	33.38			Std. Error of Mean			5.996
627					Coefficient of Variation	3.06			Skewness			4.907
628												
629	**Normal GOF Test**											
630					Shapiro Wilk Test Statistic	0.348			**Shapiro Wilk GOF Test**			
631					5% Shapiro Wilk Critical Value	0.929			Data Not Normal at 5% Significance Level			
632					Lilliefors Test Statistic	0.378			**Lilliefors GOF Test**			
633					5% Lilliefors Critical Value	0.159			Data Not Normal at 5% Significance Level			
634	**Data Not Normal at 5% Significance Level**											
635												
636	**Assuming Normal Distribution**											
637					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
638					95% Student's-t UCL	21.09			95% Adjusted-CLT UCL (Chen-1995)			26.42
639									95% Modified-t UCL (Johnson-1978)			21.97
640												
641	**Gamma GOF Test**											
642					A-D Test Statistic	1.877			**Anderson-Darling Gamma GOF Test**			
643					5% A-D Critical Value	0.845			Data Not Gamma Distributed at 5% Significance Level			
644					K-S Test Statistic	0.192			**Kolmogrov-Smirnoff Gamma GOF Test**			
645					5% K-S Critical Value	0.17			Data Not Gamma Distributed at 5% Significance Level			
646	**Data Not Gamma Distributed at 5% Significance Level**											
647												
648	**Gamma Statistics**											
649					k hat (MLE)	0.343			k star (bias corrected MLE)			0.331
650					Theta hat (MLE)	31.81			Theta star (bias corrected MLE)			32.93
651					nu hat (MLE)	21.26			nu star (bias corrected)			20.54
652					MLE Mean (bias corrected)	10.91			MLE Sd (bias corrected)			18.96
653									Approximate Chi Square Value (0.05)			11.25
654					Adjusted Level of Significance	0.0413			Adjusted Chi Square Value			10.87
655												
656	**Assuming Gamma Distribution**											
657					95% Approximate Gamma UCL (use when n>=50))	19.92			95% Adjusted Gamma UCL (use when n<50)			20.62
658												
659	**Lognormal GOF Test**											
660					Shapiro Wilk Test Statistic	0.954			**Shapiro Wilk Lognormal GOF Test**			
661					5% Shapiro Wilk Critical Value	0.929			Data appear Lognormal at 5% Significance Level			
662					Lilliefors Test Statistic	0.0946			**Lilliefors Lognormal GOF Test**			
663					5% Lilliefors Critical Value	0.159			Data appear Lognormal at 5% Significance Level			
664	**Data appear Lognormal at 5% Significance Level**											
665												
666	**Lognormal Statistics**											
667					Minimum of Logged Data	-2.308			Mean of logged Data			0.423
668					Maximum of Logged Data	5.209			SD of logged Data			1.981
669												
670	**Assuming Lognormal Distribution**											
671					95% H-UCL	42.68			90% Chebyshev (MVUE) UCL			22.54

	A	B	C	D	E	F	G	H	I	J	K	L
672				95% Chebyshev (MVUE) UCL		28.57			97.5% Chebyshev (MVUE) UCL			36.94
673				99% Chebyshev (MVUE) UCL		53.37						
674												
675						Nonparametric Distribution Free UCL Statistics						
676						Data appear to follow a Discernible Distribution at 5% Significance Level						
677												
678						Nonparametric Distribution Free UCLs						
679					95% CLT UCL	20.77				95% Jackknife UCL		21.09
680				95% Standard Bootstrap UCL		20.63				95% Bootstrap-t UCL		53.16
681				95% Hall's Bootstrap UCL		56.8				95% Percentile Bootstrap UCL		22.47
682				95% BCA Bootstrap UCL		31.72						
683				90% Chebyshev(Mean, Sd) UCL		28.9				95% Chebyshev(Mean, Sd) UCL		37.05
684				97.5% Chebyshev(Mean, Sd) UCL		48.35				99% Chebyshev(Mean, Sd) UCL		70.57
685												
686						Suggested UCL to Use						
687				95% Chebyshev (Mean, Sd) UCL		37.05						
688												
689	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
690	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
691	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
692	For additional insight the user may want to consult a statistician.											
693												
694												
695	Dibenz(a,h)anthracene_EP8_0-6											
696												
697						General Statistics						
698					Total Number of Observations	31				Number of Distinct Observations		27
699										Number of Missing Observations		62
700					Minimum	0.028				Mean		0.888
701					Maximum	17.2				Median		0.155
702					SD	3.087				Std. Error of Mean		0.554
703					Coefficient of Variation	3.476				Skewness		5.261
704												
705						Normal GOF Test						
706					Shapiro Wilk Test Statistic	0.281				Shapiro Wilk GOF Test		
707					5% Shapiro Wilk Critical Value	0.929				Data Not Normal at 5% Significance Level		
708					Lilliefors Test Statistic	0.408				Lilliefors GOF Test		
709					5% Lilliefors Critical Value	0.159				Data Not Normal at 5% Significance Level		
710						Data Not Normal at 5% Significance Level						
711												
712						Assuming Normal Distribution						
713					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
714					95% Student's-t UCL	1.829				95% Adjusted-CLT UCL (Chen-1995)		2.36
715										95% Modified-t UCL (Johnson-1978)		1.916
716												
717						Gamma GOF Test						
718					A-D Test Statistic	3.894				Anderson-Darling Gamma GOF Test		
719					5% A-D Critical Value	0.825				Data Not Gamma Distributed at 5% Significance Level		
720					K-S Test Statistic	0.334				Kolmogrov-Smirnoff Gamma GOF Test		
721					5% K-S Critical Value	0.168				Data Not Gamma Distributed at 5% Significance Level		
722						Data Not Gamma Distributed at 5% Significance Level						
723												
724						Gamma Statistics						
725					k hat (MLE)	0.433				k star (bias corrected MLE)		0.412
726					Theta hat (MLE)	2.053				Theta star (bias corrected MLE)		2.154
727					nu hat (MLE)	26.83				nu star (bias corrected)		25.56
728					MLE Mean (bias corrected)	0.888				MLE Sd (bias corrected)		1.383
729										Approximate Chi Square Value (0.05)		15.04
730					Adjusted Level of Significance	0.0413				Adjusted Chi Square Value		14.59
731												
732						Assuming Gamma Distribution						

	A	B	C	D	E	F	G	H	I	J	K	L
733	95% Approximate Gamma UCL (use when n>=50))					1.509	95% Adjusted Gamma UCL (use when n<50)					1.556
734												
735	**Lognormal GOF Test**											
736	Shapiro Wilk Test Statistic					0.901	**Shapiro Wilk Lognormal GOF Test**					
737	5% Shapiro Wilk Critical Value					0.929	Data Not Lognormal at 5% Significance Level					
738	Lilliefors Test Statistic					0.171	**Lilliefors Lognormal GOF Test**					
739	5% Lilliefors Critical Value					0.159	Data Not Lognormal at 5% Significance Level					
740	**Data Not Lognormal at 5% Significance Level**											
741												
742	**Lognormal Statistics**											
743	Minimum of Logged Data					-3.576	Mean of logged Data					-1.621
744	Maximum of Logged Data					2.845	SD of logged Data					1.384
745												
746	**Assuming Lognormal Distribution**											
747	95% H-UCL					1.076	90% Chebyshev (MVUE) UCL					0.938
748	95% Chebyshev (MVUE) UCL					1.142	97.5% Chebyshev (MVUE) UCL					1.426
749	99% Chebyshev (MVUE) UCL					1.982						
750												
751	**Nonparametric Distribution Free UCL Statistics**											
752	**Data do not follow a Discernible Distribution (0.05)**											
753												
754	**Nonparametric Distribution Free UCLs**											
755	95% CLT UCL					1.8	95% Jackknife UCL					1.829
756	95% Standard Bootstrap UCL					1.765	95% Bootstrap-t UCL					9.679
757	95% Hall's Bootstrap UCL					5.743	95% Percentile Bootstrap UCL					1.905
758	95% BCA Bootstrap UCL					2.578						
759	90% Chebyshev(Mean, Sd) UCL					2.551	95% Chebyshev(Mean, Sd) UCL					3.305
760	97.5% Chebyshev(Mean, Sd) UCL					4.351	99% Chebyshev(Mean, Sd) UCL					6.405
761												
762	**Suggested UCL to Use**											
763	95% Chebyshev (Mean, Sd) UCL					3.305						
764												
765	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
766	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
767	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
768	For additional insight the user may want to consult a statistician.											
769												
770												
771	**Total PCBs_EP8_0-6**											
772												
773	**General Statistics**											
774	Total Number of Observations					70	Number of Distinct Observations					66
775							Number of Missing Observations					23
776	Minimum					0.0273	Mean					2.991
777	Maximum					19.8	Median					1.761
778	SD					3.873	Std. Error of Mean					0.463
779	Coefficient of Variation					1.295	Skewness					2.636
780												
781	**Normal GOF Test**											
782	Shapiro Wilk Test Statistic					0.697	**Shapiro Wilk GOF Test**					
783	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
784	Lilliefors Test Statistic					0.222	**Lilliefors GOF Test**					
785	5% Lilliefors Critical Value					0.106	Data Not Normal at 5% Significance Level					
786	**Data Not Normal at 5% Significance Level**											
787												
788	**Assuming Normal Distribution**											
789	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
790	95% Student's-t UCL					3.763	95% Adjusted-CLT UCL (Chen-1995)					3.909
791							95% Modified-t UCL (Johnson-1978)					3.788
792												
793	**Gamma GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
794					A-D Test Statistic	0.38	Anderson-Darling Gamma GOF Test					
795					5% A-D Critical Value	0.795	etected data appear Gamma Distributed at 5% Significance Lev					
796					K-S Test Statistic	0.0741	Kolmogrov-Smirnoff Gamma GOF Test					
797					5% K-S Critical Value	0.111	etected data appear Gamma Distributed at 5% Significance Lev					
798	Detected data appear Gamma Distributed at 5% Significance Level											
799												
800	Gamma Statistics											
801					k hat (MLE)	0.728	k star (bias corrected MLE)					0.706
802					Theta hat (MLE)	4.109	Theta star (bias corrected MLE)					4.236
803					nu hat (MLE)	101.9	nu star (bias corrected)					98.88
804					MLE Mean (bias corrected)	2.991	MLE Sd (bias corrected)					3.56
805							Approximate Chi Square Value (0.05)					76.94
806					Adjusted Level of Significance	0.0466	Adjusted Chi Square Value					76.53
807												
808	Assuming Gamma Distribution											
809					95% Approximate Gamma UCL (use when n>=50)	3.844	95% Adjusted Gamma UCL (use when n<50)					3.865
810												
811	Lognormal GOF Test											
812					Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Lognormal GOF Test					
813					5% Shapiro Wilk P Value	0.00127	Data Not Lognormal at 5% Significance Level					
814					Lilliefors Test Statistic	0.102	Lilliefors Lognormal GOF Test					
815					5% Lilliefors Critical Value	0.106	Data appear Lognormal at 5% Significance Level					
816	Data appear Approximate Lognormal at 5% Significance Level											
817												
818	Lognormal Statistics											
819					Minimum of Logged Data	-3.603	Mean of logged Data					0.27
820					Maximum of Logged Data	2.986	SD of logged Data					1.534
821												
822	Assuming Lognormal Distribution											
823					95% H-UCL	6.561	90% Chebyshev (MVUE) UCL					7.203
824					95% Chebyshev (MVUE) UCL	8.607	97.5% Chebyshev (MVUE) UCL					10.55
825					99% Chebyshev (MVUE) UCL	14.38						
826												
827	Nonparametric Distribution Free UCL Statistics											
828	Data appear to follow a Discernible Distribution at 5% Significance Level											
829												
830	Nonparametric Distribution Free UCLs											
831					95% CLT UCL	3.753	95% Jackknife UCL					3.763
832					95% Standard Bootstrap UCL	3.747	95% Bootstrap-t UCL					4.035
833					95% Hall's Bootstrap UCL	3.962	95% Percentile Bootstrap UCL					3.78
834					95% BCA Bootstrap UCL	3.865						
835					90% Chebyshev(Mean, Sd) UCL	4.38	95% Chebyshev(Mean, Sd) UCL					5.009
836					97.5% Chebyshev(Mean, Sd) UCL	5.882	99% Chebyshev(Mean, Sd) UCL					7.598
837												
838	Suggested UCL to Use											
839					95% Approximate Gamma UCL	3.844						
840												
841	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
842	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
843	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
844	For additional insight the user may want to consult a statistician.											
845												
846												
847	Lead_EP8_0-6											
848												
849	General Statistics											
850					Total Number of Observations	44	Number of Distinct Observations					44
851							Number of Missing Observations					49
852					Minimum	7.87	Mean					1128
853					Maximum	16100	Median					406.5
854					SD	2497	Std. Error of Mean					376.4

	A	B	C	D	E	F	G	H	I	J	K	L
855					Coefficient of Variation	2.214					Skewness	5.315
856												
857					Normal GOF Test							
858					Shapiro Wilk Test Statistic	0.417	Shapiro Wilk GOF Test					
859					5% Shapiro Wilk Critical Value	0.944	Data Not Normal at 5% Significance Level					
860					Lilliefors Test Statistic	0.327	Lilliefors GOF Test					
861					5% Lilliefors Critical Value	0.134	Data Not Normal at 5% Significance Level					
862					Data Not Normal at 5% Significance Level							
863												
864					Assuming Normal Distribution							
865					95% Normal UCL		95% UCLs (Adjusted for Skewness)					
866					95% Student's-t UCL	1760	95% Adjusted-CLT UCL (Chen-1995)					2069
867							95% Modified-t UCL (Johnson-1978)					1811
868												
869					Gamma GOF Test							
870					A-D Test Statistic	1.125	Anderson-Darling Gamma GOF Test					
871					5% A-D Critical Value	0.803	Data Not Gamma Distributed at 5% Significance Level					
872					K-S Test Statistic	0.133	Kolmogrov-Smirnoff Gamma GOF Test					
873					5% K-S Critical Value	0.14	etected data appear Gamma Distributed at 5% Significance Lev					
874					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
875												
876					Gamma Statistics							
877					k hat (MLE)	0.613	k star (bias corrected MLE)					0.586
878					Theta hat (MLE)	1839	Theta star (bias corrected MLE)					1923
879					nu hat (MLE)	53.95	nu star (bias corrected)					51.61
880					MLE Mean (bias corrected)	1128	MLE Sd (bias corrected)					1473
881							Approximate Chi Square Value (0.05)					36.11
882					Adjusted Level of Significance	0.0445	Adjusted Chi Square Value					35.67
883												
884					Assuming Gamma Distribution							
885					95% Approximate Gamma UCL (use when n>=50)	1612	95% Adjusted Gamma UCL (use when n<50)					1632
886												
887					Lognormal GOF Test							
888					Shapiro Wilk Test Statistic	0.991	Shapiro Wilk Lognormal GOF Test					
889					5% Shapiro Wilk Critical Value	0.944	Data appear Lognormal at 5% Significance Level					
890					Lilliefors Test Statistic	0.0943	Lilliefors Lognormal GOF Test					
891					5% Lilliefors Critical Value	0.134	Data appear Lognormal at 5% Significance Level					
892					Data appear Lognormal at 5% Significance Level							
893												
894					Lognormal Statistics							
895					Minimum of Logged Data	2.063	Mean of logged Data					6.023
896					Maximum of Logged Data	9.687	SD of logged Data					1.459
897												
898					Assuming Lognormal Distribution							
899					95% H-UCL	2296	90% Chebyshev (MVUE) UCL					2124
900					95% Chebyshev (MVUE) UCL	2568	97.5% Chebyshev (MVUE) UCL					3185
901					99% Chebyshev (MVUE) UCL	4396						
902												
903					Nonparametric Distribution Free UCL Statistics							
904					Data appear to follow a Discernible Distribution at 5% Significance Level							
905												
906					Nonparametric Distribution Free UCLs							
907					95% CLT UCL	1747	95% Jackknife UCL					1760
908					95% Standard Bootstrap UCL	1734	95% Bootstrap-t UCL					2812
909					95% Hall's Bootstrap UCL	3991	95% Percentile Bootstrap UCL					1810
910					95% BCA Bootstrap UCL	2259						
911					90% Chebyshev(Mean, Sd) UCL	2257	95% Chebyshev(Mean, Sd) UCL					2768
912					97.5% Chebyshev(Mean, Sd) UCL	3478	99% Chebyshev(Mean, Sd) UCL					4873
913												
914					Suggested UCL to Use							
915					95% Adjusted Gamma UCL	1632						

	A	B	C	D	E	F	G	H	I	J	K	L
916												
917	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
918	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
919	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
920	For additional insight the user may want to consult a statistician.											
921												
922												
923	**Benzo(a)anthracene_EP8_0-3**											
924												
925	**General Statistics**											
926	Total Number of Observations					29	Number of Distinct Observations					27
927							Number of Missing Observations					62
928	Minimum					0.0995	Mean					10.49
929	Maximum					167	Median					1.6
930	SD					31.36	Std. Error of Mean					5.823
931	Coefficient of Variation					2.989	Skewness					4.783
932												
933	**Normal GOF Test**											
934	Shapiro Wilk Test Statistic					0.353	**Shapiro Wilk GOF Test**					
935	5% Shapiro Wilk Critical Value					0.926	Data Not Normal at 5% Significance Level					
936	Lilliefors Test Statistic					0.37	**Lilliefors GOF Test**					
937	5% Lilliefors Critical Value					0.165	Data Not Normal at 5% Significance Level					
938	**Data Not Normal at 5% Significance Level**											
939												
940	**Assuming Normal Distribution**											
941	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
942	95% Student's-t UCL					20.4	95% Adjusted-CLT UCL (Chen-1995)					25.6
943							95% Modified-t UCL (Johnson-1978)					21.26
944												
945	**Gamma GOF Test**											
946	A-D Test Statistic					1.854	**Anderson-Darling Gamma GOF Test**					
947	5% A-D Critical Value					0.843	Data Not Gamma Distributed at 5% Significance Level					
948	K-S Test Statistic					0.246	**Kolmogrov-Smirnoff Gamma GOF Test**					
949	5% K-S Critical Value					0.175	Data Not Gamma Distributed at 5% Significance Level					
950	**Data Not Gamma Distributed at 5% Significance Level**											
951												
952	**Gamma Statistics**											
953	k hat (MLE)					0.36	k star (bias corrected MLE)					0.346
954	Theta hat (MLE)					29.15	Theta star (bias corrected MLE)					30.35
955	nu hat (MLE)					20.88	nu star (bias corrected)					20.05
956	MLE Mean (bias corrected)					10.49	MLE Sd (bias corrected)					17.84
957							Approximate Chi Square Value (0.05)					10.89
958	Adjusted Level of Significance					0.0407	Adjusted Chi Square Value					10.48
959												
960	**Assuming Gamma Distribution**											
961	95% Approximate Gamma UCL (use when n>=50))					19.32	95% Adjusted Gamma UCL (use when n<50)					20.06
962												
963	**Lognormal GOF Test**											
964	Shapiro Wilk Test Statistic					0.955	**Shapiro Wilk Lognormal GOF Test**					
965	5% Shapiro Wilk Critical Value					0.926	Data appear Lognormal at 5% Significance Level					
966	Lilliefors Test Statistic					0.0986	**Lilliefors Lognormal GOF Test**					
967	5% Lilliefors Critical Value					0.165	Data appear Lognormal at 5% Significance Level					
968	**Data appear Lognormal at 5% Significance Level**											
969												
970	**Lognormal Statistics**											
971	Minimum of Logged Data					-2.308	Mean of logged Data					0.491
972	Maximum of Logged Data					5.118	SD of logged Data					1.916
973												
974	**Assuming Lognormal Distribution**											
975	95% H-UCL					40.24	90% Chebyshev (MVUE) UCL					21.18
976	95% Chebyshev (MVUE) UCL					26.79	97.5% Chebyshev (MVUE) UCL					34.59

	A	B	C	D	E	F	G	H	I	J	K	L
977					99% Chebyshev (MVUE) UCL	49.91						
978												
979					Nonparametric Distribution Free UCL Statistics							
980					Data appear to follow a Discernible Distribution at 5% Significance Level							
981												
982					Nonparametric Distribution Free UCLs							
983					95% CLT UCL	20.07				95% Jackknife UCL		20.4
984					95% Standard Bootstrap UCL	19.93				95% Bootstrap-t UCL		53.04
985					95% Hall's Bootstrap UCL	52.3				95% Percentile Bootstrap UCL		21.65
986					95% BCA Bootstrap UCL	29.08						
987					90% Chebyshev(Mean, Sd) UCL	27.96				95% Chebyshev(Mean, Sd) UCL		35.87
988					97.5% Chebyshev(Mean, Sd) UCL	46.86				99% Chebyshev(Mean, Sd) UCL		68.43
989												
990					Suggested UCL to Use							
991					95% Chebyshev (Mean, Sd) UCL	35.87						
992												
993	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
994	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
995	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
996	For additional insight the user may want to consult a statistician.											
997												
998												
999	Benzo(a)pyrene_EP8_0-3											
1000												
1001					General Statistics							
1002					Total Number of Observations	29				Number of Distinct Observations		28
1003										Number of Missing Observations		62
1004					Minimum	0.0995				Mean		8.457
1005					Maximum	133				Median		1.3
1006					SD	24.99				Std. Error of Mean		4.641
1007					Coefficient of Variation	2.955				Skewness		4.765
1008												
1009					Normal GOF Test							
1010					Shapiro Wilk Test Statistic	0.357				Shapiro Wilk GOF Test		
1011					5% Shapiro Wilk Critical Value	0.926				Data Not Normal at 5% Significance Level		
1012					Lilliefors Test Statistic	0.377				Lilliefors GOF Test		
1013					5% Lilliefors Critical Value	0.165				Data Not Normal at 5% Significance Level		
1014					Data Not Normal at 5% Significance Level							
1015												
1016					Assuming Normal Distribution							
1017					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1018					95% Student's-t UCL	16.35				95% Adjusted-CLT UCL (Chen-1995)		20.48
1019										95% Modified-t UCL (Johnson-1978)		17.04
1020												
1021					Gamma GOF Test							
1022					A-D Test Statistic	1.825				Anderson-Darling Gamma GOF Test		
1023					5% A-D Critical Value	0.841				Data Not Gamma Distributed at 5% Significance Level		
1024					K-S Test Statistic	0.221				Kolmogrov-Smirnoff Gamma GOF Test		
1025					5% K-S Critical Value	0.175				Data Not Gamma Distributed at 5% Significance Level		
1026					Data Not Gamma Distributed at 5% Significance Level							
1027												
1028					Gamma Statistics							
1029					k hat (MLE)	0.366				k star (bias corrected MLE)		0.351
1030					Theta hat (MLE)	23.1				Theta star (bias corrected MLE)		24.08
1031					nu hat (MLE)	21.24				nu star (bias corrected)		20.37
1032					MLE Mean (bias corrected)	8.457				MLE Sd (bias corrected)		14.27
1033										Approximate Chi Square Value (0.05)		11.13
1034					Adjusted Level of Significance	0.0407				Adjusted Chi Square Value		10.72
1035												
1036					Assuming Gamma Distribution							
1037	95% Approximate Gamma UCL (use when n>=50))					15.49				95% Adjusted Gamma UCL (use when n<50)		16.08

	A	B	C	D	E	F	G	H	I	J	K	L
1038												
1039						Lognormal GOF Test						
1040					Shapiro Wilk Test Statistic	0.956	Shapiro Wilk Lognormal GOF Test					
1041					5% Shapiro Wilk Critical Value	0.926	Data appear Lognormal at 5% Significance Level					
1042					Lilliefors Test Statistic	0.0855	Lilliefors Lognormal GOF Test					
1043					5% Lilliefors Critical Value	0.165	Data appear Lognormal at 5% Significance Level					
1044						Data appear Lognormal at 5% Significance Level						
1045												
1046						Lognormal Statistics						
1047					Minimum of Logged Data	-2.308			Mean of logged Data			0.312
1048					Maximum of Logged Data	4.89			SD of logged Data			1.876
1049												
1050						Assuming Lognormal Distribution						
1051					95% H-UCL	29.69			90% Chebyshev (MVUE) UCL			16.35
1052					95% Chebyshev (MVUE) UCL	20.64			97.5% Chebyshev (MVUE) UCL			26.6
1053					99% Chebyshev (MVUE) UCL	38.3						
1054												
1055						Nonparametric Distribution Free UCL Statistics						
1056						Data appear to follow a Discernible Distribution at 5% Significance Level						
1057												
1058						Nonparametric Distribution Free UCLs						
1059					95% CLT UCL	16.09			95% Jackknife UCL			16.35
1060					95% Standard Bootstrap UCL	15.83			95% Bootstrap-t UCL			44.8
1061					95% Hall's Bootstrap UCL	41.09			95% Percentile Bootstrap UCL			17.37
1062					95% BCA Bootstrap UCL	23.96						
1063					90% Chebyshev(Mean, Sd) UCL	22.38			95% Chebyshev(Mean, Sd) UCL			28.69
1064					97.5% Chebyshev(Mean, Sd) UCL	37.44			99% Chebyshev(Mean, Sd) UCL			54.64
1065												
1066						Suggested UCL to Use						
1067					95% Chebyshev (Mean, Sd) UCL	28.69						
1068												
1069	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1070	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1071	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1072	For additional insight the user may want to consult a statistician.											
1073												
1074												
1075	Benzo(b)fluoranthene_EP8_0-3											
1076												
1077						General Statistics						
1078					Total Number of Observations	29			Number of Distinct Observations			29
1079									Number of Missing Observations			62
1080					Minimum	0.0995			Mean			11.55
1081					Maximum	183			Median			1.5
1082					SD	34.46			Std. Error of Mean			6.399
1083					Coefficient of Variation	2.984			Skewness			4.746
1084												
1085						Normal GOF Test						
1086					Shapiro Wilk Test Statistic	0.357	Shapiro Wilk GOF Test					
1087					5% Shapiro Wilk Critical Value	0.926	Data Not Normal at 5% Significance Level					
1088					Lilliefors Test Statistic	0.38	Lilliefors GOF Test					
1089					5% Lilliefors Critical Value	0.165	Data Not Normal at 5% Significance Level					
1090						Data Not Normal at 5% Significance Level						
1091												
1092						Assuming Normal Distribution						
1093					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
1094					95% Student's-t UCL	22.43			95% Adjusted-CLT UCL (Chen-1995)			28.1
1095									95% Modified-t UCL (Johnson-1978)			23.37
1096												
1097						Gamma GOF Test						
1098					A-D Test Statistic	1.75	Anderson-Darling Gamma GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
1099					5% A-D Critical Value	0.846	Data Not Gamma Distributed at 5% Significance Level					
1100					K-S Test Statistic	0.189	**Kolmogrov-Smirnoff Gamma GOF Test**					
1101					5% K-S Critical Value	0.176	Data Not Gamma Distributed at 5% Significance Level					
1102	**Data Not Gamma Distributed at 5% Significance Level**											
1103												
1104	**Gamma Statistics**											
1105					k hat (MLE)	0.344	k star (bias corrected MLE)					0.331
1106					Theta hat (MLE)	33.59	Theta star (bias corrected MLE)					34.87
1107					nu hat (MLE)	19.94	nu star (bias corrected)					19.21
1108					MLE Mean (bias corrected)	11.55	MLE Sd (bias corrected)					20.07
1109							Approximate Chi Square Value (0.05)					10.27
1110					Adjusted Level of Significance	0.0407	Adjusted Chi Square Value					9.882
1111												
1112	**Assuming Gamma Distribution**											
1113	95% Approximate Gamma UCL (use when n>=50))					21.6	95% Adjusted Gamma UCL (use when n<50)					22.45
1114												
1115	**Lognormal GOF Test**											
1116					Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk Lognormal GOF Test**					
1117					5% Shapiro Wilk Critical Value	0.926	Data appear Lognormal at 5% Significance Level					
1118					Lilliefors Test Statistic	0.0872	**Lilliefors Lognormal GOF Test**					
1119					5% Lilliefors Critical Value	0.165	Data appear Lognormal at 5% Significance Level					
1120	**Data appear Lognormal at 5% Significance Level**											
1121												
1122	**Lognormal Statistics**											
1123					Minimum of Logged Data	-2.308	Mean of logged Data					0.485
1124					Maximum of Logged Data	5.209	SD of logged Data					1.987
1125												
1126	**Assuming Lognormal Distribution**											
1127					95% H-UCL	50.46	90% Chebyshev (MVUE) UCL					24.37
1128					95% Chebyshev (MVUE) UCL	30.95	97.5% Chebyshev (MVUE) UCL					40.08
1129					99% Chebyshev (MVUE) UCL	58.02						
1130												
1131	**Nonparametric Distribution Free UCL Statistics**											
1132	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1133												
1134	**Nonparametric Distribution Free UCLs**											
1135					95% CLT UCL	22.07	95% Jackknife UCL					22.43
1136					95% Standard Bootstrap UCL	22.06	95% Bootstrap-t UCL					62.71
1137					95% Hall's Bootstrap UCL	56.64	95% Percentile Bootstrap UCL					24.18
1138					95% BCA Bootstrap UCL	31.4						
1139					90% Chebyshev(Mean, Sd) UCL	30.74	95% Chebyshev(Mean, Sd) UCL					39.44
1140					97.5% Chebyshev(Mean, Sd) UCL	51.51	99% Chebyshev(Mean, Sd) UCL					75.21
1141												
1142	**Suggested UCL to Use**											
1143					95% Chebyshev (Mean, Sd) UCL	39.44						
1144												
1145	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1146	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1147	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1148	For additional insight the user may want to consult a statistician.											
1149												
1150												
1151	**Dibenz(a,h)anthracene_EP8_0-3**											
1152												
1153	**General Statistics**											
1154					Total Number of Observations	29	Number of Distinct Observations					25
1155							Number of Missing Observations					62
1156					Minimum	0.028	Mean					0.938
1157					Maximum	17.2	Median					0.155
1158					SD	3.189	Std. Error of Mean					0.592
1159					Coefficient of Variation	3.4	Skewness					5.088

	A	B	C	D	E	F	G	H	I	J	K	L
1160												
1161	**Normal GOF Test**											
1162					Shapiro Wilk Test Statistic	0.29	**Shapiro Wilk GOF Test**					
1163					5% Shapiro Wilk Critical Value	0.926	Data Not Normal at 5% Significance Level					
1164					Lilliefors Test Statistic	0.408	**Lilliefors GOF Test**					
1165					5% Lilliefors Critical Value	0.165	Data Not Normal at 5% Significance Level					
1166	**Data Not Normal at 5% Significance Level**											
1167												
1168	**Assuming Normal Distribution**											
1169			**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**					
1170					95% Student's-t UCL	1.945	95% Adjusted-CLT UCL (Chen-1995)					2.51
1171							95% Modified-t UCL (Johnson-1978)					2.039
1172												
1173	**Gamma GOF Test**											
1174					A-D Test Statistic	3.515	**Anderson-Darling Gamma GOF Test**					
1175					5% A-D Critical Value	0.829	Data Not Gamma Distributed at 5% Significance Level					
1176					K-S Test Statistic	0.329	**Kolmogrov-Smirnoff Gamma GOF Test**					
1177					5% K-S Critical Value	0.174	Data Not Gamma Distributed at 5% Significance Level					
1178	**Data Not Gamma Distributed at 5% Significance Level**											
1179												
1180	**Gamma Statistics**											
1181					k hat (MLE)	0.423	k star (bias corrected MLE)					0.402
1182					Theta hat (MLE)	2.217	Theta star (bias corrected MLE)					2.331
1183					nu hat (MLE)	24.54	nu star (bias corrected)					23.34
1184					MLE Mean (bias corrected)	0.938	MLE Sd (bias corrected)					1.479
1185							Approximate Chi Square Value (0.05)					13.35
1186					Adjusted Level of Significance	0.0407	Adjusted Chi Square Value					12.89
1187												
1188	**Assuming Gamma Distribution**											
1189			95% Approximate Gamma UCL (use when n>=50))			1.64	95% Adjusted Gamma UCL (use when n<50)					1.698
1190												
1191	**Lognormal GOF Test**											
1192					Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk Lognormal GOF Test**					
1193					5% Shapiro Wilk Critical Value	0.926	Data Not Lognormal at 5% Significance Level					
1194					Lilliefors Test Statistic	0.169	**Lilliefors Lognormal GOF Test**					
1195					5% Lilliefors Critical Value	0.165	Data Not Lognormal at 5% Significance Level					
1196	**Data Not Lognormal at 5% Significance Level**											
1197												
1198	**Lognormal Statistics**											
1199					Minimum of Logged Data	-3.576	Mean of logged Data					-1.605
1200					Maximum of Logged Data	2.845	SD of logged Data					1.429
1201												
1202	**Assuming Lognormal Distribution**											
1203					95% H-UCL	1.268	90% Chebyshev (MVUE) UCL					1.039
1204					95% Chebyshev (MVUE) UCL	1.273	97.5% Chebyshev (MVUE) UCL					1.598
1205					99% Chebyshev (MVUE) UCL	2.236						
1206												
1207	**Nonparametric Distribution Free UCL Statistics**											
1208	**Data do not follow a Discernible Distribution (0.05)**											
1209												
1210	**Nonparametric Distribution Free UCLs**											
1211					95% CLT UCL	1.912	95% Jackknife UCL					1.945
1212					95% Standard Bootstrap UCL	1.885	95% Bootstrap-t UCL					10.62
1213					95% Hall's Bootstrap UCL	5.884	95% Percentile Bootstrap UCL					2.052
1214					95% BCA Bootstrap UCL	3.254						
1215					90% Chebyshev(Mean, Sd) UCL	2.715	95% Chebyshev(Mean, Sd) UCL					3.519
1216					97.5% Chebyshev(Mean, Sd) UCL	4.636	99% Chebyshev(Mean, Sd) UCL					6.83
1217												
1218	**Suggested UCL to Use**											
1219					95% Chebyshev (Mean, Sd) UCL	3.519						
1220												

	A	B	C	D	E	F	G	H	I	J	K	L
1221	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1222	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1223	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1224	For additional insight the user may want to consult a statistician.											
1225												
1226												
1227	**Total PCBs_EP8_0-3**											
1228												
1229	**General Statistics**											
1230					Total Number of Observations	68			Number of Distinct Observations			64
1231									Number of Missing Observations			23
1232					Minimum	0.0273			Mean			3.008
1233					Maximum	19.8			Median			1.761
1234					SD	3.92			Std. Error of Mean			0.475
1235					Coefficient of Variation	1.303			Skewness			2.61
1236												
1237	**Normal GOF Test**											
1238					Shapiro Wilk Test Statistic	0.697			**Shapiro Wilk GOF Test**			
1239					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
1240					Lilliefors Test Statistic	0.224			**Lilliefors GOF Test**			
1241					5% Lilliefors Critical Value	0.107			Data Not Normal at 5% Significance Level			
1242	**Data Not Normal at 5% Significance Level**											
1243												
1244	**Assuming Normal Distribution**											
1245					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
1246					95% Student's-t UCL	3.801			95% Adjusted-CLT UCL (Chen-1995)			3.951
1247									95% Modified-t UCL (Johnson-1978)			3.826
1248												
1249	**Gamma GOF Test**											
1250					A-D Test Statistic	0.355			**Anderson-Darling Gamma GOF Test**			
1251					5% A-D Critical Value	0.796			etected data appear Gamma Distributed at 5% Significance Lev			
1252					K-S Test Statistic	0.069			**Kolmogrov-Smirnoff Gamma GOF Test**			
1253					5% K-S Critical Value	0.113			etected data appear Gamma Distributed at 5% Significance Lev			
1254	**Detected data appear Gamma Distributed at 5% Significance Level**											
1255												
1256	**Gamma Statistics**											
1257					k hat (MLE)	0.716			k star (bias corrected MLE)			0.694
1258					Theta hat (MLE)	4.201			Theta star (bias corrected MLE)			4.333
1259					nu hat (MLE)	97.37			nu star (bias corrected)			94.41
1260					MLE Mean (bias corrected)	3.008			MLE Sd (bias corrected)			3.61
1261									Approximate Chi Square Value (0.05)			73
1262					Adjusted Level of Significance	0.0465			Adjusted Chi Square Value			72.59
1263												
1264	**Assuming Gamma Distribution**											
1265	95% Approximate Gamma UCL (use when n>=50)					3.89			95% Adjusted Gamma UCL (use when n<50)			3.912
1266												
1267	**Lognormal GOF Test**											
1268					Shapiro Wilk Test Statistic	0.934			**Shapiro Wilk Lognormal GOF Test**			
1269					5% Shapiro Wilk P Value	0.00182			Data Not Lognormal at 5% Significance Level			
1270					Lilliefors Test Statistic	0.102			**Lilliefors Lognormal GOF Test**			
1271					5% Lilliefors Critical Value	0.107			Data appear Lognormal at 5% Significance Level			
1272	**Data appear Approximate Lognormal at 5% Significance Level**											
1273												
1274	**Lognormal Statistics**											
1275					Minimum of Logged Data	-3.603			Mean of logged Data			0.26
1276					Maximum of Logged Data	2.986			SD of logged Data			1.55
1277												
1278	**Assuming Lognormal Distribution**											
1279					95% H-UCL	6.816			90% Chebyshev (MVUE) UCL			7.376
1280					95% Chebyshev (MVUE) UCL	8.835			97.5% Chebyshev (MVUE) UCL			10.86
1281					99% Chebyshev (MVUE) UCL	14.84						

	A	B	C	D	E	F	G	H	I	J	K	L
1282												
1283						Nonparametric Distribution Free UCL Statistics						
1284						Data appear to follow a Discernible Distribution at 5% Significance Level						
1285												
1286						Nonparametric Distribution Free UCLs						
1287					95% CLT UCL	3.79			95% Jackknife UCL			3.801
1288					95% Standard Bootstrap UCL	3.785			95% Bootstrap-t UCL			4.052
1289					95% Hall's Bootstrap UCL	4.021			95% Percentile Bootstrap UCL			3.845
1290					95% BCA Bootstrap UCL	3.942						
1291					90% Chebyshev(Mean, Sd) UCL	4.434			95% Chebyshev(Mean, Sd) UCL			5.08
1292					97.5% Chebyshev(Mean, Sd) UCL	5.977			99% Chebyshev(Mean, Sd) UCL			7.738
1293												
1294						Suggested UCL to Use						
1295					95% Approximate Gamma UCL	3.89						
1296												
1297	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1298	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1299	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1300	For additional insight the user may want to consult a statistician.											
1301												
1302												
1303	Lead_EP8_0-3											
1304												
1305						General Statistics						
1306					Total Number of Observations	42			Number of Distinct Observations			42
1307									Number of Missing Observations			49
1308					Minimum	7.87			Mean			1159
1309					Maximum	16100			Median			406.5
1310					SD	2552			Std. Error of Mean			393.8
1311					Coefficient of Variation	2.203			Skewness			5.192
1312												
1313						Normal GOF Test						
1314					Shapiro Wilk Test Statistic	0.416			Shapiro Wilk GOF Test			
1315					5% Shapiro Wilk Critical Value	0.942			Data Not Normal at 5% Significance Level			
1316					Lilliefors Test Statistic	0.326			Lilliefors GOF Test			
1317					5% Lilliefors Critical Value	0.137			Data Not Normal at 5% Significance Level			
1318						Data Not Normal at 5% Significance Level						
1319												
1320						Assuming Normal Distribution						
1321					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
1322					95% Student's-t UCL	1821			95% Adjusted-CLT UCL (Chen-1995)			2144
1323									95% Modified-t UCL (Johnson-1978)			1874
1324												
1325						Gamma GOF Test						
1326					A-D Test Statistic	1.036			Anderson-Darling Gamma GOF Test			
1327					5% A-D Critical Value	0.804			Data Not Gamma Distributed at 5% Significance Level			
1328					K-S Test Statistic	0.133			Kolmogrov-Smirnoff Gamma GOF Test			
1329					5% K-S Critical Value	0.143			etected data appear Gamma Distributed at 5% Significance Lev			
1330						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
1331												
1332						Gamma Statistics						
1333					k hat (MLE)	0.597			k star (bias corrected MLE)			0.57
1334					Theta hat (MLE)	1941			Theta star (bias corrected MLE)			2032
1335					nu hat (MLE)	50.14			nu star (bias corrected)			47.89
1336					MLE Mean (bias corrected)	1159			MLE Sd (bias corrected)			1534
1337									Approximate Chi Square Value (0.05)			33.01
1338					Adjusted Level of Significance	0.0443			Adjusted Chi Square Value			32.57
1339												
1340						Assuming Gamma Distribution						
1341					95% Approximate Gamma UCL (use when n>=50)	1681			95% Adjusted Gamma UCL (use when n<50)			1704
1342												

	A	B	C	D	E	F	G	H	I	J	K	L
1343						**Lognormal GOF Test**						
1344					Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk Lognormal GOF Test**					
1345					5% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 5% Significance Level					
1346					Lilliefors Test Statistic	0.103	**Lilliefors Lognormal GOF Test**					
1347					5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level					
1348					**Data appear Lognormal at 5% Significance Level**							
1349												
1350						**Lognormal Statistics**						
1351					Minimum of Logged Data	2.063				Mean of logged Data		6.019
1352					Maximum of Logged Data	9.687				SD of logged Data		1.492
1353												
1354						**Assuming Lognormal Distribution**						
1355					95% H-UCL	2492				90% Chebyshev (MVUE) UCL		2259
1356				95% Chebyshev (MVUE) UCL		2744				97.5% Chebyshev (MVUE) UCL		3417
1357				99% Chebyshev (MVUE) UCL		4740						
1358												
1359						**Nonparametric Distribution Free UCL Statistics**						
1360						**Data appear to follow a Discernible Distribution at 5% Significance Level**						
1361												
1362						**Nonparametric Distribution Free UCLs**						
1363					95% CLT UCL	1806				95% Jackknife UCL		1821
1364				95% Standard Bootstrap UCL		1784				95% Bootstrap-t UCL		2962
1365				95% Hall's Bootstrap UCL		4127				95% Percentile Bootstrap UCL		1882
1366				95% BCA Bootstrap UCL		2241						
1367				90% Chebyshev(Mean, Sd) UCL		2340				95% Chebyshev(Mean, Sd) UCL		2875
1368				97.5% Chebyshev(Mean, Sd) UCL		3618				99% Chebyshev(Mean, Sd) UCL		5077
1369												
1370						**Suggested UCL to Use**						
1371				95% Adjusted Gamma UCL		1704						
1372												
1373	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1374	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1375	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1376	For additional insight the user may want to consult a statistician.											
1377												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			5/5/2014 2:35:06 PM								
5	From File			ProUCL_Import.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	mber of Bootstrap Operations			2000								
9												
10												
11	Benzo(a)pyrene_EP9_0-15											
12												
13	General Statistics											
14	Total Number of Observations					66	Number of Distinct Observations					63
15							Number of Missing Observations					116
16	Minimum					0.0255	Mean					2.597
17	Maximum					30	Median					0.499
18	SD					5.547	Std. Error of Mean					0.683
19	Coefficient of Variation					2.136	Skewness					3.706
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.492	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.321	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.109	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					3.736	95% Adjusted-CLT UCL (Chen-1995)					4.053
31							95% Modified-t UCL (Johnson-1978)					3.788
32												
33	Gamma GOF Test											
34	A-D Test Statistic					2.969	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.827	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.164	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.117	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.457	k star (bias corrected MLE)					0.446
42	Theta hat (MLE)					5.688	Theta star (bias corrected MLE)					5.824
43	nu hat (MLE)					60.27	nu star (bias corrected)					58.87
44	MLE Mean (bias corrected)					2.597	MLE Sd (bias corrected)					3.889
45							Approximate Chi Square Value (0.05)					42.23
46	Adjusted Level of Significance					0.0464	Adjusted Chi Square Value					41.91
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					3.621	95% Adjusted Gamma UCL (use when n<50)					3.648
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.931	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk P Value					0.00137	Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.13	Lilliefors Lognormal GOF Test					
55	5% Lilliefors Critical Value					0.109	Data Not Lognormal at 5% Significance Level					
56	Data Not Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59	Minimum of Logged Data					-3.669	Mean of logged Data					-0.457
60	Maximum of Logged Data					3.401	SD of logged Data					1.71
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62					Assuming Lognormal Distribution							
63					95% H-UCL	4.789			90% Chebyshev (MVUE) UCL			4.926
64					95% Chebyshev (MVUE) UCL	5.982			97.5% Chebyshev (MVUE) UCL			7.448
65					99% Chebyshev (MVUE) UCL	10.33						
66												
67					Nonparametric Distribution Free UCL Statistics							
68					Data do not follow a Discernible Distribution (0.05)							
69												
70					Nonparametric Distribution Free UCLs							
71					95% CLT UCL	3.72			95% Jackknife UCL			3.736
72					95% Standard Bootstrap UCL	3.699			95% Bootstrap-t UCL			4.555
73					95% Hall's Bootstrap UCL	8.205			95% Percentile Bootstrap UCL			3.855
74					95% BCA Bootstrap UCL	4.145						
75					90% Chebyshev(Mean, Sd) UCL	4.645			95% Chebyshev(Mean, Sd) UCL			5.573
76					97.5% Chebyshev(Mean, Sd) UCL	6.861			99% Chebyshev(Mean, Sd) UCL			9.39
77												
78					Suggested UCL to Use							
79					95% Chebyshev (Mean, Sd) UCL	5.573						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	Total PCBs_EP9_0-15											
88												
89					General Statistics							
90					Total Number of Observations	163			Number of Distinct Observations			157
91									Number of Missing Observations			23
92					Minimum	0.0176			Mean			1.663
93					Maximum	40			Median			0.118
94					SD	4.477			Std. Error of Mean			0.351
95					Coefficient of Variation	2.692			Skewness			5.249
96												
97					Normal GOF Test							
98					Shapiro Wilk Test Statistic	0.432			Shapiro Wilk GOF Test			
99					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
100					Lilliefors Test Statistic	0.357			Lilliefors GOF Test			
101					5% Lilliefors Critical Value	0.0694			Data Not Normal at 5% Significance Level			
102					Data Not Normal at 5% Significance Level							
103												
104					Assuming Normal Distribution							
105					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
106					95% Student's-t UCL	2.243			95% Adjusted-CLT UCL (Chen-1995)			2.394
107									95% Modified-t UCL (Johnson-1978)			2.267
108												
109					Gamma GOF Test							
110					A-D Test Statistic	12.61			Anderson-Darling Gamma GOF Test			
111					5% A-D Critical Value	0.862			Data Not Gamma Distributed at 5% Significance Level			
112					K-S Test Statistic	0.217			Kolmogrov-Smirnoff Gamma GOF Test			
113					5% K-S Critical Value	0.0792			Data Not Gamma Distributed at 5% Significance Level			
114					Data Not Gamma Distributed at 5% Significance Level							
115												
116					Gamma Statistics							
117					k hat (MLE)	0.329			k star (bias corrected MLE)			0.327
118					Theta hat (MLE)	5.059			Theta star (bias corrected MLE)			5.09
119					nu hat (MLE)	107.2			nu star (bias corrected)			106.5
120					MLE Mean (bias corrected)	1.663			MLE Sd (bias corrected)			2.909
121									Approximate Chi Square Value (0.05)			83.7
122					Adjusted Level of Significance	0.0485			Adjusted Chi Square Value			83.52

	A	B	C	D	E	F	G	H	I	J	K	L
123												
124						Assuming Gamma Distribution						
125				95% Approximate Gamma UCL (use when n>=50))		2.116		95% Adjusted Gamma UCL (use when n<50)				2.121
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.882		Shapiro Wilk Lognormal GOF Test				
129					5% Shapiro Wilk P Value	0		Data Not Lognormal at 5% Significance Level				
130					Lilliefors Test Statistic	0.139		Lilliefors Lognormal GOF Test				
131					5% Lilliefors Critical Value	0.0694		Data Not Lognormal at 5% Significance Level				
132						Data Not Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	-4.043		Mean of logged Data				-1.558
136					Maximum of Logged Data	3.689		SD of logged Data				1.995
137												
138						Assuming Lognormal Distribution						
139					95% H-UCL	2.534		90% Chebyshev (MVUE) UCL				2.618
140					95% Chebyshev (MVUE) UCL	3.132		97.5% Chebyshev (MVUE) UCL				3.844
141					99% Chebyshev (MVUE) UCL	5.243						
142												
143						Nonparametric Distribution Free UCL Statistics						
144						Data do not follow a Discernible Distribution (0.05)						
145												
146						Nonparametric Distribution Free UCLs						
147					95% CLT UCL	2.24		95% Jackknife UCL				2.243
148					95% Standard Bootstrap UCL	2.214		95% Bootstrap-t UCL				2.534
149					95% Hall's Bootstrap UCL	2.674		95% Percentile Bootstrap UCL				2.301
150					95% BCA Bootstrap UCL	2.481						
151					90% Chebyshev(Mean, Sd) UCL	2.715		95% Chebyshev(Mean, Sd) UCL				3.192
152					97.5% Chebyshev(Mean, Sd) UCL	3.853		99% Chebyshev(Mean, Sd) UCL				5.152
153												
154						Suggested UCL to Use						
155					95% Chebyshev (Mean, Sd) UCL	3.192						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	Arsenic_EP9_0-15											
164												
165						General Statistics						
166					Total Number of Observations	88		Number of Distinct Observations				82
167								Number of Missing Observations				94
168					Minimum	1.3		Mean				12.98
169					Maximum	94		Median				9.06
170					SD	14.66		Std. Error of Mean				1.563
171					Coefficient of Variation	1.129		Skewness				2.597
172												
173						Normal GOF Test						
174					Shapiro Wilk Test Statistic	0.75		Shapiro Wilk GOF Test				
175					5% Shapiro Wilk P Value	0		Data Not Normal at 5% Significance Level				
176					Lilliefors Test Statistic	0.213		Lilliefors GOF Test				
177					5% Lilliefors Critical Value	0.0944		Data Not Normal at 5% Significance Level				
178						Data Not Normal at 5% Significance Level						
179												
180						Assuming Normal Distribution						
181					95% Normal UCL			95% UCLs (Adjusted for Skewness)				
182					95% Student's-t UCL	15.58		95% Adjusted-CLT UCL (Chen-1995)				16.01
183								95% Modified-t UCL (Johnson-1978)				15.65

	A	B	C	D	E	F	G	H	I	J	K	L
184												
185						Gamma GOF Test						
186					A-D Test Statistic	1.376	Anderson-Darling Gamma GOF Test					
187					5% A-D Critical Value	0.783	Data Not Gamma Distributed at 5% Significance Level					
188					K-S Test Statistic	0.125	Kolmogrov-Smirnoff Gamma GOF Test					
189					5% K-S Critical Value	0.0981	Data Not Gamma Distributed at 5% Significance Level					
190					Data Not Gamma Distributed at 5% Significance Level							
191												
192						Gamma Statistics						
193					k hat (MLE)	1.007	k star (bias corrected MLE)					0.98
194					Theta hat (MLE)	12.89	Theta star (bias corrected MLE)					13.25
195					nu hat (MLE)	177.2	nu star (bias corrected)					172.5
196					MLE Mean (bias corrected)	12.98	MLE Sd (bias corrected)					13.11
197							Approximate Chi Square Value (0.05)					143.1
198					Adjusted Level of Significance	0.0473	Adjusted Chi Square Value					142.7
199												
200						Assuming Gamma Distribution						
201			95% Approximate Gamma UCL (use when n>=50))			15.64	95% Adjusted Gamma UCL (use when n<50)					15.69
202												
203						Lognormal GOF Test						
204					Shapiro Wilk Test Statistic	0.917	Shapiro Wilk Lognormal GOF Test					
205					5% Shapiro Wilk P Value	5.5483E-6	Data Not Lognormal at 5% Significance Level					
206					Lilliefors Test Statistic	0.148	Lilliefors Lognormal GOF Test					
207					5% Lilliefors Critical Value	0.0944	Data Not Lognormal at 5% Significance Level					
208						Data Not Lognormal at 5% Significance Level						
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	0.262	Mean of logged Data					1.991
212					Maximum of Logged Data	4.543	SD of logged Data					1.141
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	18.78	90% Chebyshev (MVUE) UCL					20.17
216					95% Chebyshev (MVUE) UCL	23.03	97.5% Chebyshev (MVUE) UCL					26.99
217					99% Chebyshev (MVUE) UCL	34.77						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data do not follow a Discernible Distribution (0.05)						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	15.55	95% Jackknife UCL					15.58
224					95% Standard Bootstrap UCL	15.53	95% Bootstrap-t UCL					16.33
225					95% Hall's Bootstrap UCL	16.65	95% Percentile Bootstrap UCL					15.59
226					95% BCA Bootstrap UCL	15.96						
227					90% Chebyshev(Mean, Sd) UCL	17.67	95% Chebyshev(Mean, Sd) UCL					19.79
228					97.5% Chebyshev(Mean, Sd) UCL	22.74	99% Chebyshev(Mean, Sd) UCL					28.53
229												
230						Suggested UCL to Use						
231					95% Chebyshev (Mean, Sd) UCL	19.79						
232												
233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
234	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
235	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
236	For additional insight the user may want to consult a statistician.											
237												
238												
239	Barium_EP9_0-15											
240												
241						General Statistics						
242					Total Number of Observations	88	Number of Distinct Observations					86
243							Number of Missing Observations					94
244					Minimum	2.815	Mean					593.8

	A	B	C	D	E	F	G	H	I	J	K	L
245					Maximum	15400					Median	213.5
246					SD	1792					Std. Error of Mean	191.1
247					Coefficient of Variation	3.018					Skewness	7.007
248												
249					Normal GOF Test							
250					Shapiro Wilk Test Statistic	0.329	Shapiro Wilk GOF Test					
251					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
252					Lilliefors Test Statistic	0.371	Lilliefors GOF Test					
253					5% Lilliefors Critical Value	0.0944	Data Not Normal at 5% Significance Level					
254					Data Not Normal at 5% Significance Level							
255												
256					Assuming Normal Distribution							
257					95% Normal UCL		95% UCLs (Adjusted for Skewness)					
258					95% Student's-t UCL	911.5	95% Adjusted-CLT UCL (Chen-1995)					1061
259							95% Modified-t UCL (Johnson-1978)					935.3
260												
261					Gamma GOF Test							
262					A-D Test Statistic	2.438	Anderson-Darling Gamma GOF Test					
263					5% A-D Critical Value	0.841	Data Not Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.123	Kolmogrov-Smirnoff Gamma GOF Test					
265					5% K-S Critical Value	0.102	Data Not Gamma Distributed at 5% Significance Level					
266					Data Not Gamma Distributed at 5% Significance Level							
267												
268					Gamma Statistics							
269					k hat (MLE)	0.408	k star (bias corrected MLE)					0.401
270					Theta hat (MLE)	1456	Theta star (bias corrected MLE)					1479
271					nu hat (MLE)	71.76	nu star (bias corrected)					70.64
272					MLE Mean (bias corrected)	593.8	MLE Sd (bias corrected)					937.3
273							Approximate Chi Square Value (0.05)					52.29
274					Adjusted Level of Significance	0.0473	Adjusted Chi Square Value					52.03
275												
276					Assuming Gamma Distribution							
277					95% Approximate Gamma UCL (use when n>=50))	802.2	95% Adjusted Gamma UCL (use when n<50)					806.2
278												
279					Lognormal GOF Test							
280					Shapiro Wilk Test Statistic	0.944	Shapiro Wilk Lognormal GOF Test					
281					5% Shapiro Wilk P Value	0.00181	Data Not Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.137	Lilliefors Lognormal GOF Test					
283					5% Lilliefors Critical Value	0.0944	Data Not Lognormal at 5% Significance Level					
284					Data Not Lognormal at 5% Significance Level							
285												
286					Lognormal Statistics							
287					Minimum of Logged Data	1.035	Mean of logged Data					4.778
288					Maximum of Logged Data	9.642	SD of logged Data					1.961
289												
290					Assuming Lognormal Distribution							
291					95% H-UCL	1636	90% Chebyshev (MVUE) UCL					1506
292					95% Chebyshev (MVUE) UCL	1841	97.5% Chebyshev (MVUE) UCL					2307
293					99% Chebyshev (MVUE) UCL	3222						
294												
295					Nonparametric Distribution Free UCL Statistics							
296					Data do not follow a Discernible Distribution (0.05)							
297												
298					Nonparametric Distribution Free UCLs							
299					95% CLT UCL	908.1	95% Jackknife UCL					911.5
300					95% Standard Bootstrap UCL	924.3	95% Bootstrap-t UCL					1466
301					95% Hall's Bootstrap UCL	2241	95% Percentile Bootstrap UCL					931.4
302					95% BCA Bootstrap UCL	1139						
303					90% Chebyshev(Mean, Sd) UCL	1167	95% Chebyshev(Mean, Sd) UCL					1427
304					97.5% Chebyshev(Mean, Sd) UCL	1787	99% Chebyshev(Mean, Sd) UCL					2495
305												

	A	B	C	D	E	F	G	H	I	J	K	L
306	**Suggested UCL to Use**											
307					95% Chebyshev (Mean, Sd) UCL	1427						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											
313												
314												
315	**Lead_EP9_0-15**											
316												
317	**General Statistics**											
318					Total Number of Observations	125			Number of Distinct Observations			115
319									Number of Missing Observations			61
320					Minimum	2.01			Mean			1123
321					Maximum	11000			Median			540
322					SD	1808			Std. Error of Mean			161.8
323					Coefficient of Variation	1.61			Skewness			3.454
324												
325	**Normal GOF Test**											
326					Shapiro Wilk Test Statistic	0.614			**Shapiro Wilk GOF Test**			
327					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
328					Lilliefors Test Statistic	0.268			**Lilliefors GOF Test**			
329					5% Lilliefors Critical Value	0.0792			Data Not Normal at 5% Significance Level			
330	**Data Not Normal at 5% Significance Level**											
331												
332	**Assuming Normal Distribution**											
333	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
334					95% Student's-t UCL	1391			95% Adjusted-CLT UCL (Chen-1995)			1443
335									95% Modified-t UCL (Johnson-1978)			1400
336												
337	**Gamma GOF Test**											
338					A-D Test Statistic	2.737			**Anderson-Darling Gamma GOF Test**			
339					5% A-D Critical Value	0.846			Data Not Gamma Distributed at 5% Significance Level			
340					K-S Test Statistic	0.125			**Kolmogrov-Smirnoff Gamma GOF Test**			
341					5% K-S Critical Value	0.0891			Data Not Gamma Distributed at 5% Significance Level			
342	**Data Not Gamma Distributed at 5% Significance Level**											
343												
344	**Gamma Statistics**											
345					k hat (MLE)	0.39			k star (bias corrected MLE)			0.386
346					Theta hat (MLE)	2879			Theta star (bias corrected MLE)			2909
347					nu hat (MLE)	97.52			nu star (bias corrected)			96.52
348					MLE Mean (bias corrected)	1123			MLE Sd (bias corrected)			1808
349									Approximate Chi Square Value (0.05)			74.86
350					Adjusted Level of Significance	0.0481			Adjusted Chi Square Value			74.63
351												
352	**Assuming Gamma Distribution**											
353	95% Approximate Gamma UCL (use when n>=50))					1448			95% Adjusted Gamma UCL (use when n<50)			1452
354												
355	**Lognormal GOF Test**											
356					Shapiro Wilk Test Statistic	0.843			**Shapiro Wilk Lognormal GOF Test**			
357					5% Shapiro Wilk P Value	0			Data Not Lognormal at 5% Significance Level			
358					Lilliefors Test Statistic	0.2			**Lilliefors Lognormal GOF Test**			
359					5% Lilliefors Critical Value	0.0792			Data Not Lognormal at 5% Significance Level			
360	**Data Not Lognormal at 5% Significance Level**											
361												
362	**Lognormal Statistics**											
363					Minimum of Logged Data	0.698			Mean of logged Data			5.33
364					Maximum of Logged Data	9.306			SD of logged Data			2.565
365												
366	**Assuming Lognormal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
367					95% H-UCL	13771			90% Chebyshev (MVUE) UCL			11194
368				95% Chebyshev (MVUE) UCL		14005			97.5% Chebyshev (MVUE) UCL			17907
369				99% Chebyshev (MVUE) UCL		25572						
370												
371					Nonparametric Distribution Free UCL Statistics							
372					Data do not follow a Discernible Distribution (0.05)							
373												
374					Nonparametric Distribution Free UCLs							
375					95% CLT UCL	1389			95% Jackknife UCL			1391
376				95% Standard Bootstrap UCL		1386			95% Bootstrap-t UCL			1471
377				95% Hall's Bootstrap UCL		1480			95% Percentile Bootstrap UCL			1408
378				95% BCA Bootstrap UCL		1466						
379				90% Chebyshev(Mean, Sd) UCL		1608			95% Chebyshev(Mean, Sd) UCL			1828
380				97.5% Chebyshev(Mean, Sd) UCL		2133			99% Chebyshev(Mean, Sd) UCL			2733
381												
382					Suggested UCL to Use							
383				95% Chebyshev (Mean, Sd) UCL		1828						
384												
385	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
386	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
387	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
388	For additional insight the user may want to consult a statistician.											
389												
390												
391	Benzo(a)pyrene_EP9_0-6											
392												
393					General Statistics							
394					Total Number of Observations	45			Number of Distinct Observations			44
395									Number of Missing Observations			93
396					Minimum	0.0255			Mean			3.691
397					Maximum	30			Median			1.8
398					SD	6.448			Std. Error of Mean			0.961
399					Coefficient of Variation	1.747			Skewness			3.023
400												
401					Normal GOF Test							
402					Shapiro Wilk Test Statistic	0.571			Shapiro Wilk GOF Test			
403					5% Shapiro Wilk Critical Value	0.945			Data Not Normal at 5% Significance Level			
404					Lilliefors Test Statistic	0.285			Lilliefors GOF Test			
405					5% Lilliefors Critical Value	0.132			Data Not Normal at 5% Significance Level			
406					Data Not Normal at 5% Significance Level							
407												
408					Assuming Normal Distribution							
409					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
410					95% Student's-t UCL	5.306			95% Adjusted-CLT UCL (Chen-1995)			5.735
411									95% Modified-t UCL (Johnson-1978)			5.378
412												
413					Gamma GOF Test							
414					A-D Test Statistic	0.866			Anderson-Darling Gamma GOF Test			
415					5% A-D Critical Value	0.81			Data Not Gamma Distributed at 5% Significance Level			
416					K-S Test Statistic	0.112			Kolmogrov-Smirnoff Gamma GOF Test			
417					5% K-S Critical Value	0.139			etected data appear Gamma Distributed at 5% Significance Lev			
418					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
419												
420					Gamma Statistics							
421					k hat (MLE)	0.534			k star (bias corrected MLE)			0.513
422					Theta hat (MLE)	6.916			Theta star (bias corrected MLE)			7.196
423					nu hat (MLE)	48.03			nu star (bias corrected)			46.17
424					MLE Mean (bias corrected)	3.691			MLE Sd (bias corrected)			5.153
425									Approximate Chi Square Value (0.05)			31.58
426					Adjusted Level of Significance	0.0447			Adjusted Chi Square Value			31.18
427												

	A	B	C	D	E	F	G	H	I	J	K	L
428						Assuming Gamma Distribution						
429					95% Approximate Gamma UCL (use when n>=50)	5.396			95% Adjusted Gamma UCL (use when n<50)			5.466
430												
431						Lognormal GOF Test						
432					Shapiro Wilk Test Statistic	0.962			Shapiro Wilk Lognormal GOF Test			
433					5% Shapiro Wilk Critical Value	0.945			Data appear Lognormal at 5% Significance Level			
434					Lilliefors Test Statistic	0.118			Lilliefors Lognormal GOF Test			
435					5% Lilliefors Critical Value	0.132			Data appear Lognormal at 5% Significance Level			
436						Data appear Lognormal at 5% Significance Level						
437												
438						Lognormal Statistics						
439					Minimum of Logged Data	-3.669			Mean of logged Data			0.128
440					Maximum of Logged Data	3.401			SD of logged Data			1.713
441												
442						Assuming Lognormal Distribution						
443					95% H-UCL	11.48			90% Chebyshev (MVUE) UCL			9.376
444					95% Chebyshev (MVUE) UCL	11.55			97.5% Chebyshev (MVUE) UCL			14.57
445					99% Chebyshev (MVUE) UCL	20.51						
446												
447						Nonparametric Distribution Free UCL Statistics						
448						Data appear to follow a Discernible Distribution at 5% Significance Level						
449												
450						Nonparametric Distribution Free UCLs						
451					95% CLT UCL	5.272			95% Jackknife UCL			5.306
452					95% Standard Bootstrap UCL	5.253			95% Bootstrap-t UCL			6.611
453					95% Hall's Bootstrap UCL	5.755			95% Percentile Bootstrap UCL			5.454
454					95% BCA Bootstrap UCL	5.835						
455					90% Chebyshev(Mean, Sd) UCL	6.575			95% Chebyshev(Mean, Sd) UCL			7.881
456					97.5% Chebyshev(Mean, Sd) UCL	9.694			99% Chebyshev(Mean, Sd) UCL			13.25
457												
458						Suggested UCL to Use						
459					95% Adjusted Gamma UCL	5.466						
460												
461	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
462	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
463	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
464	For additional insight the user may want to consult a statistician.											
465												
466												
467	Total PCBs_EP9_0-6											
468												
469						General Statistics						
470					Total Number of Observations	124			Number of Distinct Observations			122
471									Number of Missing Observations			18
472					Minimum	0.0176			Mean			2.156
473					Maximum	40			Median			0.217
474					SD	5.037			Std. Error of Mean			0.452
475					Coefficient of Variation	2.336			Skewness			4.585
476												
477						Normal GOF Test						
478					Shapiro Wilk Test Statistic	0.49			Shapiro Wilk GOF Test			
479					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
480					Lilliefors Test Statistic	0.336			Lilliefors GOF Test			
481					5% Lilliefors Critical Value	0.0796			Data Not Normal at 5% Significance Level			
482						Data Not Normal at 5% Significance Level						
483												
484						Assuming Normal Distribution						
485					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
486					95% Student's-t UCL	2.906			95% Adjusted-CLT UCL (Chen-1995)			3.099
487									95% Modified-t UCL (Johnson-1978)			2.937
488												

	A	B	C	D	E	F	G	H	I	J	K	L
489						Gamma GOF Test						
490					A-D Test Statistic	5.911	Anderson-Darling Gamma GOF Test					
491					5% A-D Critical Value	0.856	Data Not Gamma Distributed at 5% Significance Level					
492					K-S Test Statistic	0.161	Kolmogrov-Smirnoff Gamma GOF Test					
493					5% K-S Critical Value	0.0898	Data Not Gamma Distributed at 5% Significance Level					
494						Data Not Gamma Distributed at 5% Significance Level						
495												
496						Gamma Statistics						
497					k hat (MLE)	0.348	k star (bias corrected MLE)					0.345
498					Theta hat (MLE)	6.191	Theta star (bias corrected MLE)					6.245
499					nu hat (MLE)	86.38	nu star (bias corrected)					85.62
500					MLE Mean (bias corrected)	2.156	MLE Sd (bias corrected)					3.67
501							Approximate Chi Square Value (0.05)					65.29
502					Adjusted Level of Significance	0.0481	Adjusted Chi Square Value					65.09
503												
504						Assuming Gamma Distribution						
505					95% Approximate Gamma UCL (use when n>=50))	2.828	95% Adjusted Gamma UCL (use when n<50)					2.837
506												
507						Lognormal GOF Test						
508					Shapiro Wilk Test Statistic	0.913	Shapiro Wilk Lognormal GOF Test					
509					5% Shapiro Wilk P Value	1.4314E-9	Data Not Lognormal at 5% Significance Level					
510					Lilliefors Test Statistic	0.106	Lilliefors Lognormal GOF Test					
511					5% Lilliefors Critical Value	0.0796	Data Not Lognormal at 5% Significance Level					
512						Data Not Lognormal at 5% Significance Level						
513												
514						Lognormal Statistics						
515					Minimum of Logged Data	-4.043	Mean of logged Data					-1.164
516					Maximum of Logged Data	3.689	SD of logged Data					2.086
517												
518						Assuming Lognormal Distribution						
519					95% H-UCL	5.177	90% Chebyshev (MVUE) UCL					5.01
520					95% Chebyshev (MVUE) UCL	6.097	97.5% Chebyshev (MVUE) UCL					7.606
521					99% Chebyshev (MVUE) UCL	10.57						
522												
523						Nonparametric Distribution Free UCL Statistics						
524						Data do not follow a Discernible Distribution (0.05)						
525												
526						Nonparametric Distribution Free UCLs						
527					95% CLT UCL	2.9	95% Jackknife UCL					2.906
528					95% Standard Bootstrap UCL	2.9	95% Bootstrap-t UCL					3.248
529					95% Hall's Bootstrap UCL	3.509	95% Percentile Bootstrap UCL					2.945
530					95% BCA Bootstrap UCL	3.099						
531					90% Chebyshev(Mean, Sd) UCL	3.513	95% Chebyshev(Mean, Sd) UCL					4.128
532					97.5% Chebyshev(Mean, Sd) UCL	4.981	99% Chebyshev(Mean, Sd) UCL					6.657
533												
534						Suggested UCL to Use						
535					95% Chebyshev (Mean, Sd) UCL	4.128						
536												
537	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
538	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
539	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
540	For additional insight the user may want to consult a statistician.											
541												
542												
543	Arsenic_EP9_0-6											
544												
545						General Statistics						
546					Total Number of Observations	55	Number of Distinct Observations					53
547							Number of Missing Observations					83
548					Minimum	1.305	Mean					17.54
549					Maximum	94	Median					11

	A	B	C	D	E	F	G	H	I	J	K	L
550					SD	16.33				Std. Error of Mean		2.201
551					Coefficient of Variation	0.931					Skewness	2.282
552												
553					Normal GOF Test							
554					Shapiro Wilk Test Statistic	0.797	Shapiro Wilk GOF Test					
555					5% Shapiro Wilk P Value	8.103E-10	Data Not Normal at 5% Significance Level					
556					Lilliefors Test Statistic	0.202	Lilliefors GOF Test					
557					5% Lilliefors Critical Value	0.119	Data Not Normal at 5% Significance Level					
558					Data Not Normal at 5% Significance Level							
559												
560					Assuming Normal Distribution							
561			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
562					95% Student's-t UCL	21.23				95% Adjusted-CLT UCL (Chen-1995)		21.89
563										95% Modified-t UCL (Johnson-1978)		21.34
564												
565					Gamma GOF Test							
566					A-D Test Statistic	0.651	Anderson-Darling Gamma GOF Test					
567					5% A-D Critical Value	0.772	etected data appear Gamma Distributed at 5% Significance Lev					
568					K-S Test Statistic	0.118	Kolmogrov-Smirnoff Gamma GOF Test					
569					5% K-S Critical Value	0.123	etected data appear Gamma Distributed at 5% Significance Lev					
570					Detected data appear Gamma Distributed at 5% Significance Level							
571												
572					Gamma Statistics							
573					k hat (MLE)	1.336				k star (bias corrected MLE)		1.275
574					Theta hat (MLE)	13.13				Theta star (bias corrected MLE)		13.76
575					nu hat (MLE)	146.9				nu star (bias corrected)		140.3
576					MLE Mean (bias corrected)	17.54				MLE Sd (bias corrected)		15.54
577										Approximate Chi Square Value (0.05)		113.9
578					Adjusted Level of Significance	0.0456				Adjusted Chi Square Value		113.3
579												
580					Assuming Gamma Distribution							
581			95% Approximate Gamma UCL (use when n>=50)			21.61				95% Adjusted Gamma UCL (use when n<50)		21.73
582												
583					Lognormal GOF Test							
584					Shapiro Wilk Test Statistic	0.924	Shapiro Wilk Lognormal GOF Test					
585					5% Shapiro Wilk P Value	0.00198	Data Not Lognormal at 5% Significance Level					
586					Lilliefors Test Statistic	0.172	Lilliefors Lognormal GOF Test					
587					5% Lilliefors Critical Value	0.119	Data Not Lognormal at 5% Significance Level					
588					Data Not Lognormal at 5% Significance Level							
589												
590					Lognormal Statistics							
591					Minimum of Logged Data	0.266				Mean of logged Data		2.446
592					Maximum of Logged Data	4.543				SD of logged Data		1.02
593												
594					Assuming Lognormal Distribution							
595					95% H-UCL	26.91				90% Chebyshev (MVUE) UCL		28.51
596					95% Chebyshev (MVUE) UCL	32.75				97.5% Chebyshev (MVUE) UCL		38.64
597					99% Chebyshev (MVUE) UCL	50.21						
598												
599					Nonparametric Distribution Free UCL Statistics							
600					Data appear to follow a Discernible Distribution at 5% Significance Level							
601												
602					Nonparametric Distribution Free UCLs							
603					95% CLT UCL	21.17				95% Jackknife UCL		21.23
604					95% Standard Bootstrap UCL	21.18				95% Bootstrap-t UCL		22.5
605					95% Hall's Bootstrap UCL	23.62				95% Percentile Bootstrap UCL		21.17
606					95% BCA Bootstrap UCL	21.97						
607					90% Chebyshev(Mean, Sd) UCL	24.15				95% Chebyshev(Mean, Sd) UCL		27.14
608					97.5% Chebyshev(Mean, Sd) UCL	31.29				99% Chebyshev(Mean, Sd) UCL		39.45
609												
610					Suggested UCL to Use							

	A	B	C	D	E	F	G	H	I	J	K	L
611					95% Approximate Gamma UCL	21.61						
612												
613	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
614	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
615	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
616	For additional insight the user may want to consult a statistician.											
617												
618												
619	**Lead_EP9_0-6**											
620												
621	**General Statistics**											
622					Total Number of Observations	92			Number of Distinct Observations			83
623									Number of Missing Observations			50
624					Minimum	2.97			Mean			1491
625					Maximum	11000			Median			960
626					SD	1981			Std. Error of Mean			206.5
627					Coefficient of Variation	1.329			Skewness			3.086
628												
629	**Normal GOF Test**											
630					Shapiro Wilk Test Statistic	0.656			**Shapiro Wilk GOF Test**			
631					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
632					Lilliefors Test Statistic	0.226			**Lilliefors GOF Test**			
633					5% Lilliefors Critical Value	0.0924			Data Not Normal at 5% Significance Level			
634	**Data Not Normal at 5% Significance Level**											
635												
636	**Assuming Normal Distribution**											
637					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
638					95% Student's-t UCL	1834			95% Adjusted-CLT UCL (Chen-1995)			1901
639									95% Modified-t UCL (Johnson-1978)			1845
640												
641	**Gamma GOF Test**											
642					A-D Test Statistic	1.451			**Anderson-Darling Gamma GOF Test**			
643					5% A-D Critical Value	0.804			Data Not Gamma Distributed at 5% Significance Level			
644					K-S Test Statistic	0.11			**Kolmogrov-Smirnoff Gamma GOF Test**			
645					5% K-S Critical Value	0.0976			Data Not Gamma Distributed at 5% Significance Level			
646	**Data Not Gamma Distributed at 5% Significance Level**											
647												
648	**Gamma Statistics**											
649					k hat (MLE)	0.645			k star (bias corrected MLE)			0.631
650					Theta hat (MLE)	2311			Theta star (bias corrected MLE)			2361
651					nu hat (MLE)	118.7			nu star (bias corrected)			116.2
652					MLE Mean (bias corrected)	1491			MLE Sd (bias corrected)			1876
653									Approximate Chi Square Value (0.05)			92.29
654					Adjusted Level of Significance	0.0474			Adjusted Chi Square Value			91.95
655												
656	**Assuming Gamma Distribution**											
657	95% Approximate Gamma UCL (use when n>=50))					1877			95% Adjusted Gamma UCL (use when n<50)			1883
658												
659	**Lognormal GOF Test**											
660					Shapiro Wilk Test Statistic	0.833			**Shapiro Wilk Lognormal GOF Test**			
661					5% Shapiro Wilk P Value	3.109E-15			Data Not Lognormal at 5% Significance Level			
662					Lilliefors Test Statistic	0.192			**Lilliefors Lognormal GOF Test**			
663					5% Lilliefors Critical Value	0.0924			Data Not Lognormal at 5% Significance Level			
664	**Data Not Lognormal at 5% Significance Level**											
665												
666	**Lognormal Statistics**											
667					Minimum of Logged Data	1.089			Mean of logged Data			6.359
668					Maximum of Logged Data	9.306			SD of logged Data			1.89
669												
670	**Assuming Lognormal Distribution**											
671					95% H-UCL	6576			90% Chebyshev (MVUE) UCL			6233

	A	B	C	D	E	F	G	H	I	J	K	L
672					95% Chebyshev (MVUE) UCL	7572				97.5% Chebyshev (MVUE) UCL		9430
673					99% Chebyshev (MVUE) UCL	13081						
674												
675					**Nonparametric Distribution Free UCL Statistics**							
676					**Data do not follow a Discernible Distribution (0.05)**							
677												
678					**Nonparametric Distribution Free UCLs**							
679					95% CLT UCL	1830				95% Jackknife UCL		1834
680					95% Standard Bootstrap UCL	1837				95% Bootstrap-t UCL		1944
681					95% Hall's Bootstrap UCL	1946				95% Percentile Bootstrap UCL		1854
682					95% BCA Bootstrap UCL	1933						
683					90% Chebyshev(Mean, Sd) UCL	2110				95% Chebyshev(Mean, Sd) UCL		2391
684					97.5% Chebyshev(Mean, Sd) UCL	2780				99% Chebyshev(Mean, Sd) UCL		3545
685												
686					**Suggested UCL to Use**							
687					95% Chebyshev (Mean, Sd) UCL	2391						
688												
689	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
690	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
691	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
692	For additional insight the user may want to consult a statistician.											
693												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			5/2/2014 3:16:33 PM								
5	From File			ProUCL_Import.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	mber of Bootstrap Operations			2000								
9												
10												
11	Total PCBs_EP10_0-15											
12												
13	General Statistics											
14	Total Number of Observations					95	Number of Distinct Observations					83
15							Number of Missing Observations					14
16	Minimum					0.00555	Mean					0.703
17	Maximum					11	Median					0.142
18	SD					1.538	Std. Error of Mean					0.158
19	Coefficient of Variation					2.189	Skewness					4.393
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.496	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.325	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.0909	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					0.965	95% Adjusted-CLT UCL (Chen-1995)					1.038
31							95% Modified-t UCL (Johnson-1978)					0.977
32												
33	Gamma GOF Test											
34	A-D Test Statistic					4.356	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.828	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.182	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.0976	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.46	k star (bias corrected MLE)					0.453
42	Theta hat (MLE)					1.528	Theta star (bias corrected MLE)					1.553
43	nu hat (MLE)					87.41	nu star (bias corrected)					85.98
44	MLE Mean (bias corrected)					0.703	MLE Sd (bias corrected)					1.045
45							Approximate Chi Square Value (0.05)					65.61
46	Adjusted Level of Significance					0.0475	Adjusted Chi Square Value					65.34
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					0.921	95% Adjusted Gamma UCL (use when n<50)					0.925
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.949	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk P Value					0.00308	Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.0963	Lilliefors Lognormal GOF Test					
55	5% Lilliefors Critical Value					0.0909	Data Not Lognormal at 5% Significance Level					
56	Data Not Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59	Minimum of Logged Data					-5.194	Mean of logged Data					-1.751
60	Maximum of Logged Data					2.398	SD of logged Data					1.678
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	Assuming Lognormal Distribution											
63					95% H-UCL	1.194			90% Chebyshev (MVUE) UCL			1.2
64					95% Chebyshev (MVUE) UCL	1.433			97.5% Chebyshev (MVUE) UCL			1.756
65					99% Chebyshev (MVUE) UCL	2.391						
66												
67	Nonparametric Distribution Free UCL Statistics											
68	Data do not follow a Discernible Distribution (0.05)											
69												
70	Nonparametric Distribution Free UCLs											
71					95% CLT UCL	0.962			95% Jackknife UCL			0.965
72					95% Standard Bootstrap UCL	0.962			95% Bootstrap-t UCL			1.107
73					95% Hall's Bootstrap UCL	1.204			95% Percentile Bootstrap UCL			0.987
74					95% BCA Bootstrap UCL	1.058						
75					90% Chebyshev(Mean, Sd) UCL	1.176			95% Chebyshev(Mean, Sd) UCL			1.391
76					97.5% Chebyshev(Mean, Sd) UCL	1.688			99% Chebyshev(Mean, Sd) UCL			2.273
77												
78	Suggested UCL to Use											
79					95% Chebyshev (Mean, Sd) UCL	1.391						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	Lead_EP10_0-15											
88												
89	General Statistics											
90					Total Number of Observations	68			Number of Distinct Observations			65
91									Number of Missing Observations			41
92					Minimum	2.18			Mean			276.1
93					Maximum	3000			Median			82
94					SD	537.6			Std. Error of Mean			65.19
95					Coefficient of Variation	1.947			Skewness			3.756
96												
97	Normal GOF Test											
98					Shapiro Wilk Test Statistic	0.526			Shapiro Wilk GOF Test			
99					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
100					Lilliefors Test Statistic	0.305			Lilliefors GOF Test			
101					5% Lilliefors Critical Value	0.107			Data Not Normal at 5% Significance Level			
102	Data Not Normal at 5% Significance Level											
103												
104	Assuming Normal Distribution											
105			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
106					95% Student's-t UCL	384.8			95% Adjusted-CLT UCL (Chen-1995)			415.1
107									95% Modified-t UCL (Johnson-1978)			389.8
108												
109	Gamma GOF Test											
110					A-D Test Statistic	1.421			Anderson-Darling Gamma GOF Test			
111					5% A-D Critical Value	0.826			Data Not Gamma Distributed at 5% Significance Level			
112					K-S Test Statistic	0.126			Kolmogrov-Smirnoff Gamma GOF Test			
113					5% K-S Critical Value	0.115			Data Not Gamma Distributed at 5% Significance Level			
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	0.463			k star (bias corrected MLE)			0.452
118					Theta hat (MLE)	596.7			Theta star (bias corrected MLE)			610.7
119					nu hat (MLE)	62.93			nu star (bias corrected)			61.49
120					MLE Mean (bias corrected)	276.1			MLE Sd (bias corrected)			410.6
121									Approximate Chi Square Value (0.05)			44.46
122					Adjusted Level of Significance	0.0465			Adjusted Chi Square Value			44.14

	A	B	C	D	E	F	G	H	I	J	K	L
123												
124						Assuming Gamma Distribution						
125				95% Approximate Gamma UCL (use when n>=50))		381.9		95% Adjusted Gamma UCL (use when n<50)				384.6
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.947		Shapiro Wilk Lognormal GOF Test				
129					5% Shapiro Wilk P Value	0.0126		Data Not Lognormal at 5% Significance Level				
130					Lilliefors Test Statistic	0.121		Lilliefors Lognormal GOF Test				
131					5% Lilliefors Critical Value	0.107		Data Not Lognormal at 5% Significance Level				
132						Data Not Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	0.779		Mean of logged Data				4.231
136					Maximum of Logged Data	8.006		SD of logged Data				1.87
137												
138						Assuming Lognormal Distribution						
139					95% H-UCL	746.9		90% Chebyshev (MVUE) UCL				741.7
140					95% Chebyshev (MVUE) UCL	910.2		97.5% Chebyshev (MVUE) UCL				1144
141					99% Chebyshev (MVUE) UCL	1603						
142												
143						Nonparametric Distribution Free UCL Statistics						
144						Data do not follow a Discernible Distribution (0.05)						
145												
146						Nonparametric Distribution Free UCLs						
147					95% CLT UCL	383.3		95% Jackknife UCL				384.8
148					95% Standard Bootstrap UCL	381.2		95% Bootstrap-t UCL				450.3
149					95% Hall's Bootstrap UCL	480.6		95% Percentile Bootstrap UCL				386.1
150					95% BCA Bootstrap UCL	433						
151					90% Chebyshev(Mean, Sd) UCL	471.7		95% Chebyshev(Mean, Sd) UCL				560.3
152					97.5% Chebyshev(Mean, Sd) UCL	683.2		99% Chebyshev(Mean, Sd) UCL				924.8
153												
154						Suggested UCL to Use						
155					95% Chebyshev (Mean, Sd) UCL	560.3						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	Total PCBs_EP10_0-6											
164												
165						General Statistics						
166					Total Number of Observations	89		Number of Distinct Observations				77
167								Number of Missing Observations				13
168					Minimum	0.00555		Mean				0.746
169					Maximum	11		Median				0.15
170					SD	1.581		Std. Error of Mean				0.168
171					Coefficient of Variation	2.12		Skewness				4.254
172												
173						Normal GOF Test						
174					Shapiro Wilk Test Statistic	0.509		Shapiro Wilk GOF Test				
175					5% Shapiro Wilk P Value	0		Data Not Normal at 5% Significance Level				
176					Lilliefors Test Statistic	0.32		Lilliefors GOF Test				
177					5% Lilliefors Critical Value	0.0939		Data Not Normal at 5% Significance Level				
178						Data Not Normal at 5% Significance Level						
179												
180						Assuming Normal Distribution						
181					95% Normal UCL			95% UCLs (Adjusted for Skewness)				
182					95% Student's-t UCL	1.024		95% Adjusted-CLT UCL (Chen-1995)				1.102
183								95% Modified-t UCL (Johnson-1978)				1.037

	A	B	C	D	E	F	G	H	I	J	K	L
184												
185						Gamma GOF Test						
186					A-D Test Statistic	3.581	Anderson-Darling Gamma GOF Test					
187					5% A-D Critical Value	0.826	Data Not Gamma Distributed at 5% Significance Level					
188					K-S Test Statistic	0.179	Kolmogrov-Smirnoff Gamma GOF Test					
189					5% K-S Critical Value	0.101	Data Not Gamma Distributed at 5% Significance Level					
190					Data Not Gamma Distributed at 5% Significance Level							
191												
192						Gamma Statistics						
193					k hat (MLE)	0.468	k star (bias corrected MLE)					0.459
194					Theta hat (MLE)	1.594	Theta star (bias corrected MLE)					1.623
195					nu hat (MLE)	83.25	nu star (bias corrected)					81.78
196					MLE Mean (bias corrected)	0.746	MLE Sd (bias corrected)					1.1
197							Approximate Chi Square Value (0.05)					61.94
198					Adjusted Level of Significance	0.0473	Adjusted Chi Square Value					61.66
199												
200						Assuming Gamma Distribution						
201			95% Approximate Gamma UCL (use when n>=50))			0.985	95% Adjusted Gamma UCL (use when n<50)					0.989
202												
203						Lognormal GOF Test						
204					Shapiro Wilk Test Statistic	0.957	Shapiro Wilk Lognormal GOF Test					
205					5% Shapiro Wilk P Value	0.0193	Data Not Lognormal at 5% Significance Level					
206					Lilliefors Test Statistic	0.0833	Lilliefors Lognormal GOF Test					
207					5% Lilliefors Critical Value	0.0939	Data appear Lognormal at 5% Significance Level					
208					Data appear Approximate Lognormal at 5% Significance Level							
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	-5.194	Mean of logged Data					-1.666
212					Maximum of Logged Data	2.398	SD of logged Data					1.689
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	1.351	90% Chebyshev (MVUE) UCL					1.349
216					95% Chebyshev (MVUE) UCL	1.616	97.5% Chebyshev (MVUE) UCL					1.987
217					99% Chebyshev (MVUE) UCL	2.716						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data appear to follow a Discernible Distribution at 5% Significance Level						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	1.021	95% Jackknife UCL					1.024
224					95% Standard Bootstrap UCL	1.034	95% Bootstrap-t UCL					1.216
225					95% Hall's Bootstrap UCL	1.297	95% Percentile Bootstrap UCL					1.019
226					95% BCA Bootstrap UCL	1.102						
227					90% Chebyshev(Mean, Sd) UCL	1.248	95% Chebyshev(Mean, Sd) UCL					1.476
228					97.5% Chebyshev(Mean, Sd) UCL	1.792	99% Chebyshev(Mean, Sd) UCL					2.413
229												
230						Suggested UCL to Use						
231					95% Chebyshev (Mean, Sd) UCL	1.476						
232												
233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
234	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
235	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
236	For additional insight the user may want to consult a statistician.											
237												
238												
239	Lead_EP10_0-6											
240												
241						General Statistics						
242					Total Number of Observations	62	Number of Distinct Observations					59
243							Number of Missing Observations					40
244					Minimum	4.76	Mean					258.9

	A	B	C	D	E	F	G	H	I	J	K	L
245					Maximum	3000					Median	127.5
246					SD	462.5					Std. Error of Mean	58.74
247					Coefficient of Variation	1.787					Skewness	4.163
248												
249					Normal GOF Test							
250					Shapiro Wilk Test Statistic	0.556	Shapiro Wilk GOF Test					
251					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
252					Lilliefors Test Statistic	0.291	Lilliefors GOF Test					
253					5% Lilliefors Critical Value	0.113	Data Not Normal at 5% Significance Level					
254					Data Not Normal at 5% Significance Level							
255												
256					Assuming Normal Distribution							
257					95% Normal UCL		95% UCLs (Adjusted for Skewness)					
258					95% Student's-t UCL	357	95% Adjusted-CLT UCL (Chen-1995)					388.7
259							95% Modified-t UCL (Johnson-1978)					362.1
260												
261					Gamma GOF Test							
262					A-D Test Statistic	1.17	Anderson-Darling Gamma GOF Test					
263					5% A-D Critical Value	0.811	Data Not Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.118	Kolmogrov-Smirnoff Gamma GOF Test					
265					5% K-S Critical Value	0.119	etected data appear Gamma Distributed at 5% Significance Lev					
266					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
267												
268					Gamma Statistics							
269					k hat (MLE)	0.554	k star (bias corrected MLE)					0.538
270					Theta hat (MLE)	467.2	Theta star (bias corrected MLE)					481.2
271					nu hat (MLE)	68.7	nu star (bias corrected)					66.71
272					MLE Mean (bias corrected)	258.9	MLE Sd (bias corrected)					352.9
273							Approximate Chi Square Value (0.05)					48.91
274					Adjusted Level of Significance	0.0461	Adjusted Chi Square Value					48.55
275												
276					Assuming Gamma Distribution							
277					95% Approximate Gamma UCL (use when n>=50)	353.1	95% Adjusted Gamma UCL (use when n<50)					355.7
278												
279					Lognormal GOF Test							
280					Shapiro Wilk Test Statistic	0.939	Shapiro Wilk Lognormal GOF Test					
281					5% Shapiro Wilk P Value	0.00663	Data Not Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.129	Lilliefors Lognormal GOF Test					
283					5% Lilliefors Critical Value	0.113	Data Not Lognormal at 5% Significance Level					
284					Data Not Lognormal at 5% Significance Level							
285												
286					Lognormal Statistics							
287					Minimum of Logged Data	1.56	Mean of logged Data					4.428
288					Maximum of Logged Data	8.006	SD of logged Data					1.658
289												
290					Assuming Lognormal Distribution							
291					95% H-UCL	586.4	90% Chebyshev (MVUE) UCL					593.7
292					95% Chebyshev (MVUE) UCL	719.9	97.5% Chebyshev (MVUE) UCL					895.1
293					99% Chebyshev (MVUE) UCL	1239						
294												
295					Nonparametric Distribution Free UCL Statistics							
296					Data appear to follow a Discernible Distribution at 5% Significance Level							
297												
298					Nonparametric Distribution Free UCLs							
299					95% CLT UCL	355.5	95% Jackknife UCL					357
300					95% Standard Bootstrap UCL	351.6	95% Bootstrap-t UCL					433.4
301					95% Hall's Bootstrap UCL	779.4	95% Percentile Bootstrap UCL					358.1
302					95% BCA Bootstrap UCL	409.4						
303					90% Chebyshev(Mean, Sd) UCL	435.1	95% Chebyshev(Mean, Sd) UCL					514.9
304					97.5% Chebyshev(Mean, Sd) UCL	625.7	99% Chebyshev(Mean, Sd) UCL					843.3
305												

	A	B	C	D	E	F	G	H	I	J	K	L
306						Suggested UCL to Use						
307					95% Approximate Gamma UCL	353.1						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											
313												
314												
315	Total PCBs_EP10_0-3											
316												
317						General Statistics						
318					Total Number of Observations	82			Number of Distinct Observations			71
319									Number of Missing Observations			13
320					Minimum	0.00555			Mean			0.789
321					Maximum	11			Median			0.156
322					SD	1.637			Std. Error of Mean			0.181
323					Coefficient of Variation	2.076			Skewness			4.092
324												
325						Normal GOF Test						
326					Shapiro Wilk Test Statistic	0.518			Shapiro Wilk GOF Test			
327					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
328					Lilliefors Test Statistic	0.316			Lilliefors GOF Test			
329					5% Lilliefors Critical Value	0.0978			Data Not Normal at 5% Significance Level			
330						Data Not Normal at 5% Significance Level						
331												
332						Assuming Normal Distribution						
333					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
334					95% Student's-t UCL	1.089			95% Adjusted-CLT UCL (Chen-1995)			1.173
335									95% Modified-t UCL (Johnson-1978)			1.103
336												
337						Gamma GOF Test						
338					A-D Test Statistic	3.399			Anderson-Darling Gamma GOF Test			
339					5% A-D Critical Value	0.824			Data Not Gamma Distributed at 5% Significance Level			
340					K-S Test Statistic	0.183			Kolmogrov-Smirnoff Gamma GOF Test			
341					5% K-S Critical Value	0.105			Data Not Gamma Distributed at 5% Significance Level			
342						Data Not Gamma Distributed at 5% Significance Level						
343												
344						Gamma Statistics						
345					k hat (MLE)	0.479			k star (bias corrected MLE)			0.47
346					Theta hat (MLE)	1.645			Theta star (bias corrected MLE)			1.678
347					nu hat (MLE)	78.62			nu star (bias corrected)			77.07
348					MLE Mean (bias corrected)	0.789			MLE Sd (bias corrected)			1.15
349									Approximate Chi Square Value (0.05)			57.85
350					Adjusted Level of Significance	0.0471			Adjusted Chi Square Value			57.55
351												
352						Assuming Gamma Distribution						
353					95% Approximate Gamma UCL (use when n>=50))	1.051			95% Adjusted Gamma UCL (use when n<50)			1.056
354												
355						Lognormal GOF Test						
356					Shapiro Wilk Test Statistic	0.959			Shapiro Wilk Lognormal GOF Test			
357					5% Shapiro Wilk P Value	0.0391			Data Not Lognormal at 5% Significance Level			
358					Lilliefors Test Statistic	0.0942			Lilliefors Lognormal GOF Test			
359					5% Lilliefors Critical Value	0.0978			Data appear Lognormal at 5% Significance Level			
360						Data appear Approximate Lognormal at 5% Significance Level						
361												
362						Lognormal Statistics						
363					Minimum of Logged Data	-5.194			Mean of logged Data			-1.571
364					Maximum of Logged Data	2.398			SD of logged Data			1.657
365												
366						Assuming Lognormal Distribution						

	A	B	C	D	E	F	G	H	I	J	K	L
367					95% H-UCL	1.41			90% Chebyshev (MVUE) UCL			1.409
368				95% Chebyshev (MVUE) UCL		1.69			97.5% Chebyshev (MVUE) UCL			2.079
369				99% Chebyshev (MVUE) UCL		2.844						
370												
371					Nonparametric Distribution Free UCL Statistics							
372					Data appear to follow a Discernible Distribution at 5% Significance Level							
373												
374					Nonparametric Distribution Free UCLs							
375					95% CLT UCL	1.086			95% Jackknife UCL			1.089
376				95% Standard Bootstrap UCL		1.094			95% Bootstrap-t UCL			1.255
377				95% Hall's Bootstrap UCL		1.331			95% Percentile Bootstrap UCL			1.12
378				95% BCA Bootstrap UCL		1.203						
379				90% Chebyshev(Mean, Sd) UCL		1.331			95% Chebyshev(Mean, Sd) UCL			1.577
380				97.5% Chebyshev(Mean, Sd) UCL		1.918			99% Chebyshev(Mean, Sd) UCL			2.587
381												
382					Suggested UCL to Use							
383				95% Chebyshev (Mean, Sd) UCL		1.577						
384												
385	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
386	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
387	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
388	For additional insight the user may want to consult a statistician.											
389												
390												
391	Lead_EP10_0-3											
392												
393					General Statistics							
394					Total Number of Observations	59			Number of Distinct Observations			56
395									Number of Missing Observations			36
396					Minimum	4.76			Mean			256
397					Maximum	3000			Median			129
398					SD	467.5			Std. Error of Mean			60.86
399					Coefficient of Variation	1.826			Skewness			4.241
400												
401					Normal GOF Test							
402					Shapiro Wilk Test Statistic	0.54			Shapiro Wilk GOF Test			
403					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
404					Lilliefors Test Statistic	0.295			Lilliefors GOF Test			
405					5% Lilliefors Critical Value	0.115			Data Not Normal at 5% Significance Level			
406					Data Not Normal at 5% Significance Level							
407												
408					Assuming Normal Distribution							
409					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
410					95% Student's-t UCL	357.8			95% Adjusted-CLT UCL (Chen-1995)			392.1
411									95% Modified-t UCL (Johnson-1978)			363.4
412												
413					Gamma GOF Test							
414					A-D Test Statistic	1.188			Anderson-Darling Gamma GOF Test			
415					5% A-D Critical Value	0.811			Data Not Gamma Distributed at 5% Significance Level			
416					K-S Test Statistic	0.115			Kolmogrov-Smirnoff Gamma GOF Test			
417					5% K-S Critical Value	0.122			etected data appear Gamma Distributed at 5% Significance Lev			
418					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
419												
420					Gamma Statistics							
421					k hat (MLE)	0.552			k star (bias corrected MLE)			0.535
422					Theta hat (MLE)	463.9			Theta star (bias corrected MLE)			478.4
423					nu hat (MLE)	65.13			nu star (bias corrected)			63.15
424					MLE Mean (bias corrected)	256			MLE Sd (bias corrected)			350
425									Approximate Chi Square Value (0.05)			45.87
426					Adjusted Level of Significance	0.0459			Adjusted Chi Square Value			45.5
427												

	A	B	C	D	E	F	G	H	I	J	K	L
428	**Assuming Gamma Distribution**											
429	95% Approximate Gamma UCL (use when n>=50)					352.5	95% Adjusted Gamma UCL (use when n<50)					355.4
430												
431	**Lognormal GOF Test**											
432	Shapiro Wilk Test Statistic					0.938	**Shapiro Wilk Lognormal GOF Test**					
433	5% Shapiro Wilk P Value					0.00757	Data Not Lognormal at 5% Significance Level					
434	Lilliefors Test Statistic					0.136	**Lilliefors Lognormal GOF Test**					
435	5% Lilliefors Critical Value					0.115	Data Not Lognormal at 5% Significance Level					
436	**Data Not Lognormal at 5% Significance Level**											
437												
438	**Lognormal Statistics**											
439	Minimum of Logged Data					1.56	Mean of logged Data					4.412
440	Maximum of Logged Data					8.006	SD of logged Data					1.658
441												
442	**Assuming Lognormal Distribution**											
443	95% H-UCL					678.6	90% Chebyshev (MVUE) UCL					588.4
444	95% Chebyshev (MVUE) UCL					714.9	97.5% Chebyshev (MVUE) UCL					890.4
445	99% Chebyshev (MVUE) UCL					1235						
446												
447	**Nonparametric Distribution Free UCL Statistics**											
448	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
449												
450	**Nonparametric Distribution Free UCLs**											
451	95% CLT UCL					356.2	95% Jackknife UCL					357.8
452	95% Standard Bootstrap UCL					357.9	95% Bootstrap-t UCL					462.5
453	95% Hall's Bootstrap UCL					822.8	95% Percentile Bootstrap UCL					368.5
454	95% BCA Bootstrap UCL					393						
455	90% Chebyshev(Mean, Sd) UCL					438.6	95% Chebyshev(Mean, Sd) UCL					521.3
456	97.5% Chebyshev(Mean, Sd) UCL					636.1	99% Chebyshev(Mean, Sd) UCL					861.6
457												
458	**Suggested UCL to Use**											
459	95% Approximate Gamma UCL					352.5						
460												
461	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
462	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
463	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
464	For additional insight the user may want to consult a statistician.											
465												

	A	B	C	D	E	F	G	H	I	J	K	L	M
1						UCL Statistics for Uncensored Full Data Sets							
2													
3				User Selected Options									
4				Date/Time of Computation		4/25/2014 3:13:32 PM							
5				From File		WorkSheet.xls							
6				Full Precision		OFF							
7				Confidence Coefficient		95%							
8				mber of Bootstrap Operations		2000							
9													
10													
11	TEQ Summation(0-15)												
12													
13						General Statistics							
14					Total Number of Observations	23			Number of Distinct Observations			23	
15									Number of Missing Observations			1	
16					Minimum	3.1192E-7			Mean			3.1202E-5	
17					Maximum	1.7831E-4			Median			1.0588E-5	
18					SD	4.6206E-5			Std. Error of Mean			9.6347E-6	
19					Coefficient of Variation	N/A			Skewness			2.048	
20													
21						Normal GOF Test							
22					Shapiro Wilk Test Statistic	0.688			Shapiro Wilk GOF Test				
23					5% Shapiro Wilk Critical Value	0.914			Data Not Normal at 5% Significance Level				
24					Lilliefors Test Statistic	0.318			Lilliefors GOF Test				
25					5% Lilliefors Critical Value	0.185			Data Not Normal at 5% Significance Level				
26						Data Not Normal at 5% Significance Level							
27													
28						Assuming Normal Distribution							
29					95% Normal UCL				95% UCLs (Adjusted for Skewness)				
30					95% Student's-t UCL	4.7746E-5			95% Adjusted-CLT UCL (Chen-1995)			5.1446E-5	
31									95% Modified-t UCL (Johnson-1978)			4.8432E-5	
32													
33						Gamma GOF Test							
34					A-D Test Statistic	0.546			Anderson-Darling Gamma GOF Test				
35					5% A-D Critical Value	0.799			etected data appear Gamma Distributed at 5% Significance Lev				
36					K-S Test Statistic	0.156			Kolmogrov-Smirnoff Gamma GOF Test				
37					5% K-S Critical Value	0.191			etected data appear Gamma Distributed at 5% Significance Lev				
38						Detected data appear Gamma Distributed at 5% Significance Level							
39													
40						Gamma Statistics							
41					k hat (MLE)	0.561			k star (bias corrected MLE)			0.517	
42					Theta hat (MLE)	5.5585E-5			Theta star (bias corrected MLE)			6.0340E-5	
43					nu hat (MLE)	25.82			nu star (bias corrected)			23.79	
44					MLE Mean (bias corrected)	3.1202E-5			MLE Sd (bias corrected)			4.3390E-5	
45									Approximate Chi Square Value (0.05)			13.69	
46					Adjusted Level of Significance	0.0389			Adjusted Chi Square Value			13.13	
47													
48						Assuming Gamma Distribution							
49					95% Approximate Gamma UCL (use when n>=50)	5.4228E-5			95% Adjusted Gamma UCL (use when n<50)			5.6519E-5	
50													
51						Lognormal GOF Test							
52					Shapiro Wilk Test Statistic	0.973			Shapiro Wilk Lognormal GOF Test				
53					5% Shapiro Wilk Critical Value	0.914			Data appear Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.0969			Lilliefors Lognormal GOF Test				
55					5% Lilliefors Critical Value	0.185			Data appear Lognormal at 5% Significance Level				
56						Data appear Lognormal at 5% Significance Level							
57													
58						Lognormal Statistics							
59					Minimum of Logged Data	-14.98			Mean of logged Data			-11.49	
60					Maximum of Logged Data	-8.632			SD of logged Data			1.707	
61													

	A	B	C	D	E	F	G	H	I	J	K	L	M
62					Assuming Lognormal Distribution								
63					95% H-UCL	1.6188E-4			90% Chebyshev (MVUE) UCL			8.9865E-5	
64				95% Chebyshev (MVUE) UCL		1.1312E-4			97.5% Chebyshev (MVUE) UCL			1.4539E-4	
65				99% Chebyshev (MVUE) UCL		2.0878E-4							
66													
67					Nonparametric Distribution Free UCL Statistics								
68					Data appear to follow a Discernible Distribution at 5% Significance Level								
69													
70					Nonparametric Distribution Free UCLs								
71					95% CLT UCL	4.7050E-5			95% Jackknife UCL			4.7746E-5	
72				95% Standard Bootstrap UCL		4.6980E-5			95% Bootstrap-t UCL			5.7491E-5	
73				95% Hall's Bootstrap UCL		5.3991E-5			95% Percentile Bootstrap UCL			4.7296E-5	
74				95% BCA Bootstrap UCL		5.1719E-5							
75				90% Chebyshev(Mean, Sd) UCL		6.0106E-5			95% Chebyshev(Mean, Sd) UCL			7.3198E-5	
76				97.5% Chebyshev(Mean, Sd) UCL		9.1370E-5			99% Chebyshev(Mean, Sd) UCL			1.2707E-4	
77													
78					Suggested UCL to Use								
79				95% Adjusted Gamma UCL		5.6519E-5							
80													
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)												
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.												
84	For additional insight the user may want to consult a statistician.												
85													
86													
87	TEQ Summation(0-3)												
88													
89					General Statistics								
90				Total Number of Observations		18			Number of Distinct Observations			18	
91									Number of Missing Observations			1	
92				Minimum		3.1192E-7			Mean			1.3823E-5	
93				Maximum		8.5368E-5			Median			8.3828E-6	
94				SD		2.0476E-5			Std. Error of Mean			4.8262E-6	
95				Coefficient of Variation		N/A			Skewness			2.885	
96													
97					Normal GOF Test								
98				Shapiro Wilk Test Statistic		0.632			Shapiro Wilk GOF Test				
99				5% Shapiro Wilk Critical Value		0.897			Data Not Normal at 5% Significance Level				
100				Lilliefors Test Statistic		0.279			Lilliefors GOF Test				
101				5% Lilliefors Critical Value		0.209			Data Not Normal at 5% Significance Level				
102					Data Not Normal at 5% Significance Level								
103													
104					Assuming Normal Distribution								
105				95% Normal UCL					95% UCLs (Adjusted for Skewness)				
106				95% Student's-t UCL		2.2218E-5			95% Adjusted-CLT UCL (Chen-1995)			2.5268E-5	
107									95% Modified-t UCL (Johnson-1978)			2.2765E-5	
108													
109					Gamma GOF Test								
110				A-D Test Statistic		0.294			Anderson-Darling Gamma GOF Test				
111				5% A-D Critical Value		0.781			etected data appear Gamma Distributed at 5% Significance Lev				
112				K-S Test Statistic		0.138			Kolmogrov-Smirnoff Gamma GOF Test				
113				5% K-S Critical Value		0.212			etected data appear Gamma Distributed at 5% Significance Lev				
114					Detected data appear Gamma Distributed at 5% Significance Level								
115													
116					Gamma Statistics								
117				k hat (MLE)		0.717			k star (bias corrected MLE)			0.635	
118				Theta hat (MLE)		1.9268E-5			Theta star (bias corrected MLE)			2.1772E-5	
119				nu hat (MLE)		25.83			nu star (bias corrected)			22.86	
120				MLE Mean (bias corrected)		1.3823E-5			MLE Sd (bias corrected)			1.7348E-5	
121									Approximate Chi Square Value (0.05)			12.98	
122				Adjusted Level of Significance		0.0357			Adjusted Chi Square Value			12.27	

	A	B	C	D	E	F	G	H	I	J	K	L	M
123													
124						**Assuming Gamma Distribution**							
125					95% Approximate Gamma UCL (use when n>=50)	2.4336E-5			95% Adjusted Gamma UCL (use when n<50)			2.5747E-5	
126													
127						**Lognormal GOF Test**							
128					Shapiro Wilk Test Statistic	0.975			**Shapiro Wilk Lognormal GOF Test**				
129					5% Shapiro Wilk Critical Value	0.897			Data appear Lognormal at 5% Significance Level				
130					Lilliefors Test Statistic	0.132			**Lilliefors Lognormal GOF Test**				
131					5% Lilliefors Critical Value	0.209			Data appear Lognormal at 5% Significance Level				
132						**Data appear Lognormal at 5% Significance Level**							
133													
134						**Lognormal Statistics**							
135					Minimum of Logged Data	-14.98			Mean of logged Data			-12.03	
136					Maximum of Logged Data	-9.369			SD of logged Data			1.462	
137													
138						**Assuming Lognormal Distribution**							
139					95% H-UCL	5.7426E-5			90% Chebyshev (MVUE) UCL			3.4552E-5	
140					95% Chebyshev (MVUE) UCL	4.3128E-5			97.5% Chebyshev (MVUE) UCL			5.5031E-5	
141					99% Chebyshev (MVUE) UCL	7.8412E-5							
142													
143						**Nonparametric Distribution Free UCL Statistics**							
144						**Data appear to follow a Discernible Distribution at 5% Significance Level**							
145													
146						**Nonparametric Distribution Free UCLs**							
147					95% CLT UCL	2.1761E-5			95% Jackknife UCL			2.2218E-5	
148					95% Standard Bootstrap UCL	2.1639E-5			95% Bootstrap-t UCL			3.5753E-5	
149					95% Hall's Bootstrap UCL	5.7490E-5			95% Percentile Bootstrap UCL			2.2151E-5	
150					95% BCA Bootstrap UCL	2.6920E-5							
151					90% Chebyshev(Mean, Sd) UCL	2.8301E-5			95% Chebyshev(Mean, Sd) UCL			3.4860E-5	
152					97.5% Chebyshev(Mean, Sd) UCL	4.3963E-5			99% Chebyshev(Mean, Sd) UCL			6.1843E-5	
153													
154						**Suggested UCL to Use**							
155					95% Adjusted Gamma UCL	2.5747E-5							
156													
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)												
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.												
160	For additional insight the user may want to consult a statistician.												
161													
162													
163	**TEQ Summation(0-1)**												
164													
165						**General Statistics**							
166					Total Number of Observations	9			Number of Distinct Observations			9	
167									Number of Missing Observations			1	
168					Minimum	3.1192E-7			Mean			1.2888E-5	
169					Maximum	4.1192E-5			Median			9.8577E-6	
170					SD	1.2365E-5			Std. Error of Mean			4.1215E-6	
171					Coefficient of Variation	N/A			Skewness			1.696	
172													
173	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**												
174	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**												
175	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**												
176	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0**												
177													
178						**Normal GOF Test**							
179					Shapiro Wilk Test Statistic	0.839			**Shapiro Wilk GOF Test**				
180					5% Shapiro Wilk Critical Value	0.829			Data appear Normal at 5% Significance Level				
181					Lilliefors Test Statistic	0.25			**Lilliefors GOF Test**				
182					5% Lilliefors Critical Value	0.295			Data appear Normal at 5% Significance Level				
183						**Data appear Normal at 5% Significance Level**							

	A	B	C	D	E	F	G	H	I	J	K	L	M
184													
185						Assuming Normal Distribution							
186				95% Normal UCL					95% UCLs (Adjusted for Skewness)				
187					95% Student's-t UCL	2.0553E-5			95% Adjusted-CLT UCL (Chen-1995)			2.2157E-5	
188									95% Modified-t UCL (Johnson-1978)			2.0941E-5	
189													
190						Gamma GOF Test							
191					A-D Test Statistic	0.257			Anderson-Darling Gamma GOF Test				
192					5% A-D Critical Value	0.743			etected data appear Gamma Distributed at 5% Significance Lev				
193					K-S Test Statistic	0.195			Kolmogrov-Smirnoff Gamma GOF Test				
194					5% K-S Critical Value	0.287			etected data appear Gamma Distributed at 5% Significance Lev				
195						Detected data appear Gamma Distributed at 5% Significance Level							
196													
197						Gamma Statistics							
198					k hat (MLE)	1.025			k star (bias corrected MLE)			0.758	
199					Theta hat (MLE)	1.2569E-5			Theta star (bias corrected MLE)			1.7010E-5	
200					nu hat (MLE)	18.46			nu star (bias corrected)			13.64	
201					MLE Mean (bias corrected)	1.2888E-5			MLE Sd (bias corrected)			1.4807E-5	
202									Approximate Chi Square Value (0.05)			6.325	
203					Adjusted Level of Significance	0.0231			Adjusted Chi Square Value			5.311	
204													
205						Assuming Gamma Distribution							
206				95% Approximate Gamma UCL (use when n>=50))		2.7793E-5			95% Adjusted Gamma UCL (use when n<50)			3.3096E-5	
207													
208						Lognormal GOF Test							
209					Shapiro Wilk Test Statistic	0.879			Shapiro Wilk Lognormal GOF Test				
210					5% Shapiro Wilk Critical Value	0.829			Data appear Lognormal at 5% Significance Level				
211					Lilliefors Test Statistic	0.246			Lilliefors Lognormal GOF Test				
212					5% Lilliefors Critical Value	0.295			Data appear Lognormal at 5% Significance Level				
213						Data appear Lognormal at 5% Significance Level							
214													
215						Lognormal Statistics							
216					Minimum of Logged Data	-14.98			Mean of logged Data			-11.82	
217					Maximum of Logged Data	-10.1			SD of logged Data			1.407	
218													
219						Assuming Lognormal Distribution							
220					95% H-UCL	1.6058E-4			90% Chebyshev (MVUE) UCL			4.0829E-5	
221					95% Chebyshev (MVUE) UCL	5.1799E-5			97.5% Chebyshev (MVUE) UCL			6.7025E-5	
222					99% Chebyshev (MVUE) UCL	9.6934E-5							
223													
224						Nonparametric Distribution Free UCL Statistics							
225						Data appear to follow a Discernible Distribution at 5% Significance Level							
226													
227						Nonparametric Distribution Free UCLs							
228					95% CLT UCL	1.9668E-5			95% Jackknife UCL			2.0553E-5	
229					95% Standard Bootstrap UCL	1.9135E-5			95% Bootstrap-t UCL			2.6959E-5	
230					95% Hall's Bootstrap UCL	5.8620E-5			95% Percentile Bootstrap UCL			1.9457E-5	
231					95% BCA Bootstrap UCL	2.1545E-5							
232					90% Chebyshev(Mean, Sd) UCL	2.5253E-5			95% Chebyshev(Mean, Sd) UCL			3.0854E-5	
233					97.5% Chebyshev(Mean, Sd) UCL	3.8627E-5			99% Chebyshev(Mean, Sd) UCL			5.3897E-5	
234													
235						Suggested UCL to Use							
236					95% Student's-t UCL	2.0553E-5							
237													
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
239	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)												
240	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.												
241	For additional insight the user may want to consult a statistician.												
242													

APPENDIX C-4

TRENCH AIR MODELING

Appendix C-4 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep Site-wide Shallow Groundwater New Bedford High School	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3	Concentration of Contaminant in Trench Ctrench mg/m3
Carbon disulfide	75-15-0	76.14	3.03E-02	4.90E-01	1.24E-03	1.23E-03	1.26E+00	5.06E-02	6.37E-02	6.37E-05
cis-1,2-Dichloroethene	156-59-2	96.94	4.08E-03	4.52E-01	1.10E-03	1.08E-03	3.11E+01	4.43E-02	1.38E+00	1.38E-03
Tetrachloroethene	127-18-4	165.83	1.84E-02	3.77E-01	8.37E-04	8.35E-04	4.80E+01	3.42E-02	1.64E+00	1.64E-03
Trichloroethene	79-01-6	131.39	1.03E-02	4.08E-01	9.41E-04	9.36E-04	6.39E+00	3.84E-02	2.45E-01	2.45E-04
Vinyl Chloride (commercial, construction)	75-01-4	62.50	2.70E-02	5.23E-01	1.36E-03	1.36E-03	3.93E+00	5.58E-02	2.19E-01	2.19E-04
C9-C10 Aromatics		120	0.00792	4.20E-01	9.84E-04	9.78E-04	3.60E+00	4.01E-02	1.44E-02	1.44E-05

For Mass-Transfer Coefficients			For Emission Flux and Concentration in Trench			Trench dimensions		
Kg,H2O	0.833	cm/s	CF1	1.00E-03	L/cm3	Length	**31.5**	ft
MWH2O	18		CF2	1.00E+04	cm2/m2		9.60	m
Kg,O2	0.002	cm/s	CF3	3600	s/hr	Width	**31.5**	ft
MWO2	32		F	**1**			9.60	m
T	**51.6**	F	ACH	360	hr-1	Depth	**8**	ft
T	284	K					2.44	m
R	8.20E-05	atm-m3/mol-K				Width/Depth	3.94	

APPENDIX C-5

RISK AND HAZARD CALCULATIONS FOR 0 TO 1 FOOT SOIL INTERVAL

Table 1
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-1 (0-1')
New Bedford, Massachusetts

Constituent		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.7E-03	1.0E+00	9.4E-11	1.0E+00	1.5E-09	2.0E+00	5.0E-05	2E-10	3.0E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.1E-12	1.0E+00	1.8E-11	1.5E+05	7.0E-10	2E-07	2.6E-02

	Cancer Risk	Hazard Index
TOTAL:	1.7E-07	2.6E-02

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 2
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-1 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	1.7E-03	0.1	1.4E-10	0.1	1.9E-09	2.0E+00	5.0E-05	3E-10	3.7E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.7E-12	0.1	2.2E-11	1.5E+05	7.0E-10	3E-07	3.2E-02

	Cancer Risk	Hazard Index
TOTAL:	2.6E-07	3.2E-02

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 3
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-1 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	1.7E-03	5.6E-10	6.2E-09	1.0E-04	2.0E-02	6E-14	3.1E-07
1746-01-6	Dioxin/PCB TEQ	2.1E-05	6.7E-12	7.4E-11	3.3E+01	2.0E-06	2E-10	3.7E-05

	Cancer Risk	Hazard Index
TOTAL:	2.2E-10	3.7E-05

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 4
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-1 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	1.7E-03	1.0E+00	4.79E-13	1.00E+00	5.33E-12	2.0E+00	5.0E-05	1E-12	1.1E-07
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	5.72E-15	1.00E+00	6.37E-14	1.5E+05	7.0E-10	9E-10	9.1E-05

	Cancer Risk	Hazard Index
TOTAL:	8.6E-10	9.1E-05

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 5
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-2 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	2.9E-01	3.0E-01	4.8E-09	3.0E-01	7.7E-08	7.3E-01	3.0E-01	3E-09	2.6E-07
205-99-2	Benzo(b)fluoranthene	2.8E-01	3.0E-01	4.6E-09	3.0E-01	7.4E-08	7.3E-01	3.0E-01	3E-09	2.5E-07
191-24-2	Benzo(g,h,i)perylene	2.0E-01	NC	NA	3.0E-01	5.4E-08	NA	3.0E-01	NA	1.8E-07
218-01-9	Chrysene	2.8E-01	3.0E-01	4.6E-09	3.0E-01	7.5E-08	7.3E-02	3.0E-01	3E-10	2.5E-07
206-44-0	Fluoranthene	5.1E-01	NC	NA	3.0E-01	1.4E-07	NA	4.0E-01	NA	3.4E-07
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	3.0E-01	3.5E-09	3.0E-01	5.7E-08	7.3E-01	3.0E-01	3E-09	1.9E-07
85-01-8	Phenanthrene	4.3E-01	NC	NA	3.0E-01	1.1E-07	NA	3.0E-01	NA	3.8E-07
129-00-0	Pyrene	4.9E-01	NC	NA	3.0E-01	1.3E-07	NA	3.0E-01	NA	4.3E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	5.2E-01	1.0E+00	2.9E-08	1.0E+00	4.6E-07	2.0E+00	5.0E-05	6E-08	9.2E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.1E-12	1.0E+00	1.8E-11	1.5E+05	7.0E-10	2E-07	2.6E-02
Metals										
7440-39-3	Barium	7.6E+01	NC	NA	1.0E+00	6.7E-05	NA	7.0E-02	NA	9.6E-04
7440-43-9	Cadmium	5.2E-01	NC	NA	1.0E+00	4.6E-07	NA	5.0E-04	NA	9.2E-04
16065-83-1	Chromium III	1.9E+01	NC	NA	1.0E+00	1.7E-05	NA	1.5E+00	NA	1.1E-05
7439-92-1	Lead	7.1E+01	NC	NA	5.0E-01	3.1E-05	NA	7.5E-04	NA	4.2E-02
7439-97-6	Mercury	8.0E-02	NC	NA	5.0E-01	3.5E-08	NA	3.0E-04	NA	1.2E-04
7440-02-0	Nickel	1.1E+01	NC	NA	1.0E+00	9.9E-06	NA	2.0E-02	NA	5.0E-04
7440-22-4	Silver	1.9E+00	NC	NA	1.0E+00	1.7E-06	NA	5.0E-03	NA	3.4E-04
7440-62-2	Vanadium	2.1E+01	NC	NA	1.0E+00	1.9E-05	NA	9.0E-03	NA	2.1E-03
7440-66-6	Zinc	6.3E+01	NC	NA	1.0E+00	5.6E-05	NA	3.0E-01	NA	1.9E-04

	Cancer Risk	Hazard Index
TOTAL:	2.4E-07	8.2E-02

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 6
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-2 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
56-55-3	Benzo(a)anthracene	2.9E-01	0.02	4.8E-09	0.02	6.3E-08	7.3E-01	3.0E-01	4E-09	2.1E-07
205-99-2	Benzo(b)fluoranthene	2.8E-01	0.02	4.6E-09	0.02	6.1E-08	7.3E-01	3.0E-01	3E-09	2.0E-07
191-24-2	Benzo(g,h,i)perylene	2.0E-01	NC	NA	0.1	2.2E-07	NA	3.0E-01	NA	7.3E-07
218-01-9	Chrysene	2.8E-01	0.02	4.7E-09	0.02	6.1E-08	7.3E-02	3.0E-01	3E-10	2.0E-07
206-44-0	Fluoranthene	5.1E-01	NC	NA	0.1	5.6E-07	NA	4.0E-01	NA	1.4E-06
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	0.02	3.6E-09	0.02	4.7E-08	7.3E-01	3.0E-01	3E-09	1.6E-07
85-01-8	Phenanthrene	4.3E-01	NC	NA	0.1	4.6E-07	NA	3.0E-01	NA	1.5E-06
129-00-0	Pyrene	4.9E-01	NC	NA	0.1	5.3E-07	NA	3.0E-01	NA	1.8E-06
1336-36-3	Total PCBs	5.2E-01	0.1	4.3E-08	0.1	5.6E-07	2.0E+00	5.0E-05	9E-08	1.1E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.7E-12	0.1	2.2E-11	1.5E+05	7.0E-10	3E-07	3.2E-02
7440-39-3	Barium	7.6E+01	NC	NA	0.1	8.2E-05	NA	7.0E-02	NA	1.2E-03
7440-43-9	Cadmium	5.2E-01	NC	NA	0.01	5.6E-08	NA	5.0E-04	NA	1.1E-04
16065-83-1	Chromium III	1.9E+01	NC	NA	0.1	2.1E-05	NA	1.5E+00	NA	1.4E-05
7439-92-1	Lead	7.1E+01	NC	NA	0.006	4.6E-06	NA	7.5E-04	NA	6.1E-03
7439-97-6	Mercury	8.0E-02	NC	NA	0.1	8.7E-08	NA	3.0E-04	NA	2.9E-04
7440-02-0	Nickel	1.1E+01	NC	NA	0.2	2.4E-05	NA	2.0E-02	NA	1.2E-03
7440-22-4	Silver	1.9E+00	NC	NA	0.3	6.1E-06	NA	5.0E-03	NA	1.2E-03
7440-62-2	Vanadium	2.1E+01	NC	NA	0.1	2.3E-05	NA	9.0E-03	NA	2.5E-03
7440-66-6	Zinc	6.3E+01	NC	NA	0.1	6.9E-05	NA	3.0E-01	NA	2.3E-04

	Cancer Risk	Hazard Index
TOTAL:	3.5E-07	5.6E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 7
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-2 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
56-55-3	Benzo(a)anthracene	2.9E-01	9.4E-08	1.0E-06	2.1E-04	5.0E+02	2E-11	2.1E-09
205-99-2	Benzo(b)fluoranthene	2.8E-01	9.1E-08	1.0E-06	2.1E-04	5.0E+02	2E-11	2.0E-09
191-24-2	Benzo(g,h,i)perylene	2.0E-01	6.6E-08	7.3E-07	NA	5.0E+02	NA	1.5E-09
218-01-9	Chrysene	2.8E-01	9.1E-08	1.0E-06	2.1E-05	5.0E+02	2E-12	2.0E-09
206-44-0	Fluoranthene	5.1E-01	1.7E-07	1.9E-06	NA	5.0E+02	NA	3.7E-09
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	7.0E-08	7.8E-07	2.1E-04	5.0E+02	1E-11	1.6E-09
85-01-8	Phenanthrene	4.3E-01	1.4E-07	1.5E-06	NA	5.0E+02	NA	3.1E-09
129-00-0	Pyrene	4.9E-01	1.6E-07	1.8E-06	NA	5.0E+02	NA	3.5E-09
Dioxins/PCBs								
1336-36-3	Total PCBs	5.2E-01	1.7E-07	1.9E-06	1.0E-04	2.0E-02	2E-11	9.4E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	6.7E-12	7.4E-11	3.3E+01	2.0E-06	2E-10	3.7E-05
Metals								
7440-39-3	Barium	7.6E+01	2.5E-05	2.7E-04	NA	5.0E+00	NA	5.5E-05
7440-43-9	Cadmium	5.2E-01	1.7E-07	1.9E-06	1.8E-03	2.0E-02	3E-10	9.3E-05
16065-83-1	Chromium III	1.9E+01	6.3E-06	7.0E-05	NA	3.0E-01	NA	2.3E-04
7439-92-1	Lead	7.1E+01	2.3E-05	2.6E-04	NA	1.0E+00	NA	2.6E-04
7439-97-6	Mercury	8.0E-02	2.6E-08	2.9E-07	NA	3.0E-01	NA	9.6E-07
7440-02-0	Nickel	1.1E+01	3.6E-06	4.1E-05	4.8E-04	1.0E+00	2E-09	4.1E-05
7440-22-4	Silver	1.9E+00	6.1E-07	6.8E-06	NA	1.4E-01	NA	4.9E-05
7440-62-2	Vanadium	2.1E+01	6.8E-06	7.6E-05	NA	1.0E+00	NA	7.6E-05
7440-66-6	Zinc	6.3E+01	2.1E-05	2.3E-04	NA	1.4E+00	NA	1.6E-04

	Cancer Risk	Hazard Index
TOTAL:	2.3E-09	1.1E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 8
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-2 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	2.9E-01	3.0E-01	2.41E-11	3.00E-01	2.69E-10	7.3E-01	3.0E-01	2E-11	9.0E-10
205-99-2	Benzo(b)fluoranthene	2.8E-01	3.0E-01	2.33E-11	3.00E-01	2.60E-10	7.3E-01	3.0E-01	2E-11	8.7E-10
191-24-2	Benzo(g,h,i)perylene	2.0E-01	NC	NA	3.00E-01	1.89E-10	NA	3.0E-01	NA	6.3E-10
218-01-9	Chrysene	2.8E-01	3.0E-01	2.35E-11	3.00E-01	2.61E-10	7.3E-02	3.0E-01	2E-12	8.7E-10
206-44-0	Fluoranthene	5.1E-01	NC	NA	3.00E-01	4.78E-10	NA	4.0E-01	NA	1.2E-09
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	3.0E-01	1.80E-11	3.00E-01	2.00E-10	7.3E-01	3.0E-01	1E-11	6.7E-10
85-01-8	Phenanthrene	4.3E-01	NC	NA	3.00E-01	3.97E-10	NA	3.0E-01	NA	1.3E-09
129-00-0	Pyrene	4.9E-01	NC	NA	3.00E-01	4.54E-10	NA	3.0E-01	NA	1.5E-09
1336-36-3	Total PCBs	5.2E-01	1.0E+00	1.45E-10	1.00E+00	1.62E-09	2.0E+00	5.0E-05	3E-10	3.2E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	5.72E-15	1.00E+00	6.37E-14	1.5E+05	7.0E-10	9E-10	9.1E-05
7440-39-3	Barium	7.6E+01	NC	NA	1.00E+00	2.34E-07	NA	7.0E-02	NA	3.3E-06
7440-43-9	Cadmium	5.2E-01	NC	NA	1.00E+00	1.60E-09	NA	5.0E-04	NA	3.2E-06
16065-83-1	Chromium III	1.9E+01	NC	NA	1.00E+00	6.00E-08	NA	1.5E+00	NA	4.0E-08
7439-92-1	Lead	7.1E+01	NC	NA	5.00E-01	1.10E-07	NA	7.5E-04	NA	1.5E-04
7439-97-6	Mercury	8.0E-02	NC	NA	5.00E-01	1.24E-10	NA	3.0E-04	NA	4.1E-07
7440-02-0	Nickel	1.1E+01	NC	NA	1.00E+00	3.48E-08	NA	2.0E-02	NA	1.7E-06
7440-22-4	Silver	1.9E+00	NC	NA	1.00E+00	5.86E-09	NA	5.0E-03	NA	1.2E-06
7440-62-2	Vanadium	2.1E+01	NC	NA	1.00E+00	6.53E-08	NA	9.0E-03	NA	7.3E-06
7440-66-6	Zinc	6.3E+01	NC	NA	1.00E+00	1.96E-07	NA	3.0E-01	NA	6.5E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.2E-09	2.9E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 9
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-3 (0-1')
New Bedford, Massachusetts

Constituent		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	1.0E+00	1.0E-08	1.0E+00	1.7E-07	2.0E+00	5.0E-05	2E-08	3.4E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.1E-12	1.0E+00	1.8E-11	1.5E+05	7.0E-10	2E-07	2.6E-02
Metals										
7440-39-3	Barium	2.6E+01	NC	NA	1.0E+00	2.3E-05	NA	7.0E-02	NA	3.3E-04
7439-92-1	Lead	5.7E+01	NC	NA	5.0E-01	2.5E-05	NA	7.5E-04	NA	3.4E-02
7439-97-6	Mercury	9.8E-02	NC	NA	5.0E-01	4.3E-08	NA	3.0E-04	NA	1.4E-04
7440-22-4	Silver	7.2E-01	NC	NA	1.0E+00	6.4E-07	NA	5.0E-03	NA	1.3E-04
7440-66-6	Zinc	3.1E+01	NC	NA	1.0E+00	2.8E-05	NA	3.0E-01	NA	9.3E-05

	Cancer Risk	Hazard Index
TOTAL:	1.9E-07	6.4E-02

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 10
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-3 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	1.9E-01	0.1	1.6E-08	0.1	2.1E-07	2.0E+00	5.0E-05	3E-08	4.1E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.7E-12	0.1	2.2E-11	1.5E+05	7.0E-10	3E-07	3.2E-02
7440-39-3	Barium	2.6E+01	NC	NA	0.1	2.8E-05	NA	7.0E-02	NA	4.0E-04
7439-92-1	Lead	5.7E+01	NC	NA	0.006	3.7E-06	NA	7.5E-04	NA	5.0E-03
7439-97-6	Mercury	9.8E-02	NC	NA	0.1	1.1E-07	NA	3.0E-04	NA	3.5E-04
7440-22-4	Silver	7.2E-01	NC	NA	0.3	2.3E-06	NA	5.0E-03	NA	4.7E-04
7440-66-6	Zinc	3.1E+01	NC	NA	0.1	3.4E-05	NA	3.0E-01	NA	1.1E-04

	Cancer Risk	Hazard Index
TOTAL:	2.9E-07	4.2E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 11
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-3 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	1.9E-01	6.2E-08	6.9E-07	1.0E-04	2.0E-02	6E-12	3.5E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	6.7E-12	7.4E-11	3.3E+01	2.0E-06	2E-10	3.7E-05
Metals								
7440-39-3	Barium	2.6E+01	8.5E-06	9.4E-05	NA	5.0E+00	NA	1.9E-05
7439-92-1	Lead	5.7E+01	1.9E-05	2.1E-04	NA	1.0E+00	NA	2.1E-04
7439-97-6	Mercury	9.8E-02	3.2E-08	3.5E-07	NA	3.0E-01	NA	1.2E-06
7440-22-4	Silver	7.2E-01	2.3E-07	2.6E-06	NA	1.4E-01	NA	1.9E-05
7440-66-6	Zinc	3.1E+01	1.0E-05	1.1E-04	NA	1.4E+00	NA	8.1E-05

	Cancer Risk	Hazard Index
TOTAL:	2.3E-10	4.0E-04

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 12
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-3 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	1.9E-01	1.0E+00	5.32E-11	1.00E+00	5.93E-10	2.0E+00	5.0E-05	1E-10	1.2E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	5.72E-15	1.00E+00	6.37E-14	1.5E+05	7.0E-10	9E-10	9.1E-05
7440-39-3	Barium	2.6E+01	NC	NA	1.00E+00	8.07E-08	NA	7.0E-02	NA	1.2E-06
7439-92-1	Lead	5.7E+01	NC	NA	5.00E-01	8.89E-08	NA	7.5E-04	NA	1.2E-04
7439-97-6	Mercury	9.8E-02	NC	NA	5.00E-01	1.52E-10	NA	3.0E-04	NA	5.1E-07
7440-22-4	Silver	7.2E-01	NC	NA	1.00E+00	2.23E-09	NA	5.0E-03	NA	4.5E-07
7440-66-6	Zinc	3.1E+01	NC	NA	1.00E+00	9.72E-08	NA	3.0E-01	NA	3.2E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	9.6E-10	2.2E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 13
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-4 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.1E-01	1.0E+00	5.9E-09	1.0E+00	9.6E-08	2.0E+00	5.0E-05	1E-08	1.9E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.1E-12	1.0E+00	1.8E-11	1.5E+05	7.0E-10	2E-07	2.6E-02
Metals										
7439-92-1	Lead	5.2E+01	NC	NA	5.0E-01	2.3E-05	NA	7.5E-04	NA	3.1E-02
7440-22-4	Silver	5.3E-01	NC	NA	1.0E+00	4.7E-07	NA	5.0E-03	NA	9.3E-05

	Cancer Risk	Hazard Index
TOTAL:	1.8E-07	5.9E-02

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 14
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-4 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	1.1E-01	0.1	9.0E-09	0.1	1.2E-07	2.0E+00	5.0E-05	2E-08	2.3E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.7E-12	0.1	2.2E-11	1.5E+05	7.0E-10	3E-07	3.2E-02
7439-92-1	Lead	5.2E+01	NC	NA	0.006	3.4E-06	NA	7.5E-04	NA	4.5E-03
7440-22-4	Silver	5.3E-01	NC	NA	0.3	1.7E-06	NA	5.0E-03	NA	3.4E-04

	Cancer Risk	Hazard Index
TOTAL:	2.7E-07	3.9E-02

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 15
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-4 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	1.1E-01	3.5E-08	3.9E-07	1.0E-04	2.0E-02	4E-12	2.0E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	6.7E-12	7.4E-11	3.3E+01	2.0E-06	2E-10	3.7E-05
Metals								
7439-92-1	Lead	5.2E+01	1.7E-05	1.9E-04	NA	1.0E+00	NA	1.9E-04
7440-22-4	Silver	5.3E-01	1.7E-07	1.9E-06	NA	1.4E-01	NA	1.4E-05

	Cancer Risk	Hazard Index
TOTAL:	2.2E-10	2.6E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 16
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-4 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	1.1E-01	1.0E+00	3.01E-11	1.00E+00	3.35E-10	2.0E+00	5.0E-05	6E-11	6.7E-06
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	5.72E-15	1.00E+00	6.37E-14	1.5E+05	7.0E-10	9E-10	9.1E-05
7439-92-1	Lead	5.2E+01	NC	NA	5.00E-01	8.11E-08	NA	7.5E-04	NA	1.1E-04
7440-22-4	Silver	5.3E-01	NC	NA	1.00E+00	1.64E-09	NA	5.0E-03	NA	3.3E-07

	Cancer Risk	Hazard Index
TOTAL:	9.2E-10	2.1E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 17
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-6 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	4.5E-01	3.0E-01	7.5E-09	3.0E-01	1.2E-07	7.3E-01	3.0E-01	5E-09	4.0E-07
205-99-2	Benzo(b)fluoranthene	4.8E-01	3.0E-01	7.8E-09	3.0E-01	1.3E-07	7.3E-01	3.0E-01	6E-09	4.2E-07
206-44-0	Fluoranthene	9.0E-01	NC	NA	3.0E-01	2.4E-07	NA	4.0E-01	NA	6.0E-07
85-01-8	Phenanthrene	6.8E-01	NC	NA	3.0E-01	1.8E-07	NA	3.0E-01	NA	6.1E-07
129-00-0	Pyrene	9.3E-01	NC	NA	3.0E-01	2.5E-07	NA	3.0E-01	NA	8.3E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	2.7E-01	1.0E+00	1.5E-08	1.0E+00	2.4E-07	2.0E+00	5.0E-05	3E-08	4.8E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.1E-12	1.0E+00	1.8E-11	1.5E+05	7.0E-10	2E-07	2.6E-02
Metals										
7440-39-3	Barium	5.3E+01	NC	NA	1.0E+00	4.7E-05	NA	7.0E-02	NA	6.8E-04
7439-92-1	Lead	4.9E+01	NC	NA	5.0E-01	2.2E-05	NA	7.5E-04	NA	2.9E-02
7440-66-6	Zinc	5.2E+01	NC	NA	1.0E+00	4.6E-05	NA	3.0E-01	NA	1.5E-04

	Cancer Risk	Hazard Index
TOTAL:	2.1E-07	6.1E-02

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 18
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-6 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
56-55-3	Benzo(a)anthracene	4.5E-01	0.02	7.5E-09	0.02	9.9E-08	7.3E-01	3.0E-01	6E-09	3.3E-07
205-99-2	Benzo(b)fluoranthene	4.8E-01	0.02	7.9E-09	0.02	1.0E-07	7.3E-01	3.0E-01	6E-09	3.4E-07
206-44-0	Fluoranthene	9.0E-01	NC	NA	0.1	9.7E-07	NA	4.0E-01	NA	2.4E-06
85-01-8	Phenanthrene	6.8E-01	NC	NA	0.1	7.4E-07	NA	3.0E-01	NA	2.5E-06
129-00-0	Pyrene	9.3E-01	NC	NA	0.1	1.0E-06	NA	3.0E-01	NA	3.4E-06
1336-36-3	Total PCBs	2.7E-01	0.1	2.2E-08	0.1	2.9E-07	2.0E+00	5.0E-05	4E-08	5.8E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.7E-12	0.1	2.2E-11	1.5E+05	7.0E-10	3E-07	3.2E-02
7440-39-3	Barium	5.3E+01	NC	NA	0.1	5.8E-05	NA	7.0E-02	NA	8.3E-04
7439-92-1	Lead	4.9E+01	NC	NA	0.006	3.2E-06	NA	7.5E-04	NA	4.2E-03
7440-66-6	Zinc	5.2E+01	NC	NA	0.1	5.6E-05	NA	3.0E-01	NA	1.9E-04

	Cancer Risk	Hazard Index
TOTAL:	3.1E-07	4.3E-02

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 19
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-6 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
56-55-3	Benzo(a)anthracene	4.5E-01	1.5E-07	1.6E-06	2.1E-04	5.0E+02	3E-11	3.3E-09
205-99-2	Benzo(b)fluoranthene	4.8E-01	1.5E-07	1.7E-06	2.1E-04	5.0E+02	3E-11	3.4E-09
206-44-0	Fluoranthene	9.0E-01	2.9E-07	3.2E-06	NA	5.0E+02	NA	6.5E-09
85-01-8	Phenanthrene	6.8E-01	2.2E-07	2.5E-06	NA	5.0E+02	NA	4.9E-09
129-00-0	Pyrene	9.3E-01	3.0E-07	3.4E-06	NA	5.0E+02	NA	6.8E-09
Dioxins/PCBs								
1336-36-3	Total PCBs	2.7E-01	8.7E-08	9.7E-07	1.0E-04	2.0E-02	9E-12	4.9E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	6.7E-12	7.4E-11	3.3E+01	2.0E-06	2E-10	3.7E-05
Metals								
7440-39-3	Barium	5.3E+01	1.7E-05	1.9E-04	NA	5.0E+00	NA	3.9E-05
7439-92-1	Lead	4.9E+01	1.6E-05	1.8E-04	NA	1.0E+00	NA	1.8E-04
7440-66-6	Zinc	5.2E+01	1.7E-05	1.9E-04	NA	1.4E+00	NA	1.3E-04

	Cancer Risk	Hazard Index
TOTAL:	2.9E-10	4.4E-04

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 20
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-6 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	4.5E-01	3.0E-01	3.79E-11	3.00E-01	4.23E-10	7.3E-01	3.0E-01	3E-11	1.4E-09
205-99-2	Benzo(b)fluoranthene	4.8E-01	3.0E-01	3.97E-11	3.00E-01	4.42E-10	7.3E-01	3.0E-01	3E-11	1.5E-09
206-44-0	Fluoranthene	9.0E-01	NC	NA	3.00E-01	8.35E-10	NA	4.0E-01	NA	2.1E-09
85-01-8	Phenanthrene	6.8E-01	NC	NA	3.00E-01	6.35E-10	NA	3.0E-01	NA	2.1E-09
129-00-0	Pyrene	9.3E-01	NC	NA	3.00E-01	8.68E-10	NA	3.0E-01	NA	2.9E-09
1336-36-3	Total PCBs	2.7E-01	1.0E+00	7.48E-11	1.00E+00	8.34E-10	2.0E+00	5.0E-05	1E-10	1.7E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	5.72E-15	1.00E+00	6.37E-14	1.5E+05	7.0E-10	9E-10	9.1E-05
7440-39-3	Barium	5.3E+01	NC	NA	1.00E+00	1.66E-07	NA	7.0E-02	NA	2.4E-06
7439-92-1	Lead	4.9E+01	NC	NA	5.00E-01	7.59E-08	NA	7.5E-04	NA	1.0E-04
7440-66-6	Zinc	5.2E+01	NC	NA	1.00E+00	1.61E-07	NA	3.0E-01	NA	5.4E-07

	Cancer Risk	Hazard Index
TOTAL:	1.1E-09	2.1E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 21
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-7 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.8E-01	1.0E+00	1.5E-08	1.0E+00	2.4E-07	2.0E+00	5.0E-05	3E-08	4.9E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.1E-12	1.0E+00	1.8E-11	1.5E+05	7.0E-10	2E-07	2.6E-02
Metals										
7440-39-3	Barium	7.1E+01	NC	NA	1.0E+00	6.2E-05	NA	7.0E-02	NA	8.9E-04
7440-43-9	Cadmium	6.2E-01	NC	NA	1.0E+00	5.5E-07	NA	5.0E-04	NA	1.1E-03
16065-83-1	Chromium III	1.3E+01	NC	NA	1.0E+00	1.2E-05	NA	1.5E+00	NA	7.8E-06
7439-92-1	Lead	1.1E+02	NC	NA	5.0E-01	4.9E-05	NA	7.5E-04	NA	6.5E-02
7440-66-6	Zinc	8.1E+01	NC	NA	1.0E+00	7.2E-05	NA	3.0E-01	NA	2.4E-04

	Cancer Risk	Hazard Index
TOTAL:	2.0E-07	9.9E-02

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 22
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-7 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	2.8E-01	0.1	2.3E-08	0.1	3.0E-07	2.0E+00	5.0E-05	5E-08	6.0E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.7E-12	0.1	2.2E-11	1.5E+05	7.0E-10	3E-07	3.2E-02
7440-39-3	Barium	7.1E+01	NC	NA	0.1	7.6E-05	NA	7.0E-02	NA	1.1E-03
7440-43-9	Cadmium	6.2E-01	NC	NA	0.01	6.7E-08	NA	5.0E-04	NA	1.3E-04
16065-83-1	Chromium III	1.3E+01	NC	NA	0.1	1.4E-05	NA	1.5E+00	NA	9.6E-06
7439-92-1	Lead	1.1E+02	NC	NA	0.006	7.2E-06	NA	7.5E-04	NA	9.6E-03
7440-66-6	Zinc	8.1E+01	NC	NA	0.1	8.8E-05	NA	3.0E-01	NA	2.9E-04

	Cancer Risk	Hazard Index
TOTAL:	3.0E-07	4.9E-02

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 23
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-7 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	2.8E-01	8.9E-08	1.0E-06	1.0E-04	2.0E-02	9E-12	5.0E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	6.7E-12	7.4E-11	3.3E+01	2.0E-06	2E-10	3.7E-05
Metals								
7440-39-3	Barium	7.1E+01	2.3E-05	2.6E-04	NA	5.0E+00	NA	5.1E-05
7440-43-9	Cadmium	6.2E-01	2.0E-07	2.2E-06	1.8E-03	2.0E-02	4E-10	1.1E-04
16065-83-1	Chromium III	1.3E+01	4.3E-06	4.8E-05	NA	3.0E-01	NA	1.6E-04
7439-92-1	Lead	1.1E+02	3.6E-05	4.0E-04	NA	1.0E+00	NA	4.0E-04
7440-66-6	Zinc	8.1E+01	2.6E-05	2.9E-04	NA	1.4E+00	NA	2.1E-04

	Cancer Risk	Hazard Index
TOTAL:	5.9E-10	1.0E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 24
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-7 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	2.8E-01	1.0E+00	7.66E-11	1.00E+00	8.53E-10	2.0E+00	5.0E-05	2E-10	1.7E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	5.72E-15	1.00E+00	6.37E-14	1.5E+05	7.0E-10	9E-10	9.1E-05
7440-39-3	Barium	7.1E+01	NC	NA	1.00E+00	2.19E-07	NA	7.0E-02	NA	3.1E-06
7440-43-9	Cadmium	6.2E-01	NC	NA	1.00E+00	1.91E-09	NA	5.0E-04	NA	3.8E-06
16065-83-1	Chromium III	1.3E+01	NC	NA	1.00E+00	4.12E-08	NA	1.5E+00	NA	2.7E-08
7439-92-1	Lead	1.1E+02	NC	NA	5.00E-01	1.72E-07	NA	7.5E-04	NA	2.3E-04
7440-66-6	Zinc	8.1E+01	NC	NA	1.00E+00	2.53E-07	NA	3.0E-01	NA	8.4E-07

	Cancer Risk	Hazard Index
TOTAL:	1.0E-09	3.5E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 25
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-10 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	6.6E-01	1.0E+00	3.6E-08	1.0E+00	5.8E-07	2.0E+00	5.0E-05	7E-08	1.2E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.1E-12	1.0E+00	1.8E-11	1.5E+05	7.0E-10	2E-07	2.6E-02
Metals										
7440-39-3	Barium	1.9E+02	NC	NA	1.0E+00	1.7E-04	NA	7.0E-02	NA	2.4E-03
7440-43-9	Cadmium	7.5E-01	NC	NA	1.0E+00	6.7E-07	NA	5.0E-04	NA	1.3E-03
16065-83-1	Chromium III	2.3E+01	NC	NA	1.0E+00	2.0E-05	NA	1.5E+00	NA	1.3E-05
7439-92-1	Lead	1.2E+02	NC	NA	5.0E-01	5.1E-05	NA	7.5E-04	NA	6.8E-02

	Cancer Risk	Hazard Index
TOTAL:	2.4E-07	1.1E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 26
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-10 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	6.6E-01	0.1	5.5E-08	0.1	7.1E-07	2.0E+00	5.0E-05	1E-07	1.4E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.7E-12	0.1	2.2E-11	1.5E+05	7.0E-10	3E-07	3.2E-02
7440-39-3	Barium	1.9E+02	NC	NA	0.1	2.1E-04	NA	7.0E-02	NA	2.9E-03
7440-43-9	Cadmium	7.5E-01	NC	NA	0.01	8.2E-08	NA	5.0E-04	NA	1.6E-04
16065-83-1	Chromium III	2.3E+01	NC	NA	0.1	2.4E-05	NA	1.5E+00	NA	1.6E-05
7439-92-1	Lead	1.2E+02	NC	NA	0.006	7.5E-06	NA	7.5E-04	NA	1.0E-02

	Cancer Risk	Hazard Index
TOTAL:	3.7E-07	5.9E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 27
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-10 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	6.6E-01	2.1E-07	2.4E-06	1.0E-04	2.0E-02	2E-11	1.2E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	6.7E-12	7.4E-11	3.3E+01	2.0E-06	2E-10	3.7E-05
Metals								
7440-39-3	Barium	1.9E+02	6.2E-05	6.9E-04	NA	5.0E+00	NA	1.4E-04
7440-43-9	Cadmium	7.5E-01	2.4E-07	2.7E-06	1.8E-03	2.0E-02	4E-10	1.4E-04
16065-83-1	Chromium III	2.3E+01	7.3E-06	8.2E-05	NA	3.0E-01	NA	2.7E-04
7439-92-1	Lead	1.2E+02	3.7E-05	4.2E-04	NA	1.0E+00	NA	4.2E-04

	Cancer Risk	Hazard Index
TOTAL:	6.8E-10	1.1E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 28
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-10 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	6.6E-01	1.0E+00	1.83E-10	1.00E+00	2.04E-09	2.0E+00	5.0E-05	4E-10	4.1E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	5.72E-15	1.00E+00	6.37E-14	1.5E+05	7.0E-10	9E-10	9.1E-05
7440-39-3	Barium	1.9E+02	NC	NA	1.00E+00	5.89E-07	NA	7.0E-02	NA	8.4E-06
7440-43-9	Cadmium	7.5E-01	NC	NA	1.00E+00	2.33E-09	NA	5.0E-04	NA	4.7E-06
16065-83-1	Chromium III	2.3E+01	NC	NA	1.00E+00	7.01E-08	NA	1.5E+00	NA	4.7E-08
7439-92-1	Lead	1.2E+02	NC	NA	5.00E-01	1.79E-07	NA	7.5E-04	NA	2.4E-04

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.2E-09	3.8E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 1
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-1 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.7E-03	1.0E+00	1.6E-10	1.0E+00	8.4E-09	2.0E+00	5.0E-05	3E-10	1.7E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.9E-12	1.0E+00	1.0E-10	1.5E+05	7.0E-10	3E-07	1.4E-01

	Cancer Risk	Hazard Index
TOTAL:	2.8E-07	1.4E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 2
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-1 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	1.7E-03	0.1	1.3E-10	0.1	6.8E-09	2.0E+00	5.0E-05	3E-10	1.4E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.6E-12	0.1	8.2E-11	1.5E+05	7.0E-10	2E-07	1.2E-01

	Cancer Risk	Hazard Index
TOTAL:	2.4E-07	1.2E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 3
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-1 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	1.7E-03	1.7E-10	8.7E-09	1.0E-04	2.0E-02	2E-14	4.3E-07
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.1E-12	1.0E-10	3.3E+01	2.0E-06	7E-11	5.2E-05

	Cancer Risk	Hazard Index
TOTAL:	6.9E-11	5.2E-05

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 4
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-1 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	1.7E-03	1.0E+00	1.49E-13	1.00E+00	7.45E-12	2.0E+00	5.0E-05	3E-13	1.5E-07
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.79E-15	1.00E+00	8.90E-14	1.5E+05	7.0E-10	3E-10	1.3E-04

	Cancer Risk	Hazard Index
TOTAL:	2.7E-10	1.3E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 5
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-2 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	2.9E-01	3.0E-01	7.9E-09	3.0E-01	4.2E-07	7.3E-01	3.0E-01	6E-09	1.4E-06
205-99-2	Benzo(b)fluoranthene	2.8E-01	3.0E-01	7.6E-09	3.0E-01	4.1E-07	7.3E-01	3.0E-01	6E-09	1.4E-06
191-24-2	Benzo(g,h,i)perylene	2.0E-01	NC	NA	3.0E-01	3.0E-07	NA	3.0E-01	NA	9.9E-07
218-01-9	Chrysene	2.8E-01	3.0E-01	7.7E-09	3.0E-01	4.1E-07	7.3E-02	3.0E-01	6E-10	1.4E-06
206-44-0	Fluoranthene	5.1E-01	NC	NA	3.0E-01	7.5E-07	NA	4.0E-01	NA	1.9E-06
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	3.0E-01	5.9E-09	3.0E-01	3.2E-07	7.3E-01	3.0E-01	4E-09	1.1E-06
85-01-8	Phenanthrene	4.3E-01	NC	NA	3.0E-01	6.3E-07	NA	3.0E-01	NA	2.1E-06
129-00-0	Pyrene	4.9E-01	NC	NA	3.0E-01	7.2E-07	NA	3.0E-01	NA	2.4E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	5.2E-01	1.0E+00	4.7E-08	1.0E+00	2.5E-06	2.0E+00	5.0E-05	9E-08	5.1E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.9E-12	1.0E+00	1.0E-10	1.5E+05	7.0E-10	3E-07	1.4E-01
Metals										
7440-39-3	Barium	7.6E+01	NC	NA	1.0E+00	3.7E-04	NA	7.0E-02	NA	5.3E-03
7440-43-9	Cadmium	5.2E-01	NC	NA	1.0E+00	2.5E-06	NA	5.0E-04	NA	5.1E-03
16065-83-1	Chromium III	1.9E+01	NC	NA	1.0E+00	9.5E-05	NA	1.5E+00	NA	6.3E-05
7439-92-1	Lead	7.1E+01	NC	NA	5.0E-01	1.7E-04	NA	7.5E-04	NA	2.3E-01
7439-97-6	Mercury	8.0E-02	NC	NA	5.0E-01	2.0E-07	NA	3.0E-04	NA	6.5E-04
7440-02-0	Nickel	1.1E+01	NC	NA	1.0E+00	5.5E-05	NA	2.0E-02	NA	2.7E-03
7440-22-4	Silver	1.9E+00	NC	NA	1.0E+00	9.2E-06	NA	5.0E-03	NA	1.8E-03
7440-62-2	Vanadium	2.1E+01	NC	NA	1.0E+00	1.0E-04	NA	9.0E-03	NA	1.1E-02
7440-66-6	Zinc	6.3E+01	NC	NA	1.0E+00	3.1E-04	NA	3.0E-01	NA	1.0E-03

	Cancer Risk	Hazard Index
TOTAL:	3.9E-07	4.5E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 6
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-2 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
56-55-3	Benzo(a)anthracene	2.9E-01	0.02	4.5E-09	0.02	2.3E-07	7.3E-01	3.0E-01	3E-09	7.7E-07
205-99-2	Benzo(b)fluoranthene	2.8E-01	0.02	4.3E-09	0.02	2.2E-07	7.3E-01	3.0E-01	3E-09	7.4E-07
191-24-2	Benzo(g,h,i)perylene	2.0E-01	NC	NA	0.1	8.1E-07	NA	3.0E-01	NA	2.7E-06
218-01-9	Chrysene	2.8E-01	0.02	4.3E-09	0.02	2.2E-07	7.3E-02	3.0E-01	3E-10	7.4E-07
206-44-0	Fluoranthene	5.1E-01	NC	NA	0.1	2.0E-06	NA	4.0E-01	NA	5.1E-06
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	0.02	3.3E-09	0.02	1.7E-07	7.3E-01	3.0E-01	2E-09	5.7E-07
85-01-8	Phenanthrene	4.3E-01	NC	NA	0.1	1.7E-06	NA	3.0E-01	NA	5.7E-06
129-00-0	Pyrene	4.9E-01	NC	NA	0.1	1.9E-06	NA	3.0E-01	NA	6.5E-06
1336-36-3	Total PCBs	5.2E-01	0.1	4.0E-08	0.1	2.1E-06	2.0E+00	5.0E-05	8E-08	4.1E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.6E-12	0.1	8.2E-11	1.5E+05	7.0E-10	2E-07	1.2E-01
7440-39-3	Barium	7.6E+01	NC	NA	0.1	3.0E-04	NA	7.0E-02	NA	4.3E-03
7440-43-9	Cadmium	5.2E-01	NC	NA	0.01	2.1E-07	NA	5.0E-04	NA	4.1E-04
16065-83-1	Chromium III	1.9E+01	NC	NA	0.1	7.7E-05	NA	1.5E+00	NA	5.1E-05
7439-92-1	Lead	7.1E+01	NC	NA	0.006	1.7E-05	NA	7.5E-04	NA	2.2E-02
7439-97-6	Mercury	8.0E-02	NC	NA	0.1	3.2E-07	NA	3.0E-04	NA	1.1E-03
7440-02-0	Nickel	1.1E+01	NC	NA	0.2	8.9E-05	NA	2.0E-02	NA	4.5E-03
7440-22-4	Silver	1.9E+00	NC	NA	0.3	2.3E-05	NA	5.0E-03	NA	4.5E-03
7440-62-2	Vanadium	2.1E+01	NC	NA	0.1	8.4E-05	NA	9.0E-03	NA	9.3E-03
7440-66-6	Zinc	6.3E+01	NC	NA	0.1	2.5E-04	NA	3.0E-01	NA	8.4E-04

	Cancer Risk	Hazard Index
TOTAL:	3.3E-07	2.1E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 7
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-2 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
56-55-3	Benzo(a)anthracene	2.9E-01	2.9E-08	1.5E-06	2.1E-04	5.0E+02	6E-12	2.9E-09
205-99-2	Benzo(b)fluoranthene	2.8E-01	2.8E-08	1.4E-06	2.1E-04	5.0E+02	6E-12	2.8E-09
191-24-2	Benzo(g,h,i)perylene	2.0E-01	2.1E-08	1.0E-06	NA	5.0E+02	NA	2.1E-09
218-01-9	Chrysene	2.8E-01	2.8E-08	1.4E-06	2.1E-05	5.0E+02	6E-13	2.8E-09
206-44-0	Fluoranthene	5.1E-01	5.2E-08	2.6E-06	NA	5.0E+02	NA	5.2E-09
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	2.2E-08	1.1E-06	2.1E-04	5.0E+02	5E-12	2.2E-09
85-01-8	Phenanthrene	4.3E-01	4.3E-08	2.2E-06	NA	5.0E+02	NA	4.3E-09
129-00-0	Pyrene	4.9E-01	4.9E-08	2.5E-06	NA	5.0E+02	NA	4.9E-09
Dioxins/PCBs								
1336-36-3	Total PCBs	5.2E-01	5.3E-08	2.6E-06	1.0E-04	2.0E-02	5E-12	1.3E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.1E-12	1.0E-10	3.3E+01	2.0E-06	7E-11	5.2E-05
Metals								
7440-39-3	Barium	7.6E+01	7.7E-06	3.8E-04	NA	5.0E+00	NA	7.6E-05
7440-43-9	Cadmium	5.2E-01	5.2E-08	2.6E-06	1.8E-03	2.0E-02	9E-11	1.3E-04
16065-83-1	Chromium III	1.9E+01	2.0E-06	9.8E-05	NA	3.0E-01	NA	3.3E-04
7439-92-1	Lead	7.1E+01	7.2E-06	3.6E-04	NA	1.0E+00	NA	3.6E-04
7439-97-6	Mercury	8.0E-02	8.1E-09	4.0E-07	NA	3.0E-01	NA	1.3E-06
7440-02-0	Nickel	1.1E+01	1.1E-06	5.7E-05	4.8E-04	1.0E+00	5E-10	5.7E-05
7440-22-4	Silver	1.9E+00	1.9E-07	9.6E-06	NA	1.4E-01	NA	6.8E-05
7440-62-2	Vanadium	2.1E+01	2.1E-06	1.1E-04	NA	1.0E+00	NA	1.1E-04
7440-66-6	Zinc	6.3E+01	6.4E-06	3.2E-04	NA	1.4E+00	NA	2.3E-04

	Cancer Risk	Hazard Index
TOTAL:	7.3E-10	1.5E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 8
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-2 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	2.9E-01	3.0E-01	7.54E-12	3.00E-01	3.76E-10	7.3E-01	3.0E-01	6E-12	1.3E-09
205-99-2	Benzo(b)fluoranthene	2.8E-01	3.0E-01	7.29E-12	3.00E-01	3.63E-10	7.3E-01	3.0E-01	5E-12	1.2E-09
191-24-2	Benzo(g,h,i)perylene	2.0E-01	NC	NA	3.00E-01	2.64E-10	NA	3.0E-01	NA	8.8E-10
218-01-9	Chrysene	2.8E-01	3.0E-01	7.32E-12	3.00E-01	3.65E-10	7.3E-02	3.0E-01	5E-13	1.2E-09
206-44-0	Fluoranthene	5.1E-01	NC	NA	3.00E-01	6.67E-10	NA	4.0E-01	NA	1.7E-09
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	3.0E-01	5.62E-12	3.00E-01	2.80E-10	7.3E-01	3.0E-01	4E-12	9.3E-10
85-01-8	Phenanthrene	4.3E-01	NC	NA	3.00E-01	5.55E-10	NA	3.0E-01	NA	1.8E-09
129-00-0	Pyrene	4.9E-01	NC	NA	3.00E-01	6.34E-10	NA	3.0E-01	NA	2.1E-09
1336-36-3	Total PCBs	5.2E-01	1.0E+00	4.53E-11	1.00E+00	2.26E-09	2.0E+00	5.0E-05	9E-11	4.5E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.79E-15	1.00E+00	8.90E-14	1.5E+05	7.0E-10	3E-10	1.3E-04
7440-39-3	Barium	7.6E+01	NC	NA	1.00E+00	3.27E-07	NA	7.0E-02	NA	4.7E-06
7440-43-9	Cadmium	5.2E-01	NC	NA	1.00E+00	2.24E-09	NA	5.0E-04	NA	4.5E-06
16065-83-1	Chromium III	1.9E+01	NC	NA	1.00E+00	8.38E-08	NA	1.5E+00	NA	5.6E-08
7439-92-1	Lead	7.1E+01	NC	NA	5.00E-01	1.53E-07	NA	7.5E-04	NA	2.0E-04
7439-97-6	Mercury	8.0E-02	NC	NA	5.00E-01	1.73E-10	NA	3.0E-04	NA	5.8E-07
7440-02-0	Nickel	1.1E+01	NC	NA	1.00E+00	4.86E-08	NA	2.0E-02	NA	2.4E-06
7440-22-4	Silver	1.9E+00	NC	NA	1.00E+00	8.19E-09	NA	5.0E-03	NA	1.6E-06
7440-62-2	Vanadium	2.1E+01	NC	NA	1.00E+00	9.12E-08	NA	9.0E-03	NA	1.0E-05
7440-66-6	Zinc	6.3E+01	NC	NA	1.00E+00	2.74E-07	NA	3.0E-01	NA	9.1E-07

	Cancer Risk	Hazard Index
TOTAL:	3.7E-10	4.0E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 9
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-3 (0-1')
New Bedford, Massachusetts

Constituent		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	1.0E+00	1.7E-08	1.0E+00	9.4E-07	2.0E+00	5.0E-05	3E-08	1.9E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.9E-12	1.0E+00	1.0E-10	1.5E+05	7.0E-10	3E-07	1.4E-01
Metals										
7440-39-3	Barium	2.6E+01	NC	NA	1.0E+00	1.3E-04	NA	7.0E-02	NA	1.8E-03
7439-92-1	Lead	5.7E+01	NC	NA	5.0E-01	1.4E-04	NA	7.5E-04	NA	1.9E-01
7439-97-6	Mercury	9.8E-02	NC	NA	5.0E-01	2.4E-07	NA	3.0E-04	NA	8.0E-04
7440-22-4	Silver	7.2E-01	NC	NA	1.0E+00	3.5E-06	NA	5.0E-03	NA	7.0E-04
7440-66-6	Zinc	3.1E+01	NC	NA	1.0E+00	1.5E-04	NA	3.0E-01	NA	5.1E-04

	Cancer Risk	Hazard Index
TOTAL:	3.2E-07	3.5E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 10
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-3 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	1.9E-01	0.1	1.5E-08	0.1	7.6E-07	2.0E+00	5.0E-05	3E-08	1.5E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.6E-12	0.1	8.2E-11	1.5E+05	7.0E-10	2E-07	1.2E-01
7440-39-3	Barium	2.6E+01	NC	NA	0.1	1.0E-04	NA	7.0E-02	NA	1.5E-03
7439-92-1	Lead	5.7E+01	NC	NA	0.006	1.4E-05	NA	7.5E-04	NA	1.8E-02
7439-97-6	Mercury	9.8E-02	NC	NA	0.1	3.9E-07	NA	3.0E-04	NA	1.3E-03
7440-22-4	Silver	7.2E-01	NC	NA	0.3	8.6E-06	NA	5.0E-03	NA	1.7E-03
7440-66-6	Zinc	3.1E+01	NC	NA	0.1	1.2E-04	NA	3.0E-01	NA	4.2E-04

	Cancer Risk	Hazard Index
TOTAL:	2.7E-07	1.6E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 11
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-3 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	1.9E-01	1.9E-08	9.7E-07	1.0E-04	2.0E-02	2E-12	4.8E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.1E-12	1.0E-10	3.3E+01	2.0E-06	7E-11	5.2E-05
Metals								
7440-39-3	Barium	2.6E+01	2.6E-06	1.3E-04	NA	5.0E+00	NA	2.6E-05
7439-92-1	Lead	5.7E+01	5.8E-06	2.9E-04	NA	1.0E+00	NA	2.9E-04
7439-97-6	Mercury	9.8E-02	9.9E-09	5.0E-07	NA	3.0E-01	NA	1.7E-06
7440-22-4	Silver	7.2E-01	7.3E-08	3.6E-06	NA	1.4E-01	NA	2.6E-05
7440-66-6	Zinc	3.1E+01	3.2E-06	1.6E-04	NA	1.4E+00	NA	1.1E-04

	Cancer Risk	Hazard Index
TOTAL:	7.1E-11	5.6E-04

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 12
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-3 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	1.9E-01	1.0E+00	1.66E-11	1.00E+00	8.29E-10	2.0E+00	5.0E-05	3E-11	1.7E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.79E-15	1.00E+00	8.90E-14	1.5E+05	7.0E-10	3E-10	1.3E-04
7440-39-3	Barium	2.6E+01	NC	NA	1.00E+00	1.13E-07	NA	7.0E-02	NA	1.6E-06
7439-92-1	Lead	5.7E+01	NC	NA	5.00E-01	1.24E-07	NA	7.5E-04	NA	1.7E-04
7439-97-6	Mercury	9.8E-02	NC	NA	5.00E-01	2.12E-10	NA	3.0E-04	NA	7.1E-07
7440-22-4	Silver	7.2E-01	NC	NA	1.00E+00	3.12E-09	NA	5.0E-03	NA	6.2E-07
7440-66-6	Zinc	3.1E+01	NC	NA	1.00E+00	1.36E-07	NA	3.0E-01	NA	4.5E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.0E-10	3.1E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 13
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-4 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.1E-01	1.0E+00	9.8E-09	1.0E+00	5.3E-07	2.0E+00	5.0E-05	2E-08	1.1E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.9E-12	1.0E+00	1.0E-10	1.5E+05	7.0E-10	3E-07	1.4E-01
Metals										
7439-92-1	Lead	5.2E+01	NC	NA	5.0E-01	1.3E-04	NA	7.5E-04	NA	1.7E-01
7440-22-4	Silver	5.3E-01	NC	NA	1.0E+00	2.6E-06	NA	5.0E-03	NA	5.2E-04

	Cancer Risk	Hazard Index
TOTAL:	3.0E-07	3.3E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 14
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-4 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	1.1E-01	0.1	8.3E-09	0.1	4.3E-07	2.0E+00	5.0E-05	2E-08	8.6E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.6E-12	0.1	8.2E-11	1.5E+05	7.0E-10	2E-07	1.2E-01
7439-92-1	Lead	5.2E+01	NC	NA	0.006	1.2E-05	NA	7.5E-04	NA	1.7E-02
7440-22-4	Silver	5.3E-01	NC	NA	0.3	6.3E-06	NA	5.0E-03	NA	1.3E-03

	Cancer Risk	Hazard Index
TOTAL:	2.5E-07	1.4E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 15
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-4 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	1.1E-01	1.1E-08	5.5E-07	1.0E-04	2.0E-02	1E-12	2.7E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.1E-12	1.0E-10	3.3E+01	2.0E-06	7E-11	5.2E-05
Metals								
7439-92-1	Lead	5.2E+01	5.3E-06	2.6E-04	NA	1.0E+00	NA	2.6E-04
7440-22-4	Silver	5.3E-01	5.3E-08	2.7E-06	NA	1.4E-01	NA	1.9E-05

	Cancer Risk	Hazard Index
TOTAL:	7.0E-11	3.6E-04

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 16
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-4 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	1.1E-01	1.0E+00	9.38E-12	1.00E+00	4.68E-10	2.0E+00	5.0E-05	2E-11	9.4E-06
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.79E-15	1.00E+00	8.90E-14	1.5E+05	7.0E-10	3E-10	1.3E-04
7439-92-1	Lead	5.2E+01	NC	NA	5.00E-01	1.13E-07	NA	7.5E-04	NA	1.5E-04
7440-22-4	Silver	5.3E-01	NC	NA	1.00E+00	2.29E-09	NA	5.0E-03	NA	4.6E-07

	Cancer Risk	Hazard Index
TOTAL:	2.9E-10	2.9E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 17
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-6 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	4.5E-01	3.0E-01	1.2E-08	3.0E-01	6.7E-07	7.3E-01	3.0E-01	9E-09	2.2E-06
205-99-2	Benzo(b)fluoranthene	4.8E-01	3.0E-01	1.3E-08	3.0E-01	7.0E-07	7.3E-01	3.0E-01	9E-09	2.3E-06
206-44-0	Fluoranthene	9.0E-01	NC	NA	3.0E-01	1.3E-06	NA	4.0E-01	NA	3.3E-06
85-01-8	Phenanthrene	6.8E-01	NC	NA	3.0E-01	1.0E-06	NA	3.0E-01	NA	3.3E-06
129-00-0	Pyrene	9.3E-01	NC	NA	3.0E-01	1.4E-06	NA	3.0E-01	NA	4.6E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	2.7E-01	1.0E+00	2.4E-08	1.0E+00	1.3E-06	2.0E+00	5.0E-05	5E-08	2.6E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.9E-12	1.0E+00	1.0E-10	1.5E+05	7.0E-10	3E-07	1.4E-01
Metals										
7440-39-3	Barium	5.3E+01	NC	NA	1.0E+00	2.6E-04	NA	7.0E-02	NA	3.7E-03
7439-92-1	Lead	4.9E+01	NC	NA	5.0E-01	1.2E-04	NA	7.5E-04	NA	1.6E-01
7440-66-6	Zinc	5.2E+01	NC	NA	1.0E+00	2.5E-04	NA	3.0E-01	NA	8.5E-04

	Cancer Risk	Hazard Index
TOTAL:	3.5E-07	3.3E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 18
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-6 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
56-55-3	Benzo(a)anthracene	4.5E-01	0.02	7.0E-09	0.02	3.6E-07	7.3E-01	3.0E-01	5E-09	1.2E-06
205-99-2	Benzo(b)fluoranthene	4.8E-01	0.02	7.3E-09	0.02	3.8E-07	7.3E-01	3.0E-01	5E-09	1.3E-06
206-44-0	Fluoranthene	9.0E-01	NC	NA	0.1	3.6E-06	NA	4.0E-01	NA	8.9E-06
85-01-8	Phenanthrene	6.8E-01	NC	NA	0.1	2.7E-06	NA	3.0E-01	NA	9.1E-06
129-00-0	Pyrene	9.3E-01	NC	NA	0.1	3.7E-06	NA	3.0E-01	NA	1.2E-05
1336-36-3	Total PCBs	2.7E-01	0.1	2.1E-08	0.1	1.1E-06	2.0E+00	5.0E-05	4E-08	2.1E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.6E-12	0.1	8.2E-11	1.5E+05	7.0E-10	2E-07	1.2E-01
7440-39-3	Barium	5.3E+01	NC	NA	0.1	2.1E-04	NA	7.0E-02	NA	3.0E-03
7439-92-1	Lead	4.9E+01	NC	NA	0.006	1.2E-05	NA	7.5E-04	NA	1.6E-02
7440-66-6	Zinc	5.2E+01	NC	NA	0.1	2.1E-04	NA	3.0E-01	NA	6.9E-04

	Cancer Risk	Hazard Index
TOTAL:	2.9E-07	1.6E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 19
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-6 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
56-55-3	Benzo(a)anthracene	4.5E-01	4.6E-08	2.3E-06	2.1E-04	5.0E+02	1E-11	4.6E-09
205-99-2	Benzo(b)fluoranthene	4.8E-01	4.8E-08	2.4E-06	2.1E-04	5.0E+02	1E-11	4.8E-09
206-44-0	Fluoranthene	9.0E-01	9.1E-08	4.5E-06	NA	5.0E+02	NA	9.1E-09
85-01-8	Phenanthrene	6.8E-01	6.9E-08	3.5E-06	NA	5.0E+02	NA	6.9E-09
129-00-0	Pyrene	9.3E-01	9.5E-08	4.7E-06	NA	5.0E+02	NA	9.4E-09
Dioxins/PCBs								
1336-36-3	Total PCBs	2.7E-01	2.7E-08	1.4E-06	1.0E-04	2.0E-02	3E-12	6.8E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.1E-12	1.0E-10	3.3E+01	2.0E-06	7E-11	5.2E-05
Metals								
7440-39-3	Barium	5.3E+01	5.4E-06	2.7E-04	NA	5.0E+00	NA	5.4E-05
7439-92-1	Lead	4.9E+01	5.0E-06	2.5E-04	NA	1.0E+00	NA	2.5E-04
7440-66-6	Zinc	5.2E+01	5.3E-06	2.6E-04	NA	1.4E+00	NA	1.9E-04

	Cancer Risk	Hazard Index
TOTAL:	9.1E-11	6.1E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 20
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-6 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	4.5E-01	3.0E-01	1.18E-11	3.00E-01	5.91E-10	7.3E-01	3.0E-01	9E-12	2.0E-09
205-99-2	Benzo(b)fluoranthene	4.8E-01	3.0E-01	1.24E-11	3.00E-01	6.18E-10	7.3E-01	3.0E-01	9E-12	2.1E-09
206-44-0	Fluoranthene	9.0E-01	NC	NA	3.00E-01	1.17E-09	NA	4.0E-01	NA	2.9E-09
85-01-8	Phenanthrene	6.8E-01	NC	NA	3.00E-01	8.88E-10	NA	3.0E-01	NA	3.0E-09
129-00-0	Pyrene	9.3E-01	NC	NA	3.00E-01	1.21E-09	NA	3.0E-01	NA	4.0E-09
1336-36-3	Total PCBs	2.7E-01	1.0E+00	2.34E-11	1.00E+00	1.17E-09	2.0E+00	5.0E-05	5E-11	2.3E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.79E-15	1.00E+00	8.90E-14	1.5E+05	7.0E-10	3E-10	1.3E-04
7440-39-3	Barium	5.3E+01	NC	NA	1.00E+00	2.31E-07	NA	7.0E-02	NA	3.3E-06
7439-92-1	Lead	4.9E+01	NC	NA	5.00E-01	1.06E-07	NA	7.5E-04	NA	1.4E-04
7440-66-6	Zinc	5.2E+01	NC	NA	1.00E+00	2.25E-07	NA	3.0E-01	NA	7.5E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.3E-10	3.0E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 21
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-7 (0-1')
New Bedford, Massachusetts

Constituent		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.8E-01	1.0E+00	2.5E-08	1.0E+00	1.3E-06	2.0E+00	5.0E-05	5E-08	2.7E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.9E-12	1.0E+00	1.0E-10	1.5E+05	7.0E-10	3E-07	1.4E-01
Metals										
7440-39-3	Barium	7.1E+01	NC	NA	1.0E+00	3.4E-04	NA	7.0E-02	NA	4.9E-03
7440-43-9	Cadmium	6.2E-01	NC	NA	1.0E+00	3.0E-06	NA	5.0E-04	NA	6.0E-03
16065-83-1	Chromium III	1.3E+01	NC	NA	1.0E+00	6.5E-05	NA	1.5E+00	NA	4.3E-05
7439-92-1	Lead	1.1E+02	NC	NA	5.0E-01	2.7E-04	NA	7.5E-04	NA	3.6E-01
7440-66-6	Zinc	8.1E+01	NC	NA	1.0E+00	4.0E-04	NA	3.0E-01	NA	1.3E-03

	Cancer Risk	Hazard Index
TOTAL:	3.3E-07	5.4E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 22
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-7 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	2.8E-01	0.1	2.1E-08	0.1	1.1E-06	2.0E+00	5.0E-05	4E-08	2.2E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.6E-12	0.1	8.2E-11	1.5E+05	7.0E-10	2E-07	1.2E-01
7440-39-3	Barium	7.1E+01	NC	NA	0.1	2.8E-04	NA	7.0E-02	NA	4.0E-03
7440-43-9	Cadmium	6.2E-01	NC	NA	0.01	2.5E-07	NA	5.0E-04	NA	4.9E-04
16065-83-1	Chromium III	1.3E+01	NC	NA	0.1	5.3E-05	NA	1.5E+00	NA	3.5E-05
7439-92-1	Lead	1.1E+02	NC	NA	0.006	2.6E-05	NA	7.5E-04	NA	3.5E-02
7440-66-6	Zinc	8.1E+01	NC	NA	0.1	3.2E-04	NA	3.0E-01	NA	1.1E-03

	Cancer Risk	Hazard Index
TOTAL:	2.8E-07	1.8E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 23
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-7 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	2.8E-01	2.8E-08	1.4E-06	1.0E-04	2.0E-02	3E-12	7.0E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.1E-12	1.0E-10	3.3E+01	2.0E-06	7E-11	5.2E-05
Metals								
7440-39-3	Barium	7.1E+01	7.1E-06	3.6E-04	NA	5.0E+00	NA	7.1E-05
7440-43-9	Cadmium	6.2E-01	6.3E-08	3.1E-06	1.8E-03	2.0E-02	1E-10	1.6E-04
16065-83-1	Chromium III	1.3E+01	1.3E-06	6.7E-05	NA	3.0E-01	NA	2.2E-04
7439-92-1	Lead	1.1E+02	1.1E-05	5.6E-04	NA	1.0E+00	NA	5.6E-04
7440-66-6	Zinc	8.1E+01	8.3E-06	4.1E-04	NA	1.4E+00	NA	2.9E-04

Max Dioxin/PCB TEQ at HB-26 1-3'

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.8E-10	1.4E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 24
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-7 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	2.8E-01	1.0E+00	2.39E-11	1.00E+00	1.19E-09	2.0E+00	5.0E-05	5E-11	2.4E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.79E-15	1.00E+00	8.90E-14	1.5E+05	7.0E-10	3E-10	1.3E-04
7440-39-3	Barium	7.1E+01	NC	NA	1.00E+00	3.06E-07	NA	7.0E-02	NA	4.4E-06
7440-43-9	Cadmium	6.2E-01	NC	NA	1.00E+00	2.67E-09	NA	5.0E-04	NA	5.3E-06
16065-83-1	Chromium III	1.3E+01	NC	NA	1.00E+00	5.76E-08	NA	1.5E+00	NA	3.8E-08
7439-92-1	Lead	1.1E+02	NC	NA	5.00E-01	2.40E-07	NA	7.5E-04	NA	3.2E-04
7440-66-6	Zinc	8.1E+01	NC	NA	1.00E+00	3.53E-07	NA	3.0E-01	NA	1.2E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.2E-10	4.8E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 25
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-10 (0-1')
New Bedford, Massachusetts

Constituent		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	6.6E-01	1.0E+00	6.0E-08	1.0E+00	3.2E-06	2.0E+00	5.0E-05	1E-07	6.4E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.9E-12	1.0E+00	1.0E-10	1.5E+05	7.0E-10	3E-07	1.4E-01
Metals										
7440-39-3	Barium	1.9E+02	NC	NA	1.0E+00	9.3E-04	NA	7.0E-02	NA	1.3E-02
7440-43-9	Cadmium	7.5E-01	NC	NA	1.0E+00	3.7E-06	NA	5.0E-04	NA	7.4E-03
16065-83-1	Chromium III	2.3E+01	NC	NA	1.0E+00	1.1E-04	NA	1.5E+00	NA	7.4E-05
7439-92-1	Lead	1.2E+02	NC	NA	5.0E-01	2.8E-04	NA	7.5E-04	NA	3.8E-01

	Cancer Risk	Hazard Index
TOTAL:	4.0E-07	6.0E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 26
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-10 (0-1')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	6.6E-01	0.1	5.1E-08	0.1	2.6E-06	2.0E+00	5.0E-05	1E-07	5.2E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	1.6E-12	0.1	8.2E-11	1.5E+05	7.0E-10	2E-07	1.2E-01
7440-39-3	Barium	1.9E+02	NC	NA	0.1	7.6E-04	NA	7.0E-02	NA	1.1E-02
7440-43-9	Cadmium	7.5E-01	NC	NA	0.01	3.0E-07	NA	5.0E-04	NA	6.0E-04
16065-83-1	Chromium III	2.3E+01	NC	NA	0.1	9.0E-05	NA	1.5E+00	NA	6.0E-05
7439-92-1	Lead	1.2E+02	NC	NA	0.006	2.7E-05	NA	7.5E-04	NA	3.7E-02

	Cancer Risk	Hazard Index
TOTAL:	3.4E-07	2.2E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 27
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-10 (0-1')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	6.6E-01	6.7E-08	3.3E-06	1.0E-04	2.0E-02	7E-12	1.7E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.1E-12	1.0E-10	3.3E+01	2.0E-06	7E-11	5.2E-05
Metals								
7440-39-3	Barium	1.9E+02	1.9E-05	9.6E-04	NA	5.0E+00	NA	1.9E-04
7440-43-9	Cadmium	7.5E-01	7.6E-08	3.8E-06	1.8E-03	2.0E-02	1E-10	1.9E-04
16065-83-1	Chromium III	2.3E+01	2.3E-06	1.1E-04	NA	3.0E-01	NA	3.8E-04
7439-92-1	Lead	1.2E+02	1.2E-05	5.8E-04	NA	1.0E+00	NA	5.8E-04

Max Dioxin/PCB TEQ at HB-26 1-3'

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.1E-10	1.6E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 28
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-10 (0-1')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	6.6E-01	1.0E+00	5.72E-11	1.00E+00	2.85E-09	2.0E+00	5.0E-05	1E-10	5.7E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	1.79E-15	1.00E+00	8.90E-14	1.5E+05	7.0E-10	3E-10	1.3E-04
7440-39-3	Barium	1.9E+02	NC	NA	1.00E+00	8.23E-07	NA	7.0E-02	NA	1.2E-05
7440-43-9	Cadmium	7.5E-01	NC	NA	1.00E+00	3.26E-09	NA	5.0E-04	NA	6.5E-06
16065-83-1	Chromium III	2.3E+01	NC	NA	1.00E+00	9.79E-08	NA	1.5E+00	NA	6.5E-08
7439-92-1	Lead	1.2E+02	NC	NA	5.00E-01	2.49E-07	NA	7.5E-04	NA	3.3E-04

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.8E-10	5.4E-04

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 1
Adult Staff - 0-1'
Incidential Ingestion of Surface Soil
HS-1 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.7E-03	1	2.2E-10	1	5.8E-10	2.0E+00	2.0E-05	4E-10	2.9E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1	2.7E-12	1	6.9E-12	1.5E+05	7.0E-10	4E-07	9.9E-03

	Cancer Risk	Hazard Index
TOTAL:	4.0E-07	9.9E-03

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 2
Adult Staff - 0-1'
Dermal Contact with Surface Soil
HS-1 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.7E-03	0.1	4.6E-11	0.1	1.2E-10	2.0E+00	2.0E-05	9E-11	6.0E-06
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	5.6E-13	0.1	1.4E-12	1.5E+05	7.0E-10	8E-08	2.1E-03

	Cancer Risk	Hazard Index
TOTAL:	8.3E-08	2.1E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 3
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-1 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	1.7E-03	1.9E-09	5.0E-09	1.0E-04	2.0E-02	2E-13	2.5E-07
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.3E-11	6.0E-11	3.3E+01	2.0E-06	8E-10	3.0E-05

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	7.6E-10	3.0E-05

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 4
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-1 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.7E-03	1.0E+00	5.78E-12	1.00E+00	1.50E-11	2.0E+00	2.0E-05	1E-11	7.5E-07
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	6.91E-14	1.00E+00	1.79E-13	1.5E+05	7.0E-10	1E-08	2.6E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.0E-08	2.6E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 5
Adult Staff - 0-1'
Incidental Ingestion of Surface Soil
HS-2 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	2.9E-01	0.3	1.1E-08	0.3	2.9E-08	7.3E-01	3.0E-02	8E-09	9.7E-07
205-99-2	Benzo(b)fluoranthene	2.8E-01	0.3	1.1E-08	0.3	2.8E-08	7.3E-01	3.0E-02	8E-09	9.4E-07
191-24-2	Benzo(g,h,i)perylene	2.0E-01	NC	NA	0.3	2.0E-08	NA	3.0E-02	NA	6.8E-07
218-01-9	Chrysene	2.8E-01	0.3	1.1E-08	0.3	2.8E-08	7.3E-02	3.0E-02	8E-10	9.4E-07
206-44-0	Fluoranthene	5.1E-01	NC	NA	0.3	5.2E-08	NA	4.0E-02	NA	1.3E-06
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	0.3	8.4E-09	0.3	2.2E-08	7.3E-01	3.0E-02	6E-09	7.2E-07
85-01-8	Phenanthrene	4.3E-01	NC	NA	0.3	4.3E-08	NA	3.0E-02	NA	1.4E-06
129-00-0	Pyrene	4.9E-01	NC	NA	0.3	4.9E-08	NA	3.0E-02	NA	1.6E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	5.2E-01	1	6.8E-08	1	1.8E-07	2.0E+00	2.0E-05	1E-07	8.8E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1	2.7E-12	1	6.9E-12	1.5E+05	7.0E-10	4E-07	9.9E-03
Metals										
7440-39-3	Barium	7.6E+01	NC	NA	1	2.5E-05	NA	2.0E-01	NA	1.3E-04
7440-43-9	Cadmium	5.2E-01	NC	NA	1	1.7E-07	NA	5.0E-04	NA	3.5E-04
16065-83-1	Chromium III	1.9E+01	NC	NA	1	6.5E-06	NA	1.5E+00	NA	4.3E-06
7439-92-1	Lead	7.1E+01	NC	NA	0.5	1.2E-05	NA	7.5E-04	NA	1.6E-02
7439-97-6	Mercury	8.0E-02	NC	NA	0.5	1.3E-08	NA	3.0E-04	NA	4.5E-05
7440-02-0	Nickel	1.1E+01	NC	NA	1	3.8E-06	NA	2.0E-02	NA	1.9E-04
7440-22-4	Silver	1.9E+00	NC	NA	1	6.4E-07	NA	5.0E-03	NA	1.3E-04
7440-62-2	Vanadium	2.1E+01	NC	NA	1	7.1E-06	NA	9.0E-03	NA	7.9E-04
7440-66-6	Zinc	6.3E+01	NC	NA	1	2.1E-05	NA	3.0E-01	NA	7.1E-05

	Cancer Risk	Hazard Index
TOTAL:	5.6E-07	3.6E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 6
Adult Staff - 0-1'
Dermal Contact with Surface Soil
HS-2 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
56-55-3	Benzo(a)anthracene	2.9E-01	0.02	1.6E-09	0.02	4.1E-09	7.3E-01	3.0E-02	1E-09	1.4E-07
205-99-2	Benzo(b)fluoranthene	2.8E-01	0.02	1.5E-09	0.02	3.9E-09	7.3E-01	3.0E-02	1E-09	1.3E-07
191-24-2	Benzo(g,h,i)perylene	2.0E-01	NA	NA	0.1	1.4E-08	NA	3.0E-02	NA	4.7E-07
218-01-9	Chrysene	2.8E-01	0.02	1.5E-09	0.02	3.9E-09	7.3E-02	3.0E-02	1E-10	1.3E-07
206-44-0	Fluoranthene	5.1E-01	NA	NA	0.1	3.6E-08	NA	4.0E-02	NA	9.0E-07
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	0.02	1.2E-09	0.02	3.0E-09	7.3E-01	3.0E-02	9E-10	1.0E-07
85-01-8	Phenanthrene	4.3E-01	NA	NA	0.1	3.0E-08	NA	3.0E-02	NA	1.0E-06
129-00-0	Pyrene	4.9E-01	NA	NA	0.1	3.4E-08	NA	3.0E-02	NA	1.1E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	5.2E-01	0.1	1.4E-08	0.1	3.7E-08	2.0E+00	2.0E-05	3E-08	1.8E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	5.6E-13	0.1	1.4E-12	1.5E+05	7.0E-10	8E-08	2.1E-03
Metals										
7440-39-3	Barium	7.6E+01	NA	NA	0.1	5.3E-06	NA	2.0E-01	NA	2.6E-05
7440-43-9	Cadmium	5.2E-01	NA	NA	0.01	3.6E-09	NA	5.0E-04	NA	7.2E-06
16065-83-1	Chromium III	1.9E+01	NA	NA	0.1	1.4E-06	NA	1.5E+00	NA	9.0E-07
7439-92-1	Lead	7.1E+01	NA	NA	0.006	3.0E-07	NA	7.5E-04	NA	4.0E-04
7439-97-6	Mercury	8.0E-02	NA	NA	0.1	5.6E-09	NA	3.0E-04	NA	1.9E-05
7440-02-0	Nickel	1.1E+01	NA	NA	0.2	1.6E-06	NA	2.0E-02	NA	7.9E-05
7440-22-4	Silver	1.9E+00	NA	NA	0.3	4.0E-07	NA	5.0E-03	NA	7.9E-05
7440-62-2	Vanadium	2.1E+01	NA	NA	0.1	1.5E-06	NA	9.0E-03	NA	1.6E-04
7440-66-6	Zinc	6.3E+01	NA	NA	0.1	4.4E-06	NA	3.0E-01	NA	1.5E-05

	Cancer Risk	Hazard Index
TOTAL:	1.1E-07	4.7E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 7
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-2 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
56-55-3	Benzo(a)anthracene	2.9E-01	3.2E-07	8.4E-07	2.1E-04	5.0E+01	7E-11	1.7E-08
205-99-2	Benzo(b)fluoranthene	2.8E-01	3.1E-07	8.1E-07	2.1E-04	5.0E+01	7E-11	1.6E-08
191-24-2	Benzo(g,h,i)perylene	2.0E-01	2.3E-07	5.9E-07	NA	5.0E+01	NA	1.2E-08
218-01-9	Chrysene	2.8E-01	3.1E-07	8.2E-07	2.1E-05	5.0E+01	7E-12	1.6E-08
206-44-0	Fluoranthene	5.1E-01	5.8E-07	1.5E-06	NA	5.0E+01	NA	3.0E-08
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	2.4E-07	6.3E-07	2.1E-04	5.0E+01	5E-11	1.3E-08
85-01-8	Phenanthrene	4.3E-01	4.8E-07	1.2E-06	NA	5.0E+01	NA	2.5E-08
129-00-0	Pyrene	4.9E-01	5.5E-07	1.4E-06	NA	5.0E+01	NA	2.8E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	5.2E-01	5.8E-07	1.5E-06	1.0E-04	2.0E-02	6E-11	7.6E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.3E-11	6.0E-11	3.3E+01	2.0E-06	8E-10	3.0E-05
Metals								
7440-39-3	Barium	7.6E+01	8.5E-05	2.2E-04	NA	5.0E-01	NA	4.4E-04
7440-43-9	Cadmium	5.2E-01	5.8E-07	1.5E-06	1.8E-03	2.0E-02	1E-09	7.5E-05
16065-83-1	Chromium III	1.9E+01	2.2E-05	5.6E-05	NA	1.0E-01	NA	5.6E-04
7439-92-1	Lead	7.1E+01	7.9E-05	2.1E-04	NA	1.0E+00	NA	2.1E-04
7439-97-6	Mercury	8.0E-02	9.0E-08	2.3E-07	NA	3.0E-01	NA	7.7E-07
7440-02-0	Nickel	1.1E+01	1.3E-05	3.3E-05	4.8E-04	1.0E+00	6E-09	3.3E-05
7440-22-4	Silver	1.9E+00	2.1E-06	5.5E-06	NA	1.4E-01	NA	3.9E-05
7440-62-2	Vanadium	2.1E+01	2.4E-05	6.1E-05	NA	1.0E+00	NA	6.1E-05
7440-66-6	Zinc	6.3E+01	7.1E-05	1.8E-04	NA	1.4E+00	NA	1.3E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	8.1E-09	1.7E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 8
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-2 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	2.9E-01	3.0E-01	2.92E-10	3.00E-01	7.56E-10	7.3E-01	3.0E-02	2E-10	2.5E-08
205-99-2	Benzo(b)fluoranthene	2.8E-01	3.0E-01	2.82E-10	3.00E-01	7.31E-10	7.3E-01	3.0E-02	2E-10	2.4E-08
191-24-2	Benzo(g,h,i)perylene	2.0E-01	NC	NA	3.00E-01	5.31E-10	NA	3.0E-02	NA	1.8E-08
218-01-9	Chrysene	2.8E-01	3.0E-01	2.83E-10	3.00E-01	7.35E-10	7.3E-02	3.0E-02	2E-11	2.4E-08
206-44-0	Fluoranthene	5.1E-01	NC	NA	3.00E-01	1.34E-09	NA	4.0E-02	NA	3.4E-08
193-39-5	Indeno(1,2,3-cd)pyrene	2.2E-01	3.0E-01	2.17E-10	3.00E-01	5.63E-10	7.3E-01	3.0E-02	2E-10	1.9E-08
85-01-8	Phenanthrene	4.3E-01	NC	NA	3.00E-01	1.12E-09	NA	3.0E-02	NA	3.7E-08
129-00-0	Pyrene	4.9E-01	NC	NA	3.00E-01	1.28E-09	NA	3.0E-02	NA	4.3E-08
Dioxins/PCBs										
1336-36-3	Total PCBs	5.2E-01	1.0E+00	1.75E-09	1.00E+00	4.54E-09	2.0E+00	2.0E-05	4E-09	2.3E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	6.91E-14	1.00E+00	1.79E-13	1.5E+05	7.0E-10	1E-08	2.6E-04
Metals										
7440-39-3	Barium	7.6E+01	NC	NA	1.00E+00	6.58E-07	NA	2.0E-01	NA	3.3E-06
7440-43-9	Cadmium	5.2E-01	NC	NA	1.00E+00	4.50E-09	NA	5.0E-04	NA	9.0E-06
16065-83-1	Chromium III	1.9E+01	NC	NA	1.00E+00	1.69E-07	NA	1.5E+00	NA	1.1E-07
7439-92-1	Lead	7.1E+01	NC	NA	5.00E-01	3.08E-07	NA	7.5E-04	NA	4.1E-04
7439-97-6	Mercury	8.0E-02	NC	NA	5.00E-01	3.49E-10	NA	3.0E-04	NA	1.2E-06
7440-02-0	Nickel	1.1E+01	NC	NA	1.00E+00	9.78E-08	NA	2.0E-02	NA	4.9E-06
7440-22-4	Silver	1.9E+00	NC	NA	1.00E+00	1.65E-08	NA	5.0E-03	NA	3.3E-06
7440-62-2	Vanadium	2.1E+01	NC	NA	1.00E+00	1.83E-07	NA	9.0E-03	NA	2.0E-05
7440-66-6	Zinc	6.3E+01	NC	NA	1.00E+00	5.52E-07	NA	3.0E-01	NA	1.8E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.4E-08	9.4E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 9
Adult Staff - 0-1'
Incidential Ingestion of Surface Soil
HS-3 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	1	2.5E-08	1	6.4E-08	2.0E+00	2.0E-05	5E-08	3.2E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1	2.7E-12	1	6.9E-12	1.5E+05	7.0E-10	4E-07	9.9E-03
Metals										
7440-39-3	Barium	2.6E+01	NC	NA	1	8.8E-06	NA	2.0E-01	NA	4.4E-05
7439-92-1	Lead	5.7E+01	NC	NA	0.5	9.6E-06	NA	7.5E-04	NA	1.3E-02
7439-97-6	Mercury	9.8E-02	NC	NA	0.5	1.6E-08	NA	3.0E-04	NA	5.5E-05
7440-22-4	Silver	7.2E-01	NC	NA	1	2.4E-07	NA	5.0E-03	NA	4.8E-05
7440-66-6	Zinc	3.1E+01	NC	NA	1	1.1E-05	NA	3.0E-01	NA	3.5E-05

	Cancer Risk	Hazard Index
TOTAL:	4.5E-07	2.6E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 10
Adult Staff - 0-1'
Dermal Contact with Surface Soil
HS-3 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	0.1	5.2E-09	0.1	1.3E-08	2.0E+00	2.0E-05	1E-08	6.7E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	5.6E-13	0.1	1.4E-12	1.5E+05	7.0E-10	8E-08	2.1E-03
Metals										
7440-39-3	Barium	2.6E+01	NA	NA	0.1	1.8E-06	NA	2.0E-01	NA	9.1E-06
7439-92-1	Lead	5.7E+01	NA	NA	0.006	2.4E-07	NA	7.5E-04	NA	3.2E-04
7439-97-6	Mercury	9.8E-02	NA	NA	0.1	6.9E-09	NA	3.0E-04	NA	2.3E-05
7440-22-4	Silver	7.2E-01	NA	NA	0.3	1.5E-07	NA	5.0E-03	NA	3.0E-05
7440-66-6	Zinc	3.1E+01	NA	NA	0.1	2.2E-06	NA	3.0E-01	NA	7.3E-06

	Cancer Risk	Hazard Index
TOTAL:	9.4E-08	3.1E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 11
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-3 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	1.9E-01	2.1E-07	5.6E-07	1.0E-04	2.0E-02	2E-11	2.8E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.3E-11	6.0E-11	3.3E+01	2.0E-06	8E-10	3.0E-05
Metals								
7440-39-3	Barium	2.6E+01	2.9E-05	7.6E-05	NA	5.0E-01	NA	1.5E-04
7439-92-1	Lead	5.7E+01	6.4E-05	1.7E-04	NA	1.0E+00	NA	1.7E-04
7439-97-6	Mercury	9.8E-02	1.1E-07	2.8E-07	NA	3.0E-01	NA	9.5E-07
7440-22-4	Silver	7.2E-01	8.1E-07	2.1E-06	NA	1.4E-01	NA	1.5E-05
7440-66-6	Zinc	3.1E+01	3.5E-05	9.1E-05	NA	1.4E+00	NA	6.5E-05

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	7.8E-10	4.6E-04

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 12
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-3 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	1.0E+00	6.43E-10	1.00E+00	1.67E-09	2.0E+00	2.0E-05	1E-09	8.3E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	6.91E-14	1.00E+00	1.79E-13	1.5E+05	7.0E-10	1E-08	2.6E-04
Metals										
7440-39-3	Barium	2.6E+01	NC	NA	1.00E+00	2.27E-07	NA	2.0E-01	NA	1.1E-06
7439-92-1	Lead	5.7E+01	NC	NA	5.00E-01	2.50E-07	NA	7.5E-04	NA	3.3E-04
7439-97-6	Mercury	9.8E-02	NC	NA	5.00E-01	4.27E-10	NA	3.0E-04	NA	1.4E-06
7440-22-4	Silver	7.2E-01	NC	NA	1.00E+00	6.28E-09	NA	5.0E-03	NA	1.3E-06
7440-66-6	Zinc	3.1E+01	NC	NA	1.00E+00	2.73E-07	NA	3.0E-01	NA	9.1E-07

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.2E-08	6.8E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 13
Adult Staff - 0-1'
Incidential Ingestion of Surface Soil
HS-4 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.1E-01	1	1.4E-08	1	3.6E-08	2.0E+00	2.0E-05	3E-08	1.8E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1	2.7E-12	1	6.9E-12	1.5E+05	7.0E-10	4E-07	9.9E-03
Metals										
7439-92-1	Lead	5.2E+01	NC	NA	0.5	8.8E-06	NA	7.5E-04	NA	1.2E-02
7440-22-4	Silver	5.3E-01	NC	NA	1	1.8E-07	NA	5.0E-03	NA	3.5E-05

	Cancer Risk	Hazard Index
TOTAL:	4.3E-07	2.3E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 14
Adult Staff - 0-1'
Dermal Contact with Surface Soil
HS-4 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.1E-01	0.1	2.9E-09	0.1	7.6E-09	2.0E+00	2.0E-05	6E-09	3.8E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	5.6E-13	0.1	1.4E-12	1.5E+05	7.0E-10	8E-08	2.1E-03
Metals										
7439-92-1	Lead	5.2E+01	NA	NA	0.006	2.2E-07	NA	7.5E-04	NA	2.9E-04
7440-22-4	Silver	5.3E-01	NA	NA	0.3	1.1E-07	NA	5.0E-03	NA	2.2E-05

	Cancer Risk	Hazard Index
TOTAL:	8.9E-08	2.8E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 15
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-4 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	1.1E-01	1.2E-07	3.1E-07	1.0E-04	2.0E-02	1E-11	1.6E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.3E-11	6.0E-11	3.3E+01	2.0E-06	8E-10	3.0E-05
Metals								
7439-92-1	Lead	5.2E+01	5.9E-05	1.5E-04	NA	1.0E+00	NA	1.5E-04
7440-22-4	Silver	5.3E-01	5.9E-07	1.5E-06	NA	1.4E-01	NA	1.1E-05

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	7.7E-10	2.1E-04

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 16
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-4 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	1.1E-01	1.0E+00	3.63E-10	1.00E+00	9.41E-10	2.0E+00	2.0E-05	7E-10	4.7E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	6.91E-14	1.00E+00	1.79E-13	1.5E+05	7.0E-10	1E-08	2.6E-04
Metals										
7439-92-1	Lead	5.2E+01	NC	NA	5.00E-01	2.28E-07	NA	7.5E-04	NA	3.0E-04
7440-22-4	Silver	5.3E-01	NC	NA	1.00E+00	4.60E-09	NA	5.0E-03	NA	9.2E-07

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.1E-08	6.1E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 17
Adult Staff - 0-1'
Incidential Ingestion of Surface Soil
HS-6 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	4.5E-01	0.3	1.8E-08	0.3	4.6E-08	7.3E-01	3.0E-02	1E-08	1.5E-06
205-99-2	Benzo(b)fluoranthene	4.8E-01	0.3	1.9E-08	0.3	4.8E-08	7.3E-01	3.0E-02	1E-08	1.6E-06
206-44-0	Fluoranthene	9.0E-01	NC	NA	0.3	9.1E-08	NA	4.0E-02	NA	2.3E-06
85-01-8	Phenanthrene	6.8E-01	NC	NA	0.3	6.9E-08	NA	3.0E-02	NA	2.3E-06
129-00-0	Pyrene	9.3E-01	NC	NA	0.3	9.4E-08	NA	3.0E-02	NA	3.1E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	2.7E-01	1	3.5E-08	1	9.0E-08	2.0E+00	2.0E-05	7E-08	4.5E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1	2.7E-12	1	6.9E-12	1.5E+05	7.0E-10	4E-07	9.9E-03
Metals										
7440-39-3	Barium	5.3E+01	NC	NA	1	1.8E-05	NA	2.0E-01	NA	9.0E-05
7439-92-1	Lead	4.9E+01	NC	NA	0.5	8.2E-06	NA	7.5E-04	NA	1.1E-02
7440-66-6	Zinc	5.2E+01	NC	NA	1	1.7E-05	NA	3.0E-01	NA	5.8E-05

	Cancer Risk	Hazard Index
TOTAL:	5.0E-07	2.6E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 18
Adult Staff - 0-1'
Dermal Contact with Surface Soil
HS-6 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
56-55-3	Benzo(a)anthracene	4.5E-01	0.02	2.5E-09	0.02	6.4E-09	7.3E-01	3.0E-02	2E-09	2.1E-07
205-99-2	Benzo(b)fluoranthene	4.8E-01	0.02	2.6E-09	0.02	6.7E-09	7.3E-01	3.0E-02	2E-09	2.2E-07
206-44-0	Fluoranthene	9.0E-01	NA	NA	0.1	6.3E-08	NA	4.0E-02	NA	1.6E-06
85-01-8	Phenanthrene	6.8E-01	NA	NA	0.1	4.8E-08	NA	3.0E-02	NA	1.6E-06
129-00-0	Pyrene	9.3E-01	NA	NA	0.1	6.5E-08	NA	3.0E-02	NA	2.2E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	2.7E-01	0.1	7.3E-09	0.1	1.9E-08	2.0E+00	2.0E-05	1E-08	9.4E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	5.6E-13	0.1	1.4E-12	1.5E+05	7.0E-10	8E-08	2.1E-03
Metals										
7440-39-3	Barium	5.3E+01	NA	NA	0.1	3.7E-06	NA	2.0E-01	NA	1.9E-05
7439-92-1	Lead	4.9E+01	NA	NA	0.006	2.1E-07	NA	7.5E-04	NA	2.7E-04
7440-66-6	Zinc	5.2E+01	NA	NA	0.1	3.6E-06	NA	3.0E-01	NA	1.2E-05

	Cancer Risk	Hazard Index
TOTAL:	1.0E-07	3.3E-03

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 19
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-6 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
56-55-3	Benzo(a)anthracene	4.5E-01	5.1E-07	1.3E-06	2.1E-04	5.0E+01	1E-10	2.6E-08
205-99-2	Benzo(b)fluoranthene	4.8E-01	5.3E-07	1.4E-06	2.1E-04	5.0E+01	1E-10	2.8E-08
206-44-0	Fluoranthene	9.0E-01	1.0E-06	2.6E-06	NA	5.0E+01	NA	5.2E-08
85-01-8	Phenanthrene	6.8E-01	7.7E-07	2.0E-06	NA	5.0E+01	NA	4.0E-08
129-00-0	Pyrene	9.3E-01	1.0E-06	2.7E-06	NA	5.0E+01	NA	5.4E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	2.7E-01	3.0E-07	7.8E-07	1.0E-04	2.0E-02	3E-11	3.9E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.3E-11	6.0E-11	3.3E+01	2.0E-06	8E-10	3.0E-05
Metals								
7440-39-3	Barium	5.3E+01	6.0E-05	1.6E-04	NA	5.0E-01	NA	3.1E-04
7439-92-1	Lead	4.9E+01	5.5E-05	1.4E-04	NA	1.0E+00	NA	1.4E-04
7440-66-6	Zinc	5.2E+01	5.8E-05	1.5E-04	NA	1.4E+00	NA	1.1E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.0E-09	6.3E-04

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 20
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-6 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
56-55-3	Benzo(a)anthracene	4.5E-01	3.0E-01	4.58E-10	3.00E-01	1.19E-09	7.3E-01	3.0E-02	3E-10	4.0E-08
205-99-2	Benzo(b)fluoranthene	4.8E-01	3.0E-01	4.80E-10	3.00E-01	1.24E-09	7.3E-01	3.0E-02	4E-10	4.1E-08
206-44-0	Fluoranthene	9.0E-01	NC	NA	3.00E-01	2.35E-09	NA	4.0E-02	NA	5.9E-08
85-01-8	Phenanthrene	6.8E-01	NC	NA	3.00E-01	1.79E-09	NA	3.0E-02	NA	6.0E-08
129-00-0	Pyrene	9.3E-01	NC	NA	3.00E-01	2.44E-09	NA	3.0E-02	NA	8.1E-08
Dioxins/PCBs										
1336-36-3	Total PCBs	2.7E-01	1.0E+00	9.04E-10	1.00E+00	2.34E-09	2.0E+00	2.0E-05	2E-09	1.2E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	6.91E-14	1.00E+00	1.79E-13	1.5E+05	7.0E-10	1E-08	2.6E-04
Metals										
7440-39-3	Barium	5.3E+01	NC	NA	1.00E+00	4.66E-07	NA	2.0E-01	NA	2.3E-06
7439-92-1	Lead	4.9E+01	NC	NA	5.00E-01	2.13E-07	NA	7.5E-04	NA	2.8E-04
7440-66-6	Zinc	5.2E+01	NC	NA	1.00E+00	4.52E-07	NA	3.0E-01	NA	1.5E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.3E-08	6.6E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 21
Adult Staff - 0-1'
Incidential Ingestion of Surface Soil
HS-7 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.8E-01	1	3.6E-08	1	9.3E-08	2.0E+00	2.0E-05	7E-08	4.6E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1	2.7E-12	1	6.9E-12	1.5E+05	7.0E-10	4E-07	9.9E-03
Metals										
7440-39-3	Barium	7.1E+01	NC	NA	1	2.4E-05	NA	2.0E-01	NA	1.2E-04
7440-43-9	Cadmium	6.2E-01	NC	NA	1	2.1E-07	NA	5.0E-04	NA	4.1E-04
16065-83-1	Chromium III	1.3E+01	NC	NA	1	4.5E-06	NA	1.5E+00	NA	3.0E-06
7439-92-1	Lead	1.1E+02	NC	NA	0.5	1.9E-05	NA	7.5E-04	NA	2.5E-02
7440-66-6	Zinc	8.1E+01	NC	NA	1	2.7E-05	NA	3.0E-01	NA	9.1E-05

	Cancer Risk	Hazard Index
TOTAL:	4.7E-07	4.0E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 22
Adult Staff - 0-1'
Dermal Contact with Surface Soil
HS-7 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.8E-01	0.1	7.4E-09	0.1	1.9E-08	2.0E+00	2.0E-05	1E-08	9.6E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	5.6E-13	0.1	1.4E-12	1.5E+05	7.0E-10	8E-08	2.1E-03
Metals										
7440-39-3	Barium	7.1E+01	NA	NA	0.1	4.9E-06	NA	2.0E-01	NA	2.5E-05
7440-43-9	Cadmium	6.2E-01	NA	NA	0.01	4.3E-09	NA	5.0E-04	NA	8.6E-06
16065-83-1	Chromium III	1.3E+01	NA	NA	0.1	9.3E-07	NA	1.5E+00	NA	6.2E-07
7439-92-1	Lead	1.1E+02	NA	NA	0.006	4.7E-07	NA	7.5E-04	NA	6.2E-04
7440-66-6	Zinc	8.1E+01	NA	NA	0.1	5.7E-06	NA	3.0E-01	NA	1.9E-05

	Cancer Risk	Hazard Index
TOTAL:	9.8E-08	3.7E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 23
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-7 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	2.8E-01	3.1E-07	8.0E-07	1.0E-04	2.0E-02	3E-11	4.0E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.3E-11	6.0E-11	3.3E+01	2.0E-06	8E-10	3.0E-05
Metals								
7440-39-3	Barium	7.1E+01	7.9E-05	2.0E-04	NA	5.0E-01	NA	4.1E-04
7440-43-9	Cadmium	6.2E-01	6.9E-07	1.8E-06	1.8E-03	2.0E-02	1E-09	9.0E-05
16065-83-1	Chromium III	1.3E+01	1.5E-05	3.9E-05	NA	1.0E-01	NA	3.9E-04
7439-92-1	Lead	1.1E+02	1.2E-04	3.2E-04	NA	1.0E+00	NA	3.2E-04
7440-66-6	Zinc	8.1E+01	9.1E-05	2.4E-04	NA	1.4E+00	NA	1.7E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.0E-09	1.4E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 24
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-7 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.8E-01	1.0E+00	9.25E-10	1.00E+00	2.40E-09	2.0E+00	2.0E-05	2E-09	1.2E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	6.91E-14	1.00E+00	1.79E-13	1.5E+05	7.0E-10	1E-08	2.6E-04
Metals										
7440-39-3	Barium	7.1E+01	NC	NA	1.00E+00	6.15E-07	NA	2.0E-01	NA	3.1E-06
7440-43-9	Cadmium	6.2E-01	NC	NA	1.00E+00	5.38E-09	NA	5.0E-04	NA	1.1E-05
16065-83-1	Chromium III	1.3E+01	NC	NA	1.00E+00	1.16E-07	NA	1.5E+00	NA	7.7E-08
7439-92-1	Lead	1.1E+02	NC	NA	5.00E-01	4.83E-07	NA	7.5E-04	NA	6.4E-04
7440-66-6	Zinc	8.1E+01	NC	NA	1.00E+00	7.10E-07	NA	3.0E-01	NA	2.4E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.2E-08	1.0E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 25
Adult Solar Worker - 0-1'
Incidential Ingestion of Surface Soil
HS-8 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	Di-n-butlyphthalate	9.5E-02	NC	NA	1	1.3E-08	NA	1.0E-01	NA	1.3E-07
117-81-7	bis(2-Ethylhexyl)phthalate	7.8E-02	1	4.0E-09	1	1.0E-08	1.4E-02	2.0E-02	6E-11	5.2E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	1.0E+00	1	5.4E-08	1	1.4E-07	2.0E+00	2.0E-05	1E-07	7.0E-03
1746-01-6	Dioxin/PCB TEQ	1.5E-05	1	7.5E-13	1	2.0E-12	1.5E+05	7.0E-10	1E-07	2.8E-03
Metals										
7440-39-3	Barium	9.9E+01	NC	NA	1	1.3E-05	NA	2.0E-01	NA	6.7E-05
7440-43-9	Cadmium	6.1E-01	NC	NA	1	8.2E-08	NA	5.0E-04	NA	1.6E-04
16065-83-1	Chromium III	2.0E+01	NC	NA	1	2.6E-06	NA	1.5E+00	NA	1.8E-06
7439-92-1	Lead	1.2E+02	NC	NA	0.5	7.9E-06	NA	7.5E-04	NA	1.1E-02
7439-97-6	Mercury	1.4E-01	NC	NA	0.5	9.3E-09	NA	3.0E-04	NA	3.1E-05
7440-66-6	Zinc	7.4E+01	NC	NA	1	1.0E-05	NA	3.0E-01	NA	3.3E-05

	Cancer Risk	Hazard Index
TOTAL:	2.2E-07	2.1E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 26
Adult Solar Worker - 0-1'
Dermal Contact with Surface Soil
HS-8 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
84-74-2	Di-n-butlyphthalate	9.5E-02	NA	NA	0.07	1.9E-09	NA	1.0E-01	NA	1.9E-08
117-81-7	bis(2-Ethylhexyl)phthalate	7.8E-02	0.1	8.4E-10	0.1	2.2E-09	1.4E-02	2.0E-02	1E-11	1.1E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	1.0E+00	0.1	1.1E-08	0.1	2.9E-08	2.0E+00	2.0E-05	2E-08	1.5E-03
1746-01-6	Dioxin/PCB TEQ	1.5E-05	0.1	1.6E-13	0.1	4.1E-13	1.5E+05	7.0E-10	2E-08	5.8E-04
Metals										
7440-39-3	Barium	9.9E+01	NA	NA	0.1	2.8E-06	NA	2.0E-01	NA	1.4E-05
7440-43-9	Cadmium	6.1E-01	NA	NA	0.01	1.7E-09	NA	5.0E-04	NA	3.4E-06
16065-83-1	Chromium III	2.0E+01	NA	NA	0.1	5.5E-07	NA	1.5E+00	NA	3.7E-07
7439-92-1	Lead	1.2E+02	NA	NA	0.006	2.0E-07	NA	7.5E-04	NA	2.6E-04
7439-97-6	Mercury	1.4E-01	NA	NA	0.1	3.9E-09	NA	3.0E-04	NA	1.3E-05
7440-66-6	Zinc	7.4E+01	NA	NA	0.1	2.1E-06	NA	3.0E-01	NA	7.0E-06

	Cancer Risk	Hazard Index
TOTAL:	4.6E-08	2.3E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 27
Adult Solar Worker - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-8 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
84-74-2	Di-n-butlyphthalate	9.5E-02	4.3E-08	1.1E-07	NA	3.5E+02	NA	3.2E-10
117-81-7	bis(2-Ethylhexyl)phthalate	7.8E-02	3.5E-08	9.1E-08	1.3E-06	7.0E+00	5E-14	1.3E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.0E+00	4.7E-07	1.2E-06	1.0E-04	2.0E-02	5E-11	6.1E-05
1746-01-6	Dioxin/PCB TEQ	1.5E-05	6.5E-12	1.7E-11	3.3E+01	2.0E-06	2E-10	8.4E-06
Metals								
7440-39-3	Barium	9.9E+01	4.5E-05	1.2E-04	NA	5.0E-01	NA	2.3E-04
7440-43-9	Cadmium	6.1E-01	2.7E-07	7.1E-07	1.8E-03	2.0E-02	5E-10	3.5E-05
16065-83-1	Chromium III	2.0E+01	8.8E-06	2.3E-05	NA	1.0E-01	NA	2.3E-04
7439-92-1	Lead	1.2E+02	5.3E-05	1.4E-04	NA	1.0E+00	NA	1.4E-04
7439-97-6	Mercury	1.4E-01	6.2E-08	1.6E-07	NA	3.0E-01	NA	5.4E-07
7440-66-6	Zinc	7.4E+01	3.3E-05	8.7E-05	NA	1.4E+00	NA	6.2E-05

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	7.5E-10	7.6E-04

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 28
Adult Solar Worker - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-8 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	Di-n-butlyphthalate	9.5E-02	NC	NA	1.00E+00	3.31E-10	NA	1.0E-01	NA	3.3E-09
117-81-7	bis(2-Ethylhexyl)phthalate	7.8E-02	1.0E+00	1.05E-10	1.00E+00	2.72E-10	1.4E-02	2.0E-02	1E-12	1.4E-08
Dioxins/PCBs										
1336-36-3	Total PCBs	1.0E+00	1.0E+00	1.40E-09	1.00E+00	3.64E-09	2.0E+00	2.0E-05	3E-09	1.8E-04
1746-01-6	Dioxin/PCB TEQ	1.5E-05	1.0E+00	1.95E-14	1.00E+00	5.07E-14	1.5E+05	7.0E-10	3E-09	7.2E-05
Metals										
7440-39-3	Barium	9.9E+01	NC	NA	1.00E+00	3.47E-07	NA	2.0E-01	NA	1.7E-06
7440-43-9	Cadmium	6.1E-01	NC	NA	1.00E+00	2.12E-09	NA	5.0E-04	NA	4.2E-06
16065-83-1	Chromium III	2.0E+01	NC	NA	1.00E+00	6.84E-08	NA	1.5E+00	NA	4.6E-08
7439-92-1	Lead	1.2E+02	NC	NA	5.00E-01	2.05E-07	NA	7.5E-04	NA	2.7E-04
7439-97-6	Mercury	1.4E-01	NC	NA	5.00E-01	2.42E-10	NA	3.0E-04	NA	8.1E-07
7440-66-6	Zinc	7.4E+01	NC	NA	1.00E+00	2.60E-07	NA	3.0E-01	NA	8.7E-07

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	5.7E-09	5.4E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 29
Adult Staff - 0-1'
Incidential Ingestion of Surface Soil
HS-10 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	6.6E-01	1	8.5E-08	1	2.2E-07	2.0E+00	2.0E-05	2E-07	1.1E-02
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1	2.7E-12	1	6.9E-12	1.5E+05	7.0E-10	4E-07	9.9E-03
Metals										
7440-39-3	Barium	1.9E+02	NC	NA	1	6.4E-05	NA	2.0E-01	NA	3.2E-04
7440-43-9	Cadmium	7.5E-01	NC	NA	1	2.5E-07	NA	5.0E-04	NA	5.1E-04
16065-83-1	Chromium III	2.3E+01	NC	NA	1	7.6E-06	NA	1.5E+00	NA	5.1E-06
7439-92-1	Lead	1.2E+02	NC	NA	0.5	1.9E-05	NA	7.5E-04	NA	2.6E-02

	Cancer Risk	Hazard Index
TOTAL:	5.7E-07	4.8E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 30
Adult Staff - 0-1'
Dermal Contact with Surface Soil
HS-10 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
Dioxins/PCBs										
1336-36-3	Total PCBs	6.6E-01	0.1	1.8E-08	0.1	4.6E-08	2.0E+00	2.0E-05	4E-08	2.3E-03
1746-01-6	Dioxin/PCB TEQ	2.1E-05	0.1	5.6E-13	0.1	1.4E-12	1.5E+05	7.0E-10	8E-08	2.1E-03
Metals										
7440-39-3	Barium	1.9E+02	NA	NA	0.1	1.3E-05	NA	2.0E-01	NA	6.7E-05
7440-43-9	Cadmium	7.5E-01	NA	NA	0.01	5.3E-09	NA	5.0E-04	NA	1.1E-05
16065-83-1	Chromium III	2.3E+01	NA	NA	0.1	1.6E-06	NA	1.5E+00	NA	1.1E-06
7439-92-1	Lead	1.2E+02	NA	NA	0.006	4.8E-07	NA	7.5E-04	NA	6.5E-04

	Cancer Risk	Hazard Index
TOTAL:	1.2E-07	5.1E-03

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 31
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-10 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	6.6E-01	7.4E-07	1.9E-06	1.0E-04	2.0E-02	7E-11	9.6E-05
1746-01-6	Dioxin/PCB TEQ	2.1E-05	2.3E-11	6.0E-11	3.3E+01	2.0E-06	8E-10	3.0E-05
Metals								
7440-39-3	Barium	1.9E+02	2.1E-04	5.5E-04	NA	5.0E-01	NA	1.1E-03
7440-43-9	Cadmium	7.5E-01	8.4E-07	2.2E-06	1.8E-03	2.0E-02	2E-09	1.1E-04
16065-83-1	Chromium III	2.3E+01	2.5E-05	6.6E-05	NA	1.0E-01	NA	6.6E-04
7439-92-1	Lead	1.2E+02	1.3E-04	3.3E-04	NA	1.0E+00	NA	3.3E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.4E-09	2.3E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 32
Adult Staff - 0-1'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-10 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	6.6E-01	1.0E+00	2.21E-09	1.00E+00	5.73E-09	2.0E+00	2.0E-05	4E-09	2.9E-04
1746-01-6	Dioxin/PCB TEQ	2.1E-05	1.0E+00	6.91E-14	1.00E+00	1.79E-13	1.5E+05	7.0E-10	1E-08	2.6E-04
Metals										
7440-39-3	Barium	1.9E+02	NC	NA	1.00E+00	1.66E-06	NA	2.0E-01	NA	8.3E-06
7440-43-9	Cadmium	7.5E-01	NC	NA	1.00E+00	6.56E-09	NA	5.0E-04	NA	1.3E-05
16065-83-1	Chromium III	2.3E+01	NC	NA	1.00E+00	1.97E-07	NA	1.5E+00	NA	1.3E-07
7439-92-1	Lead	1.2E+02	NC	NA	5.00E-01	5.02E-07	NA	7.5E-04	NA	6.7E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.5E-08	1.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

APPENDIX C-6

RISK AND HAZARD CALCULATIONS FOR 0 TO 3 FOOT SOIL INTERVAL

Table 1
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-1 (0-3')
New Bedford, Massachusetts

Constituent		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	1.0E+00	3.2E-10	1.0E+00	5.2E-09	2.0E+00	5.0E-05	6E-10	1.0E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	1.4E-12	1.0E+00	2.3E-11	1.5E+05	7.0E-10	2E-07	3.3E-02

	Cancer Risk	Hazard Index
TOTAL:	2.1E-07	3.3E-02

NA = Not Applicable
NC = No Criteria
Where:

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 2
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-1 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	5.9E-03	0.1	4.9E-10	0.1	6.4E-09	2.0E+00	5.0E-05	1E-09	1.3E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.1E-12	0.1	2.8E-11	1.5E+05	7.0E-10	3E-07	4.0E-02

	Cancer Risk	Hazard Index
TOTAL:	3.2E-07	4.0E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 3
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-1 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	5.9E-03	1.9E-09	2.1E-08	1.0E-04	2.0E-02	2E-13	1.1E-06
1746-01-6	Dioxin/PCB TEQ	2.6E-05	8.4E-12	9.3E-11	3.3E+01	2.0E-06	3E-10	4.7E-05

	Cancer Risk	Hazard Index
TOTAL:	2.8E-10	4.8E-05

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 4
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-1 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	5.9E-03	1.0E+00	1.64E-12	1.00E+00	1.83E-11	2.0E+00	5.0E-05	3E-12	3.7E-07
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	7.17E-15	1.00E+00	7.98E-14	1.5E+05	7.0E-10	1E-09	1.1E-04

	Cancer Risk	Hazard Index
TOTAL:	1.1E-09	1.1E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 5
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-2 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.0E+00	1.5E-07	NA	9.0E-02	NA	1.7E-06
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.9E-01	1.8E-07	NA	8.0E-04	NA	2.3E-04
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.0E-01	4.2E-08	NA	2.0E-01	NA	2.1E-07
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.0E-01	3.9E-08	NA	3.0E-01	NA	1.3E-07
120-12-7	Anthracene	3.3E-01	NC	NA	3.0E-01	8.8E-08	NA	1.0E+00	NA	8.8E-08
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	1.0E-08	3.0E-01	1.6E-07	7.3E-01	3.0E-01	7E-09	5.4E-07
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	8.7E-09	3.0E-01	1.4E-07	7.3E+00	3.0E-01	6E-08	4.7E-07
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	9.3E-09	3.0E-01	1.5E-07	7.3E-01	3.0E-01	7E-09	5.0E-07
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.0E-01	9.6E-08	NA	3.0E-01	NA	3.2E-07
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	4.4E-09	3.0E-01	7.1E-08	7.3E-02	3.0E-01	3E-10	2.4E-07
218-01-9	Chrysene	5.9E-01	3.0E-01	9.7E-09	3.0E-01	1.6E-07	7.3E-02	3.0E-01	7E-10	5.2E-07
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	2.3E-09	3.0E-01	3.8E-08	7.3E+00	3.0E-01	2E-08	1.3E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.0E-01	3.2E-07	NA	4.0E-01	NA	7.9E-07
86-73-7	Fluorene	2.1E-01	NC	NA	3.0E-01	5.5E-08	NA	4.0E-01	NA	1.4E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	6.8E-09	3.0E-01	1.1E-07	7.3E-01	3.0E-01	5E-09	3.7E-07
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.0E-01	3.6E-08	NA	4.0E-03	NA	8.9E-06
91-20-3	Naphthalene	1.6E-01	NC	NA	3.0E-01	4.2E-08	NA	2.0E-01	NA	2.1E-07
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.0E-01	3.3E-07	NA	3.0E-01	NA	1.1E-06
129-00-0	Pyrene	1.2E+00	NC	NA	3.0E-01	3.1E-07	NA	3.0E-01	NA	1.0E-06
C9-C10	GRO	1.5E+01	NC	NA	1.0E+00	1.3E-05	NA	3.0E-01	NA	4.3E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	4.6E-01	1.0E+00	2.5E-08	1.0E+00	4.1E-07	2.0E+00	5.0E-05	5E-08	8.2E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	1.4E-12	1.0E+00	2.3E-11	1.5E+05	7.0E-10	2E-07	3.3E-02
Metals										
7440-39-3	Barium	7.3E+01	NC	NA	1.0E+00	6.5E-05	NA	7.0E-02	NA	9.3E-04
7440-41-7	Beryllium	1.6E-01	NC	NA	1.0E+00	1.5E-07	NA	5.0E-03	NA	2.9E-05
7440-43-9	Cadmium	4.9E-01	NC	NA	1.0E+00	4.3E-07	NA	5.0E-04	NA	8.6E-04
16065-83-1	Chromium III	1.2E+01	NC	NA	1.0E+00	1.1E-05	NA	1.5E+00	NA	7.3E-06
7439-92-1	Lead	1.1E+02	NC	NA	5.0E-01	4.9E-05	NA	7.5E-04	NA	6.6E-02
7439-97-6	Mercury	1.2E-01	NC	NA	5.0E-01	5.5E-08	NA	3.0E-04	NA	1.8E-04
7440-02-0	Nickel	8.5E+00	NC	NA	1.0E+00	7.5E-06	NA	2.0E-02	NA	3.8E-04
7440-22-4	Silver	1.6E+00	NC	NA	1.0E+00	1.4E-06	NA	5.0E-03	NA	2.8E-04
7440-62-2	Vanadium	1.4E+01	NC	NA	1.0E+00	1.3E-05	NA	9.0E-03	NA	1.4E-03
7440-66-6	Zinc	6.8E+01	NC	NA	1.0E+00	6.0E-05	NA	3.0E-01	NA	2.0E-04

	Cancer Risk	Hazard Index
TOTAL:	3.6E-07	1.1E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 6
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-2 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	0.03	5.5E-08	NA	9.0E-02	NA	6.1E-07
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	0.11	2.5E-07	NA	8.0E-04	NA	3.1E-04
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	0.1	1.7E-07	NA	2.0E-01	NA	8.5E-07
208-96-8	Acenaphthylene	1.5E-01	NC	NA	0.1	1.6E-07	NA	3.0E-01	NA	5.3E-07
120-12-7	Anthracene	3.3E-01	NC	NA	0.1	3.6E-07	NA	1.0E+00	NA	3.6E-07
56-55-3	Benzo(a)anthracene	6.1E-01	0.02	1.0E-08	0.02	1.3E-07	7.3E-01	3.0E-01	7E-09	4.4E-07
50-32-8	Benzo(a)pyrene	5.3E-01	0.02	8.8E-09	0.02	1.1E-07	7.3E+00	3.0E-01	6E-08	3.8E-07
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.02	9.4E-09	0.02	1.2E-07	7.3E-01	3.0E-01	7E-09	4.1E-07
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	0.1	3.9E-07	NA	3.0E-01	NA	1.3E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.02	4.4E-09	0.02	5.8E-08	7.3E-02	3.0E-01	3E-10	1.9E-07
218-01-9	Chrysene	5.9E-01	0.02	9.8E-09	0.02	1.3E-07	7.3E-02	3.0E-01	7E-10	4.3E-07
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.02	2.4E-09	0.02	3.1E-08	7.3E+00	3.0E-01	2E-08	1.0E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	0.1	1.3E-06	NA	4.0E-01	NA	3.2E-06
86-73-7	Fluorene	2.1E-01	NC	NA	0.1	2.3E-07	NA	4.0E-01	NA	5.6E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.02	6.9E-09	0.02	9.0E-08	7.3E-01	3.0E-01	5E-09	3.0E-07
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	0.1	1.5E-07	NA	4.0E-03	NA	3.6E-05
91-20-3	Naphthalene	1.6E-01	NC	NA	0.1	1.7E-07	NA	2.0E-01	NA	8.6E-07
85-01-8	Phenanthrene	1.3E+00	NC	NA	0.1	1.4E-06	NA	3.0E-01	NA	4.5E-06
129-00-0	Pyrene	1.2E+00	NC	NA	0.1	1.3E-06	NA	3.0E-01	NA	4.3E-06
C9-C10	GRO	1.5E+01	NC	NA	0.2	3.2E-05	NA	3.0E-01	NA	1.1E-04
1336-36-3	Total PCBs	4.6E-01	0.1	3.8E-08	0.1	5.0E-07	2.0E+00	5.0E-05	8E-08	1.0E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.1E-12	0.1	2.8E-11	1.5E+05	7.0E-10	3E-07	4.0E-02
7440-39-3	Barium	7.3E+01	NC	NA	0.1	8.0E-05	NA	7.0E-02	NA	1.1E-03
7440-41-7	Beryllium	1.6E-01	NC	NA	0.1	1.8E-07	NA	5.0E-03	NA	3.6E-05
7440-43-9	Cadmium	4.9E-01	NC	NA	0.01	5.3E-08	NA	5.0E-04	NA	1.1E-04
16065-83-1	Chromium III	1.2E+01	NC	NA	0.1	1.3E-05	NA	1.5E+00	NA	9.0E-06
7439-92-1	Lead	1.1E+02	NC	NA	0.006	7.3E-06	NA	7.5E-04	NA	9.7E-03
7439-97-6	Mercury	1.2E-01	NC	NA	0.1	1.3E-07	NA	3.0E-04	NA	4.5E-04
7440-02-0	Nickel	8.5E+00	NC	NA	0.2	1.8E-05	NA	2.0E-02	NA	9.2E-04
7440-22-4	Silver	1.6E+00	NC	NA	0.3	5.2E-06	NA	5.0E-03	NA	1.0E-03
7440-62-2	Vanadium	1.4E+01	NC	NA	0.1	1.6E-05	NA	9.0E-03	NA	1.7E-03
7440-66-6	Zinc	6.8E+01	NC	NA	0.1	7.4E-05	NA	3.0E-01	NA	2.5E-04

	Cancer Risk	Hazard Index
TOTAL:	5.0E-07	6.6E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 7
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-2 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	5.5E-08	6.2E-07	NA	2.0E+01	NA	3.1E-08
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	6.8E-08	7.6E-07	NA	2.8E+00	NA	2.7E-07
SVOCs								
83-32-9	Acenaphthene	1.6E-01	5.1E-08	5.7E-07	NA	5.0E+02	NA	1.1E-09
208-96-8	Acenaphthylene	1.5E-01	4.7E-08	5.3E-07	NA	5.0E+02	NA	1.1E-09
120-12-7	Anthracene	3.3E-01	1.1E-07	1.2E-06	NA	5.0E+02	NA	2.4E-09
56-55-3	Benzo(a)anthracene	6.1E-01	2.0E-07	2.2E-06	2.1E-04	5.0E+02	4E-11	4.4E-09
50-32-8	Benzo(a)pyrene	5.3E-01	1.7E-07	1.9E-06	2.1E-03	5.0E+02	4E-10	3.8E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	1.8E-07	2.1E-06	2.1E-04	5.0E+02	4E-11	4.1E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	1.2E-07	1.3E-06	NA	5.0E+02	NA	2.6E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	8.7E-08	9.7E-07	2.1E-05	5.0E+02	2E-12	1.9E-09
218-01-9	Chrysene	5.9E-01	1.9E-07	2.1E-06	2.1E-05	5.0E+02	4E-12	4.3E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	4.6E-08	5.1E-07	2.1E-03	5.0E+02	1E-10	1.0E-09
206-44-0	Fluoranthene	1.2E+00	3.9E-07	4.3E-06	NA	5.0E+02	NA	8.6E-09
86-73-7	Fluorene	2.1E-01	6.8E-08	7.5E-07	NA	5.0E+02	NA	1.5E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	1.4E-07	1.5E-06	2.1E-04	5.0E+02	3E-11	3.0E-09
91-57-6	2-Methylnaphthalene	1.3E-01	4.4E-08	4.9E-07	NA	5.0E+02	NA	9.7E-10
91-20-3	Naphthalene	1.6E-01	5.2E-08	5.7E-07	NA	3.0E+00	NA	1.9E-07
85-01-8	Phenanthrene	1.3E+00	4.1E-07	4.6E-06	NA	5.0E+02	NA	9.1E-09
129-00-0	Pyrene	1.2E+00	3.8E-07	4.3E-06	NA	5.0E+02	NA	8.5E-09
C9-C10	GRO	1.5E+01	4.8E-06	5.3E-05	NA	5.0E+02	NA	1.1E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	4.6E-01	1.5E-07	1.7E-06	1.0E-04	2.0E-02	2E-11	8.4E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	8.4E-12	9.3E-11	3.3E+01	2.0E-06	3E-10	4.7E-05
Metals								
7440-39-3	Barium	7.3E+01	2.4E-05	2.7E-04	NA	5.0E+00	NA	5.3E-05
7440-41-7	Beryllium	1.6E-01	5.3E-08	5.9E-07	2.4E-03	2.0E-02	1E-10	3.0E-05
7440-43-9	Cadmium	4.9E-01	1.6E-07	1.8E-06	1.8E-03	2.0E-02	3E-10	8.8E-05
16065-83-1	Chromium III	1.2E+01	4.0E-06	4.5E-05	NA	3.0E-01	NA	1.5E-04
7439-92-1	Lead	1.1E+02	3.6E-05	4.0E-04	NA	1.0E+00	NA	4.0E-04
7439-97-6	Mercury	1.2E-01	4.0E-08	4.5E-07	NA	3.0E-01	NA	1.5E-06
7440-02-0	Nickel	8.5E+00	2.7E-06	3.1E-05	4.8E-04	1.0E+00	1E-09	3.1E-05
7440-22-4	Silver	1.6E+00	5.2E-07	5.7E-06	NA	1.4E-01	NA	4.1E-05
7440-62-2	Vanadium	1.4E+01	4.7E-06	5.2E-05	NA	1.0E+00	NA	5.2E-05
7440-66-6	Zinc	6.8E+01	2.2E-05	2.5E-04	NA	1.4E+00	NA	1.8E-04

	Cancer Risk	Hazard Index
TOTAL:	2.6E-09	1.2E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 8
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-2 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.00E+00	5.27E-10	NA	9.0E-02	NA	5.9E-09
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.90E-01	6.45E-10	NA	8.0E-04	NA	8.1E-07
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.00E-01	1.47E-10	NA	2.0E-01	NA	7.3E-10
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.00E-01	1.36E-10	NA	3.0E-01	NA	4.5E-10
120-12-7	Anthracene	3.3E-01	NC	NA	3.00E-01	3.07E-10	NA	1.0E+00	NA	3.1E-10
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	5.06E-11	3.00E-01	5.64E-10	7.3E-01	3.0E-01	4E-11	1.9E-09
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	4.41E-11	3.00E-01	4.91E-10	7.3E+00	3.0E-01	3E-10	1.6E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	4.74E-11	3.00E-01	5.28E-10	7.3E-01	3.0E-01	3E-11	1.8E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.00E-01	3.37E-10	NA	3.0E-01	NA	1.1E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	2.23E-11	3.00E-01	2.48E-10	7.3E-02	3.0E-01	2E-12	8.3E-10
218-01-9	Chrysene	5.9E-01	3.0E-01	4.92E-11	3.00E-01	5.48E-10	7.3E-02	3.0E-01	4E-12	1.8E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	1.19E-11	3.00E-01	1.32E-10	7.3E+00	3.0E-01	9E-11	4.4E-10
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.00E-01	1.10E-09	NA	4.0E-01	NA	2.8E-09
86-73-7	Fluorene	2.1E-01	NC	NA	3.00E-01	1.94E-10	NA	4.0E-01	NA	4.8E-10
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	3.47E-11	3.00E-01	3.87E-10	7.3E-01	3.0E-01	3E-11	1.3E-09
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.00E-01	1.25E-10	NA	4.0E-03	NA	3.1E-08
91-20-3	Naphthalene	1.6E-01	NC	NA	3.00E-01	1.48E-10	NA	2.0E-01	NA	7.4E-10
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.00E-01	1.17E-09	NA	3.0E-01	NA	3.9E-09
129-00-0	Pyrene	1.2E+00	NC	NA	3.00E-01	1.10E-09	NA	3.0E-01	NA	3.7E-09
C9-C10	GRO	1.5E+01	NC	NA	1.00E+00	4.55E-08	NA	3.0E-01	NA	1.5E-07
1336-36-3	Total PCBs	4.6E-01	1.0E+00	1.29E-10	1.00E+00	1.44E-09	2.0E+00	5.0E-05	3E-10	2.9E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	7.17E-15	1.00E+00	7.98E-14	1.5E+05	7.0E-10	1E-09	1.1E-04
7440-39-3	Barium	7.3E+01	NC	NA	1.00E+00	2.28E-07	NA	7.0E-02	NA	3.3E-06
7440-41-7	Beryllium	1.6E-01	NC	NA	1.00E+00	5.09E-10	NA	5.0E-03	NA	1.0E-07
7440-43-9	Cadmium	4.9E-01	NC	NA	1.00E+00	1.51E-09	NA	5.0E-04	NA	3.0E-06
16065-83-1	Chromium III	1.2E+01	NC	NA	1.00E+00	3.84E-08	NA	1.5E+00	NA	2.6E-08
7439-92-1	Lead	1.1E+02	NC	NA	5.00E-01	1.73E-07	NA	7.5E-04	NA	2.3E-04
7439-97-6	Mercury	1.2E-01	NC	NA	5.00E-01	1.93E-10	NA	3.0E-04	NA	6.4E-07
7440-02-0	Nickel	8.5E+00	NC	NA	1.00E+00	2.63E-08	NA	2.0E-02	NA	1.3E-06
7440-22-4	Silver	1.6E+00	NC	NA	1.00E+00	4.92E-09	NA	5.0E-03	NA	9.8E-07
7440-62-2	Vanadium	1.4E+01	NC	NA	1.00E+00	4.44E-08	NA	9.0E-03	NA	4.9E-06
7440-66-6	Zinc	6.8E+01	NC	NA	1.00E+00	2.10E-07	NA	3.0E-01	NA	7.0E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.8E-09	3.9E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 9
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-3 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	2.0E-09	1.0E+00	3.2E-08	5.5E-02	1.0E-02	1E-10	3.2E-06
108-88-3	Toluene	4.1E-02	NC	NA	1.0E+00	3.6E-08	NA	8.0E-01	NA	4.5E-08
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.0E+00	4.1E-08	NA	3.0E-01	NA	1.4E-07
SVOCs										
120-12-7	Anthracene	4.8E-01	NC	NA	3.0E-01	1.3E-07	NA	1.0E+00	NA	1.3E-07
56-55-3	Benzo(a)anthracene	8.1E-01	3.0E-01	1.3E-08	3.0E-01	2.2E-07	7.3E-01	3.0E-01	1E-08	7.2E-07
50-32-8	Benzo(a)pyrene	8.4E-01	3.0E-01	1.4E-08	3.0E-01	2.2E-07	7.3E+00	3.0E-01	1E-07	7.4E-07
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	1.5E-08	3.0E-01	2.4E-07	7.3E-01	3.0E-01	1E-08	8.1E-07
191-24-2	Benzo(g,h,i)perylene	5.2E-01	NC	NA	3.0E-01	1.4E-07	NA	3.0E-01	NA	4.6E-07
207-08-9	Benzo(k)fluoranthene	2.8E-01	3.0E-01	4.7E-09	3.0E-01	7.5E-08	7.3E-02	3.0E-01	3E-10	2.5E-07
218-01-9	Chrysene	7.8E-01	3.0E-01	1.3E-08	3.0E-01	2.1E-07	7.3E-02	3.0E-01	9E-10	6.9E-07
53-70-3	Dibenz(a,h)anthracene	1.6E-01	3.0E-01	2.6E-09	3.0E-01	4.2E-08	7.3E+00	3.0E-01	2E-08	1.4E-07
206-44-0	Fluoranthene	1.8E+00	NC	NA	3.0E-01	4.9E-07	NA	4.0E-01	NA	1.2E-06
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	3.0E-01	1.1E-08	3.0E-01	1.7E-07	7.3E-01	3.0E-01	8E-09	5.8E-07
91-20-3	Naphthalene	8.0E-01	NC	NA	3.0E-01	2.1E-07	NA	2.0E-01	NA	1.1E-06
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.0E-01	5.0E-07	NA	3.0E-01	NA	1.7E-06
129-00-0	Pyrene	1.7E+00	NC	NA	3.0E-01	4.4E-07	NA	3.0E-01	NA	1.5E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	1.0E+00	1.0E-08	1.0E+00	1.7E-07	2.0E+00	5.0E-05	2E-08	3.4E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	1.4E-12	1.0E+00	2.3E-11	1.5E+05	7.0E-10	2E-07	3.3E-02
Metals										
7440-39-3	Barium	1.4E+02	NC	NA	1.0E+00	1.2E-04	NA	7.0E-02	NA	1.7E-03
7440-41-7	Beryllium	2.4E-01	NC	NA	1.0E+00	2.1E-07	NA	5.0E-03	NA	4.2E-05
7439-92-1	Lead	2.0E+02	NC	NA	5.0E-01	9.0E-05	NA	7.5E-04	NA	1.2E-01
7439-97-6	Mercury	1.5E-01	NC	NA	5.0E-01	6.8E-08	NA	3.0E-04	NA	2.3E-04
7440-22-4	Silver	8.4E-01	NC	NA	1.0E+00	7.5E-07	NA	5.0E-03	NA	1.5E-04
7440-66-6	Zinc	1.1E+02	NC	NA	1.0E+00	9.4E-05	NA	3.0E-01	NA	3.1E-04

	Cancer Risk	Hazard Index
TOTAL:	3.8E-07	1.6E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 10
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-3 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
71-43-2	Benzene	3.6E-02	0.03	9.0E-10	0.03	1.2E-08	5.5E-02	1.0E-02	5E-11	1.2E-06
108-88-3	Toluene	4.1E-02	NC	NA	0.03	1.3E-08	NA	8.0E-01	NA	1.7E-08
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	0.2	1.0E-07	NA	3.0E-01	NA	3.3E-07
SVOCs										
120-12-7	Anthracene	4.8E-01	NC	NA	0.1	5.2E-07	NA	1.0E+00	NA	5.2E-07
56-55-3	Benzo(a)anthracene	8.1E-01	0.02	1.3E-08	0.02	1.8E-07	7.3E-01	3.0E-01	1E-08	5.9E-07
50-32-8	Benzo(a)pyrene	8.4E-01	0.02	1.4E-08	0.02	1.8E-07	7.3E+00	3.0E-01	1E-07	6.0E-07
205-99-2	Benzo(b)fluoranthene	9.2E-01	0.02	1.5E-08	0.02	2.0E-07	7.3E-01	3.0E-01	1E-08	6.6E-07
191-24-2	Benzo(g,h,i)perylene	5.2E-01	NC	NA	0.1	5.6E-07	NA	3.0E-01	NA	1.9E-06
207-08-9	Benzo(k)fluoranthene	2.8E-01	0.02	4.7E-09	0.02	6.2E-08	7.3E-02	3.0E-01	3E-10	2.1E-07
218-01-9	Chrysene	7.8E-01	0.02	1.3E-08	0.02	1.7E-07	7.3E-02	3.0E-01	9E-10	5.7E-07
53-70-3	Dibenz(a,h)anthracene	1.6E-01	0.02	2.6E-09	0.02	3.4E-08	7.3E+00	3.0E-01	2E-08	1.1E-07
206-44-0	Fluoranthene	1.8E+00	NC	NA	0.1	2.0E-06	NA	4.0E-01	NA	5.0E-06
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	0.02	1.1E-08	0.02	1.4E-07	7.3E-01	3.0E-01	8E-09	4.7E-07
91-20-3	Naphthalene	8.0E-01	NC	NA	0.1	8.7E-07	NA	2.0E-01	NA	4.3E-06
85-01-8	Phenanthrene	1.9E+00	NC	NA	0.1	2.1E-06	NA	3.0E-01	NA	6.8E-06
129-00-0	Pyrene	1.7E+00	NC	NA	0.1	1.8E-06	NA	3.0E-01	NA	6.0E-06
1336-36-3	Total PCBs	1.9E-01	0.1	1.6E-08	0.1	2.0E-07	2.0E+00	5.0E-05	3E-08	4.1E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.1E-12	0.1	2.8E-11	1.5E+05	7.0E-10	3E-07	4.0E-02
7440-39-3	Barium	1.4E+02	NC	NA	0.1	1.5E-04	NA	7.0E-02	NA	2.1E-03
7440-41-7	Beryllium	2.4E-01	NC	NA	0.1	2.6E-07	NA	5.0E-03	NA	5.1E-05
7439-92-1	Lead	2.0E+02	NC	NA	0.006	1.3E-05	NA	7.5E-04	NA	1.8E-02
7439-97-6	Mercury	1.5E-01	NC	NA	0.1	1.7E-07	NA	3.0E-04	NA	5.6E-04
7440-22-4	Silver	8.4E-01	NC	NA	0.3	2.7E-06	NA	5.0E-03	NA	5.5E-04
7440-66-6	Zinc	1.1E+02	NC	NA	0.1	1.2E-04	NA	3.0E-01	NA	3.8E-04

	Cancer Risk	Hazard Index
TOTAL:	5.0E-07	6.5E-02

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 11
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-3 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
71-43-2	Benzene	3.6E-02	1.2E-08	1.3E-07	7.8E-06	1.0E+01	9E-14	1.3E-08
108-88-3	Toluene	4.1E-02	1.3E-08	1.5E-07	NA	5.0E+03	NA	3.0E-11
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	1.5E-08	1.7E-07	NA	5.0E+02	NA	3.3E-10
SVOCs								
120-12-7	Anthracene	4.8E-01	1.6E-07	1.7E-06	NA	5.0E+02	NA	3.5E-09
56-55-3	Benzo(a)anthracene	8.1E-01	2.6E-07	2.9E-06	2.1E-04	5.0E+02	6E-11	5.9E-09
50-32-8	Benzo(a)pyrene	8.4E-01	2.7E-07	3.0E-06	2.1E-03	5.0E+02	6E-10	6.0E-09
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-07	3.3E-06	2.1E-04	5.0E+02	6E-11	6.6E-09
191-24-2	Benzo(g,h,i)perylene	5.2E-01	1.7E-07	1.9E-06	NA	5.0E+02	NA	3.8E-09
207-08-9	Benzo(k)fluoranthene	2.8E-01	9.2E-08	1.0E-06	2.1E-05	5.0E+02	2E-12	2.1E-09
218-01-9	Chrysene	7.8E-01	2.5E-07	2.8E-06	2.1E-05	5.0E+02	5E-12	5.7E-09
53-70-3	Dibenz(a,h)anthracene	1.6E-01	5.1E-08	5.7E-07	2.1E-03	5.0E+02	1E-10	1.1E-09
206-44-0	Fluoranthene	1.8E+00	6.0E-07	6.6E-06	NA	5.0E+02	NA	1.3E-08
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	2.1E-07	2.4E-06	2.1E-04	5.0E+02	4E-11	4.7E-09
91-20-3	Naphthalene	8.0E-01	2.6E-07	2.9E-06	NA	3.0E+00	NA	9.6E-07
85-01-8	Phenanthrene	1.9E+00	6.1E-07	6.8E-06	NA	5.0E+02	NA	1.4E-08
129-00-0	Pyrene	1.7E+00	5.4E-07	6.1E-06	NA	5.0E+02	NA	1.2E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.9E-01	6.1E-08	6.8E-07	1.0E-04	2.0E-02	6E-12	3.4E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	8.4E-12	9.3E-11	3.3E+01	2.0E-06	3E-10	4.7E-05
Metals								
7440-39-3	Barium	1.4E+02	4.4E-05	4.9E-04	NA	5.0E+00	NA	9.9E-05
7440-41-7	Beryllium	2.4E-01	7.7E-08	8.5E-07	2.4E-03	2.0E-02	2E-10	4.3E-05
7439-92-1	Lead	2.0E+02	6.6E-05	7.3E-04	NA	1.0E+00	NA	7.3E-04
7439-97-6	Mercury	1.5E-01	5.0E-08	5.6E-07	NA	3.0E-01	NA	1.9E-06
7440-22-4	Silver	8.4E-01	2.7E-07	3.1E-06	NA	1.4E-01	NA	2.2E-05
7440-66-6	Zinc	1.1E+02	3.5E-05	3.9E-04	NA	1.4E+00	NA	2.8E-04

	Cancer Risk	Hazard Index
TOTAL:	1.3E-09	1.3E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 12
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-3 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	1.00E-11	1.00E+00	1.12E-10	5.5E-02	1.0E-02	6E-13	1.1E-08
108-88-3	Toluene	4.1E-02	NC	NA	1.00E+00	1.27E-10	NA	8.0E-01	NA	1.6E-10
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.00E+00	1.43E-10	NA	3.0E-01	NA	4.8E-10
SVOCs										
120-12-7	Anthracene	4.8E-01	NC	NA	3.00E-01	4.48E-10	NA	1.0E+00	NA	4.5E-10
56-55-3	Benzo(a)anthracene	8.1E-01	3.0E-01	6.77E-11	3.00E-01	7.54E-10	7.3E-01	3.0E-01	5E-11	2.5E-09
50-32-8	Benzo(a)pyrene	8.4E-01	3.0E-01	6.97E-11	3.00E-01	7.77E-10	7.3E+00	3.0E-01	5E-10	2.6E-09
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	7.64E-11	3.00E-01	8.51E-10	7.3E-01	3.0E-01	6E-11	2.8E-09
191-24-2	Benzo(g,h,i)perylene	5.2E-01	NC	NA	3.00E-01	4.83E-10	NA	3.0E-01	NA	1.6E-09
207-08-9	Benzo(k)fluoranthene	2.8E-01	3.0E-01	2.37E-11	3.00E-01	2.64E-10	7.3E-02	3.0E-01	2E-12	8.8E-10
218-01-9	Chrysene	7.8E-01	3.0E-01	6.53E-11	3.00E-01	7.28E-10	7.3E-02	3.0E-01	5E-12	2.4E-09
53-70-3	Dibenz(a,h)anthracene	1.6E-01	3.0E-01	1.31E-11	3.00E-01	1.46E-10	7.3E+00	3.0E-01	1E-10	4.9E-10
206-44-0	Fluoranthene	1.8E+00	NC	NA	3.00E-01	1.71E-09	NA	4.0E-01	NA	4.3E-09
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	3.0E-01	5.47E-11	3.00E-01	6.10E-10	7.3E-01	3.0E-01	4E-11	2.0E-09
91-20-3	Naphthalene	8.0E-01	NC	NA	3.00E-01	7.44E-10	NA	2.0E-01	NA	3.7E-09
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.00E-01	1.76E-09	NA	3.0E-01	NA	5.9E-09
129-00-0	Pyrene	1.7E+00	NC	NA	3.00E-01	1.56E-09	NA	3.0E-01	NA	5.2E-09
1336-36-3	Total PCBs	1.9E-01	1.0E+00	5.26E-11	1.00E+00	5.86E-10	2.0E+00	5.0E-05	1E-10	1.2E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	7.17E-15	1.00E+00	7.98E-14	1.5E+05	7.0E-10	1E-09	1.1E-04
7440-39-3	Barium	1.4E+02	NC	NA	1.00E+00	4.24E-07	NA	7.0E-02	NA	6.1E-06
7440-41-7	Beryllium	2.4E-01	NC	NA	1.00E+00	7.33E-10	NA	5.0E-03	NA	1.5E-07
7439-92-1	Lead	2.0E+02	NC	NA	5.00E-01	3.15E-07	NA	7.5E-04	NA	4.2E-04
7439-97-6	Mercury	1.5E-01	NC	NA	5.00E-01	2.39E-10	NA	3.0E-04	NA	8.0E-07
7440-22-4	Silver	8.4E-01	NC	NA	1.00E+00	2.62E-09	NA	5.0E-03	NA	5.2E-07
7440-66-6	Zinc	1.1E+02	NC	NA	1.00E+00	3.30E-07	NA	3.0E-01	NA	1.1E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.9E-09	5.5E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 13
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-4 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.0E+00	6.9E-08	NA	1.0E-05	NA	6.9E-03
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	4.2E-09	1.0E+00	6.7E-08	1.4E-02	2.0E-02	6E-11	3.4E-06
120-12-7	Anthracene	3.8E-01	NC	NA	3.0E-01	1.0E-07	NA	1.0E+00	NA	1.0E-07
56-55-3	Benzo(a)anthracene	7.8E-01	3.0E-01	1.3E-08	3.0E-01	2.1E-07	7.3E-01	3.0E-01	9E-09	6.9E-07
50-32-8	Benzo(a)pyrene	7.0E-01	3.0E-01	1.2E-08	3.0E-01	1.9E-07	7.3E+00	3.0E-01	8E-08	6.2E-07
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	1.5E-08	3.0E-01	2.4E-07	7.3E-01	3.0E-01	1E-08	8.2E-07
191-24-2	Benzo(g,h,i)perylene	2.5E-01	NC	NA	3.0E-01	6.6E-08	NA	3.0E-01	NA	2.2E-07
207-08-9	Benzo(k)fluoranthene	3.6E-01	3.0E-01	5.9E-09	3.0E-01	9.6E-08	7.3E-02	3.0E-01	4E-10	3.2E-07
218-01-9	Chrysene	6.9E-01	3.0E-01	1.1E-08	3.0E-01	1.8E-07	7.3E-02	3.0E-01	8E-10	6.1E-07
53-70-3	Dibenz(a,h)anthracene	1.3E-01	3.0E-01	2.2E-09	3.0E-01	3.5E-08	7.3E+00	3.0E-01	2E-08	1.2E-07
206-44-0	Fluoranthene	1.4E+00	NC	NA	3.0E-01	3.8E-07	NA	4.0E-01	NA	9.5E-07
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	3.0E-01	4.0E-09	3.0E-01	6.4E-08	7.3E-01	3.0E-01	3E-09	2.1E-07
129-00-0	Pyrene	1.5E+00	NC	NA	3.0E-01	4.0E-07	NA	3.0E-01	NA	1.3E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	5.4E-01	1.0E+00	2.9E-08	1.0E+00	4.8E-07	2.0E+00	5.0E-05	6E-08	9.5E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	1.4E-12	1.0E+00	2.3E-11	1.5E+05	7.0E-10	2E-07	3.3E-02
Metals										
7440-39-3	Barium	6.8E+01	NC	NA	1.0E+00	6.0E-05	NA	7.0E-02	NA	8.6E-04
7440-43-9	Cadmium	5.2E-01	NC	NA	1.0E+00	4.6E-07	NA	5.0E-04	NA	9.2E-04
16065-83-1	Chromium III	1.4E+01	NC	NA	1.0E+00	1.2E-05	NA	1.5E+00	NA	8.0E-06
7439-92-1	Lead	1.4E+02	NC	NA	5.0E-01	6.1E-05	NA	7.5E-04	NA	8.2E-02
7440-22-4	Silver	3.8E-01	NC	NA	1.0E+00	3.4E-07	NA	5.0E-03	NA	6.8E-05

	Cancer Risk	Hazard Index
TOTAL:	4.0E-07	1.3E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 14
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-4 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	0.19	1.6E-07	NA	1.0E-05	NA	1.6E-02
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	0.1	6.3E-09	0.1	8.2E-08	1.4E-02	2.0E-02	9E-11	4.1E-06
120-12-7	Anthracene	3.8E-01	NC	NA	0.1	4.1E-07	NA	1.0E+00	NA	4.1E-07
56-55-3	Benzo(a)anthracene	7.8E-01	0.02	1.3E-08	0.02	1.7E-07	7.3E-01	3.0E-01	9E-09	5.6E-07
50-32-8	Benzo(a)pyrene	7.0E-01	0.02	1.2E-08	0.02	1.5E-07	7.3E+00	3.0E-01	9E-08	5.1E-07
205-99-2	Benzo(b)fluoranthene	9.2E-01	0.02	1.5E-08	0.02	2.0E-07	7.3E-01	3.0E-01	1E-08	6.6E-07
191-24-2	Benzo(g,h,i)perylene	2.5E-01	NC	NA	0.1	2.7E-07	NA	3.0E-01	NA	8.9E-07
207-08-9	Benzo(k)fluoranthene	3.6E-01	0.02	6.0E-09	0.02	7.8E-08	7.3E-02	3.0E-01	4E-10	2.6E-07
218-01-9	Chrysene	6.9E-01	0.02	1.1E-08	0.02	1.5E-07	7.3E-02	3.0E-01	8E-10	5.0E-07
53-70-3	Dibenz(a,h)anthracene	1.3E-01	0.02	2.2E-09	0.02	2.8E-08	7.3E+00	3.0E-01	2E-08	9.5E-08
206-44-0	Fluoranthene	1.4E+00	NC	NA	0.1	1.5E-06	NA	4.0E-01	NA	3.9E-06
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	0.02	4.0E-09	0.02	5.2E-08	7.3E-01	3.0E-01	3E-09	1.7E-07
129-00-0	Pyrene	1.5E+00	NC	NA	0.1	1.6E-06	NA	3.0E-01	NA	5.5E-06
1336-36-3	Total PCBs	5.4E-01	0.1	4.5E-08	0.1	5.8E-07	2.0E+00	5.0E-05	9E-08	1.2E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.1E-12	0.1	2.8E-11	1.5E+05	7.0E-10	3E-07	4.0E-02
7440-39-3	Barium	6.8E+01	NC	NA	0.1	7.3E-05	NA	7.0E-02	NA	1.0E-03
7440-43-9	Cadmium	5.2E-01	NC	NA	0.01	5.6E-08	NA	5.0E-04	NA	1.1E-04
16065-83-1	Chromium III	1.4E+01	NC	NA	0.1	1.5E-05	NA	1.5E+00	NA	9.8E-06
7439-92-1	Lead	1.4E+02	NC	NA	0.006	9.0E-06	NA	7.5E-04	NA	1.2E-02
7440-22-4	Silver	3.8E-01	NC	NA	0.3	1.2E-06	NA	5.0E-03	NA	2.5E-04

	Cancer Risk	Hazard Index
TOTAL:	5.4E-07	8.1E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 15
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-4 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
101-55-3	4-Bromodiphenyl ether	7.8E-02	2.5E-08	2.8E-07	NA	3.5E-02	NA	8.1E-06
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	2.5E-08	2.7E-07	1.3E-06	7.0E+00	3E-14	3.9E-08
120-12-7	Anthracene	3.8E-01	1.2E-07	1.4E-06	NA	5.0E+02	NA	2.8E-09
56-55-3	Benzo(a)anthracene	7.8E-01	2.5E-07	2.8E-06	2.1E-04	5.0E+02	5E-11	5.6E-09
50-32-8	Benzo(a)pyrene	7.0E-01	2.3E-07	2.6E-06	2.1E-03	5.0E+02	5E-10	5.1E-09
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-07	3.3E-06	2.1E-04	5.0E+02	6E-11	6.7E-09
191-24-2	Benzo(g,h,i)perylene	2.5E-01	8.0E-08	9.0E-07	NA	5.0E+02	NA	1.8E-09
207-08-9	Benzo(k)fluoranthene	3.6E-01	1.2E-07	1.3E-06	2.1E-05	5.0E+02	2E-12	2.6E-09
218-01-9	Chrysene	6.9E-01	2.2E-07	2.5E-06	2.1E-05	5.0E+02	5E-12	5.0E-09
53-70-3	Dibenz(a,h)anthracene	1.3E-01	4.3E-08	4.7E-07	2.1E-03	5.0E+02	9E-11	9.5E-10
206-44-0	Fluoranthene	1.4E+00	4.6E-07	5.2E-06	NA	5.0E+02	NA	1.0E-08
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	7.8E-08	8.7E-07	2.1E-04	5.0E+02	2E-11	1.7E-09
129-00-0	Pyrene	1.5E+00	4.9E-07	5.5E-06	NA	5.0E+02	NA	1.1E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	5.4E-01	1.7E-07	1.9E-06	1.0E-04	2.0E-02	2E-11	9.7E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	8.4E-12	9.3E-11	3.3E+01	2.0E-06	3E-10	4.7E-05
Metals								
7440-39-3	Barium	6.8E+01	2.2E-05	2.4E-04	NA	5.0E+00	NA	4.9E-05
7440-43-9	Cadmium	5.2E-01	1.7E-07	1.9E-06	1.8E-03	2.0E-02	3E-10	9.4E-05
16065-83-1	Chromium III	1.4E+01	4.4E-06	4.9E-05	NA	3.0E-01	NA	1.6E-04
7439-92-1	Lead	1.4E+02	4.5E-05	5.0E-04	NA	1.0E+00	NA	5.0E-04
7440-22-4	Silver	3.8E-01	1.2E-07	1.4E-06	NA	1.4E-01	NA	9.9E-06

	Cancer Risk	Hazard Index
TOTAL:	1.3E-09	9.7E-04

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 16
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-4 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.00E+00	2.42E-10	NA	1.0E-05	NA	2.4E-05
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	2.12E-11	1.00E+00	2.36E-10	1.4E-02	2.0E-02	3E-13	1.2E-08
120-12-7	Anthracene	3.8E-01	NC	NA	3.00E-01	3.54E-10	NA	1.0E+00	NA	3.5E-10
56-55-3	Benzo(a)anthracene	7.8E-01	3.0E-01	6.49E-11	3.00E-01	7.23E-10	7.3E-01	3.0E-01	5E-11	2.4E-09
50-32-8	Benzo(a)pyrene	7.0E-01	3.0E-01	5.89E-11	3.00E-01	6.56E-10	7.3E+00	3.0E-01	4E-10	2.2E-09
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	7.68E-11	3.00E-01	8.56E-10	7.3E-01	3.0E-01	6E-11	2.9E-09
191-24-2	Benzo(g,h,i)perylene	2.5E-01	NC	NA	3.00E-01	2.30E-10	NA	3.0E-01	NA	7.7E-10
207-08-9	Benzo(k)fluoranthene	3.6E-01	3.0E-01	3.01E-11	3.00E-01	3.36E-10	7.3E-02	3.0E-01	2E-12	1.1E-09
218-01-9	Chrysene	6.9E-01	3.0E-01	5.72E-11	3.00E-01	6.37E-10	7.3E-02	3.0E-01	4E-12	2.1E-09
53-70-3	Dibenz(a,h)anthracene	1.3E-01	3.0E-01	1.10E-11	3.00E-01	1.22E-10	7.3E+00	3.0E-01	8E-11	4.1E-10
206-44-0	Fluoranthene	1.4E+00	NC	NA	3.00E-01	1.33E-09	NA	4.0E-01	NA	3.3E-09
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	3.0E-01	2.01E-11	3.00E-01	2.24E-10	7.3E-01	3.0E-01	1E-11	7.5E-10
129-00-0	Pyrene	1.5E+00	NC	NA	3.00E-01	1.41E-09	NA	3.0E-01	NA	4.7E-09
1336-36-3	Total PCBs	5.4E-01	1.0E+00	1.49E-10	1.00E+00	1.66E-09	2.0E+00	5.0E-05	3E-10	3.3E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	7.17E-15	1.00E+00	7.98E-14	1.5E+05	7.0E-10	1E-09	1.1E-04
7440-39-3	Barium	6.8E+01	NC	NA	1.00E+00	2.10E-07	NA	7.0E-02	NA	3.0E-06
7440-43-9	Cadmium	5.2E-01	NC	NA	1.00E+00	1.61E-09	NA	5.0E-04	NA	3.2E-06
16065-83-1	Chromium III	1.4E+01	NC	NA	1.00E+00	4.20E-08	NA	1.5E+00	NA	2.8E-08
7439-92-1	Lead	1.4E+02	NC	NA	5.00E-01	2.14E-07	NA	7.5E-04	NA	2.9E-04
7440-22-4	Silver	3.8E-01	NC	NA	1.00E+00	1.19E-09	NA	5.0E-03	NA	2.4E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.0E-09	4.6E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 17
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-6 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.3E-01	NC	NA	3.0E-01	3.5E-08	NA	2.0E-01	NA	1.7E-07
120-12-7	Anthracene	2.7E-01	NC	NA	3.0E-01	7.3E-08	NA	1.0E+00	NA	7.3E-08
56-55-3	Benzo(a)anthracene	4.4E-01	3.0E-01	7.3E-09	3.0E-01	1.2E-07	7.3E-01	3.0E-01	5E-09	3.9E-07
205-99-2	Benzo(b)fluoranthene	4.6E-01	3.0E-01	7.6E-09	3.0E-01	1.2E-07	7.3E-01	3.0E-01	6E-09	4.1E-07
206-44-0	Fluoranthene	7.9E-01	NC	NA	3.0E-01	2.1E-07	NA	4.0E-01	NA	5.2E-07
91-20-3	Naphthalene	1.2E-01	NC	NA	3.0E-01	3.1E-08	NA	2.0E-01	NA	1.5E-07
85-01-8	Phenanthrene	8.3E-01	NC	NA	3.0E-01	2.2E-07	NA	3.0E-01	NA	7.4E-07
129-00-0	Pyrene	8.1E-01	NC	NA	3.0E-01	2.1E-07	NA	3.0E-01	NA	7.2E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	4.2E+00	1.0E+00	2.3E-07	1.0E+00	3.7E-06	2.0E+00	5.0E-05	5E-07	7.4E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	1.4E-12	1.0E+00	2.3E-11	1.5E+05	7.0E-10	2E-07	3.3E-02
Metals										
7440-39-3	Barium	2.1E+02	NC	NA	1.0E+00	1.8E-04	NA	7.0E-02	NA	2.6E-03
7440-43-9	Cadmium	4.8E-01	NC	NA	1.0E+00	4.3E-07	NA	5.0E-04	NA	8.6E-04
16065-83-1	Chromium III	1.5E+03	NC	NA	1.0E+00	1.3E-03	NA	1.5E+00	NA	8.6E-04
7439-92-1	Lead	1.1E+02	NC	NA	5.0E-01	5.0E-05	NA	7.5E-04	NA	6.6E-02
7440-66-6	Zinc	5.1E+01	NC	NA	1.0E+00	4.5E-05	NA	3.0E-01	NA	1.5E-04

	Cancer Risk	Hazard Index
TOTAL:	6.8E-07	1.8E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 18
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-6 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
83-32-9	Acenaphthene	1.3E-01	NC	NA	0.1	1.4E-07	NA	2.0E-01	NA	7.1E-07
120-12-7	Anthracene	2.7E-01	NC	NA	0.1	3.0E-07	NA	1.0E+00	NA	3.0E-07
56-55-3	Benzo(a)anthracene	4.4E-01	0.02	7.4E-09	0.02	9.6E-08	7.3E-01	3.0E-01	5E-09	3.2E-07
205-99-2	Benzo(b)fluoranthene	4.6E-01	0.02	7.6E-09	0.02	1.0E-07	7.3E-01	3.0E-01	6E-09	3.3E-07
206-44-0	Fluoranthene	7.9E-01	NC	NA	0.1	8.5E-07	NA	4.0E-01	NA	2.1E-06
91-20-3	Naphthalene	1.2E-01	NC	NA	0.1	1.3E-07	NA	2.0E-01	NA	6.3E-07
85-01-8	Phenanthrene	8.3E-01	NC	NA	0.1	9.0E-07	NA	3.0E-01	NA	3.0E-06
129-00-0	Pyrene	8.1E-01	NC	NA	0.1	8.7E-07	NA	3.0E-01	NA	2.9E-06
1336-36-3	Total PCBs	4.2E+00	0.1	3.5E-07	0.1	4.5E-06	2.0E+00	5.0E-05	7E-07	9.0E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.1E-12	0.1	2.8E-11	1.5E+05	7.0E-10	3E-07	4.0E-02
7440-39-3	Barium	2.1E+02	NC	NA	0.1	2.3E-04	NA	7.0E-02	NA	3.2E-03
7440-43-9	Cadmium	4.8E-01	NC	NA	0.01	5.2E-08	NA	5.0E-04	NA	1.0E-04
16065-83-1	Chromium III	1.5E+03	NC	NA	0.1	1.6E-03	NA	1.5E+00	NA	1.1E-03
7439-92-1	Lead	1.1E+02	NC	NA	0.006	7.3E-06	NA	7.5E-04	NA	9.7E-03
7440-66-6	Zinc	5.1E+01	NC	NA	0.1	5.5E-05	NA	3.0E-01	NA	1.8E-04

	Cancer Risk	Hazard Index
TOTAL:	1.0E-06	1.4E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 19
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-6 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
83-32-9	Acenaphthene	1.3E-01	4.3E-08	4.8E-07	NA	5.0E+02	NA	9.5E-10
120-12-7	Anthracene	2.7E-01	8.9E-08	9.9E-07	NA	5.0E+02	NA	2.0E-09
56-55-3	Benzo(a)anthracene	4.4E-01	1.4E-07	1.6E-06	2.1E-04	5.0E+02	3E-11	3.2E-09
205-99-2	Benzo(b)fluoranthene	4.6E-01	1.5E-07	1.7E-06	2.1E-04	5.0E+02	3E-11	3.3E-09
206-44-0	Fluoranthene	7.9E-01	2.6E-07	2.8E-06	NA	5.0E+02	NA	5.7E-09
91-20-3	Naphthalene	1.2E-01	3.8E-08	4.2E-07	NA	3.0E+00	NA	1.4E-07
85-01-8	Phenanthrene	8.3E-01	2.7E-07	3.0E-06	NA	5.0E+02	NA	6.0E-09
129-00-0	Pyrene	8.1E-01	2.6E-07	2.9E-06	NA	5.0E+02	NA	5.8E-09
Dioxins/PCBs								
1336-36-3	Total PCBs	4.2E+00	1.4E-06	1.5E-05	1.0E-04	2.0E-02	1E-10	7.5E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	8.4E-12	9.3E-11	3.3E+01	2.0E-06	3E-10	4.7E-05
Metals								
7440-39-3	Barium	2.1E+02	6.8E-05	7.5E-04	NA	5.0E+00	NA	1.5E-04
7440-43-9	Cadmium	4.8E-01	1.6E-07	1.7E-06	1.8E-03	2.0E-02	3E-10	8.7E-05
16065-83-1	Chromium III	1.5E+03	4.7E-04	5.3E-03	NA	3.0E-01	NA	1.8E-02
7439-92-1	Lead	1.1E+02	3.6E-05	4.1E-04	NA	1.0E+00	NA	4.1E-04
7440-66-6	Zinc	5.1E+01	1.7E-05	1.8E-04	NA	1.4E+00	NA	1.3E-04

	Cancer Risk	Hazard Index
TOTAL:	7.5E-10	1.9E-02

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 20
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-6 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.3E-01	NC	NA	3.00E-01	1.22E-10	NA	2.0E-01	NA	6.1E-10
120-12-7	Anthracene	2.7E-01	NC	NA	3.00E-01	2.56E-10	NA	1.0E+00	NA	2.6E-10
56-55-3	Benzo(a)anthracene	4.4E-01	3.0E-01	3.71E-11	3.00E-01	4.14E-10	7.3E-01	3.0E-01	3E-11	1.4E-09
205-99-2	Benzo(b)fluoranthene	4.6E-01	3.0E-01	3.84E-11	3.00E-01	4.28E-10	7.3E-01	3.0E-01	3E-11	1.4E-09
206-44-0	Fluoranthene	7.9E-01	NC	NA	3.00E-01	7.32E-10	NA	4.0E-01	NA	1.8E-09
91-20-3	Naphthalene	1.2E-01	NC	NA	3.00E-01	1.08E-10	NA	2.0E-01	NA	5.4E-10
85-01-8	Phenanthrene	8.3E-01	NC	NA	3.00E-01	7.74E-10	NA	3.0E-01	NA	2.6E-09
129-00-0	Pyrene	8.1E-01	NC	NA	3.00E-01	7.51E-10	NA	3.0E-01	NA	2.5E-09
1336-36-3	Total PCBs	4.2E+00	1.0E+00	1.16E-09	1.00E+00	1.29E-08	2.0E+00	5.0E-05	2E-09	2.6E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	7.17E-15	1.00E+00	7.98E-14	1.5E+05	7.0E-10	1E-09	1.1E-04
7440-39-3	Barium	2.1E+02	NC	NA	1.00E+00	6.45E-07	NA	7.0E-02	NA	9.2E-06
7440-43-9	Cadmium	4.8E-01	NC	NA	1.00E+00	1.50E-09	NA	5.0E-04	NA	3.0E-06
16065-83-1	Chromium III	1.5E+03	NC	NA	1.00E+00	4.52E-06	NA	1.5E+00	NA	3.0E-06
7439-92-1	Lead	1.1E+02	NC	NA	5.00E-01	1.74E-07	NA	7.5E-04	NA	2.3E-04
7440-66-6	Zinc	5.1E+01	NC	NA	1.00E+00	1.58E-07	NA	3.0E-01	NA	5.3E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.4E-09	6.2E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 21
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-7 (0-3')
New Bedford, Massachusetts

Constituent		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.5E-01	1.0E+00	1.3E-08	1.0E+00	2.2E-07	2.0E+00	5.0E-05	3E-08	4.4E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	1.4E-12	1.0E+00	2.3E-11	1.5E+05	7.0E-10	2E-07	3.3E-02
Metals										
7440-39-3	Barium	7.8E+01	NC	NA	1.0E+00	6.9E-05	NA	7.0E-02	NA	9.8E-04
7440-41-7	Beryllium	2.6E-01	NC	NA	1.0E+00	2.3E-07	NA	5.0E-03	NA	4.7E-05
7440-43-9	Cadmium	6.6E-01	NC	NA	1.0E+00	5.8E-07	NA	5.0E-04	NA	1.2E-03
16065-83-1	Chromium III	1.4E+01	NC	NA	1.0E+00	1.2E-05	NA	1.5E+00	NA	8.3E-06
7439-92-1	Lead	1.2E+02	NC	NA	5.0E-01	5.4E-05	NA	7.5E-04	NA	7.2E-02
7440-66-6	Zinc	7.7E+01	NC	NA	1.0E+00	6.8E-05	NA	3.0E-01	NA	2.3E-04

	Cancer Risk	Hazard Index
TOTAL:	2.4E-07	1.1E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 22
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-7 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	2.5E-01	0.1	2.0E-08	0.1	2.7E-07	2.0E+00	5.0E-05	4E-08	5.3E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.1E-12	0.1	2.8E-11	1.5E+05	7.0E-10	3E-07	4.0E-02
7440-39-3	Barium	7.8E+01	NC	NA	0.1	8.4E-05	NA	7.0E-02	NA	1.2E-03
7440-41-7	Beryllium	2.6E-01	NC	NA	0.1	2.9E-07	NA	5.0E-03	NA	5.7E-05
7440-43-9	Cadmium	6.6E-01	NC	NA	0.01	7.1E-08	NA	5.0E-04	NA	1.4E-04
16065-83-1	Chromium III	1.4E+01	NC	NA	0.1	1.5E-05	NA	1.5E+00	NA	1.0E-05
7439-92-1	Lead	1.2E+02	NC	NA	0.006	8.0E-06	NA	7.5E-04	NA	1.1E-02
7440-66-6	Zinc	7.7E+01	NC	NA	0.1	8.3E-05	NA	3.0E-01	NA	2.8E-04

	Cancer Risk	Hazard Index
TOTAL:	3.6E-07	5.8E-02

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 23
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-7 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	2.5E-01	8.0E-08	8.9E-07	1.0E-04	2.0E-02	8E-12	4.4E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	8.4E-12	9.3E-11	3.3E+01	2.0E-06	3E-10	4.7E-05
Metals								
7440-39-3	Barium	7.8E+01	2.5E-05	2.8E-04	NA	5.0E+00	NA	5.6E-05
7440-41-7	Beryllium	2.6E-01	8.6E-08	9.6E-07	2.4E-03	2.0E-02	2E-10	4.8E-05
7440-43-9	Cadmium	6.6E-01	2.1E-07	2.4E-06	1.8E-03	2.0E-02	4E-10	1.2E-04
16065-83-1	Chromium III	1.4E+01	4.5E-06	5.1E-05	NA	3.0E-01	NA	1.7E-04
7439-92-1	Lead	1.2E+02	4.0E-05	4.4E-04	NA	1.0E+00	NA	4.4E-04
7440-66-6	Zinc	7.7E+01	2.5E-05	2.8E-04	NA	1.4E+00	NA	2.0E-04

	Cancer Risk	Hazard Index
TOTAL:	8.8E-10	1.1E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 24
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-7 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	2.5E-01	1.0E+00	6.84E-11	1.00E+00	7.62E-10	2.0E+00	5.0E-05	1E-10	1.5E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	7.17E-15	1.00E+00	7.98E-14	1.5E+05	7.0E-10	1E-09	1.1E-04
7440-39-3	Barium	7.8E+01	NC	NA	1.00E+00	2.41E-07	NA	7.0E-02	NA	3.4E-06
7440-41-7	Beryllium	2.6E-01	NC	NA	1.00E+00	8.22E-10	NA	5.0E-03	NA	1.6E-07
7440-43-9	Cadmium	6.6E-01	NC	NA	1.00E+00	2.05E-09	NA	5.0E-04	NA	4.1E-06
16065-83-1	Chromium III	1.4E+01	NC	NA	1.00E+00	4.33E-08	NA	1.5E+00	NA	2.9E-08
7439-92-1	Lead	1.2E+02	NC	NA	5.00E-01	1.90E-07	NA	7.5E-04	NA	2.5E-04
7440-66-6	Zinc	7.7E+01	NC	NA	1.00E+00	2.38E-07	NA	3.0E-01	NA	7.9E-07

	Cancer Risk	Hazard Index
TOTAL:	1.2E-09	3.9E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 25
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-10 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.0E+00	2.7E-07	NA	1.0E-01	NA	2.7E-06
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	7.7E-09	1.0E+00	1.2E-07	1.4E-02	2.0E-02	1E-10	6.2E-06
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.6E-01	1.2E-07	NA	1.0E-03	NA	1.2E-04
83-32-9	Acenaphthene	2.0E-01	NC	NA	3.0E-01	5.3E-08	NA	2.0E-01	NA	2.6E-07
208-96-8	Acenaphthylene	1.4E-01	NC	NA	3.0E-01	3.7E-08	NA	3.0E-01	NA	1.2E-07
120-12-7	Anthracene	5.0E-01	NC	NA	3.0E-01	1.3E-07	NA	1.0E+00	NA	1.3E-07
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	2.0E-08	3.0E-01	3.2E-07	7.3E-01	3.0E-01	1E-08	1.1E-06
50-32-8	Benzo(a)pyrene	9.6E-01	3.0E-01	1.6E-08	3.0E-01	2.5E-07	7.3E+00	3.0E-01	1E-07	8.5E-07
205-99-2	Benzo(b)fluoranthene	1.2E+00	3.0E-01	2.0E-08	3.0E-01	3.2E-07	7.3E-01	3.0E-01	1E-08	1.1E-06
191-24-2	Benzo(g,h,i)perylene	4.0E-01	NC	NA	3.0E-01	1.1E-07	NA	3.0E-01	NA	3.6E-07
207-08-9	Benzo(k)fluoranthene	4.3E-01	3.0E-01	7.1E-09	3.0E-01	1.1E-07	7.3E-02	3.0E-01	5E-10	3.8E-07
218-01-9	Chrysene	1.1E+00	3.0E-01	1.8E-08	3.0E-01	2.9E-07	7.3E-02	3.0E-01	1E-09	9.8E-07
53-70-3	Dibenz(a,h)anthracene	1.2E-01	3.0E-01	2.1E-09	3.0E-01	3.3E-08	7.3E+00	3.0E-01	1E-08	1.1E-07
206-44-0	Fluoranthene	2.4E+00	NC	NA	3.0E-01	6.4E-07	NA	4.0E-01	NA	1.6E-06
86-73-7	Fluorene	2.2E-01	NC	NA	3.0E-01	5.9E-08	NA	4.0E-01	NA	1.5E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	3.0E-01	7.6E-09	3.0E-01	1.2E-07	7.3E-01	3.0E-01	6E-09	4.1E-07
91-57-6	2-Methylnaphthalene	1.6E-01	NC	NA	3.0E-01	4.3E-08	NA	4.0E-03	NA	1.1E-05
91-20-3	Naphthalene	1.4E-01	NC	NA	3.0E-01	3.7E-08	NA	2.0E-01	NA	1.9E-07
85-01-8	Phenanthrene	2.4E+00	NC	NA	3.0E-01	6.3E-07	NA	3.0E-01	NA	2.1E-06
129-00-0	Pyrene	2.8E+00	NC	NA	3.0E-01	7.3E-07	NA	3.0E-01	NA	2.4E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.6E+00	1.0E+00	8.6E-08	1.0E+00	1.4E-06	2.0E+00	5.0E-05	2E-07	2.8E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	1.4E-12	1.0E+00	2.3E-11	1.5E+05	7.0E-10	2E-07	3.3E-02
Metals										
7440-38-2	Arsenic	5.3E+00	5.0E-01	1.4E-07	5.0E-01	2.3E-06	1.5E+00	3.0E-04	2E-07	7.8E-03
7440-39-3	Barium	3.3E+02	NC	NA	1.0E+00	3.0E-04	NA	7.0E-02	NA	4.2E-03
7440-41-7	Beryllium	1.8E-01	NC	NA	1.0E+00	1.6E-07	NA	5.0E-03	NA	3.1E-05
7440-43-9	Cadmium	9.8E-01	NC	NA	1.0E+00	8.7E-07	NA	5.0E-04	NA	1.7E-03
16065-83-1	Chromium III	2.9E+01	NC	NA	1.0E+00	2.5E-05	NA	1.5E+00	NA	1.7E-05
7439-92-1	Lead	3.5E+02	NC	NA	5.0E-01	1.6E-04	NA	7.5E-04	NA	2.1E-01
7439-97-6	Mercury	1.2E-01	NC	NA	5.0E-01	5.4E-08	NA	3.0E-04	NA	1.8E-04
7440-02-0	Nickel	5.6E+00	NC	NA	1.0E+00	5.0E-06	NA	2.0E-02	NA	2.5E-04
7440-22-4	Silver	5.8E-01	NC	NA	1.0E+00	5.2E-07	NA	5.0E-03	NA	1.0E-04
7440-62-2	Vanadium	1.2E+01	NC	NA	1.0E+00	1.1E-05	NA	9.0E-03	NA	1.2E-03
7440-66-6	Zinc	3.1E+01	NC	NA	1.0E+00	2.7E-05	NA	3.0E-01	NA	9.0E-05

	Cancer Risk	Hazard Index
TOTAL:	7.7E-07	2.8E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 26
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-10 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	0.07	2.3E-07	NA	1.0E-01	NA	2.3E-06
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	0.1	1.2E-08	0.1	1.5E-07	1.4E-02	2.0E-02	2E-10	7.6E-06
132-64-9	Dibenzofuran	1.4E-01	NC	NA	0.18	2.8E-07	NA	1.0E-03	NA	2.8E-04
83-32-9	Acenaphthene	2.0E-01	NC	NA	0.1	2.1E-07	NA	2.0E-01	NA	1.1E-06
208-96-8	Acenaphthylene	1.4E-01	NC	NA	0.1	1.5E-07	NA	3.0E-01	NA	5.0E-07
120-12-7	Anthracene	5.0E-01	NC	NA	0.1	5.5E-07	NA	1.0E+00	NA	5.5E-07
56-55-3	Benzo(a)anthracene	1.2E+00	0.02	2.0E-08	0.02	2.6E-07	7.3E-01	3.0E-01	1E-08	8.7E-07
50-32-8	Benzo(a)pyrene	9.6E-01	0.02	1.6E-08	0.02	2.1E-07	7.3E+00	3.0E-01	1E-07	6.9E-07
205-99-2	Benzo(b)fluoranthene	1.2E+00	0.02	2.0E-08	0.02	2.6E-07	7.3E-01	3.0E-01	1E-08	8.8E-07
191-24-2	Benzo(g,h,i)perylene	4.0E-01	NC	NA	0.1	4.3E-07	NA	3.0E-01	NA	1.4E-06
207-08-9	Benzo(k)fluoranthene	4.3E-01	0.02	7.2E-09	0.02	9.3E-08	7.3E-02	3.0E-01	5E-10	3.1E-07
218-01-9	Chrysene	1.1E+00	0.02	1.8E-08	0.02	2.4E-07	7.3E-02	3.0E-01	1E-09	8.0E-07
53-70-3	Dibenz(a,h)anthracene	1.2E-01	0.02	2.1E-09	0.02	2.7E-08	7.3E+00	3.0E-01	2E-08	9.0E-08
206-44-0	Fluoranthene	2.4E+00	NC	NA	0.1	2.6E-06	NA	4.0E-01	NA	6.5E-06
86-73-7	Fluorene	2.2E-01	NC	NA	0.1	2.4E-07	NA	4.0E-01	NA	6.1E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	0.02	7.7E-09	0.02	1.0E-07	7.3E-01	3.0E-01	6E-09	3.3E-07
91-57-6	2-Methylnaphthalene	1.6E-01	NC	NA	0.1	1.8E-07	NA	4.0E-03	NA	4.4E-05
91-20-3	Naphthalene	1.4E-01	NC	NA	0.1	1.5E-07	NA	2.0E-01	NA	7.6E-07
85-01-8	Phenanthrene	2.4E+00	NC	NA	0.1	2.6E-06	NA	3.0E-01	NA	8.6E-06
129-00-0	Pyrene	2.8E+00	NC	NA	0.1	3.0E-06	NA	3.0E-01	NA	1.0E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	1.6E+00	0.1	1.3E-07	0.1	1.7E-06	2.0E+00	5.0E-05	3E-07	3.4E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.1E-12	0.1	2.8E-11	1.5E+05	7.0E-10	3E-07	4.0E-02
Metals										
7440-38-2	Arsenic	5.3E+00	0.03	1.3E-07	0.03	1.7E-06	1.5E+00	3.0E-04	2E-07	5.7E-03
7440-39-3	Barium	3.3E+02	NC	NA	0.1	3.6E-04	NA	7.0E-02	NA	5.2E-03
7440-41-7	Beryllium	1.8E-01	NC	NA	0.1	1.9E-07	NA	5.0E-03	NA	3.8E-05
7440-43-9	Cadmium	9.8E-01	NC	NA	0.01	1.1E-07	NA	5.0E-04	NA	2.1E-04
16065-83-1	Chromium III	2.9E+01	NC	NA	0.1	3.1E-05	NA	1.5E+00	NA	2.1E-05
7439-92-1	Lead	3.5E+02	NC	NA	0.006	2.3E-05	NA	7.5E-04	NA	3.1E-02
7439-97-6	Mercury	1.2E-01	NC	NA	0.1	1.3E-07	NA	3.0E-04	NA	4.4E-04
7440-02-0	Nickel	5.6E+00	NC	NA	0.2	1.2E-05	NA	2.0E-02	NA	6.1E-04
7440-22-4	Silver	5.8E-01	NC	NA	0.3	1.9E-06	NA	5.0E-03	NA	3.8E-04
7440-62-2	Vanadium	1.2E+01	NC	NA	0.1	1.3E-05	NA	9.0E-03	NA	1.5E-03
7440-66-6	Zinc	3.1E+01	NC	NA	0.1	3.3E-05	NA	3.0E-01	NA	1.1E-04

	Cancer Risk	Hazard Index
TOTAL:	9.5E-07	1.2E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 27
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-10 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
84-74-2	di-n-Butylphthalate	3.0E-01	9.9E-08	1.1E-06	NA	3.5E+02	NA	3.1E-09
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	4.5E-08	5.1E-07	1.3E-06	7.0E+00	6E-14	7.2E-08
132-64-9	Dibenzofuran	1.4E-01	4.6E-08	5.1E-07	NA	3.5E+00	NA	1.5E-07
83-32-9	Acenaphthene	2.0E-01	6.4E-08	7.1E-07	NA	5.0E+02	NA	1.4E-09
208-96-8	Acenaphthylene	1.4E-01	4.5E-08	5.0E-07	NA	5.0E+02	NA	1.0E-09
120-12-7	Anthracene	5.0E-01	1.6E-07	1.8E-06	NA	5.0E+02	NA	3.6E-09
56-55-3	Benzo(a)anthracene	1.2E+00	3.9E-07	4.3E-06	2.1E-04	5.0E+02	8E-11	8.7E-09
50-32-8	Benzo(a)pyrene	9.6E-01	3.1E-07	3.5E-06	2.1E-03	5.0E+02	7E-10	6.9E-09
205-99-2	Benzo(b)fluoranthene	1.2E+00	4.0E-07	4.4E-06	2.1E-04	5.0E+02	8E-11	8.8E-09
191-24-2	Benzo(g,h,i)perylene	4.0E-01	1.3E-07	1.5E-06	NA	5.0E+02	NA	2.9E-09
207-08-9	Benzo(k)fluoranthene	4.3E-01	1.4E-07	1.6E-06	2.1E-05	5.0E+02	3E-12	3.1E-09
218-01-9	Chrysene	1.1E+00	3.6E-07	4.0E-06	2.1E-05	5.0E+02	8E-12	8.0E-09
53-70-3	Dibenz(a,h)anthracene	1.2E-01	4.1E-08	4.5E-07	2.1E-03	5.0E+02	9E-11	9.0E-10
206-44-0	Fluoranthene	2.4E+00	7.8E-07	8.7E-06	NA	5.0E+02	NA	1.7E-08
86-73-7	Fluorene	2.2E-01	7.3E-08	8.1E-07	NA	5.0E+02	NA	1.6E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	1.5E-07	1.7E-06	2.1E-04	5.0E+02	3E-11	3.4E-09
91-57-6	2-Methylnaphthalene	1.6E-01	5.3E-08	5.9E-07	NA	5.0E+02	NA	1.2E-09
91-20-3	Naphthalene	1.4E-01	4.5E-08	5.1E-07	NA	3.0E+00	NA	1.7E-07
85-01-8	Phenanthrene	2.4E+00	7.7E-07	8.6E-06	NA	5.0E+02	NA	1.7E-08
129-00-0	Pyrene	2.8E+00	9.0E-07	1.0E-05	NA	5.0E+02	NA	2.0E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.6E+00	5.1E-07	5.7E-06	1.0E-04	2.0E-02	5E-11	2.9E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	8.4E-12	9.3E-11	3.3E+01	2.0E-06	3E-10	4.7E-05
Metals								
7440-38-2	Arsenic	5.3E+00	1.7E-06	1.9E-05	3.0E-03	2.0E-02	5E-09	9.5E-04
7440-39-3	Barium	3.3E+02	1.1E-04	1.2E-03	NA	5.0E+00	NA	2.4E-04
7440-41-7	Beryllium	1.8E-01	5.7E-08	6.4E-07	2.4E-03	2.0E-02	1E-10	3.2E-05
7440-43-9	Cadmium	9.8E-01	3.2E-07	3.5E-06	1.8E-03	2.0E-02	6E-10	1.8E-04
16065-83-1	Chromium III	2.9E+01	9.3E-06	1.0E-04	NA	3.0E-01	NA	3.4E-04
7439-92-1	Lead	3.5E+02	1.1E-04	1.3E-03	NA	1.0E+00	NA	1.3E-03
7439-97-6	Mercury	1.2E-01	3.9E-08	4.4E-07	NA	3.0E-01	NA	1.5E-06
7440-02-0	Nickel	5.6E+00	1.8E-06	2.0E-05	4.8E-04	1.0E+00	9E-10	2.0E-05
7440-22-4	Silver	5.8E-01	1.9E-07	2.1E-06	NA	1.4E-01	NA	1.5E-05
7440-62-2	Vanadium	1.2E+01	4.0E-06	4.5E-05	NA	1.0E+00	NA	4.5E-05
7440-66-6	Zinc	3.1E+01	9.9E-06	1.1E-04	NA	1.4E+00	NA	7.9E-05

	Cancer Risk	Hazard Index
TOTAL:	8.0E-09	3.5E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 28
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-10 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.00E+00	9.42E-10	NA	1.0E-01	NA	9.4E-09
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	3.90E-11	1.00E+00	4.34E-10	1.4E-02	2.0E-02	5E-13	2.2E-08
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.60E-01	4.20E-10	NA	1.0E-03	NA	4.2E-07
83-32-9	Acenaphthene	2.0E-01	NC	NA	3.00E-01	1.84E-10	NA	2.0E-01	NA	9.2E-10
208-96-8	Acenaphthylene	1.4E-01	NC	NA	3.00E-01	1.28E-10	NA	3.0E-01	NA	4.3E-10
120-12-7	Anthracene	5.0E-01	NC	NA	3.00E-01	4.68E-10	NA	1.0E+00	NA	4.7E-10
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	1.00E-10	3.00E-01	1.12E-09	7.3E-01	3.0E-01	7E-11	3.7E-09
50-32-8	Benzo(a)pyrene	9.6E-01	3.0E-01	7.99E-11	3.00E-01	8.91E-10	7.3E+00	3.0E-01	6E-10	3.0E-09
205-99-2	Benzo(b)fluoranthene	1.2E+00	3.0E-01	1.02E-10	3.00E-01	1.13E-09	7.3E-01	3.0E-01	7E-11	3.8E-09
191-24-2	Benzo(g,h,i)perylene	4.0E-01	NC	NA	3.00E-01	3.73E-10	NA	3.0E-01	NA	1.2E-09
207-08-9	Benzo(k)fluoranthene	4.3E-01	3.0E-01	3.59E-11	3.00E-01	4.00E-10	7.3E-02	3.0E-01	3E-12	1.3E-09
218-01-9	Chrysene	1.1E+00	3.0E-01	9.25E-11	3.00E-01	1.03E-09	7.3E-02	3.0E-01	7E-12	3.4E-09
53-70-3	Dibenz(a,h)anthracene	1.2E-01	3.0E-01	1.04E-11	3.00E-01	1.16E-10	7.3E+00	3.0E-01	8E-11	3.9E-10
206-44-0	Fluoranthene	2.4E+00	NC	NA	3.00E-01	2.25E-09	NA	4.0E-01	NA	5.6E-09
86-73-7	Fluorene	2.2E-01	NC	NA	3.00E-01	2.08E-10	NA	4.0E-01	NA	5.2E-10
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	3.0E-01	3.87E-11	3.00E-01	4.31E-10	7.3E-01	3.0E-01	3E-11	1.4E-09
91-57-6	2-Methylnaphthalene	1.6E-01	NC	NA	3.00E-01	1.52E-10	NA	4.0E-03	NA	3.8E-08
91-20-3	Naphthalene	1.4E-01	NC	NA	3.00E-01	1.30E-10	NA	2.0E-01	NA	6.5E-10
85-01-8	Phenanthrene	2.4E+00	NC	NA	3.00E-01	2.20E-09	NA	3.0E-01	NA	7.3E-09
129-00-0	Pyrene	2.8E+00	NC	NA	3.00E-01	2.57E-09	NA	3.0E-01	NA	8.6E-09
Dioxins/PCBs										
1336-36-3	Total PCBs	1.6E+00	1.0E+00	4.39E-10	1.00E+00	4.89E-09	2.0E+00	5.0E-05	9E-10	9.8E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	7.17E-15	1.00E+00	7.98E-14	1.5E+05	7.0E-10	1E-09	1.1E-04
Metals										
7440-38-2	Arsenic	5.3E+00	5.0E-01	7.32E-10	5.00E-01	8.16E-09	1.5E+00	3.0E-04	1E-09	2.7E-05
7440-39-3	Barium	3.3E+02	NC	NA	1.00E+00	1.03E-06	NA	7.0E-02	NA	1.5E-05
7440-41-7	Beryllium	1.8E-01	NC	NA	1.00E+00	5.48E-10	NA	5.0E-03	NA	1.1E-07
7440-43-9	Cadmium	9.8E-01	NC	NA	1.00E+00	3.04E-09	NA	5.0E-04	NA	6.1E-06
16065-83-1	Chromium III	2.9E+01	NC	NA	1.00E+00	8.85E-08	NA	1.5E+00	NA	5.9E-08
7439-92-1	Lead	3.5E+02	NC	NA	5.00E-01	5.47E-07	NA	7.5E-04	NA	7.3E-04
7439-97-6	Mercury	1.2E-01	NC	NA	5.00E-01	1.89E-10	NA	3.0E-04	NA	6.3E-07
7440-02-0	Nickel	5.6E+00	NC	NA	1.00E+00	1.73E-08	NA	2.0E-02	NA	8.7E-07
7440-22-4	Silver	5.8E-01	NC	NA	1.00E+00	1.80E-09	NA	5.0E-03	NA	3.6E-07
7440-62-2	Vanadium	1.2E+01	NC	NA	1.00E+00	3.83E-08	NA	9.0E-03	NA	4.3E-06
7440-66-6	Zinc	3.1E+01	NC	NA	1.00E+00	9.49E-08	NA	3.0E-01	NA	3.2E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.9E-09	1.0E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 1
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-1 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	1.0E+00	5.4E-10	1.0E+00	2.9E-08	2.0E+00	5.0E-05	1E-09	5.8E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.3E-12	1.0E+00	1.3E-10	1.5E+05	7.0E-10	4E-07	1.8E-01

	Cancer Risk	Hazard Index
TOTAL:	3.5E-07	1.8E-01

NA = Not Applicable
NC = No Criteria
Where:

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 2
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-1 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	5.9E-03	0.1	4.5E-10	0.1	2.3E-08	2.0E+00	5.0E-05	9E-10	4.7E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.0E-12	0.1	1.0E-10	1.5E+05	7.0E-10	3E-07	1.5E-01

	Cancer Risk	Hazard Index
TOTAL:	3.0E-07	1.5E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 3
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-1 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	5.9E-03	6.0E-10	3.0E-08	1.0E-04	2.0E-02	6E-14	1.5E-06
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.6E-12	1.3E-10	3.3E+01	2.0E-06	9E-11	6.5E-05

	Cancer Risk	Hazard Index
TOTAL:	8.6E-11	6.7E-05

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 4
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-1 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	5.9E-03	1.0E+00	5.12E-13	1.00E+00	2.55E-11	2.0E+00	5.0E-05	1E-12	5.1E-07
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.24E-15	1.00E+00	1.12E-13	1.5E+05	7.0E-10	3E-10	1.6E-04

	Cancer Risk	Hazard Index
TOTAL:	3.4E-10	1.6E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 5
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-2 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.0E+00	8.3E-07	NA	9.0E-02	NA	9.2E-06
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.9E-01	1.0E-06	NA	8.0E-04	NA	1.3E-03
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.0E-01	2.3E-07	NA	2.0E-01	NA	1.2E-06
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.0E-01	2.1E-07	NA	3.0E-01	NA	7.1E-07
120-12-7	Anthracene	3.3E-01	NC	NA	3.0E-01	4.8E-07	NA	1.0E+00	NA	4.8E-07
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	1.7E-08	3.0E-01	8.9E-07	7.3E-01	3.0E-01	1E-08	3.0E-06
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	1.4E-08	3.0E-01	7.8E-07	7.3E+00	3.0E-01	1E-07	2.6E-06
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	1.5E-08	3.0E-01	8.3E-07	7.3E-01	3.0E-01	1E-08	2.8E-06
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.0E-01	5.3E-07	NA	3.0E-01	NA	1.8E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	7.3E-09	3.0E-01	3.9E-07	7.3E-02	3.0E-01	5E-10	1.3E-06
218-01-9	Chrysene	5.9E-01	3.0E-01	1.6E-08	3.0E-01	8.6E-07	7.3E-02	3.0E-01	1E-09	2.9E-06
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	3.9E-09	3.0E-01	2.1E-07	7.3E+00	3.0E-01	3E-08	6.9E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.0E-01	1.7E-06	NA	4.0E-01	NA	4.4E-06
86-73-7	Fluorene	2.1E-01	NC	NA	3.0E-01	3.1E-07	NA	4.0E-01	NA	7.6E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	1.1E-08	3.0E-01	6.1E-07	7.3E-01	3.0E-01	8E-09	2.0E-06
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.0E-01	2.0E-07	NA	4.0E-03	NA	4.9E-05
91-20-3	Naphthalene	1.6E-01	NC	NA	3.0E-01	2.3E-07	NA	2.0E-01	NA	1.2E-06
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.0E-01	1.8E-06	NA	3.0E-01	NA	6.2E-06
129-00-0	Pyrene	1.2E+00	NC	NA	3.0E-01	1.7E-06	NA	3.0E-01	NA	5.8E-06
C9-C10	GRO	1.5E+01	NC	NA	1.0E+00	7.2E-05	NA	3.0E-01	NA	2.4E-04
Dioxins/PCBs										
1336-36-3	Total PCBs	4.6E-01	1.0E+00	4.2E-08	1.0E+00	2.3E-06	2.0E+00	5.0E-05	8E-08	4.5E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.3E-12	1.0E+00	1.3E-10	1.5E+05	7.0E-10	4E-07	1.8E-01
Metals										
7440-39-3	Barium	7.3E+01	NC	NA	1.0E+00	3.6E-04	NA	7.0E-02	NA	5.1E-03
7440-41-7	Beryllium	1.6E-01	NC	NA	1.0E+00	8.0E-07	NA	5.0E-03	NA	1.6E-04
7440-43-9	Cadmium	4.9E-01	NC	NA	1.0E+00	2.4E-06	NA	5.0E-04	NA	4.8E-03
16065-83-1	Chromium III	1.2E+01	NC	NA	1.0E+00	6.1E-05	NA	1.5E+00	NA	4.0E-05
7439-92-1	Lead	1.1E+02	NC	NA	5.0E-01	2.7E-04	NA	7.5E-04	NA	3.6E-01
7439-97-6	Mercury	1.2E-01	NC	NA	5.0E-01	3.0E-07	NA	3.0E-04	NA	1.0E-03
7440-02-0	Nickel	8.5E+00	NC	NA	1.0E+00	4.1E-05	NA	2.0E-02	NA	2.1E-03
7440-22-4	Silver	1.6E+00	NC	NA	1.0E+00	7.8E-06	NA	5.0E-03	NA	1.6E-03
7440-62-2	Vanadium	1.4E+01	NC	NA	1.0E+00	7.0E-05	NA	9.0E-03	NA	7.8E-03
7440-66-6	Zinc	6.8E+01	NC	NA	1.0E+00	3.3E-04	NA	3.0E-01	NA	1.1E-03

	Cancer Risk	Hazard Index
TOTAL:	6.0E-07	6.1E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 6
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-2 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	0.03	2.0E-07	NA	9.0E-02	NA	2.3E-06
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	0.11	9.2E-07	NA	8.0E-04	NA	1.1E-03
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	0.1	6.3E-07	NA	2.0E-01	NA	3.1E-06
208-96-8	Acenaphthylene	1.5E-01	NC	NA	0.1	5.8E-07	NA	3.0E-01	NA	1.9E-06
120-12-7	Anthracene	3.3E-01	NC	NA	0.1	1.3E-06	NA	1.0E+00	NA	1.3E-06
56-55-3	Benzo(a)anthracene	6.1E-01	0.02	9.3E-09	0.02	4.8E-07	7.3E-01	3.0E-01	7E-09	1.6E-06
50-32-8	Benzo(a)pyrene	5.3E-01	0.02	8.1E-09	0.02	4.2E-07	7.3E+00	3.0E-01	6E-08	1.4E-06
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.02	8.7E-09	0.02	4.5E-07	7.3E-01	3.0E-01	6E-09	1.5E-06
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	0.1	1.4E-06	NA	3.0E-01	NA	4.8E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.02	4.1E-09	0.02	2.1E-07	7.3E-02	3.0E-01	3E-10	7.1E-07
218-01-9	Chrysene	5.9E-01	0.02	9.1E-09	0.02	4.7E-07	7.3E-02	3.0E-01	7E-10	1.6E-06
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.02	2.2E-09	0.02	1.1E-07	7.3E+00	3.0E-01	2E-08	3.8E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	0.1	4.7E-06	NA	4.0E-01	NA	1.2E-05
86-73-7	Fluorene	2.1E-01	NC	NA	0.1	8.3E-07	NA	4.0E-01	NA	2.1E-06
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.02	6.4E-09	0.02	3.3E-07	7.3E-01	3.0E-01	5E-09	1.1E-06
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	0.1	5.3E-07	NA	4.0E-03	NA	1.3E-04
91-20-3	Naphthalene	1.6E-01	NC	NA	0.1	6.3E-07	NA	2.0E-01	NA	3.2E-06
85-01-8	Phenanthrene	1.3E+00	NC	NA	0.1	5.0E-06	NA	3.0E-01	NA	1.7E-05
129-00-0	Pyrene	1.2E+00	NC	NA	0.1	4.7E-06	NA	3.0E-01	NA	1.6E-05
C9-C10	GRO	1.5E+01	NC	NA	0.2	1.2E-04	NA	3.0E-01	NA	3.9E-04
1336-36-3	Total PCBs	4.6E-01	0.1	3.6E-08	0.1	1.8E-06	2.0E+00	5.0E-05	7E-08	3.7E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.0E-12	0.1	1.0E-10	1.5E+05	7.0E-10	3E-07	1.5E-01
7440-39-3	Barium	7.3E+01	NC	NA	0.1	2.9E-04	NA	7.0E-02	NA	4.2E-03
7440-41-7	Beryllium	1.6E-01	NC	NA	0.1	6.5E-07	NA	5.0E-03	NA	1.3E-04
7440-43-9	Cadmium	4.9E-01	NC	NA	0.01	1.9E-07	NA	5.0E-04	NA	3.9E-04
16065-83-1	Chromium III	1.2E+01	NC	NA	0.1	4.9E-05	NA	1.5E+00	NA	3.3E-05
7439-92-1	Lead	1.1E+02	NC	NA	0.006	2.7E-05	NA	7.5E-04	NA	3.6E-02
7439-97-6	Mercury	1.2E-01	NC	NA	0.1	5.0E-07	NA	3.0E-04	NA	1.7E-03
7440-02-0	Nickel	8.5E+00	NC	NA	0.2	6.7E-05	NA	2.0E-02	NA	3.4E-03
7440-22-4	Silver	1.6E+00	NC	NA	0.3	1.9E-05	NA	5.0E-03	NA	3.8E-03
7440-62-2	Vanadium	1.4E+01	NC	NA	0.1	5.7E-05	NA	9.0E-03	NA	6.3E-03
7440-66-6	Zinc	6.8E+01	NC	NA	0.1	2.7E-04	NA	3.0E-01	NA	9.0E-04

	Cancer Risk	Hazard Index
TOTAL:	4.6E-07	2.4E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 7
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-2 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	1.7E-08	8.6E-07	NA	2.0E+01	NA	4.3E-08
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	2.1E-08	1.1E-06	NA	2.8E+00	NA	3.8E-07
SVOCs								
83-32-9	Acenaphthene	1.6E-01	1.6E-08	8.0E-07	NA	5.0E+02	NA	1.6E-09
208-96-8	Acenaphthylene	1.5E-01	1.5E-08	7.4E-07	NA	5.0E+02	NA	1.5E-09
120-12-7	Anthracene	3.3E-01	3.3E-08	1.7E-06	NA	5.0E+02	NA	3.3E-09
56-55-3	Benzo(a)anthracene	6.1E-01	6.1E-08	3.1E-06	2.1E-04	5.0E+02	1E-11	6.1E-09
50-32-8	Benzo(a)pyrene	5.3E-01	5.4E-08	2.7E-06	2.1E-03	5.0E+02	1E-10	5.3E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	5.7E-08	2.9E-06	2.1E-04	5.0E+02	1E-11	5.7E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	3.7E-08	1.8E-06	NA	5.0E+02	NA	3.7E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	2.7E-08	1.4E-06	2.1E-05	5.0E+02	6E-13	2.7E-09
218-01-9	Chrysene	5.9E-01	6.0E-08	3.0E-06	2.1E-05	5.0E+02	1E-12	6.0E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	1.4E-08	7.2E-07	2.1E-03	5.0E+02	3E-11	1.4E-09
206-44-0	Fluoranthene	1.2E+00	1.2E-07	6.0E-06	NA	5.0E+02	NA	1.2E-08
86-73-7	Fluorene	2.1E-01	2.1E-08	1.1E-06	NA	5.0E+02	NA	2.1E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	4.2E-08	2.1E-06	2.1E-04	5.0E+02	9E-12	4.2E-09
91-57-6	2-Methylnaphthalene	1.3E-01	1.4E-08	6.8E-07	NA	5.0E+02	NA	1.4E-09
91-20-3	Naphthalene	1.6E-01	1.6E-08	8.0E-07	NA	3.0E+00	NA	2.7E-07
85-01-8	Phenanthrene	1.3E+00	1.3E-07	6.4E-06	NA	5.0E+02	NA	1.3E-08
129-00-0	Pyrene	1.2E+00	1.2E-07	6.0E-06	NA	5.0E+02	NA	1.2E-08
C9-C10	GRO	1.5E+01	1.5E-06	7.4E-05	NA	5.0E+02	NA	1.5E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	4.6E-01	4.7E-08	2.3E-06	1.0E-04	2.0E-02	5E-12	1.2E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.6E-12	1.3E-10	3.3E+01	2.0E-06	9E-11	6.5E-05
Metals								
7440-39-3	Barium	7.3E+01	7.4E-06	3.7E-04	NA	5.0E+00	NA	7.4E-05
7440-41-7	Beryllium	1.6E-01	1.7E-08	8.3E-07	2.4E-03	2.0E-02	4E-11	4.2E-05
7440-43-9	Cadmium	4.9E-01	4.9E-08	2.5E-06	1.8E-03	2.0E-02	9E-11	1.2E-04
16065-83-1	Chromium III	1.2E+01	1.3E-06	6.3E-05	NA	3.0E-01	NA	2.1E-04
7439-92-1	Lead	1.1E+02	1.1E-05	5.6E-04	NA	1.0E+00	NA	5.6E-04
7439-97-6	Mercury	1.2E-01	1.3E-08	6.3E-07	NA	3.0E-01	NA	2.1E-06
7440-02-0	Nickel	8.5E+00	8.6E-07	4.3E-05	4.8E-04	1.0E+00	4E-10	4.3E-05
7440-22-4	Silver	1.6E+00	1.6E-07	8.0E-06	NA	1.4E-01	NA	5.7E-05
7440-62-2	Vanadium	1.4E+01	1.5E-06	7.2E-05	NA	1.0E+00	NA	7.2E-05
7440-66-6	Zinc	6.8E+01	6.9E-06	3.4E-04	NA	1.4E+00	NA	2.4E-04

	Cancer Risk	Hazard Index
TOTAL:	8.1E-10	1.6E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 8
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-2 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.00E+00	7.37E-10	NA	9.0E-02	NA	8.2E-09
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.90E-01	9.01E-10	NA	8.0E-04	NA	1.1E-06
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.00E-01	2.05E-10	NA	2.0E-01	NA	1.0E-09
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.00E-01	1.89E-10	NA	3.0E-01	NA	6.3E-10
120-12-7	Anthracene	3.3E-01	NC	NA	3.00E-01	4.29E-10	NA	1.0E+00	NA	4.3E-10
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	1.58E-11	3.00E-01	7.88E-10	7.3E-01	3.0E-01	1E-11	2.6E-09
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	1.38E-11	3.00E-01	6.87E-10	7.3E+00	3.0E-01	1E-10	2.3E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	1.48E-11	3.00E-01	7.37E-10	7.3E-01	3.0E-01	1E-11	2.5E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.00E-01	4.70E-10	NA	3.0E-01	NA	1.6E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	6.96E-12	3.00E-01	3.47E-10	7.3E-02	3.0E-01	5E-13	1.2E-09
218-01-9	Chrysene	5.9E-01	3.0E-01	1.54E-11	3.00E-01	7.66E-10	7.3E-02	3.0E-01	1E-12	2.6E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	3.70E-12	3.00E-01	1.85E-10	7.3E+00	3.0E-01	3E-11	6.2E-10
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.00E-01	1.54E-09	NA	4.0E-01	NA	3.9E-09
86-73-7	Fluorene	2.1E-01	NC	NA	3.00E-01	2.71E-10	NA	4.0E-01	NA	6.8E-10
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	1.08E-11	3.00E-01	5.40E-10	7.3E-01	3.0E-01	8E-12	1.8E-09
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.00E-01	1.75E-10	NA	4.0E-03	NA	4.4E-08
91-20-3	Naphthalene	1.6E-01	NC	NA	3.00E-01	2.06E-10	NA	2.0E-01	NA	1.0E-09
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.00E-01	1.64E-09	NA	3.0E-01	NA	5.5E-09
129-00-0	Pyrene	1.2E+00	NC	NA	3.00E-01	1.53E-09	NA	3.0E-01	NA	5.1E-09
C9-C10	GRO	1.5E+01	NC	NA	1.00E+00	6.35E-08	NA	3.0E-01	NA	2.1E-07
1336-36-3	Total PCBs	4.6E-01	1.0E+00	4.02E-11	1.00E+00	2.01E-09	2.0E+00	5.0E-05	8E-11	4.0E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.24E-15	1.00E+00	1.12E-13	1.5E+05	7.0E-10	3E-10	1.6E-04
7440-39-3	Barium	7.3E+01	NC	NA	1.00E+00	3.18E-07	NA	7.0E-02	NA	4.5E-06
7440-41-7	Beryllium	1.6E-01	NC	NA	1.00E+00	7.12E-10	NA	5.0E-03	NA	1.4E-07
7440-43-9	Cadmium	4.9E-01	NC	NA	1.00E+00	2.11E-09	NA	5.0E-04	NA	4.2E-06
16065-83-1	Chromium III	1.2E+01	NC	NA	1.00E+00	5.37E-08	NA	1.5E+00	NA	3.6E-08
7439-92-1	Lead	1.1E+02	NC	NA	5.00E-01	2.42E-07	NA	7.5E-04	NA	3.2E-04
7439-97-6	Mercury	1.2E-01	NC	NA	5.00E-01	2.70E-10	NA	3.0E-04	NA	9.0E-07
7440-02-0	Nickel	8.5E+00	NC	NA	1.00E+00	3.67E-08	NA	2.0E-02	NA	1.8E-06
7440-22-4	Silver	1.6E+00	NC	NA	1.00E+00	6.88E-09	NA	5.0E-03	NA	1.4E-06
7440-62-2	Vanadium	1.4E+01	NC	NA	1.00E+00	6.21E-08	NA	9.0E-03	NA	6.9E-06
7440-66-6	Zinc	6.8E+01	NC	NA	1.00E+00	2.94E-07	NA	3.0E-01	NA	9.8E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	5.8E-10	5.4E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 9
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-3 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	3.3E-09	1.0E+00	1.8E-07	5.5E-02	1.0E-02	2E-10	1.8E-05
108-88-3	Toluene	4.1E-02	NC	NA	1.0E+00	2.0E-07	NA	8.0E-01	NA	2.5E-07
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.0E+00	2.3E-07	NA	3.0E-01	NA	7.5E-07
SVOCs										
120-12-7	Anthracene	4.8E-01	NC	NA	3.0E-01	7.1E-07	NA	1.0E+00	NA	7.1E-07
56-55-3	Benzo(a)anthracene	8.1E-01	3.0E-01	2.2E-08	3.0E-01	1.2E-06	7.3E-01	3.0E-01	2E-08	4.0E-06
50-32-8	Benzo(a)pyrene	8.4E-01	3.0E-01	2.3E-08	3.0E-01	1.2E-06	7.3E+00	3.0E-01	2E-07	4.1E-06
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	2.5E-08	3.0E-01	1.3E-06	7.3E-01	3.0E-01	2E-08	4.5E-06
191-24-2	Benzo(g,h,i)perylene	5.2E-01	NC	NA	3.0E-01	7.6E-07	NA	3.0E-01	NA	2.5E-06
207-08-9	Benzo(k)fluoranthene	2.8E-01	3.0E-01	7.7E-09	3.0E-01	4.2E-07	7.3E-02	3.0E-01	6E-10	1.4E-06
218-01-9	Chrysene	7.8E-01	3.0E-01	2.1E-08	3.0E-01	1.1E-06	7.3E-02	3.0E-01	2E-09	3.8E-06
53-70-3	Dibenz(a,h)anthracene	1.6E-01	3.0E-01	4.3E-09	3.0E-01	2.3E-07	7.3E+00	3.0E-01	3E-08	7.7E-07
206-44-0	Fluoranthene	1.8E+00	NC	NA	3.0E-01	2.7E-06	NA	4.0E-01	NA	6.7E-06
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	3.0E-01	1.8E-08	3.0E-01	9.6E-07	7.3E-01	3.0E-01	1E-08	3.2E-06
91-20-3	Naphthalene	8.0E-01	NC	NA	3.0E-01	1.2E-06	NA	2.0E-01	NA	5.9E-06
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.0E-01	2.8E-06	NA	3.0E-01	NA	9.3E-06
129-00-0	Pyrene	1.7E+00	NC	NA	3.0E-01	2.5E-06	NA	3.0E-01	NA	8.2E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	1.0E+00	1.7E-08	1.0E+00	9.2E-07	2.0E+00	5.0E-05	3E-08	1.8E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.3E-12	1.0E+00	1.3E-10	1.5E+05	7.0E-10	4E-07	1.8E-01
Metals										
7440-39-3	Barium	1.4E+02	NC	NA	1.0E+00	6.7E-04	NA	7.0E-02	NA	9.6E-03
7440-41-7	Beryllium	2.4E-01	NC	NA	1.0E+00	1.2E-06	NA	5.0E-03	NA	2.3E-04
7439-92-1	Lead	2.0E+02	NC	NA	5.0E-01	5.0E-04	NA	7.5E-04	NA	6.6E-01
7439-97-6	Mercury	1.5E-01	NC	NA	5.0E-01	3.8E-07	NA	3.0E-04	NA	1.3E-03
7440-22-4	Silver	8.4E-01	NC	NA	1.0E+00	4.1E-06	NA	5.0E-03	NA	8.3E-04
7440-66-6	Zinc	1.1E+02	NC	NA	1.0E+00	5.2E-04	NA	3.0E-01	NA	1.7E-03

	Cancer Risk	Hazard Index
TOTAL:	6.3E-07	8.7E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 10
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-3 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
71-43-2	Benzene	3.6E-02	0.03	8.3E-10	0.03	4.3E-08	5.5E-02	1.0E-02	5E-11	4.3E-06
108-88-3	Toluene	4.1E-02	NC	NA	0.03	4.9E-08	NA	8.0E-01	NA	6.1E-08
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	0.2	3.7E-07	NA	3.0E-01	NA	1.2E-06
SVOCs										
120-12-7	Anthracene	4.8E-01	NC	NA	0.1	1.9E-06	NA	1.0E+00	NA	1.9E-06
56-55-3	Benzo(a)anthracene	8.1E-01	0.02	1.2E-08	0.02	6.5E-07	7.3E-01	3.0E-01	9E-09	2.2E-06
50-32-8	Benzo(a)pyrene	8.4E-01	0.02	1.3E-08	0.02	6.6E-07	7.3E+00	3.0E-01	9E-08	2.2E-06
205-99-2	Benzo(b)fluoranthene	9.2E-01	0.02	1.4E-08	0.02	7.3E-07	7.3E-01	3.0E-01	1E-08	2.4E-06
191-24-2	Benzo(g,h,i)perylene	5.2E-01	NC	NA	0.1	2.1E-06	NA	3.0E-01	NA	6.9E-06
207-08-9	Benzo(k)fluoranthene	2.8E-01	0.02	4.4E-09	0.02	2.3E-07	7.3E-02	3.0E-01	3E-10	7.5E-07
218-01-9	Chrysene	7.8E-01	0.02	1.2E-08	0.02	6.2E-07	7.3E-02	3.0E-01	9E-10	2.1E-06
53-70-3	Dibenz(a,h)anthracene	1.6E-01	0.02	2.4E-09	0.02	1.2E-07	7.3E+00	3.0E-01	2E-08	4.2E-07
206-44-0	Fluoranthene	1.8E+00	NC	NA	0.1	7.3E-06	NA	4.0E-01	NA	1.8E-05
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	0.02	1.0E-08	0.02	5.2E-07	7.3E-01	3.0E-01	7E-09	1.7E-06
91-20-3	Naphthalene	8.0E-01	NC	NA	0.1	3.2E-06	NA	2.0E-01	NA	1.6E-05
85-01-8	Phenanthrene	1.9E+00	NC	NA	0.1	7.5E-06	NA	3.0E-01	NA	2.5E-05
129-00-0	Pyrene	1.7E+00	NC	NA	0.1	6.7E-06	NA	3.0E-01	NA	2.2E-05
1336-36-3	Total PCBs	1.9E-01	0.1	1.5E-08	0.1	7.5E-07	2.0E+00	5.0E-05	3E-08	1.5E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.0E-12	0.1	1.0E-10	1.5E+05	7.0E-10	3E-07	1.5E-01
7440-39-3	Barium	1.4E+02	NC	NA	0.1	5.4E-04	NA	7.0E-02	NA	7.8E-03
7440-41-7	Beryllium	2.4E-01	NC	NA	0.1	9.4E-07	NA	5.0E-03	NA	1.9E-04
7439-92-1	Lead	2.0E+02	NC	NA	0.006	4.8E-05	NA	7.5E-04	NA	6.5E-02
7439-97-6	Mercury	1.5E-01	NC	NA	0.1	6.1E-07	NA	3.0E-04	NA	2.0E-03
7440-22-4	Silver	8.4E-01	NC	NA	0.3	1.0E-05	NA	5.0E-03	NA	2.0E-03
7440-66-6	Zinc	1.1E+02	NC	NA	0.1	4.2E-04	NA	3.0E-01	NA	1.4E-03

	Cancer Risk	Hazard Index
TOTAL:	4.7E-07	2.4E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 11
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-3 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
71-43-2	Benzene	3.6E-02	3.6E-09	1.8E-07	7.8E-06	1.0E+01	3E-14	1.8E-08
108-88-3	Toluene	4.1E-02	4.2E-09	2.1E-07	NA	5.0E+03	NA	4.1E-11
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	4.7E-09	2.3E-07	NA	5.0E+02	NA	4.7E-10
SVOCs								
120-12-7	Anthracene	4.8E-01	4.9E-08	2.4E-06	NA	5.0E+02	NA	4.9E-09
56-55-3	Benzo(a)anthracene	8.1E-01	8.2E-08	4.1E-06	2.1E-04	5.0E+02	2E-11	8.2E-09
50-32-8	Benzo(a)pyrene	8.4E-01	8.5E-08	4.2E-06	2.1E-03	5.0E+02	2E-10	8.4E-09
205-99-2	Benzo(b)fluoranthene	9.2E-01	9.3E-08	4.6E-06	2.1E-04	5.0E+02	2E-11	9.3E-09
191-24-2	Benzo(g,h,i)perylene	5.2E-01	5.3E-08	2.6E-06	NA	5.0E+02	NA	5.2E-09
207-08-9	Benzo(k)fluoranthene	2.8E-01	2.9E-08	1.4E-06	2.1E-05	5.0E+02	6E-13	2.9E-09
218-01-9	Chrysene	7.8E-01	7.9E-08	4.0E-06	2.1E-05	5.0E+02	2E-12	7.9E-09
53-70-3	Dibenz(a,h)anthracene	1.6E-01	1.6E-08	7.9E-07	2.1E-03	5.0E+02	3E-11	1.6E-09
206-44-0	Fluoranthene	1.8E+00	1.9E-07	9.3E-06	NA	5.0E+02	NA	1.9E-08
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	6.6E-08	3.3E-06	2.1E-04	5.0E+02	1E-11	6.6E-09
91-20-3	Naphthalene	8.0E-01	8.1E-08	4.0E-06	NA	3.0E+00	NA	1.3E-06
85-01-8	Phenanthrene	1.9E+00	1.9E-07	9.6E-06	NA	5.0E+02	NA	1.9E-08
129-00-0	Pyrene	1.7E+00	1.7E-07	8.5E-06	NA	5.0E+02	NA	1.7E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.9E-01	1.9E-08	9.6E-07	1.0E-04	2.0E-02	2E-12	4.8E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.6E-12	1.3E-10	3.3E+01	2.0E-06	9E-11	6.5E-05
Metals								
7440-39-3	Barium	1.4E+02	1.4E-05	6.9E-04	NA	5.0E+00	NA	1.4E-04
7440-41-7	Beryllium	2.4E-01	2.4E-08	1.2E-06	2.4E-03	2.0E-02	6E-11	6.0E-05
7439-92-1	Lead	2.0E+02	2.1E-05	1.0E-03	NA	1.0E+00	NA	1.0E-03
7439-97-6	Mercury	1.5E-01	1.6E-08	7.8E-07	NA	3.0E-01	NA	2.6E-06
7440-22-4	Silver	8.4E-01	8.6E-08	4.3E-06	NA	1.4E-01	NA	3.0E-05
7440-66-6	Zinc	1.1E+02	1.1E-05	5.4E-04	NA	1.4E+00	NA	3.8E-04

	Cancer Risk	Hazard Index
TOTAL:	4.1E-10	1.8E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 12
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-3 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	3.13E-12	1.00E+00	1.56E-10	5.5E-02	1.0E-02	2E-13	1.6E-08
108-88-3	Toluene	4.1E-02	NC	NA	1.00E+00	1.78E-10	NA	8.0E-01	NA	2.2E-10
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.00E+00	1.99E-10	NA	3.0E-01	NA	6.6E-10
SVOCs										
120-12-7	Anthracene	4.8E-01	NC	NA	3.00E-01	6.26E-10	NA	1.0E+00	NA	6.3E-10
56-55-3	Benzo(a)anthracene	8.1E-01	3.0E-01	2.11E-11	3.00E-01	1.05E-09	7.3E-01	3.0E-01	2E-11	3.5E-09
50-32-8	Benzo(a)pyrene	8.4E-01	3.0E-01	2.18E-11	3.00E-01	1.09E-09	7.3E+00	3.0E-01	2E-10	3.6E-09
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	2.39E-11	3.00E-01	1.19E-09	7.3E-01	3.0E-01	2E-11	4.0E-09
191-24-2	Benzo(g,h,i)perylene	5.2E-01	NC	NA	3.00E-01	6.75E-10	NA	3.0E-01	NA	2.2E-09
207-08-9	Benzo(k)fluoranthene	2.8E-01	3.0E-01	7.40E-12	3.00E-01	3.69E-10	7.3E-02	3.0E-01	5E-13	1.2E-09
218-01-9	Chrysene	7.8E-01	3.0E-01	2.04E-11	3.00E-01	1.02E-09	7.3E-02	3.0E-01	1E-12	3.4E-09
53-70-3	Dibenz(a,h)anthracene	1.6E-01	3.0E-01	4.09E-12	3.00E-01	2.04E-10	7.3E+00	3.0E-01	3E-11	6.8E-10
206-44-0	Fluoranthene	1.8E+00	NC	NA	3.00E-01	2.39E-09	NA	4.0E-01	NA	6.0E-09
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	3.0E-01	1.71E-11	3.00E-01	8.52E-10	7.3E-01	3.0E-01	1E-11	2.8E-09
91-20-3	Naphthalene	8.0E-01	NC	NA	3.00E-01	1.04E-09	NA	2.0E-01	NA	5.2E-09
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.00E-01	2.46E-09	NA	3.0E-01	NA	8.2E-09
129-00-0	Pyrene	1.7E+00	NC	NA	3.00E-01	2.17E-09	NA	3.0E-01	NA	7.2E-09
1336-36-3	Total PCBs	1.9E-01	1.0E+00	1.64E-11	1.00E+00	8.19E-10	2.0E+00	5.0E-05	3E-11	1.6E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.24E-15	1.00E+00	1.12E-13	1.5E+05	7.0E-10	3E-10	1.6E-04
7440-39-3	Barium	1.4E+02	NC	NA	1.00E+00	5.92E-07	NA	7.0E-02	NA	8.5E-06
7440-41-7	Beryllium	2.4E-01	NC	NA	1.00E+00	1.02E-09	NA	5.0E-03	NA	2.0E-07
7439-92-1	Lead	2.0E+02	NC	NA	5.00E-01	4.40E-07	NA	7.5E-04	NA	5.9E-04
7439-97-6	Mercury	1.5E-01	NC	NA	5.00E-01	3.34E-10	NA	3.0E-04	NA	1.1E-06
7440-22-4	Silver	8.4E-01	NC	NA	1.00E+00	3.66E-09	NA	5.0E-03	NA	7.3E-07
7440-66-6	Zinc	1.1E+02	NC	NA	1.00E+00	4.61E-07	NA	3.0E-01	NA	1.5E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	6.0E-10	7.7E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 13
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-4 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.0E+00	3.8E-07	NA	1.0E-05	NA	3.8E-02
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	6.9E-09	1.0E+00	3.7E-07	1.4E-02	2.0E-02	1E-10	1.9E-05
120-12-7	Anthracene	3.8E-01	NC	NA	3.0E-01	5.6E-07	NA	1.0E+00	NA	5.6E-07
56-55-3	Benzo(a)anthracene	7.8E-01	3.0E-01	2.1E-08	3.0E-01	1.1E-06	7.3E-01	3.0E-01	2E-08	3.8E-06
50-32-8	Benzo(a)pyrene	7.0E-01	3.0E-01	1.9E-08	3.0E-01	1.0E-06	7.3E+00	3.0E-01	1E-07	3.4E-06
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	2.5E-08	3.0E-01	1.3E-06	7.3E-01	3.0E-01	2E-08	4.5E-06
191-24-2	Benzo(g,h,i)perylene	2.5E-01	NC	NA	3.0E-01	3.6E-07	NA	3.0E-01	NA	1.2E-06
207-08-9	Benzo(k)fluoranthene	3.6E-01	3.0E-01	9.8E-09	3.0E-01	5.3E-07	7.3E-02	3.0E-01	7E-10	1.8E-06
218-01-9	Chrysene	6.9E-01	3.0E-01	1.9E-08	3.0E-01	1.0E-06	7.3E-02	3.0E-01	1E-09	3.4E-06
53-70-3	Dibenz(a,h)anthracene	1.3E-01	3.0E-01	3.6E-09	3.0E-01	1.9E-07	7.3E+00	3.0E-01	3E-08	6.4E-07
206-44-0	Fluoranthene	1.4E+00	NC	NA	3.0E-01	2.1E-06	NA	4.0E-01	NA	5.2E-06
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	3.0E-01	6.6E-09	3.0E-01	3.5E-07	7.3E-01	3.0E-01	5E-09	1.2E-06
129-00-0	Pyrene	1.5E+00	NC	NA	3.0E-01	2.2E-06	NA	3.0E-01	NA	7.4E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	5.4E-01	1.0E+00	4.9E-08	1.0E+00	2.6E-06	2.0E+00	5.0E-05	1E-07	5.2E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.3E-12	1.0E+00	1.3E-10	1.5E+05	7.0E-10	4E-07	1.8E-01
Metals										
7440-39-3	Barium	6.8E+01	NC	NA	1.0E+00	3.3E-04	NA	7.0E-02	NA	4.7E-03
7440-43-9	Cadmium	5.2E-01	NC	NA	1.0E+00	2.5E-06	NA	5.0E-04	NA	5.1E-03
16065-83-1	Chromium III	1.4E+01	NC	NA	1.0E+00	6.6E-05	NA	1.5E+00	NA	4.4E-05
7439-92-1	Lead	1.4E+02	NC	NA	5.0E-01	3.4E-04	NA	7.5E-04	NA	4.5E-01
7440-22-4	Silver	3.8E-01	NC	NA	1.0E+00	1.9E-06	NA	5.0E-03	NA	3.7E-04

	Cancer Risk	Hazard Index
TOTAL:	6.6E-07	7.3E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 14
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-4 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	0.19	5.9E-07	NA	1.0E-05	NA	5.9E-02
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	0.1	5.9E-09	0.1	3.0E-07	1.4E-02	2.0E-02	8E-11	1.5E-05
120-12-7	Anthracene	3.8E-01	NC	NA	0.1	1.5E-06	NA	1.0E+00	NA	1.5E-06
56-55-3	Benzo(a)anthracene	7.8E-01	0.02	1.2E-08	0.02	6.2E-07	7.3E-01	3.0E-01	9E-09	2.1E-06
50-32-8	Benzo(a)pyrene	7.0E-01	0.02	1.1E-08	0.02	5.6E-07	7.3E+00	3.0E-01	8E-08	1.9E-06
205-99-2	Benzo(b)fluoranthene	9.2E-01	0.02	1.4E-08	0.02	7.3E-07	7.3E-01	3.0E-01	1E-08	2.4E-06
191-24-2	Benzo(g,h,i)perylene	2.5E-01	NC	NA	0.1	9.9E-07	NA	3.0E-01	NA	3.3E-06
207-08-9	Benzo(k)fluoranthene	3.6E-01	0.02	5.6E-09	0.02	2.9E-07	7.3E-02	3.0E-01	4E-10	9.6E-07
218-01-9	Chrysene	6.9E-01	0.02	1.1E-08	0.02	5.5E-07	7.3E-02	3.0E-01	8E-10	1.8E-06
53-70-3	Dibenz(a,h)anthracene	1.3E-01	0.02	2.0E-09	0.02	1.0E-07	7.3E+00	3.0E-01	1E-08	3.5E-07
206-44-0	Fluoranthene	1.4E+00	NC	NA	0.1	5.7E-06	NA	4.0E-01	NA	1.4E-05
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	0.02	3.7E-09	0.02	1.9E-07	7.3E-01	3.0E-01	3E-09	6.4E-07
129-00-0	Pyrene	1.5E+00	NC	NA	0.1	6.0E-06	NA	3.0E-01	NA	2.0E-05
1336-36-3	Total PCBs	5.4E-01	0.1	4.1E-08	0.1	2.1E-06	2.0E+00	5.0E-05	8E-08	4.3E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.0E-12	0.1	1.0E-10	1.5E+05	7.0E-10	3E-07	1.5E-01
7440-39-3	Barium	6.8E+01	NC	NA	0.1	2.7E-04	NA	7.0E-02	NA	3.8E-03
7440-43-9	Cadmium	5.2E-01	NC	NA	0.01	2.1E-07	NA	5.0E-04	NA	4.1E-04
16065-83-1	Chromium III	1.4E+01	NC	NA	0.1	5.4E-05	NA	1.5E+00	NA	3.6E-05
7439-92-1	Lead	1.4E+02	NC	NA	0.006	3.3E-05	NA	7.5E-04	NA	4.4E-02
7440-22-4	Silver	3.8E-01	NC	NA	0.3	4.6E-06	NA	5.0E-03	NA	9.1E-04

	Cancer Risk	Hazard Index
TOTAL:	5.0E-07	3.0E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 15
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-4 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
101-55-3	4-Bromodiphenyl ether	7.8E-02	7.9E-09	3.9E-07	NA	3.5E-02	NA	1.1E-05
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	7.7E-09	3.8E-07	1.3E-06	7.0E+00	1E-14	5.5E-08
120-12-7	Anthracene	3.8E-01	3.9E-08	1.9E-06	NA	5.0E+02	NA	3.9E-09
56-55-3	Benzo(a)anthracene	7.8E-01	7.9E-08	3.9E-06	2.1E-04	5.0E+02	2E-11	7.9E-09
50-32-8	Benzo(a)pyrene	7.0E-01	7.1E-08	3.6E-06	2.1E-03	5.0E+02	2E-10	7.1E-09
205-99-2	Benzo(b)fluoranthene	9.2E-01	9.3E-08	4.6E-06	2.1E-04	5.0E+02	2E-11	9.3E-09
191-24-2	Benzo(g,h,i)perylene	2.5E-01	2.5E-08	1.3E-06	NA	5.0E+02	NA	2.5E-09
207-08-9	Benzo(k)fluoranthene	3.6E-01	3.7E-08	1.8E-06	2.1E-05	5.0E+02	8E-13	3.6E-09
218-01-9	Chrysene	6.9E-01	6.9E-08	3.5E-06	2.1E-05	5.0E+02	1E-12	6.9E-09
53-70-3	Dibenz(a,h)anthracene	1.3E-01	1.3E-08	6.6E-07	2.1E-03	5.0E+02	3E-11	1.3E-09
206-44-0	Fluoranthene	1.4E+00	1.4E-07	7.2E-06	NA	5.0E+02	NA	1.4E-08
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	2.4E-08	1.2E-06	2.1E-04	5.0E+02	5E-12	2.4E-09
129-00-0	Pyrene	1.5E+00	1.5E-07	7.7E-06	NA	5.0E+02	NA	1.5E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	5.4E-01	5.4E-08	2.7E-06	1.0E-04	2.0E-02	5E-12	1.4E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.6E-12	1.3E-10	3.3E+01	2.0E-06	9E-11	6.5E-05
Metals								
7440-39-3	Barium	6.8E+01	6.8E-06	3.4E-04	NA	5.0E+00	NA	6.8E-05
7440-43-9	Cadmium	5.2E-01	5.3E-08	2.6E-06	1.8E-03	2.0E-02	1E-10	1.3E-04
16065-83-1	Chromium III	1.4E+01	1.4E-06	6.9E-05	NA	3.0E-01	NA	2.3E-04
7439-92-1	Lead	1.4E+02	1.4E-05	7.0E-04	NA	1.0E+00	NA	7.0E-04
7440-22-4	Silver	3.8E-01	3.9E-08	1.9E-06	NA	1.4E-01	NA	1.4E-05

	Cancer Risk	Hazard Index
TOTAL:	4.1E-10	1.4E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 16
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-4 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.00E+00	3.38E-10	NA	1.0E-05	NA	3.4E-05
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	6.60E-12	1.00E+00	3.29E-10	1.4E-02	2.0E-02	9E-14	1.6E-08
120-12-7	Anthracene	3.8E-01	NC	NA	3.00E-01	4.95E-10	NA	1.0E+00	NA	5.0E-10
56-55-3	Benzo(a)anthracene	7.8E-01	3.0E-01	2.03E-11	3.00E-01	1.01E-09	7.3E-01	3.0E-01	1E-11	3.4E-09
50-32-8	Benzo(a)pyrene	7.0E-01	3.0E-01	1.84E-11	3.00E-01	9.16E-10	7.3E+00	3.0E-01	1E-10	3.1E-09
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	2.40E-11	3.00E-01	1.20E-09	7.3E-01	3.0E-01	2E-11	4.0E-09
191-24-2	Benzo(g,h,i)perylene	2.5E-01	NC	NA	3.00E-01	3.22E-10	NA	3.0E-01	NA	1.1E-09
207-08-9	Benzo(k)fluoranthene	3.6E-01	3.0E-01	9.41E-12	3.00E-01	4.69E-10	7.3E-02	3.0E-01	7E-13	1.6E-09
218-01-9	Chrysene	6.9E-01	3.0E-01	1.79E-11	3.00E-01	8.91E-10	7.3E-02	3.0E-01	1E-12	3.0E-09
53-70-3	Dibenz(a,h)anthracene	1.3E-01	3.0E-01	3.42E-12	3.00E-01	1.71E-10	7.3E+00	3.0E-01	2E-11	5.7E-10
206-44-0	Fluoranthene	1.4E+00	NC	NA	3.00E-01	1.86E-09	NA	4.0E-01	NA	4.6E-09
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	3.0E-01	6.27E-12	3.00E-01	3.13E-10	7.3E-01	3.0E-01	5E-12	1.0E-09
129-00-0	Pyrene	1.5E+00	NC	NA	3.00E-01	1.97E-09	NA	3.0E-01	NA	6.6E-09
1336-36-3	Total PCBs	5.4E-01	1.0E+00	4.66E-11	1.00E+00	2.32E-09	2.0E+00	5.0E-05	9E-11	4.6E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.24E-15	1.00E+00	1.12E-13	1.5E+05	7.0E-10	3E-10	1.6E-04
7440-39-3	Barium	6.8E+01	NC	NA	1.00E+00	2.93E-07	NA	7.0E-02	NA	4.2E-06
7440-43-9	Cadmium	5.2E-01	NC	NA	1.00E+00	2.26E-09	NA	5.0E-04	NA	4.5E-06
16065-83-1	Chromium III	1.4E+01	NC	NA	1.00E+00	5.87E-08	NA	1.5E+00	NA	3.9E-08
7439-92-1	Lead	1.4E+02	NC	NA	5.00E-01	2.99E-07	NA	7.5E-04	NA	4.0E-04
7440-22-4	Silver	3.8E-01	NC	NA	1.00E+00	1.66E-09	NA	5.0E-03	NA	3.3E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	6.3E-10	6.5E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 17
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-6 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.3E-01	NC	NA	3.0E-01	1.9E-07	NA	2.0E-01	NA	9.7E-07
120-12-7	Anthracene	2.7E-01	NC	NA	3.0E-01	4.0E-07	NA	1.0E+00	NA	4.0E-07
56-55-3	Benzo(a)anthracene	4.4E-01	3.0E-01	1.2E-08	3.0E-01	6.5E-07	7.3E-01	3.0E-01	9E-09	2.2E-06
205-99-2	Benzo(b)fluoranthene	4.6E-01	3.0E-01	1.3E-08	3.0E-01	6.8E-07	7.3E-01	3.0E-01	9E-09	2.3E-06
206-44-0	Fluoranthene	7.9E-01	NC	NA	3.0E-01	1.2E-06	NA	4.0E-01	NA	2.9E-06
91-20-3	Naphthalene	1.2E-01	NC	NA	3.0E-01	1.7E-07	NA	2.0E-01	NA	8.5E-07
85-01-8	Phenanthrene	8.3E-01	NC	NA	3.0E-01	1.2E-06	NA	3.0E-01	NA	4.1E-06
129-00-0	Pyrene	8.1E-01	NC	NA	3.0E-01	1.2E-06	NA	3.0E-01	NA	3.9E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	4.2E+00	1.0E+00	3.8E-07	1.0E+00	2.0E-05	2.0E+00	5.0E-05	8E-07	4.1E-01
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.3E-12	1.0E+00	1.3E-10	1.5E+05	7.0E-10	4E-07	1.8E-01
Metals										
7440-39-3	Barium	2.1E+02	NC	NA	1.0E+00	1.0E-03	NA	7.0E-02	NA	1.5E-02
7440-43-9	Cadmium	4.8E-01	NC	NA	1.0E+00	2.4E-06	NA	5.0E-04	NA	4.7E-03
16065-83-1	Chromium III	1.5E+03	NC	NA	1.0E+00	7.1E-03	NA	1.5E+00	NA	4.8E-03
7439-92-1	Lead	1.1E+02	NC	NA	5.0E-01	2.7E-04	NA	7.5E-04	NA	3.7E-01
7440-66-6	Zinc	5.1E+01	NC	NA	1.0E+00	2.5E-04	NA	3.0E-01	NA	8.3E-04

	Cancer Risk	Hazard Index
TOTAL:	1.1E-06	9.8E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 18
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-6 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
83-32-9	Acenaphthene	1.3E-01	NC	NA	0.1	5.2E-07	NA	2.0E-01	NA	2.6E-06
120-12-7	Anthracene	2.7E-01	NC	NA	0.1	1.1E-06	NA	1.0E+00	NA	1.1E-06
56-55-3	Benzo(a)anthracene	4.4E-01	0.02	6.9E-09	0.02	3.5E-07	7.3E-01	3.0E-01	5E-09	1.2E-06
205-99-2	Benzo(b)fluoranthene	4.6E-01	0.02	7.1E-09	0.02	3.7E-07	7.3E-01	3.0E-01	5E-09	1.2E-06
206-44-0	Fluoranthene	7.9E-01	NC	NA	0.1	3.1E-06	NA	4.0E-01	NA	7.8E-06
91-20-3	Naphthalene	1.2E-01	NC	NA	0.1	4.6E-07	NA	2.0E-01	NA	2.3E-06
85-01-8	Phenanthrene	8.3E-01	NC	NA	0.1	3.3E-06	NA	3.0E-01	NA	1.1E-05
129-00-0	Pyrene	8.1E-01	NC	NA	0.1	3.2E-06	NA	3.0E-01	NA	1.1E-05
1336-36-3	Total PCBs	4.2E+00	0.1	3.2E-07	0.1	1.7E-05	2.0E+00	5.0E-05	6E-07	3.3E-01
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.0E-12	0.1	1.0E-10	1.5E+05	7.0E-10	3E-07	1.5E-01
7440-39-3	Barium	2.1E+02	NC	NA	0.1	8.3E-04	NA	7.0E-02	NA	1.2E-02
7440-43-9	Cadmium	4.8E-01	NC	NA	0.01	1.9E-07	NA	5.0E-04	NA	3.8E-04
16065-83-1	Chromium III	1.5E+03	NC	NA	0.1	5.8E-03	NA	1.5E+00	NA	3.9E-03
7439-92-1	Lead	1.1E+02	NC	NA	0.006	2.7E-05	NA	7.5E-04	NA	3.6E-02
7440-66-6	Zinc	5.1E+01	NC	NA	0.1	2.0E-04	NA	3.0E-01	NA	6.7E-04

	Cancer Risk	Hazard Index
TOTAL:	9.5E-07	5.3E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 19
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-6 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
83-32-9	Acenaphthene	1.3E-01	1.3E-08	6.6E-07	NA	5.0E+02	NA	1.3E-09
120-12-7	Anthracene	2.7E-01	2.8E-08	1.4E-06	NA	5.0E+02	NA	2.8E-09
56-55-3	Benzo(a)anthracene	4.4E-01	4.5E-08	2.2E-06	2.1E-04	5.0E+02	9E-12	4.5E-09
205-99-2	Benzo(b)fluoranthene	4.6E-01	4.7E-08	2.3E-06	2.1E-04	5.0E+02	1E-11	4.7E-09
206-44-0	Fluoranthene	7.9E-01	8.0E-08	4.0E-06	NA	5.0E+02	NA	8.0E-09
91-20-3	Naphthalene	1.2E-01	1.2E-08	5.8E-07	NA	3.0E+00	NA	1.9E-07
85-01-8	Phenanthrene	8.3E-01	8.4E-08	4.2E-06	NA	5.0E+02	NA	8.4E-09
129-00-0	Pyrene	8.1E-01	8.2E-08	4.1E-06	NA	5.0E+02	NA	8.2E-09
Dioxins/PCBs								
1336-36-3	Total PCBs	4.2E+00	4.2E-07	2.1E-05	1.0E-04	2.0E-02	4E-11	1.1E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.6E-12	1.3E-10	3.3E+01	2.0E-06	9E-11	6.5E-05
Metals								
7440-39-3	Barium	2.1E+02	2.1E-05	1.1E-03	NA	5.0E+00	NA	2.1E-04
7440-43-9	Cadmium	4.8E-01	4.9E-08	2.4E-06	1.8E-03	2.0E-02	9E-11	1.2E-04
16065-83-1	Chromium III	1.5E+03	1.5E-04	7.4E-03	NA	3.0E-01	NA	2.5E-02
7439-92-1	Lead	1.1E+02	1.1E-05	5.7E-04	NA	1.0E+00	NA	5.7E-04
7440-66-6	Zinc	5.1E+01	5.2E-06	2.6E-04	NA	1.4E+00	NA	1.8E-04

	Cancer Risk	Hazard Index
TOTAL:	2.4E-10	2.7E-02

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 20
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-6 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.3E-01	NC	NA	3.00E-01	1.71E-10	NA	2.0E-01	NA	8.5E-10
120-12-7	Anthracene	2.7E-01	NC	NA	3.00E-01	3.57E-10	NA	1.0E+00	NA	3.6E-10
56-55-3	Benzo(a)anthracene	4.4E-01	3.0E-01	1.16E-11	3.00E-01	5.78E-10	7.3E-01	3.0E-01	8E-12	1.9E-09
205-99-2	Benzo(b)fluoranthene	4.6E-01	3.0E-01	1.20E-11	3.00E-01	5.98E-10	7.3E-01	3.0E-01	9E-12	2.0E-09
206-44-0	Fluoranthene	7.9E-01	NC	NA	3.00E-01	1.02E-09	NA	4.0E-01	NA	2.6E-09
91-20-3	Naphthalene	1.2E-01	NC	NA	3.00E-01	1.50E-10	NA	2.0E-01	NA	7.5E-10
85-01-8	Phenanthrene	8.3E-01	NC	NA	3.00E-01	1.08E-09	NA	3.0E-01	NA	3.6E-09
129-00-0	Pyrene	8.1E-01	NC	NA	3.00E-01	1.05E-09	NA	3.0E-01	NA	3.5E-09
1336-36-3	Total PCBs	4.2E+00	1.0E+00	3.62E-10	1.00E+00	1.81E-08	2.0E+00	5.0E-05	7E-10	3.6E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.24E-15	1.00E+00	1.12E-13	1.5E+05	7.0E-10	3E-10	1.6E-04
7440-39-3	Barium	2.1E+02	NC	NA	1.00E+00	9.01E-07	NA	7.0E-02	NA	1.3E-05
7440-43-9	Cadmium	4.8E-01	NC	NA	1.00E+00	2.09E-09	NA	5.0E-04	NA	4.2E-06
16065-83-1	Chromium III	1.5E+03	NC	NA	1.00E+00	6.32E-06	NA	1.5E+00	NA	4.2E-06
7439-92-1	Lead	1.1E+02	NC	NA	5.00E-01	2.43E-07	NA	7.5E-04	NA	3.2E-04
7440-66-6	Zinc	5.1E+01	NC	NA	1.00E+00	2.20E-07	NA	3.0E-01	NA	7.3E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.1E-09	8.7E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 21
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-7 (0-3')
New Bedford, Massachusetts

Constituent		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.5E-01	1.0E+00	2.2E-08	1.0E+00	1.2E-06	2.0E+00	5.0E-05	4E-08	2.4E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.3E-12	1.0E+00	1.3E-10	1.5E+05	7.0E-10	4E-07	1.8E-01
Metals										
7440-39-3	Barium	7.8E+01	NC	NA	1.0E+00	3.8E-04	NA	7.0E-02	NA	5.4E-03
7440-41-7	Beryllium	2.6E-01	NC	NA	1.0E+00	1.3E-06	NA	5.0E-03	NA	2.6E-04
7440-43-9	Cadmium	6.6E-01	NC	NA	1.0E+00	3.2E-06	NA	5.0E-04	NA	6.5E-03
16065-83-1	Chromium III	1.4E+01	NC	NA	1.0E+00	6.8E-05	NA	1.5E+00	NA	4.6E-05
7439-92-1	Lead	1.2E+02	NC	NA	5.0E-01	3.0E-04	NA	7.5E-04	NA	4.0E-01
7440-66-6	Zinc	7.7E+01	NC	NA	1.0E+00	3.8E-04	NA	3.0E-01	NA	1.3E-03

	Cancer Risk	Hazard Index
TOTAL:	4.0E-07	6.2E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 22
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-7 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	2.5E-01	0.1	1.9E-08	0.1	9.8E-07	2.0E+00	5.0E-05	4E-08	2.0E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.0E-12	0.1	1.0E-10	1.5E+05	7.0E-10	3E-07	1.5E-01
7440-39-3	Barium	7.8E+01	NC	NA	0.1	3.1E-04	NA	7.0E-02	NA	4.4E-03
7440-41-7	Beryllium	2.6E-01	NC	NA	0.1	1.1E-06	NA	5.0E-03	NA	2.1E-04
7440-43-9	Cadmium	6.6E-01	NC	NA	0.01	2.6E-07	NA	5.0E-04	NA	5.2E-04
16065-83-1	Chromium III	1.4E+01	NC	NA	0.1	5.6E-05	NA	1.5E+00	NA	3.7E-05
7439-92-1	Lead	1.2E+02	NC	NA	0.006	2.9E-05	NA	7.5E-04	NA	3.9E-02
7440-66-6	Zinc	7.7E+01	NC	NA	0.1	3.1E-04	NA	3.0E-01	NA	1.0E-03

	Cancer Risk	Hazard Index
TOTAL:	3.4E-07	2.1E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 23
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-7 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	2.5E-01	2.5E-08	1.2E-06	1.0E-04	2.0E-02	2E-12	6.2E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.6E-12	1.3E-10	3.3E+01	2.0E-06	9E-11	6.5E-05
Metals								
7440-39-3	Barium	7.8E+01	7.9E-06	3.9E-04	NA	5.0E+00	NA	7.9E-05
7440-41-7	Beryllium	2.6E-01	2.7E-08	1.3E-06	2.4E-03	2.0E-02	6E-11	6.7E-05
7440-43-9	Cadmium	6.6E-01	6.7E-08	3.3E-06	1.8E-03	2.0E-02	1E-10	1.7E-04
16065-83-1	Chromium III	1.4E+01	1.4E-06	7.1E-05	NA	3.0E-01	NA	2.4E-04
7439-92-1	Lead	1.2E+02	1.2E-05	6.2E-04	NA	1.0E+00	NA	6.2E-04
7440-66-6	Zinc	7.7E+01	7.8E-06	3.9E-04	NA	1.4E+00	NA	2.8E-04

Max Dioxin/PCB TEQ at HB-26 1-3'

	Cancer Risk	Hazard Index
TOTAL:	2.7E-10	1.6E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 24
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-7 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	2.5E-01	1.0E+00	2.13E-11	1.00E+00	1.06E-09	2.0E+00	5.0E-05	4E-11	2.1E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.24E-15	1.00E+00	1.12E-13	1.5E+05	7.0E-10	3E-10	1.6E-04
7440-39-3	Barium	7.8E+01	NC	NA	1.00E+00	3.37E-07	NA	7.0E-02	NA	4.8E-06
7440-41-7	Beryllium	2.6E-01	NC	NA	1.00E+00	1.15E-09	NA	5.0E-03	NA	2.3E-07
7440-43-9	Cadmium	6.6E-01	NC	NA	1.00E+00	2.86E-09	NA	5.0E-04	NA	5.7E-06
16065-83-1	Chromium III	1.4E+01	NC	NA	1.00E+00	6.05E-08	NA	1.5E+00	NA	4.0E-08
7439-92-1	Lead	1.2E+02	NC	NA	5.00E-01	2.66E-07	NA	7.5E-04	NA	3.5E-04
7440-66-6	Zinc	7.7E+01	NC	NA	1.00E+00	3.33E-07	NA	3.0E-01	NA	1.1E-06

	Cancer Risk	Hazard Index
TOTAL:	3.8E-10	5.5E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 25
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-10 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.0E+00	1.5E-06	NA	1.0E-01	NA	1.5E-05
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	1.3E-08	1.0E+00	6.8E-07	1.4E-02	2.0E-02	2E-10	3.4E-05
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.6E-01	6.6E-07	NA	1.0E-03	NA	6.6E-04
83-32-9	Acenaphthene	2.0E-01	NC	NA	3.0E-01	2.9E-07	NA	2.0E-01	NA	1.5E-06
208-96-8	Acenaphthylene	1.4E-01	NC	NA	3.0E-01	2.0E-07	NA	3.0E-01	NA	6.8E-07
120-12-7	Anthracene	5.0E-01	NC	NA	3.0E-01	7.4E-07	NA	1.0E+00	NA	7.4E-07
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	3.3E-08	3.0E-01	1.8E-06	7.3E-01	3.0E-01	2E-08	5.9E-06
50-32-8	Benzo(a)pyrene	9.6E-01	3.0E-01	2.6E-08	3.0E-01	1.4E-06	7.3E+00	3.0E-01	2E-07	4.7E-06
205-99-2	Benzo(b)fluoranthene	1.2E+00	3.0E-01	3.3E-08	3.0E-01	1.8E-06	7.3E-01	3.0E-01	2E-08	6.0E-06
191-24-2	Benzo(g,h,i)perylene	4.0E-01	NC	NA	3.0E-01	5.9E-07	NA	3.0E-01	NA	2.0E-06
207-08-9	Benzo(k)fluoranthene	4.3E-01	3.0E-01	1.2E-08	3.0E-01	6.3E-07	7.3E-02	3.0E-01	9E-10	2.1E-06
218-01-9	Chrysene	1.1E+00	3.0E-01	3.0E-08	3.0E-01	1.6E-06	7.3E-02	3.0E-01	2E-09	5.4E-06
53-70-3	Dibenz(a,h)anthracene	1.2E-01	3.0E-01	3.4E-09	3.0E-01	1.8E-07	7.3E+00	3.0E-01	2E-08	6.1E-07
206-44-0	Fluoranthene	2.4E+00	NC	NA	3.0E-01	3.5E-06	NA	4.0E-01	NA	8.9E-06
86-73-7	Fluorene	2.2E-01	NC	NA	3.0E-01	3.3E-07	NA	4.0E-01	NA	8.2E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	3.0E-01	1.3E-08	3.0E-01	6.8E-07	7.3E-01	3.0E-01	9E-09	2.3E-06
91-57-6	2-Methylnaphthalene	1.6E-01	NC	NA	3.0E-01	2.4E-07	NA	4.0E-03	NA	6.0E-05
91-20-3	Naphthalene	1.4E-01	NC	NA	3.0E-01	2.1E-07	NA	2.0E-01	NA	1.0E-06
85-01-8	Phenanthrene	2.4E+00	NC	NA	3.0E-01	3.5E-06	NA	3.0E-01	NA	1.2E-05
129-00-0	Pyrene	2.8E+00	NC	NA	3.0E-01	4.1E-06	NA	3.0E-01	NA	1.4E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	1.6E+00	1.0E+00	1.4E-07	1.0E+00	7.7E-06	2.0E+00	5.0E-05	3E-07	1.5E-01
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.3E-12	1.0E+00	1.3E-10	1.5E+05	7.0E-10	4E-07	1.8E-01
Metals										
7440-38-2	Arsenic	5.3E+00	5.0E-01	2.4E-07	5.0E-01	1.3E-05	1.5E+00	3.0E-04	4E-07	4.3E-02
7440-39-3	Barium	3.3E+02	NC	NA	1.0E+00	1.6E-03	NA	7.0E-02	NA	2.3E-02
7440-41-7	Beryllium	1.8E-01	NC	NA	1.0E+00	8.6E-07	NA	5.0E-03	NA	1.7E-04
7440-43-9	Cadmium	9.8E-01	NC	NA	1.0E+00	4.8E-06	NA	5.0E-04	NA	9.6E-03
16065-83-1	Chromium III	2.9E+01	NC	NA	1.0E+00	1.4E-04	NA	1.5E+00	NA	9.3E-05
7439-92-1	Lead	3.5E+02	NC	NA	5.0E-01	8.6E-04	NA	7.5E-04	NA	1.1E+00
7439-97-6	Mercury	1.2E-01	NC	NA	5.0E-01	3.0E-07	NA	3.0E-04	NA	9.9E-04
7440-02-0	Nickel	5.6E+00	NC	NA	1.0E+00	2.7E-05	NA	2.0E-02	NA	1.4E-03
7440-22-4	Silver	5.8E-01	NC	NA	1.0E+00	2.8E-06	NA	5.0E-03	NA	5.7E-04
7440-62-2	Vanadium	1.2E+01	NC	NA	1.0E+00	6.0E-05	NA	9.0E-03	NA	6.7E-03
7440-66-6	Zinc	3.1E+01	NC	NA	1.0E+00	1.5E-04	NA	3.0E-01	NA	5.0E-04

	Cancer Risk	Hazard Index
TOTAL:	1.3E-06	1.6E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 26
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-10 (0-3')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	0.07	8.5E-07	NA	1.0E-01	NA	8.5E-06
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	0.1	1.1E-08	0.1	5.6E-07	1.4E-02	2.0E-02	2E-10	2.8E-05
132-64-9	Dibenzofuran	1.4E-01	NC	NA	0.18	1.0E-06	NA	1.0E-03	NA	1.0E-03
83-32-9	Acenaphthene	2.0E-01	NC	NA	0.1	7.9E-07	NA	2.0E-01	NA	3.9E-06
208-96-8	Acenaphthylene	1.4E-01	NC	NA	0.1	5.5E-07	NA	3.0E-01	NA	1.8E-06
120-12-7	Anthracene	5.0E-01	NC	NA	0.1	2.0E-06	NA	1.0E+00	NA	2.0E-06
56-55-3	Benzo(a)anthracene	1.2E+00	0.02	1.9E-08	0.02	9.6E-07	7.3E-01	3.0E-01	1E-08	3.2E-06
50-32-8	Benzo(a)pyrene	9.6E-01	0.02	1.5E-08	0.02	7.6E-07	7.3E+00	3.0E-01	1E-07	2.5E-06
205-99-2	Benzo(b)fluoranthene	1.2E+00	0.02	1.9E-08	0.02	9.7E-07	7.3E-01	3.0E-01	1E-08	3.2E-06
191-24-2	Benzo(g,h,i)perylene	4.0E-01	NC	NA	0.1	1.6E-06	NA	3.0E-01	NA	5.3E-06
207-08-9	Benzo(k)fluoranthene	4.3E-01	0.02	6.6E-09	0.02	3.4E-07	7.3E-02	3.0E-01	5E-10	1.1E-06
218-01-9	Chrysene	1.1E+00	0.02	1.7E-08	0.02	8.8E-07	7.3E-02	3.0E-01	1E-09	2.9E-06
53-70-3	Dibenz(a,h)anthracene	1.2E-01	0.02	1.9E-09	0.02	9.9E-08	7.3E+00	3.0E-01	1E-08	3.3E-07
206-44-0	Fluoranthene	2.4E+00	NC	NA	0.1	9.6E-06	NA	4.0E-01	NA	2.4E-05
86-73-7	Fluorene	2.2E-01	NC	NA	0.1	8.9E-07	NA	4.0E-01	NA	2.2E-06
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	0.02	7.1E-09	0.02	3.7E-07	7.3E-01	3.0E-01	5E-09	1.2E-06
91-57-6	2-Methylnaphthalene	1.6E-01	NC	NA	0.1	6.5E-07	NA	4.0E-03	NA	1.6E-04
91-20-3	Naphthalene	1.4E-01	NC	NA	0.1	5.6E-07	NA	2.0E-01	NA	2.8E-06
85-01-8	Phenanthrene	2.4E+00	NC	NA	0.1	9.4E-06	NA	3.0E-01	NA	3.1E-05
129-00-0	Pyrene	2.8E+00	NC	NA	0.1	1.1E-05	NA	3.0E-01	NA	3.7E-05
1336-36-3	Total PCBs	1.6E+00	0.1	1.2E-07	0.1	6.3E-06	2.0E+00	5.0E-05	2E-07	1.3E-01
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	2.0E-12	0.1	1.0E-10	1.5E+05	7.0E-10	3E-07	1.5E-01
7440-38-2	Arsenic	5.3E+00	0.03	1.2E-07	0.03	6.3E-06	1.5E+00	3.0E-04	2E-07	2.1E-02
7440-39-3	Barium	3.3E+02	NC	NA	0.1	1.3E-03	NA	7.0E-02	NA	1.9E-02
7440-41-7	Beryllium	1.8E-01	NC	NA	0.1	7.0E-07	NA	5.0E-03	NA	1.4E-04
7440-43-9	Cadmium	9.8E-01	NC	NA	0.01	3.9E-07	NA	5.0E-04	NA	7.8E-04
16065-83-1	Chromium III	2.9E+01	NC	NA	0.1	1.1E-04	NA	1.5E+00	NA	7.6E-05
7439-92-1	Lead	3.5E+02	NC	NA	0.006	8.4E-05	NA	7.5E-04	NA	1.1E-01
7439-97-6	Mercury	1.2E-01	NC	NA	0.1	4.8E-07	NA	3.0E-04	NA	1.6E-03
7440-02-0	Nickel	5.6E+00	NC	NA	0.2	4.5E-05	NA	2.0E-02	NA	2.2E-03
7440-22-4	Silver	5.8E-01	NC	NA	0.3	6.9E-06	NA	5.0E-03	NA	1.4E-03
7440-62-2	Vanadium	1.2E+01	NC	NA	0.1	4.9E-05	NA	9.0E-03	NA	5.5E-03
7440-66-6	Zinc	3.1E+01	NC	NA	0.1	1.2E-04	NA	3.0E-01	NA	4.1E-04

	Cancer Risk	Hazard Index
TOTAL:	8.8E-07	4.4E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 27
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-10 (0-3')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
84-74-2	di-n-Butylphthalate	3.0E-01	3.1E-08	1.5E-06	NA	3.5E+02	NA	4.4E-09
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.4E-08	7.1E-07	1.3E-06	7.0E+00	2E-14	1.0E-07
132-64-9	Dibenzofuran	1.4E-01	1.4E-08	7.1E-07	NA	3.5E+00	NA	2.0E-07
83-32-9	Acenaphthene	2.0E-01	2.0E-08	1.0E-06	NA	5.0E+02	NA	2.0E-09
208-96-8	Acenaphthylene	1.4E-01	1.4E-08	7.0E-07	NA	5.0E+02	NA	1.4E-09
120-12-7	Anthracene	5.0E-01	5.1E-08	2.5E-06	NA	5.0E+02	NA	5.1E-09
56-55-3	Benzo(a)anthracene	1.2E+00	1.2E-07	6.1E-06	2.1E-04	5.0E+02	3E-11	1.2E-08
50-32-8	Benzo(a)pyrene	9.6E-01	9.7E-08	4.8E-06	2.1E-03	5.0E+02	2E-10	9.7E-09
205-99-2	Benzo(b)fluoranthene	1.2E+00	1.2E-07	6.1E-06	2.1E-04	5.0E+02	3E-11	1.2E-08
191-24-2	Benzo(g,h,i)perylene	4.0E-01	4.1E-08	2.0E-06	NA	5.0E+02	NA	4.1E-09
207-08-9	Benzo(k)fluoranthene	4.3E-01	4.4E-08	2.2E-06	2.1E-05	5.0E+02	9E-13	4.4E-09
218-01-9	Chrysene	1.1E+00	1.1E-07	5.6E-06	2.1E-05	5.0E+02	2E-12	1.1E-08
53-70-3	Dibenz(a,h)anthracene	1.2E-01	1.3E-08	6.3E-07	2.1E-03	5.0E+02	3E-11	1.3E-09
206-44-0	Fluoranthene	2.4E+00	2.4E-07	1.2E-05	NA	5.0E+02	NA	2.4E-08
86-73-7	Fluorene	2.2E-01	2.3E-08	1.1E-06	NA	5.0E+02	NA	2.3E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	4.7E-08	2.3E-06	2.1E-04	5.0E+02	1E-11	4.7E-09
91-57-6	2-Methylnaphthalene	1.6E-01	1.7E-08	8.2E-07	NA	5.0E+02	NA	1.6E-09
91-20-3	Naphthalene	1.4E-01	1.4E-08	7.1E-07	NA	3.0E+00	NA	2.4E-07
85-01-8	Phenanthrene	2.4E+00	2.4E-07	1.2E-05	NA	5.0E+02	NA	2.4E-08
129-00-0	Pyrene	2.8E+00	2.8E-07	1.4E-05	NA	5.0E+02	NA	2.8E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.6E+00	1.6E-07	8.0E-06	1.0E-04	2.0E-02	2E-11	4.0E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.6E-12	1.3E-10	3.3E+01	2.0E-06	9E-11	6.5E-05
Metals								
7440-38-2	Arsenic	5.3E+00	5.3E-07	2.7E-05	3.0E-03	2.0E-02	2E-09	1.3E-03
7440-39-3	Barium	3.3E+02	3.4E-05	1.7E-03	NA	5.0E+00	NA	3.4E-04
7440-41-7	Beryllium	1.8E-01	1.8E-08	8.9E-07	2.4E-03	2.0E-02	4E-11	4.5E-05
7440-43-9	Cadmium	9.8E-01	9.9E-08	5.0E-06	1.8E-03	2.0E-02	2E-10	2.5E-04
16065-83-1	Chromium III	2.9E+01	2.9E-06	1.4E-04	NA	3.0E-01	NA	4.8E-04
7439-92-1	Lead	3.5E+02	3.6E-05	1.8E-03	NA	1.0E+00	NA	1.8E-03
7439-97-6	Mercury	1.2E-01	1.2E-08	6.1E-07	NA	3.0E-01	NA	2.0E-06
7440-02-0	Nickel	5.6E+00	5.7E-07	2.8E-05	4.8E-04	1.0E+00	3E-10	2.8E-05
7440-22-4	Silver	5.8E-01	5.9E-08	2.9E-06	NA	1.4E-01	NA	2.1E-05
7440-62-2	Vanadium	1.2E+01	1.3E-06	6.2E-05	NA	1.0E+00	NA	6.2E-05
7440-66-6	Zinc	3.1E+01	3.1E-06	1.5E-04	NA	1.4E+00	NA	1.1E-04

	Cancer Risk	Hazard Index
TOTAL:	2.5E-09	4.9E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 28
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-10 (0-3')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.00E+00	1.32E-09	NA	1.0E-01	NA	1.3E-08
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	1.22E-11	1.00E+00	6.07E-10	1.4E-02	2.0E-02	2E-13	3.0E-08
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.60E-01	5.86E-10	NA	1.0E-03	NA	5.9E-07
83-32-9	Acenaphthene	2.0E-01	NC	NA	3.00E-01	2.57E-10	NA	2.0E-01	NA	1.3E-09
208-96-8	Acenaphthylene	1.4E-01	NC	NA	3.00E-01	1.79E-10	NA	3.0E-01	NA	6.0E-10
120-12-7	Anthracene	5.0E-01	NC	NA	3.00E-01	6.54E-10	NA	1.0E+00	NA	6.5E-10
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	3.13E-11	3.00E-01	1.56E-09	7.3E-01	3.0E-01	2E-11	5.2E-09
50-32-8	Benzo(a)pyrene	9.6E-01	3.0E-01	2.50E-11	3.00E-01	1.24E-09	7.3E+00	3.0E-01	2E-10	4.1E-09
205-99-2	Benzo(b)fluoranthene	1.2E+00	3.0E-01	3.17E-11	3.00E-01	1.58E-09	7.3E-01	3.0E-01	2E-11	5.3E-09
191-24-2	Benzo(g,h,i)perylene	4.0E-01	NC	NA	3.00E-01	5.21E-10	NA	3.0E-01	NA	1.7E-09
207-08-9	Benzo(k)fluoranthene	4.3E-01	3.0E-01	1.12E-11	3.00E-01	5.60E-10	7.3E-02	3.0E-01	8E-13	1.9E-09
218-01-9	Chrysene	1.1E+00	3.0E-01	2.89E-11	3.00E-01	1.44E-09	7.3E-02	3.0E-01	2E-12	4.8E-09
53-70-3	Dibenz(a,h)anthracene	1.2E-01	3.0E-01	3.25E-12	3.00E-01	1.62E-10	7.3E+00	3.0E-01	2E-11	5.4E-10
206-44-0	Fluoranthene	2.4E+00	NC	NA	3.00E-01	3.14E-09	NA	4.0E-01	NA	7.8E-09
86-73-7	Fluorene	2.2E-01	NC	NA	3.00E-01	2.91E-10	NA	4.0E-01	NA	7.3E-10
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	3.0E-01	1.21E-11	3.00E-01	6.02E-10	7.3E-01	3.0E-01	9E-12	2.0E-09
91-57-6	2-Methylnaphthalene	1.6E-01	NC	NA	3.00E-01	2.12E-10	NA	4.0E-03	NA	5.3E-08
91-20-3	Naphthalene	1.4E-01	NC	NA	3.00E-01	1.82E-10	NA	2.0E-01	NA	9.1E-10
85-01-8	Phenanthrene	2.4E+00	NC	NA	3.00E-01	3.08E-09	NA	3.0E-01	NA	1.0E-08
129-00-0	Pyrene	2.8E+00	NC	NA	3.00E-01	3.59E-09	NA	3.0E-01	NA	1.2E-08
1336-36-3	Total PCBs	1.6E+00	1.0E+00	1.37E-10	1.00E+00	6.83E-09	2.0E+00	5.0E-05	3E-10	1.4E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	2.24E-15	1.00E+00	1.12E-13	1.5E+05	7.0E-10	3E-10	1.6E-04
7440-38-2	Arsenic	5.3E+00	5.0E-01	2.29E-10	5.00E-01	1.14E-08	1.5E+00	3.0E-04	3E-10	3.8E-05
7440-39-3	Barium	3.3E+02	NC	NA	1.00E+00	1.44E-06	NA	7.0E-02	NA	2.1E-05
7440-41-7	Beryllium	1.8E-01	NC	NA	1.00E+00	7.65E-10	NA	5.0E-03	NA	1.5E-07
7440-43-9	Cadmium	9.8E-01	NC	NA	1.00E+00	4.25E-09	NA	5.0E-04	NA	8.5E-06
16065-83-1	Chromium III	2.9E+01	NC	NA	1.00E+00	1.24E-07	NA	1.5E+00	NA	8.2E-08
7439-92-1	Lead	3.5E+02	NC	NA	5.00E-01	7.64E-07	NA	7.5E-04	NA	1.0E-03
7439-97-6	Mercury	1.2E-01	NC	NA	5.00E-01	2.64E-10	NA	3.0E-04	NA	8.8E-07
7440-02-0	Nickel	5.6E+00	NC	NA	1.00E+00	2.42E-08	NA	2.0E-02	NA	1.2E-06
7440-22-4	Silver	5.8E-01	NC	NA	1.00E+00	2.52E-09	NA	5.0E-03	NA	5.0E-07
7440-62-2	Vanadium	1.2E+01	NC	NA	1.00E+00	5.35E-08	NA	9.0E-03	NA	5.9E-06
7440-66-6	Zinc	3.1E+01	NC	NA	1.00E+00	1.33E-07	NA	3.0E-01	NA	4.4E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.2E-09	1.4E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 1
Adult Staff - 0-3'
Incidential Ingestion of Surface Soil
HS-1 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	1	7.6E-10	1	2.0E-09	2.0E+00	2.0E-05	2E-09	9.9E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1	3.3E-12	1	8.7E-12	1.5E+05	7.0E-10	5E-07	1.2E-02

	Cancer Risk	Hazard Index
TOTAL:	5.0E-07	1.2E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 2
Adult Staff - 0-3'
Dermal Contact with Surface Soil
HS-1 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	0.1	1.6E-10	0.1	4.1E-10	2.0E+00	2.0E-05	3E-10	2.1E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	7.0E-13	0.1	1.8E-12	1.5E+05	7.0E-10	1E-07	2.6E-03

	Cancer Risk	Hazard Index
TOTAL:	1.0E-07	2.6E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 3
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-1 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	5.9E-03	6.6E-09	1.7E-08	1.0E-04	2.0E-02	7E-13	8.6E-07
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.9E-11	7.5E-11	3.3E+01	2.0E-06	1E-09	3.7E-05

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	9.5E-10	3.8E-05

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 4
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-1 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	1.0E+00	1.98E-11	1.00E+00	5.13E-11	2.0E+00	2.0E-05	4E-11	2.6E-06
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	8.66E-14	1.00E+00	2.24E-13	1.5E+05	7.0E-10	1E-08	3.2E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.3E-08	3.2E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 5
Adult Staff - 0-3'
Incidential Ingestion of Surface Soil
HS-2 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1	5.7E-08	NA	1.0E-02	NA	5.7E-06
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	0.99	7.0E-08	NA	8.0E-04	NA	8.7E-05
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	0.3	1.6E-08	NA	6.0E-02	NA	2.6E-07
208-96-8	Acenaphthylene	1.5E-01	NC	NA	0.3	1.5E-08	NA	3.0E-02	NA	4.9E-07
120-12-7	Anthracene	3.3E-01	NC	NA	0.3	3.3E-08	NA	3.0E-01	NA	1.1E-07
56-55-3	Benzo(a)anthracene	6.1E-01	0.3	2.4E-08	0.3	6.1E-08	7.3E-01	3.0E-02	2E-08	2.0E-06
50-32-8	Benzo(a)pyrene	5.3E-01	0.3	2.1E-08	0.3	5.3E-08	7.3E+00	3.0E-02	2E-07	1.8E-06
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.3	2.2E-08	0.3	5.7E-08	7.3E-01	3.0E-02	2E-08	1.9E-06
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	0.3	3.7E-08	NA	3.0E-02	NA	1.2E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.3	1.0E-08	0.3	2.7E-08	7.3E-02	3.0E-02	8E-10	9.0E-07
218-01-9	Chrysene	5.9E-01	0.3	2.3E-08	0.3	5.9E-08	7.3E-02	3.0E-02	2E-09	2.0E-06
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.3	5.5E-09	0.3	1.4E-08	7.3E+00	3.0E-02	4E-08	4.8E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	0.3	1.2E-07	NA	4.0E-02	NA	3.0E-06
86-73-7	Fluorene	2.1E-01	NC	NA	0.3	2.1E-08	NA	4.0E-02	NA	5.3E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.3	1.6E-08	0.3	4.2E-08	7.3E-01	3.0E-02	1E-08	1.4E-06
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	0.3	1.4E-08	NA	4.0E-03	NA	3.4E-06
91-20-3	Naphthalene	1.6E-01	NC	NA	0.3	1.6E-08	NA	2.0E-02	NA	8.0E-07
85-01-8	Phenanthrene	1.3E+00	NC	NA	0.3	1.3E-07	NA	3.0E-02	NA	4.2E-06
129-00-0	Pyrene	1.2E+00	NC	NA	0.3	1.2E-07	NA	3.0E-02	NA	4.0E-06
C9-C10	GRO	1.5E+01	NC	NA	1	4.9E-06	NA	3.0E-02	NA	1.6E-04
Dioxins/PCBs										
1336-36-3	Total PCBs	4.6E-01	1	6.0E-08	1	1.6E-07	2.0E+00	2.0E-05	1E-07	7.8E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1	3.3E-12	1	8.7E-12	1.5E+05	7.0E-10	5E-07	1.2E-02
Metals										
7440-39-3	Barium	7.3E+01	NC	NA	1	2.5E-05	NA	2.0E-01	NA	1.2E-04
7440-41-7	Beryllium	1.6E-01	NC	NA	1	5.5E-08	NA	2.0E-03	NA	2.8E-05
7440-43-9	Cadmium	4.9E-01	NC	NA	1	1.6E-07	NA	5.0E-04	NA	3.3E-04
16065-83-1	Chromium III	1.2E+01	NC	NA	1	4.2E-06	NA	1.5E+00	NA	2.8E-06
7439-92-1	Lead	1.1E+02	NC	NA	0.5	1.9E-05	NA	7.5E-04	NA	2.5E-02
7439-97-6	Mercury	1.2E-01	NC	NA	0.5	2.1E-08	NA	3.0E-04	NA	7.0E-05
7440-02-0	Nickel	8.5E+00	NC	NA	1	2.8E-06	NA	2.0E-02	NA	1.4E-04
7440-22-4	Silver	1.6E+00	NC	NA	1	5.3E-07	NA	5.0E-03	NA	1.1E-04
7440-62-2	Vanadium	1.4E+01	NC	NA	1	4.8E-06	NA	9.0E-03	NA	5.4E-04
7440-66-6	Zinc	6.8E+01	NC	NA	1	2.3E-05	NA	3.0E-01	NA	7.6E-05

	Cancer Risk	Hazard Index
TOTAL:	8.6E-07	4.7E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 6
Adult Staff - 0-3'
Dermal Contact with Surface Soil
HS-2 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NA	NA	0.03	3.6E-09	NA	1.0E-02	NA	3.6E-07
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NA	NA	0.11	1.6E-08	NA	8.0E-04	NA	2.0E-05
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NA	NA	0.1	1.1E-08	NA	6.0E-02	NA	1.8E-07
208-96-8	Acenaphthylene	1.5E-01	NA	NA	0.1	1.0E-08	NA	3.0E-02	NA	3.4E-07
120-12-7	Anthracene	3.3E-01	NA	NA	0.1	2.3E-08	NA	3.0E-01	NA	7.7E-08
56-55-3	Benzo(a)anthracene	6.1E-01	0.02	3.3E-09	0.02	8.5E-09	7.3E-01	3.0E-02	2E-09	2.8E-07
50-32-8	Benzo(a)pyrene	5.3E-01	0.02	2.9E-09	0.02	7.4E-09	7.3E+00	3.0E-02	2E-08	2.5E-07
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.02	3.1E-09	0.02	8.0E-09	7.3E-01	3.0E-02	2E-09	2.7E-07
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NA	NA	0.1	2.5E-08	NA	3.0E-02	NA	8.5E-07
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.02	1.4E-09	0.02	3.7E-09	7.3E-02	3.0E-02	1E-10	1.2E-07
218-01-9	Chrysene	5.9E-01	0.02	3.2E-09	0.02	8.3E-09	7.3E-02	3.0E-02	2E-10	2.8E-07
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.02	7.7E-10	0.02	2.0E-09	7.3E+00	3.0E-02	6E-09	6.6E-08
206-44-0	Fluoranthene	1.2E+00	NA	NA	0.1	8.3E-08	NA	4.0E-02	NA	2.1E-06
86-73-7	Fluorene	2.1E-01	NA	NA	0.1	1.5E-08	NA	4.0E-02	NA	3.7E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.02	2.2E-09	0.02	5.8E-09	7.3E-01	3.0E-02	2E-09	1.9E-07
91-57-6	2-Methylnaphthalene	1.3E-01	NA	NA	0.1	9.4E-09	NA	4.0E-03	NA	2.4E-06
91-20-3	Naphthalene	1.6E-01	NA	NA	0.1	1.1E-08	NA	2.0E-02	NA	5.6E-07
85-01-8	Phenanthrene	1.3E+00	NA	NA	0.1	8.8E-08	NA	3.0E-02	NA	2.9E-06
129-00-0	Pyrene	1.2E+00	NA	NA	0.1	8.3E-08	NA	3.0E-02	NA	2.8E-06
C9-C10	GRO	1.5E+01	NA	NA	0.2	2.1E-06	NA	3.0E-02	NA	6.9E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	4.6E-01	0.1	1.3E-08	0.1	3.2E-08	2.0E+00	2.0E-05	3E-08	1.6E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	7.0E-13	0.1	1.8E-12	1.5E+05	7.0E-10	1E-07	2.6E-03
Metals										
7440-39-3	Barium	7.3E+01	NA	NA	0.1	5.1E-06	NA	2.0E-01	NA	2.6E-05
7440-41-7	Beryllium	1.6E-01	NA	NA	0.1	1.2E-08	NA	2.0E-03	NA	5.8E-06
7440-43-9	Cadmium	4.9E-01	NA	NA	0.01	3.4E-09	NA	5.0E-04	NA	6.8E-06
16065-83-1	Chromium III	1.2E+01	NA	NA	0.1	8.7E-07	NA	1.5E+00	NA	5.8E-07
7439-92-1	Lead	1.1E+02	NA	NA	0.006	4.7E-07	NA	7.5E-04	NA	6.3E-04
7439-97-6	Mercury	1.2E-01	NA	NA	0.1	8.7E-09	NA	3.0E-04	NA	2.9E-05
7440-02-0	Nickel	8.5E+00	NA	NA	0.2	1.2E-06	NA	2.0E-02	NA	5.9E-05
7440-22-4	Silver	1.6E+00	NA	NA	0.3	3.3E-07	NA	5.0E-03	NA	6.7E-05
7440-62-2	Vanadium	1.4E+01	NA	NA	0.1	1.0E-06	NA	9.0E-03	NA	1.1E-04
7440-66-6	Zinc	6.8E+01	NA	NA	0.1	4.8E-06	NA	3.0E-01	NA	1.6E-05

	Cancer Risk	Hazard Index
TOTAL:	1.6E-07	5.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 7
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-2 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	1.9E-07	4.9E-07	NA	2.0E+00	NA	2.5E-07
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	2.4E-07	6.1E-07	NA	2.8E+00	NA	2.2E-07
SVOCs								
83-32-9	Acenaphthene	1.6E-01	1.8E-07	4.6E-07	NA	5.0E+01	NA	9.2E-09
208-96-8	Acenaphthylene	1.5E-01	1.6E-07	4.2E-07	NA	5.0E+01	NA	8.5E-09
120-12-7	Anthracene	3.3E-01	3.7E-07	9.6E-07	NA	5.0E+01	NA	1.9E-08
56-55-3	Benzo(a)anthracene	6.1E-01	6.8E-07	1.8E-06	2.1E-04	5.0E+01	1E-10	3.5E-08
50-32-8	Benzo(a)pyrene	5.3E-01	5.9E-07	1.5E-06	2.1E-03	5.0E+01	1E-09	3.1E-08
205-99-2	Benzo(b)fluoranthene	5.7E-01	6.4E-07	1.6E-06	2.1E-04	5.0E+01	1E-10	3.3E-08
191-24-2	Benzo(g,h,i)perylene	3.6E-01	4.1E-07	1.1E-06	NA	5.0E+01	NA	2.1E-08
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-07	7.8E-07	2.1E-05	5.0E+01	6E-12	1.6E-08
218-01-9	Chrysene	5.9E-01	6.6E-07	1.7E-06	2.1E-05	5.0E+01	1E-11	3.4E-08
53-70-3	Dibenz(a,h)anthracene	1.4E-01	1.6E-07	4.1E-07	2.1E-03	5.0E+01	3E-10	8.3E-09
206-44-0	Fluoranthene	1.2E+00	1.3E-06	3.4E-06	NA	5.0E+01	NA	6.9E-08
86-73-7	Fluorene	2.1E-01	2.3E-07	6.1E-07	NA	5.0E+01	NA	1.2E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	4.7E-07	1.2E-06	2.1E-04	5.0E+01	1E-10	2.4E-08
91-57-6	2-Methylnaphthalene	1.3E-01	1.5E-07	3.9E-07	NA	5.0E+01	NA	7.8E-09
91-20-3	Naphthalene	1.6E-01	1.8E-07	4.6E-07	NA	3.0E+00	NA	1.5E-07
85-01-8	Phenanthrene	1.3E+00	1.4E-06	3.7E-06	NA	5.0E+01	NA	7.3E-08
129-00-0	Pyrene	1.2E+00	1.3E-06	3.4E-06	NA	5.0E+01	NA	6.9E-08
C9-C10	GRO	1.5E+01	1.6E-05	4.3E-05	NA	5.0E+01	NA	8.5E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	4.6E-01	5.2E-07	1.3E-06	1.0E-04	2.0E-02	5E-11	6.7E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.9E-11	7.5E-11	3.3E+01	2.0E-06	1E-09	3.7E-05
Metals								
7440-39-3	Barium	7.3E+01	8.2E-05	2.1E-04	NA	5.0E-01	NA	4.3E-04
7440-41-7	Beryllium	1.6E-01	1.8E-07	4.8E-07	2.4E-03	2.0E-02	4E-10	2.4E-05
7440-43-9	Cadmium	4.9E-01	5.5E-07	1.4E-06	1.8E-03	2.0E-02	1E-09	7.1E-05
16065-83-1	Chromium III	1.2E+01	1.4E-05	3.6E-05	NA	1.0E-01	NA	3.6E-04
7439-92-1	Lead	1.1E+02	1.3E-04	3.2E-04	NA	1.0E+00	NA	3.2E-04
7439-97-6	Mercury	1.2E-01	1.4E-07	3.6E-07	NA	3.0E-01	NA	1.2E-06
7440-02-0	Nickel	8.5E+00	9.5E-06	2.5E-05	4.8E-04	1.0E+00	5E-09	2.5E-05
7440-22-4	Silver	1.6E+00	1.8E-06	4.6E-06	NA	1.4E-01	NA	3.3E-05
7440-62-2	Vanadium	1.4E+01	1.6E-05	4.2E-05	NA	1.0E+00	NA	4.2E-05
7440-66-6	Zinc	6.8E+01	7.6E-05	2.0E-04	NA	1.4E+00	NA	1.4E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	9.0E-09	1.6E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 8
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-2 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.00E+00	1.48E-09	NA	1.0E-02	NA	1.5E-07
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.90E-01	1.81E-09	NA	8.0E-04	NA	2.3E-06
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.00E-01	4.12E-10	NA	6.0E-02	NA	6.9E-09
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.00E-01	3.81E-10	NA	3.0E-02	NA	1.3E-08
120-12-7	Anthracene	3.3E-01	NC	NA	3.00E-01	8.62E-10	NA	3.0E-01	NA	2.9E-09
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	6.12E-10	3.00E-01	1.59E-09	7.3E-01	3.0E-02	4E-10	5.3E-08
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	5.33E-10	3.00E-01	1.38E-09	7.3E+00	3.0E-02	4E-09	4.6E-08
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	5.72E-10	3.00E-01	1.48E-09	7.3E-01	3.0E-02	4E-10	4.9E-08
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.00E-01	9.46E-10	NA	3.0E-02	NA	3.2E-08
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	2.69E-10	3.00E-01	6.98E-10	7.3E-02	3.0E-02	2E-11	2.3E-08
218-01-9	Chrysene	5.9E-01	3.0E-01	5.94E-10	3.00E-01	1.54E-09	7.3E-02	3.0E-02	4E-11	5.1E-08
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	1.43E-10	3.00E-01	3.71E-10	7.3E+00	3.0E-02	1E-09	1.2E-08
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.00E-01	3.10E-09	NA	4.0E-02	NA	7.8E-08
86-73-7	Fluorene	2.1E-01	NC	NA	3.00E-01	5.45E-10	NA	4.0E-02	NA	1.4E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	4.19E-10	3.00E-01	1.09E-09	7.3E-01	3.0E-02	3E-10	3.6E-08
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.00E-01	3.51E-10	NA	4.0E-03	NA	8.8E-08
91-20-3	Naphthalene	1.6E-01	NC	NA	3.00E-01	4.15E-10	NA	2.0E-02	NA	2.1E-08
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.00E-01	3.29E-09	NA	3.0E-02	NA	1.1E-07
129-00-0	Pyrene	1.2E+00	NC	NA	3.00E-01	3.09E-09	NA	3.0E-02	NA	1.0E-07
C9-C10	GRO	1.5E+01	NC	NA	1.00E+00	1.28E-07	NA	3.0E-02	NA	4.3E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	4.6E-01	1.0E+00	1.56E-09	1.00E+00	4.03E-09	2.0E+00	2.0E-05	3E-09	2.0E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	8.66E-14	1.00E+00	2.24E-13	1.5E+05	7.0E-10	1E-08	3.2E-04
Metals										
7440-39-3	Barium	7.3E+01	NC	NA	1.00E+00	6.41E-07	NA	2.0E-01	NA	3.2E-06
7440-41-7	Beryllium	1.6E-01	NC	NA	1.00E+00	1.43E-09	NA	2.0E-03	NA	7.2E-07
7440-43-9	Cadmium	4.9E-01	NC	NA	1.00E+00	4.24E-09	NA	5.0E-04	NA	8.5E-06
16065-83-1	Chromium III	1.2E+01	NC	NA	1.00E+00	1.08E-07	NA	1.5E+00	NA	7.2E-08
7439-92-1	Lead	1.1E+02	NC	NA	5.00E-01	4.86E-07	NA	7.5E-04	NA	6.5E-04
7439-97-6	Mercury	1.2E-01	NC	NA	5.00E-01	5.43E-10	NA	3.0E-04	NA	1.8E-06
7440-02-0	Nickel	8.5E+00	NC	NA	1.00E+00	7.38E-08	NA	2.0E-02	NA	3.7E-06
7440-22-4	Silver	1.6E+00	NC	NA	1.00E+00	1.38E-08	NA	5.0E-03	NA	2.8E-06
7440-62-2	Vanadium	1.4E+01	NC	NA	1.00E+00	1.25E-07	NA	9.0E-03	NA	1.4E-05
7440-66-6	Zinc	6.8E+01	NC	NA	1.00E+00	5.91E-07	NA	3.0E-01	NA	2.0E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.2E-08	1.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 9
Adult Staff - 0-3'
Incidential Ingestion of Surface Soil
HS-3 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1	4.7E-09	1	1.2E-08	5.5E-02	4.0E-03	3E-10	3.0E-06
108-88-3	Toluene	4.1E-02	NC	NA	1	1.4E-08	NA	8.0E-02	NA	1.7E-07
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1	1.5E-08	NA	3.0E-02	NA	5.2E-07
SVOCs										
120-12-7	Anthracene	4.8E-01	NC	NA	0.3	4.9E-08	NA	3.0E-01	NA	1.6E-07
56-55-3	Benzo(a)anthracene	8.1E-01	0.3	3.2E-08	0.3	8.2E-08	7.3E-01	3.0E-02	2E-08	2.7E-06
50-32-8	Benzo(a)pyrene	8.4E-01	0.3	3.3E-08	0.3	8.4E-08	7.3E+00	3.0E-02	2E-07	2.8E-06
205-99-2	Benzo(b)fluoranthene	9.2E-01	0.3	3.6E-08	0.3	9.2E-08	7.3E-01	3.0E-02	3E-08	3.1E-06
191-24-2	Benzo(g,h,i)perylene	5.2E-01	NC	NA	0.3	5.2E-08	NA	3.0E-02	NA	1.7E-06
207-08-9	Benzo(k)fluoranthene	2.8E-01	0.3	1.1E-08	0.3	2.9E-08	7.3E-02	3.0E-02	8E-10	9.5E-07
218-01-9	Chrysene	7.8E-01	0.3	3.0E-08	0.3	7.9E-08	7.3E-02	3.0E-02	2E-09	2.6E-06
53-70-3	Dibenz(a,h)anthracene	1.6E-01	0.3	6.1E-09	0.3	1.6E-08	7.3E+00	3.0E-02	4E-08	5.3E-07
206-44-0	Fluoranthene	1.8E+00	NC	NA	0.3	1.9E-07	NA	4.0E-02	NA	4.6E-06
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	0.3	2.5E-08	0.3	6.6E-08	7.3E-01	3.0E-02	2E-08	2.2E-06
91-20-3	Naphthalene	8.0E-01	NC	NA	0.3	8.1E-08	NA	2.0E-02	NA	4.0E-06
85-01-8	Phenanthrene	1.9E+00	NC	NA	0.3	1.9E-07	NA	3.0E-02	NA	6.4E-06
129-00-0	Pyrene	1.7E+00	NC	NA	0.3	1.7E-07	NA	3.0E-02	NA	5.6E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	1	2.5E-08	1	6.4E-08	2.0E+00	2.0E-05	5E-08	3.2E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1	3.3E-12	1	8.7E-12	1.5E+05	7.0E-10	5E-07	1.2E-02
Metals										
7440-39-3	Barium	1.4E+02	NC	NA	1	4.6E-05	NA	2.0E-01	NA	2.3E-04
7440-41-7	Beryllium	2.4E-01	NC	NA	1	7.9E-08	NA	2.0E-03	NA	4.0E-05
7439-92-1	Lead	2.0E+02	NC	NA	0.5	3.4E-05	NA	7.5E-04	NA	4.6E-02
7439-97-6	Mercury	1.5E-01	NC	NA	0.5	2.6E-08	NA	3.0E-04	NA	8.6E-05
7440-22-4	Silver	8.4E-01	NC	NA	1	2.8E-07	NA	5.0E-03	NA	5.7E-05
7440-66-6	Zinc	1.1E+02	NC	NA	1	3.6E-05	NA	3.0E-01	NA	1.2E-04

	Cancer Risk	Hazard Index
TOTAL:	9.0E-07	6.2E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 10
Adult Staff - 0-3'
Dermal Contact with Surface Soil
HS-3 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
71-43-2	Benzene	3.6E-02	0.03	2.9E-10	0.03	7.6E-10	5.5E-02	4.0E-03	2E-11	1.9E-07
108-88-3	Toluene	4.1E-02	NA	NA	0.03	8.6E-10	NA	8.0E-02	NA	1.1E-08
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NA	NA	0.2	6.4E-09	NA	3.0E-02	NA	2.1E-07
SVOCs										
120-12-7	Anthracene	4.8E-01	NA	NA	0.1	3.4E-08	NA	3.0E-01	NA	1.1E-07
56-55-3	Benzo(a)anthracene	8.1E-01	0.02	4.4E-09	0.02	1.1E-08	7.3E-01	3.0E-02	3E-09	3.8E-07
50-32-8	Benzo(a)pyrene	8.4E-01	0.02	4.5E-09	0.02	1.2E-08	7.3E+00	3.0E-02	3E-08	3.9E-07
205-99-2	Benzo(b)fluoranthene	9.2E-01	0.02	4.9E-09	0.02	1.3E-08	7.3E-01	3.0E-02	4E-09	4.3E-07
191-24-2	Benzo(g,h,i)perylene	5.2E-01	NA	NA	0.1	3.6E-08	NA	3.0E-02	NA	1.2E-06
207-08-9	Benzo(k)fluoranthene	2.8E-01	0.02	1.5E-09	0.02	4.0E-09	7.3E-02	3.0E-02	1E-10	1.3E-07
218-01-9	Chrysene	7.8E-01	0.02	4.2E-09	0.02	1.1E-08	7.3E-02	3.0E-02	3E-10	3.7E-07
53-70-3	Dibenz(a,h)anthracene	1.6E-01	0.02	8.5E-10	0.02	2.2E-09	7.3E+00	3.0E-02	6E-09	7.3E-08
206-44-0	Fluoranthene	1.8E+00	NA	NA	0.1	1.3E-07	NA	4.0E-02	NA	3.2E-06
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	0.02	3.5E-09	0.02	9.2E-09	7.3E-01	3.0E-02	3E-09	3.1E-07
91-20-3	Naphthalene	8.0E-01	NA	NA	0.1	5.6E-08	NA	2.0E-02	NA	2.8E-06
85-01-8	Phenanthrene	1.9E+00	NA	NA	0.1	1.3E-07	NA	3.0E-02	NA	4.4E-06
129-00-0	Pyrene	1.7E+00	NA	NA	0.1	1.2E-07	NA	3.0E-02	NA	3.9E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	0.1	5.1E-09	0.1	1.3E-08	2.0E+00	2.0E-05	1E-08	6.6E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	7.0E-13	0.1	1.8E-12	1.5E+05	7.0E-10	1E-07	2.6E-03
Metals										
7440-39-3	Barium	1.4E+02	NA	NA	0.1	9.6E-06	NA	2.0E-01	NA	4.8E-05
7440-41-7	Beryllium	2.4E-01	NA	NA	0.1	1.7E-08	NA	2.0E-03	NA	8.3E-06
7439-92-1	Lead	2.0E+02	NA	NA	0.006	8.5E-07	NA	7.5E-04	NA	1.1E-03
7439-97-6	Mercury	1.5E-01	NA	NA	0.1	1.1E-08	NA	3.0E-04	NA	3.6E-05
7440-22-4	Silver	8.4E-01	NA	NA	0.3	1.8E-07	NA	5.0E-03	NA	3.5E-05
7440-66-6	Zinc	1.1E+02	NA	NA	0.1	7.5E-06	NA	3.0E-01	NA	2.5E-05

	Cancer Risk	Hazard Index
TOTAL:	1.6E-07	4.5E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 11
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-3 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
71-43-2	Benzene	3.6E-02	4.0E-08	1.0E-07	7.8E-06	1.0E+01	3E-13	1.0E-08
108-88-3	Toluene	4.1E-02	4.6E-08	1.2E-07	NA	5.0E+03	NA	2.4E-11
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	5.2E-08	1.3E-07	NA	5.0E+01	NA	2.7E-09
SVOCs								
120-12-7	Anthracene	4.8E-01	5.4E-07	1.4E-06	NA	5.0E+01	NA	2.8E-08
56-55-3	Benzo(a)anthracene	8.1E-01	9.1E-07	2.4E-06	2.1E-04	5.0E+01	2E-10	4.7E-08
50-32-8	Benzo(a)pyrene	8.4E-01	9.4E-07	2.4E-06	2.1E-03	5.0E+01	2E-09	4.9E-08
205-99-2	Benzo(b)fluoranthene	9.2E-01	1.0E-06	2.7E-06	2.1E-04	5.0E+01	2E-10	5.3E-08
191-24-2	Benzo(g,h,i)perylene	5.2E-01	5.8E-07	1.5E-06	NA	5.0E+01	NA	3.0E-08
207-08-9	Benzo(k)fluoranthene	2.8E-01	3.2E-07	8.2E-07	2.1E-05	5.0E+01	7E-12	1.6E-08
218-01-9	Chrysene	7.8E-01	8.8E-07	2.3E-06	2.1E-05	5.0E+01	2E-11	4.5E-08
53-70-3	Dibenz(a,h)anthracene	1.6E-01	1.8E-07	4.6E-07	2.1E-03	5.0E+01	4E-10	9.1E-09
206-44-0	Fluoranthene	1.8E+00	2.1E-06	5.3E-06	NA	5.0E+01	NA	1.1E-07
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	7.3E-07	1.9E-06	2.1E-04	5.0E+01	2E-10	3.8E-08
91-20-3	Naphthalene	8.0E-01	9.0E-07	2.3E-06	NA	3.0E+00	NA	7.7E-07
85-01-8	Phenanthrene	1.9E+00	2.1E-06	5.5E-06	NA	5.0E+01	NA	1.1E-07
129-00-0	Pyrene	1.7E+00	1.9E-06	4.9E-06	NA	5.0E+01	NA	9.7E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.9E-01	2.1E-07	5.5E-07	1.0E-04	2.0E-02	2E-11	2.7E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.9E-11	7.5E-11	3.3E+01	2.0E-06	1E-09	3.7E-05
Metals								
7440-39-3	Barium	1.4E+02	1.5E-04	4.0E-04	NA	5.0E-01	NA	7.9E-04
7440-41-7	Beryllium	2.4E-01	2.6E-07	6.9E-07	2.4E-03	2.0E-02	6E-10	3.4E-05
7439-92-1	Lead	2.0E+02	2.3E-04	5.9E-04	NA	1.0E+00	NA	5.9E-04
7439-97-6	Mercury	1.5E-01	1.7E-07	4.5E-07	NA	3.0E-01	NA	1.5E-06
7440-22-4	Silver	8.4E-01	9.5E-07	2.5E-06	NA	1.4E-01	NA	1.8E-05
7440-66-6	Zinc	1.1E+02	1.2E-04	3.1E-04	NA	1.4E+00	NA	2.2E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	4.5E-09	1.7E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 12
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-3 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	1.21E-10	1.00E+00	3.14E-10	5.5E-02	4.0E-03	7E-12	7.8E-08
108-88-3	Toluene	4.1E-02	NC	NA	1.00E+00	3.57E-10	NA	8.0E-02	NA	4.5E-09
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.00E+00	4.01E-10	NA	3.0E-02	NA	1.3E-08
SVOCs										
120-12-7	Anthracene	4.8E-01	NC	NA	3.00E-01	1.26E-09	NA	3.0E-01	NA	4.2E-09
56-55-3	Benzo(a)anthracene	8.1E-01	3.0E-01	8.18E-10	3.00E-01	2.12E-09	7.3E-01	3.0E-02	6E-10	7.1E-08
50-32-8	Benzo(a)pyrene	8.4E-01	3.0E-01	8.43E-10	3.00E-01	2.18E-09	7.3E+00	3.0E-02	6E-09	7.3E-08
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	9.23E-10	3.00E-01	2.39E-09	7.3E-01	3.0E-02	7E-10	8.0E-08
191-24-2	Benzo(g,h,i)perylene	5.2E-01	NC	NA	3.00E-01	1.36E-09	NA	3.0E-02	NA	4.5E-08
207-08-9	Benzo(k)fluoranthene	2.8E-01	3.0E-01	2.86E-10	3.00E-01	7.42E-10	7.3E-02	3.0E-02	2E-11	2.5E-08
218-01-9	Chrysene	7.8E-01	3.0E-01	7.89E-10	3.00E-01	2.05E-09	7.3E-02	3.0E-02	6E-11	6.8E-08
53-70-3	Dibenz(a,h)anthracene	1.6E-01	3.0E-01	1.58E-10	3.00E-01	4.10E-10	7.3E+00	3.0E-02	1E-09	1.4E-08
206-44-0	Fluoranthene	1.8E+00	NC	NA	3.00E-01	4.80E-09	NA	4.0E-02	NA	1.2E-07
193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-01	3.0E-01	6.61E-10	3.00E-01	1.71E-09	7.3E-01	3.0E-02	5E-10	5.7E-08
91-20-3	Naphthalene	8.0E-01	NC	NA	3.00E-01	2.09E-09	NA	2.0E-02	NA	1.0E-07
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.00E-01	4.95E-09	NA	3.0E-02	NA	1.7E-07
129-00-0	Pyrene	1.7E+00	NC	NA	3.00E-01	4.37E-09	NA	3.0E-02	NA	1.5E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	1.9E-01	1.0E+00	6.36E-10	1.00E+00	1.65E-09	2.0E+00	2.0E-05	1E-09	8.2E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	8.66E-14	1.00E+00	2.24E-13	1.5E+05	7.0E-10	1E-08	3.2E-04
Metals										
7440-39-3	Barium	1.4E+02	NC	NA	1.00E+00	1.19E-06	NA	2.0E-01	NA	6.0E-06
7440-41-7	Beryllium	2.4E-01	NC	NA	1.00E+00	2.06E-09	NA	2.0E-03	NA	1.0E-06
7439-92-1	Lead	2.0E+02	NC	NA	5.00E-01	8.85E-07	NA	7.5E-04	NA	1.2E-03
7439-97-6	Mercury	1.5E-01	NC	NA	5.00E-01	6.72E-10	NA	3.0E-04	NA	2.2E-06
7440-22-4	Silver	8.4E-01	NC	NA	1.00E+00	7.36E-09	NA	5.0E-03	NA	1.5E-06
7440-66-6	Zinc	1.1E+02	NC	NA	1.00E+00	9.28E-07	NA	3.0E-01	NA	3.1E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.3E-08	1.6E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 13
Adult Staff - 0-3'
Incidential Ingestion of Surface Soil
HS-4 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1	2.6E-08	NA	1.0E-05	NA	2.6E-03
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1	9.9E-09	1	2.6E-08	1.4E-02	2.0E-02	1E-10	1.3E-06
120-12-7	Anthracene	3.8E-01	NC	NA	0.3	3.8E-08	NA	3.0E-01	NA	1.3E-07
56-55-3	Benzo(a)anthracene	7.8E-01	0.3	3.0E-08	0.3	7.8E-08	7.3E-01	3.0E-02	2E-08	2.6E-06
50-32-8	Benzo(a)pyrene	7.0E-01	0.3	2.7E-08	0.3	7.1E-08	7.3E+00	3.0E-02	2E-07	2.4E-06
205-99-2	Benzo(b)fluoranthene	9.2E-01	0.3	3.6E-08	0.3	9.3E-08	7.3E-01	3.0E-02	3E-08	3.1E-06
191-24-2	Benzo(g,h,i)perylene	2.5E-01	NC	NA	0.3	2.5E-08	NA	3.0E-02	NA	8.3E-07
207-08-9	Benzo(k)fluoranthene	3.6E-01	0.3	1.4E-08	0.3	3.6E-08	7.3E-02	3.0E-02	1E-09	1.2E-06
218-01-9	Chrysene	6.9E-01	0.3	2.7E-08	0.3	6.9E-08	7.3E-02	3.0E-02	2E-09	2.3E-06
53-70-3	Dibenz(a,h)anthracene	1.3E-01	0.3	5.1E-09	0.3	1.3E-08	7.3E+00	3.0E-02	4E-08	4.4E-07
206-44-0	Fluoranthene	1.4E+00	NC	NA	0.3	1.4E-07	NA	4.0E-02	NA	3.6E-06
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	0.3	9.4E-09	0.3	2.4E-08	7.3E-01	3.0E-02	7E-09	8.1E-07
129-00-0	Pyrene	1.5E+00	NC	NA	0.3	1.5E-07	NA	3.0E-02	NA	5.1E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	5.4E-01	1	7.0E-08	1	1.8E-07	2.0E+00	2.0E-05	1E-07	9.0E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1	3.3E-12	1	8.7E-12	1.5E+05	7.0E-10	5E-07	1.2E-02
Metals										
7440-39-3	Barium	6.8E+01	NC	NA	1	2.3E-05	NA	2.0E-01	NA	1.1E-04
7440-43-9	Cadmium	5.2E-01	NC	NA	1	1.8E-07	NA	5.0E-04	NA	3.5E-04
16065-83-1	Chromium III	1.4E+01	NC	NA	1	4.6E-06	NA	1.5E+00	NA	3.0E-06
7439-92-1	Lead	1.4E+02	NC	NA	0.5	2.3E-05	NA	7.5E-04	NA	3.1E-02
7440-22-4	Silver	3.8E-01	NC	NA	1	1.3E-07	NA	5.0E-03	NA	2.6E-05

	Cancer Risk	Hazard Index
TOTAL:	9.4E-07	5.5E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 14
Adult Staff - 0-3'
Dermal Contact with Surface Soil
HS-4 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NA	NA	0.19	1.0E-08	NA	1.0E-05	NA	1.0E-03
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	0.1	2.1E-09	0.1	5.3E-09	1.4E-02	2.0E-02	3E-11	2.7E-07
120-12-7	Anthracene	3.8E-01	NA	NA	0.1	2.7E-08	NA	3.0E-01	NA	8.9E-08
56-55-3	Benzo(a)anthracene	7.8E-01	0.02	4.2E-09	0.02	1.1E-08	7.3E-01	3.0E-02	3E-09	3.6E-07
50-32-8	Benzo(a)pyrene	7.0E-01	0.02	3.8E-09	0.02	9.9E-09	7.3E+00	3.0E-02	3E-08	3.3E-07
205-99-2	Benzo(b)fluoranthene	9.2E-01	0.02	5.0E-09	0.02	1.3E-08	7.3E-01	3.0E-02	4E-09	4.3E-07
191-24-2	Benzo(g,h,i)perylene	2.5E-01	NA	NA	0.1	1.7E-08	NA	3.0E-02	NA	5.8E-07
207-08-9	Benzo(k)fluoranthene	3.6E-01	0.02	2.0E-09	0.02	5.1E-09	7.3E-02	3.0E-02	1E-10	1.7E-07
218-01-9	Chrysene	6.9E-01	0.02	3.7E-09	0.02	9.6E-09	7.3E-02	3.0E-02	3E-10	3.2E-07
53-70-3	Dibenz(a,h)anthracene	1.3E-01	0.02	7.1E-10	0.02	1.8E-09	7.3E+00	3.0E-02	5E-09	6.1E-08
206-44-0	Fluoranthene	1.4E+00	NA	NA	0.1	1.0E-07	NA	4.0E-02	NA	2.5E-06
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	0.02	1.3E-09	0.02	3.4E-09	7.3E-01	3.0E-02	9E-10	1.1E-07
129-00-0	Pyrene	1.5E+00	NA	NA	0.1	1.1E-07	NA	3.0E-02	NA	3.5E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	5.4E-01	0.1	1.5E-08	0.1	3.8E-08	2.0E+00	2.0E-05	3E-08	1.9E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	7.0E-13	0.1	1.8E-12	1.5E+05	7.0E-10	1E-07	2.6E-03
Metals										
7440-39-3	Barium	6.8E+01	NA	NA	0.1	4.7E-06	NA	2.0E-01	NA	2.4E-05
7440-43-9	Cadmium	5.2E-01	NA	NA	0.01	3.6E-09	NA	5.0E-04	NA	7.3E-06
16065-83-1	Chromium III	1.4E+01	NA	NA	0.1	9.5E-07	NA	1.5E+00	NA	6.3E-07
7439-92-1	Lead	1.4E+02	NA	NA	0.006	5.8E-07	NA	7.5E-04	NA	7.7E-04
7440-22-4	Silver	3.8E-01	NA	NA	0.3	8.0E-08	NA	5.0E-03	NA	1.6E-05

	Cancer Risk	Hazard Index
TOTAL:	1.7E-07	6.3E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 15
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-4 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
101-55-3	4-Bromodiphenyl ether	7.8E-02	8.7E-08	2.3E-07	NA	3.5E-02	NA	6.5E-06
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	8.5E-08	2.2E-07	1.3E-06	7.0E+00	1E-13	3.2E-08
120-12-7	Anthracene	3.8E-01	4.3E-07	1.1E-06	NA	5.0E+01	NA	2.2E-08
56-55-3	Benzo(a)anthracene	7.8E-01	8.7E-07	2.3E-06	2.1E-04	5.0E+01	2E-10	4.5E-08
50-32-8	Benzo(a)pyrene	7.0E-01	7.9E-07	2.0E-06	2.1E-03	5.0E+01	2E-09	4.1E-08
205-99-2	Benzo(b)fluoranthene	9.2E-01	1.0E-06	2.7E-06	2.1E-04	5.0E+01	2E-10	5.3E-08
191-24-2	Benzo(g,h,i)perylene	2.5E-01	2.8E-07	7.2E-07	NA	5.0E+01	NA	1.4E-08
207-08-9	Benzo(k)fluoranthene	3.6E-01	4.0E-07	1.0E-06	2.1E-05	5.0E+01	8E-12	2.1E-08
218-01-9	Chrysene	6.9E-01	7.7E-07	2.0E-06	2.1E-05	5.0E+01	2E-11	4.0E-08
53-70-3	Dibenz(a,h)anthracene	1.3E-01	1.5E-07	3.8E-07	2.1E-03	5.0E+01	3E-10	7.6E-09
206-44-0	Fluoranthene	1.4E+00	1.6E-06	4.2E-06	NA	5.0E+01	NA	8.3E-08
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	2.7E-07	7.0E-07	2.1E-04	5.0E+01	6E-11	1.4E-08
129-00-0	Pyrene	1.5E+00	1.7E-06	4.4E-06	NA	5.0E+01	NA	8.8E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	5.4E-01	6.0E-07	1.6E-06	1.0E-04	2.0E-02	6E-11	7.8E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.9E-11	7.5E-11	3.3E+01	2.0E-06	1E-09	3.7E-05
Metals								
7440-39-3	Barium	6.8E+01	7.6E-05	2.0E-04	NA	5.0E-01	NA	3.9E-04
7440-43-9	Cadmium	5.2E-01	5.8E-07	1.5E-06	1.8E-03	2.0E-02	1E-09	7.6E-05
16065-83-1	Chromium III	1.4E+01	1.5E-05	3.9E-05	NA	1.0E-01	NA	3.9E-04
7439-92-1	Lead	1.4E+02	1.5E-04	4.0E-04	NA	1.0E+00	NA	4.0E-04
7440-22-4	Silver	3.8E-01	4.3E-07	1.1E-06	NA	1.4E-01	NA	7.9E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	4.5E-09	1.4E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 16
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-4 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.00E+00	6.80E-10	NA	1.0E-05	NA	6.8E-05
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	2.56E-10	1.00E+00	6.62E-10	1.4E-02	2.0E-02	4E-12	3.3E-08
120-12-7	Anthracene	3.8E-01	NC	NA	3.00E-01	9.96E-10	NA	3.0E-01	NA	3.3E-09
56-55-3	Benzo(a)anthracene	7.8E-01	3.0E-01	7.84E-10	3.00E-01	2.03E-09	7.3E-01	3.0E-02	6E-10	6.8E-08
50-32-8	Benzo(a)pyrene	7.0E-01	3.0E-01	7.11E-10	3.00E-01	1.84E-09	7.3E+00	3.0E-02	5E-09	6.1E-08
205-99-2	Benzo(b)fluoranthene	9.2E-01	3.0E-01	9.28E-10	3.00E-01	2.41E-09	7.3E-01	3.0E-02	7E-10	8.0E-08
191-24-2	Benzo(g,h,i)perylene	2.5E-01	NC	NA	3.00E-01	6.48E-10	NA	3.0E-02	NA	2.2E-08
207-08-9	Benzo(k)fluoranthene	3.6E-01	3.0E-01	3.64E-10	3.00E-01	9.44E-10	7.3E-02	3.0E-02	3E-11	3.1E-08
218-01-9	Chrysene	6.9E-01	3.0E-01	6.91E-10	3.00E-01	1.79E-09	7.3E-02	3.0E-02	5E-11	6.0E-08
53-70-3	Dibenz(a,h)anthracene	1.3E-01	3.0E-01	1.32E-10	3.00E-01	3.43E-10	7.3E+00	3.0E-02	1E-09	1.1E-08
206-44-0	Fluoranthene	1.4E+00	NC	NA	3.00E-01	3.74E-09	NA	4.0E-02	NA	9.3E-08
193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	3.0E-01	2.43E-10	3.00E-01	6.29E-10	7.3E-01	3.0E-02	2E-10	2.1E-08
129-00-0	Pyrene	1.5E+00	NC	NA	3.00E-01	3.96E-09	NA	3.0E-02	NA	1.3E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	5.4E-01	1.0E+00	1.80E-09	1.00E+00	4.68E-09	2.0E+00	2.0E-05	4E-09	2.3E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	8.66E-14	1.00E+00	2.24E-13	1.5E+05	7.0E-10	1E-08	3.2E-04
Metals										
7440-39-3	Barium	6.8E+01	NC	NA	1.00E+00	5.89E-07	NA	2.0E-01	NA	2.9E-06
7440-43-9	Cadmium	5.2E-01	NC	NA	1.00E+00	4.54E-09	NA	5.0E-04	NA	9.1E-06
16065-83-1	Chromium III	1.4E+01	NC	NA	1.00E+00	1.18E-07	NA	1.5E+00	NA	7.9E-08
7439-92-1	Lead	1.4E+02	NC	NA	5.00E-01	6.02E-07	NA	7.5E-04	NA	8.0E-04
7440-22-4	Silver	3.8E-01	NC	NA	1.00E+00	3.33E-09	NA	5.0E-03	NA	6.7E-07

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.4E-08	1.4E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 17
Adult Staff - 0-3'
Incidental Ingestion of Surface Soil
HS-6 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.3E-01	NC	NA	0.3	1.3E-08	NA	6.0E-02	NA	2.2E-07
120-12-7	Anthracene	2.7E-01	NC	NA	0.3	2.8E-08	NA	3.0E-01	NA	9.2E-08
56-55-3	Benzo(a)anthracene	4.4E-01	0.3	1.7E-08	0.3	4.5E-08	7.3E-01	3.0E-02	1E-08	1.5E-06
205-99-2	Benzo(b)fluoranthene	4.6E-01	0.3	1.8E-08	0.3	4.6E-08	7.3E-01	3.0E-02	1E-08	1.5E-06
206-44-0	Fluoranthene	7.9E-01	NC	NA	0.3	7.9E-08	NA	4.0E-02	NA	2.0E-06
91-20-3	Naphthalene	1.2E-01	NC	NA	0.3	1.2E-08	NA	2.0E-02	NA	5.8E-07
85-01-8	Phenanthrene	8.3E-01	NC	NA	0.3	8.4E-08	NA	3.0E-02	NA	2.8E-06
129-00-0	Pyrene	8.1E-01	NC	NA	0.3	8.1E-08	NA	3.0E-02	NA	2.7E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	4.2E+00	1	5.4E-07	1	1.4E-06	2.0E+00	2.0E-05	1E-06	7.0E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1	3.3E-12	1	8.7E-12	1.5E+05	7.0E-10	5E-07	1.2E-02
Metals										
7440-39-3	Barium	2.1E+02	NC	NA	1	7.0E-05	NA	2.0E-01	NA	3.5E-04
7440-43-9	Cadmium	4.8E-01	NC	NA	1	1.6E-07	NA	5.0E-04	NA	3.2E-04
16065-83-1	Chromium III	1.5E+03	NC	NA	1	4.9E-04	NA	1.5E+00	NA	3.3E-04
7439-92-1	Lead	1.1E+02	NC	NA	0.5	1.9E-05	NA	7.5E-04	NA	2.5E-02
7440-66-6	Zinc	5.1E+01	NC	NA	1	1.7E-05	NA	3.0E-01	NA	5.7E-05

	Cancer Risk	Hazard Index
TOTAL:	1.6E-06	1.1E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 18
Adult Staff - 0-3'
Dermal Contact with Surface Soil
HS-6 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
83-32-9	Acenaphthene	1.3E-01	NA	NA	0.1	9.2E-09	NA	6.0E-02	NA	1.5E-07
120-12-7	Anthracene	2.7E-01	NA	NA	0.1	1.9E-08	NA	3.0E-01	NA	6.4E-08
56-55-3	Benzo(a)anthracene	4.4E-01	0.02	2.4E-09	0.02	6.2E-09	7.3E-01	3.0E-02	2E-09	2.1E-07
205-99-2	Benzo(b)fluoranthene	4.6E-01	0.02	2.5E-09	0.02	6.4E-09	7.3E-01	3.0E-02	2E-09	2.1E-07
206-44-0	Fluoranthene	7.9E-01	NA	NA	0.1	5.5E-08	NA	4.0E-02	NA	1.4E-06
91-20-3	Naphthalene	1.2E-01	NA	NA	0.1	8.1E-09	NA	2.0E-02	NA	4.1E-07
85-01-8	Phenanthrene	8.3E-01	NA	NA	0.1	5.8E-08	NA	3.0E-02	NA	1.9E-06
129-00-0	Pyrene	8.1E-01	NA	NA	0.1	5.7E-08	NA	3.0E-02	NA	1.9E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	4.2E+00	0.1	1.1E-07	0.1	2.9E-07	2.0E+00	2.0E-05	2E-07	1.5E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	7.0E-13	0.1	1.8E-12	1.5E+05	7.0E-10	1E-07	2.6E-03
Metals										
7440-39-3	Barium	2.1E+02	NA	NA	0.1	1.5E-05	NA	2.0E-01	NA	7.3E-05
7440-43-9	Cadmium	4.8E-01	NA	NA	0.01	3.4E-09	NA	5.0E-04	NA	6.8E-06
16065-83-1	Chromium III	1.5E+03	NA	NA	0.1	1.0E-04	NA	1.5E+00	NA	6.8E-05
7439-92-1	Lead	1.1E+02	NA	NA	0.006	4.7E-07	NA	7.5E-04	NA	6.3E-04
7440-66-6	Zinc	5.1E+01	NA	NA	0.1	3.6E-06	NA	3.0E-01	NA	1.2E-05

	Cancer Risk	Hazard Index
TOTAL:	3.3E-07	1.8E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 19
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-6 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
83-32-9	Acenaphthene	1.3E-01	1.5E-07	3.8E-07	NA	5.0E+01	NA	7.6E-09
120-12-7	Anthracene	2.7E-01	3.1E-07	8.0E-07	NA	5.0E+01	NA	1.6E-08
56-55-3	Benzo(a)anthracene	4.4E-01	5.0E-07	1.3E-06	2.1E-04	5.0E+01	1E-10	2.6E-08
205-99-2	Benzo(b)fluoranthene	4.6E-01	5.2E-07	1.3E-06	2.1E-04	5.0E+01	1E-10	2.7E-08
206-44-0	Fluoranthene	7.9E-01	8.8E-07	2.3E-06	NA	5.0E+01	NA	4.6E-08
91-20-3	Naphthalene	1.2E-01	1.3E-07	3.4E-07	NA	3.0E+00	NA	1.1E-07
85-01-8	Phenanthrene	8.3E-01	9.3E-07	2.4E-06	NA	5.0E+01	NA	4.8E-08
129-00-0	Pyrene	8.1E-01	9.0E-07	2.3E-06	NA	5.0E+01	NA	4.7E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	4.2E+00	4.7E-06	1.2E-05	1.0E-04	2.0E-02	5E-10	6.1E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.9E-11	7.5E-11	3.3E+01	2.0E-06	1E-09	3.7E-05
Metals								
7440-39-3	Barium	2.1E+02	2.3E-04	6.0E-04	NA	5.0E-01	NA	1.2E-03
7440-43-9	Cadmium	4.8E-01	5.4E-07	1.4E-06	1.8E-03	2.0E-02	1E-09	7.0E-05
16065-83-1	Chromium III	1.5E+03	1.6E-03	4.2E-03	NA	1.0E-01	NA	4.2E-02
7439-92-1	Lead	1.1E+02	1.3E-04	3.3E-04	NA	1.0E+00	NA	3.3E-04
7440-66-6	Zinc	5.1E+01	5.7E-05	1.5E-04	NA	1.4E+00	NA	1.1E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.6E-09	4.5E-02

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 20
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-6 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.3E-01	NC	NA	3.00E-01	3.44E-10	NA	6.0E-02	NA	5.7E-09
120-12-7	Anthracene	2.7E-01	NC	NA	3.00E-01	7.19E-10	NA	3.0E-01	NA	2.4E-09
56-55-3	Benzo(a)anthracene	4.4E-01	3.0E-01	4.48E-10	3.00E-01	1.16E-09	7.3E-01	3.0E-02	3E-10	3.9E-08
205-99-2	Benzo(b)fluoranthene	4.6E-01	3.0E-01	4.64E-10	3.00E-01	1.20E-09	7.3E-01	3.0E-02	3E-10	4.0E-08
206-44-0	Fluoranthene	7.9E-01	NC	NA	3.00E-01	2.06E-09	NA	4.0E-02	NA	5.1E-08
91-20-3	Naphthalene	1.2E-01	NC	NA	3.00E-01	3.02E-10	NA	2.0E-02	NA	1.5E-08
85-01-8	Phenanthrene	8.3E-01	NC	NA	3.00E-01	2.17E-09	NA	3.0E-02	NA	7.2E-08
129-00-0	Pyrene	8.1E-01	NC	NA	3.00E-01	2.11E-09	NA	3.0E-02	NA	7.0E-08
Dioxins/PCBs										
1336-36-3	Total PCBs	4.2E+00	1.0E+00	1.40E-08	1.00E+00	3.63E-08	2.0E+00	2.0E-05	3E-08	1.8E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	8.66E-14	1.00E+00	2.24E-13	1.5E+05	7.0E-10	1E-08	3.2E-04
Metals										
7440-39-3	Barium	2.1E+02	NC	NA	1.00E+00	1.81E-06	NA	2.0E-01	NA	9.1E-06
7440-43-9	Cadmium	4.8E-01	NC	NA	1.00E+00	4.21E-09	NA	5.0E-04	NA	8.4E-06
16065-83-1	Chromium III	1.5E+03	NC	NA	1.00E+00	1.27E-05	NA	1.5E+00	NA	8.5E-06
7439-92-1	Lead	1.1E+02	NC	NA	5.00E-01	4.89E-07	NA	7.5E-04	NA	6.5E-04
7440-66-6	Zinc	5.1E+01	NC	NA	1.00E+00	4.43E-07	NA	3.0E-01	NA	1.5E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	4.2E-08	2.8E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 21
Adult Staff - 0-3'
Incidental Ingestion of Surface Soil
HS-7 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.5E-01	1	3.2E-08	1	8.3E-08	2.0E+00	2.0E-05	6E-08	4.1E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1	3.3E-12	1	8.7E-12	1.5E+05	7.0E-10	5E-07	1.2E-02
Metals										
7440-39-3	Barium	7.8E+01	NC	NA	1	2.6E-05	NA	2.0E-01	NA	1.3E-04
7440-41-7	Beryllium	2.6E-01	NC	NA	1	8.9E-08	NA	2.0E-03	NA	4.5E-05
7440-43-9	Cadmium	6.6E-01	NC	NA	1	2.2E-07	NA	5.0E-04	NA	4.4E-04
16065-83-1	Chromium III	1.4E+01	NC	NA	1	4.7E-06	NA	1.5E+00	NA	3.1E-06
7439-92-1	Lead	1.2E+02	NC	NA	0.5	2.1E-05	NA	7.5E-04	NA	2.8E-02
7440-66-6	Zinc	7.7E+01	NC	NA	1	2.6E-05	NA	3.0E-01	NA	8.6E-05

	Cancer Risk	Hazard Index
TOTAL:	5.6E-07	4.5E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 22
Adult Staff - 0-3'
Dermal Contact with Surface Soil
HS-7 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.5E-01	0.1	6.6E-09	0.1	1.7E-08	2.0E+00	2.0E-05	1E-08	8.6E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	7.0E-13	0.1	1.8E-12	1.5E+05	7.0E-10	1E-07	2.6E-03
Metals										
7440-39-3	Barium	7.8E+01	NA	NA	0.1	5.4E-06	NA	2.0E-01	NA	2.7E-05
7440-41-7	Beryllium	2.6E-01	NA	NA	0.1	1.9E-08	NA	2.0E-03	NA	9.3E-06
7440-43-9	Cadmium	6.6E-01	NA	NA	0.01	4.6E-09	NA	5.0E-04	NA	9.2E-06
16065-83-1	Chromium III	1.4E+01	NA	NA	0.1	9.8E-07	NA	1.5E+00	NA	6.5E-07
7439-92-1	Lead	1.2E+02	NA	NA	0.006	5.2E-07	NA	7.5E-04	NA	6.9E-04
7440-66-6	Zinc	7.7E+01	NA	NA	0.1	5.4E-06	NA	3.0E-01	NA	1.8E-05

	Cancer Risk	Hazard Index
TOTAL:	1.2E-07	4.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 23
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-7 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	2.5E-01	2.8E-07	7.1E-07	1.0E-04	2.0E-02	3E-11	3.6E-05
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.9E-11	7.5E-11	3.3E+01	2.0E-06	1E-09	3.7E-05
Metals								
7440-39-3	Barium	7.8E+01	8.7E-05	2.3E-04	NA	5.0E-01	NA	4.5E-04
7440-41-7	Beryllium	2.6E-01	3.0E-07	7.7E-07	2.4E-03	2.0E-02	7E-10	3.8E-05
7440-43-9	Cadmium	6.6E-01	7.4E-07	1.9E-06	1.8E-03	2.0E-02	1E-09	9.6E-05
16065-83-1	Chromium III	1.4E+01	1.6E-05	4.1E-05	NA	1.0E-01	NA	4.1E-04
7439-92-1	Lead	1.2E+02	1.4E-04	3.6E-04	NA	1.0E+00	NA	3.6E-04
7440-66-6	Zinc	7.7E+01	8.6E-05	2.2E-04	NA	1.4E+00	NA	1.6E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.0E-09	1.6E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 24
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-7 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.5E-01	1.0E+00	8.26E-10	1.00E+00	2.14E-09	2.0E+00	2.0E-05	2E-09	1.1E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	8.66E-14	1.00E+00	2.24E-13	1.5E+05	7.0E-10	1E-08	3.2E-04
Metals										
7440-39-3	Barium	7.8E+01	NC	NA	1.00E+00	6.78E-07	NA	2.0E-01	NA	3.4E-06
7440-41-7	Beryllium	2.6E-01	NC	NA	1.00E+00	2.31E-09	NA	2.0E-03	NA	1.2E-06
7440-43-9	Cadmium	6.6E-01	NC	NA	1.00E+00	5.75E-09	NA	5.0E-04	NA	1.1E-05
16065-83-1	Chromium III	1.4E+01	NC	NA	1.00E+00	1.22E-07	NA	1.5E+00	NA	8.1E-08
7439-92-1	Lead	1.2E+02	NC	NA	5.00E-01	5.35E-07	NA	7.5E-04	NA	7.1E-04
7440-66-6	Zinc	7.7E+01	NC	NA	1.00E+00	6.69E-07	NA	3.0E-01	NA	2.2E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.5E-08	1.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 25
Adult Solar Worker - 0-3'
Incidential Ingestion of Surface Soil
HS-8 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH										
C19-C36	C19-C36 Aliphatics	1.0E+01	NC	NA	1	1.3E-06	NA	2.0E+00	NA	6.7E-07
C11-C22	C11-C22 Aromatics	1.2E+01	NC	NA	0.3	4.8E-07	NA	3.0E-02	NA	1.6E-05
SVOCs										
65-85-0	Benzoic Acid	2.4E+00	NC	NA	0.96	3.1E-07	NA	4.0E+00	NA	7.7E-08
131-11-3	Dimethylphthalate	2.8E-01	NC	NA	1	3.8E-08	NA	1.0E-01	NA	3.8E-07
84-74-2	di-n-Butylphthalate	1.0E+00	NC	NA	1	1.4E-07	NA	1.0E-01	NA	1.4E-06
85-68-7	Butyl benzyl phthalate	2.4E-01	1	1.2E-08	1	3.2E-08	NA	2.0E-01	NA	1.6E-07
117-81-7	bis(2-Ethylhexyl)pythalate	3.0E+00	1	1.6E-07	1	4.1E-07	1.4E-02	2.0E-02	2E-09	2.0E-05
86-74-8	Carbazole	2.0E+00	0.28	2.9E-08	0.28	7.4E-08	2.0E-02	3.0E-02	6E-10	2.5E-06
132-64-9	Dibenzofuran	7.2E-01	NC	NA	0.96	9.3E-08	NA	1.0E-03	NA	9.3E-05
83-32-9	Acenaphthene	4.9E+00	NC	NA	0.3	2.0E-07	NA	6.0E-02	NA	3.3E-06
208-96-8	Acenaphthylene	7.1E-01	NC	NA	0.3	2.9E-08	NA	3.0E-02	NA	9.6E-07
120-12-7	Anthracene	8.6E+00	NC	NA	0.3	3.5E-07	NA	3.0E-01	NA	1.2E-06
56-55-3	Benzo(a)anthracene	3.6E+01	0.3	5.6E-07	0.3	1.4E-06	7.3E-01	3.0E-02	4E-07	4.8E-05
50-32-8	Benzo(a)pyrene	2.9E+01	0.3	4.5E-07	0.3	1.2E-06	7.3E+00	3.0E-02	3E-06	3.9E-05
205-99-2	Benzo(b)fluoranthene	3.9E+01	0.3	6.1E-07	0.3	1.6E-06	7.3E-01	3.0E-02	4E-07	5.3E-05
191-24-2	Benzo(g,h,i)perylene	3.2E+00	NC	NA	0.3	1.3E-07	NA	3.0E-02	NA	4.3E-06
207-08-9	Benzo(k)fluoranthene	4.3E+00	0.3	6.6E-08	0.3	1.7E-07	7.3E-02	3.0E-02	5E-09	5.7E-06
218-01-9	Chrysene	9.8E+00	0.3	1.5E-07	0.3	4.0E-07	7.3E-02	3.0E-02	1E-08	1.3E-05
53-70-3	Dibenz(a,h)anthracene	3.5E+00	0.3	5.5E-08	0.3	1.4E-07	7.3E+00	3.0E-02	4E-07	4.7E-06
206-44-0	Fluoranthene	2.5E+01	NC	NA	0.3	1.0E-06	NA	4.0E-02	NA	2.5E-05
86-73-7	Fluorene	5.0E+00	NC	NA	0.3	2.0E-07	NA	4.0E-02	NA	5.1E-06
193-39-5	Indeno(1,2,3-cd)pyrene	3.3E+00	0.3	5.1E-08	0.3	1.3E-07	7.3E-01	3.0E-02	4E-08	4.4E-06
91-57-6	2-Methylnaphthalene	2.1E+00	NC	NA	0.3	8.6E-08	NA	4.0E-03	NA	2.2E-05
91-20-3	Naphthalene	3.4E+00	NC	NA	0.3	1.4E-07	NA	2.0E-02	NA	6.8E-06
85-01-8	Phenanthrene	3.3E+01	NC	NA	0.3	1.3E-06	NA	3.0E-02	NA	4.4E-05
129-00-0	Pyrene	1.8E+01	NC	NA	0.3	7.1E-07	NA	3.0E-02	NA	2.4E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	3.9E+00	1	2.0E-07	1	5.2E-07	2.0E+00	2.0E-05	4E-07	2.6E-02
1746-01-6	Dioxin/PCB TEQ	1.9E-04	1	9.8E-12	1	2.5E-11	1.5E+05	7.0E-10	1E-06	3.6E-02
Metals										
7440-38-2	Arsenic	5.9E+00	0.5	1.5E-07	0.5	3.9E-07	1.5E+00	3.0E-04	2E-07	1.3E-03
7440-39-3	Barium	7.4E+02	NC	NA	1	1.0E-04	NA	2.0E-01	NA	5.0E-04
7440-43-9	Cadmium	4.8E+00	NC	NA	1	6.5E-07	NA	5.0E-04	NA	1.3E-03
16065-83-1	Chromium III	1.0E+02	NC	NA	1	1.4E-05	NA	1.5E+00	NA	9.1E-06
7439-92-1	Lead	1.7E+03	NC	NA	0.5	1.1E-04	NA	7.5E-04	NA	1.5E-01
7439-97-6	Mercury	1.0E+00	NC	NA	0.5	7.0E-08	NA	3.0E-04	NA	2.3E-04
7440-02-0	Nickel	9.9E+00	NC	NA	1	1.3E-06	NA	2.0E-02	NA	6.7E-05
7782-49-2	Selenium	9.0E-01	NC	NA	1	1.2E-07	NA	5.0E-03	NA	2.4E-05
7440-22-4	Silver	6.6E-01	NC	NA	1	8.9E-08	NA	5.0E-03	NA	1.8E-05
7440-62-2	Vanadium	2.4E+01	NC	NA	1	3.3E-06	NA	9.0E-03	NA	3.6E-04
7440-66-6	Zinc	1.5E+02	NC	NA	1	2.0E-05	NA	3.0E-01	NA	6.6E-05

	Cancer Risk	Hazard Index
TOTAL:	6.7E-06	2.2E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 26
Adult Solar Worker - 0-3'
Dermal Contact with Surface Soil
HS-8 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
EPH										
C19-C36	C19-C36 Aliphatics	1.0E+01	NA	NA	0.2	5.6E-07	NA	2.0E+00	NA	2.8E-07
C11-C22	C11-C22 Aromatics	1.2E+01	NA	NA	0.1	3.4E-07	NA	3.0E-02	NA	1.1E-05
SVOCs										
65-85-0	Benzoic Acid	2.4E+00	NA	NA	0.18	1.2E-07	NA	4.0E+00	NA	3.0E-08
131-11-3	Dimethylphthalate	2.8E-01	NA	NA	0.1	8.0E-09	NA	1.0E-01	NA	8.0E-08
84-74-2	di-n-Butylphthalate	1.0E+00	NA	NA	0.07	2.0E-08	NA	1.0E-01	NA	2.0E-07
85-68-7	Butyl benzyl phthalate	2.4E-01	1	2.6E-08	1	6.7E-08	NA	2.0E-01	NA	3.4E-07
117-81-7	bis(2-Ethylhexyl)pythalate	3.0E+00	0.1	3.3E-08	0.1	8.5E-08	1.4E-02	2.0E-02	5E-10	4.3E-06
86-74-8	Carbazole	2.0E+00	0.02	4.3E-09	0.02	1.1E-08	2.0E-02	3.0E-02	9E-11	3.7E-07
132-64-9	Dibenzofuran	7.2E-01	NA	NA	0.18	3.6E-08	NA	1.0E-03	NA	3.6E-05
83-32-9	Acenaphthene	4.9E+00	NA	NA	0.1	1.4E-07	NA	6.0E-02	NA	2.3E-06
208-96-8	Acenaphthylene	7.1E-01	NA	NA	0.1	2.0E-08	NA	3.0E-02	NA	6.6E-07
120-12-7	Anthracene	8.6E+00	NA	NA	0.1	2.4E-07	NA	3.0E-01	NA	8.1E-07
56-55-3	Benzo(a)anthracene	3.6E+01	0.02	7.8E-08	0.02	2.0E-07	7.3E-01	3.0E-02	6E-08	6.7E-06
50-32-8	Benzo(a)pyrene	2.9E+01	0.02	6.2E-08	0.02	1.6E-07	7.3E+00	3.0E-02	5E-07	5.4E-06
205-99-2	Benzo(b)fluoranthene	3.9E+01	0.02	8.5E-08	0.02	2.2E-07	7.3E-01	3.0E-02	6E-08	7.4E-06
191-24-2	Benzo(g,h,i)perylene	3.2E+00	NA	NA	0.1	8.9E-08	NA	3.0E-02	NA	3.0E-06
207-08-9	Benzo(k)fluoranthene	4.3E+00	0.02	9.2E-09	0.02	2.4E-08	7.3E-02	3.0E-02	7E-10	8.0E-07
218-01-9	Chrysene	9.8E+00	0.02	2.1E-08	0.02	5.5E-08	7.3E-02	3.0E-02	2E-09	1.8E-06
53-70-3	Dibenz(a,h)anthracene	3.5E+00	0.02	7.6E-09	0.02	2.0E-08	7.3E+00	3.0E-02	6E-08	6.6E-07
206-44-0	Fluoranthene	2.5E+01	NA	NA	0.1	7.1E-07	NA	4.0E-02	NA	1.8E-05
86-73-7	Fluorene	5.0E+00	NA	NA	0.1	1.4E-07	NA	4.0E-02	NA	3.5E-06
193-39-5	Indeno(1,2,3-cd)pyrene	3.3E+00	0.02	7.1E-09	0.02	1.8E-08	7.3E-01	3.0E-02	5E-09	6.1E-07
91-57-6	2-Methylnaphthalene	2.1E+00	NA	NA	0.1	6.0E-08	NA	4.0E-03	NA	1.5E-05
91-20-3	Naphthalene	3.4E+00	NA	NA	0.1	9.5E-08	NA	2.0E-02	NA	4.7E-06
85-01-8	Phenanthrene	3.3E+01	NA	NA	0.1	9.2E-07	NA	3.0E-02	NA	3.1E-05
129-00-0	Pyrene	1.8E+01	NA	NA	0.1	4.9E-07	NA	3.0E-02	NA	1.6E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	3.9E+00	0.1	4.2E-08	0.1	1.1E-07	2.0E+00	2.0E-05	8E-08	5.5E-03
1746-01-6	Dioxin/PCB TEQ	1.9E-04	0.1	2.0E-12	0.1	5.3E-12	1.5E+05	7.0E-10	3E-07	7.6E-03
Metals										
7440-38-2	Arsenic	5.9E+00	0.03	1.9E-08	0.03	4.9E-08	1.5E+00	3.0E-04	3E-08	1.6E-04
7440-39-3	Barium	7.4E+02	NA	NA	0.1	2.1E-05	NA	2.0E-01	NA	1.0E-04
7440-43-9	Cadmium	4.8E+00	NA	NA	0.01	1.3E-08	NA	5.0E-04	NA	2.7E-05
16065-83-1	Chromium III	1.0E+02	NA	NA	0.1	2.9E-06	NA	1.5E+00	NA	1.9E-06
7439-92-1	Lead	1.7E+03	NA	NA	0.006	2.9E-06	NA	7.5E-04	NA	3.8E-03
7439-97-6	Mercury	1.0E+00	NA	NA	0.1	2.9E-08	NA	3.0E-04	NA	9.8E-05
7440-02-0	Nickel	9.9E+00	NA	NA	0.2	5.6E-07	NA	2.0E-02	NA	2.8E-05
7782-49-2	Selenium	9.0E-01	NA	NA	0.01	2.5E-09	NA	5.0E-03	NA	5.1E-07
7440-22-4	Silver	6.6E-01	NA	NA	0.3	5.6E-08	NA	5.0E-03	NA	1.1E-05
7440-62-2	Vanadium	2.4E+01	NA	NA	0.1	6.8E-07	NA	9.0E-03	NA	7.6E-05
7440-66-6	Zinc	1.5E+02	NA	NA	0.1	4.1E-06	NA	3.0E-01	NA	1.4E-05

	Cancer Risk	Hazard Index
TOTAL:	1.1E-06	1.8E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 27
Adult Solar Worker - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-8 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH								
C19-C36	C19-C36 Aliphatics	1.0E+01	4.5E-06	1.2E-05	NA	NA	NA	NA
C11-C22	C11-C22 Aromatics	1.2E+01	5.4E-06	1.4E-05	NA	5.0E+01	NA	2.8E-07
SVOCs								
65-85-0	Benzoic Acid	2.4E+00	1.1E-06	2.8E-06	NA	1.4E+04	NA	2.0E-10
131-11-3	Dimethylphthalate	2.8E-01	1.3E-07	3.3E-07	NA	4.0E+02	NA	8.3E-10
84-74-2	di-n-Butylphthalate	1.0E+00	4.5E-07	1.2E-06	NA	3.5E+02	NA	3.3E-09
85-68-7	Butyl benzyl phthalate	2.4E-01	1.1E-07	2.8E-07	NA	7.0E+02	NA	4.0E-10
117-81-7	bis(2-Ethylhexyl)pythalate	3.0E+00	1.4E-06	3.5E-06	1.3E-06	7.0E+00	2E-12	5.0E-07
86-74-8	Carbazole	2.0E+00	8.8E-07	2.3E-06	5.7E-06	5.0E+01	5E-12	4.6E-08
132-64-9	Dibenzofuran	7.2E-01	3.2E-07	8.3E-07	NA	3.5E+00	NA	2.4E-07
83-32-9	Acenaphthene	4.9E+00	2.2E-06	5.7E-06	NA	5.0E+01	NA	1.1E-07
208-96-8	Acenaphthylene	7.1E-01	3.2E-07	8.3E-07	NA	5.0E+01	NA	1.7E-08
120-12-7	Anthracene	8.6E+00	3.9E-06	1.0E-05	NA	5.0E+01	NA	2.0E-07
56-55-3	Benzo(a)anthracene	3.6E+01	1.6E-05	4.2E-05	2.1E-04	5.0E+01	3E-09	8.3E-07
50-32-8	Benzo(a)pyrene	2.9E+01	1.3E-05	3.3E-05	2.1E-03	5.0E+01	3E-08	6.7E-07
205-99-2	Benzo(b)fluoranthene	3.9E+01	1.8E-05	4.6E-05	2.1E-04	5.0E+01	4E-09	9.2E-07
191-24-2	Benzo(g,h,i)perylene	3.2E+00	1.4E-06	3.7E-06	NA	5.0E+01	NA	7.4E-08
207-08-9	Benzo(k)fluoranthene	4.3E+00	1.9E-06	4.9E-06	2.1E-05	5.0E+01	4E-11	9.9E-08
218-01-9	Chrysene	9.8E+00	4.4E-06	1.1E-05	2.1E-05	5.0E+01	9E-11	2.3E-07
53-70-3	Dibenz(a,h)anthracene	3.5E+00	1.6E-06	4.1E-06	2.1E-03	5.0E+01	3E-09	8.2E-08
206-44-0	Fluoranthene	2.5E+01	1.1E-05	2.9E-05	NA	5.0E+01	NA	5.9E-07
86-73-7	Fluorene	5.0E+00	2.3E-06	5.8E-06	NA	5.0E+01	NA	1.2E-07
193-39-5	Indeno(1,2,3-cd)pyrene	3.3E+00	1.5E-06	3.8E-06	2.1E-04	5.0E+01	3E-10	7.6E-08
91-57-6	2-Methylnaphthalene	2.1E+00	9.6E-07	2.5E-06	NA	5.0E+01	NA	5.0E-08
91-20-3	Naphthalene	3.4E+00	1.5E-06	3.9E-06	NA	3.0E+00	NA	1.3E-06
85-01-8	Phenanthrene	3.3E+01	1.5E-05	3.8E-05	NA	5.0E+01	NA	7.6E-07
129-00-0	Pyrene	1.8E+01	7.8E-06	2.0E-05	NA	5.0E+01	NA	4.1E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	3.9E+00	1.7E-06	4.5E-06	1.0E-04	2.0E-02	2E-10	2.3E-04
1746-01-6	Dioxin/PCB TEQ	1.9E-04	8.5E-11	2.2E-10	3.3E+01	2.0E-06	3E-09	1.1E-04
Metals								
7440-38-2	Arsenic	5.9E+00	2.6E-06	6.8E-06	3.0E-03	2.0E-02	8E-09	3.4E-04
7440-39-3	Barium	7.4E+02	3.3E-04	8.6E-04	NA	5.0E-01	NA	1.7E-03
7440-43-9	Cadmium	4.8E+00	2.2E-06	5.6E-06	1.8E-03	2.0E-02	4E-09	2.8E-04
16065-83-1	Chromium III	1.0E+02	4.6E-05	1.2E-04	NA	1.0E-01	NA	1.2E-03
7439-92-1	Lead	1.7E+03	7.6E-04	2.0E-03	NA	1.0E+00	NA	2.0E-03
7439-97-6	Mercury	1.0E+00	4.7E-07	1.2E-06	NA	3.0E-01	NA	4.1E-06
7440-02-0	Nickel	9.9E+00	4.5E-06	1.2E-05	4.8E-04	1.0E+00	2E-09	1.2E-05
7782-49-2	Selenium	9.0E-01	4.0E-07	1.0E-06	NA	3.0E+00	NA	3.5E-07
7440-22-4	Silver	6.6E-01	3.0E-07	7.7E-07	NA	1.4E-01	NA	5.5E-06
7440-62-2	Vanadium	2.4E+01	1.1E-05	2.8E-05	NA	1.0E+00	NA	2.8E-05
7440-66-6	Zinc	1.5E+02	6.6E-05	1.7E-04	NA	1.4E+00	NA	1.2E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	5.5E-08	6.0E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 28
Adult Solar Worker - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-8 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH										
C19-C36	C19-C36 Aliphatics	1.0E+01	NC	NA	1.00E+00	3.49E-08	NA	2.0E+00	NA	1.7E-08
C11-C22	C11-C22 Aromatics	1.2E+01	NC	NA	3.00E-01	1.26E-08	NA	3.0E-02	NA	4.2E-07
SVOCs										
65-85-0	Benzoic Acid	2.4E+00	NC	NA	9.60E-01	8.03E-09	NA	4.0E+00	NA	2.0E-09
131-11-3	Dimethylphthalate	2.8E-01	NC	NA	1.00E+00	9.91E-10	NA	1.0E-01	NA	9.9E-09
84-74-2	di-n-Butylphthalate	1.0E+00	NC	NA	1.00E+00	3.51E-09	NA	1.0E-01	NA	3.5E-08
85-68-7	Butyl benzyl phthalate	2.4E-01	1.0E+00	3.22E-10	1.00E+00	8.34E-10	NA	2.0E-01	NA	4.2E-09
117-81-7	bis(2-Ethylhexyl)pythalate	3.0E+00	1.0E+00	4.08E-09	1.00E+00	1.06E-08	1.4E-02	2.0E-02	6E-11	5.3E-07
86-74-8	Carbazole	2.0E+00	2.8E-01	7.43E-10	2.80E-01	1.93E-09	2.0E-02	3.0E-02	1E-11	6.4E-08
132-64-9	Dibenzofuran	7.2E-01	NC	NA	9.60E-01	2.40E-09	NA	1.0E-03	NA	2.4E-06
83-32-9	Acenaphthene	4.9E+00	NC	NA	3.00E-01	5.14E-09	NA	6.0E-02	NA	8.6E-08
208-96-8	Acenaphthylene	7.1E-01	NC	NA	3.00E-01	7.43E-10	NA	3.0E-02	NA	2.5E-08
120-12-7	Anthracene	8.6E+00	NC	NA	3.00E-01	9.02E-09	NA	3.0E-01	NA	3.0E-08
56-55-3	Benzo(a)anthracene	3.6E+01	3.0E-01	1.45E-08	3.00E-01	3.75E-08	7.3E-01	3.0E-02	1E-08	1.3E-06
50-32-8	Benzo(a)pyrene	2.9E+01	3.0E-01	1.16E-08	3.00E-01	3.00E-08	7.3E+00	3.0E-02	8E-08	1.0E-06
205-99-2	Benzo(b)fluoranthene	3.9E+01	3.0E-01	1.59E-08	3.00E-01	4.13E-08	7.3E-01	3.0E-02	1E-08	1.4E-06
191-24-2	Benzo(g,h,i)perylene	3.2E+00	NC	NA	3.00E-01	3.31E-09	NA	3.0E-02	NA	1.1E-07
207-08-9	Benzo(k)fluoranthene	4.3E+00	3.0E-01	1.72E-09	3.00E-01	4.45E-09	7.3E-02	3.0E-02	1E-10	1.5E-07
218-01-9	Chrysene	9.8E+00	3.0E-01	3.96E-09	3.00E-01	1.03E-08	7.3E-02	3.0E-02	3E-10	3.4E-07
53-70-3	Dibenz(a,h)anthracene	3.5E+00	3.0E-01	1.42E-09	3.00E-01	3.68E-09	7.3E+00	3.0E-02	1E-08	1.2E-07
206-44-0	Fluoranthene	2.5E+01	NC	NA	3.00E-01	2.64E-08	NA	4.0E-02	NA	6.6E-07
86-73-7	Fluorene	5.0E+00	NC	NA	3.00E-01	5.26E-09	NA	4.0E-02	NA	1.3E-07
193-39-5	Indeno(1,2,3-cd)pyrene	3.3E+00	3.0E-01	1.32E-09	3.00E-01	3.41E-09	7.3E-01	3.0E-02	1E-09	1.1E-07
91-57-6	2-Methylnaphthalene	2.1E+00	NC	NA	3.00E-01	2.24E-09	NA	4.0E-03	NA	5.6E-07
91-20-3	Naphthalene	3.4E+00	NC	NA	3.00E-01	3.54E-09	NA	2.0E-02	NA	1.8E-07
85-01-8	Phenanthrene	3.3E+01	NC	NA	3.00E-01	3.42E-08	NA	3.0E-02	NA	1.1E-06
129-00-0	Pyrene	1.8E+01	NC	NA	3.00E-01	1.83E-08	NA	3.0E-02	NA	6.1E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	3.9E+00	1.0E+00	5.23E-09	1.00E+00	1.36E-08	2.0E+00	2.0E-05	1E-08	6.8E-04
1746-01-6	Dioxin/PCB TEQ	1.9E-04	1.0E+00	2.54E-13	1.00E+00	6.57E-13	1.5E+05	7.0E-10	4E-08	9.4E-04
Metals										
7440-38-2	Arsenic	5.9E+00	5.0E-01	3.94E-09	5.00E-01	1.02E-08	1.5E+00	3.0E-04	6E-09	3.4E-05
7440-39-3	Barium	7.4E+02	NC	NA	1.00E+00	2.59E-06	NA	2.0E-01	NA	1.3E-05
7440-43-9	Cadmium	4.8E+00	NC	NA	1.00E+00	1.67E-08	NA	5.0E-04	NA	3.3E-05
16065-83-1	Chromium III	1.0E+02	NC	NA	1.00E+00	3.55E-07	NA	1.5E+00	NA	2.4E-07
7439-92-1	Lead	1.7E+03	NC	NA	5.00E-01	2.97E-06	NA	7.5E-04	NA	4.0E-03
7439-97-6	Mercury	1.0E+00	NC	NA	5.00E-01	1.82E-09	NA	3.0E-04	NA	6.1E-06
7440-02-0	Nickel	9.9E+00	NC	NA	1.00E+00	3.46E-08	NA	2.0E-02	NA	1.7E-06
7782-49-2	Selenium	9.0E-01	NC	NA	1.00E+00	3.14E-09	NA	5.0E-03	NA	6.3E-07
7440-22-4	Silver	6.6E-01	NC	NA	1.00E+00	2.30E-09	NA	5.0E-03	NA	4.6E-07
7440-62-2	Vanadium	2.4E+01	NC	NA	1.00E+00	8.46E-08	NA	9.0E-03	NA	9.4E-06
7440-66-6	Zinc	1.5E+02	NC	NA	1.00E+00	5.11E-07	NA	3.0E-01	NA	1.7E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.7E-07	5.7E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 29
Adult Staff - 0-3'
Incidental Ingestion of Surface Soil
HS-10 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1	1.0E-07	NA	1.0E-01	NA	1.0E-06
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1	1.8E-08	1	4.7E-08	1.4E-02	2.0E-02	3E-10	2.4E-06
132-64-9	Dibenzofuran	1.4E-01	NC	NA	0.96	4.6E-08	NA	1.0E-03	NA	4.6E-05
83-32-9	Acenaphthene	2.0E-01	NC	NA	0.3	2.0E-08	NA	6.0E-02	NA	3.3E-07
208-96-8	Acenaphthylene	1.4E-01	NC	NA	0.3	1.4E-08	NA	3.0E-02	NA	4.6E-07
120-12-7	Anthracene	5.0E-01	NC	NA	0.3	5.1E-08	NA	3.0E-01	NA	1.7E-07
56-55-3	Benzo(a)anthracene	1.2E+00	0.3	4.7E-08	0.3	1.2E-07	7.3E-01	3.0E-02	3E-08	4.0E-06
50-32-8	Benzo(a)pyrene	9.6E-01	0.3	3.7E-08	0.3	9.7E-08	7.3E+00	3.0E-02	3E-07	3.2E-06
205-99-2	Benzo(b)fluoranthene	1.2E+00	0.3	4.7E-08	0.3	1.2E-07	7.3E-01	3.0E-02	3E-08	4.1E-06
191-24-2	Benzo(g,h,i)perylene	4.0E-01	NC	NA	0.3	4.0E-08	NA	3.0E-02	NA	1.3E-06
207-08-9	Benzo(k)fluoranthene	4.3E-01	0.3	1.7E-08	0.3	4.3E-08	7.3E-02	3.0E-02	1E-09	1.4E-06
218-01-9	Chrysene	1.1E+00	0.3	4.3E-08	0.3	1.1E-07	7.3E-02	3.0E-02	3E-09	3.7E-06
53-70-3	Dibenz(a,h)anthracene	1.2E-01	0.3	4.9E-09	0.3	1.3E-08	7.3E+00	3.0E-02	4E-08	4.2E-07
206-44-0	Fluoranthene	2.4E+00	NC	NA	0.3	2.4E-07	NA	4.0E-02	NA	6.1E-06
86-73-7	Fluorene	2.2E-01	NC	NA	0.3	2.3E-08	NA	4.0E-02	NA	5.6E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	0.3	1.8E-08	0.3	4.7E-08	7.3E-01	3.0E-02	1E-08	1.6E-06
91-57-6	2-Methylnaphthalene	1.6E-01	NC	NA	0.3	1.6E-08	NA	4.0E-03	NA	4.1E-06
91-20-3	Naphthalene	1.4E-01	NC	NA	0.3	1.4E-08	NA	2.0E-02	NA	7.1E-07
85-01-8	Phenanthrene	2.4E+00	NC	NA	0.3	2.4E-07	NA	3.0E-02	NA	8.0E-06
129-00-0	Pyrene	2.8E+00	NC	NA	0.3	2.8E-07	NA	3.0E-02	NA	9.3E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.6E+00	1	2.0E-07	1	5.3E-07	2.0E+00	2.0E-05	4E-07	2.7E-02
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1	3.3E-12	1	8.7E-12	1.5E+05	7.0E-10	5E-07	1.2E-02
Metals										
7440-38-2	Arsenic	5.3E+00	0.5	3.4E-07	0.5	8.8E-07	1.5E+00	3.0E-04	5E-07	2.9E-03
7440-39-3	Barium	3.3E+02	NC	NA	1	1.1E-04	NA	2.0E-01	NA	5.6E-04
7440-41-7	Beryllium	1.8E-01	NC	NA	1	5.9E-08	NA	2.0E-03	NA	3.0E-05
7440-43-9	Cadmium	9.8E-01	NC	NA	1	3.3E-07	NA	5.0E-04	NA	6.6E-04
16065-83-1	Chromium III	2.9E+01	NC	NA	1	9.6E-06	NA	1.5E+00	NA	6.4E-06
7439-92-1	Lead	3.5E+02	NC	NA	0.5	5.9E-05	NA	7.5E-04	NA	7.9E-02
7439-97-6	Mercury	1.2E-01	NC	NA	0.5	2.0E-08	NA	3.0E-04	NA	6.8E-05
7440-02-0	Nickel	5.6E+00	NC	NA	1	1.9E-06	NA	2.0E-02	NA	9.4E-05
7440-22-4	Silver	5.8E-01	NC	NA	1	2.0E-07	NA	5.0E-03	NA	3.9E-05
7440-62-2	Vanadium	1.2E+01	NC	NA	1	4.2E-06	NA	9.0E-03	NA	4.6E-04
7440-66-6	Zinc	3.1E+01	NC	NA	1	1.0E-05	NA	3.0E-01	NA	3.4E-05

	Cancer Risk	Hazard Index
TOTAL:	1.8E-06	1.2E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 30
Adult Staff - 0-3'
Dermal Contact with Surface Soil
HS-10 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NA	NA	0.07	1.5E-08	NA	1.0E-01	NA	1.5E-07
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	0.1	3.8E-09	0.1	9.8E-09	1.4E-02	2.0E-02	5E-11	4.9E-07
132-64-9	Dibenzofuran	1.4E-01	NA	NA	0.18	1.8E-08	NA	1.0E-03	NA	1.8E-05
83-32-9	Acenaphthene	2.0E-01	NA	NA	0.1	1.4E-08	NA	6.0E-02	NA	2.3E-07
208-96-8	Acenaphthylene	1.4E-01	NA	NA	0.1	9.7E-09	NA	3.0E-02	NA	3.2E-07
120-12-7	Anthracene	5.0E-01	NA	NA	0.1	3.5E-08	NA	3.0E-01	NA	1.2E-07
56-55-3	Benzo(a)anthracene	1.2E+00	0.02	6.5E-09	0.02	1.7E-08	7.3E-01	3.0E-02	5E-09	5.6E-07
50-32-8	Benzo(a)pyrene	9.6E-01	0.02	5.2E-09	0.02	1.3E-08	7.3E+00	3.0E-02	4E-08	4.5E-07
205-99-2	Benzo(b)fluoranthene	1.2E+00	0.02	6.6E-09	0.02	1.7E-08	7.3E-01	3.0E-02	5E-09	5.7E-07
191-24-2	Benzo(g,h,i)perylene	4.0E-01	NA	NA	0.1	2.8E-08	NA	3.0E-02	NA	9.4E-07
207-08-9	Benzo(k)fluoranthene	4.3E-01	0.02	2.3E-09	0.02	6.0E-09	7.3E-02	3.0E-02	2E-10	2.0E-07
218-01-9	Chrysene	1.1E+00	0.02	6.0E-09	0.02	1.6E-08	7.3E-02	3.0E-02	4E-10	5.2E-07
53-70-3	Dibenz(a,h)anthracene	1.2E-01	0.02	6.7E-10	0.02	1.7E-09	7.3E+00	3.0E-02	5E-09	5.8E-08
206-44-0	Fluoranthene	2.4E+00	NA	NA	0.1	1.7E-07	NA	4.0E-02	NA	4.2E-06
86-73-7	Fluorene	2.2E-01	NA	NA	0.1	1.6E-08	NA	4.0E-02	NA	3.9E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	0.02	2.5E-09	0.02	6.5E-09	7.3E-01	3.0E-02	2E-09	2.2E-07
91-57-6	2-Methylnaphthalene	1.6E-01	NA	NA	0.1	1.1E-08	NA	4.0E-03	NA	2.9E-06
91-20-3	Naphthalene	1.4E-01	NA	NA	0.1	9.8E-09	NA	2.0E-02	NA	4.9E-07
85-01-8	Phenanthrene	2.4E+00	NA	NA	0.1	1.7E-07	NA	3.0E-02	NA	5.5E-06
129-00-0	Pyrene	2.8E+00	NA	NA	0.1	1.9E-07	NA	3.0E-02	NA	6.5E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.6E+00	0.1	4.3E-08	0.1	1.1E-07	2.0E+00	2.0E-05	9E-08	5.5E-03
1746-01-6	Dioxin/PCB TEQ	2.6E-05	0.1	7.0E-13	0.1	1.8E-12	1.5E+05	7.0E-10	1E-07	2.6E-03
Metals										
7440-38-2	Arsenic	5.3E+00	0.03	4.3E-08	0.03	1.1E-07	1.5E+00	3.0E-04	6E-08	3.7E-04
7440-39-3	Barium	3.3E+02	NA	NA	0.1	2.3E-05	NA	2.0E-01	NA	1.2E-04
7440-41-7	Beryllium	1.8E-01	NA	NA	0.1	1.2E-08	NA	2.0E-03	NA	6.2E-06
7440-43-9	Cadmium	9.8E-01	NA	NA	0.01	6.9E-09	NA	5.0E-04	NA	1.4E-05
16065-83-1	Chromium III	2.9E+01	NA	NA	0.1	2.0E-06	NA	1.5E+00	NA	1.3E-06
7439-92-1	Lead	3.5E+02	NA	NA	0.006	1.5E-06	NA	7.5E-04	NA	2.0E-03
7439-97-6	Mercury	1.2E-01	NA	NA	0.1	8.5E-09	NA	3.0E-04	NA	2.8E-05
7440-02-0	Nickel	5.6E+00	NA	NA	0.2	7.8E-07	NA	2.0E-02	NA	3.9E-05
7440-22-4	Silver	5.8E-01	NA	NA	0.3	1.2E-07	NA	5.0E-03	NA	2.4E-05
7440-62-2	Vanadium	1.2E+01	NA	NA	0.1	8.6E-07	NA	9.0E-03	NA	9.6E-05
7440-66-6	Zinc	3.1E+01	NA	NA	0.1	2.1E-06	NA	3.0E-01	NA	7.1E-06

	Cancer Risk	Hazard Index
TOTAL:	3.1E-07	1.1E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 31
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-10 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
84-74-2	di-n-Butylphthalate	3.0E-01	3.4E-07	8.8E-07	NA	3.5E+02	NA	2.5E-09
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.6E-07	4.1E-07	1.3E-06	7.0E+00	2E-13	5.8E-08
132-64-9	Dibenzofuran	1.4E-01	1.6E-07	4.1E-07	NA	3.5E+00	NA	1.2E-07
83-32-9	Acenaphthene	2.0E-01	2.2E-07	5.7E-07	NA	5.0E+01	NA	1.1E-08
208-96-8	Acenaphthylene	1.4E-01	1.5E-07	4.0E-07	NA	5.0E+01	NA	8.0E-09
120-12-7	Anthracene	5.0E-01	5.6E-07	1.5E-06	NA	5.0E+01	NA	2.9E-08
56-55-3	Benzo(a)anthracene	1.2E+00	1.3E-06	3.5E-06	2.1E-04	5.0E+01	3E-10	7.0E-08
50-32-8	Benzo(a)pyrene	9.6E-01	1.1E-06	2.8E-06	2.1E-03	5.0E+01	2E-09	5.6E-08
205-99-2	Benzo(b)fluoranthene	1.2E+00	1.4E-06	3.5E-06	2.1E-04	5.0E+01	3E-10	7.1E-08
191-24-2	Benzo(g,h,i)perylene	4.0E-01	4.5E-07	1.2E-06	NA	5.0E+01	NA	2.3E-08
207-08-9	Benzo(k)fluoranthene	4.3E-01	4.8E-07	1.3E-06	2.1E-05	5.0E+01	1E-11	2.5E-08
218-01-9	Chrysene	1.1E+00	1.2E-06	3.2E-06	2.1E-05	5.0E+01	3E-11	6.4E-08
53-70-3	Dibenz(a,h)anthracene	1.2E-01	1.4E-07	3.6E-07	2.1E-03	5.0E+01	3E-10	7.3E-09
206-44-0	Fluoranthene	2.4E+00	2.7E-06	7.0E-06	NA	5.0E+01	NA	1.4E-07
86-73-7	Fluorene	2.2E-01	2.5E-07	6.5E-07	NA	5.0E+01	NA	1.3E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	5.2E-07	1.3E-06	2.1E-04	5.0E+01	1E-10	2.7E-08
91-57-6	2-Methylnaphthalene	1.6E-01	1.8E-07	4.7E-07	NA	5.0E+01	NA	9.5E-09
91-20-3	Naphthalene	1.4E-01	1.6E-07	4.1E-07	NA	3.0E+00	NA	1.4E-07
85-01-8	Phenanthrene	2.4E+00	2.7E-06	6.9E-06	NA	5.0E+01	NA	1.4E-07
129-00-0	Pyrene	2.8E+00	3.1E-06	8.0E-06	NA	5.0E+01	NA	1.6E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	1.6E+00	1.8E-06	4.6E-06	1.0E-04	2.0E-02	2E-10	2.3E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	2.9E-11	7.5E-11	3.3E+01	2.0E-06	1E-09	3.7E-05
Metals								
7440-38-2	Arsenic	5.3E+00	5.9E-06	1.5E-05	3.0E-03	2.0E-02	2E-08	7.6E-04
7440-39-3	Barium	3.3E+02	3.7E-04	9.7E-04	NA	5.0E-01	NA	1.9E-03
7440-41-7	Beryllium	1.8E-01	2.0E-07	5.1E-07	2.4E-03	2.0E-02	5E-10	2.6E-05
7440-43-9	Cadmium	9.8E-01	1.1E-06	2.8E-06	1.8E-03	2.0E-02	2E-09	1.4E-04
16065-83-1	Chromium III	2.9E+01	3.2E-05	8.3E-05	NA	1.0E-01	NA	8.3E-04
7439-92-1	Lead	3.5E+02	4.0E-04	1.0E-03	NA	1.0E+00	NA	1.0E-03
7439-97-6	Mercury	1.2E-01	1.4E-07	3.5E-07	NA	3.0E-01	NA	1.2E-06
7440-02-0	Nickel	5.6E+00	6.3E-06	1.6E-05	4.8E-04	1.0E+00	3E-09	1.6E-05
7440-22-4	Silver	5.8E-01	6.5E-07	1.7E-06	NA	1.4E-01	NA	1.2E-05
7440-62-2	Vanadium	1.2E+01	1.4E-05	3.6E-05	NA	1.0E+00	NA	3.6E-05
7440-66-6	Zinc	3.1E+01	3.4E-05	8.9E-05	NA	1.4E+00	NA	6.4E-05

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.8E-08	5.1E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 32
Adult Staff - 0-3'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-10 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.00E+00	2.65E-09	NA	1.0E-01	NA	2.6E-08
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	4.71E-10	1.00E+00	1.22E-09	1.4E-02	2.0E-02	7E-12	6.1E-08
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.60E-01	1.18E-09	NA	1.0E-03	NA	1.2E-06
83-32-9	Acenaphthene	2.0E-01	NC	NA	3.00E-01	5.17E-10	NA	6.0E-02	NA	8.6E-09
208-96-8	Acenaphthylene	1.4E-01	NC	NA	3.00E-01	3.61E-10	NA	3.0E-02	NA	1.2E-08
120-12-7	Anthracene	5.0E-01	NC	NA	3.00E-01	1.32E-09	NA	3.0E-01	NA	4.4E-09
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	1.21E-09	3.00E-01	3.14E-09	7.3E-01	3.0E-02	9E-10	1.0E-07
50-32-8	Benzo(a)pyrene	9.6E-01	3.0E-01	9.66E-10	3.00E-01	2.50E-09	7.3E+00	3.0E-02	7E-09	8.3E-08
205-99-2	Benzo(b)fluoranthene	1.2E+00	3.0E-01	1.23E-09	3.00E-01	3.18E-09	7.3E-01	3.0E-02	9E-10	1.1E-07
191-24-2	Benzo(g,h,i)perylene	4.0E-01	NC	NA	3.00E-01	1.05E-09	NA	3.0E-02	NA	3.5E-08
207-08-9	Benzo(k)fluoranthene	4.3E-01	3.0E-01	4.34E-10	3.00E-01	1.13E-09	7.3E-02	3.0E-02	3E-11	3.8E-08
218-01-9	Chrysene	1.1E+00	3.0E-01	1.12E-09	3.00E-01	2.90E-09	7.3E-02	3.0E-02	8E-11	9.7E-08
53-70-3	Dibenz(a,h)anthracene	1.2E-01	3.0E-01	1.26E-10	3.00E-01	3.26E-10	7.3E+00	3.0E-02	9E-10	1.1E-08
206-44-0	Fluoranthene	2.4E+00	NC	NA	3.00E-01	6.31E-09	NA	4.0E-02	NA	1.6E-07
86-73-7	Fluorene	2.2E-01	NC	NA	3.00E-01	5.85E-10	NA	4.0E-02	NA	1.5E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.6E-01	3.0E-01	4.67E-10	3.00E-01	1.21E-09	7.3E-01	3.0E-02	3E-10	4.0E-08
91-57-6	2-Methylnaphthalene	1.6E-01	NC	NA	3.00E-01	4.27E-10	NA	4.0E-03	NA	1.1E-07
91-20-3	Naphthalene	1.4E-01	NC	NA	3.00E-01	3.66E-10	NA	2.0E-02	NA	1.8E-08
85-01-8	Phenanthrene	2.4E+00	NC	NA	3.00E-01	6.19E-09	NA	3.0E-02	NA	2.1E-07
129-00-0	Pyrene	2.8E+00	NC	NA	3.00E-01	7.22E-09	NA	3.0E-02	NA	2.4E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	1.6E+00	1.0E+00	5.30E-09	1.00E+00	1.37E-08	2.0E+00	2.0E-05	1E-08	6.9E-04
1746-01-6	Dioxin/PCB TEQ	2.6E-05	1.0E+00	8.66E-14	1.00E+00	2.24E-13	1.5E+05	7.0E-10	1E-08	3.2E-04
Metals										
7440-38-2	Arsenic	5.3E+00	5.0E-01	8.84E-09	5.00E-01	2.29E-08	1.5E+00	3.0E-04	1E-08	7.6E-05
7440-39-3	Barium	3.3E+02	NC	NA	1.00E+00	2.90E-06	NA	2.0E-01	NA	1.5E-05
7440-41-7	Beryllium	1.8E-01	NC	NA	1.00E+00	1.54E-09	NA	2.0E-03	NA	7.7E-07
7440-43-9	Cadmium	9.8E-01	NC	NA	1.00E+00	8.55E-09	NA	5.0E-04	NA	1.7E-05
16065-83-1	Chromium III	2.9E+01	NC	NA	1.00E+00	2.49E-07	NA	1.5E+00	NA	1.7E-07
7439-92-1	Lead	3.5E+02	NC	NA	5.00E-01	1.54E-06	NA	7.5E-04	NA	2.0E-03
7439-97-6	Mercury	1.2E-01	NC	NA	5.00E-01	5.30E-10	NA	3.0E-04	NA	1.8E-06
7440-02-0	Nickel	5.6E+00	NC	NA	1.00E+00	4.88E-08	NA	2.0E-02	NA	2.4E-06
7440-22-4	Silver	5.8E-01	NC	NA	1.00E+00	5.07E-09	NA	5.0E-03	NA	1.0E-06
7440-62-2	Vanadium	1.2E+01	NC	NA	1.00E+00	1.08E-07	NA	9.0E-03	NA	1.2E-05
7440-66-6	Zinc	3.1E+01	NC	NA	1.00E+00	2.67E-07	NA	3.0E-01	NA	8.9E-07

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	4.7E-08	3.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

APPENDIX C-7

RISK AND HAZARD CALCULATIONS FOR 0 TO 6 FOOT SOIL INTERVAL

Utility Worker (6-month) - Soil: Table CW-1 (HS-1: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0114

ELCR (all chemicals) = 1.5E-07
HI (all chemicals) = 2.0E-01

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
POLYCHLORINATED BIPHENYLS (PCBs)	5.9E-03	1.0E-10	1.0E-10	2.7E-12	1.6E-13	2.1E-10	1.5E-04	1.5E-04	3.8E-06	1.1E-05	3.1E-04
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01

Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	µg/m^3

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
POLYCHLORINATED BIPHENYLS (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Utility Worker (6 months) - Soil: Table CW-1 (HS-2: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0114

ELCR (all chemicals) = 2E-07
HI (all chemicals) = 8E-01

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)		EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
Trichlorobenzene, 1,2,4-		1.7E-01						2.3E-06	7.0E-07	6.0E-08	3.2E-07	3.4E-06
zz1,2,3-Trichlorobenzene		2.1E-01						3.2E-04	3.6E-04	8.3E-06	2.8E-06	6.9E-04
Acenaphthene		1.6E-01						2.9E-07	9.8E-07	7.5E-09	1.2E-08	1.3E-06
Acenaphthylene		1.5E-01						1.8E-07	6.0E-07	4.7E-09	1.1E-08	8.0E-07
Anthracene		3.3E-01						1.2E-07	4.1E-07	3.2E-09	2.5E-08	5.6E-07
Benzo(a)anthracene		6.1E-01	1.2E-09	7.8E-10	3.0E-11	3.4E-11	2.0E-09	7.5E-07	5.0E-07	1.9E-08	4.5E-08	1.3E-06
Benzo(a)pyrene		5.3E-01	1.0E-08	6.8E-09	2.6E-10	2.9E-10	1.8E-08	6.5E-07	4.4E-07	1.7E-08	3.9E-08	1.1E-06
Benzo(b)fluoranthene		5.7E-01	1.1E-09	7.3E-10	2.8E-11	3.1E-11	1.9E-09	7.0E-07	4.7E-07	1.8E-08	4.2E-08	1.2E-06
Benzo(g,h,i)perylene		3.6E-01						4.5E-07	1.5E-06	1.2E-08	2.7E-08	2.0E-06
Benzo(k)fluoranthene		2.7E-01	5.1E-11	3.4E-11	1.3E-12	1.5E-12	8.9E-11	3.3E-07	2.2E-07	8.5E-09	2.0E-08	5.8E-07
Chrysene		5.9E-01	1.1E-10	7.6E-11	2.9E-12	3.3E-12	2.0E-10	7.3E-07	4.9E-07	1.9E-08	4.4E-08	1.3E-06
Dibenzo(a,h)anthracene		1.4E-01	2.7E-09	1.8E-09	7.1E-11	7.9E-11	4.7E-09	1.7E-07	1.2E-07	4.5E-09	1.1E-08	3.1E-07
Fluoranthene		1.2E+00						4.4E-06	1.5E-05	1.1E-07	8.8E-08	1.9E-05
Fluorene		2.1E-01						1.9E-07	6.5E-07	5.0E-09	1.6E-08	8.6E-07
Indeno(1,2,3-cd)pyrene		4.2E-01	8.0E-10	5.4E-10	2.1E-11	2.3E-11	1.4E-09	5.1E-07	3.4E-07	1.3E-08	3.1E-08	9.0E-07
Methylnaphthalene, 2-		1.3E-01						1.2E-05	4.2E-05	3.2E-07	1.0E-08	5.4E-05
Naphthalene		1.6E-01						2.9E-07	9.8E-07	7.6E-09	2.0E-06	3.3E-06
Phenanthrene		1.3E+00						1.6E-06	5.2E-06	4.0E-08	9.4E-08	6.9E-06
Pyrene		1.2E+00						1.5E-06	4.9E-06	3.8E-08	8.8E-08	6.5E-06
AROMATICS C9 to C10	GRO	1.5E+01						6.0E-05	1.2E-04	1.6E-06	1.1E-06	1.8E-04
Polychlorinated biphenyls (PCBs)		4.5E-01	8.0E-09	8.0E-09	2.1E-10	1.2E-11	1.6E-08	1.1E-02	1.1E-02	2.9E-04	8.4E-04	2.4E-02
TCDD, 2,3,7,8- (equivalents)		5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Arsenic		3.5E+00	2.3E-08	1.4E-08	6.0E-10	2.8E-09	4.0E-08	7.2E-03	4.3E-03	1.9E-04	6.5E-03	1.8E-02
Barium		8.8E+01						1.5E-03	1.6E-03	4.0E-05	6.5E-04	3.8E-03
Beryllium		1.8E-01				1.1E-10	1.1E-10	4.4E-05	4.5E-05	1.1E-06	3.4E-04	4.3E-04
Cadmium		6.1E-01				2.9E-10	2.9E-10	7.5E-04	1.5E-04	2.0E-05	1.1E-03	2.1E-03
Chromium(III)		1.3E+01						1.1E-05	1.1E-05	2.8E-07	1.6E-03	1.6E-03
Lead		6.0E+02						4.9E-01	5.9E-02	1.3E-02	2.2E-02	5.8E-01
MERCURY		1.3E-01						2.6E-04	5.3E-04	6.8E-06	1.6E-05	8.2E-04
NICKEL		9.3E+00				1.2E-09	1.2E-09	5.7E-04	1.2E-03	1.5E-05	3.5E-04	2.1E-03
Silver		1.5E+00						3.8E-04	1.2E-03	9.9E-06	4.1E-04	2.0E-03
Vanadium		1.5E+01						2.1E-03	2.1E-03	5.4E-05	5.7E-04	4.8E-03
Zinc		8.8E+01						3.6E-04	3.6E-04	9.3E-06	2.3E-03	3.1E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

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Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
Trichlorobenzene, 1,2,4-						9.0E-02	1	0.03	1	5.7E-03
zz1,2,3-Trichlorobenzene						8.0E-04	0.99	0.11	1	8.0E-04
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Methylnaphthalene, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
MERCURY						3.0E-04	0.5	0.1	1	8.6E-05
NICKEL					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) $_{11\text{-}12}$	58	kg
IR $_{\text{(1-time reasonable max)}}$	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Utility Worker (6 month) - Soil: Table CW-1 (HS-3: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0114

ELCR (all chemicals) = 2E-07
HI (all chemicals) = 1E+00

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
Benzene	3.6E-02	1.7E-11	5.2E-12	4.5E-13	7.4E-14	2.3E-11	4.4E-06	1.3E-06	1.1E-07	1.3E-07	6.0E-06
Toluene	4.1E-02						6.3E-08	1.9E-08	1.6E-09	3.1E-10	8.4E-08
AROMATICS C9 to C10 1,2,4-Trimethylbenzene	4.6E-02						1.9E-07	3.8E-07	4.9E-09	3.4E-09	5.8E-07
Anthracene	4.6E-01						1.7E-07	5.7E-07	4.4E-09	3.4E-08	7.8E-07
Benzo(a)anthracene	7.7E-01	1.5E-09	9.9E-10	3.8E-11	4.3E-11	2.6E-09	9.5E-07	6.4E-07	2.5E-08	5.7E-08	1.7E-06
Benzo(a)pyrene	7.9E-01	1.5E-08	1.0E-08	3.9E-10	4.4E-10	2.6E-08	9.8E-07	6.6E-07	2.5E-08	5.9E-08	1.7E-06
Benzo(b)fluoranthene	8.7E-01	1.7E-09	1.1E-09	4.3E-11	4.8E-11	2.9E-09	1.1E-06	7.2E-07	2.8E-08	6.5E-08	1.9E-06
Benzo(g,h,i)perylene	5.0E-01						6.1E-07	2.1E-06	1.6E-08	3.7E-08	2.7E-06
Benzo(k)fluoranthene	2.8E-01	5.3E-11	3.6E-11	1.4E-12	1.5E-12	9.1E-11	3.4E-07	2.3E-07	8.8E-09	2.1E-08	6.0E-07
Chrysene	7.4E-01	1.4E-10	9.6E-11	3.7E-12	4.1E-12	2.5E-10	9.2E-07	6.1E-07	2.4E-08	5.5E-08	1.6E-06
Dibenzo(a,h)anthracene	1.6E-01	3.0E-09	2.0E-09	7.8E-11	8.7E-11	5.2E-09	1.9E-07	1.3E-07	5.0E-09	1.2E-08	3.4E-07
Fluoranthene	1.7E+00						6.4E-06	2.1E-05	1.7E-07	1.3E-07	2.8E-05
Indeno(1,2,3-cd)pyrene	6.2E-01	1.2E-09	8.0E-10	3.1E-11	3.5E-11	2.1E-09	7.7E-07	5.2E-07	2.0E-08	4.6E-08	1.4E-06
Naphthalene	7.6E-01						1.4E-06	4.7E-06	3.6E-08	9.4E-06	1.6E-05
Phenanthrene	1.8E+00						2.2E-06	7.4E-06	5.7E-08	1.3E-07	9.8E-06
Pyrene	1.6E+00						1.9E-06	6.5E-06	5.0E-08	1.2E-07	8.6E-06
Polychlorinated biphenyls (PCBs)	1.8E-01	3.2E-09	3.3E-09	8.4E-11	4.9E-12	6.6E-09	4.5E-03	4.6E-03	1.2E-04	3.4E-04	9.6E-03
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Barium	1.7E+02						3.0E-03	3.0E-03	7.7E-05	1.3E-03	7.3E-03
Beryllium	3.0E-01				1.9E-10	1.9E-10	7.5E-05	7.5E-05	1.9E-06	5.6E-04	7.2E-04
Lead	1.2E+03						9.5E-01	1.1E-01	2.5E-02	4.3E-02	1.1E+00
MERCURY	1.6E-01						3.3E-04	6.7E-04	8.7E-06	2.0E-05	1.0E-03
Nickel	6.5E+00				8.3E-10	8.3E-10	4.0E-04	8.1E-04	1.0E-05	2.4E-04	1.5E-03
Silver	8.2E-01						2.0E-04	6.1E-04	5.2E-06	2.2E-04	1.0E-03
Vanadium	1.4E+01						1.9E-03	1.9E-03	5.0E-05	5.2E-04	4.4E-03
Zinc	1.4E+02						5.6E-04	5.6E-04	1.4E-05	3.6E-03	4.7E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

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Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

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Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

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Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
Benzene	5.5E-02	1	0.03	1	2.7E-02	1.0E-02	1	0.03	1	2.9E-03
Toluene						8.0E-01	1	0.03	1	1.4E+00
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Lead						7.5E-04	0.5	0.006	1	2.9E-04
MERCURY						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) $_{11\text{-}12}$	58	kg
IR $_{\text{(1-time reasonable max)}}$	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Utility Worker (6 month) - Soil: Table CW-1 (HS-4: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

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ELCR (all chemicals) = 4E-07
HI (all chemicals) = 8E-01

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Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
zz4-Bromodiphenyl ether	7.8E-02						9.6E-03	1.8E-02	2.5E-04	8.3E-05	2.8E-02
bis(2-Ethylhexyl)phthalate	7.6E-02	9.3E-12	9.4E-12	2.4E-13	2.6E-14	1.9E-11	4.7E-06	4.7E-06	1.2E-07	4.0E-07	9.9E-06
Acenaphthene	1.8E-01						3.4E-07	1.1E-06	8.8E-09	1.4E-08	1.5E-06
Acenaphthylene	5.9E-01						7.3E-07	2.5E-06	1.9E-08	4.4E-08	3.3E-06
Anthracene	6.0E-01						2.2E-07	7.4E-07	5.7E-09	4.4E-08	1.0E-06
Benzo(a)anthracene	1.2E+00	2.4E-09	1.6E-09	6.1E-11	6.8E-11	4.1E-09	1.5E-06	1.0E-06	3.9E-08	9.2E-08	2.7E-06
Benzo(a)pyrene	1.5E+00	2.8E-08	1.9E-08	7.3E-10	8.2E-10	4.9E-08	1.8E-06	1.2E-06	4.7E-08	1.1E-07	3.2E-06
Benzo(b)fluoranthene	1.7E+00	3.2E-09	2.2E-09	8.4E-11	9.3E-11	5.6E-09	2.1E-06	1.4E-06	5.4E-08	1.3E-07	3.7E-06
Benzo(g,h,i)perylene	7.3E-01						9.0E-07	3.0E-06	2.3E-08	5.4E-08	4.0E-06
Benzo(k)fluoranthene	5.8E-01	1.1E-10	7.4E-11	2.9E-12	3.2E-12	1.9E-10	7.1E-07	4.8E-07	1.8E-08	4.3E-08	1.2E-06
Chrysene	1.3E+00	2.6E-10	1.7E-10	6.6E-12	7.4E-12	4.4E-10	1.6E-06	1.1E-06	4.3E-08	9.9E-08	2.9E-06
Dibenzo(a,h)anthracene	2.0E-01	3.8E-09	2.5E-09	9.8E-11	1.1E-10	6.6E-09	2.4E-07	1.6E-07	6.3E-09	1.5E-08	4.3E-07
Fluoranthene	3.2E+00						1.2E-05	4.0E-05	3.1E-07	2.4E-07	5.3E-05
Fluorene	2.5E-01						2.4E-07	7.9E-07	6.1E-09	1.9E-08	1.1E-06
Indeno(1,2,3-cd)pyrene	6.9E-01	1.3E-09	8.9E-10	3.4E-11	3.8E-11	2.3E-09	8.5E-07	5.7E-07	2.2E-08	5.1E-08	1.5E-06
Naphthalene	1.0E+00						1.9E-06	6.4E-06	5.0E-08	1.3E-05	2.1E-05
Phenanthrene	2.9E+00						3.6E-06	1.2E-05	9.3E-08	2.2E-07	1.6E-05
Pyrene	3.0E+00						3.8E-06	1.3E-05	9.7E-08	2.3E-07	1.7E-05
Polychlorinated biphenyls (PCBs)	2.0E+00	3.5E-08	3.5E-08	9.1E-10	5.3E-11	7.1E-08	4.9E-02	5.0E-02	1.3E-03	3.7E-03	1.0E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Antimony	2.9E+00						8.9E-03	9.0E-03	2.3E-04	1.1E-05	1.8E-02
Arsenic	6.7E+00	4.4E-08	2.7E-08	1.1E-09	5.3E-09	7.7E-08	1.4E-02	8.3E-03	3.5E-04	1.2E-02	3.5E-02
Barium	1.7E+02						2.9E-03	3.0E-03	7.6E-05	1.2E-03	7.2E-03
Beryllium	2.3E-01				1.5E-10	1.5E-10	5.8E-05	5.8E-05	1.5E-06	4.4E-04	5.5E-04
Cadmium	7.7E-01				3.7E-10	3.7E-10	9.5E-04	1.9E-04	2.5E-05	1.4E-03	2.6E-03
Chromium(III)	1.6E+01						1.3E-05	1.3E-05	3.3E-07	1.9E-03	2.0E-03
Lead	3.4E+02						2.8E-01	3.4E-02	7.2E-03	1.3E-02	3.3E-01
MERCURY	1.4E-01						2.9E-04	5.8E-04	7.5E-06	1.7E-05	9.0E-04
Nickel	1.2E+01				1.6E-09	1.6E-09	7.6E-04	1.5E-03	2.0E-05	4.6E-04	2.8E-03
Silver	7.5E-01						1.9E-04	5.6E-04	4.8E-06	2.0E-04	9.5E-04
Vanadium	3.1E+01						4.3E-03	4.3E-03	1.1E-04	1.2E-03	9.8E-03
Zinc	1.7E+02						7.1E-04	7.2E-04	1.8E-05	4.6E-03	6.1E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

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Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
zz4-Bromodiphenyl ether						1.0E-05	1	0.19	1	1.0E-05
bis(2-Ethylhexyl)phthalate	1.4E-02	1	0.1	1	4.6E-03	2.0E-02	1	0.1	1	2.0E-03
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Antimony						4.0E-04	1	0.1	1	2.9E-03
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
MERCURY						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Utility Worker (3-Day) - Soil: Table CW-1 (HS-5: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

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Vlookup Version v0114

ELCR (all chemicals) = 8E-07

HI (all chemicals) = 1E+00

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Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
zzDibenzofuran	9.8E-01						1.7E-04	3.3E-04	4.5E-06	1.6E-06	5.1E-04
ACENAPHTHENE	8.5E-01						9.4E-07	3.2E-06	2.4E-08	3.8E-08	4.2E-06
ACENAPHTHYLENE	1.5E+00						1.1E-06	3.8E-06	2.9E-08	6.9E-08	5.1E-06
Anthracene	4.3E+00						9.5E-07	3.2E-06	2.5E-08	1.9E-07	4.3E-06
Benzo(a)anthracene	1.7E+01	2.0E-08	1.3E-08	5.1E-10	5.6E-10	3.4E-08	1.3E-05	8.4E-06	3.3E-07	7.6E-07	2.2E-05
Benzo(a)pyrene	1.1E+01	1.3E-07	8.5E-08	3.3E-09	3.7E-09	2.2E-07	8.1E-06	5.5E-06	2.1E-07	4.9E-07	1.4E-05
Benzo(b)fluoranthene	1.3E+01	1.5E-08	1.0E-08	3.9E-10	4.3E-10	2.6E-08	9.6E-06	6.5E-06	2.5E-07	5.8E-07	1.7E-05
Benzo(g,h,i)perylene	4.1E+00						3.0E-06	1.0E-05	7.9E-08	1.8E-07	1.4E-05
Benzo(k)fluoranthene	7.4E+00	8.5E-10	5.7E-10	2.2E-11	2.5E-11	1.5E-09	5.5E-06	3.7E-06	1.4E-07	3.3E-07	9.6E-06
Chrysene	7.2E+00	8.3E-10	5.6E-10	2.1E-11	2.4E-11	1.4E-09	5.3E-06	3.6E-06	1.4E-07	3.2E-07	9.3E-06
Dibenzo(a,h)anthracene	9.4E+00	1.1E-07	7.3E-08	2.8E-09	3.1E-09	1.9E-07	6.9E-06	4.7E-06	1.8E-07	4.2E-07	1.2E-05
Fluoranthene	2.1E+01						4.6E-05	1.5E-04	1.2E-06	9.2E-07	2.0E-04
Fluorene	2.0E+00						1.1E-06	3.8E-06	2.9E-08	9.1E-08	5.0E-06
Indeno(1,2,3-cd)pyrene	4.0E+00	4.6E-09	3.1E-09	1.2E-10	1.3E-10	7.9E-09	2.9E-06	2.0E-06	7.6E-08	1.8E-07	5.2E-06
METHYLNAPHTHALENE, 2-	6.0E-01						3.4E-05	1.1E-04	8.7E-07	2.7E-08	1.5E-04
Phenanthrene	1.7E+01						1.2E-05	4.1E-05	3.2E-07	7.4E-07	5.5E-05
Pyrene	1.8E+01						1.3E-05	4.5E-05	3.5E-07	8.1E-07	5.9E-05
Polychlorinated biphenyls (PCBs)	4.9E+00	5.1E-08	5.2E-08	1.3E-09	7.8E-11	1.0E-07	7.2E-02	7.2E-02	1.9E-03	5.4E-03	1.5E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	4.5E-08	4.5E-08	1.2E-09	3.0E-10	9.1E-08	6.0E-02	6.0E-02	1.5E-03	6.3E-04	1.2E-01
Arsenic	1.5E+01	5.7E-08	3.5E-08	1.5E-09	7.0E-09	1.0E-07	1.8E-02	1.1E-02	4.6E-04	1.6E-02	4.5E-02
Barium	2.1E+02						2.2E-03	2.2E-03	5.7E-05	9.3E-04	5.4E-03
Cadmium	1.7E+00				4.8E-10	4.8E-10	1.2E-03	2.5E-04	3.2E-05	1.9E-03	3.4E-03
Chromium(III)	2.1E+01						1.1E-05	1.1E-05	2.7E-07	1.6E-03	1.6E-03
Lead	1.8E+03						8.9E-01	1.1E-01	2.3E-02	4.0E-02	1.1E+00
Mercury	6.0E-01						7.4E-04	1.5E-03	1.9E-05	4.5E-05	2.3E-03
Silver	6.1E-01						9.0E-05	2.7E-04	2.3E-06	9.8E-05	4.6E-04

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.429	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.429	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.429	event/day	3 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
zzDibenzofuran						4.0E-03	0.96	0.18	1	4.0E-03
ACENAPHTHENE						2.0E-01	0.3	0.1	1	1.4E-01
ACENAPHTHYLENE						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
METHYLNAPHTHALENE, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Silver						5.0E-03	1	0.3	1	4.0E-05

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Utility Worker (6-month) - Soil: Table CW-1 (HS-6: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 3E-07

HI (all chemicals) = 6E-01

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
Acenaphthene	1.5E-01						2.9E-07	9.6E-07	7.4E-09	1.2E-08	1.3E-06
Anthracene	3.1E-01						1.1E-07	3.8E-07	2.9E-09	2.3E-08	5.2E-07
Benzo(a)anthracene	5.4E-01	1.0E-09	7.0E-10	2.7E-11	3.0E-11	1.8E-09	6.7E-07	4.5E-07	1.7E-08	4.0E-08	1.2E-06
Benzo(a)pyrene	4.8E-01	9.2E-09	6.2E-09	2.4E-10	2.6E-10	1.6E-08	5.9E-07	4.0E-07	1.5E-08	3.6E-08	1.0E-06
Benzo(b)fluoranthene	5.9E-01	1.1E-09	7.6E-10	2.9E-11	3.3E-11	2.0E-09	7.3E-07	4.9E-07	1.9E-08	4.4E-08	1.3E-06
Benzo(k)fluoranthene	2.7E-01	5.1E-11	3.4E-11	1.3E-12	1.5E-12	8.8E-11	3.3E-07	2.2E-07	8.5E-09	2.0E-08	5.7E-07
Chrysene	5.5E-01	1.1E-10	7.1E-11	2.7E-12	3.0E-12	1.8E-10	6.7E-07	4.5E-07	1.7E-08	4.1E-08	1.2E-06
Fluoranthene	1.0E+00						3.8E-06	1.3E-05	9.8E-08	7.7E-08	1.7E-05
Naphthalene	1.3E-01						2.5E-07	8.4E-07	6.5E-09	1.7E-06	2.8E-06
Phenanthrene	1.0E+00						1.2E-06	4.2E-06	3.2E-08	7.5E-08	5.5E-06
Pyrene	8.7E-01						1.1E-06	3.6E-06	2.8E-08	6.5E-08	4.8E-06
Polychlorinated biphenyls (PCBs)	4.1E+00	7.1E-08	7.2E-08	1.8E-09	1.1E-10	1.5E-07	1.0E-01	1.0E-01	2.6E-03	7.6E-03	2.1E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Barium	3.8E+02						6.7E-03	6.8E-03	1.7E-04	2.9E-03	1.7E-02
Beryllium	1.9E-01				1.2E-10	1.2E-10	4.8E-05	4.8E-05	1.2E-06	3.6E-04	4.6E-04
Cadmium	5.2E-01				2.5E-10	2.5E-10	6.5E-04	1.3E-04	1.7E-05	9.8E-04	1.8E-03
Chromium(III)	9.5E+01						7.8E-05	7.9E-05	2.0E-06	1.2E-02	1.2E-02
Lead	1.4E+02						1.2E-01	1.4E-02	3.0E-03	5.2E-03	1.4E-01
Mercury	9.9E-02						2.0E-04	4.1E-04	5.3E-06	1.2E-05	6.3E-04
Nickel	1.1E+01				1.4E-09	1.4E-09	6.5E-04	1.3E-03	1.7E-05	4.0E-04	2.4E-03
Vanadium	4.1E+01						5.6E-03	5.6E-03	1.4E-04	1.5E-03	1.3E-02
Zinc	9.5E+01						3.9E-04	3.9E-04	1.0E-05	2.5E-03	3.3E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

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Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Utility Worker (6-month) - Soil: Table CW-1 (HS-7: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 2E-07
HI (all chemicals) = 5E-01

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Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
Polychlorinated biphenyls (PCBs)	2.3E-01	4.0E-09	4.0E-09	1.0E-10	6.0E-12	8.1E-09	5.6E-03	5.6E-03	1.5E-04	4.2E-04	1.2E-02
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Barium	8.6E+01						1.5E-03	1.5E-03	3.9E-05	6.4E-04	3.7E-03
Beryllium	2.9E-01				1.9E-10	1.9E-10	7.2E-05	7.3E-05	1.9E-06	5.5E-04	6.9E-04
Cadmium	6.7E-01				3.2E-10	3.2E-10	8.3E-04	1.7E-04	2.1E-05	1.3E-03	2.3E-03
Chromium(III)	1.4E+01						1.1E-05	1.1E-05	2.9E-07	1.7E-03	1.7E-03
Lead	3.1E+02						2.5E-01	3.1E-02	6.6E-03	1.2E-02	3.0E-01
Zinc	8.7E+01						3.6E-04	3.6E-04	9.3E-06	2.3E-03	3.1E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

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Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

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Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Utility Worker (3-day) - Soil: Table CW-1 (HS-8: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0114

ELCR (all chemicals) = 1.2E-06
HI (all chemicals) = 1.6E+00

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Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)			EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	HQ_{derm}	HQ_{inh-GI}	HQ_{inh}	HQ_{total}
AROMATICS	C9 to C10	p-Isopropyltoluene	1.2E+00						3.0E-06	6.0E-06	7.7E-08	5.4E-08	9.0E-06
AROMATICS	C9 to C10		5.1E+01						1.3E-04	2.5E-04	3.3E-06	2.3E-06	3.8E-04
ALIPHATICS	C9 to C12		2.5E+01						1.8E-05	3.7E-05	4.8E-07	9.3E-07	5.7E-05
ALIPHATICS	C19 to C36		1.6E+02						2.0E-05	4.0E-05	5.1E-07		6.0E-05
AROMATICS	C11 to C22		1.2E+02						8.9E-05	3.0E-04	2.3E-06	5.4E-06	3.9E-04
zzBenzoic Acid			2.4E+00						4.3E-07	8.0E-07	1.1E-08	3.8E-09	1.2E-06
DIMETHYL PHTHALATE			2.8E-01						2.1E-06	2.1E-06	5.4E-08	1.6E-08	4.3E-06
zzdi-n-butylphthalate			1.0E+00						7.4E-06	5.2E-06	1.9E-07	6.4E-08	1.3E-05
zzButylbenzylphthalate			2.4E-01	2.3E-12	4.3E-12	6.0E-14	2.1E-14	6.7E-12	8.5E-07	1.6E-06	2.2E-08	7.6E-09	2.5E-06
BIS(2-ETHYLHEXYL)PHTHALATE			3.0E+00	2.2E-10	2.3E-10	5.8E-12	6.3E-13	4.6E-10	1.1E-04	1.1E-04	2.9E-06	9.7E-06	2.4E-04
zzCarbazole			2.0E+00	5.8E-11	4.2E-11	1.5E-12	1.8E-12	1.0E-10	1.4E-06	9.8E-07	3.5E-08	8.8E-08	2.5E-06
zzDibenzofuran			7.2E-01						1.3E-04	2.4E-04	3.3E-06	1.1E-06	3.7E-04
Acenaphthene			4.6E+00						5.1E-06	1.7E-05	1.3E-07	2.1E-07	2.3E-05
Acenaphthylene			6.8E-01						5.0E-07	1.7E-06	1.3E-08	3.0E-08	2.2E-06
Anthracene			8.1E+00						1.8E-06	6.0E-06	4.7E-08	3.6E-07	8.2E-06
Benzo(a)anthracene			3.4E+01	3.9E-08	2.6E-08	1.0E-09	1.1E-09	6.7E-08	2.5E-05	1.7E-05	6.5E-07	1.5E-06	4.4E-05
Benzo(a)pyrene			2.7E+01	3.1E-07	2.1E-07	8.1E-09	8.9E-09	5.4E-07	2.0E-05	1.3E-05	5.2E-07	1.2E-06	3.5E-05
Benzo(b)fluoranthene			3.7E+01	4.3E-08	2.9E-08	1.1E-09	1.2E-09	7.4E-08	2.7E-05	1.8E-05	7.1E-07	1.7E-06	4.8E-05
Benzo(g,h,i)perylene			3.0E+00						2.2E-06	7.5E-06	5.8E-08	1.3E-07	9.9E-06
Benzo(k)fluoranthene			4.0E+00	4.6E-10	3.1E-10	1.2E-11	1.3E-11	8.0E-10	3.0E-06	2.0E-06	7.7E-08	1.8E-07	5.2E-06
Chrysene			9.3E+00	1.1E-09	7.2E-10	2.8E-11	3.1E-11	1.8E-09	6.9E-06	4.6E-06	1.8E-07	4.1E-07	1.2E-05
DIBENZO(a,h)ANTHRACENE			3.3E+00	3.8E-08	2.6E-08	9.9E-10	1.1E-09	6.6E-08	2.4E-06	1.6E-06	6.3E-08	1.5E-07	4.3E-06
Fluoranthene			2.4E+01						5.3E-05	1.8E-04	1.4E-06	1.1E-06	2.3E-04
Fluorene			4.7E+00						2.6E-06	8.8E-06	6.8E-08	2.1E-07	1.2E-05
Indeno(1,2,3-cd)pyrene			3.1E+00	3.6E-09	2.4E-09	9.3E-11	1.0E-10	6.2E-09	2.3E-06	1.5E-06	6.0E-08	1.4E-07	4.0E-06
METHYLNAPHTHALENE, 2-			2.0E+00						1.1E-04	3.7E-04	2.9E-06	9.0E-08	4.9E-04
Naphthalene			7.6E+01						8.4E-05	2.8E-04	2.2E-06	5.7E-04	9.4E-04
Phenanthrene			3.1E+01						2.3E-05	7.6E-05	5.9E-07	1.4E-06	1.0E-04
Pyrene			1.7E+01						1.2E-05	4.1E-05	3.2E-07	7.4E-07	5.4E-05
POLYCHLORINATED BIPHENYLS (PCBs)			3.8E+00	4.0E-08	4.1E-08	1.0E-09	6.1E-11	8.2E-08	5.7E-02	5.7E-02	1.5E-03	4.3E-03	1.2E-01
TCDD, 2,3,7,8- (equivalents)			1.9E-04	1.5E-07	1.5E-07	3.9E-09	9.9E-10	3.0E-07	2.0E-01	2.0E-01	5.2E-03	2.1E-03	4.1E-01
Arsenic			7.0E+00	2.8E-08	1.7E-08	7.2E-10	3.4E-09	4.9E-08	8.7E-03	5.2E-03	2.3E-04	7.9E-03	2.2E-02
Barium			8.8E+02						9.3E-03	9.4E-03	2.4E-04	4.0E-03	2.3E-02
Beryllium			2.1E-01				7.9E-11	7.9E-11	3.1E-05	3.1E-05	7.9E-07	2.3E-04	2.9E-04
Cadmium			4.7E+00				1.4E-09	1.4E-09	3.5E-03	7.1E-04	9.1E-05	5.3E-03	9.6E-03
CHROMIUM(III)			1.3E+02						6.4E-05	6.4E-05	1.7E-06	9.6E-03	9.8E-03
Lead			1.6E+03						8.0E-01	9.7E-02	2.1E-02	3.6E-02	9.6E-01
Mercury			1.0E+00						1.2E-03	2.5E-03	3.2E-05	7.5E-05	3.8E-03
Nickel			2.9E+01				2.2E-09	2.2E-09	1.1E-03	2.2E-03	2.8E-05	6.5E-04	3.9E-03
Selenium			1.0E+00						1.5E-04	1.5E-05	3.9E-06	7.6E-06	1.8E-04
Silver			1.4E+00						2.1E-04	6.3E-04	5.4E-06	2.2E-04	1.1E-03
Vanadium			8.9E+01						7.3E-03	7.3E-03	1.9E-04	2.0E-03	1.7E-02
Zinc			3.0E+02						7.3E-04	7.4E-04	1.9E-05	4.7E-03	6.2E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.429	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.429	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

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Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.429	event/day	3 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
ALIPHATICS C9 to C12						1.0E+00	1	0.2	1	1.7E-01
ALIPHATICS C19 to C36						6.0E+00	1	0.2		
AROMATICS C11 to C22						3.0E-01	0.3	0.1	1	1.4E-01
zzBenzoic Acid						4.0E+00	0.96	0.18	1	4.0E+00
DIMETHYL PHTHALATE						1.0E-01	1	0.1	1	1.1E-01
zzdi-n-butylphthalate						1.0E-01	1	0.07	1	1.0E-01
zzButylbenzylphthalate	1.9E-03	0.96	0.18	1	1.9E-03	2.0E-01	0.96	0.18	1	2.0E-01
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-02	1	0.1	1	4.6E-03	2.0E-02	1	0.1	1	2.0E-03
zzCarbazole	2.0E-02	0.28	0.02	1	2.0E-02	3.0E-01	0.28	0.02	1	1.4E-01
zzDibenzofuran						4.0E-03	0.96	0.18	1	4.0E-03
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
DIBENZO(a,h)ANTHRACENE	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
METHYLNAPHTHALENE, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
POLYCHLORINATED BIPHENYLS (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
CHROMIUM(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Selenium						5.0E-03	1	0.01	1	8.6E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) [11-12]	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Utility Worker (2-day) - Soil: Table CW-1 (HS-9: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0114

ELCR (all chemicals) = 3E-07
HI (all chemicals) = 2E+00

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)		EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	HQ_{derm}	HQ_{inh-GI}	HQ_{inh}	HQ_{total}
ALIPHATICS C19 to C36		7.6E+01						6.2E-06	1.3E-05	1.6E-07		1.9E-05
AROMATICS C11 to C22		3.1E+01						1.5E-05	5.1E-05	4.0E-07	9.2E-07	6.8E-05
zz4-Methylphenol		7.4E-02						7.3E-06	1.4E-05	1.9E-07	1.8E-09	2.1E-05
Dimethyl phthalate		3.2E-01						1.6E-06	1.6E-06	4.0E-08	1.2E-08	3.2E-06
zzDi-n-butylphthalate		3.5E-01						1.7E-06	1.2E-06	4.5E-08	1.5E-08	3.0E-06
bis(2-Ethylhexyl)phthalate		2.0E+00	9.6E-11	9.7E-11	2.5E-12	2.7E-13	2.0E-10	4.8E-05	4.9E-05	1.3E-06	4.2E-06	1.0E-04
zzDibenzofuran		4.5E-01						5.3E-05	1.0E-04	1.4E-06	4.7E-07	1.5E-04
Acenaphthene		5.9E-01						4.3E-07	1.5E-06	1.1E-08	1.8E-08	1.9E-06
Acenaphthylene		5.2E-01						2.5E-07	8.5E-07	6.6E-09	1.5E-08	1.1E-06
Anthracene		1.7E+00						2.5E-07	8.3E-07	6.4E-09	5.0E-08	1.1E-06
Benzo(a)anthracene		4.1E+00	3.1E-09	2.1E-09	8.1E-11	9.0E-11	5.4E-09	2.0E-06	1.3E-06	5.2E-08	1.2E-07	3.5E-06
Benzo(a)pyrene		5.5E+00	4.2E-08	2.8E-08	1.1E-09	1.2E-09	7.3E-08	2.7E-06	1.8E-06	7.0E-08	1.6E-07	4.7E-06
Benzo(b)fluoranthene		4.3E+00	3.3E-09	2.2E-09	8.6E-11	9.6E-11	5.7E-09	2.1E-06	1.4E-06	5.5E-08	1.3E-07	3.8E-06
Benzo(g,h,i)perylene		2.0E+00						9.9E-07	3.3E-06	2.6E-08	6.0E-08	4.4E-06
Benzo(k)fluoranthene		2.0E+00	1.5E-10	1.0E-10	4.0E-12	4.4E-12	2.6E-10	9.8E-07	6.6E-07	2.5E-08	5.9E-08	1.7E-06
Chrysene		3.9E+00	3.0E-10	2.0E-10	7.7E-12	8.6E-12	5.1E-10	1.9E-06	1.3E-06	5.0E-08	1.2E-07	3.4E-06
Dibenzo(a,h)anthracene		6.1E-01	4.7E-09	3.2E-09	1.2E-10	1.4E-10	8.1E-09	3.0E-07	2.0E-07	7.8E-09	1.8E-08	5.3E-07
Fluoranthene		8.3E+00						1.2E-05	4.1E-05	3.2E-07	2.5E-07	5.4E-05
Fluorene		7.1E-01						2.6E-07	8.9E-07	6.8E-09	2.1E-08	1.2E-06
Indeno(1,2,3-cd)pyrene		2.2E+00	1.7E-09	1.1E-09	4.4E-11	4.9E-11	3.0E-09	1.1E-06	7.4E-07	2.8E-08	6.6E-08	1.9E-06
METHYLNAPHTHALENE, 2-		3.6E-01						1.3E-05	4.4E-05	3.4E-07	1.1E-08	5.8E-05
Naphthalene		1.4E+00						1.0E-06	3.4E-06	2.6E-08	6.7E-06	1.1E-05
Phenanthrene		5.9E+00						2.9E-06	9.7E-06	7.5E-08	1.8E-07	1.3E-05
Pyrene		8.1E+00						4.0E-06	1.3E-05	1.0E-07	2.4E-07	1.8E-05
Polychlorinated biphenyls (PCBs)		4.1E+00	2.9E-08	2.9E-08	7.5E-10	4.4E-11	5.9E-08	4.1E-02	4.1E-02	1.1E-03	3.1E-03	8.6E-02
TCDD, 2,3,7,8- (equivalents)		5.7E-05	3.0E-08	3.0E-08	7.7E-10	2.0E-10	6.1E-08	4.0E-02	4.0E-02	1.0E-03	4.2E-04	8.1E-02
AROMATICS C9 to C10	GRO	1.2E+01						2.0E-05	4.1E-05	5.2E-07	3.7E-07	6.2E-05
Antimony		2.3E+02						2.8E-01	2.8E-01	7.2E-03	3.4E-04	5.7E-01
Arsenic		2.2E+01	5.7E-08	3.4E-08	1.5E-09	6.9E-09	1.0E-07	1.8E-02	1.1E-02	4.6E-04	1.6E-02	4.5E-02
Barium		9.1E+02						6.4E-03	6.5E-03	1.7E-04	2.7E-03	1.6E-02
Beryllium		5.0E-01				1.3E-10	1.3E-10	4.9E-05	4.9E-05	1.3E-06	3.7E-04	4.7E-04
Cadmium		5.2E+00				9.8E-10	9.8E-10	2.5E-03	5.1E-04	6.6E-05	3.8E-03	7.0E-03
Chromium(III)		1.1E+02						3.6E-05	3.6E-05	9.4E-07	5.5E-03	5.5E-03
Lead		2.4E+03						7.9E-01	9.5E-02	2.0E-02	3.6E-02	9.4E-01
Mercury		2.1E+00						1.7E-03	3.5E-03	4.5E-05	1.0E-04	5.4E-03
Nickel		2.3E+01				1.2E-09	1.2E-09	5.7E-04	1.1E-03	1.5E-05	3.4E-04	2.1E-03
Selenium		3.0E+00						3.0E-04	3.0E-05	7.7E-06	1.5E-05	3.5E-04
Silver		6.8E+00						6.7E-04	2.0E-03	1.7E-05	7.2E-04	3.4E-03
Vanadium		3.6E+01						1.9E-03	2.0E-03	5.1E-05	5.3E-04	4.5E-03
Zinc		6.3E+02						1.0E-03	1.0E-03	2.7E-05	6.7E-03	8.8E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.286	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.286	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

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Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.286	event/day	2 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
ALIPHATICS C19 to C36						6.0E+00	1	0.2		
AROMATICS C11 to C22						3.0E-01	0.3	0.1	1	1.4E-01
zz4-Methylphenol						5.0E-03	1	0.19	1	1.7E-01
Dimethyl phthalate						1.0E-01	1	0.1	1	1.1E-01
zzDi-n-butylphthalate						1.0E-01	1	0.07	1	1.0E-01
bis(2-Ethylhexyl)phthalate	1.4E-02	1	0.1	1	4.6E-03	2.0E-02	1	0.1	1	2.0E-03
zzDibenzofuran						4.0E-03	0.96	0.18	1	4.0E-03
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
METHYLNAPHTHALENE, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
Antimony						4.0E-04	1	0.1	1	2.9E-03
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Selenium						5.0E-03	1	0.01	1	8.6E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) $_{11\text{-}12}$	58	kg
IR $_{(1\text{-time reasonable max})}$	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Utility Worker (6-month) - Soil: Table CW-1 (HS-10: 0-6' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0114

ELCR (all chemicals) = 3.2E-07
HI (all chemicals) = 6.9E-01

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
zzDi-n-butylphthalate	3.0E-01						3.7E-06	2.6E-06	9.7E-08	3.2E-08	6.5E-06
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-01	1.7E-11	1.7E-11	4.5E-13	4.8E-14	3.5E-11	8.6E-06	8.7E-06	2.2E-07	7.4E-07	1.8E-05
zzDibenzofuran	1.4E-01						4.2E-05	7.9E-05	1.1E-06	3.8E-07	1.2E-04
Acenaphthene	1.9E-01						3.5E-07	1.2E-06	9.1E-09	1.4E-08	1.5E-06
Acenaphthylene	1.4E-01						1.7E-07	5.6E-07	4.3E-09	1.0E-08	7.4E-07
Anthracene	4.7E-01						1.7E-07	5.8E-07	4.5E-09	3.5E-08	7.9E-07
Benzo(a)anthracene	1.1E+00	2.1E-09	1.4E-09	5.5E-11	6.1E-11	3.7E-09	1.4E-06	9.2E-07	3.5E-08	8.3E-08	2.4E-06
Benzo(a)pyrene	8.9E-01	1.7E-08	1.1E-08	4.4E-10	4.9E-10	2.9E-08	1.1E-06	7.3E-07	2.8E-08	6.6E-08	1.9E-06
Benzo(b)fluoranthene	1.1E+00	2.2E-09	1.5E-09	5.6E-11	6.3E-11	3.7E-09	1.4E-06	9.3E-07	3.6E-08	8.4E-08	2.4E-06
Benzo(g,h,i)perylene	3.8E-01						4.7E-07	1.6E-06	1.2E-08	2.8E-08	2.1E-06
Benzo(k)fluoranthene	4.0E-01	7.7E-11	5.2E-11	2.0E-12	2.2E-12	1.3E-10	5.0E-07	3.3E-07	1.3E-08	3.0E-08	8.7E-07
Chrysene	1.0E+00	2.0E-10	1.3E-10	5.1E-12	5.7E-12	3.4E-10	1.3E-06	8.5E-07	3.3E-08	7.6E-08	2.2E-06
DIBENZO(a,h)ANTHRACENE	1.3E-01	2.4E-09	1.6E-09	6.3E-11	7.0E-11	4.2E-09	1.6E-07	1.0E-07	4.0E-09	9.4E-09	2.7E-07
Fluoranthene	2.2E+00						8.2E-06	2.8E-05	2.1E-07	1.7E-07	3.6E-05
Fluorene	2.1E-01						2.0E-07	6.6E-07	5.1E-09	1.6E-08	8.8E-07
Indeno(1,2,3-cd)pyrene	4.4E-01	8.4E-10	5.7E-10	2.2E-11	2.4E-11	1.5E-09	5.4E-07	3.6E-07	1.4E-08	3.3E-08	9.5E-07
METHYLNAPHTHALENE, 2-	1.6E-01						1.5E-05	4.9E-05	3.8E-07	1.2E-08	6.4E-05
Naphthalene	1.4E-01						2.5E-07	8.5E-07	6.6E-09	1.7E-06	2.8E-06
Phenanthrene	2.2E+00						2.7E-06	9.0E-06	6.9E-08	1.6E-07	1.2E-05
Pyrene	2.5E+00						3.1E-06	1.0E-05	8.1E-08	1.9E-07	1.4E-05
POLYCHLORINATED BIPHENYLS (PCBs)	1.5E+00	2.6E-08	2.6E-08	6.7E-10	3.9E-11	5.3E-08	3.6E-02	3.7E-02	9.4E-04	2.7E-03	7.7E-02
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Arsenic	6.3E+00	4.1E-08	2.5E-08	1.1E-09	5.0E-09	7.2E-08	1.3E-02	7.8E-03	3.3E-04	1.2E-02	3.3E-02
Barium	3.3E+02						5.7E-03	5.8E-03	1.5E-04	2.4E-03	1.4E-02
Beryllium	2.1E-01				1.3E-10	1.3E-10	5.1E-05	5.2E-05	1.3E-06	3.9E-04	4.9E-04
Cadmium	9.8E-01				4.7E-10	4.7E-10	1.2E-03	2.4E-04	3.1E-05	1.8E-03	3.3E-03
CHROMIUM(III)	2.8E+01						2.3E-05	2.3E-05	5.9E-07	3.4E-03	3.5E-03
Lead	3.5E+02						2.9E-01	3.5E-02	7.5E-03	1.3E-02	3.5E-01
Mercury	1.5E-01						3.0E-04	6.0E-04	7.8E-06	1.8E-05	9.3E-04
Nickel	6.5E+00				8.2E-10	8.2E-10	4.0E-04	8.0E-04	1.0E-05	2.4E-04	1.5E-03
Selenium	3.0E+00						7.3E-04	7.3E-05	1.9E-05	3.7E-05	8.6E-04
Silver	6.3E-01						1.5E-04	4.7E-04	4.0E-06	1.7E-04	7.9E-04
Vanadium	1.4E+01						1.9E-03	1.9E-03	4.8E-05	5.1E-04	4.3E-03
Zinc	6.8E+01						2.8E-04	2.8E-04	7.3E-06	1.8E-03	2.4E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
zzDi-n-butylphthalate						1.0E-01	1	0.07	1	1.0E-01
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-02	1	0.1	1	4.6E-03	2.0E-02	1	0.1	1	2.0E-03
zzDibenzofuran						4.0E-03	0.96	0.18	1	4.0E-03
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
DIBENZO(a,h)ANTHRACENE	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
METHYLNAPHTHALENE, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
POLYCHLORINATED BIPHENYLS (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
CHROMIUM(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Selenium						5.0E-03	1	0.01	1	8.6E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) $_{11\text{-}12}$	58	kg
IR $_{\text{(1-time reasonable max)}}$	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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APPENDIX C-8

RISK AND HAZARD CALCULATIONS FOR 0 TO 15 FOOT SOIL INTERVAL

Table 1
Adolescent Student
Incidential Ingestion of Soil
New Bedford High School - HS-1 (0-15')
New Bedford, Massachusetts

Constituent		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	1.0E+00	3.2E-10	1.0E+00	5.2E-09	2.0E+00	5.0E-05	6E-10	1.0E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	3.1E-12	1.0E+00	5.0E-11	1.5E+05	7.0E-10	5E-07	7.2E-02

	Cancer Risk	Hazard Index
TOTAL:	4.7E-07	7.2E-02

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 2
Adolescent Student
Dermal Contact with Soil
New Bedford High School - HS-1 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	5.9E-03	0.1	4.9E-10	0.1	6.4E-09	2.0E+00	5.0E-05	1E-09	1.3E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.7E-12	0.1	6.1E-11	1.5E+05	7.0E-10	7E-07	8.8E-02

	Cancer Risk	Hazard Index
TOTAL:	7.1E-07	8.8E-02

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 3
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-1 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	5.9E-03	1.9E-09	2.1E-08	1.0E-04	2.0E-02	2E-13	1.1E-06
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.8E-11	2.0E-10	3.3E+01	2.0E-06	6E-10	1.0E-04

	Cancer Risk	Hazard Index
TOTAL:	6.1E-10	1.0E-04

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 4
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-1 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	5.9E-03	1.0E+00	1.64E-12	1.00E+00	1.83E-11	2.0E+00	5.0E-05	3E-12	3.7E-07
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.57E-14	1.00E+00	1.75E-13	1.5E+05	7.0E-10	2E-09	2.5E-04

	Cancer Risk	Hazard Index
TOTAL:	2.4E-09	2.5E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 5
Adolescent Student
Incidential Ingestion of Soil
New Bedford High School - HS-2 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.0E+00	1.5E-07	NA	9.0E-02	NA	1.7E-06
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.9E-01	1.8E-07	NA	8.0E-04	NA	2.3E-04
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.0E-01	4.2E-08	NA	2.0E-01	NA	2.1E-07
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.0E-01	3.9E-08	NA	3.0E-01	NA	1.3E-07
120-12-7	Anthracene	3.3E-01	NC	NA	3.0E-01	8.8E-08	NA	1.0E+00	NA	8.8E-08
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	1.0E-08	3.0E-01	1.6E-07	7.3E-01	3.0E-01	7E-09	5.4E-07
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	8.7E-09	3.0E-01	1.4E-07	7.3E+00	3.0E-01	6E-08	4.7E-07
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	9.3E-09	3.0E-01	1.5E-07	7.3E-01	3.0E-01	7E-09	5.0E-07
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.0E-01	9.6E-08	NA	3.0E-01	NA	3.2E-07
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	4.4E-09	3.0E-01	7.1E-08	7.3E-02	3.0E-01	3E-10	2.4E-07
218-01-9	Chrysene	5.9E-01	3.0E-01	9.7E-09	3.0E-01	1.6E-07	7.3E-02	3.0E-01	7E-10	5.2E-07
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	2.3E-09	3.0E-01	3.8E-08	7.3E+00	3.0E-01	2E-08	1.3E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.0E-01	3.2E-07	NA	4.0E-01	NA	7.9E-07
86-73-7	Fluorene	2.1E-01	NC	NA	3.0E-01	5.5E-08	NA	4.0E-01	NA	1.4E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	6.8E-09	3.0E-01	1.1E-07	7.3E-01	3.0E-01	5E-09	3.7E-07
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.0E-01	3.6E-08	NA	4.0E-03	NA	8.9E-06
91-20-3	Naphthalene	1.6E-01	NC	NA	3.0E-01	4.2E-08	NA	2.0E-01	NA	2.1E-07
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.0E-01	3.3E-07	NA	3.0E-01	NA	1.1E-06
129-00-0	Pyrene	1.2E+00	NC	NA	3.0E-01	3.1E-07	NA	3.0E-01	NA	1.0E-06
C9-C10	GRO	1.5E+01	NC	NA	1.0E+00	1.3E-05	NA	3.0E-01	NA	4.3E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	4.5E-01	1.0E+00	2.4E-08	1.0E+00	3.9E-07	2.0E+00	5.0E-05	5E-08	7.9E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	3.1E-12	1.0E+00	5.0E-11	1.5E+05	7.0E-10	5E-07	7.2E-02
Metals										
7440-38-2	Arsenic	3.5E+00	5.0E-01	9.6E-08	5.0E-01	1.6E-06	1.5E+00	3.0E-04	1E-07	5.2E-03
7440-39-3	Barium	8.8E+01	NC	NA	1.0E+00	7.8E-05	NA	7.0E-02	NA	1.1E-03
7440-41-7	Beryllium	1.9E-01	NC	NA	1.0E+00	1.6E-07	NA	5.0E-03	NA	3.3E-05
7440-43-9	Cadmium	6.1E-01	NC	NA	1.0E+00	5.4E-07	NA	5.0E-04	NA	1.1E-03
16065-83-1	Chromium III	1.3E+01	NC	NA	1.0E+00	1.1E-05	NA	1.5E+00	NA	7.6E-06
7439-92-1	Lead	5.6E+02	NC	NA	5.0E-01	2.5E-04	NA	7.5E-04	NA	3.3E-01
7439-97-6	Mercury	1.3E-01	NC	NA	5.0E-01	5.6E-08	NA	3.0E-04	NA	1.9E-04
7440-02-0	Nickel	9.3E+00	NC	NA	1.0E+00	8.3E-06	NA	2.0E-02	NA	4.1E-04
7440-22-4	Silver	1.5E+00	NC	NA	1.0E+00	1.3E-06	NA	5.0E-03	NA	2.7E-04
7440-62-2	Vanadium	1.5E+01	NC	NA	1.0E+00	1.3E-05	NA	9.0E-03	NA	1.5E-03
7440-66-6	Zinc	9.1E+01	NC	NA	1.0E+00	8.1E-05	NA	3.0E-01	NA	2.7E-04

	Cancer Risk	Hazard Index
TOTAL:	7.6E-07	4.2E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 6
Adolescent Student
Dermal Contact with Soil
New Bedford High School - HS-2 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	0.03	5.5E-08	NA	9.0E-02	NA	6.1E-07
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	0.11	2.5E-07	NA	8.0E-04	NA	3.1E-04
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	0.1	1.7E-07	NA	2.0E-01	NA	8.5E-07
208-96-8	Acenaphthylene	1.5E-01	NC	NA	0.1	1.6E-07	NA	3.0E-01	NA	5.3E-07
120-12-7	Anthracene	3.3E-01	NC	NA	0.1	3.6E-07	NA	1.0E+00	NA	3.6E-07
56-55-3	Benzo(a)anthracene	6.1E-01	0.02	1.0E-08	0.02	1.3E-07	7.3E-01	3.0E-01	7E-09	4.4E-07
50-32-8	Benzo(a)pyrene	5.3E-01	0.02	8.8E-09	0.02	1.1E-07	7.3E+00	3.0E-01	6E-08	3.8E-07
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.02	9.4E-09	0.02	1.2E-07	7.3E-01	3.0E-01	7E-09	4.1E-07
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	0.1	3.9E-07	NA	3.0E-01	NA	1.3E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.02	4.4E-09	0.02	5.8E-08	7.3E-02	3.0E-01	3E-10	1.9E-07
218-01-9	Chrysene	5.9E-01	0.02	9.8E-09	0.02	1.3E-07	7.3E-02	3.0E-01	7E-10	4.3E-07
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.02	2.4E-09	0.02	3.1E-08	7.3E+00	3.0E-01	2E-08	1.0E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	0.1	1.3E-06	NA	4.0E-01	NA	3.2E-06
86-73-7	Fluorene	2.1E-01	NC	NA	0.1	2.3E-07	NA	4.0E-01	NA	5.6E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.02	6.9E-09	0.02	9.0E-08	7.3E-01	3.0E-01	5E-09	3.0E-07
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	0.1	1.5E-07	NA	4.0E-03	NA	3.6E-05
91-20-3	Naphthalene	1.6E-01	NC	NA	0.1	1.7E-07	NA	2.0E-01	NA	8.6E-07
85-01-8	Phenanthrene	1.3E+00	NC	NA	0.1	1.4E-06	NA	3.0E-01	NA	4.5E-06
129-00-0	Pyrene	1.2E+00	NC	NA	0.1	1.3E-06	NA	3.0E-01	NA	4.3E-06
C9-C10	GRO	1.5E+01	NC	NA	0.2	3.2E-05	NA	3.0E-01	NA	1.1E-04
1336-36-3	Total PCBs	4.5E-01	0.1	3.7E-08	0.1	4.8E-07	2.0E+00	5.0E-05	7E-08	9.7E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.7E-12	0.1	6.1E-11	1.5E+05	7.0E-10	7E-07	8.8E-02
7440-38-2	Arsenic	3.5E+00	0.03	8.7E-08	0.03	1.1E-06	1.5E+00	3.0E-04	1E-07	3.8E-03
7440-39-3	Barium	8.8E+01	NC	NA	0.1	9.5E-05	NA	7.0E-02	NA	1.4E-03
7440-41-7	Beryllium	1.9E-01	NC	NA	0.1	2.0E-07	NA	5.0E-03	NA	4.0E-05
7440-43-9	Cadmium	6.1E-01	NC	NA	0.01	6.6E-08	NA	5.0E-04	NA	1.3E-04
16065-83-1	Chromium III	1.3E+01	NC	NA	0.1	1.4E-05	NA	1.5E+00	NA	9.3E-06
7439-92-1	Lead	5.6E+02	NC	NA	0.006	3.7E-05	NA	7.5E-04	NA	4.9E-02
7439-97-6	Mercury	1.3E-01	NC	NA	0.1	1.4E-07	NA	3.0E-04	NA	4.6E-04
7440-02-0	Nickel	9.3E+00	NC	NA	0.2	2.0E-05	NA	2.0E-02	NA	1.0E-03
7440-22-4	Silver	1.5E+00	NC	NA	0.3	4.9E-06	NA	5.0E-03	NA	9.9E-04
7440-62-2	Vanadium	1.5E+01	NC	NA	0.1	1.6E-05	NA	9.0E-03	NA	1.8E-03
7440-66-6	Zinc	9.1E+01	NC	NA	0.1	9.9E-05	NA	3.0E-01	NA	3.3E-04

	Cancer Risk	Hazard Index
TOTAL:	1.0E-06	1.6E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 7
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-2 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	5.5E-08	6.2E-07	NA	2.0E+01	NA	3.1E-08
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	6.8E-08	7.6E-07	NA	2.8E+00	NA	2.7E-07
SVOCs								
83-32-9	Acenaphthene	1.6E-01	5.1E-08	5.7E-07	NA	5.0E+02	NA	1.1E-09
208-96-8	Acenaphthylene	1.5E-01	4.7E-08	5.3E-07	NA	5.0E+02	NA	1.1E-09
120-12-7	Anthracene	3.3E-01	1.1E-07	1.2E-06	NA	5.0E+02	NA	2.4E-09
56-55-3	Benzo(a)anthracene	6.1E-01	2.0E-07	2.2E-06	2.1E-04	5.0E+02	4E-11	4.4E-09
50-32-8	Benzo(a)pyrene	5.3E-01	1.7E-07	1.9E-06	2.1E-03	5.0E+02	4E-10	3.8E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	1.8E-07	2.1E-06	2.1E-04	5.0E+02	4E-11	4.1E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	1.2E-07	1.3E-06	NA	5.0E+02	NA	2.6E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	8.7E-08	9.7E-07	2.1E-05	5.0E+02	2E-12	1.9E-09
218-01-9	Chrysene	5.9E-01	1.9E-07	2.1E-06	2.1E-05	5.0E+02	4E-12	4.3E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	4.6E-08	5.1E-07	2.1E-03	5.0E+02	1E-10	1.0E-09
206-44-0	Fluoranthene	1.2E+00	3.9E-07	4.3E-06	NA	5.0E+02	NA	8.6E-09
86-73-7	Fluorene	2.1E-01	6.8E-08	7.5E-07	NA	5.0E+02	NA	1.5E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	1.4E-07	1.5E-06	2.1E-04	5.0E+02	3E-11	3.0E-09
91-57-6	2-Methylnaphthalene	1.3E-01	4.4E-08	4.9E-07	NA	5.0E+02	NA	9.7E-10
91-20-3	Naphthalene	1.6E-01	5.2E-08	5.7E-07	NA	3.0E+00	NA	1.9E-07
85-01-8	Phenanthrene	1.3E+00	4.1E-07	4.6E-06	NA	5.0E+02	NA	9.1E-09
129-00-0	Pyrene	1.2E+00	3.8E-07	4.3E-06	NA	5.0E+02	NA	8.5E-09
C9-C10	GRO	1.5E+01	4.8E-06	5.3E-05	NA	5.0E+02	NA	1.1E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	4.5E-01	1.4E-07	1.6E-06	1.0E-04	2.0E-02	1E-11	8.1E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.8E-11	2.0E-10	3.3E+01	2.0E-06	6E-10	1.0E-04
Metals								
7440-38-2	Arsenic	3.5E+00	1.1E-06	1.3E-05	3.0E-03	2.0E-02	3E-09	6.3E-04
7440-39-3	Barium	8.8E+01	2.8E-05	3.2E-04	NA	5.0E+00	NA	6.3E-05
7440-41-7	Beryllium	1.9E-01	6.0E-08	6.7E-07	2.4E-03	2.0E-02	1E-10	3.4E-05
7440-43-9	Cadmium	6.1E-01	2.0E-07	2.2E-06	1.8E-03	2.0E-02	4E-10	1.1E-04
16065-83-1	Chromium III	1.3E+01	4.2E-06	4.6E-05	NA	3.0E-01	NA	1.5E-04
7439-92-1	Lead	5.6E+02	1.8E-04	2.0E-03	NA	1.0E+00	NA	2.0E-03
7439-97-6	Mercury	1.3E-01	4.1E-08	4.6E-07	NA	3.0E-01	NA	1.5E-06
7440-02-0	Nickel	9.3E+00	3.0E-06	3.4E-05	4.8E-04	1.0E+00	1E-09	3.4E-05
7440-22-4	Silver	1.5E+00	4.9E-07	5.5E-06	NA	1.4E-01	NA	3.9E-05
7440-62-2	Vanadium	1.5E+01	4.9E-06	5.4E-05	NA	1.0E+00	NA	5.4E-05
7440-66-6	Zinc	9.1E+01	3.0E-05	3.3E-04	NA	1.4E+00	NA	2.4E-04

	Cancer Risk	Hazard Index
TOTAL:	6.6E-09	3.6E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 8
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-2 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.00E+00	5.27E-10	NA	9.0E-02	NA	5.9E-09
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.90E-01	6.45E-10	NA	8.0E-04	NA	8.1E-07
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.00E-01	1.47E-10	NA	2.0E-01	NA	7.3E-10
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.00E-01	1.36E-10	NA	3.0E-01	NA	4.5E-10
120-12-7	Anthracene	3.3E-01	NC	NA	3.00E-01	3.07E-10	NA	1.0E+00	NA	3.1E-10
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	5.06E-11	3.00E-01	5.64E-10	7.3E-01	3.0E-01	4E-11	1.9E-09
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	4.41E-11	3.00E-01	4.91E-10	7.3E+00	3.0E-01	3E-10	1.6E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	4.74E-11	3.00E-01	5.28E-10	7.3E-01	3.0E-01	3E-11	1.8E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.00E-01	3.37E-10	NA	3.0E-01	NA	1.1E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	2.23E-11	3.00E-01	2.48E-10	7.3E-02	3.0E-01	2E-12	8.3E-10
218-01-9	Chrysene	5.9E-01	3.0E-01	4.92E-11	3.00E-01	5.48E-10	7.3E-02	3.0E-01	4E-12	1.8E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	1.19E-11	3.00E-01	1.32E-10	7.3E+00	3.0E-01	9E-11	4.4E-10
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.00E-01	1.10E-09	NA	4.0E-01	NA	2.8E-09
86-73-7	Fluorene	2.1E-01	NC	NA	3.00E-01	1.94E-10	NA	4.0E-01	NA	4.8E-10
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	3.47E-11	3.00E-01	3.87E-10	7.3E-01	3.0E-01	3E-11	1.3E-09
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.00E-01	1.25E-10	NA	4.0E-03	NA	3.1E-08
91-20-3	Naphthalene	1.6E-01	NC	NA	3.00E-01	1.48E-10	NA	2.0E-01	NA	7.4E-10
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.00E-01	1.17E-09	NA	3.0E-01	NA	3.9E-09
129-00-0	Pyrene	1.2E+00	NC	NA	3.00E-01	1.10E-09	NA	3.0E-01	NA	3.7E-09
C9-C10	GRO	1.5E+01	NC	NA	1.00E+00	4.55E-08	NA	3.0E-01	NA	1.5E-07
1336-36-3	Total PCBs	4.5E-01	1.0E+00	1.24E-10	1.00E+00	1.38E-09	2.0E+00	5.0E-05	2E-10	2.8E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.57E-14	1.00E+00	1.75E-13	1.5E+05	7.0E-10	2E-09	2.5E-04
7440-38-2	Arsenic	3.5E+00	5.0E-01	4.87E-10	5.00E-01	5.43E-09	1.5E+00	3.0E-04	7E-10	1.8E-05
7440-39-3	Barium	8.8E+01	NC	NA	1.00E+00	2.72E-07	NA	7.0E-02	NA	3.9E-06
7440-41-7	Beryllium	1.9E-01	NC	NA	1.00E+00	5.77E-10	NA	5.0E-03	NA	1.2E-07
7440-43-9	Cadmium	6.1E-01	NC	NA	1.00E+00	1.88E-09	NA	5.0E-04	NA	3.8E-06
16065-83-1	Chromium III	1.3E+01	NC	NA	1.00E+00	3.98E-08	NA	1.5E+00	NA	2.7E-08
7439-92-1	Lead	5.6E+02	NC	NA	5.00E-01	8.72E-07	NA	7.5E-04	NA	1.2E-03
7439-97-6	Mercury	1.3E-01	NC	NA	5.00E-01	1.97E-10	NA	3.0E-04	NA	6.6E-07
7440-02-0	Nickel	9.3E+00	NC	NA	1.00E+00	2.89E-08	NA	2.0E-02	NA	1.4E-06
7440-22-4	Silver	1.5E+00	NC	NA	1.00E+00	4.72E-09	NA	5.0E-03	NA	9.4E-07
7440-62-2	Vanadium	1.5E+01	NC	NA	1.00E+00	4.65E-08	NA	9.0E-03	NA	5.2E-06
7440-66-6	Zinc	9.1E+01	NC	NA	1.00E+00	2.83E-07	NA	3.0E-01	NA	9.4E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.8E-09	1.5E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 9
Adolescent Student
Incidential Ingestion of Soil
New Bedford High School - HS-3 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	2.0E-09	1.0E+00	3.2E-08	5.5E-02	1.0E-02	1E-10	3.2E-06
108-88-3	Toluene	4.1E-02	NC	NA	1.0E+00	3.6E-08	NA	8.0E-01	NA	4.5E-08
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.0E+00	4.1E-08	NA	3.0E-01	NA	1.4E-07
SVOCs										
120-12-7	Anthracene	4.4E-01	NC	NA	3.0E-01	1.2E-07	NA	1.0E+00	NA	1.2E-07
56-55-3	Benzo(a)anthracene	7.3E-01	3.0E-01	1.2E-08	3.0E-01	1.9E-07	7.3E-01	3.0E-01	9E-09	6.5E-07
50-32-8	Benzo(a)pyrene	7.5E-01	3.0E-01	1.2E-08	3.0E-01	2.0E-07	7.3E+00	3.0E-01	9E-08	6.7E-07
205-99-2	Benzo(b)fluoranthene	8.2E-01	3.0E-01	1.4E-08	3.0E-01	2.2E-07	7.3E-01	3.0E-01	1E-08	7.3E-07
191-24-2	Benzo(g,h,i)perylene	4.7E-01	NC	NA	3.0E-01	1.3E-07	NA	3.0E-01	NA	4.2E-07
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	4.4E-09	3.0E-01	7.1E-08	7.3E-02	3.0E-01	3E-10	2.4E-07
218-01-9	Chrysene	7.1E-01	3.0E-01	1.2E-08	3.0E-01	1.9E-07	7.3E-02	3.0E-01	8E-10	6.3E-07
53-70-3	Dibenz(a,h)anthracene	1.5E-01	3.0E-01	2.5E-09	3.0E-01	4.1E-08	7.3E+00	3.0E-01	2E-08	1.4E-07
206-44-0	Fluoranthene	1.6E+00	NC	NA	3.0E-01	4.4E-07	NA	4.0E-01	NA	1.1E-06
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	3.0E-01	9.8E-09	3.0E-01	1.6E-07	7.3E-01	3.0E-01	7E-09	5.3E-07
91-20-3	Naphthalene	7.3E-01	NC	NA	3.0E-01	1.9E-07	NA	2.0E-01	NA	9.6E-07
85-01-8	Phenanthrene	1.7E+00	NC	NA	3.0E-01	4.5E-07	NA	3.0E-01	NA	1.5E-06
129-00-0	Pyrene	1.5E+00	NC	NA	3.0E-01	4.0E-07	NA	3.0E-01	NA	1.3E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E-01	1.0E+00	9.8E-09	1.0E+00	1.6E-07	2.0E+00	5.0E-05	2E-08	3.2E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	3.1E-12	1.0E+00	5.0E-11	1.5E+05	7.0E-10	5E-07	7.2E-02
Metals										
7440-39-3	Barium	1.6E+02	NC	NA	1.0E+00	1.4E-04	NA	7.0E-02	NA	2.0E-03
7440-41-7	Beryllium	2.9E-01	NC	NA	1.0E+00	2.6E-07	NA	5.0E-03	NA	5.2E-05
7439-92-1	Lead	1.1E+03	NC	NA	5.0E-01	4.8E-04	NA	7.5E-04	NA	6.5E-01
7439-97-6	Mercury	1.5E-01	NC	NA	5.0E-01	6.8E-08	NA	3.0E-04	NA	2.3E-04
7440-02-0	Nickel	6.4E+00	NC	NA	1.0E+00	5.7E-06	NA	2.0E-02	NA	2.8E-04
7440-22-4	Silver	7.8E-01	NC	NA	1.0E+00	7.0E-07	NA	5.0E-03	NA	1.4E-04
7440-62-2	Vanadium	1.3E+01	NC	NA	1.0E+00	1.2E-05	NA	9.0E-03	NA	1.3E-03
7440-66-6	Zinc	1.3E+02	NC	NA	1.0E+00	1.1E-04	NA	3.0E-01	NA	3.7E-04

	Cancer Risk	Hazard Index
TOTAL:	6.2E-07	7.2E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 10
Adolescent Student
Dermal Contact with Soil
New Bedford High School - HS-3 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
71-43-2	Benzene	3.6E-02	0.03	9.0E-10	0.03	1.2E-08	5.5E-02	1.0E-02	5E-11	1.2E-06
108-88-3	Toluene	4.1E-02	NC	NA	0.03	1.3E-08	NA	8.0E-01	NA	1.7E-08
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	0.2	1.0E-07	NA	3.0E-01	NA	3.3E-07
SVOCs										
120-12-7	Anthracene	4.4E-01	NC	NA	0.1	4.8E-07	NA	1.0E+00	NA	4.8E-07
56-55-3	Benzo(a)anthracene	7.3E-01	0.02	1.2E-08	0.02	1.6E-07	7.3E-01	3.0E-01	9E-09	5.3E-07
50-32-8	Benzo(a)pyrene	7.5E-01	0.02	1.3E-08	0.02	1.6E-07	7.3E+00	3.0E-01	9E-08	5.4E-07
205-99-2	Benzo(b)fluoranthene	8.2E-01	0.02	1.4E-08	0.02	1.8E-07	7.3E-01	3.0E-01	1E-08	5.9E-07
191-24-2	Benzo(g,h,i)perylene	4.7E-01	NC	NA	0.1	5.1E-07	NA	3.0E-01	NA	1.7E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.02	4.4E-09	0.02	5.8E-08	7.3E-02	3.0E-01	3E-10	1.9E-07
218-01-9	Chrysene	7.1E-01	0.02	1.2E-08	0.02	1.5E-07	7.3E-02	3.0E-01	9E-10	5.1E-07
53-70-3	Dibenz(a,h)anthracene	1.5E-01	0.02	2.6E-09	0.02	3.3E-08	7.3E+00	3.0E-01	2E-08	1.1E-07
206-44-0	Fluoranthene	1.6E+00	NC	NA	0.1	1.8E-06	NA	4.0E-01	NA	4.4E-06
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	0.02	9.9E-09	0.02	1.3E-07	7.3E-01	3.0E-01	7E-09	4.3E-07
91-20-3	Naphthalene	7.3E-01	NC	NA	0.1	7.9E-07	NA	2.0E-01	NA	3.9E-06
85-01-8	Phenanthrene	1.7E+00	NC	NA	0.1	1.8E-06	NA	3.0E-01	NA	6.1E-06
129-00-0	Pyrene	1.5E+00	NC	NA	0.1	1.6E-06	NA	3.0E-01	NA	5.4E-06
1336-36-3	Total PCBs	1.8E-01	0.1	1.5E-08	0.1	1.9E-07	2.0E+00	5.0E-05	3E-08	3.9E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.7E-12	0.1	6.1E-11	1.5E+05	7.0E-10	7E-07	8.8E-02
7440-39-3	Barium	1.6E+02	NC	NA	0.1	1.7E-04	NA	7.0E-02	NA	2.5E-03
7440-41-7	Beryllium	2.9E-01	NC	NA	0.1	3.2E-07	NA	5.0E-03	NA	6.3E-05
7439-92-1	Lead	1.1E+03	NC	NA	0.006	7.1E-05	NA	7.5E-04	NA	9.5E-02
7439-97-6	Mercury	1.5E-01	NC	NA	0.1	1.7E-07	NA	3.0E-04	NA	5.5E-04
7440-02-0	Nickel	6.4E+00	NC	NA	0.2	1.4E-05	NA	2.0E-02	NA	6.9E-04
7440-22-4	Silver	7.8E-01	NC	NA	0.3	2.6E-06	NA	5.0E-03	NA	5.1E-04
7440-62-2	Vanadium	1.3E+01	NC	NA	0.1	1.4E-05	NA	9.0E-03	NA	1.6E-03
7440-66-6	Zinc	1.3E+02	NC	NA	0.1	1.4E-04	NA	3.0E-01	NA	4.6E-04

	Cancer Risk	Hazard Index
TOTAL:	8.7E-07	1.9E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 11
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-3 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
71-43-2	Benzene	3.6E-02	1.2E-08	1.3E-07	7.8E-06	1.0E+01	9E-14	1.3E-08
108-88-3	Toluene	4.1E-02	1.3E-08	1.5E-07	NA	5.0E+03	NA	3.0E-11
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	1.5E-08	1.7E-07	NA	5.0E+02	NA	3.3E-10
SVOCs								
120-12-7	Anthracene	4.4E-01	1.4E-07	1.6E-06	NA	5.0E+02	NA	3.2E-09
56-55-3	Benzo(a)anthracene	7.3E-01	2.4E-07	2.6E-06	2.1E-04	5.0E+02	5E-11	5.3E-09
50-32-8	Benzo(a)pyrene	7.5E-01	2.4E-07	2.7E-06	2.1E-03	5.0E+02	5E-10	5.4E-09
205-99-2	Benzo(b)fluoranthene	8.2E-01	2.7E-07	3.0E-06	2.1E-04	5.0E+02	6E-11	6.0E-09
191-24-2	Benzo(g,h,i)perylene	4.7E-01	1.5E-07	1.7E-06	NA	5.0E+02	NA	3.4E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	8.6E-08	9.6E-07	2.1E-05	5.0E+02	2E-12	1.9E-09
218-01-9	Chrysene	7.1E-01	2.3E-07	2.6E-06	2.1E-05	5.0E+02	5E-12	5.1E-09
53-70-3	Dibenz(a,h)anthracene	1.5E-01	5.0E-08	5.6E-07	2.1E-03	5.0E+02	1E-10	1.1E-09
206-44-0	Fluoranthene	1.6E+00	5.3E-07	5.9E-06	NA	5.0E+02	NA	1.2E-08
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	1.9E-07	2.1E-06	2.1E-04	5.0E+02	4E-11	4.3E-09
91-20-3	Naphthalene	7.3E-01	2.4E-07	2.6E-06	NA	3.0E+00	NA	8.7E-07
85-01-8	Phenanthrene	1.7E+00	5.5E-07	6.1E-06	NA	5.0E+02	NA	1.2E-08
129-00-0	Pyrene	1.5E+00	4.8E-07	5.4E-06	NA	5.0E+02	NA	1.1E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.8E-01	5.8E-08	6.5E-07	1.0E-04	2.0E-02	6E-12	3.2E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.8E-11	2.0E-10	3.3E+01	2.0E-06	6E-10	1.0E-04
Metals								
7440-39-3	Barium	1.6E+02	5.2E-05	5.8E-04	NA	5.0E+00	NA	1.2E-04
7440-41-7	Beryllium	2.9E-01	9.5E-08	1.1E-06	2.4E-03	2.0E-02	2E-10	5.3E-05
7439-92-1	Lead	1.1E+03	3.5E-04	4.0E-03	NA	1.0E+00	NA	4.0E-03
7439-97-6	Mercury	1.5E-01	5.0E-08	5.5E-07	NA	3.0E-01	NA	1.8E-06
7440-02-0	Nickel	6.4E+00	2.1E-06	2.3E-05	4.8E-04	1.0E+00	1E-09	2.3E-05
7440-22-4	Silver	7.8E-01	2.5E-07	2.8E-06	NA	1.4E-01	NA	2.0E-05
7440-62-2	Vanadium	1.3E+01	4.3E-06	4.7E-05	NA	1.0E+00	NA	4.7E-05
7440-66-6	Zinc	1.3E+02	4.1E-05	4.6E-04	NA	1.4E+00	NA	3.3E-04

	Cancer Risk	Hazard Index
TOTAL:	2.6E-09	4.7E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 12
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-3 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	1.00E-11	1.00E+00	1.12E-10	5.5E-02	1.0E-02	6E-13	1.1E-08
108-88-3	Toluene	4.1E-02	NC	NA	1.00E+00	1.27E-10	NA	8.0E-01	NA	1.6E-10
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.00E+00	1.43E-10	NA	3.0E-01	NA	4.8E-10
SVOCs										
120-12-7	Anthracene	4.4E-01	NC	NA	3.00E-01	4.10E-10	NA	1.0E+00	NA	4.1E-10
56-55-3	Benzo(a)anthracene	7.3E-01	3.0E-01	6.10E-11	3.00E-01	6.80E-10	7.3E-01	3.0E-01	4E-11	2.3E-09
50-32-8	Benzo(a)pyrene	7.5E-01	3.0E-01	6.28E-11	3.00E-01	7.00E-10	7.3E+00	3.0E-01	5E-10	2.3E-09
205-99-2	Benzo(b)fluoranthene	8.2E-01	3.0E-01	6.87E-11	3.00E-01	7.66E-10	7.3E-01	3.0E-01	5E-11	2.6E-09
191-24-2	Benzo(g,h,i)perylene	4.7E-01	NC	NA	3.00E-01	4.41E-10	NA	3.0E-01	NA	1.5E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	2.22E-11	3.00E-01	2.47E-10	7.3E-02	3.0E-01	2E-12	8.2E-10
218-01-9	Chrysene	7.1E-01	3.0E-01	5.89E-11	3.00E-01	6.57E-10	7.3E-02	3.0E-01	4E-12	2.2E-09
53-70-3	Dibenz(a,h)anthracene	1.5E-01	3.0E-01	1.28E-11	3.00E-01	1.43E-10	7.3E+00	3.0E-01	9E-11	4.8E-10
206-44-0	Fluoranthene	1.6E+00	NC	NA	3.00E-01	1.52E-09	NA	4.0E-01	NA	3.8E-09
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	3.0E-01	4.96E-11	3.00E-01	5.52E-10	7.3E-01	3.0E-01	4E-11	1.8E-09
91-20-3	Naphthalene	7.3E-01	NC	NA	3.00E-01	6.75E-10	NA	2.0E-01	NA	3.4E-09
85-01-8	Phenanthrene	1.7E+00	NC	NA	3.00E-01	1.57E-09	NA	3.0E-01	NA	5.2E-09
129-00-0	Pyrene	1.5E+00	NC	NA	3.00E-01	1.39E-09	NA	3.0E-01	NA	4.6E-09
1336-36-3	Total PCBs	1.8E-01	1.0E+00	4.99E-11	1.00E+00	5.56E-10	2.0E+00	5.0E-05	1E-10	1.1E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.57E-14	1.00E+00	1.75E-13	1.5E+05	7.0E-10	2E-09	2.5E-04
7440-39-3	Barium	1.6E+02	NC	NA	1.00E+00	4.97E-07	NA	7.0E-02	NA	7.1E-06
7440-41-7	Beryllium	2.9E-01	NC	NA	1.00E+00	9.06E-10	NA	5.0E-03	NA	1.8E-07
7439-92-1	Lead	1.1E+03	NC	NA	5.00E-01	1.69E-06	NA	7.5E-04	NA	2.3E-03
7439-97-6	Mercury	1.5E-01	NC	NA	5.00E-01	2.37E-10	NA	3.0E-04	NA	7.9E-07
7440-02-0	Nickel	6.4E+00	NC	NA	1.00E+00	1.98E-08	NA	2.0E-02	NA	9.9E-07
7440-22-4	Silver	7.8E-01	NC	NA	1.00E+00	2.43E-09	NA	5.0E-03	NA	4.9E-07
7440-62-2	Vanadium	1.3E+01	NC	NA	1.00E+00	4.07E-08	NA	9.0E-03	NA	4.5E-06
7440-66-6	Zinc	1.3E+02	NC	NA	1.00E+00	3.92E-07	NA	3.0E-01	NA	1.3E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.1E-09	2.5E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 13
Adolescent Student
Incidential Ingestion of Soil
New Bedford High School - HS-4 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.0E+00	6.9E-08	NA	1.0E-05	NA	6.9E-03
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	4.2E-09	1.0E+00	6.7E-08	1.4E-02	2.0E-02	6E-11	3.4E-06
83-32-9	Acenaphthene	2.1E-01	NC	NA	3.0E-01	5.5E-08	NA	2.0E-01	NA	2.7E-07
208-96-8	Acenaphthylene	5.3E-01	NC	NA	3.0E-01	1.4E-07	NA	3.0E-01	NA	4.7E-07
120-12-7	Anthracene	5.7E-01	NC	NA	3.0E-01	1.5E-07	NA	1.0E+00	NA	1.5E-07
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	2.0E-08	3.0E-01	3.2E-07	7.3E-01	3.0E-01	1E-08	1.1E-06
50-32-8	Benzo(a)pyrene	1.4E+00	3.0E-01	2.3E-08	3.0E-01	3.7E-07	7.3E+00	3.0E-01	2E-07	1.2E-06
205-99-2	Benzo(b)fluoranthene	1.6E+00	3.0E-01	2.6E-08	3.0E-01	4.2E-07	7.3E-01	3.0E-01	2E-08	1.4E-06
191-24-2	Benzo(g,h,i)perylene	7.4E-01	NC	NA	3.0E-01	2.0E-07	NA	3.0E-01	NA	6.6E-07
207-08-9	Benzo(k)fluoranthene	5.6E-01	3.0E-01	9.2E-09	3.0E-01	1.5E-07	7.3E-02	3.0E-01	7E-10	5.0E-07
218-01-9	Chrysene	1.3E+00	3.0E-01	2.1E-08	3.0E-01	3.4E-07	7.3E-02	3.0E-01	2E-09	1.1E-06
53-70-3	Dibenz(a,h)anthracene	2.4E-01	3.0E-01	3.9E-09	3.0E-01	6.3E-08	7.3E+00	3.0E-01	3E-08	2.1E-07
206-44-0	Fluoranthene	2.9E+00	NC	NA	3.0E-01	7.6E-07	NA	4.0E-01	NA	1.9E-06
86-73-7	Fluorene	2.7E-01	NC	NA	3.0E-01	7.1E-08	NA	4.0E-01	NA	1.8E-07
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	3.0E-01	1.2E-08	3.0E-01	1.9E-07	7.3E-01	3.0E-01	9E-09	6.4E-07
91-20-3	Naphthalene	9.0E-01	NC	NA	3.0E-01	2.4E-07	NA	2.0E-01	NA	1.2E-06
85-01-8	Phenanthrene	2.6E+00	NC	NA	3.0E-01	6.9E-07	NA	3.0E-01	NA	2.3E-06
129-00-0	Pyrene	2.8E+00	NC	NA	3.0E-01	7.4E-07	NA	3.0E-01	NA	2.5E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E+00	1.0E+00	1.0E-07	1.0E+00	1.6E-06	2.0E+00	5.0E-05	2E-07	3.3E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	3.1E-12	1.0E+00	5.0E-11	1.5E+05	7.0E-10	5E-07	7.2E-02
Metals										
7440-36-0	Antimony	3.9E+00	NC	NA	1.0E+00	3.4E-06	NA	4.0E-04	NA	8.6E-03
7440-38-2	Arsenic	7.7E+00	5.0E-01	2.1E-07	5.0E-01	3.4E-06	1.5E+00	3.0E-04	3E-07	1.1E-02
7440-39-3	Barium	1.6E+02	NC	NA	1.0E+00	1.5E-04	NA	7.0E-02	NA	2.1E-03
7440-41-7	Beryllium	2.7E-01	NC	NA	1.0E+00	2.4E-07	NA	5.0E-03	NA	4.7E-05
7440-43-9	Cadmium	9.7E-01	NC	NA	1.0E+00	8.6E-07	NA	5.0E-04	NA	1.7E-03
16065-83-1	Chromium III	2.0E+01	NC	NA	1.0E+00	1.8E-05	NA	1.5E+00	NA	1.2E-05
7439-92-1	Lead	4.3E+02	NC	NA	5.0E-01	1.9E-04	NA	7.5E-04	NA	2.6E-01
7439-97-6	Mercury	1.4E-01	NC	NA	5.0E-01	6.4E-08	NA	3.0E-04	NA	2.1E-04
7440-02-0	Nickel	2.1E+01	NC	NA	1.0E+00	1.9E-05	NA	2.0E-02	NA	9.4E-04
7440-22-4	Silver	2.1E+00	NC	NA	1.0E+00	1.9E-06	NA	5.0E-03	NA	3.7E-04
7440-62-2	Vanadium	2.6E+01	NC	NA	1.0E+00	2.3E-05	NA	9.0E-03	NA	2.6E-03
7440-66-6	Zinc	2.4E+02	NC	NA	1.0E+00	2.2E-04	NA	3.0E-01	NA	7.2E-04

	Cancer Risk	Hazard Index
TOTAL:	1.2E-06	4.0E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 14
Adolescent Student
Dermal Contact with Soil
New Bedford High School - HS-4 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	0.19	1.6E-07	NA	1.0E-05	NA	1.6E-02
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	0.1	6.3E-09	0.1	8.2E-08	1.4E-02	2.0E-02	9E-11	4.1E-06
83-32-9	Acenaphthene	2.1E-01	NC	NA	0.1	2.2E-07	NA	2.0E-01	NA	1.1E-06
208-96-8	Acenaphthylene	5.3E-01	NC	NA	0.1	5.8E-07	NA	3.0E-01	NA	1.9E-06
120-12-7	Anthracene	5.7E-01	NC	NA	0.1	6.2E-07	NA	1.0E+00	NA	6.2E-07
56-55-3	Benzo(a)anthracene	1.2E+00	0.02	2.0E-08	0.02	2.6E-07	7.3E-01	3.0E-01	1E-08	8.6E-07
50-32-8	Benzo(a)pyrene	1.4E+00	0.02	2.3E-08	0.02	3.0E-07	7.3E+00	3.0E-01	2E-07	9.9E-07
205-99-2	Benzo(b)fluoranthene	1.6E+00	0.02	2.6E-08	0.02	3.4E-07	7.3E-01	3.0E-01	2E-08	1.1E-06
191-24-2	Benzo(g,h,i)perylene	7.4E-01	NC	NA	0.1	8.1E-07	NA	3.0E-01	NA	2.7E-06
207-08-9	Benzo(k)fluoranthene	5.6E-01	0.02	9.3E-09	0.02	1.2E-07	7.3E-02	3.0E-01	7E-10	4.1E-07
218-01-9	Chrysene	1.3E+00	0.02	2.1E-08	0.02	2.8E-07	7.3E-02	3.0E-01	2E-09	9.2E-07
53-70-3	Dibenz(a,h)anthracene	2.4E-01	0.02	3.9E-09	0.02	5.1E-08	7.3E+00	3.0E-01	3E-08	1.7E-07
206-44-0	Fluoranthene	2.9E+00	NC	NA	0.1	3.1E-06	NA	4.0E-01	NA	7.8E-06
86-73-7	Fluorene	2.7E-01	NC	NA	0.1	2.9E-07	NA	4.0E-01	NA	7.2E-07
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	0.02	1.2E-08	0.02	1.6E-07	7.3E-01	3.0E-01	9E-09	5.3E-07
91-20-3	Naphthalene	9.0E-01	NC	NA	0.1	9.8E-07	NA	2.0E-01	NA	4.9E-06
85-01-8	Phenanthrene	2.6E+00	NC	NA	0.1	2.8E-06	NA	3.0E-01	NA	9.4E-06
129-00-0	Pyrene	2.8E+00	NC	NA	0.1	3.0E-06	NA	3.0E-01	NA	1.0E-05
1336-36-3	Total PCBs	1.8E+00	0.1	1.5E-07	0.1	2.0E-06	2.0E+00	5.0E-05	3E-07	4.0E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.7E-12	0.1	6.1E-11	1.5E+05	7.0E-10	7E-07	8.8E-02
7440-36-0	Antimony	3.9E+00	NC	NA	0.1	4.2E-06	NA	4.0E-04	NA	1.0E-02
7440-38-2	Arsenic	7.7E+00	0.03	1.9E-07	0.03	2.5E-06	1.5E+00	3.0E-04	3E-07	8.3E-03
7440-39-3	Barium	1.6E+02	NC	NA	0.1	1.8E-04	NA	7.0E-02	NA	2.5E-03
7440-41-7	Beryllium	2.7E-01	NC	NA	0.1	2.9E-07	NA	5.0E-03	NA	5.8E-05
7440-43-9	Cadmium	9.7E-01	NC	NA	0.01	1.0E-07	NA	5.0E-04	NA	2.1E-04
16065-83-1	Chromium III	2.0E+01	NC	NA	0.1	2.2E-05	NA	1.5E+00	NA	1.5E-05
7439-92-1	Lead	4.3E+02	NC	NA	0.006	2.8E-05	NA	7.5E-04	NA	3.8E-02
7439-97-6	Mercury	1.4E-01	NC	NA	0.1	1.6E-07	NA	3.0E-04	NA	5.2E-04
7440-02-0	Nickel	2.1E+01	NC	NA	0.2	4.6E-05	NA	2.0E-02	NA	2.3E-03
7440-22-4	Silver	2.1E+00	NC	NA	0.3	6.8E-06	NA	5.0E-03	NA	1.4E-03
7440-62-2	Vanadium	2.6E+01	NC	NA	0.1	2.8E-05	NA	9.0E-03	NA	3.2E-03
7440-66-6	Zinc	2.4E+02	NC	NA	0.1	2.6E-04	NA	3.0E-01	NA	8.8E-04

	Cancer Risk	Hazard Index
TOTAL:	1.5E-06	2.1E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 15
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-4 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
101-55-3	4-Bromodiphenyl ether	7.8E-02	2.5E-08	2.8E-07	NA	3.5E-02	NA	8.1E-06
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	2.5E-08	2.7E-07	1.3E-06	7.0E+00	3E-14	3.9E-08
83-32-9	Acenaphthene	2.1E-01	6.7E-08	7.4E-07	NA	5.0E+02	NA	1.5E-09
208-96-8	Acenaphthylene	5.3E-01	1.7E-07	1.9E-06	NA	5.0E+02	NA	3.8E-09
120-12-7	Anthracene	5.7E-01	1.8E-07	2.1E-06	NA	5.0E+02	NA	4.1E-09
56-55-3	Benzo(a)anthracene	1.2E+00	3.9E-07	4.3E-06	2.1E-04	5.0E+02	8E-11	8.6E-09
50-32-8	Benzo(a)pyrene	1.4E+00	4.5E-07	5.0E-06	2.1E-03	5.0E+02	9E-10	1.0E-08
205-99-2	Benzo(b)fluoranthene	1.6E+00	5.1E-07	5.7E-06	2.1E-04	5.0E+02	1E-10	1.1E-08
191-24-2	Benzo(g,h,i)perylene	7.4E-01	2.4E-07	2.7E-06	NA	5.0E+02	NA	5.4E-09
207-08-9	Benzo(k)fluoranthene	5.6E-01	1.8E-07	2.0E-06	2.1E-05	5.0E+02	4E-12	4.1E-09
218-01-9	Chrysene	1.3E+00	4.1E-07	4.6E-06	2.1E-05	5.0E+02	9E-12	9.2E-09
53-70-3	Dibenz(a,h)anthracene	2.4E-01	7.6E-08	8.5E-07	2.1E-03	5.0E+02	2E-10	1.7E-09
206-44-0	Fluoranthene	2.9E+00	9.3E-07	1.0E-05	NA	5.0E+02	NA	2.1E-08
86-73-7	Fluorene	2.7E-01	8.7E-08	9.7E-07	NA	5.0E+02	NA	1.9E-09
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	2.4E-07	2.6E-06	2.1E-04	5.0E+02	5E-11	5.3E-09
91-20-3	Naphthalene	9.0E-01	2.9E-07	3.3E-06	NA	3.0E+00	NA	1.1E-06
85-01-8	Phenanthrene	2.6E+00	8.4E-07	9.4E-06	NA	5.0E+02	NA	1.9E-08
129-00-0	Pyrene	2.8E+00	9.0E-07	1.0E-05	NA	5.0E+02	NA	2.0E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.8E+00	6.0E-07	6.7E-06	1.0E-04	2.0E-02	6E-11	3.3E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.8E-11	2.0E-10	3.3E+01	2.0E-06	6E-10	1.0E-04
Metals								
7440-36-0	Antimony	3.9E+00	1.3E-06	1.4E-05	NA	1.0E+01	NA	1.4E-06
7440-38-2	Arsenic	7.7E+00	2.5E-06	2.8E-05	3.0E-03	2.0E-02	7E-09	1.4E-03
7440-39-3	Barium	1.6E+02	5.3E-05	5.9E-04	NA	5.0E+00	NA	1.2E-04
7440-41-7	Beryllium	2.7E-01	8.7E-08	9.7E-07	2.4E-03	2.0E-02	2E-10	4.8E-05
7440-43-9	Cadmium	9.7E-01	3.1E-07	3.5E-06	1.8E-03	2.0E-02	6E-10	1.7E-04
16065-83-1	Chromium III	2.0E+01	6.6E-06	7.4E-05	NA	3.0E-01	NA	2.5E-04
7439-92-1	Lead	4.3E+02	1.4E-04	1.6E-03	NA	1.0E+00	NA	1.6E-03
7439-97-6	Mercury	1.4E-01	4.7E-08	5.2E-07	NA	3.0E-01	NA	1.7E-06
7440-02-0	Nickel	2.1E+01	6.9E-06	7.7E-05	4.8E-04	1.0E+00	3E-09	7.7E-05
7440-22-4	Silver	2.1E+00	6.8E-07	7.6E-06	NA	1.4E-01	NA	5.4E-05
7440-62-2	Vanadium	2.6E+01	8.5E-06	9.5E-05	NA	1.0E+00	NA	9.5E-05
7440-66-6	Zinc	2.4E+02	7.9E-05	8.8E-04	NA	1.4E+00	NA	6.3E-04

	Cancer Risk	Hazard Index
TOTAL:	1.4E-08	4.8E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 16
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-4 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.00E+00	2.42E-10	NA	1.0E-05	NA	2.4E-05
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	2.12E-11	1.00E+00	2.36E-10	1.4E-02	2.0E-02	3E-13	1.2E-08
83-32-9	Acenaphthene	2.1E-01	NC	NA	3.00E-01	1.91E-10	NA	2.0E-01	NA	9.6E-10
208-96-8	Acenaphthylene	5.3E-01	NC	NA	3.00E-01	4.94E-10	NA	3.0E-01	NA	1.6E-09
120-12-7	Anthracene	5.7E-01	NC	NA	3.00E-01	5.30E-10	NA	1.0E+00	NA	5.3E-10
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	9.97E-11	3.00E-01	1.11E-09	7.3E-01	3.0E-01	7E-11	3.7E-09
50-32-8	Benzo(a)pyrene	1.4E+00	3.0E-01	1.15E-10	3.00E-01	1.28E-09	7.3E+00	3.0E-01	8E-10	4.3E-09
205-99-2	Benzo(b)fluoranthene	1.6E+00	3.0E-01	1.32E-10	3.00E-01	1.47E-09	7.3E-01	3.0E-01	1E-10	4.9E-09
191-24-2	Benzo(g,h,i)perylene	7.4E-01	NC	NA	3.00E-01	6.92E-10	NA	3.0E-01	NA	2.3E-09
207-08-9	Benzo(k)fluoranthene	5.6E-01	3.0E-01	4.68E-11	3.00E-01	5.22E-10	7.3E-02	3.0E-01	3E-12	1.7E-09
218-01-9	Chrysene	1.3E+00	3.0E-01	1.06E-10	3.00E-01	1.18E-09	7.3E-02	3.0E-01	8E-12	3.9E-09
53-70-3	Dibenz(a,h)anthracene	2.4E-01	3.0E-01	1.97E-11	3.00E-01	2.19E-10	7.3E+00	3.0E-01	1E-10	7.3E-10
206-44-0	Fluoranthene	2.9E+00	NC	NA	3.00E-01	2.67E-09	NA	4.0E-01	NA	6.7E-09
86-73-7	Fluorene	2.7E-01	NC	NA	3.00E-01	2.48E-10	NA	4.0E-01	NA	6.2E-10
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	3.0E-01	6.07E-11	3.00E-01	6.76E-10	7.3E-01	3.0E-01	4E-11	2.3E-09
91-20-3	Naphthalene	9.0E-01	NC	NA	3.00E-01	8.40E-10	NA	2.0E-01	NA	4.2E-09
85-01-8	Phenanthrene	2.6E+00	NC	NA	3.00E-01	2.42E-09	NA	3.0E-01	NA	8.1E-09
129-00-0	Pyrene	2.8E+00	NC	NA	3.00E-01	2.58E-09	NA	3.0E-01	NA	8.6E-09
1336-36-3	Total PCBs	1.8E+00	1.0E+00	5.14E-10	1.00E+00	5.73E-09	2.0E+00	5.0E-05	1E-09	1.1E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.57E-14	1.00E+00	1.75E-13	1.5E+05	7.0E-10	2E-09	2.5E-04
7440-36-0	Antimony	3.9E+00	NC	NA	1.00E+00	1.20E-08	NA	4.0E-04	NA	3.0E-05
7440-38-2	Arsenic	7.7E+00	5.0E-01	1.07E-09	5.00E-01	1.19E-08	1.5E+00	3.0E-04	2E-09	4.0E-05
7440-39-3	Barium	1.6E+02	NC	NA	1.00E+00	5.10E-07	NA	7.0E-02	NA	7.3E-06
7440-41-7	Beryllium	2.7E-01	NC	NA	1.00E+00	8.30E-10	NA	5.0E-03	NA	1.7E-07
7440-43-9	Cadmium	9.7E-01	NC	NA	1.00E+00	3.00E-09	NA	5.0E-04	NA	6.0E-06
16065-83-1	Chromium III	2.0E+01	NC	NA	1.00E+00	6.33E-08	NA	1.5E+00	NA	4.2E-08
7439-92-1	Lead	4.3E+02	NC	NA	5.00E-01	6.71E-07	NA	7.5E-04	NA	8.9E-04
7439-97-6	Mercury	1.4E-01	NC	NA	5.00E-01	2.23E-10	NA	3.0E-04	NA	7.4E-07
7440-02-0	Nickel	2.1E+01	NC	NA	1.00E+00	6.57E-08	NA	2.0E-02	NA	3.3E-06
7440-22-4	Silver	2.1E+00	NC	NA	1.00E+00	6.49E-09	NA	5.0E-03	NA	1.3E-06
7440-62-2	Vanadium	2.6E+01	NC	NA	1.00E+00	8.12E-08	NA	9.0E-03	NA	9.0E-06
7440-66-6	Zinc	2.4E+02	NC	NA	1.00E+00	7.53E-07	NA	3.0E-01	NA	2.5E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	6.2E-09	1.4E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 17
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-5 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
132-64-9	Dibenzofuran	9.8E-01	NC	NA	9.6E-01	8.4E-07	NA	1.0E-03	NA	8.4E-04
83-32-9	Acenaphthene	8.5E-01	NC	NA	3.0E-01	2.3E-07	NA	2.0E-01	NA	1.1E-06
208-96-8	Acenaphthylene	1.5E+00	NC	NA	3.0E-01	4.1E-07	NA	3.0E-01	NA	1.4E-06
120-12-7	Anthracene	4.3E+00	NC	NA	3.0E-01	1.1E-06	NA	1.0E+00	NA	1.1E-06
56-55-3	Benzo(a)anthracene	1.7E+01	3.0E-01	2.8E-07	3.0E-01	4.5E-06	7.3E-01	3.0E-01	2E-07	1.5E-05
50-32-8	Benzo(a)pyrene	1.1E+01	3.0E-01	1.8E-07	3.0E-01	2.9E-06	7.3E+00	3.0E-01	1E-06	9.7E-06
205-99-2	Benzo(b)fluoranthene	1.3E+01	3.0E-01	2.1E-07	3.0E-01	3.5E-06	7.3E-01	3.0E-01	2E-07	1.2E-05
191-24-2	Benzo(g,h,i)perylene	4.1E+00	NC	NA	3.0E-01	1.1E-06	NA	3.0E-01	NA	3.7E-06
207-08-9	Benzo(k)fluoranthene	7.4E+00	3.0E-01	1.2E-07	3.0E-01	2.0E-06	7.3E-02	3.0E-01	9E-09	6.6E-06
218-01-9	Chrysene	7.2E+00	3.0E-01	1.2E-07	3.0E-01	1.9E-06	7.3E-02	3.0E-01	9E-09	6.4E-06
53-70-3	Dibenz(a,h)anthracene	9.4E+00	3.0E-01	1.5E-07	3.0E-01	2.5E-06	7.3E+00	3.0E-01	1E-06	8.3E-06
206-44-0	Fluoranthene	2.1E+01	NC	NA	3.0E-01	5.5E-06	NA	4.0E-01	NA	1.4E-05
86-73-7	Fluorene	2.0E+00	NC	NA	3.0E-01	5.4E-07	NA	4.0E-01	NA	1.4E-06
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	3.0E-01	6.6E-08	3.0E-01	1.1E-06	7.3E-01	3.0E-01	5E-08	3.5E-06
91-57-6	2-Methylnaphthalene	6.0E-01	NC	NA	3.0E-01	1.6E-07	NA	4.0E-03	NA	4.0E-05
85-01-8	Phenanthrene	1.7E+01	NC	NA	3.0E-01	4.4E-06	NA	3.0E-01	NA	1.5E-05
129-00-0	Pyrene	1.8E+01	NC	NA	3.0E-01	4.8E-06	NA	3.0E-01	NA	1.6E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	4.9E+00	1.0E+00	2.7E-07	1.0E+00	4.3E-06	2.0E+00	5.0E-05	5E-07	8.6E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	3.1E-12	1.0E+00	5.0E-11	1.5E+05	7.0E-10	5E-07	7.2E-02
Metals										
7440-38-2	Arsenic	1.5E+01	5.0E-01	4.0E-07	5.0E-01	6.5E-06	1.5E+00	3.0E-04	6E-07	2.2E-02
7440-39-3	Barium	2.1E+02	NC	NA	1.0E+00	1.8E-04	NA	7.0E-02	NA	2.6E-03
7440-43-9	Cadmium	1.7E+00	NC	NA	1.0E+00	1.5E-06	NA	5.0E-04	NA	2.9E-03
16065-83-1	Chromium III	2.1E+01	NC	NA	1.0E+00	1.9E-05	NA	1.5E+00	NA	1.3E-05
7439-92-1	Lead	1.8E+03	NC	NA	5.0E-01	8.0E-04	NA	7.5E-04	NA	1.1E+00
7439-97-6	Mercury	6.0E-01	NC	NA	5.0E-01	2.6E-07	NA	3.0E-04	NA	8.8E-04
7440-22-4	Silver	6.1E-01	NC	NA	1.0E+00	5.4E-07	NA	5.0E-03	NA	1.1E-04

	Cancer Risk	Hazard Index
TOTAL:	4.5E-06	1.3E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 18
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-5 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
132-64-9	Dibenzofuran	9.8E-01	NC	NA	0.18	1.9E-06	NA	1.0E-03	NA	1.9E-03
83-32-9	Acenaphthene	8.5E-01	NC	NA	0.1	9.2E-07	NA	2.0E-01	NA	4.6E-06
208-96-8	Acenaphthylene	1.5E+00	NC	NA	0.1	1.7E-06	NA	3.0E-01	NA	5.6E-06
120-12-7	Anthracene	4.3E+00	NC	NA	0.1	4.6E-06	NA	1.0E+00	NA	4.6E-06
56-55-3	Benzo(a)anthracene	1.7E+01	0.02	2.8E-07	0.02	3.7E-06	7.3E-01	3.0E-01	2E-07	1.2E-05
50-32-8	Benzo(a)pyrene	1.1E+01	0.02	1.8E-07	0.02	2.4E-06	7.3E+00	3.0E-01	1E-06	7.9E-06
205-99-2	Benzo(b)fluoranthene	1.3E+01	0.02	2.2E-07	0.02	2.8E-06	7.3E-01	3.0E-01	2E-07	9.4E-06
191-24-2	Benzo(g,h,i)perylene	4.1E+00	NC	NA	0.1	4.5E-06	NA	3.0E-01	NA	1.5E-05
207-08-9	Benzo(k)fluoranthene	7.4E+00	0.02	1.2E-07	0.02	1.6E-06	7.3E-02	3.0E-01	9E-09	5.3E-06
218-01-9	Chrysene	7.2E+00	0.02	1.2E-07	0.02	1.6E-06	7.3E-02	3.0E-01	9E-09	5.2E-06
53-70-3	Dibenz(a,h)anthracene	9.4E+00	0.02	1.6E-07	0.02	2.0E-06	7.3E+00	3.0E-01	1E-06	6.8E-06
206-44-0	Fluoranthene	2.1E+01	NC	NA	0.1	2.2E-05	NA	4.0E-01	NA	5.6E-05
86-73-7	Fluorene	2.0E+00	NC	NA	0.1	2.2E-06	NA	4.0E-01	NA	5.5E-06
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	0.02	6.6E-08	0.02	8.6E-07	7.3E-01	3.0E-01	5E-08	2.9E-06
91-57-6	2-Methylnaphthalene	6.0E-01	NC	NA	0.1	6.6E-07	NA	4.0E-03	NA	1.6E-04
85-01-8	Phenanthrene	1.7E+01	NC	NA	0.1	1.8E-05	NA	3.0E-01	NA	6.0E-05
129-00-0	Pyrene	1.8E+01	NC	NA	0.1	2.0E-05	NA	3.0E-01	NA	6.5E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	4.9E+00	0.1	4.0E-07	0.1	5.3E-06	2.0E+00	5.0E-05	8E-07	1.1E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.7E-12	0.1	6.1E-11	1.5E+05	7.0E-10	7E-07	8.8E-02
Metals										
7440-38-2	Arsenic	1.5E+01	0.03	3.6E-07	0.03	4.7E-06	1.5E+00	3.0E-04	5E-07	1.6E-02
7440-39-3	Barium	2.1E+02	NC	NA	0.1	2.3E-04	NA	7.0E-02	NA	3.2E-03
7440-43-9	Cadmium	1.7E+00	NC	NA	0.01	1.8E-07	NA	5.0E-04	NA	3.6E-04
16065-83-1	Chromium III	2.1E+01	NC	NA	0.1	2.3E-05	NA	1.5E+00	NA	1.5E-05
7439-92-1	Lead	1.8E+03	NC	NA	0.006	1.2E-04	NA	7.5E-04	NA	1.6E-01
7439-97-6	Mercury	6.0E-01	NC	NA	0.1	6.5E-07	NA	3.0E-04	NA	2.2E-03
7440-22-4	Silver	6.1E-01	NC	NA	0.3	2.0E-06	NA	5.0E-03	NA	4.0E-04

	Cancer Risk	Hazard Index
TOTAL:	5.0E-06	3.7E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 19
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-5 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
132-64-9	Dibenzofuran	9.8E-01	3.2E-07	3.6E-06	NA	3.5E+00	NA	1.0E-06
83-32-9	Acenaphthene	8.5E-01	2.8E-07	3.1E-06	NA	5.0E+02	NA	6.1E-09
208-96-8	Acenaphthylene	1.5E+00	5.0E-07	5.6E-06	NA	5.0E+02	NA	1.1E-08
120-12-7	Anthracene	4.3E+00	1.4E-06	1.5E-05	NA	5.0E+02	NA	3.1E-08
56-55-3	Benzo(a)anthracene	1.7E+01	5.5E-06	6.2E-05	2.1E-04	5.0E+02	1E-09	1.2E-07
50-32-8	Benzo(a)pyrene	1.1E+01	3.6E-06	4.0E-05	2.1E-03	5.0E+02	7E-09	8.0E-08
205-99-2	Benzo(b)fluoranthene	1.3E+01	4.2E-06	4.7E-05	2.1E-04	5.0E+02	9E-10	9.4E-08
191-24-2	Benzo(g,h,i)perylene	4.1E+00	1.3E-06	1.5E-05	NA	5.0E+02	NA	3.0E-08
207-08-9	Benzo(k)fluoranthene	7.4E+00	2.4E-06	2.7E-05	2.1E-05	5.0E+02	5E-11	5.4E-08
218-01-9	Chrysene	7.2E+00	2.3E-06	2.6E-05	2.1E-05	5.0E+02	5E-11	5.2E-08
53-70-3	Dibenz(a,h)anthracene	9.4E+00	3.1E-06	3.4E-05	2.1E-03	5.0E+02	6E-09	6.8E-08
206-44-0	Fluoranthene	2.1E+01	6.7E-06	7.4E-05	NA	5.0E+02	NA	1.5E-07
86-73-7	Fluorene	2.0E+00	6.6E-07	7.4E-06	NA	5.0E+02	NA	1.5E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	1.3E-06	1.4E-05	2.1E-04	5.0E+02	3E-10	2.9E-08
91-57-6	2-Methylnaphthalene	6.0E-01	2.0E-07	2.2E-06	NA	5.0E+02	NA	4.4E-09
85-01-8	Phenanthrene	1.7E+01	5.4E-06	6.0E-05	NA	5.0E+02	NA	1.2E-07
129-00-0	Pyrene	1.8E+01	5.9E-06	6.5E-05	NA	5.0E+02	NA	1.3E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	4.9E+00	1.6E-06	1.8E-05	1.0E-04	2.0E-02	2E-10	8.8E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.8E-11	2.0E-10	3.3E+01	2.0E-06	6E-10	1.0E-04
Metals								
7440-38-2	Arsenic	1.5E+01	4.7E-06	5.3E-05	3.0E-03	2.0E-02	1E-08	2.6E-03
7440-39-3	Barium	2.1E+02	6.8E-05	7.5E-04	NA	5.0E+00	NA	1.5E-04
7440-43-9	Cadmium	1.7E+00	5.4E-07	6.0E-06	1.8E-03	2.0E-02	1E-09	3.0E-04
16065-83-1	Chromium III	2.1E+01	6.9E-06	7.7E-05	NA	3.0E-01	NA	2.6E-04
7439-92-1	Lead	1.8E+03	5.8E-04	6.5E-03	NA	1.0E+00	NA	6.5E-03
7439-97-6	Mercury	6.0E-01	1.9E-07	2.2E-06	NA	3.0E-01	NA	7.2E-06
7440-22-4	Silver	6.1E-01	2.0E-07	2.2E-06	NA	1.4E-01	NA	1.6E-05

	Cancer Risk	Hazard Index
TOTAL:	3.2E-08	1.1E-02

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 20
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-5 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
132-64-9	Dibenzofuran	9.8E-01	NC	NA	9.60E-01	2.93E-09	NA	1.0E-03	NA	2.9E-06
83-32-9	Acenaphthene	8.5E-01	NC	NA	3.00E-01	7.89E-10	NA	2.0E-01	NA	3.9E-09
208-96-8	Acenaphthylene	1.5E+00	NC	NA	3.00E-01	1.43E-09	NA	3.0E-01	NA	4.8E-09
120-12-7	Anthracene	4.3E+00	NC	NA	3.00E-01	3.97E-09	NA	1.0E+00	NA	4.0E-09
56-55-3	Benzo(a)anthracene	1.7E+01	3.0E-01	1.42E-09	3.00E-01	1.58E-08	7.3E-01	3.0E-01	1E-09	5.3E-08
50-32-8	Benzo(a)pyrene	1.1E+01	3.0E-01	9.18E-10	3.00E-01	1.02E-08	7.3E+00	3.0E-01	7E-09	3.4E-08
205-99-2	Benzo(b)fluoranthene	1.3E+01	3.0E-01	1.09E-09	3.00E-01	1.21E-08	7.3E-01	3.0E-01	8E-10	4.0E-08
191-24-2	Benzo(g,h,i)perylene	4.1E+00	NC	NA	3.00E-01	3.83E-09	NA	3.0E-01	NA	1.3E-08
207-08-9	Benzo(k)fluoranthene	7.4E+00	3.0E-01	6.18E-10	3.00E-01	6.88E-09	7.3E-02	3.0E-01	5E-11	2.3E-08
218-01-9	Chrysene	7.2E+00	3.0E-01	5.99E-10	3.00E-01	6.68E-09	7.3E-02	3.0E-01	4E-11	2.2E-08
53-70-3	Dibenz(a,h)anthracene	9.4E+00	3.0E-01	7.85E-10	3.00E-01	8.74E-09	7.3E+00	3.0E-01	6E-09	2.9E-08
206-44-0	Fluoranthene	2.1E+01	NC	NA	3.00E-01	1.91E-08	NA	4.0E-01	NA	4.8E-08
86-73-7	Fluorene	2.0E+00	NC	NA	3.00E-01	1.90E-09	NA	4.0E-01	NA	4.7E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	3.0E-01	3.33E-10	3.00E-01	3.71E-09	7.3E-01	3.0E-01	2E-10	1.2E-08
91-57-6	2-Methylnaphthalene	6.0E-01	NC	NA	3.00E-01	5.63E-10	NA	4.0E-03	NA	1.4E-07
85-01-8	Phenanthrene	1.7E+01	NC	NA	3.00E-01	1.55E-08	NA	3.0E-01	NA	5.2E-08
129-00-0	Pyrene	1.8E+01	NC	NA	3.00E-01	1.68E-08	NA	3.0E-01	NA	5.6E-08
Dioxins/PCBs										
1336-36-3	Total PCBs	4.9E+00	1.0E+00	1.36E-09	1.00E+00	1.51E-08	2.0E+00	5.0E-05	3E-09	3.0E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.57E-14	1.00E+00	1.75E-13	1.5E+05	7.0E-10	2E-09	2.5E-04
Metals										
7440-38-2	Arsenic	1.5E+01	5.0E-01	2.03E-09	5.00E-01	2.26E-08	1.5E+00	3.0E-04	3E-09	7.5E-05
7440-39-3	Barium	2.1E+02	NC	NA	1.00E+00	6.45E-07	NA	7.0E-02	NA	9.2E-06
7440-43-9	Cadmium	1.7E+00	NC	NA	1.00E+00	5.15E-09	NA	5.0E-04	NA	1.0E-05
16065-83-1	Chromium III	2.1E+01	NC	NA	1.00E+00	6.63E-08	NA	1.5E+00	NA	4.4E-08
7439-92-1	Lead	1.8E+03	NC	NA	5.00E-01	2.79E-06	NA	7.5E-04	NA	3.7E-03
7439-97-6	Mercury	6.0E-01	NC	NA	5.00E-01	9.27E-10	NA	3.0E-04	NA	3.1E-06
7440-22-4	Silver	6.1E-01	NC	NA	1.00E+00	1.90E-09	NA	5.0E-03	NA	3.8E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.3E-08	4.4E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 21
Adolescent Student
Incidential Ingestion of Soil
New Bedford High School - HS-6 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.5E-01	NC	NA	3.0E-01	4.0E-08	NA	2.0E-01	NA	2.0E-07
120-12-7	Anthracene	3.0E-01	NC	NA	3.0E-01	7.9E-08	NA	1.0E+00	NA	7.9E-08
56-55-3	Benzo(a)anthracene	5.2E-01	3.0E-01	8.6E-09	3.0E-01	1.4E-07	7.3E-01	3.0E-01	6E-09	4.6E-07
50-32-8	Benzo(a)pyrene	4.6E-01	3.0E-01	7.6E-09	3.0E-01	1.2E-07	7.3E+00	3.0E-01	6E-08	4.1E-07
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	9.3E-09	3.0E-01	1.5E-07	7.3E-01	3.0E-01	7E-09	5.0E-07
207-08-9	Benzo(k)fluoranthene	2.6E-01	3.0E-01	4.2E-09	3.0E-01	6.8E-08	7.3E-02	3.0E-01	3E-10	2.3E-07
218-01-9	Chrysene	5.3E-01	3.0E-01	8.6E-09	3.0E-01	1.4E-07	7.3E-02	3.0E-01	6E-10	4.7E-07
206-44-0	Fluoranthene	9.8E-01	NC	NA	3.0E-01	2.6E-07	NA	4.0E-01	NA	6.5E-07
91-20-3	Naphthalene	1.3E-01	NC	NA	3.0E-01	3.5E-08	NA	2.0E-01	NA	1.8E-07
85-01-8	Phenanthrene	9.7E-01	NC	NA	3.0E-01	2.6E-07	NA	3.0E-01	NA	8.6E-07
129-00-0	Pyrene	8.3E-01	NC	NA	3.0E-01	2.2E-07	NA	3.0E-01	NA	7.4E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	3.9E+00	1.0E+00	2.2E-07	1.0E+00	3.5E-06	2.0E+00	5.0E-05	4E-07	7.0E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	3.1E-12	1.0E+00	5.0E-11	1.5E+05	7.0E-10	5E-07	7.2E-02
Metals										
7440-39-3	Barium	3.7E+02	NC	NA	1.0E+00	3.3E-04	NA	7.0E-02	NA	4.7E-03
7440-41-7	Beryllium	1.9E-01	NC	NA	1.0E+00	1.7E-07	NA	5.0E-03	NA	3.3E-05
7440-43-9	Cadmium	5.1E-01	NC	NA	1.0E+00	4.5E-07	NA	5.0E-04	NA	9.0E-04
16065-83-1	Chromium III	9.1E+01	NC	NA	1.0E+00	8.1E-05	NA	1.5E+00	NA	5.4E-05
7439-92-1	Lead	1.4E+02	NC	NA	5.0E-01	6.0E-05	NA	7.5E-04	NA	8.0E-02
7439-97-6	Mercury	9.1E-02	NC	NA	5.0E-01	4.0E-08	NA	3.0E-04	NA	1.3E-04
7440-02-0	Nickel	9.6E+00	NC	NA	1.0E+00	8.6E-06	NA	2.0E-02	NA	4.3E-04
7440-62-2	Vanadium	3.6E+01	NC	NA	1.0E+00	3.2E-05	NA	9.0E-03	NA	3.5E-03
7440-66-6	Zinc	8.5E+01	NC	NA	1.0E+00	7.5E-05	NA	3.0E-01	NA	2.5E-04

	Cancer Risk	Hazard Index
TOTAL:	9.7E-07	2.3E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 22
Adolescent Student
Dermal Contact with Soil
New Bedford High School - HS-6 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
83-32-9	Acenaphthene	1.5E-01	NC	NA	0.1	1.6E-07	NA	2.0E-01	NA	8.2E-07
120-12-7	Anthracene	3.0E-01	NC	NA	0.1	3.2E-07	NA	1.0E+00	NA	3.2E-07
56-55-3	Benzo(a)anthracene	5.2E-01	0.02	8.7E-09	0.02	1.1E-07	7.3E-01	3.0E-01	6E-09	3.8E-07
50-32-8	Benzo(a)pyrene	4.6E-01	0.02	7.6E-09	0.02	1.0E-07	7.3E+00	3.0E-01	6E-08	3.3E-07
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.02	9.4E-09	0.02	1.2E-07	7.3E-01	3.0E-01	7E-09	4.1E-07
207-08-9	Benzo(k)fluoranthene	2.6E-01	0.02	4.3E-09	0.02	5.6E-08	7.3E-02	3.0E-01	3E-10	1.9E-07
218-01-9	Chrysene	5.3E-01	0.02	8.7E-09	0.02	1.1E-07	7.3E-02	3.0E-01	6E-10	3.8E-07
206-44-0	Fluoranthene	9.8E-01	NC	NA	0.1	1.1E-06	NA	4.0E-01	NA	2.7E-06
91-20-3	Naphthalene	1.3E-01	NC	NA	0.1	1.4E-07	NA	2.0E-01	NA	7.2E-07
85-01-8	Phenanthrene	9.7E-01	NC	NA	0.1	1.0E-06	NA	3.0E-01	NA	3.5E-06
129-00-0	Pyrene	8.3E-01	NC	NA	0.1	9.0E-07	NA	3.0E-01	NA	3.0E-06
1336-36-3	Total PCBs	3.9E+00	0.1	3.3E-07	0.1	4.3E-06	2.0E+00	5.0E-05	7E-07	8.5E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.7E-12	0.1	6.1E-11	1.5E+05	7.0E-10	7E-07	8.8E-02
7440-39-3	Barium	3.7E+02	NC	NA	0.1	4.0E-04	NA	7.0E-02	NA	5.7E-03
7440-41-7	Beryllium	1.9E-01	NC	NA	0.1	2.0E-07	NA	5.0E-03	NA	4.1E-05
7440-43-9	Cadmium	5.1E-01	NC	NA	0.01	5.5E-08	NA	5.0E-04	NA	1.1E-04
16065-83-1	Chromium III	9.1E+01	NC	NA	0.1	9.9E-05	NA	1.5E+00	NA	6.6E-05
7439-92-1	Lead	1.4E+02	NC	NA	0.006	8.8E-06	NA	7.5E-04	NA	1.2E-02
7439-97-6	Mercury	9.1E-02	NC	NA	0.1	9.8E-08	NA	3.0E-04	NA	3.3E-04
7440-02-0	Nickel	9.6E+00	NC	NA	0.2	2.1E-05	NA	2.0E-02	NA	1.0E-03
7440-62-2	Vanadium	3.6E+01	NC	NA	0.1	3.9E-05	NA	9.0E-03	NA	4.3E-03
7440-66-6	Zinc	8.5E+01	NC	NA	0.1	9.2E-05	NA	3.0E-01	NA	3.1E-04

	Cancer Risk	Hazard Index
TOTAL:	1.4E-06	2.0E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 23
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-6 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
83-32-9	Acenaphthene	1.5E-01	4.9E-08	5.5E-07	NA	5.0E+02	NA	1.1E-09
120-12-7	Anthracene	3.0E-01	9.6E-08	1.1E-06	NA	5.0E+02	NA	2.2E-09
56-55-3	Benzo(a)anthracene	5.2E-01	1.7E-07	1.9E-06	2.1E-04	5.0E+02	4E-11	3.8E-09
50-32-8	Benzo(a)pyrene	4.6E-01	1.5E-07	1.7E-06	2.1E-03	5.0E+02	3E-10	3.3E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	1.8E-07	2.1E-06	2.1E-04	5.0E+02	4E-11	4.1E-09
207-08-9	Benzo(k)fluoranthene	2.6E-01	8.3E-08	9.3E-07	2.1E-05	5.0E+02	2E-12	1.9E-09
218-01-9	Chrysene	5.3E-01	1.7E-07	1.9E-06	2.1E-05	5.0E+02	4E-12	3.8E-09
206-44-0	Fluoranthene	9.8E-01	3.2E-07	3.6E-06	NA	5.0E+02	NA	7.1E-09
91-20-3	Naphthalene	1.3E-01	4.3E-08	4.8E-07	NA	3.0E+00	NA	1.6E-07
85-01-8	Phenanthrene	9.7E-01	3.1E-07	3.5E-06	NA	5.0E+02	NA	7.0E-09
129-00-0	Pyrene	8.3E-01	2.7E-07	3.0E-06	NA	5.0E+02	NA	6.0E-09
Dioxins/PCBs								
1336-36-3	Total PCBs	3.9E+00	1.3E-06	1.4E-05	1.0E-04	2.0E-02	1E-10	7.1E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.8E-11	2.0E-10	3.3E+01	2.0E-06	6E-10	1.0E-04
Metals								
7440-39-3	Barium	3.7E+02	1.2E-04	1.3E-03	NA	5.0E+00	NA	2.7E-04
7440-41-7	Beryllium	1.9E-01	6.1E-08	6.8E-07	2.4E-03	2.0E-02	1E-10	3.4E-05
7440-43-9	Cadmium	5.1E-01	1.7E-07	1.8E-06	1.8E-03	2.0E-02	3E-10	9.2E-05
16065-83-1	Chromium III	9.1E+01	3.0E-05	3.3E-04	NA	3.0E-01	NA	1.1E-03
7439-92-1	Lead	1.4E+02	4.4E-05	4.9E-04	NA	1.0E+00	NA	4.9E-04
7439-97-6	Mercury	9.1E-02	3.0E-08	3.3E-07	NA	3.0E-01	NA	1.1E-06
7440-02-0	Nickel	9.6E+00	3.1E-06	3.5E-05	4.8E-04	1.0E+00	2E-09	3.5E-05
7440-62-2	Vanadium	3.6E+01	1.2E-05	1.3E-04	NA	1.0E+00	NA	1.3E-04
7440-66-6	Zinc	8.5E+01	2.7E-05	3.1E-04	NA	1.4E+00	NA	2.2E-04

	Cancer Risk	Hazard Index
TOTAL:	3.1E-09	3.2E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 24
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-6 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.5E-01	NC	NA	3.00E-01	1.41E-10	NA	2.0E-01	NA	7.0E-10
120-12-7	Anthracene	3.0E-01	NC	NA	3.00E-01	2.77E-10	NA	1.0E+00	NA	2.8E-10
56-55-3	Benzo(a)anthracene	5.2E-01	3.0E-01	4.35E-11	3.00E-01	4.85E-10	7.3E-01	3.0E-01	3E-11	1.6E-09
50-32-8	Benzo(a)pyrene	4.6E-01	3.0E-01	3.84E-11	3.00E-01	4.27E-10	7.3E+00	3.0E-01	3E-10	1.4E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	4.74E-11	3.00E-01	5.29E-10	7.3E-01	3.0E-01	3E-11	1.8E-09
207-08-9	Benzo(k)fluoranthene	2.6E-01	3.0E-01	2.15E-11	3.00E-01	2.39E-10	7.3E-02	3.0E-01	2E-12	8.0E-10
218-01-9	Chrysene	5.3E-01	3.0E-01	4.38E-11	3.00E-01	4.88E-10	7.3E-02	3.0E-01	3E-12	1.6E-09
206-44-0	Fluoranthene	9.8E-01	NC	NA	3.00E-01	9.14E-10	NA	4.0E-01	NA	2.3E-09
91-20-3	Naphthalene	1.3E-01	NC	NA	3.00E-01	1.23E-10	NA	2.0E-01	NA	6.2E-10
85-01-8	Phenanthrene	9.7E-01	NC	NA	3.00E-01	8.99E-10	NA	3.0E-01	NA	3.0E-09
129-00-0	Pyrene	8.3E-01	NC	NA	3.00E-01	7.76E-10	NA	3.0E-01	NA	2.6E-09
1336-36-3	Total PCBs	3.9E+00	1.0E+00	1.10E-09	1.00E+00	1.22E-08	2.0E+00	5.0E-05	2E-09	2.4E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.57E-14	1.00E+00	1.75E-13	1.5E+05	7.0E-10	2E-09	2.5E-04
7440-39-3	Barium	3.7E+02	NC	NA	1.00E+00	1.14E-06	NA	7.0E-02	NA	1.6E-05
7440-41-7	Beryllium	1.9E-01	NC	NA	1.00E+00	5.81E-10	NA	5.0E-03	NA	1.2E-07
7440-43-9	Cadmium	5.1E-01	NC	NA	1.00E+00	1.58E-09	NA	5.0E-04	NA	3.2E-06
16065-83-1	Chromium III	9.1E+01	NC	NA	1.00E+00	2.83E-07	NA	1.5E+00	NA	1.9E-07
7439-92-1	Lead	1.4E+02	NC	NA	5.00E-01	2.10E-07	NA	7.5E-04	NA	2.8E-04
7439-97-6	Mercury	9.1E-02	NC	NA	5.00E-01	1.41E-10	NA	3.0E-04	NA	4.7E-07
7440-02-0	Nickel	9.6E+00	NC	NA	1.00E+00	2.99E-08	NA	2.0E-02	NA	1.5E-06
7440-62-2	Vanadium	3.6E+01	NC	NA	1.00E+00	1.11E-07	NA	9.0E-03	NA	1.2E-05
7440-66-6	Zinc	8.5E+01	NC	NA	1.00E+00	2.63E-07	NA	3.0E-01	NA	8.8E-07

	Cancer Risk	Hazard Index
TOTAL:	4.9E-09	8.1E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 25
Adolescent Student
Incidential Ingestion of Soil
New Bedford High School - HS-7 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.2E-01	1.0E+00	1.2E-08	1.0E+00	1.9E-07	2.0E+00	5.0E-05	2E-08	3.9E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	3.1E-12	1.0E+00	5.0E-11	1.5E+05	7.0E-10	5E-07	7.2E-02
Metals										
7440-39-3	Barium	9.0E+01	NC	NA	1.0E+00	8.0E-05	NA	7.0E-02	NA	1.1E-03
7440-41-7	Beryllium	4.0E-01	NC	NA	1.0E+00	3.5E-07	NA	5.0E-03	NA	7.1E-05
7440-43-9	Cadmium	1.0E+00	NC	NA	1.0E+00	9.0E-07	NA	5.0E-04	NA	1.8E-03
16065-83-1	Chromium III	1.6E+01	NC	NA	1.0E+00	1.4E-05	NA	1.5E+00	NA	9.4E-06
7439-92-1	Lead	3.2E+02	NC	NA	5.0E-01	1.4E-04	NA	7.5E-04	NA	1.9E-01
7440-02-0	Nickel	1.0E+01	NC	NA	1.0E+00	9.0E-06	NA	2.0E-02	NA	4.5E-04
7440-66-6	Zinc	1.4E+02	NC	NA	1.0E+00	1.2E-04	NA	3.0E-01	NA	4.1E-04

	Cancer Risk	Hazard Index
TOTAL:	4.9E-07	2.7E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 26
Adolescent Student
Dermal Contact with Soil
New Bedford High School - HS-7 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	2.2E-01	0.1	1.8E-08	0.1	2.4E-07	2.0E+00	5.0E-05	4E-08	4.7E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.7E-12	0.1	6.1E-11	1.5E+05	7.0E-10	7E-07	8.8E-02
7440-39-3	Barium	9.0E+01	NC	NA	0.1	9.7E-05	NA	7.0E-02	NA	1.4E-03
7440-41-7	Beryllium	4.0E-01	NC	NA	0.1	4.3E-07	NA	5.0E-03	NA	8.6E-05
7440-43-9	Cadmium	1.0E+00	NC	NA	0.01	1.1E-07	NA	5.0E-04	NA	2.2E-04
16065-83-1	Chromium III	1.6E+01	NC	NA	0.1	1.7E-05	NA	1.5E+00	NA	1.1E-05
7439-92-1	Lead	3.2E+02	NC	NA	0.006	2.1E-05	NA	7.5E-04	NA	2.8E-02
7440-02-0	Nickel	1.0E+01	NC	NA	0.2	2.2E-05	NA	2.0E-02	NA	1.1E-03
7440-66-6	Zinc	1.4E+02	NC	NA	0.1	1.5E-04	NA	3.0E-01	NA	5.0E-04

	Cancer Risk	Hazard Index
TOTAL:	7.4E-07	1.2E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 27
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-7 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	2.2E-01	7.1E-08	7.9E-07	1.0E-04	2.0E-02	7E-12	4.0E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.8E-11	2.0E-10	3.3E+01	2.0E-06	6E-10	1.0E-04
Metals								
7440-39-3	Barium	9.0E+01	2.9E-05	3.2E-04	NA	5.0E+00	NA	6.5E-05
7440-41-7	Beryllium	4.0E-01	1.3E-07	1.4E-06	2.4E-03	2.0E-02	3E-10	7.2E-05
7440-43-9	Cadmium	1.0E+00	3.3E-07	3.7E-06	1.8E-03	2.0E-02	6E-10	1.8E-04
16065-83-1	Chromium III	1.6E+01	5.1E-06	5.7E-05	NA	3.0E-01	NA	1.9E-04
7439-92-1	Lead	3.2E+02	1.0E-04	1.2E-03	NA	1.0E+00	NA	1.2E-03
7440-02-0	Nickel	1.0E+01	3.3E-06	3.7E-05	4.8E-04	1.0E+00	2E-09	3.7E-05
7440-66-6	Zinc	1.4E+02	4.5E-05	5.0E-04	NA	1.4E+00	NA	3.6E-04

	Cancer Risk	Hazard Index
TOTAL:	3.1E-09	2.2E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 28
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-7 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	2.2E-01	1.0E+00	6.10E-11	1.00E+00	6.79E-10	2.0E+00	5.0E-05	1E-10	1.4E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.57E-14	1.00E+00	1.75E-13	1.5E+05	7.0E-10	2E-09	2.5E-04
7440-39-3	Barium	9.0E+01	NC	NA	1.00E+00	2.78E-07	NA	7.0E-02	NA	4.0E-06
7440-41-7	Beryllium	4.0E-01	NC	NA	1.00E+00	1.24E-09	NA	5.0E-03	NA	2.5E-07
7440-43-9	Cadmium	1.0E+00	NC	NA	1.00E+00	3.14E-09	NA	5.0E-04	NA	6.3E-06
16065-83-1	Chromium III	1.6E+01	NC	NA	1.00E+00	4.91E-08	NA	1.5E+00	NA	3.3E-08
7439-92-1	Lead	3.2E+02	NC	NA	5.00E-01	4.93E-07	NA	7.5E-04	NA	6.6E-04
7440-02-0	Nickel	1.0E+01	NC	NA	1.00E+00	3.14E-08	NA	2.0E-02	NA	1.6E-06
7440-66-6	Zinc	1.4E+02	NC	NA	1.00E+00	4.30E-07	NA	3.0E-01	NA	1.4E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.5E-09	9.4E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 29
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-9 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH/SVOCs										
C19-C36	C19-C36 Aliphatics	7.6E+01	NC	NA	1.0E+00	6.7E-05	NA	6.0E+00	NA	1.1E-05
C11-C22	C11-C22 Aromatics	3.1E+01	NC	NA	3.0E-01	8.2E-06	NA	3.0E-01	NA	2.7E-05
106-44-5	4-Methylphenol	7.4E-02	NC	NA	1.0E+00	6.6E-08	NA	5.0E-03	NA	1.3E-05
131-11-3	Dimethylphthalate	3.2E-01	NC	NA	1.0E+00	2.8E-07	NA	1.0E-01	NA	2.8E-06
84-74-2	di-n-Butylphthalate	3.5E-01	NC	NA	1.0E+00	3.1E-07	NA	1.0E-01	NA	3.1E-06
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	1.0E+00	1.1E-07	1.0E+00	1.7E-06	1.4E-02	2.0E-02	2E-09	8.7E-05
132-64-9	Dibenzofuran	4.5E-01	NC	NA	9.6E-01	3.8E-07	NA	1.0E-03	NA	3.8E-04
83-32-9	Acenaphthene	4.6E-01	NC	NA	3.0E-01	1.2E-07	NA	2.0E-01	NA	6.1E-07
208-96-8	Acenaphthylene	4.1E-01	NC	NA	3.0E-01	1.1E-07	NA	3.0E-01	NA	3.7E-07
120-12-7	Anthracene	1.2E+00	NC	NA	3.0E-01	3.2E-07	NA	1.0E+00	NA	3.2E-07
56-55-3	Benzo(a)anthracene	2.9E+00	3.0E-01	4.7E-08	3.0E-01	7.6E-07	7.3E-01	3.0E-01	3E-08	2.5E-06
50-32-8	Benzo(a)pyrene	5.6E+00	3.0E-01	9.2E-08	3.0E-01	1.5E-06	7.3E+00	3.0E-01	7E-07	4.9E-06
205-99-2	Benzo(b)fluoranthene	3.0E+00	3.0E-01	5.0E-08	3.0E-01	8.1E-07	7.3E-01	3.0E-01	4E-08	2.7E-06
191-24-2	Benzo(g,h,i)perylene	1.4E+00	NC	NA	3.0E-01	3.8E-07	NA	3.0E-01	NA	1.3E-06
207-08-9	Benzo(k)fluoranthene	1.4E+00	3.0E-01	2.3E-08	3.0E-01	3.8E-07	7.3E-02	3.0E-01	2E-09	1.3E-06
218-01-9	Chrysene	2.7E+00	3.0E-01	4.5E-08	3.0E-01	7.3E-07	7.3E-02	3.0E-01	3E-09	2.4E-06
53-70-3	Dibenz(a,h)anthracene	4.8E-01	3.0E-01	7.9E-09	3.0E-01	1.3E-07	7.3E+00	3.0E-01	6E-08	4.2E-07
206-44-0	Fluoranthene	5.7E+00	NC	NA	3.0E-01	1.5E-06	NA	4.0E-01	NA	3.8E-06
86-73-7	Fluorene	5.5E-01	NC	NA	3.0E-01	1.5E-07	NA	4.0E-01	NA	3.6E-07
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	3.0E-01	2.6E-08	3.0E-01	4.2E-07	7.3E-01	3.0E-01	2E-08	1.4E-06
91-57-6	2-Methylnaphthalene	3.0E-01	NC	NA	3.0E-01	7.9E-08	NA	4.0E-03	NA	2.0E-05
91-20-3	Naphthalene	4.0E+01	NC	NA	3.0E-01	1.1E-05	NA	2.0E-01	NA	5.3E-05
85-01-8	Phenanthrene	4.1E+00	NC	NA	3.0E-01	1.1E-06	NA	3.0E-01	NA	3.6E-06
129-00-0	Pyrene	5.7E+00	NC	NA	3.0E-01	1.5E-06	NA	3.0E-01	NA	5.0E-06
C9-C10	GRO	1.2E+01	NC	NA	1.0E+00	1.1E-05	NA	3.0E-01	NA	3.6E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	3.2E+00	1.0E+00	1.8E-07	1.0E+00	2.8E-06	2.0E+00	5.0E-05	4E-07	5.7E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	3.1E-12	1.0E+00	5.0E-11	1.5E+05	7.0E-10	5E-07	7.2E-02
Metals										
7440-36-0	Antimony	2.3E+02	NC	NA	1.0E+00	2.0E-04	NA	4.0E-04	NA	5.0E-01
7440-38-2	Arsenic	2.0E+01	5.0E-01	5.4E-07	5.0E-01	8.8E-06	1.5E+00	3.0E-04	8E-07	2.9E-02
7440-39-3	Barium	1.4E+03	NC	NA	1.0E+00	1.3E-03	NA	7.0E-02	NA	1.8E-02
7440-41-7	Beryllium	4.3E-01	NC	NA	1.0E+00	3.8E-07	NA	5.0E-03	NA	7.6E-05
7440-43-9	Cadmium	3.7E+00	NC	NA	1.0E+00	3.3E-06	NA	5.0E-04	NA	6.6E-03
16065-83-1	Chromium III	7.2E+01	NC	NA	1.0E+00	6.4E-05	NA	1.5E+00	NA	4.2E-05
7439-92-1	Lead	1.8E+03	NC	NA	5.0E-01	8.1E-04	NA	7.5E-04	NA	1.1E+00
7439-97-6	Mercury	1.3E+00	NC	NA	5.0E-01	5.9E-07	NA	3.0E-04	NA	2.0E-03
7440-02-0	Nickel	1.6E+01	NC	NA	1.0E+00	1.4E-05	NA	2.0E-02	NA	7.0E-04
7782-49-2	Selenium	4.1E+00	NC	NA	1.0E+00	3.6E-06	NA	5.0E-03	NA	7.3E-04
7440-22-4	Silver	5.0E+00	NC	NA	1.0E+00	4.4E-06	NA	5.0E-03	NA	8.8E-04
7440-62-2	Vanadium	2.3E+01	NC	NA	1.0E+00	2.1E-05	NA	9.0E-03	NA	2.3E-03
7440-66-6	Zinc	5.2E+02	NC	NA	1.0E+00	4.6E-04	NA	3.0E-01	NA	1.5E-03

	Cancer Risk	Hazard Index
TOTAL:	2.5E-06	1.8E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 30
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-9 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
EPH/SVOCs										
C19-C36	C19-C36 Aliphatics	7.6E+01	NC	NA	0.2	1.6E-04	NA	6.0E+00	NA	2.7E-05
C11-C22	C11-C22 Aromatics	3.1E+01	NC	NA	0.1	3.4E-05	NA	3.0E-01	NA	1.1E-04
106-44-5	4-Methylphenol	7.4E-02	NC	NA	0.19	1.5E-07	NA	5.0E-03	NA	3.0E-05
131-11-3	Dimethylphthalate	3.2E-01	NC	NA	0.1	3.4E-07	NA	1.0E-01	NA	3.4E-06
84-74-2	di-n-Butylphthalate	3.5E-01	NC	NA	0.07	2.7E-07	NA	1.0E-01	NA	2.7E-06
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	0.1	1.6E-07	0.1	2.1E-06	1.4E-02	2.0E-02	2E-09	1.1E-04
132-64-9	Dibenzofuran	4.5E-01	NC	NA	0.18	8.7E-07	NA	1.0E-03	NA	8.7E-04
83-32-9	Acenaphthene	4.6E-01	NC	NA	0.1	5.0E-07	NA	2.0E-01	NA	2.5E-06
208-96-8	Acenaphthylene	4.1E-01	NC	NA	0.1	4.5E-07	NA	3.0E-01	NA	1.5E-06
120-12-7	Anthracene	1.2E+00	NC	NA	0.1	1.3E-06	NA	1.0E+00	NA	1.3E-06
56-55-3	Benzo(a)anthracene	2.9E+00	0.02	4.7E-08	0.02	6.2E-07	7.3E-01	3.0E-01	3E-08	2.1E-06
50-32-8	Benzo(a)pyrene	5.6E+00	0.02	9.3E-08	0.02	1.2E-06	7.3E+00	3.0E-01	7E-07	4.0E-06
205-99-2	Benzo(b)fluoranthene	3.0E+00	0.02	5.0E-08	0.02	6.6E-07	7.3E-01	3.0E-01	4E-08	2.2E-06
191-24-2	Benzo(g,h,i)perylene	1.4E+00	NC	NA	0.1	1.6E-06	NA	3.0E-01	NA	5.2E-06
207-08-9	Benzo(k)fluoranthene	1.4E+00	0.02	2.4E-08	0.02	3.1E-07	7.3E-02	3.0E-01	2E-09	1.0E-06
218-01-9	Chrysene	2.7E+00	0.02	4.5E-08	0.02	5.9E-07	7.3E-02	3.0E-01	3E-09	2.0E-06
53-70-3	Dibenz(a,h)anthracene	4.8E-01	0.02	7.9E-09	0.02	1.0E-07	7.3E+00	3.0E-01	6E-08	3.5E-07
206-44-0	Fluoranthene	5.7E+00	NC	NA	0.1	6.2E-06	NA	4.0E-01	NA	1.6E-05
86-73-7	Fluorene	5.5E-01	NC	NA	0.1	5.9E-07	NA	4.0E-01	NA	1.5E-06
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	0.02	2.6E-08	0.02	3.4E-07	7.3E-01	3.0E-01	2E-08	1.1E-06
91-57-6	2-Methylnaphthalene	3.0E-01	NC	NA	0.1	3.2E-07	NA	4.0E-03	NA	8.0E-05
91-20-3	Naphthalene	4.0E+01	NC	NA	0.1	4.3E-05	NA	2.0E-01	NA	2.2E-04
85-01-8	Phenanthrene	4.1E+00	NC	NA	0.1	4.5E-06	NA	3.0E-01	NA	1.5E-05
129-00-0	Pyrene	5.7E+00	NC	NA	0.1	6.1E-06	NA	3.0E-01	NA	2.0E-05
C9-C10	GRO	1.2E+01	NC	NA	0.2	2.7E-05	NA	3.0E-01	NA	8.9E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	3.2E+00	0.1	2.7E-07	0.1	3.5E-06	2.0E+00	5.0E-05	5E-07	6.9E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.7E-12	0.1	6.1E-11	1.5E+05	7.0E-10	7E-07	8.8E-02
Metals										
7440-36-0	Antimony	2.3E+02	NC	NA	0.1	2.4E-04	NA	4.0E-04	NA	6.1E-01
7440-38-2	Arsenic	2.0E+01	0.03	4.9E-07	0.03	6.4E-06	1.5E+00	3.0E-04	7E-07	2.1E-02
7440-39-3	Barium	1.4E+03	NC	NA	0.1	1.5E-03	NA	7.0E-02	NA	2.2E-02
7440-41-7	Beryllium	4.3E-01	NC	NA	0.1	4.7E-07	NA	5.0E-03	NA	9.3E-05
7440-43-9	Cadmium	3.7E+00	NC	NA	0.01	4.0E-07	NA	5.0E-04	NA	8.1E-04
16065-83-1	Chromium III	7.2E+01	NC	NA	0.1	7.8E-05	NA	1.5E+00	NA	5.2E-05
7439-92-1	Lead	1.8E+03	NC	NA	0.006	1.2E-04	NA	7.5E-04	NA	1.6E-01
7439-97-6	Mercury	1.3E+00	NC	NA	0.1	1.4E-06	NA	3.0E-04	NA	4.8E-03
7440-02-0	Nickel	1.6E+01	NC	NA	0.2	3.4E-05	NA	2.0E-02	NA	1.7E-03
7782-49-2	Selenium	4.1E+00	NC	NA	0.01	4.4E-07	NA	5.0E-03	NA	8.9E-05
7440-22-4	Silver	5.0E+00	NC	NA	0.3	1.6E-05	NA	5.0E-03	NA	3.2E-03
7440-62-2	Vanadium	2.3E+01	NC	NA	0.1	2.5E-05	NA	9.0E-03	NA	2.8E-03
7440-66-6	Zinc	5.2E+02	NC	NA	0.1	5.7E-04	NA	3.0E-01	NA	1.9E-03

	Cancer Risk	Hazard Index
TOTAL:	2.8E-06	9.9E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 31
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-9 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH/SVOCs								
C19-C36	C19-C36 Aliphatics	7.6E+01	2.5E-05	2.7E-04	NA	NA	NA	NA
C11-C22	C11-C22 Aromatics	3.1E+01	1.0E-05	1.1E-04	NA	5.0E+02	NA	2.2E-07
106-44-5	4-Methylphenol	7.4E-02	2.4E-08	2.7E-07	NA	6.0E+02	NA	4.5E-10
131-11-3	Dimethylphthalate	3.2E-01	1.0E-07	1.1E-06	NA	4.0E+02	NA	2.9E-09
84-74-2	di-n-Butylphthalate	3.5E-01	1.1E-07	1.3E-06	NA	3.5E+02	NA	3.6E-09
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	6.4E-07	7.1E-06	1.3E-06	7.0E+00	8E-13	1.0E-06
132-64-9	Dibenzofuran	4.5E-01	1.4E-07	1.6E-06	NA	3.5E+00	NA	4.6E-07
83-32-9	Acenaphthene	4.6E-01	1.5E-07	1.7E-06	NA	5.0E+02	NA	3.3E-09
208-96-8	Acenaphthylene	4.1E-01	1.3E-07	1.5E-06	NA	5.0E+02	NA	3.0E-09
120-12-7	Anthracene	1.2E+00	3.9E-07	4.4E-06	NA	5.0E+02	NA	8.7E-09
56-55-3	Benzo(a)anthracene	2.9E+00	9.3E-07	1.0E-05	2.1E-04	5.0E+02	2E-10	2.1E-08
50-32-8	Benzo(a)pyrene	5.6E+00	1.8E-06	2.0E-05	2.1E-03	5.0E+02	4E-09	4.0E-08
205-99-2	Benzo(b)fluoranthene	3.0E+00	9.9E-07	1.1E-05	2.1E-04	5.0E+02	2E-10	2.2E-08
191-24-2	Benzo(g,h,i)perylene	1.4E+00	4.7E-07	5.2E-06	NA	5.0E+02	NA	1.0E-08
207-08-9	Benzo(k)fluoranthene	1.4E+00	4.6E-07	5.1E-06	2.1E-05	5.0E+02	1E-11	1.0E-08
218-01-9	Chrysene	2.7E+00	8.9E-07	9.9E-06	2.1E-05	5.0E+02	2E-11	2.0E-08
53-70-3	Dibenz(a,h)anthracene	4.8E-01	1.6E-07	1.7E-06	2.1E-03	5.0E+02	3E-10	3.5E-09
206-44-0	Fluoranthene	5.7E+00	1.9E-06	2.1E-05	NA	5.0E+02	NA	4.2E-08
86-73-7	Fluorene	5.5E-01	1.8E-07	2.0E-06	NA	5.0E+02	NA	4.0E-09
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	5.2E-07	5.7E-06	2.1E-04	5.0E+02	1E-10	1.1E-08
91-57-6	2-Methylnaphthalene	3.0E-01	9.6E-08	1.1E-06	NA	5.0E+02	NA	2.1E-09
91-20-3	Naphthalene	4.0E+01	1.3E-05	1.4E-04	NA	3.0E+00	NA	4.8E-05
85-01-8	Phenanthrene	4.1E+00	1.3E-06	1.5E-05	NA	5.0E+02	NA	3.0E-08
129-00-0	Pyrene	5.7E+00	1.8E-06	2.1E-05	NA	5.0E+02	NA	4.1E-08
C9-C10	GRO	1.2E+01	4.0E-06	4.4E-05	NA	5.0E+02	NA	8.9E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	3.2E+00	1.0E-06	1.2E-05	1.0E-04	2.0E-02	1E-10	5.8E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.8E-11	2.0E-10	3.3E+01	2.0E-06	6E-10	1.0E-04
Metals								
7440-36-0	Antimony	2.3E+02	7.3E-05	8.2E-04	NA	1.0E+01	NA	8.2E-05
7440-38-2	Arsenic	2.0E+01	6.4E-06	7.2E-05	3.0E-03	2.0E-02	2E-08	3.6E-03
7440-39-3	Barium	1.4E+03	4.6E-04	5.2E-03	NA	5.0E+00	NA	1.0E-03
7440-41-7	Beryllium	4.3E-01	1.4E-07	1.6E-06	2.4E-03	2.0E-02	3E-10	7.8E-05
7440-43-9	Cadmium	3.7E+00	1.2E-06	1.4E-05	1.8E-03	2.0E-02	2E-09	6.8E-04
16065-83-1	Chromium III	7.2E+01	2.3E-05	2.6E-04	NA	3.0E-01	NA	8.6E-04
7439-92-1	Lead	1.8E+03	5.9E-04	6.6E-03	NA	1.0E+00	NA	6.6E-03
7439-97-6	Mercury	1.3E+00	4.3E-07	4.8E-06	NA	3.0E-01	NA	1.6E-05
7440-02-0	Nickel	1.6E+01	5.1E-06	5.7E-05	4.8E-04	1.0E+00	2E-09	5.7E-05
7782-49-2	Selenium	4.1E+00	1.3E-06	1.5E-05	NA	3.0E+00	NA	4.9E-06
7440-22-4	Silver	5.0E+00	1.6E-06	1.8E-05	NA	1.4E-01	NA	1.3E-04
7440-62-2	Vanadium	2.3E+01	7.6E-06	8.4E-05	NA	1.0E+00	NA	8.4E-05
7440-66-6	Zinc	5.2E+02	1.7E-04	1.9E-03	NA	1.4E+00	NA	1.4E-03

	Cancer Risk	Hazard Index
TOTAL:	3.0E-08	1.5E-02

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 32
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-9 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH/SVOCs										
C19-C36	C19-C36 Aliphatics	7.6E+01	NC	NA	1.00E+00	2.36E-07	NA	6.0E+00	NA	3.9E-08
C11-C22	C11-C22 Aromatics	3.1E+01	NC	NA	3.00E-01	2.88E-08	NA	3.0E-01	NA	9.6E-08
106-44-5	4-Methylphenol	7.4E-02	NC	NA	1.00E+00	2.29E-10	NA	5.0E-03	NA	4.6E-08
131-11-3	Dimethylphthalate	3.2E-01	NC	NA	1.00E+00	9.80E-10	NA	1.0E-01	NA	9.8E-09
84-74-2	di-n-Butylphthalate	3.5E-01	NC	NA	1.00E+00	1.09E-09	NA	1.0E-01	NA	1.1E-08
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	1.0E+00	5.46E-10	1.00E+00	6.09E-09	1.4E-02	2.0E-02	8E-12	3.0E-07
132-64-9	Dibenzofuran	4.5E-01	NC	NA	9.60E-01	1.33E-09	NA	1.0E-03	NA	1.3E-06
83-32-9	Acenaphthene	4.6E-01	NC	NA	3.00E-01	4.30E-10	NA	2.0E-01	NA	2.1E-09
208-96-8	Acenaphthylene	4.1E-01	NC	NA	3.00E-01	3.84E-10	NA	3.0E-01	NA	1.3E-09
120-12-7	Anthracene	1.2E+00	NC	NA	3.00E-01	1.12E-09	NA	1.0E+00	NA	1.1E-09
56-55-3	Benzo(a)anthracene	2.9E+00	3.0E-01	2.38E-10	3.00E-01	2.65E-09	7.3E-01	3.0E-01	2E-10	8.8E-09
50-32-8	Benzo(a)pyrene	5.6E+00	3.0E-01	4.65E-10	3.00E-01	5.18E-09	7.3E+00	3.0E-01	3E-09	1.7E-08
205-99-2	Benzo(b)fluoranthene	3.0E+00	3.0E-01	2.54E-10	3.00E-01	2.83E-09	7.3E-01	3.0E-01	2E-10	9.4E-09
191-24-2	Benzo(g,h,i)perylene	1.4E+00	NC	NA	3.00E-01	1.35E-09	NA	3.0E-01	NA	4.5E-09
207-08-9	Benzo(k)fluoranthene	1.4E+00	3.0E-01	1.19E-10	3.00E-01	1.32E-09	7.3E-02	3.0E-01	9E-12	4.4E-09
218-01-9	Chrysene	2.7E+00	3.0E-01	2.28E-10	3.00E-01	2.54E-09	7.3E-02	3.0E-01	2E-11	8.5E-09
53-70-3	Dibenz(a,h)anthracene	4.8E-01	3.0E-01	3.99E-11	3.00E-01	4.45E-10	7.3E+00	3.0E-01	3E-10	1.5E-09
206-44-0	Fluoranthene	5.7E+00	NC	NA	3.00E-01	5.34E-09	NA	4.0E-01	NA	1.3E-08
86-73-7	Fluorene	5.5E-01	NC	NA	3.00E-01	5.10E-10	NA	4.0E-01	NA	1.3E-09
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	3.0E-01	1.33E-10	3.00E-01	1.48E-09	7.3E-01	3.0E-01	1E-10	4.9E-09
91-57-6	2-Methylnaphthalene	3.0E-01	NC	NA	3.00E-01	2.75E-10	NA	4.0E-03	NA	6.9E-08
91-20-3	Naphthalene	4.0E+01	NC	NA	3.00E-01	3.72E-08	NA	2.0E-01	NA	1.9E-07
85-01-8	Phenanthrene	4.1E+00	NC	NA	3.00E-01	3.83E-09	NA	3.0E-01	NA	1.3E-08
129-00-0	Pyrene	5.7E+00	NC	NA	3.00E-01	5.27E-09	NA	3.0E-01	NA	1.8E-08
C9-C10	GRO	1.2E+01	NC	NA	1.00E+00	3.81E-08	NA	3.0E-01	NA	1.3E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	3.2E+00	1.0E+00	8.88E-10	1.00E+00	9.90E-09	2.0E+00	5.0E-05	2E-09	2.0E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.57E-14	1.00E+00	1.75E-13	1.5E+05	7.0E-10	2E-09	2.5E-04
Metals										
7440-36-0	Antimony	2.3E+02	NC	NA	1.00E+00	7.01E-07	NA	4.0E-04	NA	1.8E-03
7440-38-2	Arsenic	2.0E+01	5.0E-01	2.75E-09	5.00E-01	3.07E-08	1.5E+00	3.0E-04	4E-09	1.0E-04
7440-39-3	Barium	1.4E+03	NC	NA	1.00E+00	4.43E-06	NA	7.0E-02	NA	6.3E-05
7440-41-7	Beryllium	4.3E-01	NC	NA	1.00E+00	1.33E-09	NA	5.0E-03	NA	2.7E-07
7440-43-9	Cadmium	3.7E+00	NC	NA	1.00E+00	1.16E-08	NA	5.0E-04	NA	2.3E-05
16065-83-1	Chromium III	7.2E+01	NC	NA	1.00E+00	2.22E-07	NA	1.5E+00	NA	1.5E-07
7439-92-1	Lead	1.8E+03	NC	NA	5.00E-01	2.83E-06	NA	7.5E-04	NA	3.8E-03
7439-97-6	Mercury	1.3E+00	NC	NA	5.00E-01	2.05E-09	NA	3.0E-04	NA	6.8E-06
7440-02-0	Nickel	1.6E+01	NC	NA	1.00E+00	4.92E-08	NA	2.0E-02	NA	2.5E-06
7782-49-2	Selenium	4.1E+00	NC	NA	1.00E+00	1.27E-08	NA	5.0E-03	NA	2.5E-06
7440-22-4	Silver	5.0E+00	NC	NA	1.00E+00	1.55E-08	NA	5.0E-03	NA	3.1E-06
7440-62-2	Vanadium	2.3E+01	NC	NA	1.00E+00	7.21E-08	NA	9.0E-03	NA	8.0E-06
7440-66-6	Zinc	5.2E+02	NC	NA	1.00E+00	1.62E-06	NA	3.0E-01	NA	5.4E-06

	Cancer Risk	Hazard Index
TOTAL:	1.2E-08	6.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 33
Adolescent Student
Incidential Ingestion of Surface Soil
New Bedford High School - HS-10 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.0E+00	2.7E-07	NA	1.0E-01	NA	2.7E-06
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	7.7E-09	1.0E+00	1.2E-07	1.4E-02	2.0E-02	1E-10	6.2E-06
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.6E-01	1.2E-07	NA	1.0E-03	NA	1.2E-04
83-32-9	Acenaphthene	1.9E-01	NC	NA	3.0E-01	5.2E-08	NA	2.0E-01	NA	2.6E-07
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.0E-01	3.9E-08	NA	3.0E-01	NA	1.3E-07
120-12-7	Anthracene	4.4E-01	NC	NA	3.0E-01	1.2E-07	NA	1.0E+00	NA	1.2E-07
56-55-3	Benzo(a)anthracene	9.9E-01	3.0E-01	1.6E-08	3.0E-01	2.6E-07	7.3E-01	3.0E-01	1E-08	8.8E-07
50-32-8	Benzo(a)pyrene	8.0E-01	3.0E-01	1.3E-08	3.0E-01	2.1E-07	7.3E+00	3.0E-01	1E-07	7.1E-07
205-99-2	Benzo(b)fluoranthene	1.0E+00	3.0E-01	1.7E-08	3.0E-01	2.7E-07	7.3E-01	3.0E-01	1E-08	9.0E-07
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.0E-01	9.7E-08	NA	3.0E-01	NA	3.2E-07
207-08-9	Benzo(k)fluoranthene	3.8E-01	3.0E-01	6.2E-09	3.0E-01	1.0E-07	7.3E-02	3.0E-01	5E-10	3.4E-07
218-01-9	Chrysene	9.2E-01	3.0E-01	1.5E-08	3.0E-01	2.5E-07	7.3E-02	3.0E-01	1E-09	8.2E-07
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	2.4E-09	3.0E-01	3.8E-08	7.3E+00	3.0E-01	2E-08	1.3E-07
206-44-0	Fluoranthene	2.0E+00	NC	NA	3.0E-01	5.2E-07	NA	4.0E-01	NA	1.3E-06
86-73-7	Fluorene	2.1E-01	NC	NA	3.0E-01	5.7E-08	NA	4.0E-01	NA	1.4E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	6.9E-09	3.0E-01	1.1E-07	7.3E-01	3.0E-01	5E-09	3.7E-07
91-57-6	2-Methylnaphthalene	1.7E-01	NC	NA	3.0E-01	4.4E-08	NA	4.0E-03	NA	1.1E-05
91-20-3	Naphthalene	1.5E-01	NC	NA	3.0E-01	3.9E-08	NA	2.0E-01	NA	2.0E-07
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.0E-01	5.1E-07	NA	3.0E-01	NA	1.7E-06
129-00-0	Pyrene	2.2E+00	NC	NA	3.0E-01	5.9E-07	NA	3.0E-01	NA	2.0E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.4E+00	1.0E+00	7.6E-08	1.0E+00	1.2E-06	2.0E+00	5.0E-05	2E-07	2.5E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	3.1E-12	1.0E+00	5.0E-11	1.5E+05	7.0E-10	5E-07	7.2E-02
Metals										
7440-38-2	Arsenic	8.8E+00	5.0E-01	2.4E-07	5.0E-01	3.9E-06	1.5E+00	3.0E-04	4E-07	1.3E-02
7440-39-3	Barium	3.2E+02	NC	NA	1.0E+00	2.8E-04	NA	7.0E-02	NA	4.1E-03
7440-41-7	Beryllium	3.9E-01	NC	NA	1.0E+00	3.4E-07	NA	5.0E-03	NA	6.9E-05
7440-43-9	Cadmium	1.0E+00	NC	NA	1.0E+00	9.1E-07	NA	5.0E-04	NA	1.8E-03
16065-83-1	Chromium III	2.7E+01	NC	NA	1.0E+00	2.4E-05	NA	1.5E+00	NA	1.6E-05
7439-92-1	Lead	5.6E+02	NC	NA	5.0E-01	2.5E-04	NA	7.5E-04	NA	3.3E-01
7439-97-6	Mercury	1.2E-01	NC	NA	5.0E-01	5.5E-08	NA	3.0E-04	NA	1.8E-04
7440-02-0	Nickel	9.4E+00	NC	NA	1.0E+00	8.3E-06	NA	2.0E-02	NA	4.2E-04
7782-49-2	Selenium	5.7E+00	NC	NA	1.0E+00	5.1E-06	NA	5.0E-03	NA	1.0E-03
7440-22-4	Silver	7.4E-01	NC	NA	1.0E+00	6.5E-07	NA	5.0E-03	NA	1.3E-04
7440-62-2	Vanadium	1.8E+01	NC	NA	1.0E+00	1.6E-05	NA	9.0E-03	NA	1.8E-03
7440-66-6	Zinc	1.7E+02	NC	NA	1.0E+00	1.5E-04	NA	3.0E-01	NA	5.0E-04

	Cancer Risk	Hazard Index
TOTAL:	1.1E-06	4.5E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [4]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[4] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 34
Adolescent Student
Dermal Contact with Surface Soil
New Bedford High School - HS-10 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	0.07	2.3E-07	NA	1.0E-01	NA	2.3E-06
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	0.1	1.2E-08	0.1	1.5E-07	1.4E-02	2.0E-02	2E-10	7.6E-06
132-64-9	Dibenzofuran	1.4E-01	NC	NA	0.18	2.8E-07	NA	1.0E-03	NA	2.8E-04
83-32-9	Acenaphthene	1.9E-01	NC	NA	0.1	2.1E-07	NA	2.0E-01	NA	1.1E-06
208-96-8	Acenaphthylene	1.5E-01	NC	NA	0.1	1.6E-07	NA	3.0E-01	NA	5.3E-07
120-12-7	Anthracene	4.4E-01	NC	NA	0.1	4.7E-07	NA	1.0E+00	NA	4.7E-07
56-55-3	Benzo(a)anthracene	9.9E-01	0.02	1.7E-08	0.02	2.2E-07	7.3E-01	3.0E-01	1E-08	7.2E-07
50-32-8	Benzo(a)pyrene	8.0E-01	0.02	1.3E-08	0.02	1.7E-07	7.3E+00	3.0E-01	1E-07	5.8E-07
205-99-2	Benzo(b)fluoranthene	1.0E+00	0.02	1.7E-08	0.02	2.2E-07	7.3E-01	3.0E-01	1E-08	7.3E-07
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	0.1	3.9E-07	NA	3.0E-01	NA	1.3E-06
207-08-9	Benzo(k)fluoranthene	3.8E-01	0.02	6.3E-09	0.02	8.2E-08	7.3E-02	3.0E-01	5E-10	2.7E-07
218-01-9	Chrysene	9.2E-01	0.02	1.5E-08	0.02	2.0E-07	7.3E-02	3.0E-01	1E-09	6.7E-07
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.02	2.4E-09	0.02	3.1E-08	7.3E+00	3.0E-01	2E-08	1.0E-07
206-44-0	Fluoranthene	2.0E+00	NC	NA	0.1	2.1E-06	NA	4.0E-01	NA	5.3E-06
86-73-7	Fluorene	2.1E-01	NC	NA	0.1	2.3E-07	NA	4.0E-01	NA	5.8E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.02	6.9E-09	0.02	9.0E-08	7.3E-01	3.0E-01	5E-09	3.0E-07
91-57-6	2-Methylnaphthalene	1.7E-01	NC	NA	0.1	1.8E-07	NA	4.0E-03	NA	4.5E-05
91-20-3	Naphthalene	1.5E-01	NC	NA	0.1	1.6E-07	NA	2.0E-01	NA	8.0E-07
85-01-8	Phenanthrene	1.9E+00	NC	NA	0.1	2.1E-06	NA	3.0E-01	NA	6.9E-06
129-00-0	Pyrene	2.2E+00	NC	NA	0.1	2.4E-06	NA	3.0E-01	NA	8.1E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.4E+00	0.1	1.2E-07	0.1	1.5E-06	2.0E+00	5.0E-05	2E-07	3.0E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.7E-12	0.1	6.1E-11	1.5E+05	7.0E-10	7E-07	8.8E-02
Metals										
7440-38-2	Arsenic	8.8E+00	0.03	2.2E-07	0.03	2.9E-06	1.5E+00	3.0E-04	3E-07	9.6E-03
7440-39-3	Barium	3.2E+02	NC	NA	0.1	3.5E-04	NA	7.0E-02	NA	5.0E-03
7440-41-7	Beryllium	3.9E-01	NC	NA	0.1	4.2E-07	NA	5.0E-03	NA	8.4E-05
7440-43-9	Cadmium	1.0E+00	NC	NA	0.01	1.1E-07	NA	5.0E-04	NA	2.2E-04
16065-83-1	Chromium III	2.7E+01	NC	NA	0.1	2.9E-05	NA	1.5E+00	NA	1.9E-05
7439-92-1	Lead	5.6E+02	NC	NA	0.006	3.6E-05	NA	7.5E-04	NA	4.9E-02
7439-97-6	Mercury	1.2E-01	NC	NA	0.1	1.3E-07	NA	3.0E-04	NA	4.5E-04
7440-02-0	Nickel	9.4E+00	NC	NA	0.2	2.0E-05	NA	2.0E-02	NA	1.0E-03
7782-49-2	Selenium	5.7E+00	NC	NA	0.01	6.2E-07	NA	5.0E-03	NA	1.2E-04
7440-22-4	Silver	7.4E-01	NC	NA	0.3	2.4E-06	NA	5.0E-03	NA	4.8E-04
7440-62-2	Vanadium	1.8E+01	NC	NA	0.1	2.0E-05	NA	9.0E-03	NA	2.2E-03
7440-66-6	Zinc	1.7E+02	NC	NA	0.1	1.8E-04	NA	3.0E-01	NA	6.1E-04

	Cancer Risk	Hazard Index
TOTAL:	1.4E-06	1.9E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	4368	cm2/d [4] - (11-12 year old)
Skin Surface Area (SA) - Cancer =	5410	cm2/d [4] - (11-18 year old)
Soil Adherence Factor (SAF) =	0.14	mg/cm2 [3]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks
Exposure Period (EP) - Cancer =	8	years [2]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [5]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [5]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for school (middle and high school combined)
[3] Adolescent value from MassDEP Technical Update "Weighted Skin Soil Adherence Factors" (April 2002)
[4] 50th percentile value for males and females; face, forearms, hands, lower legs and feet (MassDEP 1995)
[5] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 35
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-10 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
84-74-2	di-n-Butylphthalate	3.0E-01	9.9E-08	1.1E-06	NA	3.5E+02	NA	3.1E-09
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	4.5E-08	5.1E-07	1.3E-06	7.0E+00	6E-14	7.2E-08
132-64-9	Dibenzofuran	1.4E-01	4.6E-08	5.1E-07	NA	3.5E+00	NA	1.5E-07
83-32-9	Acenaphthene	1.9E-01	6.3E-08	7.0E-07	NA	5.0E+02	NA	1.4E-09
208-96-8	Acenaphthylene	1.5E-01	4.8E-08	5.3E-07	NA	5.0E+02	NA	1.1E-09
120-12-7	Anthracene	4.4E-01	1.4E-07	1.6E-06	NA	5.0E+02	NA	3.2E-09
56-55-3	Benzo(a)anthracene	9.9E-01	3.2E-07	3.6E-06	2.1E-04	5.0E+02	7E-11	7.2E-09
50-32-8	Benzo(a)pyrene	8.0E-01	2.6E-07	2.9E-06	2.1E-03	5.0E+02	5E-10	5.8E-09
205-99-2	Benzo(b)fluoranthene	1.0E+00	3.3E-07	3.7E-06	2.1E-04	5.0E+02	7E-11	7.3E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	1.2E-07	1.3E-06	NA	5.0E+02	NA	2.6E-09
207-08-9	Benzo(k)fluoranthene	3.8E-01	1.2E-07	1.4E-06	2.1E-05	5.0E+02	3E-12	2.7E-09
218-01-9	Chrysene	9.2E-01	3.0E-07	3.3E-06	2.1E-05	5.0E+02	6E-12	6.7E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	4.7E-08	5.2E-07	2.1E-03	5.0E+02	1E-10	1.0E-09
206-44-0	Fluoranthene	2.0E+00	6.4E-07	7.1E-06	NA	5.0E+02	NA	1.4E-08
86-73-7	Fluorene	2.1E-01	7.0E-08	7.8E-07	NA	5.0E+02	NA	1.6E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	1.4E-07	1.5E-06	2.1E-04	5.0E+02	3E-11	3.0E-09
91-57-6	2-Methylnaphthalene	1.7E-01	5.4E-08	6.0E-07	NA	5.0E+02	NA	1.2E-09
91-20-3	Naphthalene	1.5E-01	4.8E-08	5.3E-07	NA	3.0E+00	NA	1.8E-07
85-01-8	Phenanthrene	1.9E+00	6.2E-07	6.9E-06	NA	5.0E+02	NA	1.4E-08
129-00-0	Pyrene	2.2E+00	7.3E-07	8.1E-06	NA	5.0E+02	NA	1.6E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.4E+00	4.5E-07	5.0E-06	1.0E-04	2.0E-02	5E-11	2.5E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.8E-11	2.0E-10	3.3E+01	2.0E-06	6E-10	1.0E-04
Metals								
7440-38-2	Arsenic	8.8E+00	2.9E-06	3.2E-05	3.0E-03	2.0E-02	9E-09	1.6E-03
7440-39-3	Barium	3.2E+02	1.0E-04	1.2E-03	NA	5.0E+00	NA	2.3E-04
7440-41-7	Beryllium	3.9E-01	1.3E-07	1.4E-06	2.4E-03	2.0E-02	3E-10	7.0E-05
7440-43-9	Cadmium	1.0E+00	3.3E-07	3.7E-06	1.8E-03	2.0E-02	6E-10	1.9E-04
16065-83-1	Chromium III	2.7E+01	8.7E-06	9.7E-05	NA	3.0E-01	NA	3.2E-04
7439-92-1	Lead	5.6E+02	1.8E-04	2.0E-03	NA	1.0E+00	NA	2.0E-03
7439-97-6	Mercury	1.2E-01	4.0E-08	4.5E-07	NA	3.0E-01	NA	1.5E-06
7440-02-0	Nickel	9.4E+00	3.1E-06	3.4E-05	4.8E-04	1.0E+00	1E-09	3.4E-05
7782-49-2	Selenium	5.7E+00	1.9E-06	2.1E-05	NA	3.0E+00	NA	6.9E-06
7440-22-4	Silver	7.4E-01	2.4E-07	2.7E-06	NA	1.4E-01	NA	1.9E-05
7440-62-2	Vanadium	1.8E+01	5.9E-06	6.6E-05	NA	1.0E+00	NA	6.6E-05
7440-66-6	Zinc	1.7E+02	5.5E-05	6.2E-04	NA	1.4E+00	NA	4.4E-04

	Cancer Risk	Hazard Index
TOTAL:	1.2E-08	5.4E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 36
Adolescent Student
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-10 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.00E+00	9.42E-10	NA	1.0E-01	NA	9.4E-09
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	3.90E-11	1.00E+00	4.34E-10	1.4E-02	2.0E-02	5E-13	2.2E-08
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.60E-01	4.20E-10	NA	1.0E-03	NA	4.2E-07
83-32-9	Acenaphthene	1.9E-01	NC	NA	3.00E-01	1.80E-10	NA	2.0E-01	NA	9.0E-10
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.00E-01	1.36E-10	NA	3.0E-01	NA	4.5E-10
120-12-7	Anthracene	4.4E-01	NC	NA	3.00E-01	4.06E-10	NA	1.0E+00	NA	4.1E-10
56-55-3	Benzo(a)anthracene	9.9E-01	3.0E-01	8.31E-11	3.00E-01	9.25E-10	7.3E-01	3.0E-01	6E-11	3.1E-09
50-32-8	Benzo(a)pyrene	8.0E-01	3.0E-01	6.70E-11	3.00E-01	7.46E-10	7.3E+00	3.0E-01	5E-10	2.5E-09
205-99-2	Benzo(b)fluoranthene	1.0E+00	3.0E-01	8.46E-11	3.00E-01	9.43E-10	7.3E-01	3.0E-01	6E-11	3.1E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.00E-01	3.38E-10	NA	3.0E-01	NA	1.1E-09
207-08-9	Benzo(k)fluoranthene	3.8E-01	3.0E-01	3.16E-11	3.00E-01	3.53E-10	7.3E-02	3.0E-01	2E-12	1.2E-09
218-01-9	Chrysene	9.2E-01	3.0E-01	7.70E-11	3.00E-01	8.58E-10	7.3E-02	3.0E-01	6E-12	2.9E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	1.20E-11	3.00E-01	1.34E-10	7.3E+00	3.0E-01	9E-11	4.5E-10
206-44-0	Fluoranthene	2.0E+00	NC	NA	3.00E-01	1.83E-09	NA	4.0E-01	NA	4.6E-09
86-73-7	Fluorene	2.1E-01	NC	NA	3.00E-01	2.00E-10	NA	4.0E-01	NA	5.0E-10
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	3.48E-11	3.00E-01	3.87E-10	7.3E-01	3.0E-01	3E-11	1.3E-09
91-57-6	2-Methylnaphthalene	1.7E-01	NC	NA	3.00E-01	1.55E-10	NA	4.0E-03	NA	3.9E-08
91-20-3	Naphthalene	1.5E-01	NC	NA	3.00E-01	1.37E-10	NA	2.0E-01	NA	6.9E-10
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.00E-01	1.78E-09	NA	3.0E-01	NA	5.9E-09
129-00-0	Pyrene	2.2E+00	NC	NA	3.00E-01	2.08E-09	NA	3.0E-01	NA	6.9E-09
Dioxins/PCBs										
1336-36-3	Total PCBs	1.4E+00	1.0E+00	3.87E-10	1.00E+00	4.31E-09	2.0E+00	5.0E-05	8E-10	8.6E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.57E-14	1.00E+00	1.75E-13	1.5E+05	7.0E-10	2E-09	2.5E-04
Metals										
7440-38-2	Arsenic	8.8E+00	5.0E-01	1.23E-09	5.00E-01	1.37E-08	1.5E+00	3.0E-04	2E-09	4.6E-05
7440-39-3	Barium	3.2E+02	NC	NA	1.00E+00	9.92E-07	NA	7.0E-02	NA	1.4E-05
7440-41-7	Beryllium	3.9E-01	NC	NA	1.00E+00	1.20E-09	NA	5.0E-03	NA	2.4E-07
7440-43-9	Cadmium	1.0E+00	NC	NA	1.00E+00	3.20E-09	NA	5.0E-04	NA	6.4E-06
16065-83-1	Chromium III	2.7E+01	NC	NA	1.00E+00	8.31E-08	NA	1.5E+00	NA	5.5E-08
7439-92-1	Lead	5.6E+02	NC	NA	5.00E-01	8.69E-07	NA	7.5E-04	NA	1.2E-03
7439-97-6	Mercury	1.2E-01	NC	NA	5.00E-01	1.92E-10	NA	3.0E-04	NA	6.4E-07
7440-02-0	Nickel	9.4E+00	NC	NA	1.00E+00	2.92E-08	NA	2.0E-02	NA	1.5E-06
7782-49-2	Selenium	5.7E+00	NC	NA	1.00E+00	1.78E-08	NA	5.0E-03	NA	3.6E-06
7440-22-4	Silver	7.4E-01	NC	NA	1.00E+00	2.29E-09	NA	5.0E-03	NA	4.6E-07
7440-62-2	Vanadium	1.8E+01	NC	NA	1.00E+00	5.67E-08	NA	9.0E-03	NA	6.3E-06
7440-66-6	Zinc	1.7E+02	NC	NA	1.00E+00	5.27E-07	NA	3.0E-01	NA	1.8E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	5.7E-09	1.6E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (11-12 year old) =	32.4	l/min [4] - heavy exertion; 11-12 year old
Inhalation Rate (IR) - Cancer (11-18 year old) =	47.0	l/min [4] - heavy exertion; 11-18 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [5] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	2920	days [5]
Body Weight (BW) - Noncancer =	40.3	kg (11-12 year old) [6]
Body Weight (BW) - Cancer =	51.4	kg (11-18 year old) [6]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for school (middle and high school combined)
[6] EPA 1997 Exposure Factors Handbook; Table 7-7 females (50th percentile value).

Table 1
Day Care Child
Incidential Ingestion of Soil
New Bedford High School - HS-1 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	1.0E+00	5.4E-10	1.0E+00	2.9E-08	2.0E+00	5.0E-05	1E-09	5.8E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	5.1E-12	1.0E+00	2.8E-10	1.5E+05	7.0E-10	8E-07	4.0E-01

	Cancer Risk	Hazard Index
TOTAL:	7.7E-07	4.0E-01

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 2
Day Care Child
Dermal Contact with Soil
New Bedford High School - HS-1 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	5.9E-03	0.1	4.5E-10	0.1	2.3E-08	2.0E+00	5.0E-05	9E-10	4.7E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.4E-12	0.1	2.2E-10	1.5E+05	7.0E-10	7E-07	3.2E-01

	Cancer Risk	Hazard Index
TOTAL:	6.5E-07	3.2E-01

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 3
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-1 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	5.9E-03	6.0E-10	3.0E-08	1.0E-04	2.0E-02	6E-14	1.5E-06
1746-01-6	Dioxin/PCB TEQ	5.7E-05	5.7E-12	2.9E-10	3.3E+01	2.0E-06	2E-10	1.4E-04

	Cancer Risk	Hazard Index
TOTAL:	1.9E-10	1.4E-04

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 4
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-1 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	5.9E-03	1.0E+00	5.12E-13	1.00E+00	2.55E-11	2.0E+00	5.0E-05	1E-12	5.1E-07
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	4.91E-15	1.00E+00	2.45E-13	1.5E+05	7.0E-10	7E-10	3.5E-04

	Cancer Risk	Hazard Index
TOTAL:	7.4E-10	3.5E-04

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 5
Day Care Child
Incidential Ingestion of Soil
New Bedford High School - HS-2 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.0E+00	8.3E-07	NA	9.0E-02	NA	9.2E-06
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.9E-01	1.0E-06	NA	8.0E-04	NA	1.3E-03
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.0E-01	2.3E-07	NA	2.0E-01	NA	1.2E-06
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.0E-01	2.1E-07	NA	3.0E-01	NA	7.1E-07
120-12-7	Anthracene	3.3E-01	NC	NA	3.0E-01	4.8E-07	NA	1.0E+00	NA	4.8E-07
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	1.7E-08	3.0E-01	8.9E-07	7.3E-01	3.0E-01	1E-08	3.0E-06
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	1.4E-08	3.0E-01	7.8E-07	7.3E+00	3.0E-01	1E-07	2.6E-06
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	1.5E-08	3.0E-01	8.3E-07	7.3E-01	3.0E-01	1E-08	2.8E-06
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.0E-01	5.3E-07	NA	3.0E-01	NA	1.8E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	7.3E-09	3.0E-01	3.9E-07	7.3E-02	3.0E-01	5E-10	1.3E-06
218-01-9	Chrysene	5.9E-01	3.0E-01	1.6E-08	3.0E-01	8.6E-07	7.3E-02	3.0E-01	1E-09	2.9E-06
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	3.9E-09	3.0E-01	2.1E-07	7.3E+00	3.0E-01	3E-08	6.9E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.0E-01	1.7E-06	NA	4.0E-01	NA	4.4E-06
86-73-7	Fluorene	2.1E-01	NC	NA	3.0E-01	3.1E-07	NA	4.0E-01	NA	7.6E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	1.1E-08	3.0E-01	6.1E-07	7.3E-01	3.0E-01	8E-09	2.0E-06
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.0E-01	2.0E-07	NA	4.0E-03	NA	4.9E-05
91-20-3	Naphthalene	1.6E-01	NC	NA	3.0E-01	2.3E-07	NA	2.0E-01	NA	1.2E-06
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.0E-01	1.8E-06	NA	3.0E-01	NA	6.2E-06
129-00-0	Pyrene	1.2E+00	NC	NA	3.0E-01	1.7E-06	NA	3.0E-01	NA	5.8E-06
C9-C10	GRO	1.5E+01	NC	NA	1.0E+00	7.2E-05	NA	3.0E-01	NA	2.4E-04
Dioxins/PCBs										
1336-36-3	Total PCBs	4.5E-01	1.0E+00	4.1E-08	1.0E+00	2.2E-06	2.0E+00	5.0E-05	8E-08	4.4E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	5.1E-12	1.0E+00	2.8E-10	1.5E+05	7.0E-10	8E-07	4.0E-01
Metals										
7440-38-2	Arsenic	3.5E+00	5.0E-01	1.6E-07	5.0E-01	8.6E-06	1.5E+00	3.0E-04	2E-07	2.9E-02
7440-39-3	Barium	8.8E+01	NC	NA	1.0E+00	4.3E-04	NA	7.0E-02	NA	6.1E-03
7440-41-7	Beryllium	1.9E-01	NC	NA	1.0E+00	9.1E-07	NA	5.0E-03	NA	1.8E-04
7440-43-9	Cadmium	6.1E-01	NC	NA	1.0E+00	3.0E-06	NA	5.0E-04	NA	5.9E-03
16065-83-1	Chromium III	1.3E+01	NC	NA	1.0E+00	6.3E-05	NA	1.5E+00	NA	4.2E-05
7439-92-1	Lead	5.6E+02	NC	NA	5.0E-01	1.4E-03	NA	7.5E-04	NA	1.8E+00
7439-97-6	Mercury	1.3E-01	NC	NA	5.0E-01	3.1E-07	NA	3.0E-04	NA	1.0E-03
7440-02-0	Nickel	9.3E+00	NC	NA	1.0E+00	4.6E-05	NA	2.0E-02	NA	2.3E-03
7440-22-4	Silver	1.5E+00	NC	NA	1.0E+00	7.4E-06	NA	5.0E-03	NA	1.5E-03
7440-62-2	Vanadium	1.5E+01	NC	NA	1.0E+00	7.3E-05	NA	9.0E-03	NA	8.2E-03
7440-66-6	Zinc	9.1E+01	NC	NA	1.0E+00	4.5E-04	NA	3.0E-01	NA	1.5E-03

	Cancer Risk	Hazard Index
TOTAL:	1.3E-06	2.3E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 6
Day Care Child
Dermal Contact with Soil
New Bedford High School - HS-2 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	0.03	2.0E-07	NA	9.0E-02	NA	2.3E-06
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	0.11	9.2E-07	NA	8.0E-04	NA	1.1E-03
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	0.1	6.3E-07	NA	2.0E-01	NA	3.1E-06
208-96-8	Acenaphthylene	1.5E-01	NC	NA	0.1	5.8E-07	NA	3.0E-01	NA	1.9E-06
120-12-7	Anthracene	3.3E-01	NC	NA	0.1	1.3E-06	NA	1.0E+00	NA	1.3E-06
56-55-3	Benzo(a)anthracene	6.1E-01	0.02	9.3E-09	0.02	4.8E-07	7.3E-01	3.0E-01	7E-09	1.6E-06
50-32-8	Benzo(a)pyrene	5.3E-01	0.02	8.1E-09	0.02	4.2E-07	7.3E+00	3.0E-01	6E-08	1.4E-06
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.02	8.7E-09	0.02	4.5E-07	7.3E-01	3.0E-01	6E-09	1.5E-06
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	0.1	1.4E-06	NA	3.0E-01	NA	4.8E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.02	4.1E-09	0.02	2.1E-07	7.3E-02	3.0E-01	3E-10	7.1E-07
218-01-9	Chrysene	5.9E-01	0.02	9.1E-09	0.02	4.7E-07	7.3E-02	3.0E-01	7E-10	1.6E-06
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.02	2.2E-09	0.02	1.1E-07	7.3E+00	3.0E-01	2E-08	3.8E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	0.1	4.7E-06	NA	4.0E-01	NA	1.2E-05
86-73-7	Fluorene	2.1E-01	NC	NA	0.1	8.3E-07	NA	4.0E-01	NA	2.1E-06
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.02	6.4E-09	0.02	3.3E-07	7.3E-01	3.0E-01	5E-09	1.1E-06
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	0.1	5.3E-07	NA	4.0E-03	NA	1.3E-04
91-20-3	Naphthalene	1.6E-01	NC	NA	0.1	6.3E-07	NA	2.0E-01	NA	3.2E-06
85-01-8	Phenanthrene	1.3E+00	NC	NA	0.1	5.0E-06	NA	3.0E-01	NA	1.7E-05
129-00-0	Pyrene	1.2E+00	NC	NA	0.1	4.7E-06	NA	3.0E-01	NA	1.6E-05
C9-C10	GRO	1.5E+01	NC	NA	0.2	1.2E-04	NA	3.0E-01	NA	3.9E-04
1336-36-3	Total PCBs	4.5E-01	0.1	3.4E-08	0.1	1.8E-06	2.0E+00	5.0E-05	7E-08	3.5E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.4E-12	0.1	2.2E-10	1.5E+05	7.0E-10	7E-07	3.2E-01
7440-38-2	Arsenic	3.5E+00	0.03	8.1E-08	0.03	4.2E-06	1.5E+00	3.0E-04	1E-07	1.4E-02
7440-39-3	Barium	8.8E+01	NC	NA	0.1	3.5E-04	NA	7.0E-02	NA	5.0E-03
7440-41-7	Beryllium	1.9E-01	NC	NA	0.1	7.4E-07	NA	5.0E-03	NA	1.5E-04
7440-43-9	Cadmium	6.1E-01	NC	NA	0.01	2.4E-07	NA	5.0E-04	NA	4.8E-04
16065-83-1	Chromium III	1.3E+01	NC	NA	0.1	5.1E-05	NA	1.5E+00	NA	3.4E-05
7439-92-1	Lead	5.6E+02	NC	NA	0.006	1.3E-04	NA	7.5E-04	NA	1.8E-01
7439-97-6	Mercury	1.3E-01	NC	NA	0.1	5.1E-07	NA	3.0E-04	NA	1.7E-03
7440-02-0	Nickel	9.3E+00	NC	NA	0.2	7.4E-05	NA	2.0E-02	NA	3.7E-03
7440-22-4	Silver	1.5E+00	NC	NA	0.3	1.8E-05	NA	5.0E-03	NA	3.6E-03
7440-62-2	Vanadium	1.5E+01	NC	NA	0.1	6.0E-05	NA	9.0E-03	NA	6.6E-03
7440-66-6	Zinc	9.1E+01	NC	NA	0.1	3.6E-04	NA	3.0E-01	NA	1.2E-03

	Cancer Risk	Hazard Index
TOTAL:	9.4E-07	5.7E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 7
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-2 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	1.7E-08	8.6E-07	NA	2.0E+01	NA	4.3E-08
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	2.1E-08	1.1E-06	NA	2.8E+00	NA	3.8E-07
SVOCs								
83-32-9	Acenaphthene	1.6E-01	1.6E-08	8.0E-07	NA	5.0E+02	NA	1.6E-09
208-96-8	Acenaphthylene	1.5E-01	1.5E-08	7.4E-07	NA	5.0E+02	NA	1.5E-09
120-12-7	Anthracene	3.3E-01	3.3E-08	1.7E-06	NA	5.0E+02	NA	3.3E-09
56-55-3	Benzo(a)anthracene	6.1E-01	6.1E-08	3.1E-06	2.1E-04	5.0E+02	1E-11	6.1E-09
50-32-8	Benzo(a)pyrene	5.3E-01	5.4E-08	2.7E-06	2.1E-03	5.0E+02	1E-10	5.3E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	5.7E-08	2.9E-06	2.1E-04	5.0E+02	1E-11	5.7E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	3.7E-08	1.8E-06	NA	5.0E+02	NA	3.7E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	2.7E-08	1.4E-06	2.1E-05	5.0E+02	6E-13	2.7E-09
218-01-9	Chrysene	5.9E-01	6.0E-08	3.0E-06	2.1E-05	5.0E+02	1E-12	6.0E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	1.4E-08	7.2E-07	2.1E-03	5.0E+02	3E-11	1.4E-09
206-44-0	Fluoranthene	1.2E+00	1.2E-07	6.0E-06	NA	5.0E+02	NA	1.2E-08
86-73-7	Fluorene	2.1E-01	2.1E-08	1.1E-06	NA	5.0E+02	NA	2.1E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	4.2E-08	2.1E-06	2.1E-04	5.0E+02	9E-12	4.2E-09
91-57-6	2-Methylnaphthalene	1.3E-01	1.4E-08	6.8E-07	NA	5.0E+02	NA	1.4E-09
91-20-3	Naphthalene	1.6E-01	1.6E-08	8.0E-07	NA	3.0E+00	NA	2.7E-07
85-01-8	Phenanthrene	1.3E+00	1.3E-07	6.4E-06	NA	5.0E+02	NA	1.3E-08
129-00-0	Pyrene	1.2E+00	1.2E-07	6.0E-06	NA	5.0E+02	NA	1.2E-08
C9-C10	GRO	1.5E+01	1.5E-06	7.4E-05	NA	5.0E+02	NA	1.5E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	4.5E-01	4.5E-08	2.3E-06	1.0E-04	2.0E-02	5E-12	1.1E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	5.7E-12	2.9E-10	3.3E+01	2.0E-06	2E-10	1.4E-04
Metals								
7440-38-2	Arsenic	3.5E+00	3.5E-07	1.8E-05	3.0E-03	2.0E-02	1E-09	8.8E-04
7440-39-3	Barium	8.8E+01	8.9E-06	4.4E-04	NA	5.0E+00	NA	8.9E-05
7440-41-7	Beryllium	1.9E-01	1.9E-08	9.4E-07	2.4E-03	2.0E-02	5E-11	4.7E-05
7440-43-9	Cadmium	6.1E-01	6.1E-08	3.1E-06	1.8E-03	2.0E-02	1E-10	1.5E-04
16065-83-1	Chromium III	1.3E+01	1.3E-06	6.5E-05	NA	3.0E-01	NA	2.2E-04
7439-92-1	Lead	5.6E+02	5.7E-05	2.8E-03	NA	1.0E+00	NA	2.8E-03
7439-97-6	Mercury	1.3E-01	1.3E-08	6.4E-07	NA	3.0E-01	NA	2.1E-06
7440-02-0	Nickel	9.3E+00	9.5E-07	4.7E-05	4.8E-04	1.0E+00	5E-10	4.7E-05
7440-22-4	Silver	1.5E+00	1.5E-07	7.7E-06	NA	1.4E-01	NA	5.5E-05
7440-62-2	Vanadium	1.5E+01	1.5E-06	7.6E-05	NA	1.0E+00	NA	7.6E-05
7440-66-6	Zinc	9.1E+01	9.3E-06	4.6E-04	NA	1.4E+00	NA	3.3E-04

	Cancer Risk	Hazard Index
TOTAL:	2.0E-09	5.0E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 8
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-2 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.00E+00	7.37E-10	NA	9.0E-02	NA	8.2E-09
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.90E-01	9.01E-10	NA	8.0E-04	NA	1.1E-06
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.00E-01	2.05E-10	NA	2.0E-01	NA	1.0E-09
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.00E-01	1.89E-10	NA	3.0E-01	NA	6.3E-10
120-12-7	Anthracene	3.3E-01	NC	NA	3.00E-01	4.29E-10	NA	1.0E+00	NA	4.3E-10
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	1.58E-11	3.00E-01	7.88E-10	7.3E-01	3.0E-01	1E-11	2.6E-09
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	1.38E-11	3.00E-01	6.87E-10	7.3E+00	3.0E-01	1E-10	2.3E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	1.48E-11	3.00E-01	7.37E-10	7.3E-01	3.0E-01	1E-11	2.5E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.00E-01	4.70E-10	NA	3.0E-01	NA	1.6E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	6.96E-12	3.00E-01	3.47E-10	7.3E-02	3.0E-01	5E-13	1.2E-09
218-01-9	Chrysene	5.9E-01	3.0E-01	1.54E-11	3.00E-01	7.66E-10	7.3E-02	3.0E-01	1E-12	2.6E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	3.70E-12	3.00E-01	1.85E-10	7.3E+00	3.0E-01	3E-11	6.2E-10
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.00E-01	1.54E-09	NA	4.0E-01	NA	3.9E-09
86-73-7	Fluorene	2.1E-01	NC	NA	3.00E-01	2.71E-10	NA	4.0E-01	NA	6.8E-10
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	1.08E-11	3.00E-01	5.40E-10	7.3E-01	3.0E-01	8E-12	1.8E-09
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.00E-01	1.75E-10	NA	4.0E-03	NA	4.4E-08
91-20-3	Naphthalene	1.6E-01	NC	NA	3.00E-01	2.06E-10	NA	2.0E-01	NA	1.0E-09
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.00E-01	1.64E-09	NA	3.0E-01	NA	5.5E-09
129-00-0	Pyrene	1.2E+00	NC	NA	3.00E-01	1.53E-09	NA	3.0E-01	NA	5.1E-09
C9-C10	GRO	1.5E+01	NC	NA	1.00E+00	6.35E-08	NA	3.0E-01	NA	2.1E-07
1336-36-3	Total PCBs	4.5E-01	1.0E+00	3.87E-11	1.00E+00	1.93E-09	2.0E+00	5.0E-05	8E-11	3.9E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	4.91E-15	1.00E+00	2.45E-13	1.5E+05	7.0E-10	7E-10	3.5E-04
7440-38-2	Arsenic	3.5E+00	5.0E-01	1.52E-10	5.00E-01	7.59E-09	1.5E+00	3.0E-04	2E-10	2.5E-05
7440-39-3	Barium	8.8E+01	NC	NA	1.00E+00	3.80E-07	NA	7.0E-02	NA	5.4E-06
7440-41-7	Beryllium	1.9E-01	NC	NA	1.00E+00	8.06E-10	NA	5.0E-03	NA	1.6E-07
7440-43-9	Cadmium	6.1E-01	NC	NA	1.00E+00	2.62E-09	NA	5.0E-04	NA	5.2E-06
16065-83-1	Chromium III	1.3E+01	NC	NA	1.00E+00	5.56E-08	NA	1.5E+00	NA	3.7E-08
7439-92-1	Lead	5.6E+02	NC	NA	5.00E-01	1.22E-06	NA	7.5E-04	NA	1.6E-03
7439-97-6	Mercury	1.3E-01	NC	NA	5.00E-01	2.75E-10	NA	3.0E-04	NA	9.2E-07
7440-02-0	Nickel	9.3E+00	NC	NA	1.00E+00	4.04E-08	NA	2.0E-02	NA	2.0E-06
7440-22-4	Silver	1.5E+00	NC	NA	1.00E+00	6.59E-09	NA	5.0E-03	NA	1.3E-06
7440-62-2	Vanadium	1.5E+01	NC	NA	1.00E+00	6.50E-08	NA	9.0E-03	NA	7.2E-06
7440-66-6	Zinc	9.1E+01	NC	NA	1.00E+00	3.96E-07	NA	3.0E-01	NA	1.3E-06

	Cancer Risk	Hazard Index
TOTAL:	1.2E-09	2.1E-03

NA = Not Applicable

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 9
Day Care Child
Incidential Ingestion of Soil
New Bedford High School - HS-3 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	3.3E-09	1.0E+00	1.8E-07	5.5E-02	1.0E-02	2E-10	1.8E-05
108-88-3	Toluene	4.1E-02	NC	NA	1.0E+00	2.0E-07	NA	8.0E-01	NA	2.5E-07
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.0E+00	2.3E-07	NA	3.0E-01	NA	7.5E-07
SVOCs										
120-12-7	Anthracene	4.4E-01	NC	NA	3.0E-01	6.5E-07	NA	1.0E+00	NA	6.5E-07
56-55-3	Benzo(a)anthracene	7.3E-01	3.0E-01	2.0E-08	3.0E-01	1.1E-06	7.3E-01	3.0E-01	1E-08	3.6E-06
50-32-8	Benzo(a)pyrene	7.5E-01	3.0E-01	2.1E-08	3.0E-01	1.1E-06	7.3E+00	3.0E-01	1E-07	3.7E-06
205-99-2	Benzo(b)fluoranthene	8.2E-01	3.0E-01	2.2E-08	3.0E-01	1.2E-06	7.3E-01	3.0E-01	2E-08	4.0E-06
191-24-2	Benzo(g,h,i)perylene	4.7E-01	NC	NA	3.0E-01	7.0E-07	NA	3.0E-01	NA	2.3E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	7.3E-09	3.0E-01	3.9E-07	7.3E-02	3.0E-01	5E-10	1.3E-06
218-01-9	Chrysene	7.1E-01	3.0E-01	1.9E-08	3.0E-01	1.0E-06	7.3E-02	3.0E-01	1E-09	3.5E-06
53-70-3	Dibenz(a,h)anthracene	1.5E-01	3.0E-01	4.2E-09	3.0E-01	2.3E-07	7.3E+00	3.0E-01	3E-08	7.5E-07
206-44-0	Fluoranthene	1.6E+00	NC	NA	3.0E-01	2.4E-06	NA	4.0E-01	NA	6.0E-06
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	3.0E-01	1.6E-08	3.0E-01	8.7E-07	7.3E-01	3.0E-01	1E-08	2.9E-06
91-20-3	Naphthalene	7.3E-01	NC	NA	3.0E-01	1.1E-06	NA	2.0E-01	NA	5.3E-06
85-01-8	Phenanthrene	1.7E+00	NC	NA	3.0E-01	2.5E-06	NA	3.0E-01	NA	8.2E-06
129-00-0	Pyrene	1.5E+00	NC	NA	3.0E-01	2.2E-06	NA	3.0E-01	NA	7.3E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E-01	1.0E+00	1.6E-08	1.0E+00	8.8E-07	2.0E+00	5.0E-05	3E-08	1.8E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	5.1E-12	1.0E+00	2.8E-10	1.5E+05	7.0E-10	8E-07	4.0E-01
Metals										
7440-39-3	Barium	1.6E+02	NC	NA	1.0E+00	7.8E-04	NA	7.0E-02	NA	1.1E-02
7440-41-7	Beryllium	2.9E-01	NC	NA	1.0E+00	1.4E-06	NA	5.0E-03	NA	2.9E-04
7439-92-1	Lead	1.1E+03	NC	NA	5.0E-01	2.7E-03	NA	7.5E-04	NA	3.6E+00
7439-97-6	Mercury	1.5E-01	NC	NA	5.0E-01	3.7E-07	NA	3.0E-04	NA	1.2E-03
7440-02-0	Nickel	6.4E+00	NC	NA	1.0E+00	3.1E-05	NA	2.0E-02	NA	1.6E-03
7440-22-4	Silver	7.8E-01	NC	NA	1.0E+00	3.8E-06	NA	5.0E-03	NA	7.7E-04
7440-62-2	Vanadium	1.3E+01	NC	NA	1.0E+00	6.4E-05	NA	9.0E-03	NA	7.1E-03
7440-66-6	Zinc	1.3E+02	NC	NA	1.0E+00	6.2E-04	NA	3.0E-01	NA	2.1E-03

	Cancer Risk	Hazard Index
TOTAL:	1.0E-06	4.0E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 10
Day Care Child
Dermal Contact with Soil
New Bedford High School - HS-3 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
71-43-2	Benzene	3.6E-02	0.03	8.3E-10	0.03	4.3E-08	5.5E-02	1.0E-02	5E-11	4.3E-06
108-88-3	Toluene	4.1E-02	NC	NA	0.03	4.9E-08	NA	8.0E-01	NA	6.1E-08
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	0.2	3.7E-07	NA	3.0E-01	NA	1.2E-06
SVOCs										
120-12-7	Anthracene	4.4E-01	NC	NA	0.1	1.8E-06	NA	1.0E+00	NA	1.8E-06
56-55-3	Benzo(a)anthracene	7.3E-01	0.02	1.1E-08	0.02	5.8E-07	7.3E-01	3.0E-01	8E-09	1.9E-06
50-32-8	Benzo(a)pyrene	7.5E-01	0.02	1.2E-08	0.02	6.0E-07	7.3E+00	3.0E-01	8E-08	2.0E-06
205-99-2	Benzo(b)fluoranthene	8.2E-01	0.02	1.3E-08	0.02	6.5E-07	7.3E-01	3.0E-01	9E-09	2.2E-06
191-24-2	Benzo(g,h,i)perylene	4.7E-01	NC	NA	0.1	1.9E-06	NA	3.0E-01	NA	6.3E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.02	4.1E-09	0.02	2.1E-07	7.3E-02	3.0E-01	3E-10	7.1E-07
218-01-9	Chrysene	7.1E-01	0.02	1.1E-08	0.02	5.6E-07	7.3E-02	3.0E-01	8E-10	1.9E-06
53-70-3	Dibenz(a,h)anthracene	1.5E-01	0.02	2.4E-09	0.02	1.2E-07	7.3E+00	3.0E-01	2E-08	4.1E-07
206-44-0	Fluoranthene	1.6E+00	NC	NA	0.1	6.5E-06	NA	4.0E-01	NA	1.6E-05
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	0.02	9.2E-09	0.02	4.7E-07	7.3E-01	3.0E-01	7E-09	1.6E-06
91-20-3	Naphthalene	7.3E-01	NC	NA	0.1	2.9E-06	NA	2.0E-01	NA	1.4E-05
85-01-8	Phenanthrene	1.7E+00	NC	NA	0.1	6.7E-06	NA	3.0E-01	NA	2.2E-05
129-00-0	Pyrene	1.5E+00	NC	NA	0.1	5.9E-06	NA	3.0E-01	NA	2.0E-05
1336-36-3	Total PCBs	1.8E-01	0.1	1.4E-08	0.1	7.1E-07	2.0E+00	5.0E-05	3E-08	1.4E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.4E-12	0.1	2.2E-10	1.5E+05	7.0E-10	7E-07	3.2E-01
7440-39-3	Barium	1.6E+02	NC	NA	0.1	6.4E-04	NA	7.0E-02	NA	9.1E-03
7440-41-7	Beryllium	2.9E-01	NC	NA	0.1	1.2E-06	NA	5.0E-03	NA	2.3E-04
7439-92-1	Lead	1.1E+03	NC	NA	0.006	2.6E-04	NA	7.5E-04	NA	3.5E-01
7439-97-6	Mercury	1.5E-01	NC	NA	0.1	6.1E-07	NA	3.0E-04	NA	2.0E-03
7440-02-0	Nickel	6.4E+00	NC	NA	0.2	5.1E-05	NA	2.0E-02	NA	2.5E-03
7440-22-4	Silver	7.8E-01	NC	NA	0.3	9.4E-06	NA	5.0E-03	NA	1.9E-03
7440-62-2	Vanadium	1.3E+01	NC	NA	0.1	5.2E-05	NA	9.0E-03	NA	5.8E-03
7440-66-6	Zinc	1.3E+02	NC	NA	0.1	5.0E-04	NA	3.0E-01	NA	1.7E-03

	Cancer Risk	Hazard Index
TOTAL:	8.1E-07	7.1E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 11
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-3 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{Inh}$ Cancer (ug/m^3)	ADE_{Inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
71-43-2	Benzene	3.6E-02	3.6E-09	1.8E-07	7.8E-06	1.0E+01	3E-14	1.8E-08
108-88-3	Toluene	4.1E-02	4.2E-09	2.1E-07	NA	5.0E+03	NA	4.1E-11
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	4.7E-09	2.3E-07	NA	5.0E+02	NA	4.7E-10
SVOCs								
120-12-7	Anthracene	4.4E-01	4.5E-08	2.2E-06	NA	5.0E+02	NA	4.5E-09
56-55-3	Benzo(a)anthracene	7.3E-01	7.4E-08	3.7E-06	2.1E-04	5.0E+02	2E-11	7.4E-09
50-32-8	Benzo(a)pyrene	7.5E-01	7.6E-08	3.8E-06	2.1E-03	5.0E+02	2E-10	7.6E-09
205-99-2	Benzo(b)fluoranthene	8.2E-01	8.3E-08	4.2E-06	2.1E-04	5.0E+02	2E-11	8.3E-09
191-24-2	Benzo(g,h,i)perylene	4.7E-01	4.8E-08	2.4E-06	NA	5.0E+02	NA	4.8E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	2.7E-08	1.3E-06	2.1E-05	5.0E+02	6E-13	2.7E-09
218-01-9	Chrysene	7.1E-01	7.2E-08	3.6E-06	2.1E-05	5.0E+02	2E-12	7.1E-09
53-70-3	Dibenz(a,h)anthracene	1.5E-01	1.6E-08	7.8E-07	2.1E-03	5.0E+02	3E-11	1.6E-09
206-44-0	Fluoranthene	1.6E+00	1.7E-07	8.3E-06	NA	5.0E+02	NA	1.7E-08
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	6.0E-08	3.0E-06	2.1E-04	5.0E+02	1E-11	6.0E-09
91-20-3	Naphthalene	7.3E-01	7.4E-08	3.7E-06	NA	3.0E+00	NA	1.2E-06
85-01-8	Phenanthrene	1.7E+00	1.7E-07	8.5E-06	NA	5.0E+02	NA	1.7E-08
129-00-0	Pyrene	1.5E+00	1.5E-07	7.5E-06	NA	5.0E+02	NA	1.5E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.8E-01	1.8E-08	9.1E-07	1.0E-04	2.0E-02	2E-12	4.5E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	5.7E-12	2.9E-10	3.3E+01	2.0E-06	2E-10	1.4E-04
Metals								
7440-39-3	Barium	1.6E+02	1.6E-05	8.1E-04	NA	5.0E+00	NA	1.6E-04
7440-41-7	Beryllium	2.9E-01	3.0E-08	1.5E-06	2.4E-03	2.0E-02	7E-11	7.4E-05
7439-92-1	Lead	1.1E+03	1.1E-04	5.5E-03	NA	1.0E+00	NA	5.5E-03
7439-97-6	Mercury	1.5E-01	1.6E-08	7.7E-07	NA	3.0E-01	NA	2.6E-06
7440-02-0	Nickel	6.4E+00	6.5E-07	3.2E-05	4.8E-04	1.0E+00	3E-10	3.2E-05
7440-22-4	Silver	7.8E-01	8.0E-08	4.0E-06	NA	1.4E-01	NA	2.8E-05
7440-62-2	Vanadium	1.3E+01	1.3E-06	6.6E-05	NA	1.0E+00	NA	6.6E-05
7440-66-6	Zinc	1.3E+02	1.3E-05	6.4E-04	NA	1.4E+00	NA	4.6E-04

	Cancer Risk	Hazard Index
TOTAL:	8.1E-10	6.5E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 12
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-3 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	3.13E-12	1.00E+00	1.56E-10	5.5E-02	1.0E-02	2E-13	1.6E-08
108-88-3	Toluene	4.1E-02	NC	NA	1.00E+00	1.78E-10	NA	8.0E-01	NA	2.2E-10
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.00E+00	1.99E-10	NA	3.0E-01	NA	6.6E-10
SVOCs										
120-12-7	Anthracene	4.4E-01	NC	NA	3.00E-01	5.72E-10	NA	1.0E+00	NA	5.7E-10
56-55-3	Benzo(a)anthracene	7.3E-01	3.0E-01	1.91E-11	3.00E-01	9.50E-10	7.3E-01	3.0E-01	1E-11	3.2E-09
50-32-8	Benzo(a)pyrene	7.5E-01	3.0E-01	1.96E-11	3.00E-01	9.78E-10	7.3E+00	3.0E-01	1E-10	3.3E-09
205-99-2	Benzo(b)fluoranthene	8.2E-01	3.0E-01	2.15E-11	3.00E-01	1.07E-09	7.3E-01	3.0E-01	2E-11	3.6E-09
191-24-2	Benzo(g,h,i)perylene	4.7E-01	NC	NA	3.00E-01	6.16E-10	NA	3.0E-01	NA	2.1E-09
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	6.93E-12	3.00E-01	3.46E-10	7.3E-02	3.0E-01	5E-13	1.2E-09
218-01-9	Chrysene	7.1E-01	3.0E-01	1.84E-11	3.00E-01	9.18E-10	7.3E-02	3.0E-01	1E-12	3.1E-09
53-70-3	Dibenz(a,h)anthracene	1.5E-01	3.0E-01	4.01E-12	3.00E-01	2.00E-10	7.3E+00	3.0E-01	3E-11	6.7E-10
206-44-0	Fluoranthene	1.6E+00	NC	NA	3.00E-01	2.13E-09	NA	4.0E-01	NA	5.3E-09
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	3.0E-01	1.55E-11	3.00E-01	7.72E-10	7.3E-01	3.0E-01	1E-11	2.6E-09
91-20-3	Naphthalene	7.3E-01	NC	NA	3.00E-01	9.43E-10	NA	2.0E-01	NA	4.7E-09
85-01-8	Phenanthrene	1.7E+00	NC	NA	3.00E-01	2.19E-09	NA	3.0E-01	NA	7.3E-09
129-00-0	Pyrene	1.5E+00	NC	NA	3.00E-01	1.94E-09	NA	3.0E-01	NA	6.5E-09
1336-36-3	Total PCBs	1.8E-01	1.0E+00	1.56E-11	1.00E+00	7.77E-10	2.0E+00	5.0E-05	3E-11	1.6E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	4.91E-15	1.00E+00	2.45E-13	1.5E+05	7.0E-10	7E-10	3.5E-04
7440-39-3	Barium	1.6E+02	NC	NA	1.00E+00	6.95E-07	NA	7.0E-02	NA	9.9E-06
7440-41-7	Beryllium	2.9E-01	NC	NA	1.00E+00	1.27E-09	NA	5.0E-03	NA	2.5E-07
7439-92-1	Lead	1.1E+03	NC	NA	5.00E-01	2.37E-06	NA	7.5E-04	NA	3.2E-03
7439-97-6	Mercury	1.5E-01	NC	NA	5.00E-01	3.31E-10	NA	3.0E-04	NA	1.1E-06
7440-02-0	Nickel	6.4E+00	NC	NA	1.00E+00	2.76E-08	NA	2.0E-02	NA	1.4E-06
7440-22-4	Silver	7.8E-01	NC	NA	1.00E+00	3.40E-09	NA	5.0E-03	NA	6.8E-07
7440-62-2	Vanadium	1.3E+01	NC	NA	1.00E+00	5.68E-08	NA	9.0E-03	NA	6.3E-06
7440-66-6	Zinc	1.3E+02	NC	NA	1.00E+00	5.48E-07	NA	3.0E-01	NA	1.8E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	9.8E-10	3.5E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 13
Day Care Child
Incidential Ingestion of Soil
New Bedford High School - HS-4 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.0E+00	3.8E-07	NA	1.0E-05	NA	3.8E-02
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	6.9E-09	1.0E+00	3.7E-07	1.4E-02	2.0E-02	1E-10	1.9E-05
83-32-9	Acenaphthene	2.1E-01	NC	NA	3.0E-01	3.0E-07	NA	2.0E-01	NA	1.5E-06
208-96-8	Acenaphthylene	5.3E-01	NC	NA	3.0E-01	7.8E-07	NA	3.0E-01	NA	2.6E-06
120-12-7	Anthracene	5.7E-01	NC	NA	3.0E-01	8.4E-07	NA	1.0E+00	NA	8.4E-07
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	3.3E-08	3.0E-01	1.8E-06	7.3E-01	3.0E-01	2E-08	5.8E-06
50-32-8	Benzo(a)pyrene	1.4E+00	3.0E-01	3.8E-08	3.0E-01	2.0E-06	7.3E+00	3.0E-01	3E-07	6.7E-06
205-99-2	Benzo(b)fluoranthene	1.6E+00	3.0E-01	4.3E-08	3.0E-01	2.3E-06	7.3E-01	3.0E-01	3E-08	7.7E-06
191-24-2	Benzo(g,h,i)perylene	7.4E-01	NC	NA	3.0E-01	1.1E-06	NA	3.0E-01	NA	3.6E-06
207-08-9	Benzo(k)fluoranthene	5.6E-01	3.0E-01	1.5E-08	3.0E-01	8.2E-07	7.3E-02	3.0E-01	1E-09	2.7E-06
218-01-9	Chrysene	1.3E+00	3.0E-01	3.5E-08	3.0E-01	1.9E-06	7.3E-02	3.0E-01	3E-09	6.2E-06
53-70-3	Dibenz(a,h)anthracene	2.4E-01	3.0E-01	6.4E-09	3.0E-01	3.5E-07	7.3E+00	3.0E-01	5E-08	1.2E-06
206-44-0	Fluoranthene	2.9E+00	NC	NA	3.0E-01	4.2E-06	NA	4.0E-01	NA	1.1E-05
86-73-7	Fluorene	2.7E-01	NC	NA	3.0E-01	3.9E-07	NA	4.0E-01	NA	9.8E-07
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	3.0E-01	2.0E-08	3.0E-01	1.1E-06	7.3E-01	3.0E-01	1E-08	3.6E-06
91-20-3	Naphthalene	9.0E-01	NC	NA	3.0E-01	1.3E-06	NA	2.0E-01	NA	6.6E-06
85-01-8	Phenanthrene	2.6E+00	NC	NA	3.0E-01	3.8E-06	NA	3.0E-01	NA	1.3E-05
129-00-0	Pyrene	2.8E+00	NC	NA	3.0E-01	4.1E-06	NA	3.0E-01	NA	1.4E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E+00	1.0E+00	1.7E-07	1.0E+00	9.0E-06	2.0E+00	5.0E-05	3E-07	1.8E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	5.1E-12	1.0E+00	2.8E-10	1.5E+05	7.0E-10	8E-07	4.0E-01
Metals										
7440-36-0	Antimony	3.9E+00	NC	NA	1.0E+00	1.9E-05	NA	4.0E-04	NA	4.7E-02
7440-38-2	Arsenic	7.7E+00	5.0E-01	3.5E-07	5.0E-01	1.9E-05	1.5E+00	3.0E-04	5E-07	6.3E-02
7440-39-3	Barium	1.6E+02	NC	NA	1.0E+00	8.0E-04	NA	7.0E-02	NA	1.1E-02
7440-41-7	Beryllium	2.7E-01	NC	NA	1.0E+00	1.3E-06	NA	5.0E-03	NA	2.6E-04
7440-43-9	Cadmium	9.7E-01	NC	NA	1.0E+00	4.7E-06	NA	5.0E-04	NA	9.5E-03
16065-83-1	Chromium III	2.0E+01	NC	NA	1.0E+00	1.0E-04	NA	1.5E+00	NA	6.7E-05
7439-92-1	Lead	4.3E+02	NC	NA	5.0E-01	1.1E-03	NA	7.5E-04	NA	1.4E+00
7439-97-6	Mercury	1.4E-01	NC	NA	5.0E-01	3.5E-07	NA	3.0E-04	NA	1.2E-03
7440-02-0	Nickel	2.1E+01	NC	NA	1.0E+00	1.0E-04	NA	2.0E-02	NA	5.2E-03
7440-22-4	Silver	2.1E+00	NC	NA	1.0E+00	1.0E-05	NA	5.0E-03	NA	2.0E-03
7440-62-2	Vanadium	2.6E+01	NC	NA	1.0E+00	1.3E-04	NA	9.0E-03	NA	1.4E-02
7440-66-6	Zinc	2.4E+02	NC	NA	1.0E+00	1.2E-03	NA	3.0E-01	NA	4.0E-03

	Cancer Risk	Hazard Index
TOTAL:	2.0E-06	2.2E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 14
Day Care Child
Dermal Contact with Soil
New Bedford High School - HS-4 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	0.19	5.9E-07	NA	1.0E-05	NA	5.9E-02
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	0.1	5.9E-09	0.1	3.0E-07	1.4E-02	2.0E-02	8E-11	1.5E-05
83-32-9	Acenaphthene	2.1E-01	NC	NA	0.1	8.2E-07	NA	2.0E-01	NA	4.1E-06
208-96-8	Acenaphthylene	5.3E-01	NC	NA	0.1	2.1E-06	NA	3.0E-01	NA	7.0E-06
120-12-7	Anthracene	5.7E-01	NC	NA	0.1	2.3E-06	NA	1.0E+00	NA	2.3E-06
56-55-3	Benzo(a)anthracene	1.2E+00	0.02	1.8E-08	0.02	9.5E-07	7.3E-01	3.0E-01	1E-08	3.2E-06
50-32-8	Benzo(a)pyrene	1.4E+00	0.02	2.1E-08	0.02	1.1E-06	7.3E+00	3.0E-01	2E-07	3.6E-06
205-99-2	Benzo(b)fluoranthene	1.6E+00	0.02	2.4E-08	0.02	1.3E-06	7.3E-01	3.0E-01	2E-08	4.2E-06
191-24-2	Benzo(g,h,i)perylene	7.4E-01	NC	NA	0.1	3.0E-06	NA	3.0E-01	NA	9.9E-06
207-08-9	Benzo(k)fluoranthene	5.6E-01	0.02	8.6E-09	0.02	4.5E-07	7.3E-02	3.0E-01	6E-10	1.5E-06
218-01-9	Chrysene	1.3E+00	0.02	2.0E-08	0.02	1.0E-06	7.3E-02	3.0E-01	1E-09	3.4E-06
53-70-3	Dibenz(a,h)anthracene	2.4E-01	0.02	3.6E-09	0.02	1.9E-07	7.3E+00	3.0E-01	3E-08	6.2E-07
206-44-0	Fluoranthene	2.9E+00	NC	NA	0.1	1.1E-05	NA	4.0E-01	NA	2.9E-05
86-73-7	Fluorene	2.7E-01	NC	NA	0.1	1.1E-06	NA	4.0E-01	NA	2.7E-06
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	0.02	1.1E-08	0.02	5.8E-07	7.3E-01	3.0E-01	8E-09	1.9E-06
91-20-3	Naphthalene	9.0E-01	NC	NA	0.1	3.6E-06	NA	2.0E-01	NA	1.8E-05
85-01-8	Phenanthrene	2.6E+00	NC	NA	0.1	1.0E-05	NA	3.0E-01	NA	3.4E-05
129-00-0	Pyrene	2.8E+00	NC	NA	0.1	1.1E-05	NA	3.0E-01	NA	3.7E-05
1336-36-3	Total PCBs	1.8E+00	0.1	1.4E-07	0.1	7.3E-06	2.0E+00	5.0E-05	3E-07	1.5E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.4E-12	0.1	2.2E-10	1.5E+05	7.0E-10	7E-07	3.2E-01
7440-36-0	Antimony	3.9E+00	NC	NA	0.1	1.5E-05	NA	4.0E-04	NA	3.8E-02
7440-38-2	Arsenic	7.7E+00	0.03	1.8E-07	0.03	9.1E-06	1.5E+00	3.0E-04	3E-07	3.0E-02
7440-39-3	Barium	1.6E+02	NC	NA	0.1	6.5E-04	NA	7.0E-02	NA	9.3E-03
7440-41-7	Beryllium	2.7E-01	NC	NA	0.1	1.1E-06	NA	5.0E-03	NA	2.1E-04
7440-43-9	Cadmium	9.7E-01	NC	NA	0.01	3.8E-07	NA	5.0E-04	NA	7.7E-04
16065-83-1	Chromium III	2.0E+01	NC	NA	0.1	8.1E-05	NA	1.5E+00	NA	5.4E-05
7439-92-1	Lead	4.3E+02	NC	NA	0.006	1.0E-04	NA	7.5E-04	NA	1.4E-01
7439-97-6	Mercury	1.4E-01	NC	NA	0.1	5.7E-07	NA	3.0E-04	NA	1.9E-03
7440-02-0	Nickel	2.1E+01	NC	NA	0.2	1.7E-04	NA	2.0E-02	NA	8.4E-03
7440-22-4	Silver	2.1E+00	NC	NA	0.3	2.5E-05	NA	5.0E-03	NA	5.0E-03
7440-62-2	Vanadium	2.6E+01	NC	NA	0.1	1.0E-04	NA	9.0E-03	NA	1.2E-02
7440-66-6	Zinc	2.4E+02	NC	NA	0.1	9.7E-04	NA	3.0E-01	NA	3.2E-03

	Cancer Risk	Hazard Index
TOTAL:	1.4E-06	7.7E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 15
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-4 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
101-55-3	4-Bromodiphenyl ether	7.8E-02	7.9E-09	3.9E-07	NA	3.5E-02	NA	1.1E-05
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	7.7E-09	3.8E-07	1.3E-06	7.0E+00	1E-14	5.5E-08
83-32-9	Acenaphthene	2.1E-01	2.1E-08	1.0E-06	NA	5.0E+02	NA	2.1E-09
208-96-8	Acenaphthylene	5.3E-01	5.4E-08	2.7E-06	NA	5.0E+02	NA	5.4E-09
120-12-7	Anthracene	5.7E-01	5.8E-08	2.9E-06	NA	5.0E+02	NA	5.8E-09
56-55-3	Benzo(a)anthracene	1.2E+00	1.2E-07	6.0E-06	2.1E-04	5.0E+02	3E-11	1.2E-08
50-32-8	Benzo(a)pyrene	1.4E+00	1.4E-07	7.0E-06	2.1E-03	5.0E+02	3E-10	1.4E-08
205-99-2	Benzo(b)fluoranthene	1.6E+00	1.6E-07	8.0E-06	2.1E-04	5.0E+02	3E-11	1.6E-08
191-24-2	Benzo(g,h,i)perylene	7.4E-01	7.5E-08	3.8E-06	NA	5.0E+02	NA	7.5E-09
207-08-9	Benzo(k)fluoranthene	5.6E-01	5.7E-08	2.8E-06	2.1E-05	5.0E+02	1E-12	5.7E-09
218-01-9	Chrysene	1.3E+00	1.3E-07	6.4E-06	2.1E-05	5.0E+02	3E-12	1.3E-08
53-70-3	Dibenz(a,h)anthracene	2.4E-01	2.4E-08	1.2E-06	2.1E-03	5.0E+02	5E-11	2.4E-09
206-44-0	Fluoranthene	2.9E+00	2.9E-07	1.5E-05	NA	5.0E+02	NA	2.9E-08
86-73-7	Fluorene	2.7E-01	2.7E-08	1.3E-06	NA	5.0E+02	NA	2.7E-09
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	7.4E-08	3.7E-06	2.1E-04	5.0E+02	2E-11	7.3E-09
91-20-3	Naphthalene	9.0E-01	9.2E-08	4.6E-06	NA	3.0E+00	NA	1.5E-06
85-01-8	Phenanthrene	2.6E+00	2.6E-07	1.3E-05	NA	5.0E+02	NA	2.6E-08
129-00-0	Pyrene	2.8E+00	2.8E-07	1.4E-05	NA	5.0E+02	NA	2.8E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.8E+00	1.9E-07	9.3E-06	1.0E-04	2.0E-02	2E-11	4.7E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	5.7E-12	2.9E-10	3.3E+01	2.0E-06	2E-10	1.4E-04
Metals								
7440-36-0	Antimony	3.9E+00	3.9E-07	2.0E-05	NA	1.0E+01	NA	2.0E-06
7440-38-2	Arsenic	7.7E+00	7.8E-07	3.9E-05	3.0E-03	2.0E-02	2E-09	1.9E-03
7440-39-3	Barium	1.6E+02	1.7E-05	8.3E-04	NA	5.0E+00	NA	1.7E-04
7440-41-7	Beryllium	2.7E-01	2.7E-08	1.4E-06	2.4E-03	2.0E-02	7E-11	6.8E-05
7440-43-9	Cadmium	9.7E-01	9.8E-08	4.9E-06	1.8E-03	2.0E-02	2E-10	2.4E-04
16065-83-1	Chromium III	2.0E+01	2.1E-06	1.0E-04	NA	3.0E-01	NA	3.4E-04
7439-92-1	Lead	4.3E+02	4.4E-05	2.2E-03	NA	1.0E+00	NA	2.2E-03
7439-97-6	Mercury	1.4E-01	1.5E-08	7.3E-07	NA	3.0E-01	NA	2.4E-06
7440-02-0	Nickel	2.1E+01	2.1E-06	1.1E-04	4.8E-04	1.0E+00	1E-09	1.1E-04
7440-22-4	Silver	2.1E+00	2.1E-07	1.1E-05	NA	1.4E-01	NA	7.6E-05
7440-62-2	Vanadium	2.6E+01	2.7E-06	1.3E-04	NA	1.0E+00	NA	1.3E-04
7440-66-6	Zinc	2.4E+02	2.5E-05	1.2E-03	NA	1.4E+00	NA	8.8E-04

	Cancer Risk	Hazard Index
TOTAL:	4.2E-09	6.8E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 16
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-4 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.00E+00	3.38E-10	NA	1.0E-05	NA	3.4E-05
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	6.60E-12	1.00E+00	3.29E-10	1.4E-02	2.0E-02	9E-14	1.6E-08
83-32-9	Acenaphthene	2.1E-01	NC	NA	3.00E-01	2.67E-10	NA	2.0E-01	NA	1.3E-09
208-96-8	Acenaphthylene	5.3E-01	NC	NA	3.00E-01	6.91E-10	NA	3.0E-01	NA	2.3E-09
120-12-7	Anthracene	5.7E-01	NC	NA	3.00E-01	7.40E-10	NA	1.0E+00	NA	7.4E-10
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	3.11E-11	3.00E-01	1.55E-09	7.3E-01	3.0E-01	2E-11	5.2E-09
50-32-8	Benzo(a)pyrene	1.4E+00	3.0E-01	3.59E-11	3.00E-01	1.79E-09	7.3E+00	3.0E-01	3E-10	6.0E-09
205-99-2	Benzo(b)fluoranthene	1.6E+00	3.0E-01	4.11E-11	3.00E-01	2.05E-09	7.3E-01	3.0E-01	3E-11	6.8E-09
191-24-2	Benzo(g,h,i)perylene	7.4E-01	NC	NA	3.00E-01	9.67E-10	NA	3.0E-01	NA	3.2E-09
207-08-9	Benzo(k)fluoranthene	5.6E-01	3.0E-01	1.46E-11	3.00E-01	7.29E-10	7.3E-02	3.0E-01	1E-12	2.4E-09
218-01-9	Chrysene	1.3E+00	3.0E-01	3.31E-11	3.00E-01	1.65E-09	7.3E-02	3.0E-01	2E-12	5.5E-09
53-70-3	Dibenz(a,h)anthracene	2.4E-01	3.0E-01	6.14E-12	3.00E-01	3.06E-10	7.3E+00	3.0E-01	4E-11	1.0E-09
206-44-0	Fluoranthene	2.9E+00	NC	NA	3.00E-01	3.73E-09	NA	4.0E-01	NA	9.3E-09
86-73-7	Fluorene	2.7E-01	NC	NA	3.00E-01	3.47E-10	NA	4.0E-01	NA	8.7E-10
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	3.0E-01	1.89E-11	3.00E-01	9.45E-10	7.3E-01	3.0E-01	1E-11	3.1E-09
91-20-3	Naphthalene	9.0E-01	NC	NA	3.00E-01	1.17E-09	NA	2.0E-01	NA	5.9E-09
85-01-8	Phenanthrene	2.6E+00	NC	NA	3.00E-01	3.37E-09	NA	3.0E-01	NA	1.1E-08
129-00-0	Pyrene	2.8E+00	NC	NA	3.00E-01	3.61E-09	NA	3.0E-01	NA	1.2E-08
1336-36-3	Total PCBs	1.8E+00	1.0E+00	1.60E-10	1.00E+00	8.00E-09	2.0E+00	5.0E-05	3E-10	1.6E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	4.91E-15	1.00E+00	2.45E-13	1.5E+05	7.0E-10	7E-10	3.5E-04
7440-36-0	Antimony	3.9E+00	NC	NA	1.00E+00	1.67E-08	NA	4.0E-04	NA	4.2E-05
7440-38-2	Arsenic	7.7E+00	5.0E-01	3.33E-10	5.00E-01	1.66E-08	1.5E+00	3.0E-04	5E-10	5.5E-05
7440-39-3	Barium	1.6E+02	NC	NA	1.00E+00	7.12E-07	NA	7.0E-02	NA	1.0E-05
7440-41-7	Beryllium	2.7E-01	NC	NA	1.00E+00	1.16E-09	NA	5.0E-03	NA	2.3E-07
7440-43-9	Cadmium	9.7E-01	NC	NA	1.00E+00	4.19E-09	NA	5.0E-04	NA	8.4E-06
16065-83-1	Chromium III	2.0E+01	NC	NA	1.00E+00	8.85E-08	NA	1.5E+00	NA	5.9E-08
7439-92-1	Lead	4.3E+02	NC	NA	5.00E-01	9.37E-07	NA	7.5E-04	NA	1.2E-03
7439-97-6	Mercury	1.4E-01	NC	NA	5.00E-01	3.12E-10	NA	3.0E-04	NA	1.0E-06
7440-02-0	Nickel	2.1E+01	NC	NA	1.00E+00	9.18E-08	NA	2.0E-02	NA	4.6E-06
7440-22-4	Silver	2.1E+00	NC	NA	1.00E+00	9.07E-09	NA	5.0E-03	NA	1.8E-06
7440-62-2	Vanadium	2.6E+01	NC	NA	1.00E+00	1.13E-07	NA	9.0E-03	NA	1.3E-05
7440-66-6	Zinc	2.4E+02	NC	NA	1.00E+00	1.05E-06	NA	3.0E-01	NA	3.5E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.9E-09	1.9E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 17
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-5 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
132-64-9	Dibenzofuran	9.8E-01	NC	NA	9.6E-01	4.6E-06	NA	1.0E-03	NA	4.6E-03
83-32-9	Acenaphthene	8.5E-01	NC	NA	3.0E-01	1.2E-06	NA	2.0E-01	NA	6.2E-06
208-96-8	Acenaphthylene	1.5E+00	NC	NA	3.0E-01	2.3E-06	NA	3.0E-01	NA	7.5E-06
120-12-7	Anthracene	4.3E+00	NC	NA	3.0E-01	6.3E-06	NA	1.0E+00	NA	6.3E-06
56-55-3	Benzo(a)anthracene	1.7E+01	3.0E-01	4.6E-07	3.0E-01	2.5E-05	7.3E-01	3.0E-01	3E-07	8.3E-05
50-32-8	Benzo(a)pyrene	1.1E+01	3.0E-01	3.0E-07	3.0E-01	1.6E-05	7.3E+00	3.0E-01	2E-06	5.4E-05
205-99-2	Benzo(b)fluoranthene	1.3E+01	3.0E-01	3.5E-07	3.0E-01	1.9E-05	7.3E-01	3.0E-01	3E-07	6.4E-05
191-24-2	Benzo(g,h,i)perylene	4.1E+00	NC	NA	3.0E-01	6.0E-06	NA	3.0E-01	NA	2.0E-05
207-08-9	Benzo(k)fluoranthene	7.4E+00	3.0E-01	2.0E-07	3.0E-01	1.1E-05	7.3E-02	3.0E-01	1E-08	3.6E-05
218-01-9	Chrysene	7.2E+00	3.0E-01	2.0E-07	3.0E-01	1.1E-05	7.3E-02	3.0E-01	1E-08	3.5E-05
53-70-3	Dibenz(a,h)anthracene	9.4E+00	3.0E-01	2.6E-07	3.0E-01	1.4E-05	7.3E+00	3.0E-01	2E-06	4.6E-05
206-44-0	Fluoranthene	2.1E+01	NC	NA	3.0E-01	3.0E-05	NA	4.0E-01	NA	7.5E-05
86-73-7	Fluorene	2.0E+00	NC	NA	3.0E-01	3.0E-06	NA	4.0E-01	NA	7.5E-06
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	3.0E-01	1.1E-07	3.0E-01	5.8E-06	7.3E-01	3.0E-01	8E-08	1.9E-05
91-57-6	2-Methylnaphthalene	6.0E-01	NC	NA	3.0E-01	8.9E-07	NA	4.0E-03	NA	2.2E-04
85-01-8	Phenanthrene	1.7E+01	NC	NA	3.0E-01	2.4E-05	NA	3.0E-01	NA	8.1E-05
129-00-0	Pyrene	1.8E+01	NC	NA	3.0E-01	2.7E-05	NA	3.0E-01	NA	8.8E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	4.9E+00	1.0E+00	4.4E-07	1.0E+00	2.4E-05	2.0E+00	5.0E-05	9E-07	4.8E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	5.1E-12	1.0E+00	2.8E-10	1.5E+05	7.0E-10	8E-07	4.0E-01
Metals										
7440-38-2	Arsenic	1.5E+01	5.0E-01	6.6E-07	5.0E-01	3.6E-05	1.5E+00	3.0E-04	1E-06	1.2E-01
7440-39-3	Barium	2.1E+02	NC	NA	1.0E+00	1.0E-03	NA	7.0E-02	NA	1.5E-02
7440-43-9	Cadmium	1.7E+00	NC	NA	1.0E+00	8.1E-06	NA	5.0E-04	NA	1.6E-02
16065-83-1	Chromium III	2.1E+01	NC	NA	1.0E+00	1.0E-04	NA	1.5E+00	NA	7.0E-05
7439-92-1	Lead	1.8E+03	NC	NA	5.0E-01	4.4E-03	NA	7.5E-04	NA	5.9E+00
7439-97-6	Mercury	6.0E-01	NC	NA	5.0E-01	1.5E-06	NA	3.0E-04	NA	4.9E-03
7440-22-4	Silver	6.1E-01	NC	NA	1.0E+00	3.0E-06	NA	5.0E-03	NA	6.0E-04

	Cancer Risk	Hazard Index
TOTAL:	7.4E-06	6.9E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 18
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-5 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
132-64-9	Dibenzofuran	9.8E-01	NC	NA	0.18	7.0E-06	NA	1.0E-03	NA	7.0E-03
83-32-9	Acenaphthene	8.5E-01	NC	NA	0.1	3.4E-06	NA	2.0E-01	NA	1.7E-05
208-96-8	Acenaphthylene	1.5E+00	NC	NA	0.1	6.1E-06	NA	3.0E-01	NA	2.0E-05
120-12-7	Anthracene	4.3E+00	NC	NA	0.1	1.7E-05	NA	1.0E+00	NA	1.7E-05
56-55-3	Benzo(a)anthracene	1.7E+01	0.02	2.6E-07	0.02	1.4E-05	7.3E-01	3.0E-01	2E-07	4.5E-05
50-32-8	Benzo(a)pyrene	1.1E+01	0.02	1.7E-07	0.02	8.8E-06	7.3E+00	3.0E-01	1E-06	2.9E-05
205-99-2	Benzo(b)fluoranthene	1.3E+01	0.02	2.0E-07	0.02	1.0E-05	7.3E-01	3.0E-01	1E-07	3.4E-05
191-24-2	Benzo(g,h,i)perylene	4.1E+00	NC	NA	0.1	1.6E-05	NA	3.0E-01	NA	5.5E-05
207-08-9	Benzo(k)fluoranthene	7.4E+00	0.02	1.1E-07	0.02	5.9E-06	7.3E-02	3.0E-01	8E-09	2.0E-05
218-01-9	Chrysene	7.2E+00	0.02	1.1E-07	0.02	5.7E-06	7.3E-02	3.0E-01	8E-09	1.9E-05
53-70-3	Dibenz(a,h)anthracene	9.4E+00	0.02	1.4E-07	0.02	7.5E-06	7.3E+00	3.0E-01	1E-06	2.5E-05
206-44-0	Fluoranthene	2.1E+01	NC	NA	0.1	8.2E-05	NA	4.0E-01	NA	2.0E-04
86-73-7	Fluorene	2.0E+00	NC	NA	0.1	8.1E-06	NA	4.0E-01	NA	2.0E-05
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	0.02	6.1E-08	0.02	3.2E-06	7.3E-01	3.0E-01	4E-08	1.1E-05
91-57-6	2-Methylnaphthalene	6.0E-01	NC	NA	0.1	2.4E-06	NA	4.0E-03	NA	6.0E-04
85-01-8	Phenanthrene	1.7E+01	NC	NA	0.1	6.6E-05	NA	3.0E-01	NA	2.2E-04
129-00-0	Pyrene	1.8E+01	NC	NA	0.1	7.2E-05	NA	3.0E-01	NA	2.4E-04
1336-36-3	Total PCBs	4.9E+00	0.1	3.8E-07	0.1	1.9E-05	2.0E+00	5.0E-05	8E-07	3.9E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.4E-12	0.1	2.2E-10	1.5E+05	7.0E-10	7E-07	3.2E-01
7440-38-2	Arsenic	1.5E+01	0.03	3.4E-07	0.03	1.7E-05	1.5E+00	3.0E-04	5E-07	5.8E-02
7440-39-3	Barium	2.1E+02	NC	NA	0.1	8.3E-04	NA	7.0E-02	NA	1.2E-02
7440-43-9	Cadmium	1.7E+00	NC	NA	0.01	6.6E-07	NA	5.0E-04	NA	1.3E-03
16065-83-1	Chromium III	2.1E+01	NC	NA	0.1	8.5E-05	NA	1.5E+00	NA	5.7E-05
7439-92-1	Lead	1.8E+03	NC	NA	0.006	4.3E-04	NA	7.5E-04	NA	5.7E-01
7439-97-6	Mercury	6.0E-01	NC	NA	0.1	2.4E-06	NA	3.0E-04	NA	7.9E-03
7440-22-4	Silver	6.1E-01	NC	NA	0.3	7.3E-06	NA	5.0E-03	NA	1.5E-03

	Cancer Risk	Hazard Index
TOTAL:	4.6E-06	1.4E+00

NA = Not Applicable
NC = No Criteria

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 19
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-5 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
132-64-9	Dibenzofuran	9.8E-01	1.0E-07	5.0E-06	NA	3.5E+00	NA	1.4E-06
83-32-9	Acenaphthene	8.5E-01	8.6E-08	4.3E-06	NA	5.0E+02	NA	8.6E-09
208-96-8	Acenaphthylene	1.5E+00	1.6E-07	7.8E-06	NA	5.0E+02	NA	1.6E-08
120-12-7	Anthracene	4.3E+00	4.3E-07	2.2E-05	NA	5.0E+02	NA	4.3E-08
56-55-3	Benzo(a)anthracene	1.7E+01	1.7E-06	8.6E-05	2.1E-04	5.0E+02	4E-10	1.7E-07
50-32-8	Benzo(a)pyrene	1.1E+01	1.1E-06	5.6E-05	2.1E-03	5.0E+02	2E-09	1.1E-07
205-99-2	Benzo(b)fluoranthene	1.3E+01	1.3E-06	6.6E-05	2.1E-04	5.0E+02	3E-10	1.3E-07
191-24-2	Benzo(g,h,i)perylene	4.1E+00	4.2E-07	2.1E-05	NA	5.0E+02	NA	4.2E-08
207-08-9	Benzo(k)fluoranthene	7.4E+00	7.5E-07	3.7E-05	2.1E-05	5.0E+02	2E-11	7.5E-08
218-01-9	Chrysene	7.2E+00	7.3E-07	3.6E-05	2.1E-05	5.0E+02	2E-11	7.3E-08
53-70-3	Dibenz(a,h)anthracene	9.4E+00	9.5E-07	4.8E-05	2.1E-03	5.0E+02	2E-09	9.5E-08
206-44-0	Fluoranthene	2.1E+01	2.1E-06	1.0E-04	NA	5.0E+02	NA	2.1E-07
86-73-7	Fluorene	2.0E+00	2.1E-07	1.0E-05	NA	5.0E+02	NA	2.1E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	4.0E-07	2.0E-05	2.1E-04	5.0E+02	8E-11	4.0E-08
91-57-6	2-Methylnaphthalene	6.0E-01	6.1E-08	3.1E-06	NA	5.0E+02	NA	6.1E-09
85-01-8	Phenanthrene	1.7E+01	1.7E-06	8.4E-05	NA	5.0E+02	NA	1.7E-07
129-00-0	Pyrene	1.8E+01	1.8E-06	9.1E-05	NA	5.0E+02	NA	1.8E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	4.9E+00	4.9E-07	2.5E-05	1.0E-04	2.0E-02	5E-11	1.2E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	5.7E-12	2.9E-10	3.3E+01	2.0E-06	2E-10	1.4E-04
Metals								
7440-38-2	Arsenic	1.5E+01	1.5E-06	7.4E-05	3.0E-03	2.0E-02	4E-09	3.7E-03
7440-39-3	Barium	2.1E+02	2.1E-05	1.1E-03	NA	5.0E+00	NA	2.1E-04
7440-43-9	Cadmium	1.7E+00	1.7E-07	8.4E-06	1.8E-03	2.0E-02	3E-10	4.2E-04
16065-83-1	Chromium III	2.1E+01	2.2E-06	1.1E-04	NA	3.0E-01	NA	3.6E-04
7439-92-1	Lead	1.8E+03	1.8E-04	9.1E-03	NA	1.0E+00	NA	9.1E-03
7439-97-6	Mercury	6.0E-01	6.1E-08	3.0E-06	NA	3.0E-01	NA	1.0E-05
7440-22-4	Silver	6.1E-01	6.2E-08	3.1E-06	NA	1.4E-01	NA	2.2E-05

	Cancer Risk	Hazard Index
TOTAL:	1.0E-08	1.5E-02

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 20
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-5 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
132-64-9	Dibenzofuran	9.8E-01	NC	NA	9.60E-01	4.09E-09	NA	1.0E-03	NA	4.1E-06
83-32-9	Acenaphthene	8.5E-01	NC	NA	3.00E-01	1.10E-09	NA	2.0E-01	NA	5.5E-09
208-96-8	Acenaphthylene	1.5E+00	NC	NA	3.00E-01	2.00E-09	NA	3.0E-01	NA	6.7E-09
120-12-7	Anthracene	4.3E+00	NC	NA	3.00E-01	5.54E-09	NA	1.0E+00	NA	5.5E-09
56-55-3	Benzo(a)anthracene	1.7E+01	3.0E-01	4.43E-10	3.00E-01	2.21E-08	7.3E-01	3.0E-01	3E-10	7.4E-08
50-32-8	Benzo(a)pyrene	1.1E+01	3.0E-01	2.87E-10	3.00E-01	1.43E-08	7.3E+00	3.0E-01	2E-09	4.8E-08
205-99-2	Benzo(b)fluoranthene	1.3E+01	3.0E-01	3.39E-10	3.00E-01	1.69E-08	7.3E-01	3.0E-01	2E-10	5.6E-08
191-24-2	Benzo(g,h,i)perylene	4.1E+00	NC	NA	3.00E-01	5.36E-09	NA	3.0E-01	NA	1.8E-08
207-08-9	Benzo(k)fluoranthene	7.4E+00	3.0E-01	1.93E-10	3.00E-01	9.62E-09	7.3E-02	3.0E-01	1E-11	3.2E-08
218-01-9	Chrysene	7.2E+00	3.0E-01	1.87E-10	3.00E-01	9.33E-09	7.3E-02	3.0E-01	1E-11	3.1E-08
53-70-3	Dibenz(a,h)anthracene	9.4E+00	3.0E-01	2.45E-10	3.00E-01	1.22E-08	7.3E+00	3.0E-01	2E-09	4.1E-08
206-44-0	Fluoranthene	2.1E+01	NC	NA	3.00E-01	2.67E-08	NA	4.0E-01	NA	6.7E-08
86-73-7	Fluorene	2.0E+00	NC	NA	3.00E-01	2.65E-09	NA	4.0E-01	NA	6.6E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	3.0E-01	1.04E-10	3.00E-01	5.18E-09	7.3E-01	3.0E-01	8E-11	1.7E-08
91-57-6	2-Methylnaphthalene	6.0E-01	NC	NA	3.00E-01	7.86E-10	NA	4.0E-03	NA	2.0E-07
85-01-8	Phenanthrene	1.7E+01	NC	NA	3.00E-01	2.16E-08	NA	3.0E-01	NA	7.2E-08
129-00-0	Pyrene	1.8E+01	NC	NA	3.00E-01	2.35E-08	NA	3.0E-01	NA	7.8E-08
1336-36-3	Total PCBs	4.9E+00	1.0E+00	4.23E-10	1.00E+00	2.11E-08	2.0E+00	5.0E-05	8E-10	4.2E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	4.91E-15	1.00E+00	2.45E-13	1.5E+05	7.0E-10	7E-10	3.5E-04
7440-38-2	Arsenic	1.5E+01	5.0E-01	6.33E-10	5.00E-01	3.15E-08	1.5E+00	3.0E-04	9E-10	1.1E-04
7440-39-3	Barium	2.1E+02	NC	NA	1.00E+00	9.01E-07	NA	7.0E-02	NA	1.3E-05
7440-43-9	Cadmium	1.7E+00	NC	NA	1.00E+00	7.19E-09	NA	5.0E-04	NA	1.4E-05
16065-83-1	Chromium III	2.1E+01	NC	NA	1.00E+00	9.26E-08	NA	1.5E+00	NA	6.2E-08
7439-92-1	Lead	1.8E+03	NC	NA	5.00E-01	3.90E-06	NA	7.5E-04	NA	5.2E-03
7439-97-6	Mercury	6.0E-01	NC	NA	5.00E-01	1.30E-09	NA	3.0E-04	NA	4.3E-06
7440-22-4	Silver	6.1E-01	NC	NA	1.00E+00	2.65E-09	NA	5.0E-03	NA	5.3E-07

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	7.1E-09	6.1E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 21
Day Care Child
Incidential Ingestion of Soil
New Bedford High School - HS-6 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.5E-01	NC	NA	3.0E-01	2.2E-07	NA	2.0E-01	NA	1.1E-06
120-12-7	Anthracene	3.0E-01	NC	NA	3.0E-01	4.4E-07	NA	1.0E+00	NA	4.4E-07
56-55-3	Benzo(a)anthracene	5.2E-01	3.0E-01	1.4E-08	3.0E-01	7.6E-07	7.3E-01	3.0E-01	1E-08	2.5E-06
50-32-8	Benzo(a)pyrene	4.6E-01	3.0E-01	1.3E-08	3.0E-01	6.7E-07	7.3E+00	3.0E-01	9E-08	2.2E-06
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	1.5E-08	3.0E-01	8.3E-07	7.3E-01	3.0E-01	1E-08	2.8E-06
207-08-9	Benzo(k)fluoranthene	2.6E-01	3.0E-01	7.0E-09	3.0E-01	3.8E-07	7.3E-02	3.0E-01	5E-10	1.3E-06
218-01-9	Chrysene	5.3E-01	3.0E-01	1.4E-08	3.0E-01	7.7E-07	7.3E-02	3.0E-01	1E-09	2.6E-06
206-44-0	Fluoranthene	9.8E-01	NC	NA	3.0E-01	1.4E-06	NA	4.0E-01	NA	3.6E-06
91-20-3	Naphthalene	1.3E-01	NC	NA	3.0E-01	1.9E-07	NA	2.0E-01	NA	9.7E-07
85-01-8	Phenanthrene	9.7E-01	NC	NA	3.0E-01	1.4E-06	NA	3.0E-01	NA	4.7E-06
129-00-0	Pyrene	8.3E-01	NC	NA	3.0E-01	1.2E-06	NA	3.0E-01	NA	4.1E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	3.9E+00	1.0E+00	3.6E-07	1.0E+00	1.9E-05	2.0E+00	5.0E-05	7E-07	3.9E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	5.1E-12	1.0E+00	2.8E-10	1.5E+05	7.0E-10	8E-07	4.0E-01
Metals										
7440-39-3	Barium	3.7E+02	NC	NA	1.0E+00	1.8E-03	NA	7.0E-02	NA	2.6E-02
7440-41-7	Beryllium	1.9E-01	NC	NA	1.0E+00	9.2E-07	NA	5.0E-03	NA	1.8E-04
7440-43-9	Cadmium	5.1E-01	NC	NA	1.0E+00	2.5E-06	NA	5.0E-04	NA	5.0E-03
16065-83-1	Chromium III	9.1E+01	NC	NA	1.0E+00	4.5E-04	NA	1.5E+00	NA	3.0E-04
7439-92-1	Lead	1.4E+02	NC	NA	5.0E-01	3.3E-04	NA	7.5E-04	NA	4.4E-01
7439-97-6	Mercury	9.1E-02	NC	NA	5.0E-01	2.2E-07	NA	3.0E-04	NA	7.4E-04
7440-02-0	Nickel	9.6E+00	NC	NA	1.0E+00	4.7E-05	NA	2.0E-02	NA	2.4E-03
7440-62-2	Vanadium	3.6E+01	NC	NA	1.0E+00	1.8E-04	NA	9.0E-03	NA	2.0E-02
7440-66-6	Zinc	8.5E+01	NC	NA	1.0E+00	4.1E-04	NA	3.0E-01	NA	1.4E-03

	Cancer Risk	Hazard Index
TOTAL:	1.6E-06	1.3E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 22
Day Care Child
Dermal Contact with Soil
New Bedford High School - HS-6 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
83-32-9	Acenaphthene	1.5E-01	NC	NA	0.1	6.0E-07	NA	2.0E-01	NA	3.0E-06
120-12-7	Anthracene	3.0E-01	NC	NA	0.1	1.2E-06	NA	1.0E+00	NA	1.2E-06
56-55-3	Benzo(a)anthracene	5.2E-01	0.02	8.0E-09	0.02	4.1E-07	7.3E-01	3.0E-01	6E-09	1.4E-06
50-32-8	Benzo(a)pyrene	4.6E-01	0.02	7.1E-09	0.02	3.7E-07	7.3E+00	3.0E-01	5E-08	1.2E-06
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.02	8.8E-09	0.02	4.5E-07	7.3E-01	3.0E-01	6E-09	1.5E-06
207-08-9	Benzo(k)fluoranthene	2.6E-01	0.02	4.0E-09	0.02	2.0E-07	7.3E-02	3.0E-01	3E-10	6.8E-07
218-01-9	Chrysene	5.3E-01	0.02	8.1E-09	0.02	4.2E-07	7.3E-02	3.0E-01	6E-10	1.4E-06
206-44-0	Fluoranthene	9.8E-01	NC	NA	0.1	3.9E-06	NA	4.0E-01	NA	9.8E-06
91-20-3	Naphthalene	1.3E-01	NC	NA	0.1	5.3E-07	NA	2.0E-01	NA	2.6E-06
85-01-8	Phenanthrene	9.7E-01	NC	NA	0.1	3.8E-06	NA	3.0E-01	NA	1.3E-05
129-00-0	Pyrene	8.3E-01	NC	NA	0.1	3.3E-06	NA	3.0E-01	NA	1.1E-05
1336-36-3	Total PCBs	3.9E+00	0.1	3.0E-07	0.1	1.6E-05	2.0E+00	5.0E-05	6E-07	3.1E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.4E-12	0.1	2.2E-10	1.5E+05	7.0E-10	7E-07	3.2E-01
7440-39-3	Barium	3.7E+02	NC	NA	0.1	1.5E-03	NA	7.0E-02	NA	2.1E-02
7440-41-7	Beryllium	1.9E-01	NC	NA	0.1	7.5E-07	NA	5.0E-03	NA	1.5E-04
7440-43-9	Cadmium	5.1E-01	NC	NA	0.01	2.0E-07	NA	5.0E-04	NA	4.1E-04
16065-83-1	Chromium III	9.1E+01	NC	NA	0.1	3.6E-04	NA	1.5E+00	NA	2.4E-04
7439-92-1	Lead	1.4E+02	NC	NA	0.006	3.2E-05	NA	7.5E-04	NA	4.3E-02
7439-97-6	Mercury	9.1E-02	NC	NA	0.1	3.6E-07	NA	3.0E-04	NA	1.2E-03
7440-02-0	Nickel	9.6E+00	NC	NA	0.2	7.7E-05	NA	2.0E-02	NA	3.8E-03
7440-62-2	Vanadium	3.6E+01	NC	NA	0.1	1.4E-04	NA	9.0E-03	NA	1.6E-02
7440-66-6	Zinc	8.5E+01	NC	NA	0.1	3.4E-04	NA	3.0E-01	NA	1.1E-03

	Cancer Risk	Hazard Index
TOTAL:	1.3E-06	7.2E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 23
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-6 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
83-32-9	Acenaphthene	1.5E-01	1.5E-08	7.6E-07	NA	5.0E+02	NA	1.5E-09
120-12-7	Anthracene	3.0E-01	3.0E-08	1.5E-06	NA	5.0E+02	NA	3.0E-09
56-55-3	Benzo(a)anthracene	5.2E-01	5.3E-08	2.6E-06	2.1E-04	5.0E+02	1E-11	5.3E-09
50-32-8	Benzo(a)pyrene	4.6E-01	4.7E-08	2.3E-06	2.1E-03	5.0E+02	1E-10	4.6E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	5.8E-08	2.9E-06	2.1E-04	5.0E+02	1E-11	5.7E-09
207-08-9	Benzo(k)fluoranthene	2.6E-01	2.6E-08	1.3E-06	2.1E-05	5.0E+02	5E-13	2.6E-09
218-01-9	Chrysene	5.3E-01	5.3E-08	2.7E-06	2.1E-05	5.0E+02	1E-12	5.3E-09
206-44-0	Fluoranthene	9.8E-01	1.0E-07	5.0E-06	NA	5.0E+02	NA	9.9E-09
91-20-3	Naphthalene	1.3E-01	1.3E-08	6.7E-07	NA	3.0E+00	NA	2.2E-07
85-01-8	Phenanthrene	9.7E-01	9.8E-08	4.9E-06	NA	5.0E+02	NA	9.8E-09
129-00-0	Pyrene	8.3E-01	8.5E-08	4.2E-06	NA	5.0E+02	NA	8.4E-09
Dioxins/PCBs								
1336-36-3	Total PCBs	3.9E+00	4.0E-07	2.0E-05	1.0E-04	2.0E-02	4E-11	1.0E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	5.7E-12	2.9E-10	3.3E+01	2.0E-06	2E-10	1.4E-04
Metals								
7440-39-3	Barium	3.7E+02	3.7E-05	1.9E-03	NA	5.0E+00	NA	3.7E-04
7440-41-7	Beryllium	1.9E-01	1.9E-08	9.5E-07	2.4E-03	2.0E-02	5E-11	4.7E-05
7440-43-9	Cadmium	5.1E-01	5.2E-08	2.6E-06	1.8E-03	2.0E-02	9E-11	1.3E-04
16065-83-1	Chromium III	9.1E+01	9.3E-06	4.6E-04	NA	3.0E-01	NA	1.5E-03
7439-92-1	Lead	1.4E+02	1.4E-05	6.8E-04	NA	1.0E+00	NA	6.8E-04
7439-97-6	Mercury	9.1E-02	9.2E-09	4.6E-07	NA	3.0E-01	NA	1.5E-06
7440-02-0	Nickel	9.6E+00	9.8E-07	4.9E-05	4.8E-04	1.0E+00	5E-10	4.9E-05
7440-62-2	Vanadium	3.6E+01	3.6E-06	1.8E-04	NA	1.0E+00	NA	1.8E-04
7440-66-6	Zinc	8.5E+01	8.6E-06	4.3E-04	NA	1.4E+00	NA	3.1E-04

	Cancer Risk	Hazard Index
TOTAL:	9.6E-10	4.4E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 24
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-6 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.5E-01	NC	NA	3.00E-01	1.97E-10	NA	2.0E-01	NA	9.8E-10
120-12-7	Anthracene	3.0E-01	NC	NA	3.00E-01	3.86E-10	NA	1.0E+00	NA	3.9E-10
56-55-3	Benzo(a)anthracene	5.2E-01	3.0E-01	1.36E-11	3.00E-01	6.77E-10	7.3E-01	3.0E-01	1E-11	2.3E-09
50-32-8	Benzo(a)pyrene	4.6E-01	3.0E-01	1.20E-11	3.00E-01	5.97E-10	7.3E+00	3.0E-01	9E-11	2.0E-09
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	1.48E-11	3.00E-01	7.39E-10	7.3E-01	3.0E-01	1E-11	2.5E-09
207-08-9	Benzo(k)fluoranthene	2.6E-01	3.0E-01	6.70E-12	3.00E-01	3.34E-10	7.3E-02	3.0E-01	5E-13	1.1E-09
218-01-9	Chrysene	5.3E-01	3.0E-01	1.37E-11	3.00E-01	6.82E-10	7.3E-02	3.0E-01	1E-12	2.3E-09
206-44-0	Fluoranthene	9.8E-01	NC	NA	3.00E-01	1.28E-09	NA	4.0E-01	NA	3.2E-09
91-20-3	Naphthalene	1.3E-01	NC	NA	3.00E-01	1.72E-10	NA	2.0E-01	NA	8.6E-10
85-01-8	Phenanthrene	9.7E-01	NC	NA	3.00E-01	1.26E-09	NA	3.0E-01	NA	4.2E-09
129-00-0	Pyrene	8.3E-01	NC	NA	3.00E-01	1.08E-09	NA	3.0E-01	NA	3.6E-09
1336-36-3	Total PCBs	3.9E+00	1.0E+00	3.43E-10	1.00E+00	1.71E-08	2.0E+00	5.0E-05	7E-10	3.4E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	4.91E-15	1.00E+00	2.45E-13	1.5E+05	7.0E-10	7E-10	3.5E-04
7440-39-3	Barium	3.7E+02	NC	NA	1.00E+00	1.59E-06	NA	7.0E-02	NA	2.3E-05
7440-41-7	Beryllium	1.9E-01	NC	NA	1.00E+00	8.12E-10	NA	5.0E-03	NA	1.6E-07
7440-43-9	Cadmium	5.1E-01	NC	NA	1.00E+00	2.21E-09	NA	5.0E-04	NA	4.4E-06
16065-83-1	Chromium III	9.1E+01	NC	NA	1.00E+00	3.96E-07	NA	1.5E+00	NA	2.6E-07
7439-92-1	Lead	1.4E+02	NC	NA	5.00E-01	2.93E-07	NA	7.5E-04	NA	3.9E-04
7439-97-6	Mercury	9.1E-02	NC	NA	5.00E-01	1.97E-10	NA	3.0E-04	NA	6.6E-07
7440-02-0	Nickel	9.6E+00	NC	NA	1.00E+00	4.18E-08	NA	2.0E-02	NA	2.1E-06
7440-62-2	Vanadium	3.6E+01	NC	NA	1.00E+00	1.56E-07	NA	9.0E-03	NA	1.7E-05
7440-66-6	Zinc	8.5E+01	NC	NA	1.00E+00	3.67E-07	NA	3.0E-01	NA	1.2E-06

	Cancer Risk	Hazard Index
TOTAL:	1.5E-09	1.1E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 25
Day Care Child
Incidential Ingestion of Soil
New Bedford High School - HS-7 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.2E-01	1.0E+00	2.0E-08	1.0E+00	1.1E-06	2.0E+00	5.0E-05	4E-08	2.1E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	5.1E-12	1.0E+00	2.8E-10	1.5E+05	7.0E-10	8E-07	4.0E-01
Metals										
7440-39-3	Barium	9.0E+01	NC	NA	1.0E+00	4.4E-04	NA	7.0E-02	NA	6.3E-03
7440-41-7	Beryllium	4.0E-01	NC	NA	1.0E+00	2.0E-06	NA	5.0E-03	NA	3.9E-04
7440-43-9	Cadmium	1.0E+00	NC	NA	1.0E+00	4.9E-06	NA	5.0E-04	NA	9.9E-03
16065-83-1	Chromium III	1.6E+01	NC	NA	1.0E+00	7.8E-05	NA	1.5E+00	NA	5.2E-05
7439-92-1	Lead	3.2E+02	NC	NA	5.0E-01	7.8E-04	NA	7.5E-04	NA	1.0E+00
7440-02-0	Nickel	1.0E+01	NC	NA	1.0E+00	4.9E-05	NA	2.0E-02	NA	2.5E-03
7440-66-6	Zinc	1.4E+02	NC	NA	1.0E+00	6.8E-04	NA	3.0E-01	NA	2.3E-03

	Cancer Risk	Hazard Index
TOTAL:	8.1E-07	1.5E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 26
Day Care Child
Dermal Contact with Soil
New Bedford High School - HS-7 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
1336-36-3	Total PCBs	2.2E-01	0.1	1.7E-08	0.1	8.7E-07	2.0E+00	5.0E-05	3E-08	1.7E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.4E-12	0.1	2.2E-10	1.5E+05	7.0E-10	7E-07	3.2E-01
7440-39-3	Barium	9.0E+01	NC	NA	0.1	3.6E-04	NA	7.0E-02	NA	5.1E-03
7440-41-7	Beryllium	4.0E-01	NC	NA	0.1	1.6E-06	NA	5.0E-03	NA	3.2E-04
7440-43-9	Cadmium	1.0E+00	NC	NA	0.01	4.0E-07	NA	5.0E-04	NA	8.0E-04
16065-83-1	Chromium III	1.6E+01	NC	NA	0.1	6.3E-05	NA	1.5E+00	NA	4.2E-05
7439-92-1	Lead	3.2E+02	NC	NA	0.006	7.6E-05	NA	7.5E-04	NA	1.0E-01
7440-02-0	Nickel	1.0E+01	NC	NA	0.2	8.0E-05	NA	2.0E-02	NA	4.0E-03
7440-66-6	Zinc	1.4E+02	NC	NA	0.1	5.5E-04	NA	3.0E-01	NA	1.8E-03

	Cancer Risk	Hazard Index
TOTAL:	6.9E-07	4.5E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 27
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-7 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	2.2E-01	2.2E-08	1.1E-06	1.0E-04	2.0E-02	2E-12	5.5E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	5.7E-12	2.9E-10	3.3E+01	2.0E-06	2E-10	1.4E-04
Metals								
7440-39-3	Barium	9.0E+01	9.1E-06	4.5E-04	NA	5.0E+00	NA	9.1E-05
7440-41-7	Beryllium	4.0E-01	4.0E-08	2.0E-06	2.4E-03	2.0E-02	1E-10	1.0E-04
7440-43-9	Cadmium	1.0E+00	1.0E-07	5.1E-06	1.8E-03	2.0E-02	2E-10	2.6E-04
16065-83-1	Chromium III	1.6E+01	1.6E-06	8.0E-05	NA	3.0E-01	NA	2.7E-04
7439-92-1	Lead	3.2E+02	3.2E-05	1.6E-03	NA	1.0E+00	NA	1.6E-03
7440-02-0	Nickel	1.0E+01	1.0E-06	5.1E-05	4.8E-04	1.0E+00	5E-10	5.1E-05
7440-66-6	Zinc	1.4E+02	1.4E-05	7.0E-04	NA	1.4E+00	NA	5.0E-04

	Cancer Risk	Hazard Index
TOTAL:	9.6E-10	3.1E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 28
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-7 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
1336-36-3	Total PCBs	2.2E-01	1.0E+00	1.90E-11	1.00E+00	9.49E-10	2.0E+00	5.0E-05	4E-11	1.9E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	4.91E-15	1.00E+00	2.45E-13	1.5E+05	7.0E-10	7E-10	3.5E-04
7440-39-3	Barium	9.0E+01	NC	NA	1.00E+00	3.89E-07	NA	7.0E-02	NA	5.6E-06
7440-41-7	Beryllium	4.0E-01	NC	NA	1.00E+00	1.73E-09	NA	5.0E-03	NA	3.5E-07
7440-43-9	Cadmium	1.0E+00	NC	NA	1.00E+00	4.38E-09	NA	5.0E-04	NA	8.8E-06
16065-83-1	Chromium III	1.6E+01	NC	NA	1.00E+00	6.87E-08	NA	1.5E+00	NA	4.6E-08
7439-92-1	Lead	3.2E+02	NC	NA	5.00E-01	6.89E-07	NA	7.5E-04	NA	9.2E-04
7440-02-0	Nickel	1.0E+01	NC	NA	1.00E+00	4.38E-08	NA	2.0E-02	NA	2.2E-06
7440-66-6	Zinc	1.4E+02	NC	NA	1.00E+00	6.01E-07	NA	3.0E-01	NA	2.0E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	7.7E-10	1.3E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 29
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-9 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH/SVOCs										
C19-C36	C19-C36 Aliphatics	7.6E+01	NC	NA	1.0E+00	3.7E-04	NA	6.0E+00	NA	6.2E-05
C11-C22	C11-C22 Aromatics	3.1E+01	NC	NA	3.0E-01	4.5E-05	NA	3.0E-01	NA	1.5E-04
106-44-5	4-Methylphenol	7.4E-02	NC	NA	1.0E+00	3.6E-07	NA	5.0E-03	NA	7.2E-05
131-11-3	Dimethylphthalate	3.2E-01	NC	NA	1.0E+00	1.5E-06	NA	1.0E-01	NA	1.5E-05
84-74-2	di-n-Butylphthalate	3.5E-01	NC	NA	1.0E+00	1.7E-06	NA	1.0E-01	NA	1.7E-05
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	1.0E+00	1.8E-07	1.0E+00	9.6E-06	1.4E-02	2.0E-02	2E-09	4.8E-04
132-64-9	Dibenzofuran	4.5E-01	NC	NA	9.6E-01	2.1E-06	NA	1.0E-03	NA	2.1E-03
83-32-9	Acenaphthene	4.6E-01	NC	NA	3.0E-01	6.8E-07	NA	2.0E-01	NA	3.4E-06
208-96-8	Acenaphthylene	4.1E-01	NC	NA	3.0E-01	6.1E-07	NA	3.0E-01	NA	2.0E-06
120-12-7	Anthracene	1.2E+00	NC	NA	3.0E-01	1.8E-06	NA	1.0E+00	NA	1.8E-06
56-55-3	Benzo(a)anthracene	2.9E+00	3.0E-01	7.8E-08	3.0E-01	4.2E-06	7.3E-01	3.0E-01	6E-08	1.4E-05
50-32-8	Benzo(a)pyrene	5.6E+00	3.0E-01	1.5E-07	3.0E-01	8.2E-06	7.3E+00	3.0E-01	1E-06	2.7E-05
205-99-2	Benzo(b)fluoranthene	3.0E+00	3.0E-01	8.3E-08	3.0E-01	4.5E-06	7.3E-01	3.0E-01	6E-08	1.5E-05
191-24-2	Benzo(g,h,i)perylene	1.4E+00	NC	NA	3.0E-01	2.1E-06	NA	3.0E-01	NA	7.1E-06
207-08-9	Benzo(k)fluoranthene	1.4E+00	3.0E-01	3.9E-08	3.0E-01	2.1E-06	7.3E-02	3.0E-01	3E-09	6.9E-06
218-01-9	Chrysene	2.7E+00	3.0E-01	7.4E-08	3.0E-01	4.0E-06	7.3E-02	3.0E-01	5E-09	1.3E-05
53-70-3	Dibenz(a,h)anthracene	4.8E-01	3.0E-01	1.3E-08	3.0E-01	7.0E-07	7.3E+00	3.0E-01	1E-07	2.3E-06
206-44-0	Fluoranthene	5.7E+00	NC	NA	3.0E-01	8.4E-06	NA	4.0E-01	NA	2.1E-05
86-73-7	Fluorene	5.5E-01	NC	NA	3.0E-01	8.0E-07	NA	4.0E-01	NA	2.0E-06
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	3.0E-01	4.3E-08	3.0E-01	2.3E-06	7.3E-01	3.0E-01	3E-08	7.8E-06
91-57-6	2-Methylnaphthalene	3.0E-01	NC	NA	3.0E-01	4.3E-07	NA	4.0E-03	NA	1.1E-04
91-20-3	Naphthalene	4.0E+01	NC	NA	3.0E-01	5.9E-05	NA	2.0E-01	NA	2.9E-04
85-01-8	Phenanthrene	4.1E+00	NC	NA	3.0E-01	6.0E-06	NA	3.0E-01	NA	2.0E-05
129-00-0	Pyrene	5.7E+00	NC	NA	3.0E-01	8.3E-06	NA	3.0E-01	NA	2.8E-05
C9-C10	GRO	1.2E+01	NC	NA	1.0E+00	6.0E-05	NA	3.0E-01	NA	2.0E-04
Dioxins/PCBs										
1336-36-3	Total PCBs	3.2E+00	1.0E+00	2.9E-07	1.0E+00	1.6E-05	2.0E+00	5.0E-05	6E-07	3.1E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	5.1E-12	1.0E+00	2.8E-10	1.5E+05	7.0E-10	8E-07	4.0E-01
Metals										
7440-36-0	Antimony	2.3E+02	NC	NA	1.0E+00	1.1E-03	NA	4.0E-04	NA	2.8E+00
7440-38-2	Arsenic	2.0E+01	5.0E-01	9.0E-07	5.0E-01	4.8E-05	1.5E+00	3.0E-04	1E-06	1.6E-01
7440-39-3	Barium	1.4E+03	NC	NA	1.0E+00	7.0E-03	NA	7.0E-02	NA	1.0E-01
7440-41-7	Beryllium	4.3E-01	NC	NA	1.0E+00	2.1E-06	NA	5.0E-03	NA	4.2E-04
7440-43-9	Cadmium	3.7E+00	NC	NA	1.0E+00	1.8E-05	NA	5.0E-04	NA	3.7E-02
16065-83-1	Chromium III	7.2E+01	NC	NA	1.0E+00	3.5E-04	NA	1.5E+00	NA	2.3E-04
7439-92-1	Lead	1.8E+03	NC	NA	5.0E-01	4.5E-03	NA	7.5E-04	NA	6.0E+00
7439-97-6	Mercury	1.3E+00	NC	NA	5.0E-01	3.2E-06	NA	3.0E-04	NA	1.1E-02
7440-02-0	Nickel	1.6E+01	NC	NA	1.0E+00	7.8E-05	NA	2.0E-02	NA	3.9E-03
7782-49-2	Selenium	4.1E+00	NC	NA	1.0E+00	2.0E-05	NA	5.0E-03	NA	4.0E-03
7440-22-4	Silver	5.0E+00	NC	NA	1.0E+00	2.4E-05	NA	5.0E-03	NA	4.9E-03
7440-62-2	Vanadium	2.3E+01	NC	NA	1.0E+00	1.1E-04	NA	9.0E-03	NA	1.3E-02
7440-66-6	Zinc	5.2E+02	NC	NA	1.0E+00	2.6E-03	NA	3.0E-01	NA	8.5E-03

	Cancer Risk	Hazard Index
TOTAL:	4.1E-06	9.8E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 30
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-9 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
EPH/SVOCs										
C19-C36	C19-C36 Aliphatics	7.6E+01	NC	NA	0.2	6.0E-04	NA	6.0E+00	NA	1.0E-04
C11-C22	C11-C22 Aromatics	3.1E+01	NC	NA	0.1	1.2E-04	NA	3.0E-01	NA	4.1E-04
106-44-5	4-Methylphenol	7.4E-02	NC	NA	0.19	5.6E-07	NA	5.0E-03	NA	1.1E-04
131-11-3	Dimethylphthalate	3.2E-01	NC	NA	0.1	1.3E-06	NA	1.0E-01	NA	1.3E-05
84-74-2	di-n-Butylphthalate	3.5E-01	NC	NA	0.07	9.7E-07	NA	1.0E-01	NA	9.7E-06
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	0.1	1.5E-07	0.1	7.8E-06	1.4E-02	2.0E-02	2E-09	3.9E-04
132-64-9	Dibenzofuran	4.5E-01	NC	NA	0.18	3.2E-06	NA	1.0E-03	NA	3.2E-03
83-32-9	Acenaphthene	4.6E-01	NC	NA	0.1	1.8E-06	NA	2.0E-01	NA	9.2E-06
208-96-8	Acenaphthylene	4.1E-01	NC	NA	0.1	1.6E-06	NA	3.0E-01	NA	5.5E-06
120-12-7	Anthracene	1.2E+00	NC	NA	0.1	4.8E-06	NA	1.0E+00	NA	4.8E-06
56-55-3	Benzo(a)anthracene	2.9E+00	0.02	4.4E-08	0.02	2.3E-06	7.3E-01	3.0E-01	3E-08	7.6E-06
50-32-8	Benzo(a)pyrene	5.6E+00	0.02	8.6E-08	0.02	4.4E-06	7.3E+00	3.0E-01	6E-07	1.5E-05
205-99-2	Benzo(b)fluoranthene	3.0E+00	0.02	4.7E-08	0.02	2.4E-06	7.3E-01	3.0E-01	3E-08	8.1E-06
191-24-2	Benzo(g,h,i)perylene	1.4E+00	NC	NA	0.1	5.8E-06	NA	3.0E-01	NA	1.9E-05
207-08-9	Benzo(k)fluoranthene	1.4E+00	0.02	2.2E-08	0.02	1.1E-06	7.3E-02	3.0E-01	2E-09	3.8E-06
218-01-9	Chrysene	2.7E+00	0.02	4.2E-08	0.02	2.2E-06	7.3E-02	3.0E-01	3E-09	7.2E-06
53-70-3	Dibenz(a,h)anthracene	4.8E-01	0.02	7.4E-09	0.02	3.8E-07	7.3E+00	3.0E-01	5E-08	1.3E-06
206-44-0	Fluoranthene	5.7E+00	NC	NA	0.1	2.3E-05	NA	4.0E-01	NA	5.7E-05
86-73-7	Fluorene	5.5E-01	NC	NA	0.1	2.2E-06	NA	4.0E-01	NA	5.5E-06
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	0.02	2.4E-08	0.02	1.3E-06	7.3E-01	3.0E-01	2E-08	4.2E-06
91-57-6	2-Methylnaphthalene	3.0E-01	NC	NA	0.1	1.2E-06	NA	4.0E-03	NA	2.9E-04
91-20-3	Naphthalene	4.0E+01	NC	NA	0.1	1.6E-04	NA	2.0E-01	NA	8.0E-04
85-01-8	Phenanthrene	4.1E+00	NC	NA	0.1	1.6E-05	NA	3.0E-01	NA	5.5E-05
129-00-0	Pyrene	5.7E+00	NC	NA	0.1	2.3E-05	NA	3.0E-01	NA	7.5E-05
C9-C10	GRO	1.2E+01	NC	NA	0.2	9.8E-05	NA	3.0E-01	NA	3.3E-04
1336-36-3	Total PCBs	3.2E+00	0.1	2.5E-07	0.1	1.3E-05	2.0E+00	5.0E-05	5E-07	2.5E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.4E-12	0.1	2.2E-10	1.5E+05	7.0E-10	7E-07	3.2E-01
7440-36-0	Antimony	2.3E+02	NC	NA	0.1	9.0E-04	NA	4.0E-04	NA	2.2E+00
7440-38-2	Arsenic	2.0E+01	0.03	4.6E-07	0.03	2.4E-05	1.5E+00	3.0E-04	7E-07	7.9E-02
7440-39-3	Barium	1.4E+03	NC	NA	0.1	5.7E-03	NA	7.0E-02	NA	8.1E-02
7440-41-7	Beryllium	4.3E-01	NC	NA	0.1	1.7E-06	NA	5.0E-03	NA	3.4E-04
7440-43-9	Cadmium	3.7E+00	NC	NA	0.01	1.5E-06	NA	5.0E-04	NA	3.0E-03
16065-83-1	Chromium III	7.2E+01	NC	NA	0.1	2.9E-04	NA	1.5E+00	NA	1.9E-04
7439-92-1	Lead	1.8E+03	NC	NA	0.006	4.4E-04	NA	7.5E-04	NA	5.8E-01
7439-97-6	Mercury	1.3E+00	NC	NA	0.1	5.3E-06	NA	3.0E-04	NA	1.8E-02
7440-02-0	Nickel	1.6E+01	NC	NA	0.2	1.3E-04	NA	2.0E-02	NA	6.3E-03
7782-49-2	Selenium	4.1E+00	NC	NA	0.01	1.6E-06	NA	5.0E-03	NA	3.3E-04
7440-22-4	Silver	5.0E+00	NC	NA	0.3	6.0E-05	NA	5.0E-03	NA	1.2E-02
7440-62-2	Vanadium	2.3E+01	NC	NA	0.1	9.3E-05	NA	9.0E-03	NA	1.0E-02
7440-66-6	Zinc	5.2E+02	NC	NA	0.1	2.1E-03	NA	3.0E-01	NA	6.9E-03

	Cancer Risk	Hazard Index
TOTAL:	2.6E-06	3.6E+00

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 31
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-9 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH/SVOCs								
C19-C36	C19-C36 Aliphatics	7.6E+01	7.7E-06	3.8E-04	NA	NA	NA	NA
C11-C22	C11-C22 Aromatics	3.1E+01	3.1E-06	1.6E-04	NA	5.0E+02	NA	3.1E-07
106-44-5	4-Methylphenol	7.4E-02	7.5E-09	3.7E-07	NA	6.0E+02	NA	6.2E-10
131-11-3	Dimethylphthalate	3.2E-01	3.2E-08	1.6E-06	NA	4.0E+02	NA	4.0E-09
84-74-2	di-n-Butylphthalate	3.5E-01	3.5E-08	1.8E-06	NA	3.5E+02	NA	5.1E-09
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	2.0E-07	9.9E-06	1.3E-06	7.0E+00	3E-13	1.4E-06
132-64-9	Dibenzofuran	4.5E-01	4.5E-08	2.3E-06	NA	3.5E+00	NA	6.4E-07
83-32-9	Acenaphthene	4.6E-01	4.7E-08	2.3E-06	NA	5.0E+02	NA	4.7E-09
208-96-8	Acenaphthylene	4.1E-01	4.2E-08	2.1E-06	NA	5.0E+02	NA	4.2E-09
120-12-7	Anthracene	1.2E+00	1.2E-07	6.1E-06	NA	5.0E+02	NA	1.2E-08
56-55-3	Benzo(a)anthracene	2.9E+00	2.9E-07	1.4E-05	2.1E-04	5.0E+02	6E-11	2.9E-08
50-32-8	Benzo(a)pyrene	5.6E+00	5.6E-07	2.8E-05	2.1E-03	5.0E+02	1E-09	5.6E-08
205-99-2	Benzo(b)fluoranthene	3.0E+00	3.1E-07	1.5E-05	2.1E-04	5.0E+02	6E-11	3.1E-08
191-24-2	Benzo(g,h,i)perylene	1.4E+00	1.5E-07	7.3E-06	NA	5.0E+02	NA	1.5E-08
207-08-9	Benzo(k)fluoranthene	1.4E+00	1.4E-07	7.2E-06	2.1E-05	5.0E+02	3E-12	1.4E-08
218-01-9	Chrysene	2.7E+00	2.8E-07	1.4E-05	2.1E-05	5.0E+02	6E-12	2.8E-08
53-70-3	Dibenz(a,h)anthracene	4.8E-01	4.8E-08	2.4E-06	2.1E-03	5.0E+02	1E-10	4.8E-09
206-44-0	Fluoranthene	5.7E+00	5.8E-07	2.9E-05	NA	5.0E+02	NA	5.8E-08
86-73-7	Fluorene	5.5E-01	5.6E-08	2.8E-06	NA	5.0E+02	NA	5.5E-09
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	1.6E-07	8.0E-06	2.1E-04	5.0E+02	3E-11	1.6E-08
91-57-6	2-Methylnaphthalene	3.0E-01	3.0E-08	1.5E-06	NA	5.0E+02	NA	3.0E-09
91-20-3	Naphthalene	4.0E+01	4.1E-06	2.0E-04	NA	3.0E+00	NA	6.7E-05
85-01-8	Phenanthrene	4.1E+00	4.2E-07	2.1E-05	NA	5.0E+02	NA	4.2E-08
129-00-0	Pyrene	5.7E+00	5.7E-07	2.9E-05	NA	5.0E+02	NA	5.7E-08
C9-C10	GRO	1.2E+01	1.2E-06	6.2E-05	NA	5.0E+02	NA	1.2E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	3.2E+00	3.2E-07	1.6E-05	1.0E-04	2.0E-02	3E-11	8.1E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	5.7E-12	2.9E-10	3.3E+01	2.0E-06	2E-10	1.4E-04
Metals								
7440-36-0	Antimony	2.3E+02	2.3E-05	1.1E-03	NA	1.0E+01	NA	1.1E-04
7440-38-2	Arsenic	2.0E+01	2.0E-06	1.0E-04	3.0E-03	2.0E-02	6E-09	5.0E-03
7440-39-3	Barium	1.4E+03	1.4E-04	7.2E-03	NA	5.0E+00	NA	1.4E-03
7440-41-7	Beryllium	4.3E-01	4.4E-08	2.2E-06	2.4E-03	2.0E-02	1E-10	1.1E-04
7440-43-9	Cadmium	3.7E+00	3.8E-07	1.9E-05	1.8E-03	2.0E-02	7E-10	9.4E-04
16065-83-1	Chromium III	7.2E+01	7.3E-06	3.6E-04	NA	3.0E-01	NA	1.2E-03
7439-92-1	Lead	1.8E+03	1.9E-04	9.2E-03	NA	1.0E+00	NA	9.2E-03
7439-97-6	Mercury	1.3E+00	1.3E-07	6.7E-06	NA	3.0E-01	NA	2.2E-05
7440-02-0	Nickel	1.6E+01	1.6E-06	8.0E-05	4.8E-04	1.0E+00	8E-10	8.0E-05
7782-49-2	Selenium	4.1E+00	4.2E-07	2.1E-05	NA	3.0E+00	NA	6.9E-06
7440-22-4	Silver	5.0E+00	5.1E-07	2.5E-05	NA	1.4E-01	NA	1.8E-04
7440-62-2	Vanadium	2.3E+01	2.4E-06	1.2E-04	NA	1.0E+00	NA	1.2E-04
7440-66-6	Zinc	5.2E+02	5.3E-05	2.6E-03	NA	1.4E+00	NA	1.9E-03

	Cancer Risk	Hazard Index
TOTAL:	9.3E-09	2.1E-02

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 32
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-9 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH/SVOCs										
C19-C36	C19-C36 Aliphatics	7.6E+01	NC	NA	1.00E+00	3.29E-07	NA	6.0E+00	NA	5.5E-08
C11-C22	C11-C22 Aromatics	3.1E+01	NC	NA	3.00E-01	4.03E-08	NA	3.0E-01	NA	1.3E-07
106-44-5	4-Methylphenol	7.4E-02	NC	NA	1.00E+00	3.21E-10	NA	5.0E-03	NA	6.4E-08
131-11-3	Dimethylphthalate	3.2E-01	NC	NA	1.00E+00	1.37E-09	NA	1.0E-01	NA	1.4E-08
84-74-2	di-n-Butylphthalate	3.5E-01	NC	NA	1.00E+00	1.52E-09	NA	1.0E-01	NA	1.5E-08
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	1.0E+00	1.71E-10	1.00E+00	8.51E-09	1.4E-02	2.0E-02	2E-12	4.3E-07
132-64-9	Dibenzofuran	4.5E-01	NC	NA	9.60E-01	1.85E-09	NA	1.0E-03	NA	1.9E-06
83-32-9	Acenaphthene	4.6E-01	NC	NA	3.00E-01	6.01E-10	NA	2.0E-01	NA	3.0E-09
208-96-8	Acenaphthylene	4.1E-01	NC	NA	3.00E-01	5.37E-10	NA	3.0E-01	NA	1.8E-09
120-12-7	Anthracene	1.2E+00	NC	NA	3.00E-01	1.57E-09	NA	1.0E+00	NA	1.6E-09
56-55-3	Benzo(a)anthracene	2.9E+00	3.0E-01	7.43E-11	3.00E-01	3.71E-09	7.3E-01	3.0E-01	5E-11	1.2E-08
50-32-8	Benzo(a)pyrene	5.6E+00	3.0E-01	1.45E-10	3.00E-01	7.24E-09	7.3E+00	3.0E-01	1E-09	2.4E-08
205-99-2	Benzo(b)fluoranthene	3.0E+00	3.0E-01	7.92E-11	3.00E-01	3.95E-09	7.3E-01	3.0E-01	6E-11	1.3E-08
191-24-2	Benzo(g,h,i)perylene	1.4E+00	NC	NA	3.00E-01	1.88E-09	NA	3.0E-01	NA	6.3E-09
207-08-9	Benzo(k)fluoranthene	1.4E+00	3.0E-01	3.70E-11	3.00E-01	1.85E-09	7.3E-02	3.0E-01	3E-12	6.2E-09
218-01-9	Chrysene	2.7E+00	3.0E-01	7.12E-11	3.00E-01	3.55E-09	7.3E-02	3.0E-01	5E-12	1.2E-08
53-70-3	Dibenz(a,h)anthracene	4.8E-01	3.0E-01	1.25E-11	3.00E-01	6.21E-10	7.3E+00	3.0E-01	9E-11	2.1E-09
206-44-0	Fluoranthene	5.7E+00	NC	NA	3.00E-01	7.47E-09	NA	4.0E-01	NA	1.9E-08
86-73-7	Fluorene	5.5E-01	NC	NA	3.00E-01	7.13E-10	NA	4.0E-01	NA	1.8E-09
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	3.0E-01	4.14E-11	3.00E-01	2.06E-09	7.3E-01	3.0E-01	3E-11	6.9E-09
91-57-6	2-Methylnaphthalene	3.0E-01	NC	NA	3.00E-01	3.85E-10	NA	4.0E-03	NA	9.6E-08
91-20-3	Naphthalene	4.0E+01	NC	NA	3.00E-01	5.20E-08	NA	2.0E-01	NA	2.6E-07
85-01-8	Phenanthrene	4.1E+00	NC	NA	3.00E-01	5.35E-09	NA	3.0E-01	NA	1.8E-08
129-00-0	Pyrene	5.7E+00	NC	NA	3.00E-01	7.37E-09	NA	3.0E-01	NA	2.5E-08
C9-C10	GRO	1.2E+01	NC	NA	1.00E+00	5.33E-08	NA	3.0E-01	NA	1.8E-07
1336-36-3	Total PCBs	3.2E+00	1.0E+00	2.77E-10	1.00E+00	1.38E-08	2.0E+00	5.0E-05	6E-10	2.8E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	4.91E-15	1.00E+00	2.45E-13	1.5E+05	7.0E-10	7E-10	3.5E-04
7440-36-0	Antimony	2.3E+02	NC	NA	1.00E+00	9.79E-07	NA	4.0E-04	NA	2.4E-03
7440-38-2	Arsenic	2.0E+01	5.0E-01	8.60E-10	5.00E-01	4.29E-08	1.5E+00	3.0E-04	1E-09	1.4E-04
7440-39-3	Barium	1.4E+03	NC	NA	1.00E+00	6.18E-06	NA	7.0E-02	NA	8.8E-05
7440-41-7	Beryllium	4.3E-01	NC	NA	1.00E+00	1.86E-09	NA	5.0E-03	NA	3.7E-07
7440-43-9	Cadmium	3.7E+00	NC	NA	1.00E+00	1.62E-08	NA	5.0E-04	NA	3.2E-05
16065-83-1	Chromium III	7.2E+01	NC	NA	1.00E+00	3.11E-07	NA	1.5E+00	NA	2.1E-07
7439-92-1	Lead	1.8E+03	NC	NA	5.00E-01	3.96E-06	NA	7.5E-04	NA	5.3E-03
7439-97-6	Mercury	1.3E+00	NC	NA	5.00E-01	2.87E-09	NA	3.0E-04	NA	9.6E-06
7440-02-0	Nickel	1.6E+01	NC	NA	1.00E+00	6.87E-08	NA	2.0E-02	NA	3.4E-06
7782-49-2	Selenium	4.1E+00	NC	NA	1.00E+00	1.78E-08	NA	5.0E-03	NA	3.6E-06
7440-22-4	Silver	5.0E+00	NC	NA	1.00E+00	2.16E-08	NA	5.0E-03	NA	4.3E-06
7440-62-2	Vanadium	2.3E+01	NC	NA	1.00E+00	1.01E-07	NA	9.0E-03	NA	1.1E-05
7440-66-6	Zinc	5.2E+02	NC	NA	1.00E+00	2.27E-06	NA	3.0E-01	NA	7.6E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.9E-09	8.7E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 33
Day Care Child
Incidential Ingestion of Surface Soil
New Bedford High School - HS-10 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.0E+00	1.5E-06	NA	1.0E-01	NA	1.5E-05
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	1.3E-08	1.0E+00	6.8E-07	1.4E-02	2.0E-02	2E-10	3.4E-05
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.6E-01	6.6E-07	NA	1.0E-03	NA	6.6E-04
83-32-9	Acenaphthene	1.9E-01	NC	NA	3.0E-01	2.8E-07	NA	2.0E-01	NA	1.4E-06
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.0E-01	2.1E-07	NA	3.0E-01	NA	7.2E-07
120-12-7	Anthracene	4.4E-01	NC	NA	3.0E-01	6.4E-07	NA	1.0E+00	NA	6.4E-07
56-55-3	Benzo(a)anthracene	9.9E-01	3.0E-01	2.7E-08	3.0E-01	1.5E-06	7.3E-01	3.0E-01	2E-08	4.9E-06
50-32-8	Benzo(a)pyrene	8.0E-01	3.0E-01	2.2E-08	3.0E-01	1.2E-06	7.3E+00	3.0E-01	2E-07	3.9E-06
205-99-2	Benzo(b)fluoranthene	1.0E+00	3.0E-01	2.8E-08	3.0E-01	1.5E-06	7.3E-01	3.0E-01	2E-08	5.0E-06
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.0E-01	5.3E-07	NA	3.0E-01	NA	1.8E-06
207-08-9	Benzo(k)fluoranthene	3.8E-01	3.0E-01	1.0E-08	3.0E-01	5.6E-07	7.3E-02	3.0E-01	8E-10	1.9E-06
218-01-9	Chrysene	9.2E-01	3.0E-01	2.5E-08	3.0E-01	1.4E-06	7.3E-02	3.0E-01	2E-09	4.5E-06
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	3.9E-09	3.0E-01	2.1E-07	7.3E+00	3.0E-01	3E-08	7.1E-07
206-44-0	Fluoranthene	2.0E+00	NC	NA	3.0E-01	2.9E-06	NA	4.0E-01	NA	7.2E-06
86-73-7	Fluorene	2.1E-01	NC	NA	3.0E-01	3.1E-07	NA	4.0E-01	NA	7.9E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	1.1E-08	3.0E-01	6.1E-07	7.3E-01	3.0E-01	8E-09	2.0E-06
91-57-6	2-Methylnaphthalene	1.7E-01	NC	NA	3.0E-01	2.4E-07	NA	4.0E-03	NA	6.1E-05
91-20-3	Naphthalene	1.5E-01	NC	NA	3.0E-01	2.2E-07	NA	2.0E-01	NA	1.1E-06
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.0E-01	2.8E-06	NA	3.0E-01	NA	9.4E-06
129-00-0	Pyrene	2.2E+00	NC	NA	3.0E-01	3.3E-06	NA	3.0E-01	NA	1.1E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	1.4E+00	1.0E+00	1.3E-07	1.0E+00	6.8E-06	2.0E+00	5.0E-05	3E-07	1.4E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	5.1E-12	1.0E+00	2.8E-10	1.5E+05	7.0E-10	8E-07	4.0E-01
Metals										
7440-38-2	Arsenic	8.8E+00	5.0E-01	4.0E-07	5.0E-01	2.2E-05	1.5E+00	3.0E-04	6E-07	7.2E-02
7440-39-3	Barium	3.2E+02	NC	NA	1.0E+00	1.6E-03	NA	7.0E-02	NA	2.2E-02
7440-41-7	Beryllium	3.9E-01	NC	NA	1.0E+00	1.9E-06	NA	5.0E-03	NA	3.8E-04
7440-43-9	Cadmium	1.0E+00	NC	NA	1.0E+00	5.0E-06	NA	5.0E-04	NA	1.0E-02
16065-83-1	Chromium III	2.7E+01	NC	NA	1.0E+00	1.3E-04	NA	1.5E+00	NA	8.7E-05
7439-92-1	Lead	5.6E+02	NC	NA	5.0E-01	1.4E-03	NA	7.5E-04	NA	1.8E+00
7439-97-6	Mercury	1.2E-01	NC	NA	5.0E-01	3.0E-07	NA	3.0E-04	NA	1.0E-03
7440-02-0	Nickel	9.4E+00	NC	NA	1.0E+00	4.6E-05	NA	2.0E-02	NA	2.3E-03
7782-49-2	Selenium	5.7E+00	NC	NA	1.0E+00	2.8E-05	NA	5.0E-03	NA	5.6E-03
7440-22-4	Silver	7.4E-01	NC	NA	1.0E+00	3.6E-06	NA	5.0E-03	NA	7.2E-04
7440-62-2	Vanadium	1.8E+01	NC	NA	1.0E+00	8.9E-05	NA	9.0E-03	NA	9.9E-03
7440-66-6	Zinc	1.7E+02	NC	NA	1.0E+00	8.3E-04	NA	3.0E-01	NA	2.8E-03

	Cancer Risk	Hazard Index
TOTAL:	1.9E-06	2.5E+00

NA = Not Applicable
NC = No Criteria
Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC) =	1E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless)
Ingestion Rate (IR) =	100	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 34
Day Care Child
Dermal Contact with Surface Soil
New Bedford High School - HS-10 (0-15')
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Subchronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	0.07	8.5E-07	NA	1.0E-01	NA	8.5E-06
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	0.1	1.1E-08	0.1	5.6E-07	1.4E-02	2.0E-02	2E-10	2.8E-05
132-64-9	Dibenzofuran	1.4E-01	NC	NA	0.18	1.0E-06	NA	1.0E-03	NA	1.0E-03
83-32-9	Acenaphthene	1.9E-01	NC	NA	0.1	7.7E-07	NA	2.0E-01	NA	3.9E-06
208-96-8	Acenaphthylene	1.5E-01	NC	NA	0.1	5.8E-07	NA	3.0E-01	NA	1.9E-06
120-12-7	Anthracene	4.4E-01	NC	NA	0.1	1.7E-06	NA	1.0E+00	NA	1.7E-06
56-55-3	Benzo(a)anthracene	9.9E-01	0.02	1.5E-08	0.02	7.9E-07	7.3E-01	3.0E-01	1E-08	2.6E-06
50-32-8	Benzo(a)pyrene	8.0E-01	0.02	1.2E-08	0.02	6.4E-07	7.3E+00	3.0E-01	9E-08	2.1E-06
205-99-2	Benzo(b)fluoranthene	1.0E+00	0.02	1.6E-08	0.02	8.1E-07	7.3E-01	3.0E-01	1E-08	2.7E-06
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	0.1	1.4E-06	NA	3.0E-01	NA	4.8E-06
207-08-9	Benzo(k)fluoranthene	3.8E-01	0.02	5.8E-09	0.02	3.0E-07	7.3E-02	3.0E-01	4E-10	1.0E-06
218-01-9	Chrysene	9.2E-01	0.02	1.4E-08	0.02	7.3E-07	7.3E-02	3.0E-01	1E-09	2.4E-06
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.02	2.2E-09	0.02	1.1E-07	7.3E+00	3.0E-01	2E-08	3.8E-07
206-44-0	Fluoranthene	2.0E+00	NC	NA	0.1	7.8E-06	NA	4.0E-01	NA	2.0E-05
86-73-7	Fluorene	2.1E-01	NC	NA	0.1	8.5E-07	NA	4.0E-01	NA	2.1E-06
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.02	6.4E-09	0.02	3.3E-07	7.3E-01	3.0E-01	5E-09	1.1E-06
91-57-6	2-Methylnaphthalene	1.7E-01	NC	NA	0.1	6.6E-07	NA	4.0E-03	NA	1.7E-04
91-20-3	Naphthalene	1.5E-01	NC	NA	0.1	5.9E-07	NA	2.0E-01	NA	2.9E-06
85-01-8	Phenanthrene	1.9E+00	NC	NA	0.1	7.6E-06	NA	3.0E-01	NA	2.5E-05
129-00-0	Pyrene	2.2E+00	NC	NA	0.1	8.9E-06	NA	3.0E-01	NA	3.0E-05
1336-36-3	Total PCBs	1.4E+00	0.1	1.1E-07	0.1	5.5E-06	2.0E+00	5.0E-05	2E-07	1.1E-01
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	4.4E-12	0.1	2.2E-10	1.5E+05	7.0E-10	7E-07	3.2E-01
7440-38-2	Arsenic	8.8E+00	0.03	2.0E-07	0.03	1.1E-05	1.5E+00	3.0E-04	3E-07	3.5E-02
7440-39-3	Barium	3.2E+02	NC	NA	0.1	1.3E-03	NA	7.0E-02	NA	1.8E-02
7440-41-7	Beryllium	3.9E-01	NC	NA	0.1	1.5E-06	NA	5.0E-03	NA	3.1E-04
7440-43-9	Cadmium	1.0E+00	NC	NA	0.01	4.1E-07	NA	5.0E-04	NA	8.2E-04
16065-83-1	Chromium III	2.7E+01	NC	NA	0.1	1.1E-04	NA	1.5E+00	NA	7.1E-05
7439-92-1	Lead	5.6E+02	NC	NA	0.006	1.3E-04	NA	7.5E-04	NA	1.8E-01
7439-97-6	Mercury	1.2E-01	NC	NA	0.1	4.9E-07	NA	3.0E-04	NA	1.6E-03
7440-02-0	Nickel	9.4E+00	NC	NA	0.2	7.5E-05	NA	2.0E-02	NA	3.7E-03
7782-49-2	Selenium	5.7E+00	NC	NA	0.01	2.3E-06	NA	5.0E-03	NA	4.6E-04
7440-22-4	Silver	7.4E-01	NC	NA	0.3	8.8E-06	NA	5.0E-03	NA	1.8E-03
7440-62-2	Vanadium	1.8E+01	NC	NA	0.1	7.3E-05	NA	9.0E-03	NA	8.1E-03
7440-66-6	Zinc	1.7E+02	NC	NA	0.1	6.8E-04	NA	3.0E-01	NA	2.3E-03

	Cancer Risk	Hazard Index
TOTAL:	1.3E-06	6.8E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = No Criteria

Where:

LADDcancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC1 x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) - Noncancer =	2323	cm2/d [3] - (3-4 year old)
Skin Surface Area (SA) - Cancer =	2422	cm2/d [3] - (3-5 year old)
Soil Adherence Factor (SAF) =	0.35	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless)
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) - Noncancer =	0.714	event/day [2] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Period (EP) - Noncancer =	0.690	years [2] - 36 weeks/year
Exposure Period (EP) - Cancer =	2	years [2]
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [3]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [3]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	0.690	years [2]

[1] MassDEP, 2014; Park User Soil Short-form
[2] Site-specific information for on-site day care center
[3] MassDEP, 1995; Guidance for Disposal Site Risk Characterization

Table 35
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the Lungs
New Bedford High School - HS-10 (0-15')
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Subchronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
84-74-2	di-n-Butylphthalate	3.0E-01	3.1E-08	1.5E-06	NA	3.5E+02	NA	4.4E-09
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.4E-08	7.1E-07	1.3E-06	7.0E+00	2E-14	1.0E-07
132-64-9	Dibenzofuran	1.4E-01	1.4E-08	7.1E-07	NA	3.5E+00	NA	2.0E-07
83-32-9	Acenaphthene	1.9E-01	2.0E-08	9.8E-07	NA	5.0E+02	NA	2.0E-09
208-96-8	Acenaphthylene	1.5E-01	1.5E-08	7.4E-07	NA	5.0E+02	NA	1.5E-09
120-12-7	Anthracene	4.4E-01	4.4E-08	2.2E-06	NA	5.0E+02	NA	4.4E-09
56-55-3	Benzo(a)anthracene	9.9E-01	1.0E-07	5.0E-06	2.1E-04	5.0E+02	2E-11	1.0E-08
50-32-8	Benzo(a)pyrene	8.0E-01	8.1E-08	4.1E-06	2.1E-03	5.0E+02	2E-10	8.1E-09
205-99-2	Benzo(b)fluoranthene	1.0E+00	1.0E-07	5.1E-06	2.1E-04	5.0E+02	2E-11	1.0E-08
191-24-2	Benzo(g,h,i)perylene	3.6E-01	3.7E-08	1.8E-06	NA	5.0E+02	NA	3.7E-09
207-08-9	Benzo(k)fluoranthene	3.8E-01	3.8E-08	1.9E-06	2.1E-05	5.0E+02	8E-13	3.8E-09
218-01-9	Chrysene	9.2E-01	9.4E-08	4.7E-06	2.1E-05	5.0E+02	2E-12	9.3E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	1.5E-08	7.3E-07	2.1E-03	5.0E+02	3E-11	1.5E-09
206-44-0	Fluoranthene	2.0E+00	2.0E-07	9.9E-06	NA	5.0E+02	NA	2.0E-08
86-73-7	Fluorene	2.1E-01	2.2E-08	1.1E-06	NA	5.0E+02	NA	2.2E-09
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	4.2E-08	2.1E-06	2.1E-04	5.0E+02	9E-12	4.2E-09
91-57-6	2-Methylnaphthalene	1.7E-01	1.7E-08	8.4E-07	NA	5.0E+02	NA	1.7E-09
91-20-3	Naphthalene	1.5E-01	1.5E-08	7.5E-07	NA	3.0E+00	NA	2.5E-07
85-01-8	Phenanthrene	1.9E+00	1.9E-07	9.7E-06	NA	5.0E+02	NA	1.9E-08
129-00-0	Pyrene	2.2E+00	2.3E-07	1.1E-05	NA	5.0E+02	NA	2.3E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.4E+00	1.4E-07	7.0E-06	1.0E-04	2.0E-02	1E-11	3.5E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	5.7E-12	2.9E-10	3.3E+01	2.0E-06	2E-10	1.4E-04
Metals								
7440-38-2	Arsenic	8.8E+00	9.0E-07	4.5E-05	3.0E-03	2.0E-02	3E-09	2.2E-03
7440-39-3	Barium	3.2E+02	3.2E-05	1.6E-03	NA	5.0E+00	NA	3.2E-04
7440-41-7	Beryllium	3.9E-01	3.9E-08	2.0E-06	2.4E-03	2.0E-02	9E-11	9.8E-05
7440-43-9	Cadmium	1.0E+00	1.0E-07	5.2E-06	1.8E-03	2.0E-02	2E-10	2.6E-04
16065-83-1	Chromium III	2.7E+01	2.7E-06	1.4E-04	NA	3.0E-01	NA	4.5E-04
7439-92-1	Lead	5.6E+02	5.7E-05	2.8E-03	NA	1.0E+00	NA	2.8E-03
7439-97-6	Mercury	1.2E-01	1.3E-08	6.3E-07	NA	3.0E-01	NA	2.1E-06
7440-02-0	Nickel	9.4E+00	9.5E-07	4.8E-05	4.8E-04	1.0E+00	5E-10	4.8E-05
7782-49-2	Selenium	5.7E+00	5.8E-07	2.9E-05	NA	3.0E+00	NA	9.7E-06
7440-22-4	Silver	7.4E-01	7.5E-08	3.7E-06	NA	1.4E-01	NA	2.7E-05
7440-62-2	Vanadium	1.8E+01	1.9E-06	9.2E-05	NA	1.0E+00	NA	9.2E-05
7440-66-6	Zinc	1.7E+02	1.7E-05	8.6E-04	NA	1.4E+00	NA	6.1E-04

	Cancer Risk	Hazard Index
TOTAL:	3.9E-09	7.5E-03

NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [4]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Inhalation Rate assumed (IR assumed) =	20	m3/day [2] - for adjustment of toxicity value
Body Weight (BW assumed) =	70	kg [2] - for adjustment of toxicity value
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 36
Day Care Child
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
New Bedford High School - HS-10 (0-15')
New Bedford, Massachusetts

			Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Subchronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.00E+00	1.32E-09	NA	1.0E-01	NA	1.3E-08
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	1.22E-11	1.00E+00	6.07E-10	1.4E-02	2.0E-02	2E-13	3.0E-08
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.60E-01	5.86E-10	NA	1.0E-03	NA	5.9E-07
83-32-9	Acenaphthene	1.9E-01	NC	NA	3.00E-01	2.52E-10	NA	2.0E-01	NA	1.3E-09
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.00E-01	1.90E-10	NA	3.0E-01	NA	6.3E-10
120-12-7	Anthracene	4.4E-01	NC	NA	3.00E-01	5.67E-10	NA	1.0E+00	NA	5.7E-10
56-55-3	Benzo(a)anthracene	9.9E-01	3.0E-01	2.59E-11	3.00E-01	1.29E-09	7.3E-01	3.0E-01	2E-11	4.3E-09
50-32-8	Benzo(a)pyrene	8.0E-01	3.0E-01	2.09E-11	3.00E-01	1.04E-09	7.3E+00	3.0E-01	2E-10	3.5E-09
205-99-2	Benzo(b)fluoranthene	1.0E+00	3.0E-01	2.64E-11	3.00E-01	1.32E-09	7.3E-01	3.0E-01	2E-11	4.4E-09
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.00E-01	4.73E-10	NA	3.0E-01	NA	1.6E-09
207-08-9	Benzo(k)fluoranthene	3.8E-01	3.0E-01	9.88E-12	3.00E-01	4.93E-10	7.3E-02	3.0E-01	7E-13	1.6E-09
218-01-9	Chrysene	9.2E-01	3.0E-01	2.40E-11	3.00E-01	1.20E-09	7.3E-02	3.0E-01	2E-12	4.0E-09
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	3.76E-12	3.00E-01	1.88E-10	7.3E+00	3.0E-01	3E-11	6.3E-10
206-44-0	Fluoranthene	2.0E+00	NC	NA	3.00E-01	2.55E-09	NA	4.0E-01	NA	6.4E-09
86-73-7	Fluorene	2.1E-01	NC	NA	3.00E-01	2.79E-10	NA	4.0E-01	NA	7.0E-10
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	1.09E-11	3.00E-01	5.41E-10	7.3E-01	3.0E-01	8E-12	1.8E-09
91-57-6	2-Methylnaphthalene	1.7E-01	NC	NA	3.00E-01	2.16E-10	NA	4.0E-03	NA	5.4E-08
91-20-3	Naphthalene	1.5E-01	NC	NA	3.00E-01	1.92E-10	NA	2.0E-01	NA	9.6E-10
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.00E-01	2.49E-09	NA	3.0E-01	NA	8.3E-09
129-00-0	Pyrene	2.2E+00	NC	NA	3.00E-01	2.91E-09	NA	3.0E-01	NA	9.7E-09
1336-36-3	Total PCBs	1.4E+00	1.0E+00	1.21E-10	1.00E+00	6.03E-09	2.0E+00	5.0E-05	2E-10	1.2E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	4.91E-15	1.00E+00	2.45E-13	1.5E+05	7.0E-10	7E-10	3.5E-04
7440-38-2	Arsenic	8.8E+00	5.0E-01	3.84E-10	5.00E-01	1.91E-08	1.5E+00	3.0E-04	6E-10	6.4E-05
7440-39-3	Barium	3.2E+02	NC	NA	1.00E+00	1.39E-06	NA	7.0E-02	NA	2.0E-05
7440-41-7	Beryllium	3.9E-01	NC	NA	1.00E+00	1.68E-09	NA	5.0E-03	NA	3.4E-07
7440-43-9	Cadmium	1.0E+00	NC	NA	1.00E+00	4.47E-09	NA	5.0E-04	NA	8.9E-06
16065-83-1	Chromium III	2.7E+01	NC	NA	1.00E+00	1.16E-07	NA	1.5E+00	NA	7.7E-08
7439-92-1	Lead	5.6E+02	NC	NA	5.00E-01	1.21E-06	NA	7.5E-04	NA	1.6E-03
7439-97-6	Mercury	1.2E-01	NC	NA	5.00E-01	2.68E-10	NA	3.0E-04	NA	8.9E-07
7440-02-0	Nickel	9.4E+00	NC	NA	1.00E+00	4.08E-08	NA	2.0E-02	NA	2.0E-06
7782-49-2	Selenium	5.7E+00	NC	NA	1.00E+00	2.48E-08	NA	5.0E-03	NA	5.0E-06
7440-22-4	Silver	7.4E-01	NC	NA	1.00E+00	3.20E-09	NA	5.0E-03	NA	6.4E-07
7440-62-2	Vanadium	1.8E+01	NC	NA	1.00E+00	7.92E-08	NA	9.0E-03	NA	8.8E-06
7440-66-6	Zinc	1.7E+02	NC	NA	1.00E+00	7.37E-07	NA	3.0E-01	NA	2.5E-06

NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.8E-09	2.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) - Noncancer (1-2 year old) =	16.40	l/min [4] - heavy exertion; 3-4 year old
Inhalation Rate (IR) - Cancer (1-6 year old) =	17.70	l/min [4] - heavy exertion; 3-5 year old
Exposure Frequency (EF) - Noncancer =	0.714	event/day [5] - 5 days/week
Exposure Frequency (EF) - Cancer =	0.493	event/day [2] - 5 days/week for 36 weeks
Exposure Duration (ED) =	1	hours/event [3]
Exposure Period (EP) - Noncancer =	252	days [5] - 36 weeks
Exposure Period (EP) - Cancer =	730	days [5] - 2 years
Body Weight (BW) - Noncancer =	14.6	kg (3-4 year old) [4]
Body Weight (BW) - Cancer =	15.5	kg (3-5 year old) [4]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	252	days [5] - 36 weeks
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MassDEP, 2014; Park User Soil Short-form
[2] MassDEP, 2008; Characterization of Risk Due to Inhalation of Particulats by Construction Workers
[3] Professional Judgment
[4] MassDEP, 1995; Guidance for Disposal Site Risk Characterization
[5] Site-specific information for on-site day care center

Table 1
Adult Staff - 0-15'
Incidential Ingestion of Soil
HS-1 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	1	7.6E-10	1	2.0E-09	2.0E+00	2.0E-05	2E-09	9.9E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1	7.3E-12	1	1.9E-11	1.5E+05	7.0E-10	1E-06	2.7E-02

	Cancer Risk	Hazard Index
TOTAL:	1.1E-06	2.7E-02

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 2
Adult Staff - 0-15'
Dermal Contact with Soil
HS-1 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	0.1	1.6E-10	0.1	4.1E-10	2.0E+00	2.0E-05	3E-10	2.1E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	1.5E-12	0.1	4.0E-12	1.5E+05	7.0E-10	2E-07	5.7E-03

	Cancer Risk	Hazard Index
TOTAL:	2.3E-07	5.7E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 3
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-1 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	5.9E-03	6.6E-09	1.7E-08	1.0E-04	2.0E-02	7E-13	8.6E-07
1746-01-6	Dioxin/PCB TEQ	5.7E-05	6.3E-11	1.6E-10	3.3E+01	2.0E-06	2E-09	8.2E-05

	Cancer Risk	Hazard Index
TOTAL:	2.1E-09	8.3E-05

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NC = Not carcinogenic
NA = Not Applicable

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 4
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-1 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	5.9E-03	1.0E+00	1.98E-11	1.00E+00	5.13E-11	2.0E+00	2.0E-05	4E-11	2.6E-06
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.90E-13	1.00E+00	4.93E-13	1.5E+05	7.0E-10	3E-08	7.0E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.9E-08	7.1E-04

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 5
Adult Staff - 0-15'
Incidential Ingestion of Soil
HS-2 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1	5.7E-08	NA	1.0E-02	NA	5.7E-06
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	0.99	7.0E-08	NA	8.0E-04	NA	8.7E-05
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	0.3	1.6E-08	NA	6.0E-02	NA	2.6E-07
208-96-8	Acenaphthylene	1.5E-01	NC	NA	0.3	1.5E-08	NA	3.0E-02	NA	4.9E-07
120-12-7	Anthracene	3.3E-01	NC	NA	0.3	3.3E-08	NA	3.0E-01	NA	1.1E-07
56-55-3	Benzo(a)anthracene	6.1E-01	0.3	2.4E-08	0.3	6.1E-08	7.3E-01	3.0E-02	2E-08	2.0E-06
50-32-8	Benzo(a)pyrene	5.3E-01	0.3	2.1E-08	0.3	5.3E-08	7.3E+00	3.0E-02	2E-07	1.8E-06
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.3	2.2E-08	0.3	5.7E-08	7.3E-01	3.0E-02	2E-08	1.9E-06
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	0.3	3.7E-08	NA	3.0E-02	NA	1.2E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.3	1.0E-08	0.3	2.7E-08	7.3E-02	3.0E-02	8E-10	9.0E-07
218-01-9	Chrysene	5.9E-01	0.3	2.3E-08	0.3	5.9E-08	7.3E-02	3.0E-02	2E-09	2.0E-06
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.3	5.5E-09	0.3	1.4E-08	7.3E+00	3.0E-02	4E-08	4.8E-07
206-44-0	Fluoranthene	1.2E+00	NC	NA	0.3	1.2E-07	NA	4.0E-02	NA	3.0E-06
86-73-7	Fluorene	2.1E-01	NC	NA	0.3	2.1E-08	NA	4.0E-02	NA	5.3E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.3	1.6E-08	0.3	4.2E-08	7.3E-01	3.0E-02	1E-08	1.4E-06
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	0.3	1.4E-08	NA	4.0E-03	NA	3.4E-06
91-20-3	Naphthalene	1.6E-01	NC	NA	0.3	1.6E-08	NA	2.0E-02	NA	8.0E-07
85-01-8	Phenanthrene	1.3E+00	NC	NA	0.3	1.3E-07	NA	3.0E-02	NA	4.2E-06
129-00-0	Pyrene	1.2E+00	NC	NA	0.3	1.2E-07	NA	3.0E-02	NA	4.0E-06
C9-C10	GRO	1.5E+01	NC	NA	1	4.9E-06	NA	3.0E-02	NA	1.6E-04
Dioxins/PCBs										
1336-36-3	Total PCBs	4.5E-01	1	5.8E-08	1	1.5E-07	2.0E+00	2.0E-05	1E-07	7.5E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1	7.3E-12	1	1.9E-11	1.5E+05	7.0E-10	1E-06	2.7E-02
Metals										
7440-38-2	Arsenic	3.5E+00	0.5	2.3E-07	0.5	5.9E-07	1.5E+00	3.0E-04	3E-07	2.0E-03
7440-39-3	Barium	8.8E+01	NC	NA	1	2.9E-05	NA	2.0E-01	NA	1.5E-04
7440-41-7	Beryllium	1.9E-01	NC	NA	1	6.3E-08	NA	2.0E-03	NA	3.1E-05
7440-43-9	Cadmium	6.1E-01	NC	NA	1	2.0E-07	NA	5.0E-04	NA	4.1E-04
16065-83-1	Chromium III	1.3E+01	NC	NA	1	4.3E-06	NA	1.5E+00	NA	2.9E-06
7439-92-1	Lead	5.6E+02	NC	NA	0.5	9.5E-05	NA	7.5E-04	NA	1.3E-01
7439-97-6	Mercury	1.3E-01	NC	NA	0.5	2.1E-08	NA	3.0E-04	NA	7.1E-05
7440-02-0	Nickel	9.3E+00	NC	NA	1	3.1E-06	NA	2.0E-02	NA	1.6E-04
7440-22-4	Silver	1.5E+00	NC	NA	1	5.1E-07	NA	5.0E-03	NA	1.0E-04
7440-62-2	Vanadium	1.5E+01	NC	NA	1	5.0E-06	NA	9.0E-03	NA	5.6E-04
7440-66-6	Zinc	9.1E+01	NC	NA	1	3.1E-05	NA	3.0E-01	NA	1.0E-04

	Cancer Risk	Hazard Index
TOTAL:	1.8E-06	1.6E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 6
Adult Staff - 0-15'
Dermal Contact with Soil
HS-2 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NA	NA	0.03	3.6E-09	NA	1.0E-02	NA	3.6E-07
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NA	NA	0.11	1.6E-08	NA	8.0E-04	NA	2.0E-05
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NA	NA	0.1	1.1E-08	NA	6.0E-02	NA	1.8E-07
208-96-8	Acenaphthylene	1.5E-01	NA	NA	0.1	1.0E-08	NA	3.0E-02	NA	3.4E-07
120-12-7	Anthracene	3.3E-01	NA	NA	0.1	2.3E-08	NA	3.0E-01	NA	7.7E-08
56-55-3	Benzo(a)anthracene	6.1E-01	0.02	3.3E-09	0.02	8.5E-09	7.3E-01	3.0E-02	2E-09	2.8E-07
50-32-8	Benzo(a)pyrene	5.3E-01	0.02	2.9E-09	0.02	7.4E-09	7.3E+00	3.0E-02	2E-08	2.5E-07
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.02	3.1E-09	0.02	8.0E-09	7.3E-01	3.0E-02	2E-09	2.7E-07
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NA	NA	0.1	2.5E-08	NA	3.0E-02	NA	8.5E-07
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.02	1.4E-09	0.02	3.7E-09	7.3E-02	3.0E-02	1E-10	1.2E-07
218-01-9	Chrysene	5.9E-01	0.02	3.2E-09	0.02	8.3E-09	7.3E-02	3.0E-02	2E-10	2.8E-07
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.02	7.7E-10	0.02	2.0E-09	7.3E+00	3.0E-02	6E-09	6.6E-08
206-44-0	Fluoranthene	1.2E+00	NA	NA	0.1	8.3E-08	NA	4.0E-02	NA	2.1E-06
86-73-7	Fluorene	2.1E-01	NA	NA	0.1	1.5E-08	NA	4.0E-02	NA	3.7E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.02	2.2E-09	0.02	5.8E-09	7.3E-01	3.0E-02	2E-09	1.9E-07
91-57-6	2-Methylnaphthalene	1.3E-01	NA	NA	0.1	9.4E-09	NA	4.0E-03	NA	2.4E-06
91-20-3	Naphthalene	1.6E-01	NA	NA	0.1	1.1E-08	NA	2.0E-02	NA	5.6E-07
85-01-8	Phenanthrene	1.3E+00	NA	NA	0.1	8.8E-08	NA	3.0E-02	NA	2.9E-06
129-00-0	Pyrene	1.2E+00	NA	NA	0.1	8.3E-08	NA	3.0E-02	NA	2.8E-06
C9-C10	GRO	1.5E+01	NA	NA	0.2	2.1E-06	NA	3.0E-02	NA	6.9E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	4.5E-01	0.1	1.2E-08	0.1	3.1E-08	2.0E+00	2.0E-05	2E-08	1.6E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	1.5E-12	0.1	4.0E-12	1.5E+05	7.0E-10	2E-07	5.7E-03
Metals										
7440-38-2	Arsenic	3.5E+00	0.03	2.8E-08	0.03	7.4E-08	1.5E+00	3.0E-04	4E-08	2.5E-04
7440-39-3	Barium	8.8E+01	NA	NA	0.1	6.1E-06	NA	2.0E-01	NA	3.1E-05
7440-41-7	Beryllium	1.9E-01	NA	NA	0.1	1.3E-08	NA	2.0E-03	NA	6.5E-06
7440-43-9	Cadmium	6.1E-01	NA	NA	0.01	4.2E-09	NA	5.0E-04	NA	8.5E-06
16065-83-1	Chromium III	1.3E+01	NA	NA	0.1	9.0E-07	NA	1.5E+00	NA	6.0E-07
7439-92-1	Lead	5.6E+02	NA	NA	0.006	2.4E-06	NA	7.5E-04	NA	3.2E-03
7439-97-6	Mercury	1.3E-01	NA	NA	0.1	8.9E-09	NA	3.0E-04	NA	3.0E-05
7440-02-0	Nickel	9.3E+00	NA	NA	0.2	1.3E-06	NA	2.0E-02	NA	6.5E-05
7440-22-4	Silver	1.5E+00	NA	NA	0.3	3.2E-07	NA	5.0E-03	NA	6.4E-05
7440-62-2	Vanadium	1.5E+01	NA	NA	0.1	1.1E-06	NA	9.0E-03	NA	1.2E-04
7440-66-6	Zinc	9.1E+01	NA	NA	0.1	6.4E-06	NA	3.0E-01	NA	2.1E-05

	Cancer Risk	Hazard Index
TOTAL:	3.3E-07	1.1E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 7
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-2 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	1.9E-07	4.9E-07	NA	2.0E+00	NA	2.5E-07
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	2.4E-07	6.1E-07	NA	2.8E+00	NA	2.2E-07
SVOCs								
83-32-9	Acenaphthene	1.6E-01	1.8E-07	4.6E-07	NA	5.0E+01	NA	9.2E-09
208-96-8	Acenaphthylene	1.5E-01	1.6E-07	4.2E-07	NA	5.0E+01	NA	8.5E-09
120-12-7	Anthracene	3.3E-01	3.7E-07	9.6E-07	NA	5.0E+01	NA	1.9E-08
56-55-3	Benzo(a)anthracene	6.1E-01	6.8E-07	1.8E-06	2.1E-04	5.0E+01	1E-10	3.5E-08
50-32-8	Benzo(a)pyrene	5.3E-01	5.9E-07	1.5E-06	2.1E-03	5.0E+01	1E-09	3.1E-08
205-99-2	Benzo(b)fluoranthene	5.7E-01	6.4E-07	1.6E-06	2.1E-04	5.0E+01	1E-10	3.3E-08
191-24-2	Benzo(g,h,i)perylene	3.6E-01	4.1E-07	1.1E-06	NA	5.0E+01	NA	2.1E-08
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-07	7.8E-07	2.1E-05	5.0E+01	6E-12	1.6E-08
218-01-9	Chrysene	5.9E-01	6.6E-07	1.7E-06	2.1E-05	5.0E+01	1E-11	3.4E-08
53-70-3	Dibenz(a,h)anthracene	1.4E-01	1.6E-07	4.1E-07	2.1E-03	5.0E+01	3E-10	8.3E-09
206-44-0	Fluoranthene	1.2E+00	1.3E-06	3.4E-06	NA	5.0E+01	NA	6.9E-08
86-73-7	Fluorene	2.1E-01	2.3E-07	6.1E-07	NA	5.0E+01	NA	1.2E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	4.7E-07	1.2E-06	2.1E-04	5.0E+01	1E-10	2.4E-08
91-57-6	2-Methylnaphthalene	1.3E-01	1.5E-07	3.9E-07	NA	5.0E+01	NA	7.8E-09
91-20-3	Naphthalene	1.6E-01	1.8E-07	4.6E-07	NA	3.0E+00	NA	1.5E-07
85-01-8	Phenanthrene	1.3E+00	1.4E-06	3.7E-06	NA	5.0E+01	NA	7.3E-08
129-00-0	Pyrene	1.2E+00	1.3E-06	3.4E-06	NA	5.0E+01	NA	6.9E-08
C9-C10	GRO	1.5E+01	1.6E-05	4.3E-05	NA	5.0E+01	NA	8.5E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	4.5E-01	5.0E-07	1.3E-06	1.0E-04	2.0E-02	5E-11	6.5E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	6.3E-11	1.6E-10	3.3E+01	2.0E-06	2E-09	8.2E-05
Metals								
7440-38-2	Arsenic	3.5E+00	3.9E-06	1.0E-05	3.0E-03	2.0E-02	1E-08	5.1E-04
7440-39-3	Barium	8.8E+01	9.8E-05	2.5E-04	NA	5.0E-01	NA	5.1E-04
7440-41-7	Beryllium	1.9E-01	2.1E-07	5.4E-07	2.4E-03	2.0E-02	5E-10	2.7E-05
7440-43-9	Cadmium	6.1E-01	6.8E-07	1.8E-06	1.8E-03	2.0E-02	1E-09	8.8E-05
16065-83-1	Chromium III	1.3E+01	1.4E-05	3.7E-05	NA	1.0E-01	NA	3.7E-04
7439-92-1	Lead	5.6E+02	6.3E-04	1.6E-03	NA	1.0E+00	NA	1.6E-03
7439-97-6	Mercury	1.3E-01	1.4E-07	3.7E-07	NA	3.0E-01	NA	1.2E-06
7440-02-0	Nickel	9.3E+00	1.0E-05	2.7E-05	4.8E-04	1.0E+00	5E-09	2.7E-05
7440-22-4	Silver	1.5E+00	1.7E-06	4.4E-06	NA	1.4E-01	NA	3.2E-05
7440-62-2	Vanadium	1.5E+01	1.7E-05	4.4E-05	NA	1.0E+00	NA	4.4E-05
7440-66-6	Zinc	9.1E+01	1.0E-04	2.7E-04	NA	1.4E+00	NA	1.9E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.3E-08	3.6E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 8
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-2 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
120-82-1	1,2,4-Trichlorobenzene	1.7E-01	NC	NA	1.00E+00	1.48E-09	NA	1.0E-02	NA	1.5E-07
87-61-6	1,2,3-Trichlorobenzene	2.1E-01	NC	NA	9.90E-01	1.81E-09	NA	8.0E-04	NA	2.3E-06
SVOCs										
83-32-9	Acenaphthene	1.6E-01	NC	NA	3.00E-01	4.12E-10	NA	6.0E-02	NA	6.9E-09
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.00E-01	3.81E-10	NA	3.0E-02	NA	1.3E-08
120-12-7	Anthracene	3.3E-01	NC	NA	3.00E-01	8.62E-10	NA	3.0E-01	NA	2.9E-09
56-55-3	Benzo(a)anthracene	6.1E-01	3.0E-01	6.12E-10	3.00E-01	1.59E-09	7.3E-01	3.0E-02	4E-10	5.3E-08
50-32-8	Benzo(a)pyrene	5.3E-01	3.0E-01	5.33E-10	3.00E-01	1.38E-09	7.3E+00	3.0E-02	4E-09	4.6E-08
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	5.72E-10	3.00E-01	1.48E-09	7.3E-01	3.0E-02	4E-10	4.9E-08
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.00E-01	9.46E-10	NA	3.0E-02	NA	3.2E-08
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	2.69E-10	3.00E-01	6.98E-10	7.3E-02	3.0E-02	2E-11	2.3E-08
218-01-9	Chrysene	5.9E-01	3.0E-01	5.94E-10	3.00E-01	1.54E-09	7.3E-02	3.0E-02	4E-11	5.1E-08
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	1.43E-10	3.00E-01	3.71E-10	7.3E+00	3.0E-02	1E-09	1.2E-08
206-44-0	Fluoranthene	1.2E+00	NC	NA	3.00E-01	3.10E-09	NA	4.0E-02	NA	7.8E-08
86-73-7	Fluorene	2.1E-01	NC	NA	3.00E-01	5.45E-10	NA	4.0E-02	NA	1.4E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	4.19E-10	3.00E-01	1.09E-09	7.3E-01	3.0E-02	3E-10	3.6E-08
91-57-6	2-Methylnaphthalene	1.3E-01	NC	NA	3.00E-01	3.51E-10	NA	4.0E-03	NA	8.8E-08
91-20-3	Naphthalene	1.6E-01	NC	NA	3.00E-01	4.15E-10	NA	2.0E-02	NA	2.1E-08
85-01-8	Phenanthrene	1.3E+00	NC	NA	3.00E-01	3.29E-09	NA	3.0E-02	NA	1.1E-07
129-00-0	Pyrene	1.2E+00	NC	NA	3.00E-01	3.09E-09	NA	3.0E-02	NA	1.0E-07
C9-C10	GRO	1.5E+01	NC	NA	1.00E+00	1.28E-07	NA	3.0E-02	NA	4.3E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	4.5E-01	1.0E+00	1.50E-09	1.00E+00	3.88E-09	2.0E+00	2.0E-05	3E-09	1.9E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.90E-13	1.00E+00	4.93E-13	1.5E+05	7.0E-10	3E-08	7.0E-04
Metals										
7440-38-2	Arsenic	3.5E+00	5.0E-01	5.89E-09	5.00E-01	1.53E-08	1.5E+00	3.0E-04	9E-09	5.1E-05
7440-39-3	Barium	8.8E+01	NC	NA	1.00E+00	7.65E-07	NA	2.0E-01	NA	3.8E-06
7440-41-7	Beryllium	1.9E-01	NC	NA	1.00E+00	1.62E-09	NA	2.0E-03	NA	8.1E-07
7440-43-9	Cadmium	6.1E-01	NC	NA	1.00E+00	5.28E-09	NA	5.0E-04	NA	1.1E-05
16065-83-1	Chromium III	1.3E+01	NC	NA	1.00E+00	1.12E-07	NA	1.5E+00	NA	7.5E-08
7439-92-1	Lead	5.6E+02	NC	NA	5.00E-01	2.45E-06	NA	7.5E-04	NA	3.3E-03
7439-97-6	Mercury	1.3E-01	NC	NA	5.00E-01	5.54E-10	NA	3.0E-04	NA	1.8E-06
7440-02-0	Nickel	9.3E+00	NC	NA	1.00E+00	8.13E-08	NA	2.0E-02	NA	4.1E-06
7440-22-4	Silver	1.5E+00	NC	NA	1.00E+00	1.33E-08	NA	5.0E-03	NA	2.7E-06
7440-62-2	Vanadium	1.5E+01	NC	NA	1.00E+00	1.31E-07	NA	9.0E-03	NA	1.5E-05
7440-66-6	Zinc	9.1E+01	NC	NA	1.00E+00	7.96E-07	NA	3.0E-01	NA	2.7E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	4.6E-08	4.3E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 9
Adult Staff - 0-15'
Incidential Ingestion of Soil
HS-3 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1	4.7E-09	1	1.2E-08	5.5E-02	4.0E-03	3E-10	3.0E-06
108-88-3	Toluene	4.1E-02	NC	NA	1	1.4E-08	NA	8.0E-02	NA	1.7E-07
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1	1.5E-08	NA	3.0E-02	NA	5.2E-07
SVOCs										
120-12-7	Anthracene	4.4E-01	NC	NA	0.3	4.4E-08	NA	3.0E-01	NA	1.5E-07
56-55-3	Benzo(a)anthracene	7.3E-01	0.3	2.8E-08	0.3	7.4E-08	7.3E-01	3.0E-02	2E-08	2.5E-06
50-32-8	Benzo(a)pyrene	7.5E-01	0.3	2.9E-08	0.3	7.6E-08	7.3E+00	3.0E-02	2E-07	2.5E-06
205-99-2	Benzo(b)fluoranthene	8.2E-01	0.3	3.2E-08	0.3	8.3E-08	7.3E-01	3.0E-02	2E-08	2.8E-06
191-24-2	Benzo(g,h,i)perylene	4.7E-01	NC	NA	0.3	4.8E-08	NA	3.0E-02	NA	1.6E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.3	1.0E-08	0.3	2.7E-08	7.3E-02	3.0E-02	8E-10	8.9E-07
218-01-9	Chrysene	7.1E-01	0.3	2.7E-08	0.3	7.1E-08	7.3E-02	3.0E-02	2E-09	2.4E-06
53-70-3	Dibenz(a,h)anthracene	1.5E-01	0.3	6.0E-09	0.3	1.6E-08	7.3E+00	3.0E-02	4E-08	5.2E-07
206-44-0	Fluoranthene	1.6E+00	NC	NA	0.3	1.7E-07	NA	4.0E-02	NA	4.1E-06
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	0.3	2.3E-08	0.3	6.0E-08	7.3E-01	3.0E-02	2E-08	2.0E-06
91-20-3	Naphthalene	7.3E-01	NC	NA	0.3	7.3E-08	NA	2.0E-02	NA	3.7E-06
85-01-8	Phenanthrene	1.7E+00	NC	NA	0.3	1.7E-07	NA	3.0E-02	NA	5.7E-06
129-00-0	Pyrene	1.5E+00	NC	NA	0.3	1.5E-07	NA	3.0E-02	NA	5.0E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E-01	1	2.3E-08	1	6.0E-08	2.0E+00	2.0E-05	5E-08	3.0E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1	7.3E-12	1	1.9E-11	1.5E+05	7.0E-10	1E-06	2.7E-02
Metals										
7440-39-3	Barium	1.6E+02	NC	NA	1	5.4E-05	NA	2.0E-01	NA	2.7E-04
7440-41-7	Beryllium	2.9E-01	NC	NA	1	9.8E-08	NA	2.0E-03	NA	4.9E-05
7439-92-1	Lead	1.1E+03	NC	NA	0.5	1.8E-04	NA	7.5E-04	NA	2.5E-01
7439-97-6	Mercury	1.5E-01	NC	NA	0.5	2.6E-08	NA	3.0E-04	NA	8.6E-05
7440-02-0	Nickel	6.4E+00	NC	NA	1	2.1E-06	NA	2.0E-02	NA	1.1E-04
7440-22-4	Silver	7.8E-01	NC	NA	1	2.6E-07	NA	5.0E-03	NA	5.3E-05
7440-62-2	Vanadium	1.3E+01	NC	NA	1	4.4E-06	NA	9.0E-03	NA	4.9E-04
7440-66-6	Zinc	1.3E+02	NC	NA	1	4.3E-05	NA	3.0E-01	NA	1.4E-04

	Cancer Risk	Hazard Index
TOTAL:	1.5E-06	2.8E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 10
Adult Staff - 0-15'
Dermal Contact with Soil
HS-3 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs										
71-43-2	Benzene	3.6E-02	0.03	2.9E-10	0.03	7.6E-10	5.5E-02	4.0E-03	2E-11	1.9E-07
108-88-3	Toluene	4.1E-02	NA	NA	0.03	8.6E-10	NA	8.0E-02	NA	1.1E-08
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NA	NA	0.2	6.4E-09	NA	3.0E-02	NA	2.1E-07
SVOCs										
120-12-7	Anthracene	4.4E-01	NA	NA	0.1	3.1E-08	NA	3.0E-01	NA	1.0E-07
56-55-3	Benzo(a)anthracene	7.3E-01	0.02	4.0E-09	0.02	1.0E-08	7.3E-01	3.0E-02	3E-09	3.4E-07
50-32-8	Benzo(a)pyrene	7.5E-01	0.02	4.1E-09	0.02	1.1E-08	7.3E+00	3.0E-02	3E-08	3.5E-07
205-99-2	Benzo(b)fluoranthene	8.2E-01	0.02	4.4E-09	0.02	1.2E-08	7.3E-01	3.0E-02	3E-09	3.8E-07
191-24-2	Benzo(g,h,i)perylene	4.7E-01	NA	NA	0.1	3.3E-08	NA	3.0E-02	NA	1.1E-06
207-08-9	Benzo(k)fluoranthene	2.7E-01	0.02	1.4E-09	0.02	3.7E-09	7.3E-02	3.0E-02	1E-10	1.2E-07
218-01-9	Chrysene	7.1E-01	0.02	3.8E-09	0.02	9.9E-09	7.3E-02	3.0E-02	3E-10	3.3E-07
53-70-3	Dibenz(a,h)anthracene	1.5E-01	0.02	8.3E-10	0.02	2.2E-09	7.3E+00	3.0E-02	6E-09	7.2E-08
206-44-0	Fluoranthene	1.6E+00	NA	NA	0.1	1.1E-07	NA	4.0E-02	NA	2.9E-06
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	0.02	3.2E-09	0.02	8.3E-09	7.3E-01	3.0E-02	2E-09	2.8E-07
91-20-3	Naphthalene	7.3E-01	NA	NA	0.1	5.1E-08	NA	2.0E-02	NA	2.5E-06
85-01-8	Phenanthrene	1.7E+00	NA	NA	0.1	1.2E-07	NA	3.0E-02	NA	3.9E-06
129-00-0	Pyrene	1.5E+00	NA	NA	0.1	1.0E-07	NA	3.0E-02	NA	3.5E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E-01	0.1	4.8E-09	0.1	1.3E-08	2.0E+00	2.0E-05	1E-08	6.3E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	1.5E-12	0.1	4.0E-12	1.5E+05	7.0E-10	2E-07	5.7E-03
Metals										
7440-39-3	Barium	1.6E+02	NA	NA	0.1	1.1E-05	NA	2.0E-01	NA	5.6E-05
7440-41-7	Beryllium	2.9E-01	NA	NA	0.1	2.0E-08	NA	2.0E-03	NA	1.0E-05
7439-92-1	Lead	1.1E+03	NA	NA	0.006	4.6E-06	NA	7.5E-04	NA	6.1E-03
7439-97-6	Mercury	1.5E-01	NA	NA	0.1	1.1E-08	NA	3.0E-04	NA	3.6E-05
7440-02-0	Nickel	6.4E+00	NA	NA	0.2	8.9E-07	NA	2.0E-02	NA	4.5E-05
7440-22-4	Silver	7.8E-01	NA	NA	0.3	1.7E-07	NA	5.0E-03	NA	3.3E-05
7440-62-2	Vanadium	1.3E+01	NA	NA	0.1	9.2E-07	NA	9.0E-03	NA	1.0E-04
7440-66-6	Zinc	1.3E+02	NA	NA	0.1	8.9E-06	NA	3.0E-01	NA	3.0E-05

	Cancer Risk	Hazard Index
TOTAL:	2.8E-07	1.3E-02

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 11
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-3 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs								
71-43-2	Benzene	3.6E-02	4.0E-08	1.0E-07	7.8E-06	1.0E+01	3E-13	1.0E-08
108-88-3	Toluene	4.1E-02	4.6E-08	1.2E-07	NA	5.0E+03	NA	2.4E-11
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	5.2E-08	1.3E-07	NA	5.0E+01	NA	2.7E-09
SVOCs								
120-12-7	Anthracene	4.4E-01	4.9E-07	1.3E-06	NA	5.0E+01	NA	2.6E-08
56-55-3	Benzo(a)anthracene	7.3E-01	8.2E-07	2.1E-06	2.1E-04	5.0E+01	2E-10	4.2E-08
50-32-8	Benzo(a)pyrene	7.5E-01	8.4E-07	2.2E-06	2.1E-03	5.0E+01	2E-09	4.4E-08
205-99-2	Benzo(b)fluoranthene	8.2E-01	9.2E-07	2.4E-06	2.1E-04	5.0E+01	2E-10	4.8E-08
191-24-2	Benzo(g,h,i)perylene	4.7E-01	5.3E-07	1.4E-06	NA	5.0E+01	NA	2.8E-08
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-07	7.7E-07	2.1E-05	5.0E+01	6E-12	1.5E-08
218-01-9	Chrysene	7.1E-01	7.9E-07	2.1E-06	2.1E-05	5.0E+01	2E-11	4.1E-08
53-70-3	Dibenz(a,h)anthracene	1.5E-01	1.7E-07	4.5E-07	2.1E-03	5.0E+01	4E-10	8.9E-09
206-44-0	Fluoranthene	1.6E+00	1.8E-06	4.8E-06	NA	5.0E+01	NA	9.5E-08
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	6.7E-07	1.7E-06	2.1E-04	5.0E+01	1E-10	3.5E-08
91-20-3	Naphthalene	7.3E-01	8.1E-07	2.1E-06	NA	3.0E+00	NA	7.0E-07
85-01-8	Phenanthrene	1.7E+00	1.9E-06	4.9E-06	NA	5.0E+01	NA	9.8E-08
129-00-0	Pyrene	1.5E+00	1.7E-06	4.3E-06	NA	5.0E+01	NA	8.7E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	1.8E-01	2.0E-07	5.2E-07	1.0E-04	2.0E-02	2E-11	2.6E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	6.3E-11	1.6E-10	3.3E+01	2.0E-06	2E-09	8.2E-05
Metals								
7440-39-3	Barium	1.6E+02	1.8E-04	4.7E-04	NA	5.0E-01	NA	9.3E-04
7440-41-7	Beryllium	2.9E-01	3.3E-07	8.5E-07	2.4E-03	2.0E-02	8E-10	4.2E-05
7439-92-1	Lead	1.1E+03	1.2E-03	3.2E-03	NA	1.0E+00	NA	3.2E-03
7439-97-6	Mercury	1.5E-01	1.7E-07	4.4E-07	NA	3.0E-01	NA	1.5E-06
7440-02-0	Nickel	6.4E+00	7.2E-06	1.9E-05	4.8E-04	1.0E+00	3E-09	1.9E-05
7440-22-4	Silver	7.8E-01	8.8E-07	2.3E-06	NA	1.4E-01	NA	1.6E-05
7440-62-2	Vanadium	1.3E+01	1.5E-05	3.8E-05	NA	1.0E+00	NA	3.8E-05
7440-66-6	Zinc	1.3E+02	1.4E-04	3.7E-04	NA	1.4E+00	NA	2.6E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	9.0E-09	4.6E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 12
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-3 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs										
71-43-2	Benzene	3.6E-02	1.0E+00	1.21E-10	1.00E+00	3.14E-10	5.5E-02	4.0E-03	7E-12	7.8E-08
108-88-3	Toluene	4.1E-02	NC	NA	1.00E+00	3.57E-10	NA	8.0E-02	NA	4.5E-09
C9-C10	1,2,4-Trimethylbenzene	4.6E-02	NC	NA	1.00E+00	4.01E-10	NA	3.0E-02	NA	1.3E-08
SVOCs										
120-12-7	Anthracene	4.4E-01	NC	NA	3.00E-01	1.15E-09	NA	3.0E-01	NA	3.8E-09
56-55-3	Benzo(a)anthracene	7.3E-01	3.0E-01	7.37E-10	3.00E-01	1.91E-09	7.3E-01	3.0E-02	5E-10	6.4E-08
50-32-8	Benzo(a)pyrene	7.5E-01	3.0E-01	7.59E-10	3.00E-01	1.97E-09	7.3E+00	3.0E-02	6E-09	6.6E-08
205-99-2	Benzo(b)fluoranthene	8.2E-01	3.0E-01	8.30E-10	3.00E-01	2.15E-09	7.3E-01	3.0E-02	6E-10	7.2E-08
191-24-2	Benzo(g,h,i)perylene	4.7E-01	NC	NA	3.00E-01	1.24E-09	NA	3.0E-02	NA	4.1E-08
207-08-9	Benzo(k)fluoranthene	2.7E-01	3.0E-01	2.68E-10	3.00E-01	6.96E-10	7.3E-02	3.0E-02	2E-11	2.3E-08
218-01-9	Chrysene	7.1E-01	3.0E-01	7.12E-10	3.00E-01	1.85E-09	7.3E-02	3.0E-02	5E-11	6.2E-08
53-70-3	Dibenz(a,h)anthracene	1.5E-01	3.0E-01	1.55E-10	3.00E-01	4.02E-10	7.3E+00	3.0E-02	1E-09	1.3E-08
206-44-0	Fluoranthene	1.6E+00	NC	NA	3.00E-01	4.28E-09	NA	4.0E-02	NA	1.1E-07
193-39-5	Indeno(1,2,3-cd)pyrene	5.9E-01	3.0E-01	5.99E-10	3.00E-01	1.55E-09	7.3E-01	3.0E-02	4E-10	5.2E-08
91-20-3	Naphthalene	7.3E-01	NC	NA	3.00E-01	1.90E-09	NA	2.0E-02	NA	9.5E-08
85-01-8	Phenanthrene	1.7E+00	NC	NA	3.00E-01	4.41E-09	NA	3.0E-02	NA	1.5E-07
129-00-0	Pyrene	1.5E+00	NC	NA	3.00E-01	3.90E-09	NA	3.0E-02	NA	1.3E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E-01	1.0E+00	6.03E-10	1.00E+00	1.56E-09	2.0E+00	2.0E-05	1E-09	7.8E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.90E-13	1.00E+00	4.93E-13	1.5E+05	7.0E-10	3E-08	7.0E-04
Metals										
7440-39-3	Barium	1.6E+02	NC	NA	1.00E+00	1.40E-06	NA	2.0E-01	NA	7.0E-06
7440-41-7	Beryllium	2.9E-01	NC	NA	1.00E+00	2.55E-09	NA	2.0E-03	NA	1.3E-06
7439-92-1	Lead	1.1E+03	NC	NA	5.00E-01	4.76E-06	NA	7.5E-04	NA	6.4E-03
7439-97-6	Mercury	1.5E-01	NC	NA	5.00E-01	6.67E-10	NA	3.0E-04	NA	2.2E-06
7440-02-0	Nickel	6.4E+00	NC	NA	1.00E+00	5.56E-08	NA	2.0E-02	NA	2.8E-06
7440-22-4	Silver	7.8E-01	NC	NA	1.00E+00	6.84E-09	NA	5.0E-03	NA	1.4E-06
7440-62-2	Vanadium	1.3E+01	NC	NA	1.00E+00	1.14E-07	NA	9.0E-03	NA	1.3E-05
7440-66-6	Zinc	1.3E+02	NC	NA	1.00E+00	1.10E-06	NA	3.0E-01	NA	3.7E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.8E-08	7.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 13
Adult Staff - 0-15'
Incidential Ingestion of Soil
HS-4 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1	2.6E-08	NA	1.0E-05	NA	2.6E-03
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1	9.9E-09	1	2.6E-08	1.4E-02	2.0E-02	1E-10	1.3E-06
83-32-9	Acenaphthene	2.1E-01	NC	NA	0.3	2.1E-08	NA	6.0E-02	NA	3.5E-07
208-96-8	Acenaphthylene	5.3E-01	NC	NA	0.3	5.4E-08	NA	3.0E-02	NA	1.8E-06
120-12-7	Anthracene	5.7E-01	NC	NA	0.3	5.7E-08	NA	3.0E-01	NA	1.9E-07
56-55-3	Benzo(a)anthracene	1.2E+00	0.3	4.6E-08	0.3	1.2E-07	7.3E-01	3.0E-02	3E-08	4.0E-06
50-32-8	Benzo(a)pyrene	1.4E+00	0.3	5.4E-08	0.3	1.4E-07	7.3E+00	3.0E-02	4E-07	4.6E-06
205-99-2	Benzo(b)fluoranthene	1.6E+00	0.3	6.1E-08	0.3	1.6E-07	7.3E-01	3.0E-02	4E-08	5.3E-06
191-24-2	Benzo(g,h,i)perylene	7.4E-01	NC	NA	0.3	7.5E-08	NA	3.0E-02	NA	2.5E-06
207-08-9	Benzo(k)fluoranthene	5.6E-01	0.3	2.2E-08	0.3	5.7E-08	7.3E-02	3.0E-02	2E-09	1.9E-06
218-01-9	Chrysene	1.3E+00	0.3	4.9E-08	0.3	1.3E-07	7.3E-02	3.0E-02	4E-09	4.3E-06
53-70-3	Dibenz(a,h)anthracene	2.4E-01	0.3	9.2E-09	0.3	2.4E-08	7.3E+00	3.0E-02	7E-08	7.9E-07
206-44-0	Fluoranthene	2.9E+00	NC	NA	0.3	2.9E-07	NA	4.0E-02	NA	7.2E-06
86-73-7	Fluorene	2.7E-01	NC	NA	0.3	2.7E-08	NA	4.0E-02	NA	6.7E-07
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	2.8E-08	0.3	7.3E-08	7.3E-01	3.0E-02	2E-08	2.4E-06
91-20-3	Naphthalene	9.0E-01	NC	NA	0.3	9.1E-08	NA	2.0E-02	NA	4.6E-06
85-01-8	Phenanthrene	2.6E+00	NC	NA	0.3	2.6E-07	NA	3.0E-02	NA	8.7E-06
129-00-0	Pyrene	2.8E+00	NC	NA	0.3	2.8E-07	NA	3.0E-02	NA	9.3E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E+00	1	2.4E-07	1	6.2E-07	2.0E+00	2.0E-05	5E-07	3.1E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1	7.3E-12	1	1.9E-11	1.5E+05	7.0E-10	1E-06	2.7E-02
Metals										
7440-36-0	Antimony	3.9E+00	NC	NA	1	1.3E-06	NA	4.0E-04	NA	3.3E-03
7440-38-2	Arsenic	7.7E+00	0.5	5.0E-07	0.5	1.3E-06	1.5E+00	3.0E-04	7E-07	4.3E-03
7440-39-3	Barium	1.6E+02	NC	NA	1	5.5E-05	NA	2.0E-01	NA	2.8E-04
7440-41-7	Beryllium	2.7E-01	NC	NA	1	9.0E-08	NA	2.0E-03	NA	4.5E-05
7440-43-9	Cadmium	9.7E-01	NC	NA	1	3.3E-07	NA	5.0E-04	NA	6.5E-04
16065-83-1	Chromium III	2.0E+01	NC	NA	1	6.9E-06	NA	1.5E+00	NA	4.6E-06
7439-92-1	Lead	4.3E+02	NC	NA	0.5	7.3E-05	NA	7.5E-04	NA	9.7E-02
7439-97-6	Mercury	1.4E-01	NC	NA	0.5	2.4E-08	NA	3.0E-04	NA	8.1E-05
7440-02-0	Nickel	2.1E+01	NC	NA	1	7.1E-06	NA	2.0E-02	NA	3.6E-04
7440-22-4	Silver	2.1E+00	NC	NA	1	7.0E-07	NA	5.0E-03	NA	1.4E-04
7440-62-2	Vanadium	2.6E+01	NC	NA	1	8.8E-06	NA	9.0E-03	NA	9.8E-04
7440-66-6	Zinc	2.4E+02	NC	NA	1	8.2E-05	NA	3.0E-01	NA	2.7E-04

	Cancer Risk	Hazard Index
TOTAL:	2.9E-06	1.7E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 14
Adult Staff - 0-15'
Dermal Contact with Soil
HS-4 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NA	NA	0.19	1.0E-08	NA	1.0E-05	NA	1.0E-03
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	0.1	2.1E-09	0.1	5.3E-09	1.4E-02	2.0E-02	3E-11	2.7E-07
83-32-9	Acenaphthene	2.1E-01	NA	NA	0.1	1.4E-08	NA	6.0E-02	NA	2.4E-07
208-96-8	Acenaphthylene	5.3E-01	NA	NA	0.1	3.7E-08	NA	3.0E-02	NA	1.2E-06
120-12-7	Anthracene	5.7E-01	NA	NA	0.1	4.0E-08	NA	3.0E-01	NA	1.3E-07
56-55-3	Benzo(a)anthracene	1.2E+00	0.02	6.5E-09	0.02	1.7E-08	7.3E-01	3.0E-02	5E-09	5.6E-07
50-32-8	Benzo(a)pyrene	1.4E+00	0.02	7.4E-09	0.02	1.9E-08	7.3E+00	3.0E-02	5E-08	6.4E-07
205-99-2	Benzo(b)fluoranthene	1.6E+00	0.02	8.5E-09	0.02	2.2E-08	7.3E-01	3.0E-02	6E-09	7.4E-07
191-24-2	Benzo(g,h,i)perylene	7.4E-01	NA	NA	0.1	5.2E-08	NA	3.0E-02	NA	1.7E-06
207-08-9	Benzo(k)fluoranthene	5.6E-01	0.02	3.0E-09	0.02	7.9E-09	7.3E-02	3.0E-02	2E-10	2.6E-07
218-01-9	Chrysene	1.3E+00	0.02	6.9E-09	0.02	1.8E-08	7.3E-02	3.0E-02	5E-10	5.9E-07
53-70-3	Dibenz(a,h)anthracene	2.4E-01	0.02	1.3E-09	0.02	3.3E-09	7.3E+00	3.0E-02	9E-09	1.1E-07
206-44-0	Fluoranthene	2.9E+00	NA	NA	0.1	2.0E-07	NA	4.0E-02	NA	5.0E-06
86-73-7	Fluorene	2.7E-01	NA	NA	0.1	1.9E-08	NA	4.0E-02	NA	4.7E-07
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	0.02	3.9E-09	0.02	1.0E-08	7.3E-01	3.0E-02	3E-09	3.4E-07
91-20-3	Naphthalene	9.0E-01	NA	NA	0.1	6.3E-08	NA	2.0E-02	NA	3.2E-06
85-01-8	Phenanthrene	2.6E+00	NA	NA	0.1	1.8E-07	NA	3.0E-02	NA	6.1E-06
129-00-0	Pyrene	2.8E+00	NA	NA	0.1	1.9E-07	NA	3.0E-02	NA	6.5E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E+00	0.1	5.0E-08	0.1	1.3E-07	2.0E+00	2.0E-05	1E-07	6.5E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	1.5E-12	0.1	4.0E-12	1.5E+05	7.0E-10	2E-07	5.7E-03
Metals										
7440-36-0	Antimony	3.9E+00	NA	NA	0.1	2.7E-07	NA	4.0E-04	NA	6.8E-04
7440-38-2	Arsenic	7.7E+00	0.03	6.2E-08	0.03	1.6E-07	1.5E+00	3.0E-04	9E-08	5.4E-04
7440-39-3	Barium	1.6E+02	NA	NA	0.1	1.2E-05	NA	2.0E-01	NA	5.8E-05
7440-41-7	Beryllium	2.7E-01	NA	NA	0.1	1.9E-08	NA	2.0E-03	NA	9.4E-06
7440-43-9	Cadmium	9.7E-01	NA	NA	0.01	6.8E-09	NA	5.0E-04	NA	1.4E-05
16065-83-1	Chromium III	2.0E+01	NA	NA	0.1	1.4E-06	NA	1.5E+00	NA	9.5E-07
7439-92-1	Lead	4.3E+02	NA	NA	0.006	1.8E-06	NA	7.5E-04	NA	2.4E-03
7439-97-6	Mercury	1.4E-01	NA	NA	0.1	1.0E-08	NA	3.0E-04	NA	3.4E-05
7440-02-0	Nickel	2.1E+01	NA	NA	0.2	3.0E-06	NA	2.0E-02	NA	1.5E-04
7440-22-4	Silver	2.1E+00	NA	NA	0.3	4.4E-07	NA	5.0E-03	NA	8.8E-05
7440-62-2	Vanadium	2.6E+01	NA	NA	0.1	1.8E-06	NA	9.0E-03	NA	2.0E-04
7440-66-6	Zinc	2.4E+02	NA	NA	0.1	1.7E-05	NA	3.0E-01	NA	5.7E-05

	Cancer Risk	Hazard Index
TOTAL:	5.0E-07	1.7E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 15
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-4 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
101-55-3	4-Bromodiphenyl ether	7.8E-02	8.7E-08	2.3E-07	NA	3.5E-02	NA	6.5E-06
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	8.5E-08	2.2E-07	1.3E-06	7.0E+00	1E-13	3.2E-08
83-32-9	Acenaphthene	2.1E-01	2.3E-07	6.0E-07	NA	5.0E+01	NA	1.2E-08
208-96-8	Acenaphthylene	5.3E-01	6.0E-07	1.5E-06	NA	5.0E+01	NA	3.1E-08
120-12-7	Anthracene	5.7E-01	6.4E-07	1.7E-06	NA	5.0E+01	NA	3.3E-08
56-55-3	Benzo(a)anthracene	1.2E+00	1.3E-06	3.5E-06	2.1E-04	5.0E+01	3E-10	6.9E-08
50-32-8	Benzo(a)pyrene	1.4E+00	1.5E-06	4.0E-06	2.1E-03	5.0E+01	3E-09	8.0E-08
205-99-2	Benzo(b)fluoranthene	1.6E+00	1.8E-06	4.6E-06	2.1E-04	5.0E+01	4E-10	9.2E-08
191-24-2	Benzo(g,h,i)perylene	7.4E-01	8.3E-07	2.2E-06	NA	5.0E+01	NA	4.3E-08
207-08-9	Benzo(k)fluoranthene	5.6E-01	6.3E-07	1.6E-06	2.1E-05	5.0E+01	1E-11	3.3E-08
218-01-9	Chrysene	1.3E+00	1.4E-06	3.7E-06	2.1E-05	5.0E+01	3E-11	7.4E-08
53-70-3	Dibenz(a,h)anthracene	2.4E-01	2.6E-07	6.8E-07	2.1E-03	5.0E+01	6E-10	1.4E-08
206-44-0	Fluoranthene	2.9E+00	3.2E-06	8.3E-06	NA	5.0E+01	NA	1.7E-07
86-73-7	Fluorene	2.7E-01	3.0E-07	7.8E-07	NA	5.0E+01	NA	1.6E-08
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	8.1E-07	2.1E-06	2.1E-04	5.0E+01	2E-10	4.2E-08
91-20-3	Naphthalene	9.0E-01	1.0E-06	2.6E-06	NA	3.0E+00	NA	8.7E-07
85-01-8	Phenanthrene	2.6E+00	2.9E-06	7.5E-06	NA	5.0E+01	NA	1.5E-07
129-00-0	Pyrene	2.8E+00	3.1E-06	8.1E-06	NA	5.0E+01	NA	1.6E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	1.8E+00	2.1E-06	5.4E-06	1.0E-04	2.0E-02	2E-10	2.7E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	6.3E-11	1.6E-10	3.3E+01	2.0E-06	2E-09	8.2E-05
Metals								
7440-36-0	Antimony	3.9E+00	4.3E-06	1.1E-05	NA	1.0E+01	NA	1.1E-06
7440-38-2	Arsenic	7.7E+00	8.6E-06	2.2E-05	3.0E-03	2.0E-02	3E-08	1.1E-03
7440-39-3	Barium	1.6E+02	1.8E-04	4.8E-04	NA	5.0E-01	NA	9.6E-04
7440-41-7	Beryllium	2.7E-01	3.0E-07	7.8E-07	2.4E-03	2.0E-02	7E-10	3.9E-05
7440-43-9	Cadmium	9.7E-01	1.1E-06	2.8E-06	1.8E-03	2.0E-02	2E-09	1.4E-04
16065-83-1	Chromium III	2.0E+01	2.3E-05	5.9E-05	NA	1.0E-01	NA	5.9E-04
7439-92-1	Lead	4.3E+02	4.8E-04	1.3E-03	NA	1.0E+00	NA	1.3E-03
7439-97-6	Mercury	1.4E-01	1.6E-07	4.2E-07	NA	3.0E-01	NA	1.4E-06
7440-02-0	Nickel	2.1E+01	2.4E-05	6.2E-05	4.8E-04	1.0E+00	1E-08	6.2E-05
7440-22-4	Silver	2.1E+00	2.3E-06	6.1E-06	NA	1.4E-01	NA	4.3E-05
7440-62-2	Vanadium	2.6E+01	2.9E-05	7.6E-05	NA	1.0E+00	NA	7.6E-05
7440-66-6	Zinc	2.4E+02	2.7E-04	7.1E-04	NA	1.4E+00	NA	5.0E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	4.7E-08	5.1E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 16
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-4 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
101-55-3	4-Bromodiphenyl ether	7.8E-02	NC	NA	1.00E+00	6.80E-10	NA	1.0E-05	NA	6.8E-05
117-81-7	bis(2-Ethylhexyl)phthalate	7.6E-02	1.0E+00	2.56E-10	1.00E+00	6.62E-10	1.4E-02	2.0E-02	4E-12	3.3E-08
83-32-9	Acenaphthene	2.1E-01	NC	NA	3.00E-01	5.37E-10	NA	6.0E-02	NA	9.0E-09
208-96-8	Acenaphthylene	5.3E-01	NC	NA	3.00E-01	1.39E-09	NA	3.0E-02	NA	4.6E-08
120-12-7	Anthracene	5.7E-01	NC	NA	3.00E-01	1.49E-09	NA	3.0E-01	NA	5.0E-09
56-55-3	Benzo(a)anthracene	1.2E+00	3.0E-01	1.20E-09	3.00E-01	3.12E-09	7.3E-01	3.0E-02	9E-10	1.0E-07
50-32-8	Benzo(a)pyrene	1.4E+00	3.0E-01	1.39E-09	3.00E-01	3.60E-09	7.3E+00	3.0E-02	1E-08	1.2E-07
205-99-2	Benzo(b)fluoranthene	1.6E+00	3.0E-01	1.59E-09	3.00E-01	4.12E-09	7.3E-01	3.0E-02	1E-09	1.4E-07
191-24-2	Benzo(g,h,i)perylene	7.4E-01	NC	NA	3.00E-01	1.95E-09	NA	3.0E-02	NA	6.5E-08
207-08-9	Benzo(k)fluoranthene	5.6E-01	3.0E-01	5.66E-10	3.00E-01	1.47E-09	7.3E-02	3.0E-02	4E-11	4.9E-08
218-01-9	Chrysene	1.3E+00	3.0E-01	1.28E-09	3.00E-01	3.32E-09	7.3E-02	3.0E-02	9E-11	1.1E-07
53-70-3	Dibenz(a,h)anthracene	2.4E-01	3.0E-01	2.37E-10	3.00E-01	6.16E-10	7.3E+00	3.0E-02	2E-09	2.1E-08
206-44-0	Fluoranthene	2.9E+00	NC	NA	3.00E-01	7.51E-09	NA	4.0E-02	NA	1.9E-07
86-73-7	Fluorene	2.7E-01	NC	NA	3.00E-01	6.98E-10	NA	4.0E-02	NA	1.7E-08
193-39-5	Indeno(1,2,3-cd)pyrene	7.3E-01	3.0E-01	7.33E-10	3.00E-01	1.90E-09	7.3E-01	3.0E-02	5E-10	6.3E-08
91-20-3	Naphthalene	9.0E-01	NC	NA	3.00E-01	2.36E-09	NA	2.0E-02	NA	1.2E-07
85-01-8	Phenanthrene	2.6E+00	NC	NA	3.00E-01	6.79E-09	NA	3.0E-02	NA	2.3E-07
129-00-0	Pyrene	2.8E+00	NC	NA	3.00E-01	7.26E-09	NA	3.0E-02	NA	2.4E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	1.8E+00	1.0E+00	6.21E-09	1.00E+00	1.61E-08	2.0E+00	2.0E-05	1E-08	8.1E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.90E-13	1.00E+00	4.93E-13	1.5E+05	7.0E-10	3E-08	7.0E-04
Metals										
7440-36-0	Antimony	3.9E+00	NC	NA	1.00E+00	3.37E-08	NA	4.0E-04	NA	8.4E-05
7440-38-2	Arsenic	7.7E+00	5.0E-01	1.29E-08	5.00E-01	3.34E-08	1.5E+00	3.0E-04	2E-08	1.1E-04
7440-39-3	Barium	1.6E+02	NC	NA	1.00E+00	1.43E-06	NA	2.0E-01	NA	7.2E-06
7440-41-7	Beryllium	2.7E-01	NC	NA	1.00E+00	2.33E-09	NA	2.0E-03	NA	1.2E-06
7440-43-9	Cadmium	9.7E-01	NC	NA	1.00E+00	8.43E-09	NA	5.0E-04	NA	1.7E-05
16065-83-1	Chromium III	2.0E+01	NC	NA	1.00E+00	1.78E-07	NA	1.5E+00	NA	1.2E-07
7439-92-1	Lead	4.3E+02	NC	NA	5.00E-01	1.89E-06	NA	7.5E-04	NA	2.5E-03
7439-97-6	Mercury	1.4E-01	NC	NA	5.00E-01	6.28E-10	NA	3.0E-04	NA	2.1E-06
7440-02-0	Nickel	2.1E+01	NC	NA	1.00E+00	1.85E-07	NA	2.0E-02	NA	9.2E-06
7440-22-4	Silver	2.1E+00	NC	NA	1.00E+00	1.83E-08	NA	5.0E-03	NA	3.7E-06
7440-62-2	Vanadium	2.6E+01	NC	NA	1.00E+00	2.28E-07	NA	9.0E-03	NA	2.5E-05
7440-66-6	Zinc	2.4E+02	NC	NA	1.00E+00	2.12E-06	NA	3.0E-01	NA	7.1E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	7.5E-08	4.4E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 17
Adult Staff - 0-15'
Incidential Ingestion of Surface Soil
HS-5 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
132-64-9	Dibenzofuran	9.8E-01	NC	NA	0.96	3.2E-07	NA	1.0E-03	NA	3.2E-04
83-32-9	Acenaphthene	8.5E-01	NC	NA	0.3	8.6E-08	NA	6.0E-02	NA	1.4E-06
208-96-8	Acenaphthylene	1.5E+00	NC	NA	0.3	1.6E-07	NA	3.0E-02	NA	5.2E-06
120-12-7	Anthracene	4.3E+00	NC	NA	0.3	4.3E-07	NA	3.0E-01	NA	1.4E-06
56-55-3	Benzo(a)anthracene	1.7E+01	0.3	6.6E-07	0.3	1.7E-06	7.3E-01	3.0E-02	5E-07	5.7E-05
50-32-8	Benzo(a)pyrene	1.1E+01	0.3	4.3E-07	0.3	1.1E-06	7.3E+00	3.0E-02	3E-06	3.7E-05
205-99-2	Benzo(b)fluoranthene	1.3E+01	0.3	5.1E-07	0.3	1.3E-06	7.3E-01	3.0E-02	4E-07	4.4E-05
191-24-2	Benzo(g,h,i)perylene	4.1E+00	NC	NA	0.3	4.2E-07	NA	3.0E-02	NA	1.4E-05
207-08-9	Benzo(k)fluoranthene	7.4E+00	0.3	2.9E-07	0.3	7.5E-07	7.3E-02	3.0E-02	2E-08	2.5E-05
218-01-9	Chrysene	7.2E+00	0.3	2.8E-07	0.3	7.2E-07	7.3E-02	3.0E-02	2E-08	2.4E-05
53-70-3	Dibenz(a,h)anthracene	9.4E+00	0.3	3.7E-07	0.3	9.5E-07	7.3E+00	3.0E-02	3E-06	3.2E-05
206-44-0	Fluoranthene	2.1E+01	NC	NA	0.3	2.1E-06	NA	4.0E-02	NA	5.2E-05
86-73-7	Fluorene	2.0E+00	NC	NA	0.3	2.1E-07	NA	4.0E-02	NA	5.1E-06
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	0.3	1.6E-07	0.3	4.0E-07	7.3E-01	3.0E-02	1E-07	1.3E-05
91-57-6	2-Methylnaphthalene	6.0E-01	NC	NA	0.3	6.1E-08	NA	4.0E-03	NA	1.5E-05
85-01-8	Phenanthrene	1.7E+01	NC	NA	0.3	1.7E-06	NA	3.0E-02	NA	5.6E-05
129-00-0	Pyrene	1.8E+01	NC	NA	0.3	1.8E-06	NA	3.0E-02	NA	6.1E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	4.9E+00	1	6.3E-07	1	1.6E-06	2.0E+00	2.0E-05	1E-06	8.2E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1	7.3E-12	1	1.9E-11	1.5E+05	7.0E-10	1E-06	2.7E-02
Metals										
7440-38-2	Arsenic	1.5E+01	0.5	9.4E-07	0.5	2.4E-06	1.5E+00	3.0E-04	1E-06	8.2E-03
7440-39-3	Barium	2.1E+02	NC	NA	1	7.0E-05	NA	2.0E-01	NA	3.5E-04
7440-43-9	Cadmium	1.7E+00	NC	NA	1	5.6E-07	NA	5.0E-04	NA	1.1E-03
16065-83-1	Chromium III	2.1E+01	NC	NA	1	7.2E-06	NA	1.5E+00	NA	4.8E-06
7439-92-1	Lead	1.8E+03	NC	NA	0.5	3.0E-04	NA	7.5E-04	NA	4.0E-01
7439-97-6	Mercury	6.0E-01	NC	NA	0.5	1.0E-07	NA	3.0E-04	NA	3.4E-04
7440-22-4	Silver	6.1E-01	NC	NA	1	2.1E-07	NA	5.0E-03	NA	4.1E-05

	Cancer Risk	Hazard Index
TOTAL:	1.1E-05	5.2E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 18
Adult Staff - 0-15'
Dermal Contact with Surface Soil
HS-5 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
132-64-9	Dibenzofuran	9.8E-01	NA	NA	0.18	1.2E-07	NA	1.0E-03	NA	1.2E-04
83-32-9	Acenaphthene	8.5E-01	NA	NA	0.1	5.9E-08	NA	6.0E-02	NA	9.9E-07
208-96-8	Acenaphthylene	1.5E+00	NA	NA	0.1	1.1E-07	NA	3.0E-02	NA	3.6E-06
120-12-7	Anthracene	4.3E+00	NA	NA	0.1	3.0E-07	NA	3.0E-01	NA	1.0E-06
56-55-3	Benzo(a)anthracene	1.7E+01	0.02	9.2E-08	0.02	2.4E-07	7.3E-01	3.0E-02	7E-08	7.9E-06
50-32-8	Benzo(a)pyrene	1.1E+01	0.02	5.9E-08	0.02	1.5E-07	7.3E+00	3.0E-02	4E-07	5.1E-06
205-99-2	Benzo(b)fluoranthene	1.3E+01	0.02	7.0E-08	0.02	1.8E-07	7.3E-01	3.0E-02	5E-08	6.1E-06
191-24-2	Benzo(g,h,i)perylene	4.1E+00	NA	NA	0.1	2.9E-07	NA	3.0E-02	NA	9.6E-06
207-08-9	Benzo(k)fluoranthene	7.4E+00	0.02	4.0E-08	0.02	1.0E-07	7.3E-02	3.0E-02	3E-09	3.5E-06
218-01-9	Chrysene	7.2E+00	0.02	3.9E-08	0.02	1.0E-07	7.3E-02	3.0E-02	3E-09	3.4E-06
53-70-3	Dibenz(a,h)anthracene	9.4E+00	0.02	5.1E-08	0.02	1.3E-07	7.3E+00	3.0E-02	4E-07	4.4E-06
206-44-0	Fluoranthene	2.1E+01	NA	NA	0.1	1.4E-06	NA	4.0E-02	NA	3.6E-05
86-73-7	Fluorene	2.0E+00	NA	NA	0.1	1.4E-07	NA	4.0E-02	NA	3.6E-06
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	0.02	2.2E-08	0.02	5.6E-08	7.3E-01	3.0E-02	2E-08	1.9E-06
91-57-6	2-Methylnaphthalene	6.0E-01	NA	NA	0.1	4.2E-08	NA	4.0E-03	NA	1.1E-05
85-01-8	Phenanthrene	1.7E+01	NA	NA	0.1	1.2E-06	NA	3.0E-02	NA	3.9E-05
129-00-0	Pyrene	1.8E+01	NA	NA	0.1	1.3E-06	NA	3.0E-02	NA	4.2E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	4.9E+00	0.1	1.3E-07	0.1	3.4E-07	2.0E+00	2.0E-05	3E-07	1.7E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	1.5E-12	0.1	4.0E-12	1.5E+05	7.0E-10	2E-07	5.7E-03
Metals										
7440-38-2	Arsenic	1.5E+01	0.03	1.2E-07	0.03	3.1E-07	1.5E+00	3.0E-04	2E-07	1.0E-03
7440-39-3	Barium	2.1E+02	NA	NA	0.1	1.5E-05	NA	2.0E-01	NA	7.3E-05
7440-43-9	Cadmium	1.7E+00	NA	NA	0.01	1.2E-08	NA	5.0E-04	NA	2.3E-05
16065-83-1	Chromium III	2.1E+01	NA	NA	0.1	1.5E-06	NA	1.5E+00	NA	1.0E-06
7439-92-1	Lead	1.8E+03	NA	NA	0.006	7.6E-06	NA	7.5E-04	NA	1.0E-02
7439-97-6	Mercury	6.0E-01	NA	NA	0.1	4.2E-08	NA	3.0E-04	NA	1.4E-04
7440-22-4	Silver	6.1E-01	NA	NA	0.3	1.3E-07	NA	5.0E-03	NA	2.6E-05

	Cancer Risk	Hazard Index
TOTAL:	1.6E-06	3.4E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 19
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-5 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
132-64-9	Dibenzofuran	9.8E-01	1.1E-06	2.9E-06	NA	3.5E+00	NA	8.2E-07
83-32-9	Acenaphthene	8.5E-01	9.5E-07	2.5E-06	NA	5.0E+01	NA	4.9E-08
208-96-8	Acenaphthylene	1.5E+00	1.7E-06	4.5E-06	NA	5.0E+01	NA	8.9E-08
120-12-7	Anthracene	4.3E+00	4.8E-06	1.2E-05	NA	5.0E+01	NA	2.5E-07
56-55-3	Benzo(a)anthracene	1.7E+01	1.9E-05	4.9E-05	2.1E-04	5.0E+01	4E-09	9.9E-07
50-32-8	Benzo(a)pyrene	1.1E+01	1.2E-05	3.2E-05	2.1E-03	5.0E+01	3E-08	6.4E-07
205-99-2	Benzo(b)fluoranthene	1.3E+01	1.5E-05	3.8E-05	2.1E-04	5.0E+01	3E-09	7.6E-07
191-24-2	Benzo(g,h,i)perylene	4.1E+00	4.6E-06	1.2E-05	NA	5.0E+01	NA	2.4E-07
207-08-9	Benzo(k)fluoranthene	7.4E+00	8.3E-06	2.2E-05	2.1E-05	5.0E+01	2E-10	4.3E-07
218-01-9	Chrysene	7.2E+00	8.0E-06	2.1E-05	2.1E-05	5.0E+01	2E-10	4.2E-07
53-70-3	Dibenz(a,h)anthracene	9.4E+00	1.1E-05	2.7E-05	2.1E-03	5.0E+01	2E-08	5.5E-07
206-44-0	Fluoranthene	2.1E+01	2.3E-05	6.0E-05	NA	5.0E+01	NA	1.2E-06
86-73-7	Fluorene	2.0E+00	2.3E-06	5.9E-06	NA	5.0E+01	NA	1.2E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	4.5E-06	1.2E-05	2.1E-04	5.0E+01	9E-10	2.3E-07
91-57-6	2-Methylnaphthalene	6.0E-01	6.8E-07	1.8E-06	NA	5.0E+01	NA	3.5E-08
85-01-8	Phenanthrene	1.7E+01	1.9E-05	4.8E-05	NA	5.0E+01	NA	9.7E-07
129-00-0	Pyrene	1.8E+01	2.0E-05	5.2E-05	NA	5.0E+01	NA	1.0E-06
Dioxins/PCBs								
1336-36-3	Total PCBs	4.9E+00	5.5E-06	1.4E-05	1.0E-04	2.0E-02	5E-10	7.1E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	6.3E-11	1.6E-10	3.3E+01	2.0E-06	2E-09	8.2E-05
Metals								
7440-38-2	Arsenic	1.5E+01	1.6E-05	4.2E-05	3.0E-03	2.0E-02	5E-08	2.1E-03
7440-39-3	Barium	2.1E+02	2.3E-04	6.0E-04	NA	5.0E-01	NA	1.2E-03
7440-43-9	Cadmium	1.7E+00	1.9E-06	4.8E-06	1.8E-03	2.0E-02	3E-09	2.4E-04
16065-83-1	Chromium III	2.1E+01	2.4E-05	6.2E-05	NA	1.0E-01	NA	6.2E-04
7439-92-1	Lead	1.8E+03	2.0E-03	5.2E-03	NA	1.0E+00	NA	5.2E-03
7439-97-6	Mercury	6.0E-01	6.7E-07	1.7E-06	NA	3.0E-01	NA	5.8E-06
7440-22-4	Silver	6.1E-01	6.9E-07	1.8E-06	NA	1.4E-01	NA	1.3E-05

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.1E-07	1.0E-02

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 20
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-5 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
132-64-9	Dibenzofuran	9.8E-01	NC	NA	9.60E-01	8.23E-09	NA	1.0E-03	NA	8.2E-06
83-32-9	Acenaphthene	8.5E-01	NC	NA	3.00E-01	2.22E-09	NA	6.0E-02	NA	3.7E-08
208-96-8	Acenaphthylene	1.5E+00	NC	NA	3.00E-01	4.02E-09	NA	3.0E-02	NA	1.3E-07
120-12-7	Anthracene	4.3E+00	NC	NA	3.00E-01	1.12E-08	NA	3.0E-01	NA	3.7E-08
56-55-3	Benzo(a)anthracene	1.7E+01	3.0E-01	1.71E-08	3.00E-01	4.45E-08	7.3E-01	3.0E-02	1E-08	1.5E-06
50-32-8	Benzo(a)pyrene	1.1E+01	3.0E-01	1.11E-08	3.00E-01	2.88E-08	7.3E+00	3.0E-02	8E-08	9.6E-07
205-99-2	Benzo(b)fluoranthene	1.3E+01	3.0E-01	1.31E-08	3.00E-01	3.40E-08	7.3E-01	3.0E-02	1E-08	1.1E-06
191-24-2	Benzo(g,h,i)perylene	4.1E+00	NC	NA	3.00E-01	1.08E-08	NA	3.0E-02	NA	3.6E-07
207-08-9	Benzo(k)fluoranthene	7.4E+00	3.0E-01	7.46E-09	3.00E-01	1.94E-08	7.3E-02	3.0E-02	5E-10	6.5E-07
218-01-9	Chrysene	7.2E+00	3.0E-01	7.24E-09	3.00E-01	1.88E-08	7.3E-02	3.0E-02	5E-10	6.3E-07
53-70-3	Dibenz(a,h)anthracene	9.4E+00	3.0E-01	9.48E-09	3.00E-01	2.46E-08	7.3E+00	3.0E-02	7E-08	8.2E-07
206-44-0	Fluoranthene	2.1E+01	NC	NA	3.00E-01	5.38E-08	NA	4.0E-02	NA	1.3E-06
86-73-7	Fluorene	2.0E+00	NC	NA	3.00E-01	5.33E-09	NA	4.0E-02	NA	1.3E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.0E+00	3.0E-01	4.02E-09	3.00E-01	1.04E-08	7.3E-01	3.0E-02	3E-09	3.5E-07
91-57-6	2-Methylnaphthalene	6.0E-01	NC	NA	3.00E-01	1.58E-09	NA	4.0E-03	NA	4.0E-07
85-01-8	Phenanthrene	1.7E+01	NC	NA	3.00E-01	4.35E-08	NA	3.0E-02	NA	1.5E-06
129-00-0	Pyrene	1.8E+01	NC	NA	3.00E-01	4.72E-08	NA	3.0E-02	NA	1.6E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	4.9E+00	1.0E+00	1.64E-08	1.00E+00	4.25E-08	2.0E+00	2.0E-05	3E-08	2.1E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.90E-13	1.00E+00	4.93E-13	1.5E+05	7.0E-10	3E-08	7.0E-04
Metals										
7440-38-2	Arsenic	1.5E+01	5.0E-01	2.45E-08	5.00E-01	6.35E-08	1.5E+00	3.0E-04	4E-08	2.1E-04
7440-39-3	Barium	2.1E+02	NC	NA	1.00E+00	1.81E-06	NA	2.0E-01	NA	9.1E-06
7440-43-9	Cadmium	1.7E+00	NC	NA	1.00E+00	1.45E-08	NA	5.0E-04	NA	2.9E-05
16065-83-1	Chromium III	2.1E+01	NC	NA	1.00E+00	1.86E-07	NA	1.5E+00	NA	1.2E-07
7439-92-1	Lead	1.8E+03	NC	NA	5.00E-01	7.85E-06	NA	7.5E-04	NA	1.0E-02
7439-97-6	Mercury	6.0E-01	NC	NA	5.00E-01	2.61E-09	NA	3.0E-04	NA	8.7E-06
7440-22-4	Silver	6.1E-01	NC	NA	1.00E+00	5.33E-09	NA	5.0E-03	NA	1.1E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	2.7E-07	1.4E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 21
Adult Staff - 0-15'
Incidential Ingestion of Soil
HS-6 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.5E-01	NC	NA	0.3	1.5E-08	NA	6.0E-02	NA	2.5E-07
120-12-7	Anthracene	3.0E-01	NC	NA	0.3	3.0E-08	NA	3.0E-01	NA	1.0E-07
56-55-3	Benzo(a)anthracene	5.2E-01	0.3	2.0E-08	0.3	5.3E-08	7.3E-01	3.0E-02	1E-08	1.8E-06
50-32-8	Benzo(a)pyrene	4.6E-01	0.3	1.8E-08	0.3	4.6E-08	7.3E+00	3.0E-02	1E-07	1.5E-06
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.3	2.2E-08	0.3	5.7E-08	7.3E-01	3.0E-02	2E-08	1.9E-06
207-08-9	Benzo(k)fluoranthene	2.6E-01	0.3	1.0E-08	0.3	2.6E-08	7.3E-02	3.0E-02	7E-10	8.6E-07
218-01-9	Chrysene	5.3E-01	0.3	2.0E-08	0.3	5.3E-08	7.3E-02	3.0E-02	1E-09	1.8E-06
206-44-0	Fluoranthene	9.8E-01	NC	NA	0.3	9.9E-08	NA	4.0E-02	NA	2.5E-06
91-20-3	Naphthalene	1.3E-01	NC	NA	0.3	1.3E-08	NA	2.0E-02	NA	6.7E-07
85-01-8	Phenanthrene	9.7E-01	NC	NA	0.3	9.7E-08	NA	3.0E-02	NA	3.2E-06
129-00-0	Pyrene	8.3E-01	NC	NA	0.3	8.4E-08	NA	3.0E-02	NA	2.8E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	3.9E+00	1	5.1E-07	1	1.3E-06	2.0E+00	2.0E-05	1E-06	6.6E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1	7.3E-12	1	1.9E-11	1.5E+05	7.0E-10	1E-06	2.7E-02
Metals										
7440-39-3	Barium	3.7E+02	NC	NA	1	1.2E-04	NA	2.0E-01	NA	6.2E-04
7440-41-7	Beryllium	1.9E-01	NC	NA	1	6.3E-08	NA	2.0E-03	NA	3.2E-05
7440-43-9	Cadmium	5.1E-01	NC	NA	1	1.7E-07	NA	5.0E-04	NA	3.4E-04
16065-83-1	Chromium III	9.1E+01	NC	NA	1	3.1E-05	NA	1.5E+00	NA	2.0E-05
7439-92-1	Lead	1.4E+02	NC	NA	0.5	2.3E-05	NA	7.5E-04	NA	3.0E-02
7439-97-6	Mercury	9.1E-02	NC	NA	0.5	1.5E-08	NA	3.0E-04	NA	5.1E-05
7440-02-0	Nickel	9.6E+00	NC	NA	1	3.2E-06	NA	2.0E-02	NA	1.6E-04
7440-62-2	Vanadium	3.6E+01	NC	NA	1	1.2E-05	NA	9.0E-03	NA	1.3E-03
7440-66-6	Zinc	8.5E+01	NC	NA	1	2.8E-05	NA	3.0E-01	NA	9.5E-05

	Cancer Risk	Hazard Index
TOTAL:	2.3E-06	1.3E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 22
Adult Staff - 0-15'
Dermal Contact with Surface Soil
HS-6 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
83-32-9	Acenaphthene	1.5E-01	NA	NA	0.1	1.1E-08	NA	6.0E-02	NA	1.8E-07
120-12-7	Anthracene	3.0E-01	NA	NA	0.1	2.1E-08	NA	3.0E-01	NA	6.9E-08
56-55-3	Benzo(a)anthracene	5.2E-01	0.02	2.8E-09	0.02	7.3E-09	7.3E-01	3.0E-02	2E-09	2.4E-07
50-32-8	Benzo(a)pyrene	4.6E-01	0.02	2.5E-09	0.02	6.4E-09	7.3E+00	3.0E-02	2E-08	2.1E-07
205-99-2	Benzo(b)fluoranthene	5.7E-01	0.02	3.1E-09	0.02	8.0E-09	7.3E-01	3.0E-02	2E-09	2.7E-07
207-08-9	Benzo(k)fluoranthene	2.6E-01	0.02	1.4E-09	0.02	3.6E-09	7.3E-02	3.0E-02	1E-10	1.2E-07
218-01-9	Chrysene	5.3E-01	0.02	2.8E-09	0.02	7.4E-09	7.3E-02	3.0E-02	2E-10	2.5E-07
206-44-0	Fluoranthene	9.8E-01	NA	NA	0.1	6.9E-08	NA	4.0E-02	NA	1.7E-06
91-20-3	Naphthalene	1.3E-01	NA	NA	0.1	9.3E-09	NA	2.0E-02	NA	4.6E-07
85-01-8	Phenanthrene	9.7E-01	NA	NA	0.1	6.8E-08	NA	3.0E-02	NA	2.3E-06
129-00-0	Pyrene	8.3E-01	NA	NA	0.1	5.8E-08	NA	3.0E-02	NA	1.9E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	3.9E+00	0.1	1.1E-07	0.1	2.8E-07	2.0E+00	2.0E-05	2E-07	1.4E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	1.5E-12	0.1	4.0E-12	1.5E+05	7.0E-10	2E-07	5.7E-03
Metals										
7440-39-3	Barium	3.7E+02	NA	NA	0.1	2.6E-05	NA	2.0E-01	NA	1.3E-04
7440-41-7	Beryllium	1.9E-01	NA	NA	0.1	1.3E-08	NA	2.0E-03	NA	6.6E-06
7440-43-9	Cadmium	5.1E-01	NA	NA	0.01	3.6E-09	NA	5.0E-04	NA	7.1E-06
16065-83-1	Chromium III	9.1E+01	NA	NA	0.1	6.4E-06	NA	1.5E+00	NA	4.3E-06
7439-92-1	Lead	1.4E+02	NA	NA	0.006	5.7E-07	NA	7.5E-04	NA	7.6E-04
7439-97-6	Mercury	9.1E-02	NA	NA	0.1	6.4E-09	NA	3.0E-04	NA	2.1E-05
7440-02-0	Nickel	9.6E+00	NA	NA	0.2	1.4E-06	NA	2.0E-02	NA	6.8E-05
7440-62-2	Vanadium	3.6E+01	NA	NA	0.1	2.5E-06	NA	9.0E-03	NA	2.8E-04
7440-66-6	Zinc	8.5E+01	NA	NA	0.1	5.9E-06	NA	3.0E-01	NA	2.0E-05

	Cancer Risk	Hazard Index
TOTAL:	4.6E-07	2.1E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 23
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-6 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
83-32-9	Acenaphthene	1.5E-01	1.7E-07	4.4E-07	NA	5.0E+01	NA	8.8E-09
120-12-7	Anthracene	3.0E-01	3.3E-07	8.6E-07	NA	5.0E+01	NA	1.7E-08
56-55-3	Benzo(a)anthracene	5.2E-01	5.8E-07	1.5E-06	2.1E-04	5.0E+01	1E-10	3.0E-08
50-32-8	Benzo(a)pyrene	4.6E-01	5.1E-07	1.3E-06	2.1E-03	5.0E+01	1E-09	2.7E-08
205-99-2	Benzo(b)fluoranthene	5.7E-01	6.4E-07	1.7E-06	2.1E-04	5.0E+01	1E-10	3.3E-08
207-08-9	Benzo(k)fluoranthene	2.6E-01	2.9E-07	7.5E-07	2.1E-05	5.0E+01	6E-12	1.5E-08
218-01-9	Chrysene	5.3E-01	5.9E-07	1.5E-06	2.1E-05	5.0E+01	1E-11	3.1E-08
206-44-0	Fluoranthene	9.8E-01	1.1E-06	2.9E-06	NA	5.0E+01	NA	5.7E-08
91-20-3	Naphthalene	1.3E-01	1.5E-07	3.9E-07	NA	3.0E+00	NA	1.3E-07
85-01-8	Phenanthrene	9.7E-01	1.1E-06	2.8E-06	NA	5.0E+01	NA	5.6E-08
129-00-0	Pyrene	8.3E-01	9.4E-07	2.4E-06	NA	5.0E+01	NA	4.8E-08
Dioxins/PCBs								
1336-36-3	Total PCBs	3.9E+00	4.4E-06	1.1E-05	1.0E-04	2.0E-02	4E-10	5.7E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	6.3E-11	1.6E-10	3.3E+01	2.0E-06	2E-09	8.2E-05
Metals								
7440-39-3	Barium	3.7E+02	4.1E-04	1.1E-03	NA	5.0E-01	NA	2.1E-03
7440-41-7	Beryllium	1.9E-01	2.1E-07	5.4E-07	2.4E-03	2.0E-02	5E-10	2.7E-05
7440-43-9	Cadmium	5.1E-01	5.7E-07	1.5E-06	1.8E-03	2.0E-02	1E-09	7.4E-05
16065-83-1	Chromium III	9.1E+01	1.0E-04	2.7E-04	NA	1.0E-01	NA	2.7E-03
7439-92-1	Lead	1.4E+02	1.5E-04	3.9E-04	NA	1.0E+00	NA	3.9E-04
7439-97-6	Mercury	9.1E-02	1.0E-07	2.6E-07	NA	3.0E-01	NA	8.8E-07
7440-02-0	Nickel	9.6E+00	1.1E-05	2.8E-05	4.8E-04	1.0E+00	5E-09	2.8E-05
7440-62-2	Vanadium	3.6E+01	4.0E-05	1.0E-04	NA	1.0E+00	NA	1.0E-04
7440-66-6	Zinc	8.5E+01	9.5E-05	2.5E-04	NA	1.4E+00	NA	1.8E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.1E-08	6.2E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 24
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-6 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
83-32-9	Acenaphthene	1.5E-01	NC	NA	3.00E-01	3.96E-10	NA	6.0E-02	NA	6.6E-09
120-12-7	Anthracene	3.0E-01	NC	NA	3.00E-01	7.77E-10	NA	3.0E-01	NA	2.6E-09
56-55-3	Benzo(a)anthracene	5.2E-01	3.0E-01	5.25E-10	3.00E-01	1.36E-09	7.3E-01	3.0E-02	4E-10	4.5E-08
50-32-8	Benzo(a)pyrene	4.6E-01	3.0E-01	4.63E-10	3.00E-01	1.20E-09	7.3E+00	3.0E-02	3E-09	4.0E-08
205-99-2	Benzo(b)fluoranthene	5.7E-01	3.0E-01	5.73E-10	3.00E-01	1.49E-09	7.3E-01	3.0E-02	4E-10	5.0E-08
207-08-9	Benzo(k)fluoranthene	2.6E-01	3.0E-01	2.59E-10	3.00E-01	6.72E-10	7.3E-02	3.0E-02	2E-11	2.2E-08
218-01-9	Chrysene	5.3E-01	3.0E-01	5.30E-10	3.00E-01	1.37E-09	7.3E-02	3.0E-02	4E-11	4.6E-08
206-44-0	Fluoranthene	9.8E-01	NC	NA	3.00E-01	2.57E-09	NA	4.0E-02	NA	6.4E-08
91-20-3	Naphthalene	1.3E-01	NC	NA	3.00E-01	3.47E-10	NA	2.0E-02	NA	1.7E-08
85-01-8	Phenanthrene	9.7E-01	NC	NA	3.00E-01	2.53E-09	NA	3.0E-02	NA	8.4E-08
129-00-0	Pyrene	8.3E-01	NC	NA	3.00E-01	2.18E-09	NA	3.0E-02	NA	7.3E-08
Dioxins/PCBs										
1336-36-3	Total PCBs	3.9E+00	1.0E+00	1.33E-08	1.00E+00	3.44E-08	2.0E+00	2.0E-05	3E-08	1.7E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.90E-13	1.00E+00	4.93E-13	1.5E+05	7.0E-10	3E-08	7.0E-04
Metals										
7440-39-3	Barium	3.7E+02	NC	NA	1.00E+00	3.21E-06	NA	2.0E-01	NA	1.6E-05
7440-41-7	Beryllium	1.9E-01	NC	NA	1.00E+00	1.63E-09	NA	2.0E-03	NA	8.2E-07
7440-43-9	Cadmium	5.1E-01	NC	NA	1.00E+00	4.44E-09	NA	5.0E-04	NA	8.9E-06
16065-83-1	Chromium III	9.1E+01	NC	NA	1.00E+00	7.96E-07	NA	1.5E+00	NA	5.3E-07
7439-92-1	Lead	1.4E+02	NC	NA	5.00E-01	5.90E-07	NA	7.5E-04	NA	7.9E-04
7439-97-6	Mercury	9.1E-02	NC	NA	5.00E-01	3.96E-10	NA	3.0E-04	NA	1.3E-06
7440-02-0	Nickel	9.6E+00	NC	NA	1.00E+00	8.41E-08	NA	2.0E-02	NA	4.2E-06
7440-62-2	Vanadium	3.6E+01	NC	NA	1.00E+00	3.13E-07	NA	9.0E-03	NA	3.5E-05
7440-66-6	Zinc	8.5E+01	NC	NA	1.00E+00	7.38E-07	NA	3.0E-01	NA	2.5E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	5.9E-08	3.3E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 25
Adult Staff - 0-15'
Incidential Ingestion of Soil
HS-7 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.2E-01	1	2.8E-08	1	7.4E-08	2.0E+00	2.0E-05	6E-08	3.7E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1	7.3E-12	1	1.9E-11	1.5E+05	7.0E-10	1E-06	2.7E-02
Metals										
7440-39-3	Barium	9.0E+01	NC	NA	1	3.0E-05	NA	2.0E-01	NA	1.5E-04
7440-41-7	Beryllium	4.0E-01	NC	NA	1	1.3E-07	NA	2.0E-03	NA	6.7E-05
7440-43-9	Cadmium	1.0E+00	NC	NA	1	3.4E-07	NA	5.0E-04	NA	6.8E-04
16065-83-1	Chromium III	1.6E+01	NC	NA	1	5.3E-06	NA	1.5E+00	NA	3.6E-06
7439-92-1	Lead	3.2E+02	NC	NA	0.5	5.4E-05	NA	7.5E-04	NA	7.1E-02
7440-02-0	Nickel	1.0E+01	NC	NA	1	3.4E-06	NA	2.0E-02	NA	1.7E-04
7440-66-6	Zinc	1.4E+02	NC	NA	1	4.7E-05	NA	3.0E-01	NA	1.6E-04

	Cancer Risk	Hazard Index
TOTAL:	1.2E-06	1.0E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 26
Adult Staff - 0-15'
Dermal Contact with Soil
HS-7 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.2E-01	0.1	5.9E-09	0.1	1.5E-08	2.0E+00	2.0E-05	1E-08	7.7E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	1.5E-12	0.1	4.0E-12	1.5E+05	7.0E-10	2E-07	5.7E-03
Metals										
7440-39-3	Barium	9.0E+01	NA	NA	0.1	6.3E-06	NA	2.0E-01	NA	3.1E-05
7440-41-7	Beryllium	4.0E-01	NA	NA	0.1	2.8E-08	NA	2.0E-03	NA	1.4E-05
7440-43-9	Cadmium	1.0E+00	NA	NA	0.01	7.1E-09	NA	5.0E-04	NA	1.4E-05
16065-83-1	Chromium III	1.6E+01	NA	NA	0.1	1.1E-06	NA	1.5E+00	NA	7.4E-07
7439-92-1	Lead	3.2E+02	NA	NA	0.006	1.3E-06	NA	7.5E-04	NA	1.8E-03
7440-02-0	Nickel	1.0E+01	NA	NA	0.2	1.4E-06	NA	2.0E-02	NA	7.1E-05
7440-66-6	Zinc	1.4E+02	NA	NA	0.1	9.7E-06	NA	3.0E-01	NA	3.2E-05

	Cancer Risk	Hazard Index
TOTAL:	2.4E-07	8.4E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 27
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-7 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs								
1336-36-3	Total PCBs	2.2E-01	2.5E-07	6.4E-07	1.0E-04	2.0E-02	2E-11	3.2E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	6.3E-11	1.6E-10	3.3E+01	2.0E-06	2E-09	8.2E-05
Metals								
7440-39-3	Barium	9.0E+01	1.0E-04	2.6E-04	NA	5.0E-01	NA	5.2E-04
7440-41-7	Beryllium	4.0E-01	4.5E-07	1.2E-06	2.4E-03	2.0E-02	1E-09	5.8E-05
7440-43-9	Cadmium	1.0E+00	1.1E-06	2.9E-06	1.8E-03	2.0E-02	2E-09	1.5E-04
16065-83-1	Chromium III	1.6E+01	1.8E-05	4.6E-05	NA	1.0E-01	NA	4.6E-04
7439-92-1	Lead	3.2E+02	3.6E-04	9.2E-04	NA	1.0E+00	NA	9.2E-04
7440-02-0	Nickel	1.0E+01	1.1E-05	2.9E-05	4.8E-04	1.0E+00	5E-09	2.9E-05
7440-66-6	Zinc	1.4E+02	1.6E-04	4.0E-04	NA	1.4E+00	NA	2.9E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.1E-08	2.5E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 28
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-7 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
Dioxins/PCBs										
1336-36-3	Total PCBs	2.2E-01	1.0E+00	7.37E-10	1.00E+00	1.91E-09	2.0E+00	2.0E-05	1E-09	9.5E-05
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.90E-13	1.00E+00	4.93E-13	1.5E+05	7.0E-10	3E-08	7.0E-04
Metals										
7440-39-3	Barium	9.0E+01	NC	NA	1.00E+00	7.82E-07	NA	2.0E-01	NA	3.9E-06
7440-41-7	Beryllium	4.0E-01	NC	NA	1.00E+00	3.48E-09	NA	2.0E-03	NA	1.7E-06
7440-43-9	Cadmium	1.0E+00	NC	NA	1.00E+00	8.82E-09	NA	5.0E-04	NA	1.8E-05
16065-83-1	Chromium III	1.6E+01	NC	NA	1.00E+00	1.38E-07	NA	1.5E+00	NA	9.2E-08
7439-92-1	Lead	3.2E+02	NC	NA	5.00E-01	1.39E-06	NA	7.5E-04	NA	1.8E-03
7440-02-0	Nickel	1.0E+01	NC	NA	1.00E+00	8.81E-08	NA	2.0E-02	NA	4.4E-06
7440-66-6	Zinc	1.4E+02	NC	NA	1.00E+00	1.21E-06	NA	3.0E-01	NA	4.0E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	3.0E-08	2.7E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 29
Adult Solar Worker - 0-15'
Incidential Ingestion of Surface Soil
HS-8 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs/VPH										
C9-C10	p-Isopropyltouene	1.2E+00	NC	NA	1	1.6E-07	NA	3.0E-02	NA	5.4E-06
C9-C10	C9-C10 Aromatics	5.1E+01	NC	NA	1	6.9E-06	NA	3.0E-02	NA	2.3E-04
C9-C12	C9-C12 Aliphatics	2.5E+01	NC	NA	1	3.4E-06	NA	1.0E-01	NA	3.4E-05
EPH										
C19-C36	C19-C36 Aliphatics	1.6E+02	NC	NA	1	2.2E-05	NA	2.0E+00	NA	1.1E-05
C11-C22	C11-C22 Aromatics	1.2E+02	NC	NA	0.3	4.8E-06	NA	3.0E-02	NA	1.6E-04
SVOCs										
65-85-0	Benzoic Acid	2.4E+00	NC	NA	0.96	3.1E-07	NA	4.0E+00	NA	7.7E-08
131-11-3	Dimethylphthalate	2.8E-01	NC	NA	1	3.8E-08	NA	1.0E-01	NA	3.8E-07
84-74-2	di-n-Butylphthalate	1.0E+00	NC	NA	1	1.4E-07	NA	1.0E-01	NA	1.4E-06
85-68-7	Butyl benzyl phthalate	2.4E-01	1	1.2E-08	1	3.2E-08	NA	2.0E-01	NA	1.6E-07
117-81-7	bis(2-Ethylhexyl)pythalate	3.0E+00	1	1.6E-07	1	4.1E-07	1.4E-02	2.0E-02	2E-09	2.0E-05
86-74-8	Carbazole	2.0E+00	0.28	2.9E-08	0.28	7.4E-08	2.0E-02	3.0E-02	6E-10	2.5E-06
132-64-9	Dibenzofuran	7.2E-01	NC	NA	0.96	9.3E-08	NA	1.0E-03	NA	9.3E-05
83-32-9	Acenaphthene	4.5E+00	NC	NA	0.3	1.8E-07	NA	6.0E-02	NA	3.0E-06
208-96-8	Acenaphthylene	6.6E-01	NC	NA	0.3	2.7E-08	NA	3.0E-02	NA	8.8E-07
120-12-7	Anthracene	7.9E+00	NC	NA	0.3	3.2E-07	NA	3.0E-01	NA	1.1E-06
56-55-3	Benzo(a)anthracene	3.3E+01	0.3	5.1E-07	0.3	1.3E-06	7.3E-01	3.0E-02	4E-07	4.4E-05
50-32-8	Benzo(a)pyrene	2.6E+01	0.3	4.1E-07	0.3	1.1E-06	7.3E+00	3.0E-02	3E-06	3.5E-05
205-99-2	Benzo(b)fluoranthene	4.7E+01	0.3	7.3E-07	0.3	1.9E-06	7.3E-01	3.0E-02	5E-07	6.3E-05
191-24-2	Benzo(g,h,i)perylene	2.9E+00	NC	NA	0.3	1.2E-07	NA	3.0E-02	NA	3.9E-06
207-08-9	Benzo(k)fluoranthene	3.9E+00	0.3	6.1E-08	0.3	1.6E-07	7.3E-02	3.0E-02	4E-09	5.3E-06
218-01-9	Chrysene	9.0E+00	0.3	1.4E-07	0.3	3.6E-07	7.3E-02	3.0E-02	1E-08	1.2E-05
53-70-3	Dibenz(a,h)anthracene	3.2E+00	0.3	5.0E-08	0.3	1.3E-07	7.3E+00	3.0E-02	4E-07	4.3E-06
206-44-0	Fluoranthene	2.3E+01	NC	NA	0.3	9.3E-07	NA	4.0E-02	NA	2.3E-05
86-73-7	Fluorene	4.6E+00	NC	NA	0.3	1.9E-07	NA	4.0E-02	NA	4.6E-06
193-39-5	Indeno(1,2,3-cd)pyrene	3.0E+00	0.3	4.7E-08	0.3	1.2E-07	7.3E-01	3.0E-02	3E-08	4.1E-06
91-57-6	2-Methylnaphthalene	2.0E+00	NC	NA	0.3	7.9E-08	NA	4.0E-03	NA	2.0E-05
91-20-3	Naphthalene	7.6E+01	NC	NA	0.3	3.1E-06	NA	2.0E-02	NA	1.5E-04
85-01-8	Phenanthrene	3.0E+01	NC	NA	0.3	1.2E-06	NA	3.0E-02	NA	4.0E-05
129-00-0	Pyrene	1.6E+01	NC	NA	0.3	6.5E-07	NA	3.0E-02	NA	2.2E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	3.8E+00	1	2.0E-07	1	5.1E-07	2.0E+00	2.0E-05	4E-07	2.6E-02
1746-01-6	Dioxin/PCB TEQ	1.9E-04	1	9.8E-12	1	2.5E-11	1.5E+05	7.0E-10	1E-06	3.6E-02
Metals										
7440-38-2	Arsenic	6.9E+00	0.5	1.8E-07	0.5	4.7E-07	1.5E+00	3.0E-04	3E-07	1.6E-03
7440-39-3	Barium	8.7E+02	NC	NA	1	1.2E-04	NA	2.0E-01	NA	5.8E-04
7440-41-7	Beryllium	2.0E-01	NC	NA	1	2.7E-08	NA	2.0E-03	NA	1.3E-05
7440-43-9	Cadmium	4.6E+00	NC	NA	1	6.2E-07	NA	5.0E-04	NA	1.2E-03
16065-83-1	Chromium III	1.3E+02	NC	NA	1	1.7E-05	NA	1.5E+00	NA	1.1E-05
7439-92-1	Lead	1.6E+03	NC	NA	0.5	1.1E-04	NA	7.5E-04	NA	1.4E-01
7439-97-6	Mercury	9.8E-01	NC	NA	0.5	6.6E-08	NA	3.0E-04	NA	2.2E-04
7440-02-0	Nickel	2.7E+01	NC	NA	1	3.6E-06	NA	2.0E-02	NA	1.8E-04
7782-49-2	Selenium	1.1E+00	NC	NA	1	1.4E-07	NA	5.0E-03	NA	2.9E-05
7440-22-4	Silver	1.4E+00	NC	NA	1	1.9E-07	NA	5.0E-03	NA	3.8E-05
7440-62-2	Vanadium	8.1E+01	NC	NA	1	1.1E-05	NA	9.0E-03	NA	1.2E-03
7440-66-6	Zinc	2.7E+02	NC	NA	1	3.6E-05	NA	3.0E-01	NA	1.2E-04

	Cancer Risk	Hazard Index
TOTAL:	6.4E-06	2.1E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 30
Adult Solar Worker - 0-15'
Dermal Contact with Surface Soil
HS-8 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
VOCs/VPH										
C9-C10	p-Isopropyltouene	1.2E+00	NA	NA	0.2	6.7E-08	NA	3.0E-02	NA	2.2E-06
C9-C10	C9-C10 Aromatics	5.1E+01	NA	NA	0.2	2.9E-06	NA	3.0E-02	NA	9.5E-05
C9-C12	C9-C12 Aliphatics	2.5E+01	NA	NA	0.2	1.4E-06	NA	1.0E-01	NA	1.4E-05
EPH										
C19-C36	C19-C36 Aliphatics	1.6E+02	NA	NA	0.2	9.0E-06	NA	2.0E+00	NA	4.5E-06
C11-C22	C11-C22 Aromatics	1.2E+02	NA	NA	0.1	3.4E-06	NA	3.0E-02	NA	1.1E-04
SVOCs										
65-85-0	Benzoic Acid	2.4E+00	NA	NA	0.18	1.2E-07	NA	4.0E+00	NA	3.0E-08
131-11-3	Dimethylphthalate	2.8E-01	NA	NA	0.1	8.0E-09	NA	1.0E-01	NA	8.0E-08
84-74-2	di-n-Butylphthalate	1.0E+00	NA	NA	0.07	2.0E-08	NA	1.0E-01	NA	2.0E-07
85-68-7	Butyl benzyl phthalate	2.4E-01	1	2.6E-08	1	6.7E-08	NA	2.0E-01	NA	3.4E-07
117-81-7	bis(2-Ethylhexyl)pythalate	3.0E+00	0.1	3.3E-08	0.1	8.5E-08	1.4E-02	2.0E-02	5E-10	4.3E-06
86-74-8	Carbazole	2.0E+00	0.02	4.3E-09	0.02	1.1E-08	2.0E-02	3.0E-02	9E-11	3.7E-07
132-64-9	Dibenzofuran	7.2E-01	NA	NA	0.18	3.6E-08	NA	1.0E-03	NA	3.6E-05
83-32-9	Acenaphthene	4.5E+00	NA	NA	0.1	1.3E-07	NA	6.0E-02	NA	2.1E-06
208-96-8	Acenaphthylene	6.6E-01	NA	NA	0.1	1.8E-08	NA	3.0E-02	NA	6.1E-07
120-12-7	Anthracene	7.9E+00	NA	NA	0.1	2.2E-07	NA	3.0E-01	NA	7.3E-07
56-55-3	Benzo(a)anthracene	3.3E+01	0.02	7.1E-08	0.02	1.8E-07	7.3E-01	3.0E-02	5E-08	6.1E-06
50-32-8	Benzo(a)pyrene	2.6E+01	0.02	5.7E-08	0.02	1.5E-07	7.3E+00	3.0E-02	4E-07	4.9E-06
205-99-2	Benzo(b)fluoranthene	4.7E+01	0.02	1.0E-07	0.02	2.6E-07	7.3E-01	3.0E-02	7E-08	8.8E-06
191-24-2	Benzo(g,h,i)perylene	2.9E+00	NA	NA	0.1	8.2E-08	NA	3.0E-02	NA	2.7E-06
207-08-9	Benzo(k)fluoranthene	3.9E+00	0.02	8.4E-09	0.02	2.2E-08	7.3E-02	3.0E-02	6E-10	7.3E-07
218-01-9	Chrysene	9.0E+00	0.02	1.9E-08	0.02	5.0E-08	7.3E-02	3.0E-02	1E-09	1.7E-06
53-70-3	Dibenz(a,h)anthracene	3.2E+00	0.02	6.9E-09	0.02	1.8E-08	7.3E+00	3.0E-02	5E-08	6.0E-07
206-44-0	Fluoranthene	2.3E+01	NA	NA	0.1	6.5E-07	NA	4.0E-02	NA	1.6E-05
86-73-7	Fluorene	4.6E+00	NA	NA	0.1	1.3E-07	NA	4.0E-02	NA	3.2E-06
193-39-5	Indeno(1,2,3-cd)pyrene	3.0E+00	0.02	6.5E-09	0.02	1.7E-08	7.3E-01	3.0E-02	5E-09	5.6E-07
91-57-6	2-Methylnaphthalene	2.0E+00	NA	NA	0.1	5.5E-08	NA	4.0E-03	NA	1.4E-05
91-20-3	Naphthalene	7.6E+01	NA	NA	0.1	2.1E-06	NA	2.0E-02	NA	1.1E-04
85-01-8	Phenanthrene	3.0E+01	NA	NA	0.1	8.3E-07	NA	3.0E-02	NA	2.8E-05
129-00-0	Pyrene	1.6E+01	NA	NA	0.1	4.5E-07	NA	3.0E-02	NA	1.5E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	3.8E+00	0.1	4.1E-08	0.1	1.1E-07	2.0E+00	2.0E-05	8E-08	5.3E-03
1746-01-6	Dioxin/PCB TEQ	1.9E-04	0.1	2.0E-12	0.1	5.3E-12	1.5E+05	7.0E-10	3E-07	7.6E-03
Metals										
7440-38-2	Arsenic	6.9E+00	0.03	2.2E-08	0.03	5.8E-08	1.5E+00	3.0E-04	3E-08	1.9E-04
7440-39-3	Barium	8.7E+02	NA	NA	0.1	2.4E-05	NA	2.0E-01	NA	1.2E-04
7440-41-7	Beryllium	2.0E-01	NA	NA	0.1	5.6E-09	NA	2.0E-03	NA	2.8E-06
7440-43-9	Cadmium	4.6E+00	NA	NA	0.01	1.3E-08	NA	5.0E-04	NA	2.6E-05
16065-83-1	Chromium III	1.3E+02	NA	NA	0.1	3.6E-06	NA	1.5E+00	NA	2.4E-06
7439-92-1	Lead	1.6E+03	NA	NA	0.006	2.7E-06	NA	7.5E-04	NA	3.6E-03
7439-97-6	Mercury	9.8E-01	NA	NA	0.1	2.8E-08	NA	3.0E-04	NA	9.2E-05
7440-02-0	Nickel	2.7E+01	NA	NA	0.2	1.5E-06	NA	2.0E-02	NA	7.5E-05
7782-49-2	Selenium	1.1E+00	NA	NA	0.01	3.0E-09	NA	5.0E-03	NA	5.9E-07
7440-22-4	Silver	1.4E+00	NA	NA	0.3	1.2E-07	NA	5.0E-03	NA	2.4E-05
7440-62-2	Vanadium	8.1E+01	NA	NA	0.1	2.3E-06	NA	9.0E-03	NA	2.5E-04
7440-66-6	Zinc	2.7E+02	NA	NA	0.1	7.5E-06	NA	3.0E-01	NA	2.5E-05

	Cancer Risk	Hazard Index
TOTAL:	1.0E-06	1.8E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 31
Adult Solar Worker - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-8 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs/VPH								
C9-C10	p-Isopropyltouene	1.2E+00	5.4E-07	1.4E-06	NA	5.0E+01	NA	2.8E-08
C9-C10	C9-C10 Aromatics	5.1E+01	2.3E-05	5.9E-05	NA	5.0E+01	NA	1.2E-06
C9-C12	C9-C12 Aliphatics	2.5E+01	1.1E-05	2.9E-05	NA	2.0E+02	NA	1.5E-07
EPH								
C19-C36	C19-C36 Aliphatics	1.6E+02	7.2E-05	1.9E-04	NA	NA	NA	NA
C11-C22	C11-C22 Aromatics	1.2E+02	5.4E-05	1.4E-04	NA	5.0E+01	NA	2.8E-06
SVOCs								
65-85-0	Benzoic Acid	2.4E+00	1.1E-06	2.8E-06	NA	1.4E+04	NA	2.0E-10
131-11-3	Dimethylphthalate	2.8E-01	1.3E-07	3.3E-07	NA	4.0E+02	NA	8.3E-10
84-74-2	di-n-Butylphthalate	1.0E+00	4.5E-07	1.2E-06	NA	3.5E+02	NA	3.3E-09
85-68-7	Butyl benzyl phthalate	2.4E-01	1.1E-07	2.8E-07	NA	7.0E+02	NA	4.0E-10
117-81-7	bis(2-Ethylhexyl)pythalate	3.0E+00	1.4E-06	3.5E-06	1.3E-06	7.0E+00	2E-12	5.0E-07
86-74-8	Carbazole	2.0E+00	8.8E-07	2.3E-06	5.7E-06	5.0E+01	5E-12	4.6E-08
132-64-9	Dibenzofuran	7.2E-01	3.2E-07	8.3E-07	NA	3.5E+00	NA	2.4E-07
83-32-9	Acenaphthene	4.5E+00	2.0E-06	5.2E-06	NA	5.0E+01	NA	1.0E-07
208-96-8	Acenaphthylene	6.6E-01	2.9E-07	7.6E-07	NA	5.0E+01	NA	1.5E-08
120-12-7	Anthracene	7.9E+00	3.5E-06	9.1E-06	NA	5.0E+01	NA	1.8E-07
56-55-3	Benzo(a)anthracene	3.3E+01	1.5E-05	3.8E-05	2.1E-04	5.0E+01	3E-09	7.6E-07
50-32-8	Benzo(a)pyrene	2.6E+01	1.2E-05	3.0E-05	2.1E-03	5.0E+01	2E-08	6.1E-07
205-99-2	Benzo(b)fluoranthene	4.7E+01	2.1E-05	5.4E-05	2.1E-04	5.0E+01	4E-09	1.1E-06
191-24-2	Benzo(g,h,i)perylene	2.9E+00	1.3E-06	3.4E-06	NA	5.0E+01	NA	6.8E-08
207-08-9	Benzo(k)fluoranthene	3.9E+00	1.7E-06	4.5E-06	2.1E-05	5.0E+01	4E-11	9.1E-08
218-01-9	Chrysene	9.0E+00	4.0E-06	1.0E-05	2.1E-05	5.0E+01	8E-11	2.1E-07
53-70-3	Dibenz(a,h)anthracene	3.2E+00	1.4E-06	3.7E-06	2.1E-03	5.0E+01	3E-09	7.5E-08
206-44-0	Fluoranthene	2.3E+01	1.0E-05	2.7E-05	NA	5.0E+01	NA	5.4E-07
86-73-7	Fluorene	4.6E+00	2.1E-06	5.3E-06	NA	5.0E+01	NA	1.1E-07
193-39-5	Indeno(1,2,3-cd)pyrene	3.0E+00	1.4E-06	3.5E-06	2.1E-04	5.0E+01	3E-10	7.0E-08
91-57-6	2-Methylnaphthalene	2.0E+00	8.8E-07	2.3E-06	NA	5.0E+01	NA	4.5E-08
91-20-3	Naphthalene	7.6E+01	3.4E-05	8.8E-05	NA	3.0E+00	NA	2.9E-05
85-01-8	Phenanthrene	3.0E+01	1.3E-05	3.5E-05	NA	5.0E+01	NA	6.9E-07
129-00-0	Pyrene	1.6E+01	7.2E-06	1.9E-05	NA	5.0E+01	NA	3.7E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	3.8E+00	1.7E-06	4.4E-06	1.0E-04	2.0E-02	2E-10	2.2E-04
1746-01-6	Dioxin/PCB TEQ	1.9E-04	8.5E-11	2.2E-10	3.3E+01	2.0E-06	3E-09	1.1E-04
Metals								
7440-38-2	Arsenic	6.9E+00	3.1E-06	8.0E-06	3.0E-03	2.0E-02	9E-09	4.0E-04
7440-39-3	Barium	8.7E+02	3.9E-04	1.0E-03	NA	5.0E-01	NA	2.0E-03
7440-41-7	Beryllium	2.0E-01	9.0E-08	2.3E-07	2.4E-03	2.0E-02	2E-10	1.2E-05
7440-43-9	Cadmium	4.6E+00	2.1E-06	5.4E-06	1.8E-03	2.0E-02	4E-09	2.7E-04
16065-83-1	Chromium III	1.3E+02	5.7E-05	1.5E-04	NA	1.0E-01	NA	1.5E-03
7439-92-1	Lead	1.6E+03	7.2E-04	1.9E-03	NA	1.0E+00	NA	1.9E-03
7439-97-6	Mercury	9.8E-01	4.4E-07	1.1E-06	NA	3.0E-01	NA	3.8E-06
7440-02-0	Nickel	2.7E+01	1.2E-05	3.1E-05	4.8E-04	1.0E+00	6E-09	3.1E-05
7782-49-2	Selenium	1.1E+00	4.8E-07	1.2E-06	NA	3.0E+00	NA	4.1E-07
7440-22-4	Silver	1.4E+00	6.3E-07	1.6E-06	NA	1.4E-01	NA	1.2E-05
7440-62-2	Vanadium	8.1E+01	3.6E-05	9.4E-05	NA	1.0E+00	NA	9.4E-05
7440-66-6	Zinc	2.7E+02	1.2E-04	3.1E-04	NA	1.4E+00	NA	2.2E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	5.7E-08	6.8E-03

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 32
Adult Solar Worker - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-8 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
VOCs/VPH										
C9-C10	p-Isopropyltouene	1.2E+00	NC	NA	1.00E+00	4.18E-09	NA	3.0E-02	NA	1.4E-07
C9-C10	C9-C10 Aromatics	5.1E+01	NC	NA	1.00E+00	1.78E-07	NA	3.0E-02	NA	5.9E-06
C9-C12	C9-C12 Aliphatics	2.5E+01	NC	NA	1.00E+00	8.72E-08	NA	1.0E-01	NA	8.7E-07
EPH										
C19-C36	C19-C36 Aliphatics	1.6E+02	NC	NA	1.00E+00	5.58E-07	NA	2.0E+00	NA	2.8E-07
C11-C22	C11-C22 Aromatics	1.2E+02	NC	NA	3.00E-01	1.26E-07	NA	3.0E-02	NA	4.2E-06
SVOCs										
65-85-0	Benzoic Acid	2.4E+00	NC	NA	9.60E-01	8.03E-09	NA	4.0E+00	NA	2.0E-09
131-11-3	Dimethylphthalate	2.8E-01	NC	NA	1.00E+00	9.91E-10	NA	1.0E-01	NA	9.9E-09
84-74-2	di-n-Butylphthalate	1.0E+00	NC	NA	1.00E+00	3.51E-09	NA	1.0E-01	NA	3.5E-08
85-68-7	Butyl benzyl phthalate	2.4E-01	1.0E+00	3.22E-10	1.00E+00	8.34E-10	NA	2.0E-01	NA	4.2E-09
117-81-7	bis(2-Ethylhexyl)pythalate	3.0E+00	1.0E+00	4.08E-09	1.00E+00	1.06E-08	1.4E-02	2.0E-02	6E-11	5.3E-07
86-74-8	Carbazole	2.0E+00	2.8E-01	7.43E-10	2.80E-01	1.93E-09	2.0E-02	3.0E-02	1E-11	6.4E-08
132-64-9	Dibenzofuran	7.2E-01	NC	NA	9.60E-01	2.40E-09	NA	1.0E-03	NA	2.4E-06
83-32-9	Acenaphthene	4.5E+00	NC	NA	3.00E-01	4.67E-09	NA	6.0E-02	NA	7.8E-08
208-96-8	Acenaphthylene	6.6E-01	NC	NA	3.00E-01	6.87E-10	NA	3.0E-02	NA	2.3E-08
120-12-7	Anthracene	7.9E+00	NC	NA	3.00E-01	8.22E-09	NA	3.0E-01	NA	2.7E-08
56-55-3	Benzo(a)anthracene	3.3E+01	3.0E-01	1.32E-08	3.00E-01	3.42E-08	7.3E-01	3.0E-02	1E-08	1.1E-06
50-32-8	Benzo(a)pyrene	2.6E+01	3.0E-01	1.05E-08	3.00E-01	2.73E-08	7.3E+00	3.0E-02	8E-08	9.1E-07
205-99-2	Benzo(b)fluoranthene	4.7E+01	3.0E-01	1.89E-08	3.00E-01	4.90E-08	7.3E-01	3.0E-02	1E-08	1.6E-06
191-24-2	Benzo(g,h,i)perylene	2.9E+00	NC	NA	3.00E-01	3.06E-09	NA	3.0E-02	NA	1.0E-07
207-08-9	Benzo(k)fluoranthene	3.9E+00	3.0E-01	1.57E-09	3.00E-01	4.08E-09	7.3E-02	3.0E-02	1E-10	1.4E-07
218-01-9	Chrysene	9.0E+00	3.0E-01	3.63E-09	3.00E-01	9.41E-09	7.3E-02	3.0E-02	3E-10	3.1E-07
53-70-3	Dibenz(a,h)anthracene	3.2E+00	3.0E-01	1.29E-09	3.00E-01	3.35E-09	7.3E+00	3.0E-02	9E-09	1.1E-07
206-44-0	Fluoranthene	2.3E+01	NC	NA	3.00E-01	2.41E-08	NA	4.0E-02	NA	6.0E-07
86-73-7	Fluorene	4.6E+00	NC	NA	3.00E-01	4.80E-09	NA	4.0E-02	NA	1.2E-07
193-39-5	Indeno(1,2,3-cd)pyrene	3.0E+00	3.0E-01	1.22E-09	3.00E-01	3.16E-09	7.3E-01	3.0E-02	9E-10	1.1E-07
91-57-6	2-Methylnaphthalene	2.0E+00	NC	NA	3.00E-01	2.04E-09	NA	4.0E-03	NA	5.1E-07
91-20-3	Naphthalene	7.6E+01	NC	NA	3.00E-01	7.95E-08	NA	2.0E-02	NA	4.0E-06
85-01-8	Phenanthrene	3.0E+01	NC	NA	3.00E-01	3.11E-08	NA	3.0E-02	NA	1.0E-06
129-00-0	Pyrene	1.6E+01	NC	NA	3.00E-01	1.68E-08	NA	3.0E-02	NA	5.6E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	3.8E+00	1.0E+00	5.12E-09	1.00E+00	1.33E-08	2.0E+00	2.0E-05	1E-08	6.6E-04
1746-01-6	Dioxin/PCB TEQ	1.9E-04	1.0E+00	2.54E-13	1.00E+00	6.57E-13	1.5E+05	7.0E-10	4E-08	9.4E-04
Metals										
7440-38-2	Arsenic	6.9E+00	5.0E-01	4.65E-09	5.00E-01	1.21E-08	1.5E+00	3.0E-04	7E-09	4.0E-05
7440-39-3	Barium	8.7E+02	NC	NA	1.00E+00	3.02E-06	NA	2.0E-01	NA	1.5E-05
7440-41-7	Beryllium	2.0E-01	NC	NA	1.00E+00	6.99E-10	NA	2.0E-03	NA	3.5E-07
7440-43-9	Cadmium	4.6E+00	NC	NA	1.00E+00	1.62E-08	NA	5.0E-04	NA	3.2E-05
16065-83-1	Chromium III	1.3E+02	NC	NA	1.00E+00	4.42E-07	NA	1.5E+00	NA	2.9E-07
7439-92-1	Lead	1.6E+03	NC	NA	5.00E-01	2.81E-06	NA	7.5E-04	NA	3.7E-03
7439-97-6	Mercury	9.8E-01	NC	NA	5.00E-01	1.71E-09	NA	3.0E-04	NA	5.7E-06
7440-02-0	Nickel	2.7E+01	NC	NA	1.00E+00	9.28E-08	NA	2.0E-02	NA	4.6E-06
7782-49-2	Selenium	1.1E+00	NC	NA	1.00E+00	3.70E-09	NA	5.0E-03	NA	7.4E-07
7440-22-4	Silver	1.4E+00	NC	NA	1.00E+00	4.90E-09	NA	5.0E-03	NA	9.8E-07
7440-62-2	Vanadium	8.1E+01	NC	NA	1.00E+00	2.82E-07	NA	9.0E-03	NA	3.1E-05
7440-66-6	Zinc	2.7E+02	NC	NA	1.00E+00	9.37E-07	NA	3.0E-01	NA	3.1E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.7E-07	5.5E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.164	events/days (2 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 33
Adult Staff - 0-15'
Incidental Ingestion of Surface Soil
HS-9 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH/SVOCs										
C19-C36	C19-C36 Aliphatics	7.6E+01	NC	NA	1	2.6E-05	NA	2.0E+00	NA	1.3E-05
C11-C22	C11-C22 Aromatics	3.1E+01	NC	NA	0.3	3.1E-06	NA	3.0E-02	NA	1.0E-04
106-44-5	4-Methylphenol	7.4E-02	NC	NA	1	2.5E-08	NA	5.0E-03	NA	5.0E-06
131-11-3	Dimethylphthalate	3.2E-01	NC	NA	1	1.1E-07	NA	1.0E-01	NA	1.1E-06
84-74-2	di-n-Butylphthalate	3.5E-01	NC	NA	1	1.2E-07	NA	1.0E-01	NA	1.2E-06
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	1	2.5E-07	1	6.6E-07	1.4E-02	2.0E-02	4E-09	3.3E-05
132-64-9	Dibenzofuran	4.5E-01	NC	NA	0.96	1.4E-07	NA	1.0E-03	NA	1.4E-04
83-32-9	Acenaphthene	4.6E-01	NC	NA	0.3	4.7E-08	NA	6.0E-02	NA	7.8E-07
208-96-8	Acenaphthylene	4.1E-01	NC	NA	0.3	4.2E-08	NA	3.0E-02	NA	1.4E-06
120-12-7	Anthracene	1.2E+00	NC	NA	0.3	1.2E-07	NA	3.0E-01	NA	4.1E-07
56-55-3	Benzo(a)anthracene	2.9E+00	0.3	1.1E-07	0.3	2.9E-07	7.3E-01	3.0E-02	8E-08	9.6E-06
50-32-8	Benzo(a)pyrene	5.6E+00	0.3	2.2E-07	0.3	5.6E-07	7.3E+00	3.0E-02	2E-06	1.9E-05
205-99-2	Benzo(b)fluoranthene	3.0E+00	0.3	1.2E-07	0.3	3.1E-07	7.3E-01	3.0E-02	9E-08	1.0E-05
191-24-2	Benzo(g,h,i)perylene	1.4E+00	NC	NA	0.3	1.5E-07	NA	3.0E-02	NA	4.9E-06
207-08-9	Benzo(k)fluoranthene	1.4E+00	0.3	5.5E-08	0.3	1.4E-07	7.3E-02	3.0E-02	4E-09	4.8E-06
218-01-9	Chrysene	2.7E+00	0.3	1.1E-07	0.3	2.8E-07	7.3E-02	3.0E-02	8E-09	9.2E-06
53-70-3	Dibenz(a,h)anthracene	4.8E-01	0.3	1.9E-08	0.3	4.8E-08	7.3E+00	3.0E-02	1E-07	1.6E-06
206-44-0	Fluoranthene	5.7E+00	NC	NA	0.3	5.8E-07	NA	4.0E-02	NA	1.4E-05
86-73-7	Fluorene	5.5E-01	NC	NA	0.3	5.5E-08	NA	4.0E-02	NA	1.4E-06
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	0.3	6.2E-08	0.3	1.6E-07	7.3E-01	3.0E-02	5E-08	5.3E-06
91-57-6	2-Methylnaphthalene	3.0E-01	NC	NA	0.3	3.0E-08	NA	4.0E-03	NA	7.5E-06
91-20-3	Naphthalene	4.0E+01	NC	NA	0.3	4.0E-06	NA	2.0E-02	NA	2.0E-04
85-01-8	Phenanthrene	4.1E+00	NC	NA	0.3	4.1E-07	NA	3.0E-02	NA	1.4E-05
129-00-0	Pyrene	5.7E+00	NC	NA	0.3	5.7E-07	NA	3.0E-02	NA	1.9E-05
C9-C10	GRO	1.2E+01	NC	NA	1	4.1E-06	NA	3.0E-02	NA	1.4E-04
Dioxins/PCBs										
1336-36-3	Total PCBs	3.2E+00	1	4.1E-07	1	1.1E-06	2.0E+00	2.0E-05	8E-07	5.4E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1	7.3E-12	1	1.9E-11	1.5E+05	7.0E-10	1E-06	2.7E-02
Metals										
7440-36-0	Antimony	2.3E+02	NC	NA	1	7.6E-05	NA	4.0E-04	NA	1.9E-01
7440-38-2	Arsenic	2.0E+01	0.5	1.3E-06	0.5	3.3E-06	1.5E+00	3.0E-04	2E-06	1.1E-02
7440-39-3	Barium	1.4E+03	NC	NA	1	4.8E-04	NA	2.0E-01	NA	2.4E-03
7440-41-7	Beryllium	4.3E-01	NC	NA	1	1.4E-07	NA	2.0E-03	NA	7.2E-05
7440-43-9	Cadmium	3.7E+00	NC	NA	1	1.3E-06	NA	5.0E-04	NA	2.5E-03
16065-83-1	Chromium III	7.2E+01	NC	NA	1	2.4E-05	NA	1.5E+00	NA	1.6E-05
7439-92-1	Lead	1.8E+03	NC	NA	0.5	3.1E-04	NA	7.5E-04	NA	4.1E-01
7439-97-6	Mercury	1.3E+00	NC	NA	0.5	2.2E-07	NA	3.0E-04	NA	7.4E-04
7440-02-0	Nickel	1.6E+01	NC	NA	1	5.3E-06	NA	2.0E-02	NA	2.7E-04
7782-49-2	Selenium	4.1E+00	NC	NA	1	1.4E-06	NA	5.0E-03	NA	2.8E-04
7440-22-4	Silver	5.0E+00	NC	NA	1	1.7E-06	NA	5.0E-03	NA	3.4E-04
7440-62-2	Vanadium	2.3E+01	NC	NA	1	7.8E-06	NA	9.0E-03	NA	8.7E-04
7440-66-6	Zinc	5.2E+02	NC	NA	1	1.8E-04	NA	3.0E-01	NA	5.9E-04

	Cancer Risk	Hazard Index
TOTAL:	5.8E-06	7.0E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 34
Adult Staff - 0-15'
Dermal Contact with Surface Soil
HS-9 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
EPH/SVOCs										
C19-C36	C19-C36 Aliphatics	7.6E+01	NA	NA	0.2	1.1E-05	NA	2.0E+00	NA	5.3E-06
C11-C22	C11-C22 Aromatics	3.1E+01	NA	NA	0.1	2.2E-06	NA	3.0E-02	NA	7.2E-05
106-44-5	4-Methylphenol	7.4E-02	NA	NA	0.19	9.9E-09	NA	5.0E-03	NA	2.0E-06
131-11-3	Dimethylphthalate	3.2E-01	NA	NA	0.1	2.2E-08	NA	1.0E-01	NA	2.2E-07
84-74-2	di-n-Butylphthalate	3.5E-01	NA	NA	0.07	1.7E-08	NA	1.0E-01	NA	1.7E-07
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	0.1	5.3E-08	0.1	1.4E-07	1.4E-02	2.0E-02	7E-10	6.9E-06
132-64-9	Dibenzofuran	4.5E-01	NA	NA	0.18	5.6E-08	NA	1.0E-03	NA	5.6E-05
83-32-9	Acenaphthene	4.6E-01	NA	NA	0.1	3.2E-08	NA	6.0E-02	NA	5.4E-07
208-96-8	Acenaphthylene	4.1E-01	NA	NA	0.1	2.9E-08	NA	3.0E-02	NA	9.7E-07
120-12-7	Anthracene	1.2E+00	NA	NA	0.1	8.5E-08	NA	3.0E-01	NA	2.8E-07
56-55-3	Benzo(a)anthracene	2.9E+00	0.02	1.5E-08	0.02	4.0E-08	7.3E-01	3.0E-02	1E-08	1.3E-06
50-32-8	Benzo(a)pyrene	5.6E+00	0.02	3.0E-08	0.02	7.8E-08	7.3E+00	3.0E-02	2E-07	2.6E-06
205-99-2	Benzo(b)fluoranthene	3.0E+00	0.02	1.6E-08	0.02	4.3E-08	7.3E-01	3.0E-02	1E-08	1.4E-06
191-24-2	Benzo(g,h,i)perylene	1.4E+00	NA	NA	0.1	1.0E-07	NA	3.0E-02	NA	3.4E-06
207-08-9	Benzo(k)fluoranthene	1.4E+00	0.02	7.7E-09	0.02	2.0E-08	7.3E-02	3.0E-02	6E-10	6.6E-07
218-01-9	Chrysene	2.7E+00	0.02	1.5E-08	0.02	3.8E-08	7.3E-02	3.0E-02	1E-09	1.3E-06
53-70-3	Dibenz(a,h)anthracene	4.8E-01	0.02	2.6E-09	0.02	6.7E-09	7.3E+00	3.0E-02	2E-08	2.2E-07
206-44-0	Fluoranthene	5.7E+00	NA	NA	0.1	4.0E-07	NA	4.0E-02	NA	1.0E-05
86-73-7	Fluorene	5.5E-01	NA	NA	0.1	3.8E-08	NA	4.0E-02	NA	9.6E-07
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	0.02	8.6E-09	0.02	2.2E-08	7.3E-01	3.0E-02	6E-09	7.4E-07
91-57-6	2-Methylnaphthalene	3.0E-01	NA	NA	0.1	2.1E-08	NA	4.0E-03	NA	5.2E-06
91-20-3	Naphthalene	4.0E+01	NA	NA	0.1	2.8E-06	NA	2.0E-02	NA	1.4E-04
85-01-8	Phenanthrene	4.1E+00	NA	NA	0.1	2.9E-07	NA	3.0E-02	NA	9.6E-06
129-00-0	Pyrene	5.7E+00	NA	NA	0.1	4.0E-07	NA	3.0E-02	NA	1.3E-05
C9-C10	GRO	1.2E+01	NA	NA	0.2	1.7E-06	NA	3.0E-02	NA	5.7E-05
Dioxins/PCBs										
1336-36-3	Total PCBs	3.2E+00	0.1	8.6E-08	0.1	2.2E-07	2.0E+00	2.0E-05	2E-07	1.1E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	1.5E-12	0.1	4.0E-12	1.5E+05	7.0E-10	2E-07	5.7E-03
Metals										
7440-36-0	Antimony	2.3E+02	NA	NA	0.1	1.6E-05	NA	4.0E-04	NA	4.0E-02
7440-38-2	Arsenic	2.0E+01	0.03	1.6E-07	0.03	4.2E-07	1.5E+00	3.0E-04	2E-07	1.4E-03
7440-39-3	Barium	1.4E+03	NA	NA	0.1	1.0E-04	NA	2.0E-01	NA	5.0E-04
7440-41-7	Beryllium	4.3E-01	NA	NA	0.1	3.0E-08	NA	2.0E-03	NA	1.5E-05
7440-43-9	Cadmium	3.7E+00	NA	NA	0.01	2.6E-08	NA	5.0E-04	NA	5.2E-05
16065-83-1	Chromium III	7.2E+01	NA	NA	0.1	5.0E-06	NA	1.5E+00	NA	3.3E-06
7439-92-1	Lead	1.8E+03	NA	NA	0.006	7.7E-06	NA	7.5E-04	NA	1.0E-02
7439-97-6	Mercury	1.3E+00	NA	NA	0.1	9.3E-08	NA	3.0E-04	NA	3.1E-04
7440-02-0	Nickel	1.6E+01	NA	NA	0.2	2.2E-06	NA	2.0E-02	NA	1.1E-04
7782-49-2	Selenium	4.1E+00	NA	NA	0.01	2.9E-08	NA	5.0E-03	NA	5.7E-06
7440-22-4	Silver	5.0E+00	NA	NA	0.3	1.0E-06	NA	5.0E-03	NA	2.1E-04
7440-62-2	Vanadium	2.3E+01	NA	NA	0.1	1.6E-06	NA	9.0E-03	NA	1.8E-04
7440-66-6	Zinc	5.2E+02	NA	NA	0.1	3.7E-05	NA	3.0E-01	NA	1.2E-04

	Cancer Risk	Hazard Index
TOTAL:	9.1E-07	7.0E-02

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 35
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-9 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH/SVOCs								
C19-C36	C19-C36 Aliphatics	7.6E+01	8.5E-05	2.2E-04	NA	NA	NA	NA
C11-C22	C11-C22 Aromatics	3.1E+01	3.5E-05	9.0E-05	NA	5.0E+01	NA	1.8E-06
106-44-5	4-Methylphenol	7.4E-02	8.3E-08	2.2E-07	NA	6.0E+02	NA	3.6E-10
131-11-3	Dimethylphthalate	3.2E-01	3.5E-07	9.2E-07	NA	4.0E+02	NA	2.3E-09
84-74-2	di-n-Butylphthalate	3.5E-01	3.9E-07	1.0E-06	NA	3.5E+02	NA	2.9E-09
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	2.2E-06	5.7E-06	1.3E-06	7.0E+00	3E-12	8.2E-07
132-64-9	Dibenzofuran	4.5E-01	5.0E-07	1.3E-06	NA	3.5E+00	NA	3.7E-07
83-32-9	Acenaphthene	4.6E-01	5.2E-07	1.3E-06	NA	5.0E+01	NA	2.7E-08
208-96-8	Acenaphthylene	4.1E-01	4.6E-07	1.2E-06	NA	5.0E+01	NA	2.4E-08
120-12-7	Anthracene	1.2E+00	1.4E-06	3.5E-06	NA	5.0E+01	NA	7.0E-08
56-55-3	Benzo(a)anthracene	2.9E+00	3.2E-06	8.3E-06	2.1E-04	5.0E+01	7E-10	1.7E-07
50-32-8	Benzo(a)pyrene	5.6E+00	6.2E-06	1.6E-05	2.1E-03	5.0E+01	1E-08	3.2E-07
205-99-2	Benzo(b)fluoranthene	3.0E+00	3.4E-06	8.8E-06	2.1E-04	5.0E+01	7E-10	1.8E-07
191-24-2	Benzo(g,h,i)perylene	1.4E+00	1.6E-06	4.2E-06	NA	5.0E+01	NA	8.4E-08
207-08-9	Benzo(k)fluoranthene	1.4E+00	1.6E-06	4.1E-06	2.1E-05	5.0E+01	3E-11	8.3E-08
218-01-9	Chrysene	2.7E+00	3.1E-06	7.9E-06	2.1E-05	5.0E+01	6E-11	1.6E-07
53-70-3	Dibenz(a,h)anthracene	4.8E-01	5.4E-07	1.4E-06	2.1E-03	5.0E+01	1E-09	2.8E-08
206-44-0	Fluoranthene	5.7E+00	6.4E-06	1.7E-05	NA	5.0E+01	NA	3.3E-07
86-73-7	Fluorene	5.5E-01	6.1E-07	1.6E-06	NA	5.0E+01	NA	3.2E-08
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	1.8E-06	4.6E-06	2.1E-04	5.0E+01	4E-10	9.2E-08
91-57-6	2-Methylnaphthalene	3.0E-01	3.3E-07	8.6E-07	NA	5.0E+01	NA	1.7E-08
91-20-3	Naphthalene	4.0E+01	4.5E-05	1.2E-04	NA	3.0E+00	NA	3.9E-05
85-01-8	Phenanthrene	4.1E+00	4.6E-06	1.2E-05	NA	5.0E+01	NA	2.4E-07
129-00-0	Pyrene	5.7E+00	6.4E-06	1.6E-05	NA	5.0E+01	NA	3.3E-07
C9-C10	GRO	1.2E+01	1.4E-05	3.6E-05	NA	5.0E+01	NA	7.1E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	3.2E+00	3.6E-06	9.3E-06	1.0E-04	2.0E-02	4E-10	4.6E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	6.3E-11	1.6E-10	3.3E+01	2.0E-06	2E-09	8.2E-05
Metals								
7440-36-0	Antimony	2.3E+02	2.5E-04	6.6E-04	NA	1.0E+01	NA	6.6E-05
7440-38-2	Arsenic	2.0E+01	2.2E-05	5.8E-05	3.0E-03	2.0E-02	7E-08	2.9E-03
7440-39-3	Barium	1.4E+03	1.6E-03	4.1E-03	NA	5.0E-01	NA	8.3E-03
7440-41-7	Beryllium	4.3E-01	4.8E-07	1.3E-06	2.4E-03	2.0E-02	1E-09	6.3E-05
7440-43-9	Cadmium	3.7E+00	4.2E-06	1.1E-05	1.8E-03	2.0E-02	8E-09	5.4E-04
16065-83-1	Chromium III	7.2E+01	8.0E-05	2.1E-04	NA	1.0E-01	NA	2.1E-03
7439-92-1	Lead	1.8E+03	2.0E-03	5.3E-03	NA	1.0E+00	NA	5.3E-03
7439-97-6	Mercury	1.3E+00	1.5E-06	3.8E-06	NA	3.0E-01	NA	1.3E-05
7440-02-0	Nickel	1.6E+01	1.8E-05	4.6E-05	4.8E-04	1.0E+00	9E-09	4.6E-05
7782-49-2	Selenium	4.1E+00	4.6E-06	1.2E-05	NA	3.0E+00	NA	4.0E-06
7440-22-4	Silver	5.0E+00	5.6E-06	1.5E-05	NA	1.4E-01	NA	1.0E-04
7440-62-2	Vanadium	2.3E+01	2.6E-05	6.8E-05	NA	1.0E+00	NA	6.8E-05
7440-66-6	Zinc	5.2E+02	5.9E-04	1.5E-03	NA	1.4E+00	NA	1.1E-03

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.0E-07	2.1E-02

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 36
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-9 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
EPH/SVOCs										
C19-C36	C19-C36 Aliphatics	7.6E+01	NC	NA	1.00E+00	6.62E-07	NA	2.0E+00	NA	3.3E-07
C11-C22	C11-C22 Aromatics	3.1E+01	NC	NA	3.00E-01	8.11E-08	NA	3.0E-02	NA	2.7E-06
106-44-5	4-Methylphenol	7.4E-02	NC	NA	1.00E+00	6.45E-10	NA	5.0E-03	NA	1.3E-07
131-11-3	Dimethylphthalate	3.2E-01	NC	NA	1.00E+00	2.76E-09	NA	1.0E-01	NA	2.8E-08
84-74-2	di-n-Butylphthalate	3.5E-01	NC	NA	1.00E+00	3.05E-09	NA	1.0E-01	NA	3.1E-08
117-81-7	bis(2-Ethylhexyl)pythalate	2.0E+00	1.0E+00	6.60E-09	1.00E+00	1.71E-08	1.4E-02	2.0E-02	9E-11	8.6E-07
132-64-9	Dibenzofuran	4.5E-01	NC	NA	9.60E-01	3.73E-09	NA	1.0E-03	NA	3.7E-06
83-32-9	Acenaphthene	4.6E-01	NC	NA	3.00E-01	1.21E-09	NA	6.0E-02	NA	2.0E-08
208-96-8	Acenaphthylene	4.1E-01	NC	NA	3.00E-01	1.08E-09	NA	3.0E-02	NA	3.6E-08
120-12-7	Anthracene	1.2E+00	NC	NA	3.00E-01	3.16E-09	NA	3.0E-01	NA	1.1E-08
56-55-3	Benzo(a)anthracene	2.9E+00	3.0E-01	2.88E-09	3.00E-01	7.45E-09	7.3E-01	3.0E-02	2E-09	2.5E-07
50-32-8	Benzo(a)pyrene	5.6E+00	3.0E-01	5.62E-09	3.00E-01	1.46E-08	7.3E+00	3.0E-02	4E-08	4.9E-07
205-99-2	Benzo(b)fluoranthene	3.0E+00	3.0E-01	3.06E-09	3.00E-01	7.95E-09	7.3E-01	3.0E-02	2E-09	2.6E-07
191-24-2	Benzo(g,h,i)perylene	1.4E+00	NC	NA	3.00E-01	3.78E-09	NA	3.0E-02	NA	1.3E-07
207-08-9	Benzo(k)fluoranthene	1.4E+00	3.0E-01	1.43E-09	3.00E-01	3.71E-09	7.3E-02	3.0E-02	1E-10	1.2E-07
218-01-9	Chrysene	2.7E+00	3.0E-01	2.75E-09	3.00E-01	7.14E-09	7.3E-02	3.0E-02	2E-10	2.4E-07
53-70-3	Dibenz(a,h)anthracene	4.8E-01	3.0E-01	4.82E-10	3.00E-01	1.25E-09	7.3E+00	3.0E-02	4E-09	4.2E-08
206-44-0	Fluoranthene	5.7E+00	NC	NA	3.00E-01	1.50E-08	NA	4.0E-02	NA	3.8E-07
86-73-7	Fluorene	5.5E-01	NC	NA	3.00E-01	1.43E-09	NA	4.0E-02	NA	3.6E-08
193-39-5	Indeno(1,2,3-cd)pyrene	1.6E+00	3.0E-01	1.60E-09	3.00E-01	4.15E-09	7.3E-01	3.0E-02	1E-09	1.4E-07
91-57-6	2-Methylnaphthalene	3.0E-01	NC	NA	3.00E-01	7.74E-10	NA	4.0E-03	NA	1.9E-07
91-20-3	Naphthalene	4.0E+01	NC	NA	3.00E-01	1.05E-07	NA	2.0E-02	NA	5.2E-06
85-01-8	Phenanthrene	4.1E+00	NC	NA	3.00E-01	1.08E-08	NA	3.0E-02	NA	3.6E-07
129-00-0	Pyrene	5.7E+00	NC	NA	3.00E-01	1.48E-08	NA	3.0E-02	NA	4.9E-07
C9-C10	GRO	1.2E+01	NC	NA	1.00E+00	1.07E-07	NA	3.0E-02	NA	3.6E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	3.2E+00	1.0E+00	1.07E-08	1.00E+00	2.78E-08	2.0E+00	2.0E-05	2E-08	1.4E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.90E-13	1.00E+00	4.93E-13	1.5E+05	7.0E-10	3E-08	7.0E-04
Metals										
7440-36-0	Antimony	2.3E+02	NC	NA	1.00E+00	1.97E-06	NA	4.0E-04	NA	4.9E-03
7440-38-2	Arsenic	2.0E+01	5.0E-01	3.33E-08	5.00E-01	8.63E-08	1.5E+00	3.0E-04	5E-08	2.9E-04
7440-39-3	Barium	1.4E+03	NC	NA	1.00E+00	1.24E-05	NA	2.0E-01	NA	6.2E-05
7440-41-7	Beryllium	4.3E-01	NC	NA	1.00E+00	3.75E-09	NA	2.0E-03	NA	1.9E-06
7440-43-9	Cadmium	3.7E+00	NC	NA	1.00E+00	3.25E-08	NA	5.0E-04	NA	6.5E-05
16065-83-1	Chromium III	7.2E+01	NC	NA	1.00E+00	6.25E-07	NA	1.5E+00	NA	4.2E-07
7439-92-1	Lead	1.8E+03	NC	NA	5.00E-01	7.97E-06	NA	7.5E-04	NA	1.1E-02
7439-97-6	Mercury	1.3E+00	NC	NA	5.00E-01	5.77E-09	NA	3.0E-04	NA	1.9E-05
7440-02-0	Nickel	1.6E+01	NC	NA	1.00E+00	1.38E-07	NA	2.0E-02	NA	6.9E-06
7782-49-2	Selenium	4.1E+00	NC	NA	1.00E+00	3.57E-08	NA	5.0E-03	NA	7.1E-06
7440-22-4	Silver	5.0E+00	NC	NA	1.00E+00	4.35E-08	NA	5.0E-03	NA	8.7E-06
7440-62-2	Vanadium	2.3E+01	NC	NA	1.00E+00	2.03E-07	NA	9.0E-03	NA	2.3E-05
7440-66-6	Zinc	5.2E+02	NC	NA	1.00E+00	4.56E-06	NA	3.0E-01	NA	1.5E-05

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	1.5E-07	1.8E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 37
Adult Staff - 0-15'
Incidential Ingestion of Surface Soil
HS-10 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Ingestion Cancer (--)	LADD Cancer (mg/kg-d)	RAF Ingestion Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1	1.0E-07	NA	1.0E-01	NA	1.0E-06
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1	1.8E-08	1	4.7E-08	1.4E-02	2.0E-02	3E-10	2.4E-06
132-64-9	Dibenzofuran	1.4E-01	NC	NA	0.96	4.6E-08	NA	1.0E-03	NA	4.6E-05
83-32-9	Acenaphthene	1.9E-01	NC	NA	0.3	2.0E-08	NA	6.0E-02	NA	3.3E-07
208-96-8	Acenaphthylene	1.5E-01	NC	NA	0.3	1.5E-08	NA	3.0E-02	NA	4.9E-07
120-12-7	Anthracene	4.4E-01	NC	NA	0.3	4.4E-08	NA	3.0E-01	NA	1.5E-07
56-55-3	Benzo(a)anthracene	9.9E-01	0.3	3.9E-08	0.3	1.0E-07	7.3E-01	3.0E-02	3E-08	3.3E-06
50-32-8	Benzo(a)pyrene	8.0E-01	0.3	3.1E-08	0.3	8.1E-08	7.3E+00	3.0E-02	2E-07	2.7E-06
205-99-2	Benzo(b)fluoranthene	1.0E+00	0.3	3.9E-08	0.3	1.0E-07	7.3E-01	3.0E-02	3E-08	3.4E-06
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	0.3	3.7E-08	NA	3.0E-02	NA	1.2E-06
207-08-9	Benzo(k)fluoranthene	3.8E-01	0.3	1.5E-08	0.3	3.8E-08	7.3E-02	3.0E-02	1E-09	1.3E-06
218-01-9	Chrysene	9.2E-01	0.3	3.6E-08	0.3	9.3E-08	7.3E-02	3.0E-02	3E-09	3.1E-06
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.3	5.6E-09	0.3	1.5E-08	7.3E+00	3.0E-02	4E-08	4.9E-07
206-44-0	Fluoranthene	2.0E+00	NC	NA	0.3	2.0E-07	NA	4.0E-02	NA	5.0E-06
86-73-7	Fluorene	2.1E-01	NC	NA	0.3	2.2E-08	NA	4.0E-02	NA	5.4E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.3	1.6E-08	0.3	4.2E-08	7.3E-01	3.0E-02	1E-08	1.4E-06
91-57-6	2-Methylnaphthalene	1.7E-01	NC	NA	0.3	1.7E-08	NA	4.0E-03	NA	4.2E-06
91-20-3	Naphthalene	1.5E-01	NC	NA	0.3	1.5E-08	NA	2.0E-02	NA	7.4E-07
85-01-8	Phenanthrene	1.9E+00	NC	NA	0.3	1.9E-07	NA	3.0E-02	NA	6.5E-06
129-00-0	Pyrene	2.2E+00	NC	NA	0.3	2.3E-07	NA	3.0E-02	NA	7.5E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.4E+00	1	1.8E-07	1	4.7E-07	2.0E+00	2.0E-05	4E-07	2.3E-02
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1	7.3E-12	1	1.9E-11	1.5E+05	7.0E-10	1E-06	2.7E-02
Metals										
7440-38-2	Arsenic	8.8E+00	0.5	5.7E-07	0.5	1.5E-06	1.5E+00	3.0E-04	9E-07	5.0E-03
7440-39-3	Barium	3.2E+02	NC	NA	1	1.1E-04	NA	2.0E-01	NA	5.4E-04
7440-41-7	Beryllium	3.9E-01	NC	NA	1	1.3E-07	NA	2.0E-03	NA	6.5E-05
7440-43-9	Cadmium	1.0E+00	NC	NA	1	3.5E-07	NA	5.0E-04	NA	6.9E-04
16065-83-1	Chromium III	2.7E+01	NC	NA	1	9.0E-06	NA	1.5E+00	NA	6.0E-06
7439-92-1	Lead	5.6E+02	NC	NA	0.5	9.4E-05	NA	7.5E-04	NA	1.3E-01
7439-97-6	Mercury	1.2E-01	NC	NA	0.5	2.1E-08	NA	3.0E-04	NA	6.9E-05
7440-02-0	Nickel	9.4E+00	NC	NA	1	3.2E-06	NA	2.0E-02	NA	1.6E-04
7782-49-2	Selenium	5.7E+00	NC	NA	1	1.9E-06	NA	5.0E-03	NA	3.9E-04
7440-22-4	Silver	7.4E-01	NC	NA	1	2.5E-07	NA	5.0E-03	NA	5.0E-05
7440-62-2	Vanadium	1.8E+01	NC	NA	1	6.1E-06	NA	9.0E-03	NA	6.8E-04
7440-66-6	Zinc	1.7E+02	NC	NA	1	5.7E-05	NA	3.0E-01	NA	1.9E-04

	Cancer Risk	Hazard Index
TOTAL:	2.7E-06	1.8E-01

NA = Not Applicable
NC = Not carcinogenic

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APcancer]
ADDnon-cancer = [Soil Concentration x UC x RAF x IR x EF x ED x EP] / [BW x APnon-cancer]
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (CF) =	1.0E-06	kg/mg
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Ingestion Rate (IR) =	50	mg/d [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	year [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	years [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 38
Adult Staff - 0-15'
Dermal Contact with Surface Soil
HS-10 - New Bedford High School
New Bedford, Massachusetts

		EPC	Exposure Estimates				Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Cancer Slope Factor (Oral) (mg/kg-d)-1	Chronic Noncancer Reference Dose (Oral) (mg/kg-d)	Cancer Risk (--)	Hazard Quotient (--)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NA	NA	0.07	1.5E-08	NA	1.0E-01	NA	1.5E-07
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	0.1	3.8E-09	0.1	9.8E-09	1.4E-02	2.0E-02	5E-11	4.9E-07
132-64-9	Dibenzofuran	1.4E-01	NA	NA	0.18	1.8E-08	NA	1.0E-03	NA	1.8E-05
83-32-9	Acenaphthene	1.9E-01	NA	NA	0.1	1.4E-08	NA	6.0E-02	NA	2.3E-07
208-96-8	Acenaphthylene	1.5E-01	NA	NA	0.1	1.0E-08	NA	3.0E-02	NA	3.4E-07
120-12-7	Anthracene	4.4E-01	NA	NA	0.1	3.1E-08	NA	3.0E-01	NA	1.0E-07
56-55-3	Benzo(a)anthracene	9.9E-01	0.02	5.4E-09	0.02	1.4E-08	7.3E-01	3.0E-02	4E-09	4.6E-07
50-32-8	Benzo(a)pyrene	8.0E-01	0.02	4.3E-09	0.02	1.1E-08	7.3E+00	3.0E-02	3E-08	3.7E-07
205-99-2	Benzo(b)fluoranthene	1.0E+00	0.02	5.5E-09	0.02	1.4E-08	7.3E-01	3.0E-02	4E-09	4.7E-07
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NA	NA	0.1	2.5E-08	NA	3.0E-02	NA	8.5E-07
207-08-9	Benzo(k)fluoranthene	3.8E-01	0.02	2.0E-09	0.02	5.3E-09	7.3E-02	3.0E-02	1E-10	1.8E-07
218-01-9	Chrysene	9.2E-01	0.02	5.0E-09	0.02	1.3E-08	7.3E-02	3.0E-02	4E-10	4.3E-07
53-70-3	Dibenz(a,h)anthracene	1.4E-01	0.02	7.8E-10	0.02	2.0E-09	7.3E+00	3.0E-02	6E-09	6.7E-08
206-44-0	Fluoranthene	2.0E+00	NA	NA	0.1	1.4E-07	NA	4.0E-02	NA	3.4E-06
86-73-7	Fluorene	2.1E-01	NA	NA	0.1	1.5E-08	NA	4.0E-02	NA	3.8E-07
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	0.02	2.3E-09	0.02	5.8E-09	7.3E-01	3.0E-02	2E-09	1.9E-07
91-57-6	2-Methylnaphthalene	1.7E-01	NA	NA	0.1	1.2E-08	NA	4.0E-03	NA	2.9E-06
91-20-3	Naphthalene	1.5E-01	NA	NA	0.1	1.0E-08	NA	2.0E-02	NA	5.2E-07
85-01-8	Phenanthrene	1.9E+00	NA	NA	0.1	1.3E-07	NA	3.0E-02	NA	4.5E-06
129-00-0	Pyrene	2.2E+00	NA	NA	0.1	1.6E-07	NA	3.0E-02	NA	5.2E-06
Dioxins/PCBs										
1336-36-3	Total PCBs	1.4E+00	0.1	3.8E-08	0.1	9.7E-08	2.0E+00	2.0E-05	8E-08	4.9E-03
1746-01-6	Dioxin/PCB TEQ	5.7E-05	0.1	1.5E-12	0.1	4.0E-12	1.5E+05	7.0E-10	2E-07	5.7E-03
Metals										
7440-38-2	Arsenic	8.8E+00	0.03	7.2E-08	0.03	1.9E-07	1.5E+00	3.0E-04	1E-07	6.2E-04
7440-39-3	Barium	3.2E+02	NA	NA	0.1	2.2E-05	NA	2.0E-01	NA	1.1E-04
7440-41-7	Beryllium	3.9E-01	NA	NA	0.1	2.7E-08	NA	2.0E-03	NA	1.4E-05
7440-43-9	Cadmium	1.0E+00	NA	NA	0.01	7.2E-09	NA	5.0E-04	NA	1.4E-05
16065-83-1	Chromium III	2.7E+01	NA	NA	0.1	1.9E-06	NA	1.5E+00	NA	1.3E-06
7439-92-1	Lead	5.6E+02	NA	NA	0.006	2.4E-06	NA	7.5E-04	NA	3.1E-03
7439-97-6	Mercury	1.2E-01	NA	NA	0.1	8.7E-09	NA	3.0E-04	NA	2.9E-05
7440-02-0	Nickel	9.4E+00	NA	NA	0.2	1.3E-06	NA	2.0E-02	NA	6.6E-05
7782-49-2	Selenium	5.7E+00	NA	NA	0.01	4.0E-08	NA	5.0E-03	NA	8.0E-06
7440-22-4	Silver	7.4E-01	NA	NA	0.3	1.6E-07	NA	5.0E-03	NA	3.1E-05
7440-62-2	Vanadium	1.8E+01	NA	NA	0.1	1.3E-06	NA	9.0E-03	NA	1.4E-04
7440-66-6	Zinc	1.7E+02	NA	NA	0.1	1.2E-05	NA	3.0E-01	NA	4.0E-05

	Cancer Risk	Hazard Index
TOTAL:	4.6E-07	1.5E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

NA = Not Applicable
NC = Not carcinogenic
Where:
LADDcancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APcancer)
ADDnon-cancer = Soil Concentration x UC x SA x SAF x RAF x EF x ED x EP / (BW x APnon-cancer)
Cancer Risk = LADDcancer x Slope Factor
Hazard Quotient = ADDnon-cancer / Reference Dose

Unit Conversion (UC1) =	1E-06	kg/mg
Skin Surface Area (SA) =	3473	cm^2/d [1]
Soil Adherence Factor (SAF) =	0.03	mg/cm2 [1]
Relative Absorption Factor (RAF) =	CS	(unitless) [1]
Exposure Duration (ED) =	1	day/event [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Period (EP) =	27	yrs [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	70	years [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	27	yrs [1]

[1] MADEP, 2008
[2] Best professional judgement

Table 39
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the Lungs
HS-10 - New Bedford High School
New Bedford, Massachusetts

			Exposure Estimates		Toxicity Values		Risk Estimates	
	Constituent	Surface Soil Concentration (mg/kg)	$LADE_{inh}$ Cancer (ug/m^3)	ADE_{inh} Noncancer (ug/m^3)	Unit Risk Factor (Inh) $(ug/m^3)^{-1}$	Chronic Noncancer Reference Conc. (Inh) (ug/m^3)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs								
84-74-2	di-n-Butylphthalate	3.0E-01	3.4E-07	8.8E-07	NA	3.5E+02	NA	2.5E-09
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.6E-07	4.1E-07	1.3E-06	7.0E+00	2E-13	5.8E-08
132-64-9	Dibenzofuran	1.4E-01	1.6E-07	4.1E-07	NA	3.5E+00	NA	1.2E-07
83-32-9	Acenaphthene	1.9E-01	2.2E-07	5.6E-07	NA	5.0E+01	NA	1.1E-08
208-96-8	Acenaphthylene	1.5E-01	1.6E-07	4.3E-07	NA	5.0E+01	NA	8.5E-09
120-12-7	Anthracene	4.4E-01	4.9E-07	1.3E-06	NA	5.0E+01	NA	2.5E-08
56-55-3	Benzo(a)anthracene	9.9E-01	1.1E-06	2.9E-06	2.1E-04	5.0E+01	2E-10	5.8E-08
50-32-8	Benzo(a)pyrene	8.0E-01	9.0E-07	2.3E-06	2.1E-03	5.0E+01	2E-09	4.7E-08
205-99-2	Benzo(b)fluoranthene	1.0E+00	1.1E-06	2.9E-06	2.1E-04	5.0E+01	2E-10	5.9E-08
191-24-2	Benzo(g,h,i)perylene	3.6E-01	4.1E-07	1.1E-06	NA	5.0E+01	NA	2.1E-08
207-08-9	Benzo(k)fluoranthene	3.8E-01	4.2E-07	1.1E-06	2.1E-05	5.0E+01	9E-12	2.2E-08
218-01-9	Chrysene	9.2E-01	1.0E-06	2.7E-06	2.1E-05	5.0E+01	2E-11	5.4E-08
53-70-3	Dibenz(a,h)anthracene	1.4E-01	1.6E-07	4.2E-07	2.1E-03	5.0E+01	3E-10	8.4E-09
206-44-0	Fluoranthene	2.0E+00	2.2E-06	5.7E-06	NA	5.0E+01	NA	1.1E-07
86-73-7	Fluorene	2.1E-01	2.4E-07	6.2E-07	NA	5.0E+01	NA	1.2E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	4.7E-07	1.2E-06	2.1E-04	5.0E+01	1E-10	2.4E-08
91-57-6	2-Methylnaphthalene	1.7E-01	1.9E-07	4.8E-07	NA	5.0E+01	NA	9.7E-09
91-20-3	Naphthalene	1.5E-01	1.7E-07	4.3E-07	NA	3.0E+00	NA	1.4E-07
85-01-8	Phenanthrene	1.9E+00	2.2E-06	5.6E-06	NA	5.0E+01	NA	1.1E-07
129-00-0	Pyrene	2.2E+00	2.5E-06	6.5E-06	NA	5.0E+01	NA	1.3E-07
Dioxins/PCBs								
1336-36-3	Total PCBs	1.4E+00	1.6E-06	4.0E-06	1.0E-04	2.0E-02	2E-10	2.0E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	6.3E-11	1.6E-10	3.3E+01	2.0E-06	2E-09	8.2E-05
Metals								
7440-38-2	Arsenic	8.8E+00	9.9E-06	2.6E-05	3.0E-03	2.0E-02	3E-08	1.3E-03
7440-39-3	Barium	3.2E+02	3.6E-04	9.3E-04	NA	5.0E-01	NA	1.9E-03
7440-41-7	Beryllium	3.9E-01	4.3E-07	1.1E-06	2.4E-03	2.0E-02	1E-09	5.6E-05
7440-43-9	Cadmium	1.0E+00	1.2E-06	3.0E-06	1.8E-03	2.0E-02	2E-09	1.5E-04
16065-83-1	Chromium III	2.7E+01	3.0E-05	7.8E-05	NA	1.0E-01	NA	7.8E-04
7439-92-1	Lead	5.6E+02	6.3E-04	1.6E-03	NA	1.0E+00	NA	1.6E-03
7439-97-6	Mercury	1.2E-01	1.4E-07	3.6E-07	NA	3.0E-01	NA	1.2E-06
7440-02-0	Nickel	9.4E+00	1.1E-05	2.7E-05	4.8E-04	1.0E+00	5E-09	2.7E-05
7782-49-2	Selenium	5.7E+00	6.4E-06	1.7E-05	NA	3.0E+00	NA	5.5E-06
7440-22-4	Silver	7.4E-01	8.3E-07	2.1E-06	NA	1.4E-01	NA	1.5E-05
7440-62-2	Vanadium	1.8E+01	2.0E-05	5.3E-05	NA	1.0E+00	NA	5.3E-05
7440-66-6	Zinc	1.7E+02	1.9E-04	4.9E-04	NA	1.4E+00	NA	3.5E-04

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	4.3E-08	6.5E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADEcancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW)) x (BW assumed/IR assumed)
ADEnon-cancer = (OHM x 0.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW) x (BW assumed/IR assumed)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Relative Absorption Factor (RAF) =	1	unitless
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Inhalation Rate assumed (IR assumed) =	20	m3/day [1]
Unit Conversion (UC) =	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Table 40
Adult Staff - 0-15'
Inhalation of Fugitive Dusts - Exposure Via the GI Tract
HS-10 - New Bedford High School
New Bedford, Massachusetts

				Exposure Estimates			Toxicity Values		Risk Estimates	
Constituent		Surface Soil Concentration (mg/kg)	RAF Cancer Ing (--)	$LADD_{GI-Inh}$ Cancer (mg/kg-day)	RAF Noncancer Ing (--)	ADD_{GI-Inh} Noncancer (mg/kg-day)	Cancer Slope Factor (Oral) $(mg/kg\text{-}day)^{-1}$	Chronic Noncancer Reference Dose (Oral) (mg/kg-day)	Cancer Risk (- -)	Hazard Quotient (- -)
SVOCs										
84-74-2	di-n-Butylphthalate	3.0E-01	NC	NA	1.00E+00	2.65E-09	NA	1.0E-01	NA	2.6E-08
117-81-7	bis(2-Ethylhexyl)pythalate	1.4E-01	1.0E+00	4.71E-10	1.00E+00	1.22E-09	1.4E-02	2.0E-02	7E-12	6.1E-08
132-64-9	Dibenzofuran	1.4E-01	NC	NA	9.60E-01	1.18E-09	NA	1.0E-03	NA	1.2E-06
83-32-9	Acenaphthene	1.9E-01	NC	NA	3.00E-01	5.07E-10	NA	6.0E-02	NA	8.4E-09
208-96-8	Acenaphthylene	1.5E-01	NC	NA	3.00E-01	3.83E-10	NA	3.0E-02	NA	1.3E-08
120-12-7	Anthracene	4.4E-01	NC	NA	3.00E-01	1.14E-09	NA	3.0E-01	NA	3.8E-09
56-55-3	Benzo(a)anthracene	9.9E-01	3.0E-01	1.00E-09	3.00E-01	2.60E-09	7.3E-01	3.0E-02	7E-10	8.7E-08
50-32-8	Benzo(a)pyrene	8.0E-01	3.0E-01	8.09E-10	3.00E-01	2.10E-09	7.3E+00	3.0E-02	6E-09	7.0E-08
205-99-2	Benzo(b)fluoranthene	1.0E+00	3.0E-01	1.02E-09	3.00E-01	2.65E-09	7.3E-01	3.0E-02	7E-10	8.8E-08
191-24-2	Benzo(g,h,i)perylene	3.6E-01	NC	NA	3.00E-01	9.51E-10	NA	3.0E-02	NA	3.2E-08
207-08-9	Benzo(k)fluoranthene	3.8E-01	3.0E-01	3.82E-10	3.00E-01	9.91E-10	7.3E-02	3.0E-02	3E-11	3.3E-08
218-01-9	Chrysene	9.2E-01	3.0E-01	9.30E-10	3.00E-01	2.41E-09	7.3E-02	3.0E-02	7E-11	8.0E-08
53-70-3	Dibenz(a,h)anthracene	1.4E-01	3.0E-01	1.46E-10	3.00E-01	3.77E-10	7.3E+00	3.0E-02	1E-09	1.3E-08
206-44-0	Fluoranthene	2.0E+00	NC	NA	3.00E-01	5.13E-09	NA	4.0E-02	NA	1.3E-07
86-73-7	Fluorene	2.1E-01	NC	NA	3.00E-01	5.61E-10	NA	4.0E-02	NA	1.4E-08
193-39-5	Indeno(1,2,3-cd)pyrene	4.2E-01	3.0E-01	4.20E-10	3.00E-01	1.09E-09	7.3E-01	3.0E-02	3E-10	3.6E-08
91-57-6	2-Methylnaphthalene	1.7E-01	NC	NA	3.00E-01	4.35E-10	NA	4.0E-03	NA	1.1E-07
91-20-3	Naphthalene	1.5E-01	NC	NA	3.00E-01	3.86E-10	NA	2.0E-02	NA	1.9E-08
85-01-8	Phenanthrene	1.9E+00	NC	NA	3.00E-01	5.02E-09	NA	3.0E-02	NA	1.7E-07
129-00-0	Pyrene	2.2E+00	NC	NA	3.00E-01	5.85E-09	NA	3.0E-02	NA	2.0E-07
Dioxins/PCBs										
1336-36-3	Total PCBs	1.4E+00	1.0E+00	4.68E-09	1.00E+00	1.21E-08	2.0E+00	2.0E-05	9E-09	6.1E-04
1746-01-6	Dioxin/PCB TEQ	5.7E-05	1.0E+00	1.90E-13	1.00E+00	4.93E-13	1.5E+05	7.0E-10	3E-08	7.0E-04
Metals										
7440-38-2	Arsenic	8.8E+00	5.0E-01	1.49E-08	5.00E-01	3.85E-08	1.5E+00	3.0E-04	2E-08	1.3E-04
7440-39-3	Barium	3.2E+02	NC	NA	1.00E+00	2.79E-06	NA	2.0E-01	NA	1.4E-05
7440-41-7	Beryllium	3.9E-01	NC	NA	1.00E+00	3.38E-09	NA	2.0E-03	NA	1.7E-06
7440-43-9	Cadmium	1.0E+00	NC	NA	1.00E+00	8.99E-09	NA	5.0E-04	NA	1.8E-05
16065-83-1	Chromium III	2.7E+01	NC	NA	1.00E+00	2.33E-07	NA	1.5E+00	NA	1.6E-07
7439-92-1	Lead	5.6E+02	NC	NA	5.00E-01	2.44E-06	NA	7.5E-04	NA	3.3E-03
7439-97-6	Mercury	1.2E-01	NC	NA	5.00E-01	5.40E-10	NA	3.0E-04	NA	1.8E-06
7440-02-0	Nickel	9.4E+00	NC	NA	1.00E+00	8.20E-08	NA	2.0E-02	NA	4.1E-06
7782-49-2	Selenium	5.7E+00	NC	NA	1.00E+00	4.99E-08	NA	5.0E-03	NA	1.0E-05
7440-22-4	Silver	7.4E-01	NC	NA	1.00E+00	6.44E-09	NA	5.0E-03	NA	1.3E-06
7440-62-2	Vanadium	1.8E+01	NC	NA	1.00E+00	1.59E-07	NA	9.0E-03	NA	1.8E-05
7440-66-6	Zinc	1.7E+02	NC	NA	1.00E+00	1.48E-06	NA	3.0E-01	NA	4.9E-06

NC = Not carcinogenic
NA = Not Applicable

	Cancer Risk	Hazard Index
TOTAL:	6.9E-08	4.8E-03

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:

LADDcancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / (APcancer x BW))
ADDEnon-cancer = (OHM x 1.5 X PM10 x IR x RAF x EF x ED x EP x UC1 / APnon-cancer x BW)
Cancer Risk = LADEcancer x Cancer Slope Factor
Hazard Quotient = ADEnon-cancer / Reference Dose

Respirable Dust (PM_{10}) =	60	ug/m3 [1]
Inhalation Rate (IR) =	60	l/min [1]
Exposure Frequency (EF) =	0.411	events/days (5 days per week for 30 weeks) [2]
Exposure Duration (ED) =	4	hours/event [2]
Exposure Period (EP) =	9855	days [1]
Body Weight (BW) =	61.1	kg [1]
Averaging Period Cancer (AP_{cancer}) =	25550	days [1]
Averaging Period Noncancer ($AP_{noncancer}$) =	9855	days [1]
Unit Conversion (UC1)=	6.00E-11	(60 min/hour; 1x 10-9 kg/ug; 0.001 m3/l)

[1] MADEP, 2008
[2] Best professional judgement

Construction Worker - Soil: Table CW-1 (HS-1: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 1.5E-07
HI (all chemicals) = 2.0E-01

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
POLYCHLORINATED BIPHENYLS (PCBs)	5.9E-03	1.0E-10	1.0E-10	2.7E-12	1.6E-13	2.1E-10	1.5E-04	1.5E-04	3.8E-06	1.1E-05	3.1E-04
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

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Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
POLYCHLORINATED BIPHENYLS (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Construction Worker - Soil: Table CW-1 (HS-2: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 2E-07
HI (all chemicals) = 8E-01

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)		EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
Trichlorobenzene, 1,2,4-		1.7E-01						2.3E-06	7.0E-07	6.0E-08	3.2E-07	3.4E-06
zz1,2,3-Trichlorobenzene		2.1E-01						3.2E-04	3.6E-04	8.3E-06	2.8E-06	6.9E-04
Acenaphthene		1.6E-01						2.9E-07	9.8E-07	7.5E-09	1.2E-08	1.3E-06
Acenaphthylene		1.5E-01						1.8E-07	6.0E-07	4.7E-09	1.1E-08	8.0E-07
Anthracene		3.3E-01						1.2E-07	4.1E-07	3.2E-09	2.5E-08	5.6E-07
Benzo(a)anthracene		6.1E-01	1.2E-09	7.8E-10	3.0E-11	3.4E-11	2.0E-09	7.5E-07	5.0E-07	1.9E-08	4.5E-08	1.3E-06
Benzo(a)pyrene		5.3E-01	1.0E-08	6.8E-09	2.6E-10	2.9E-10	1.8E-08	6.5E-07	4.4E-07	1.7E-08	3.9E-08	1.1E-06
Benzo(b)fluoranthene		5.7E-01	1.1E-09	7.3E-10	2.8E-11	3.1E-11	1.9E-09	7.0E-07	4.7E-07	1.8E-08	4.2E-08	1.2E-06
Benzo(g,h,i)perylene		3.6E-01						4.5E-07	1.5E-06	1.2E-08	2.7E-08	2.0E-06
Benzo(k)fluoranthene		2.7E-01	5.1E-11	3.4E-11	1.3E-12	1.5E-12	8.9E-11	3.3E-07	2.2E-07	8.5E-09	2.0E-08	5.8E-07
Chrysene		5.9E-01	1.1E-10	7.6E-11	2.9E-12	3.3E-12	2.0E-10	7.3E-07	4.9E-07	1.9E-08	4.4E-08	1.3E-06
Dibenzo(a,h)anthracene		1.4E-01	2.7E-09	1.8E-09	7.1E-11	7.9E-11	4.7E-09	1.7E-07	1.2E-07	4.5E-09	1.1E-08	3.1E-07
Fluoranthene		1.2E+00						4.4E-06	1.5E-05	1.1E-07	8.8E-08	1.9E-05
Fluorene		2.1E-01						1.9E-07	6.5E-07	5.0E-09	1.6E-08	8.6E-07
Indeno(1,2,3-cd)pyrene		4.2E-01	8.0E-10	5.4E-10	2.1E-11	2.3E-11	1.4E-09	5.1E-07	3.4E-07	1.3E-08	3.1E-08	9.0E-07
Methylnaphthalene, 2-		1.3E-01						1.2E-05	4.2E-05	3.2E-07	1.0E-08	5.4E-05
Naphthalene		1.6E-01						2.9E-07	9.8E-07	7.6E-09	2.0E-06	3.3E-06
Phenanthrene		1.3E+00						1.6E-06	5.2E-06	4.0E-08	9.4E-08	6.9E-06
Pyrene		1.2E+00						1.5E-06	4.9E-06	3.8E-08	8.8E-08	6.5E-06
AROMATICS C9 to C10	GRO	1.5E+01						6.0E-05	1.2E-04	1.6E-06	1.1E-06	1.8E-04
Polychlorinated biphenyls (PCBs)		4.5E-01	7.8E-09	7.9E-09	2.0E-10	1.2E-11	1.6E-08	1.1E-02	1.1E-02	2.8E-04	8.3E-04	2.3E-02
TCDD, 2,3,7,8- (equivalents)		5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Arsenic		3.5E+00	2.3E-08	1.4E-08	6.0E-10	2.8E-09	4.0E-08	7.2E-03	4.3E-03	1.9E-04	6.5E-03	1.8E-02
Barium		8.8E+01						1.5E-03	1.6E-03	4.0E-05	6.5E-04	3.8E-03
Beryllium		1.9E-01				1.2E-10	1.2E-10	4.6E-05	4.6E-05	1.2E-06	3.5E-04	4.4E-04
Cadmium		6.1E-01				2.9E-10	2.9E-10	7.5E-04	1.5E-04	1.9E-05	1.1E-03	2.0E-03
Chromium(III)		1.3E+01						1.1E-05	1.1E-05	2.7E-07	1.6E-03	1.6E-03
Lead		5.6E+02						4.6E-01	5.6E-02	1.2E-02	2.1E-02	5.5E-01
MERCURY		1.3E-01						2.6E-04	5.3E-04	6.8E-06	1.6E-05	8.1E-04
NICKEL		9.3E+00				1.2E-09	1.2E-09	5.7E-04	1.2E-03	1.5E-05	3.5E-04	2.1E-03
Silver		1.5E+00						3.7E-04	1.1E-03	9.7E-06	4.0E-04	1.9E-03
Vanadium		1.5E+01						2.1E-03	2.1E-03	5.3E-05	5.6E-04	4.7E-03
Zinc		9.1E+01						3.7E-04	3.8E-04	9.7E-06	2.4E-03	3.2E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

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Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
Trichlorobenzene, 1,2,4-						9.0E-02	1	0.03	1	5.7E-03
zz1,2,3-Trichlorobenzene						8.0E-04	0.99	0.11	1	8.0E-04
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Methylnaphthalene, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
MERCURY						3.0E-04	0.5	0.1	1	8.6E-05
NICKEL					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Construction Worker - Soil: Table CW-1 (HS-3: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

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ELCR (all chemicals) = 2E-07
HI (all chemicals) = 1E+00

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
Benzene	3.6E-02	1.7E-11	5.2E-12	4.5E-13	7.4E-14	2.3E-11	4.4E-06	1.3E-06	1.1E-07	1.3E-07	6.0E-06
Toluene	4.1E-02						6.3E-08	1.9E-08	1.6E-09	3.1E-10	8.4E-08
AROMATICS C9 to C10 1,2,4-Trimethylbenzene	4.6E-02						1.9E-07	3.8E-07	4.9E-09	3.4E-09	5.8E-07
Anthracene	4.4E-01						1.6E-07	5.5E-07	4.2E-09	3.3E-08	7.5E-07
Benzo(a)anthracene	7.3E-01	1.4E-09	9.4E-10	3.6E-11	4.0E-11	2.4E-09	9.0E-07	6.0E-07	2.3E-08	5.4E-08	1.6E-06
Benzo(a)pyrene	7.5E-01	1.4E-08	9.7E-09	3.7E-10	4.2E-10	2.5E-08	9.3E-07	6.2E-07	2.4E-08	5.6E-08	1.6E-06
Benzo(b)fluoranthene	8.2E-01	1.6E-09	1.1E-09	4.1E-11	4.6E-11	2.7E-09	1.0E-06	6.8E-07	2.6E-08	6.1E-08	1.8E-06
Benzo(g,h,i)perylene	4.7E-01						5.8E-07	2.0E-06	1.5E-08	3.5E-08	2.6E-06
Benzo(k)fluoranthene	2.7E-01	5.1E-11	3.4E-11	1.3E-12	1.5E-12	8.8E-11	3.3E-07	2.2E-07	8.5E-09	2.0E-08	5.8E-07
Chrysene	7.1E-01	1.4E-10	9.1E-11	3.5E-12	3.9E-12	2.3E-10	8.7E-07	5.8E-07	2.3E-08	5.3E-08	1.5E-06
Dibenzo(a,h)anthracene	1.5E-01	3.0E-09	2.0E-09	7.7E-11	8.5E-11	5.1E-09	1.9E-07	1.3E-07	4.9E-09	1.1E-08	3.3E-07
Fluoranthene	1.6E+00						6.0E-06	2.0E-05	1.6E-07	1.2E-07	2.7E-05
Indeno(1,2,3-cd)pyrene	5.9E-01	1.1E-09	7.7E-10	3.0E-11	3.3E-11	2.0E-09	7.3E-07	4.9E-07	1.9E-08	4.4E-08	1.3E-06
Naphthalene	7.3E-01						1.3E-06	4.5E-06	3.5E-08	9.0E-06	1.5E-05
Phenanthrene	1.7E+00						2.1E-06	7.0E-06	5.4E-08	1.3E-07	9.2E-06
Pyrene	1.5E+00						1.8E-06	6.2E-06	4.8E-08	1.1E-07	8.2E-06
Polychlorinated biphenyls (PCBs)	1.8E-01	3.1E-09	3.2E-09	8.2E-11	4.8E-12	6.4E-09	4.4E-03	4.5E-03	1.1E-04	3.3E-04	9.3E-03
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Barium	1.6E+02						2.8E-03	2.8E-03	7.3E-05	1.2E-03	6.9E-03
Beryllium	2.9E-01				1.9E-10	1.9E-10	7.2E-05	7.3E-05	1.9E-06	5.4E-04	6.9E-04
Lead	1.1E+03						9.0E-01	1.1E-01	2.3E-02	4.1E-02	1.1E+00
MERCURY	1.5E-01						3.1E-04	6.3E-04	8.1E-06	1.9E-05	9.7E-04
Nickel	6.4E+00				8.1E-10	8.1E-10	3.9E-04	7.9E-04	1.0E-05	2.4E-04	1.4E-03
Silver	7.8E-01						1.9E-04	5.8E-04	5.0E-06	2.1E-04	9.9E-04
Vanadium	1.3E+01						1.8E-03	1.8E-03	4.6E-05	4.9E-04	4.1E-03
Zinc	1.3E+02						5.2E-04	5.2E-04	1.3E-05	3.4E-03	4.4E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

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Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
Benzene	5.5E-02	1	0.03	1	2.7E-02	1.0E-02	1	0.03	1	2.9E-03
Toluene						8.0E-01	1	0.03	1	1.4E+00
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Lead						7.5E-04	0.5	0.006	1	2.9E-04
MERCURY						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Construction Worker - Soil: Table CW-1 (HS-4: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 4E-07

HI (all chemicals) = 9E-01

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
zz4-Bromodiphenyl ether	7.8E-02						9.6E-03	1.8E-02	2.5E-04	8.3E-05	2.8E-02
bis(2-Ethylhexyl)phthalate	7.6E-02	9.3E-12	9.4E-12	2.4E-13	2.6E-14	1.9E-11	4.7E-06	4.7E-06	1.2E-07	4.0E-07	9.9E-06
Acenaphthene	2.1E-01						3.8E-07	1.3E-06	9.8E-09	1.5E-08	1.7E-06
Acenaphthylene	5.3E-01						6.5E-07	2.2E-06	1.7E-08	4.0E-08	2.9E-06
Anthracene	5.7E-01						2.1E-07	7.1E-07	5.5E-09	4.2E-08	9.6E-07
Benzo(a)anthracene	1.2E+00	2.3E-09	1.5E-09	5.9E-11	6.6E-11	4.0E-09	1.5E-06	9.9E-07	3.8E-08	8.9E-08	2.6E-06
Benzo(a)pyrene	1.4E+00	2.6E-08	1.8E-08	6.9E-10	7.6E-10	4.6E-08	1.7E-06	1.1E-06	4.4E-08	1.0E-07	3.0E-06
Benzo(b)fluoranthene	1.6E+00	3.0E-09	2.0E-09	7.8E-11	8.7E-11	5.2E-09	1.9E-06	1.3E-06	5.0E-08	1.2E-07	3.4E-06
Benzo(g,h,i)perylene	7.4E-01						9.2E-07	3.1E-06	2.4E-08	5.5E-08	4.1E-06
Benzo(k)fluoranthene	5.6E-01	1.1E-10	7.2E-11	2.8E-12	3.1E-12	1.9E-10	6.9E-07	4.6E-07	1.8E-08	4.2E-08	1.2E-06
Chrysene	1.3E+00	2.4E-10	1.6E-10	6.3E-12	7.0E-12	4.2E-10	1.6E-06	1.1E-06	4.1E-08	9.5E-08	2.8E-06
Dibenzo(a,h)anthracene	2.4E-01	4.5E-09	3.0E-09	1.2E-10	1.3E-10	7.8E-09	2.9E-07	1.9E-07	7.5E-09	1.8E-08	5.1E-07
Fluoranthene	2.9E+00						1.1E-05	3.6E-05	2.7E-07	2.1E-07	4.7E-05
Fluorene	2.7E-01						2.5E-07	8.3E-07	6.4E-09	2.0E-08	1.1E-06
Indeno(1,2,3-cd)pyrene	7.3E-01	1.4E-09	9.4E-10	3.6E-11	4.0E-11	2.4E-09	8.9E-07	6.0E-07	2.3E-08	5.4E-08	1.6E-06
Naphthalene	9.0E-01						1.7E-06	5.6E-06	4.3E-08	1.1E-05	1.9E-05
Phenanthrene	2.6E+00						3.2E-06	1.1E-05	8.3E-08	1.9E-07	1.4E-05
Pyrene	2.8E+00						3.4E-06	1.1E-05	8.9E-08	2.1E-07	1.5E-05
Polychlorinated biphenyls (PCBs)	1.8E+00	3.2E-08	3.3E-08	8.4E-10	4.9E-11	6.6E-08	4.5E-02	4.6E-02	1.2E-03	3.4E-03	9.6E-02
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Antimony	3.9E+00						1.2E-02	1.2E-02	3.1E-04	1.4E-05	2.4E-02
Arsenic	7.7E+00	5.0E-08	3.0E-08	1.3E-09	6.1E-09	8.8E-08	1.6E-02	9.5E-03	4.1E-04	1.4E-02	4.0E-02
Barium	1.6E+02						2.9E-03	2.9E-03	7.5E-05	1.2E-03	7.1E-03
Beryllium	2.7E-01				1.7E-10	1.7E-10	6.6E-05	6.6E-05	1.7E-06	5.0E-04	6.3E-04
Cadmium	9.7E-01				4.6E-10	4.6E-10	1.2E-03	2.4E-04	3.1E-05	1.8E-03	3.3E-03
Chromium(III)	2.0E+01						1.7E-05	1.7E-05	4.3E-07	2.5E-03	2.6E-03
Lead	4.3E+02						3.6E-01	4.3E-02	9.2E-03	1.6E-02	4.2E-01
MERCURY	1.4E-01						3.0E-04	6.0E-04	7.7E-06	1.8E-05	9.2E-04
Nickel	2.1E+01				2.7E-09	2.7E-09	1.3E-03	2.6E-03	3.4E-05	7.9E-04	4.8E-03
Silver	2.1E+00						5.2E-04	1.6E-03	1.3E-05	5.6E-04	2.6E-03
Vanadium	2.6E+01						3.6E-03	3.6E-03	9.3E-05	9.8E-04	8.3E-03
Zinc	2.4E+02						1.0E-03	1.0E-03	2.6E-05	6.5E-03	8.5E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
zz4-Bromodiphenyl ether						1.0E-05	1	0.19	1	1.0E-05
bis(2-Ethylhexyl)phthalate	1.4E-02	1	0.1	1	4.6E-03	2.0E-02	1	0.1	1	2.0E-03
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Antimony						4.0E-04	1	0.1	1	2.9E-03
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
MERCURY						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Construction Worker - Soil: Table CW-1 (HS-5: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 1E-06

HI (all chemicals) = 2E+00

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
zzDibenzofuran	9.8E-01						2.9E-04	5.5E-04	7.5E-06	2.6E-06	8.5E-04
ACENAPHTHENE	8.5E-01						1.6E-06	5.3E-06	4.1E-08	6.3E-08	6.9E-06
ACENAPHTHYLENE	1.5E+00						1.9E-06	6.4E-06	4.9E-08	1.1E-07	8.4E-06
Anthracene	4.3E+00						1.6E-06	5.3E-06	4.1E-08	3.2E-07	7.2E-06
Benzo(a)anthracene	1.7E+01	3.3E-08	2.2E-08	8.5E-10	9.4E-10	5.6E-08	2.1E-05	1.4E-05	5.4E-07	1.3E-06	3.7E-05
Benzo(a)pyrene	1.1E+01	2.1E-07	1.4E-07	5.5E-09	6.1E-09	3.6E-07	1.4E-05	9.1E-06	3.5E-07	8.2E-07	2.4E-05
Benzo(b)fluoranthene	1.3E+01	2.5E-08	1.7E-08	6.5E-10	7.2E-10	4.3E-08	1.6E-05	1.1E-05	4.1E-07	9.7E-07	2.8E-05
Benzo(g,h,i)perylene	4.1E+00						5.1E-06	1.7E-05	1.3E-07	3.1E-07	2.3E-05
Benzo(k)fluoranthene	7.4E+00	1.4E-09	9.5E-10	3.7E-11	4.1E-11	2.5E-09	9.1E-06	6.1E-06	2.4E-07	5.5E-07	1.6E-05
Chrysene	7.2E+00	1.4E-09	9.3E-10	3.6E-11	4.0E-11	2.4E-09	8.8E-06	5.9E-06	2.3E-07	5.3E-07	1.6E-05
Dibenzo(a,h)anthracene	9.4E+00	1.8E-07	1.2E-07	4.7E-09	5.2E-09	3.1E-07	1.2E-05	7.8E-06	3.0E-07	7.0E-07	2.0E-05
Fluoranthene	2.1E+01						7.6E-05	2.6E-04	2.0E-06	1.5E-06	3.3E-04
Fluorene	2.0E+00						1.9E-06	6.3E-06	4.9E-08	1.5E-07	8.4E-06
Indeno(1,2,3-cd)pyrene	4.0E+00	7.7E-09	5.1E-09	2.0E-10	2.2E-10	1.3E-08	4.9E-06	3.3E-06	1.3E-07	3.0E-07	8.6E-06
METHYLNAPHTHALENE, 2-	6.0E-01						5.6E-05	1.9E-04	1.4E-06	4.5E-08	2.4E-04
Phenanthrene	1.7E+01						2.0E-05	6.9E-05	5.3E-07	1.2E-06	9.1E-05
Pyrene	1.8E+01						2.2E-05	7.5E-05	5.8E-07	1.3E-06	9.9E-05
Polychlorinated biphenyls (PCBs)	4.9E+00	8.5E-08	8.6E-08	2.2E-09	1.3E-10	1.7E-07	1.2E-01	1.2E-01	3.1E-03	9.1E-03	2.5E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Arsenic	1.5E+01	9.6E-08	5.8E-08	2.5E-09	1.2E-08	1.7E-07	3.0E-02	1.8E-02	7.7E-04	2.7E-02	7.6E-02
Barium	2.1E+02						3.7E-03	3.7E-03	9.5E-05	1.5E-03	9.0E-03
Cadmium	1.7E+00				7.9E-10	7.9E-10	2.0E-03	4.1E-04	5.3E-05	3.1E-03	5.6E-03
Chromium(III)	2.1E+01						1.8E-05	1.8E-05	4.5E-07	2.7E-03	2.7E-03
Lead	1.8E+03						1.5E+00	1.8E-01	3.8E-02	6.7E-02	1.8E+00
Mercury	6.0E-01						1.2E-03	2.5E-03	3.2E-05	7.4E-05	3.8E-03
Silver	6.1E-01						1.5E-04	4.6E-04	3.9E-06	1.6E-04	7.7E-04

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
zzDibenzofuran						4.0E-03	0.96	0.18	1	4.0E-03
ACENAPHTHENE						2.0E-01	0.3	0.1	1	1.4E-01
ACENAPHTHYLENE						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
METHYLNAPHTHALENE, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Silver						5.0E-03	1	0.3	1	4.0E-05

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Construction Worker - Soil: Table CW-1 (HS-6: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 3E-07

HI (all chemicals) = 6E-01

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
Acenaphthene	1.5E-01						2.8E-07	9.4E-07	7.2E-09	1.1E-08	1.2E-06
Anthracene	3.0E-01						1.1E-07	3.7E-07	2.8E-09	2.2E-08	5.0E-07
Benzo(a)anthracene	5.2E-01	1.0E-09	6.7E-10	2.6E-11	2.9E-11	1.7E-09	6.4E-07	4.3E-07	1.7E-08	3.9E-08	1.1E-06
Benzo(a)pyrene	4.6E-01	8.8E-09	5.9E-09	2.3E-10	2.5E-10	1.5E-08	5.7E-07	3.8E-07	1.5E-08	3.4E-08	9.9E-07
Benzo(b)fluoranthene	5.7E-01	1.1E-09	7.3E-10	2.8E-11	3.1E-11	1.9E-09	7.0E-07	4.7E-07	1.8E-08	4.2E-08	1.2E-06
Benzo(k)fluoranthene	2.6E-01	4.9E-11	3.3E-11	1.3E-12	1.4E-12	8.5E-11	3.2E-07	2.1E-07	8.2E-09	1.9E-08	5.6E-07
Chrysene	5.3E-01	1.0E-10	6.8E-11	2.6E-12	2.9E-12	1.7E-10	6.5E-07	4.3E-07	1.7E-08	3.9E-08	1.1E-06
Fluoranthene	9.8E-01						3.6E-06	1.2E-05	9.4E-08	7.3E-08	1.6E-05
Naphthalene	1.3E-01						2.5E-07	8.2E-07	6.4E-09	1.6E-06	2.7E-06
Phenanthrene	9.7E-01						1.2E-06	4.0E-06	3.1E-08	7.2E-08	5.3E-06
Pyrene	8.3E-01						1.0E-06	3.4E-06	2.7E-08	6.2E-08	4.6E-06
Polychlorinated biphenyls (PCBs)	3.9E+00	6.9E-08	7.0E-08	1.8E-09	1.0E-10	1.4E-07	9.7E-02	9.8E-02	2.5E-03	7.3E-03	2.0E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Barium	3.7E+02						6.5E-03	6.5E-03	1.7E-04	2.7E-03	1.6E-02
Beryllium	1.9E-01				1.2E-10	1.2E-10	4.6E-05	4.7E-05	1.2E-06	3.5E-04	4.4E-04
Cadmium	5.1E-01				2.4E-10	2.4E-10	6.3E-04	1.3E-04	1.6E-05	9.5E-04	1.7E-03
Chromium(III)	9.1E+01						7.5E-05	7.6E-05	1.9E-06	1.1E-02	1.1E-02
Lead	1.4E+02						1.1E-01	1.3E-02	2.9E-03	5.0E-03	1.3E-01
Mercury	9.1E-02						1.9E-04	3.8E-04	4.8E-06	1.1E-05	5.8E-04
Nickel	9.6E+00				1.2E-09	1.2E-09	5.9E-04	1.2E-03	1.5E-05	3.6E-04	2.2E-03
Vanadium	3.6E+01						4.9E-03	5.0E-03	1.3E-04	1.3E-03	1.1E-02
Zinc	8.5E+01						3.5E-04	3.5E-04	9.0E-06	2.3E-03	3.0E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Construction Worker - Soil: Table CW-1 (HS-7: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 2E-07
HI (all chemicals) = 5E-01

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Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
Polychlorinated biphenyls (PCBs)	2.2E-01	3.8E-09	3.9E-09	1.0E-10	5.8E-12	7.8E-09	5.4E-03	5.4E-03	1.4E-04	4.1E-04	1.1E-02
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Barium	9.0E+01						1.6E-03	1.6E-03	4.1E-05	6.7E-04	3.9E-03
Beryllium	4.0E-01				2.5E-10	2.5E-10	9.8E-05	9.9E-05	2.5E-06	7.4E-04	9.4E-04
Cadmium	1.0E+00				4.8E-10	4.8E-10	1.2E-03	2.5E-04	3.2E-05	1.9E-03	3.4E-03
Chromium(III)	1.6E+01						1.3E-05	1.3E-05	3.4E-07	2.0E-03	2.0E-03
Lead	3.2E+02						2.6E-01	3.2E-02	6.8E-03	1.2E-02	3.1E-01
Nickel	1.0E+01				1.3E-09	1.3E-09	6.2E-04	1.3E-03	1.6E-05	3.8E-04	2.3E-03
Zinc	1.4E+02						5.7E-04	5.7E-04	1.5E-05	3.7E-03	4.8E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Construction Worker - Soil: Table CW-1 (HS-8: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0114

ELCR (all chemicals) = 2.0E-06
HI (all chemicals) = 2.6E+00

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Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)			EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
AROMATICS	C9 to C10	p-Isopropyltoluene	1.2E+00						4.9E-06	9.9E-06	1.3E-07	8.9E-08	1.5E-05
AROMATICS	C9 to C10		5.1E+01						2.1E-04	4.2E-04	5.4E-06	3.8E-06	6.4E-04
ALIPHATICS	C9 to C12		2.5E+01						3.1E-05	6.2E-05	8.0E-07	1.6E-06	9.5E-05
ALIPHATICS	C19 to C36		1.6E+02						3.3E-05	6.6E-05	8.5E-07		1.0E-04
AROMATICS	C11 to C22		1.2E+02						1.5E-04	5.0E-04	3.8E-06	8.9E-06	6.6E-04
zzBenzoic Acid			2.4E+00						7.1E-07	1.3E-06	1.8E-08	6.4E-09	2.1E-06
DIMETHYL PHTHALATE			2.8E-01						3.5E-06	3.5E-06	9.1E-08	2.6E-08	7.1E-06
zzdi-n-butylphthalate			1.0E+00						1.2E-05	8.7E-06	3.2E-07	1.1E-07	2.2E-05
zzButylbenzylphthalate			2.4E-01	3.8E-12	7.2E-12	9.9E-14	3.4E-14	1.1E-11	1.4E-06	2.7E-06	3.7E-08	1.3E-08	4.1E-06
BIS(2-ETHYLHEXYL)PHTHALATE			3.0E+00	3.7E-10	3.8E-10	9.7E-12	1.0E-12	7.6E-10	1.9E-04	1.9E-04	4.8E-06	1.6E-05	4.0E-04
zzCarbazole			2.0E+00	9.7E-11	7.0E-11	2.5E-12	3.0E-12	1.7E-10	2.3E-06	1.6E-06	5.9E-08	1.5E-07	4.1E-06
zzDibenzofuran			7.2E-01						2.1E-04	4.0E-04	5.5E-06	1.9E-06	6.2E-04
Acenaphthene			4.5E+00						8.3E-06	2.8E-05	2.1E-07	3.3E-07	3.7E-05
Acenaphthylene			6.6E-01						8.1E-07	2.7E-06	2.1E-08	4.9E-08	3.6E-06
Anthracene			7.9E+00						2.9E-06	9.7E-06	7.5E-08	5.9E-07	1.3E-05
Benzo(a)anthracene			3.3E+01	6.3E-08	4.2E-08	1.6E-09	1.8E-09	1.1E-07	4.0E-05	2.7E-05	1.0E-06	2.4E-06	7.1E-05
Benzo(a)pyrene			2.6E+01	5.0E-07	3.4E-07	1.3E-08	1.4E-08	8.7E-07	3.2E-05	2.2E-05	8.3E-07	1.9E-06	5.7E-05
Benzo(b)fluoranthene			4.7E+01	9.0E-08	6.0E-08	2.3E-09	2.6E-09	1.6E-07	5.8E-05	3.9E-05	1.5E-06	3.5E-06	1.0E-04
Benzo(g,h,i)perylene			2.9E+00						3.6E-06	1.2E-05	9.3E-08	2.2E-07	1.6E-05
Benzo(k)fluoranthene			3.9E+00	7.5E-10	5.0E-10	1.9E-11	2.2E-11	1.3E-09	4.8E-06	3.2E-06	1.2E-07	2.9E-07	8.5E-06
Chrysene			9.0E+00	1.7E-09	1.2E-09	4.5E-11	5.0E-11	3.0E-09	1.1E-05	7.4E-06	2.9E-07	6.7E-07	1.9E-05
DIBENZO(a,h)ANTHRACENE			3.2E+00	6.2E-08	4.1E-08	1.6E-09	1.8E-09	1.1E-07	3.9E-06	2.7E-06	1.0E-07	2.4E-07	6.9E-06
Fluoranthene			2.3E+01						8.5E-05	2.9E-04	2.2E-06	1.7E-06	3.7E-04
Fluorene			4.6E+00						4.2E-06	1.4E-05	1.1E-07	3.4E-07	1.9E-05
Indeno(1,2,3-cd)pyrene			3.0E+00	5.8E-09	3.9E-09	1.5E-10	1.7E-10	1.0E-08	3.7E-06	2.5E-06	9.6E-08	2.2E-07	6.5E-06
METHYLNAPHTHALENE, 2-			2.0E+00						1.8E-04	6.1E-04	4.7E-06	1.5E-07	7.9E-04
Naphthalene			7.6E+01						1.4E-04	4.7E-04	3.6E-06	9.4E-04	1.6E-03
Phenanthrene			3.0E+01						3.7E-05	1.2E-04	9.5E-07	2.2E-06	1.6E-04
Pyrene			1.6E+01						2.0E-05	6.6E-05	5.1E-07	1.2E-06	8.8E-05
POLYCHLORINATED BIPHENYLS (PCBs)			3.8E+00	6.7E-08	6.7E-08	1.7E-09	1.0E-10	1.4E-07	9.4E-02	9.4E-02	2.4E-03	7.1E-03	2.0E-01
TCDD, 2,3,7,8- (equivalents)			1.9E-04	2.5E-07	2.5E-07	6.4E-09	1.7E-09	5.1E-07	3.3E-01	3.3E-01	8.6E-03	3.5E-03	6.8E-01
Arsenic			6.9E+00	4.6E-08	2.8E-08	1.2E-09	5.5E-09	8.0E-08	1.4E-02	8.6E-03	3.7E-04	1.3E-02	3.6E-02
Barium			8.7E+02						1.5E-02	1.5E-02	3.9E-04	6.4E-03	3.7E-02
Beryllium			2.0E-01				1.3E-10	1.3E-10	4.9E-05	5.0E-05	1.3E-06	3.7E-04	4.7E-04
Cadmium			4.6E+00				2.2E-09	2.2E-09	5.7E-03	1.2E-03	1.5E-04	8.6E-03	1.6E-02
CHROMIUM(III)			1.3E+02						1.0E-04	1.0E-04	2.7E-06	1.6E-02	1.6E-02
Lead			1.6E+03						1.3E+00	1.6E-01	3.4E-02	6.0E-02	1.6E+00
Mercury			9.8E-01						2.0E-03	4.1E-03	5.2E-05	1.2E-04	6.3E-03
Nickel			2.7E+01				3.4E-09	3.4E-09	1.6E-03	3.3E-03	4.2E-05	9.9E-04	6.0E-03
Selenium			1.1E+00						2.6E-04	2.6E-05	6.8E-06	1.3E-05	3.1E-04
Silver			1.4E+00						3.5E-04	1.0E-03	9.0E-06	3.7E-04	1.8E-03
Vanadium			8.1E+01						1.1E-02	1.1E-02	2.9E-04	3.0E-03	2.6E-02
Zinc			2.7E+02						1.1E-03	1.1E-03	2.9E-05	7.1E-03	9.4E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

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Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

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Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

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Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
ALIPHATICS C9 to C12						1.0E+00	1	0.2	1	1.7E-01
ALIPHATICS C19 to C36						6.0E+00	1	0.2		
AROMATICS C11 to C22						3.0E-01	0.3	0.1	1	1.4E-01
zzBenzoic Acid						4.0E+00	0.96	0.18	1	4.0E+00
DIMETHYL PHTHALATE						1.0E-01	1	0.1	1	1.1E-01
zzdi-n-butylphthalate						1.0E-01	1	0.07	1	1.0E-01
zzButylbenzylphthalate	1.9E-03	0.96	0.18	1	1.9E-03	2.0E-01	0.96	0.18	1	2.0E-01
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-02	1	0.1	1	4.6E-03	2.0E-02	1	0.1	1	2.0E-03
zzCarbazole	2.0E-02	0.28	0.02	1	2.0E-02	3.0E-01	0.28	0.02	1	1.4E-01
zzDibenzofuran						4.0E-03	0.96	0.18	1	4.0E-03
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
DIBENZO(a,h)ANTHRACENE	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
METHYLNAPHTHALENE, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
POLYCHLORINATED BIPHENYLS (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
CHROMIUM(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Selenium						5.0E-03	1	0.01	1	8.6E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Construction Worker - Soil: Table CW-1 (HS-9: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12
Vlookup Version v0114

ELCR (all chemicals) = 7E-07
HI (all chemicals) = 4E+00

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)		EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
ALIPHATICS C19 to C36		7.6E+01						1.6E-05	3.1E-05	4.0E-07		4.7E-05
AROMATICS C11 to C22		3.1E+01						3.8E-05	1.3E-04	9.9E-07	2.3E-06	1.7E-04
zz4-Methylphenol		7.4E-02						1.8E-05	3.5E-05	4.7E-07	4.6E-09	5.4E-05
Dimethyl phthalate		3.2E-01						3.9E-06	3.9E-06	1.0E-07	2.9E-08	7.9E-06
zzDi-n-butylphthalate		3.5E-01						4.3E-06	3.0E-06	1.1E-07	3.7E-08	7.5E-06
bis(2-Ethylhexyl)phthalate		2.0E+00	2.4E-10	2.4E-10	6.3E-12	6.8E-13	4.9E-10	1.2E-04	1.2E-04	3.1E-06	1.0E-05	2.6E-04
zzDibenzofuran		4.5E-01						1.3E-04	2.5E-04	3.4E-06	1.2E-06	3.9E-04
Acenaphthene		4.6E-01						8.5E-07	2.9E-06	2.2E-08	3.4E-08	3.8E-06
Acenaphthylene		4.1E-01						5.1E-07	1.7E-06	1.3E-08	3.1E-08	2.3E-06
Anthracene		1.2E+00						4.5E-07	1.5E-06	1.2E-08	9.0E-08	2.0E-06
Benzo(a)anthracene		2.9E+00	5.5E-09	3.7E-09	1.4E-10	1.6E-10	9.5E-09	3.5E-06	2.4E-06	9.1E-08	2.1E-07	6.2E-06
Benzo(a)pyrene		5.6E+00	1.1E-07	7.2E-08	2.8E-09	3.1E-09	1.8E-07	6.9E-06	4.6E-06	1.8E-07	4.2E-07	1.2E-05
Benzo(b)fluoranthene		3.0E+00	5.8E-09	3.9E-09	1.5E-10	1.7E-10	1.0E-08	3.7E-06	2.5E-06	9.7E-08	2.3E-07	6.6E-06
Benzo(g,h,i)perylene		1.4E+00						1.8E-06	6.0E-06	4.6E-08	1.1E-07	7.9E-06
Benzo(k)fluoranthene		1.4E+00	2.7E-10	1.8E-10	7.1E-12	7.9E-12	4.7E-10	1.7E-06	1.2E-06	4.5E-08	1.1E-07	3.1E-06
Chrysene		2.7E+00	5.2E-10	3.5E-10	1.4E-11	1.5E-11	9.1E-10	3.4E-06	2.3E-06	8.7E-08	2.0E-07	5.9E-06
Dibenzo(a,h)anthracene		4.8E-01	9.2E-09	6.2E-09	2.4E-10	2.6E-10	1.6E-08	5.9E-07	4.0E-07	1.5E-08	3.6E-08	1.0E-06
Fluoranthene		5.7E+00						2.1E-05	7.1E-05	5.5E-07	4.3E-07	9.3E-05
Fluorene		5.5E-01						5.1E-07	1.7E-06	1.3E-08	4.1E-08	2.3E-06
Indeno(1,2,3-cd)pyrene		1.6E+00	3.1E-09	2.0E-09	7.9E-11	8.8E-11	5.3E-09	2.0E-06	1.3E-06	5.1E-08	1.2E-07	3.4E-06
METHYLNAPHTHALENE, 2-		3.0E-01						2.7E-05	9.2E-05	7.1E-07	2.2E-08	1.2E-04
Naphthalene		4.0E+01						7.4E-05	2.5E-04	1.9E-06	5.0E-04	8.2E-04
Phenanthrene		4.1E+00						5.1E-06	1.7E-05	1.3E-07	3.1E-07	2.3E-05
Pyrene		5.7E+00						7.0E-06	2.3E-05	1.8E-07	4.2E-07	3.1E-05
Polychlorinated biphenyls (PCBs)		3.2E+00	5.6E-08	5.6E-08	1.5E-09	8.5E-11	1.1E-07	7.9E-02	7.9E-02	2.0E-03	5.9E-03	1.7E-01
TCDD, 2,3,7,8- (equivalents)		5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
AROMATICS C9 to C10	GRO	1.2E+01						5.0E-05	1.0E-04	1.3E-06	9.2E-07	1.5E-04
Antimony		2.3E+02						7.0E-01	7.0E-01	1.8E-02	8.4E-04	1.4E+00
Arsenic		2.0E+01	1.3E-07	7.9E-08	3.4E-09	1.6E-08	2.3E-07	4.1E-02	2.5E-02	1.1E-03	3.7E-02	1.0E-01
Barium		1.4E+03						2.5E-02	2.5E-02	6.5E-04	1.1E-02	6.2E-02
Beryllium		4.3E-01				2.7E-10	2.7E-10	1.1E-04	1.1E-04	2.7E-06	8.0E-04	1.0E-03
Cadmium		3.7E+00				1.8E-09	1.8E-09	4.6E-03	9.3E-04	1.2E-04	6.9E-03	1.3E-02
Chromium(III)		7.2E+01						5.9E-05	5.9E-05	1.5E-06	8.9E-03	9.0E-03
Lead		1.8E+03						1.5E+00	1.8E-01	3.9E-02	6.8E-02	1.8E+00
Mercury		1.3E+00						2.7E-03	5.5E-03	7.0E-05	1.6E-04	8.4E-03
Nickel		1.6E+01				2.0E-09	2.0E-09	9.8E-04	2.0E-03	2.5E-05	5.9E-04	3.6E-03
Selenium		4.1E+00						1.0E-03	1.0E-04	2.6E-05	5.1E-05	1.2E-03
Silver		5.0E+00						1.2E-03	3.7E-03	3.2E-05	1.3E-03	6.3E-03
Vanadium		2.3E+01						3.2E-03	3.2E-03	8.3E-05	8.7E-04	7.3E-03
Zinc		5.2E+02						2.1E-03	2.2E-03	5.6E-05	1.4E-02	1.8E-02

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

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Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

Vlookup Version v0114

Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

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Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

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Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
ALIPHATICS C19 to C36						6.0E+00	1	0.2		
AROMATICS C11 to C22						3.0E-01	0.3	0.1	1	1.4E-01
zz4-Methylphenol						5.0E-03	1	0.19	1	1.7E-01
Dimethyl phthalate						1.0E-01	1	0.1	1	1.1E-01
zzDi-n-butylphthalate						1.0E-01	1	0.07	1	1.0E-01
bis(2-Ethylhexyl)phthalate	1.4E-02	1	0.1	1	4.6E-03	2.0E-02	1	0.1	1	2.0E-03
zzDibenzofuran						4.0E-03	0.96	0.18	1	4.0E-03
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
METHYLNAPHTHALENE, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
Polychlorinated biphenyls (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
AROMATICS C9 to C10						3.0E-01	1	0.2	1	1.4E-01
Antimony						4.0E-04	1	0.1	1	2.9E-03
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
Chromium(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Selenium						5.0E-03	1	0.01	1	8.6E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Construction Worker - Soil: Table CW-1 (HS-10: 0-15' bgs)
Exposure Point Concentration (EPC) and Risk
Based on Construction Worker 18-25 years of age

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 3.5E-07

HI (all chemicals) = 9.1E-01

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Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material (OHM)	EPC (mg/kg)	ELCR ingestion	ELCR dermal	ELCR inhalation GI	ELCR inhalation pulmonary	$ELCR_{total}$	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{inh-GI}	Subchronic HQ_{inh}	HQ_{total}
zzDi-n-butylphthalate	3.0E-01						3.7E-06	2.6E-06	9.7E-08	3.2E-08	6.5E-06
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-01	1.7E-11	1.7E-11	4.5E-13	4.8E-14	3.5E-11	8.6E-06	8.7E-06	2.2E-07	7.4E-07	1.8E-05
zzDibenzofuran	1.4E-01						4.2E-05	7.9E-05	1.1E-06	3.8E-07	1.2E-04
Acenaphthene	1.9E-01						3.6E-07	1.2E-06	9.3E-09	1.4E-08	1.6E-06
Acenaphthylene	1.5E-01						1.8E-07	6.1E-07	4.7E-09	1.1E-08	8.0E-07
Anthracene	4.4E-01						1.6E-07	5.4E-07	4.2E-09	3.3E-08	7.4E-07
Benzo(a)anthracene	9.9E-01	1.9E-09	1.3E-09	5.0E-11	5.5E-11	3.3E-09	1.2E-06	8.2E-07	3.2E-08	7.4E-08	2.2E-06
Benzo(a)pyrene	8.0E-01	1.5E-08	1.0E-08	4.0E-10	4.4E-10	2.7E-08	9.9E-07	6.6E-07	2.6E-08	6.0E-08	1.7E-06
Benzo(b)fluoranthene	1.0E+00	1.9E-09	1.3E-09	5.0E-11	5.6E-11	3.4E-09	1.2E-06	8.4E-07	3.2E-08	7.6E-08	2.2E-06
Benzo(g,h,i)perylene	3.6E-01						4.5E-07	1.5E-06	1.2E-08	2.7E-08	2.0E-06
Benzo(k)fluoranthene	3.8E-01	7.3E-11	4.9E-11	1.9E-12	2.1E-12	1.3E-10	4.7E-07	3.1E-07	1.2E-08	2.8E-08	8.2E-07
Chrysene	9.2E-01	1.8E-10	1.2E-10	4.6E-12	5.1E-12	3.1E-10	1.1E-06	7.6E-07	2.9E-08	6.9E-08	2.0E-06
DIBENZO(a,h)ANTHRACENE	1.4E-01	2.8E-09	1.9E-09	7.2E-11	8.0E-11	4.8E-09	1.8E-07	1.2E-07	4.6E-09	1.1E-08	3.1E-07
Fluoranthene	2.0E+00						7.3E-06	2.4E-05	1.9E-07	1.5E-07	3.2E-05
Fluorene	2.1E-01						2.0E-07	6.7E-07	5.1E-09	1.6E-08	8.8E-07
Indeno(1,2,3-cd)pyrene	4.2E-01	8.0E-10	5.4E-10	2.1E-11	2.3E-11	1.4E-09	5.1E-07	3.4E-07	1.3E-08	3.1E-08	9.0E-07
METHYLNAPHTHALENE, 2-	1.7E-01						1.5E-05	5.2E-05	4.0E-07	1.2E-08	6.7E-05
Naphthalene	1.5E-01						2.7E-07	9.2E-07	7.1E-09	1.8E-06	3.0E-06
Phenanthrene	1.9E+00						2.4E-06	7.9E-06	6.1E-08	1.4E-07	1.0E-05
Pyrene	2.2E+00						2.8E-06	9.3E-06	7.1E-08	1.7E-07	1.2E-05
POLYCHLORINATED BIPHENYLS (PCBs)	1.4E+00	2.4E-08	2.5E-08	6.3E-10	3.7E-11	5.0E-08	3.4E-02	3.5E-02	8.9E-04	2.6E-03	7.2E-02
TCDD, 2,3,7,8- (equivalents)	5.7E-05	7.4E-08	7.5E-08	1.9E-09	4.9E-10	1.5E-07	9.9E-02	1.0E-01	2.6E-03	1.1E-03	2.0E-01
Arsenic	8.8E+00	5.8E-08	3.5E-08	1.5E-09	7.0E-09	1.0E-07	1.8E-02	1.1E-02	4.7E-04	1.6E-02	4.6E-02
Barium	3.2E+02						5.6E-03	5.7E-03	1.5E-04	2.4E-03	1.4E-02
Beryllium	3.9E-01				2.5E-10	2.5E-10	9.5E-05	9.6E-05	2.5E-06	7.2E-04	9.1E-04
Cadmium	1.0E+00				4.9E-10	4.9E-10	1.3E-03	2.6E-04	3.3E-05	1.9E-03	3.5E-03
CHROMIUM(III)	2.7E+01						2.2E-05	2.2E-05	5.7E-07	3.3E-03	3.4E-03
Lead	5.6E+02						4.6E-01	5.6E-02	1.2E-02	2.1E-02	5.5E-01
Mercury	1.2E-01						2.5E-04	5.1E-04	6.6E-06	1.5E-05	7.9E-04
Nickel	9.4E+00				1.2E-09	1.2E-09	5.8E-04	1.2E-03	1.5E-05	3.5E-04	2.1E-03
Selenium	5.7E+00						1.4E-03	1.4E-04	3.7E-05	7.1E-05	1.7E-03
Silver	7.4E-01						1.8E-04	5.5E-04	4.7E-06	2.0E-04	9.3E-04
Vanadium	1.8E+01						2.5E-03	2.5E-03	6.5E-05	6.8E-04	5.8E-03
Zinc	1.7E+02						7.0E-04	7.0E-04	1.8E-05	4.5E-03	5.9E-03

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Construction Worker - Soil: Table CW-2

Equations to Calculate Cancer Risk for Construction Worker

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Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing} * CSF_{oral}$$

$$LADD_{ing} = \frac{EPC * IR * RAF_{c\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF_{oral}$$

$$LADD_{derm} = \frac{EPC * SA * AF * RAF_{c\text{-}derm} * EF * ED_{derm} * EP * C1}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$ELCR_{inh\text{-}GI} = LADD_{inh\text{-}GI} * CSF_{oral}$$

$$LADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{c\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Cancer Risk from Particulate Inhalation - Pulmonary Absorption

$$ELCR_{inh} = LADD_{inh} * CSF_{inhalation}$$

$$LADD = \frac{EPC * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{c\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM-specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{c\text{-}ing}$	OHM-specific	dimensionless
$RAF_{c\text{-}derm}$	OHM-specific	dimensionless
$RAF_{c\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{(lifetime)}$	25,550	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM_{10}	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-3

Equations to Calculate Noncancer Risk for Construction Worker

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Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{ing} = \frac{EPC * IR * RAF_{nc\text{-}ing} * EF * ED_{ing} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{dermal} = \frac{EPC * SA * AF * RAF_{nc\text{-}derm} * EF * ED_{dermal} * EP * C1}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Gastrointestinal Absorption

$$HQ_{inh\text{-}GI} = \frac{ADD_{inh\text{-}GI}}{RfD_{oral\text{-}subchronic}}$$

$$ADD_{inh\text{-}GI} = \frac{EPC * RCAF_{inh\text{-}gi} * PM_{10} * VR_{work} * RAF_{nc\text{-}ing} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Noncancer Risk from Particulate Inhalation - Pulmonary Absorption

$$HQ_{inh} = \frac{ADD}{RfD_{inhalation\text{-}subchronic}}$$

$$ADD_{inh} = \frac{EPC_{soil} * RCAF_{inh} * PM_{10} * VR_{work} * RAF_{nc\text{-}inh} * EF * ED_{inh} * EP * C2 * C3 * C4}{BW * AP_{noncancer}}$$

Parameter	Value	Units
RfD	OHM-specific	mg/kg-day
ADD	OHM-specific	mg/kg-day
EPC	OHM-specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM-specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM-specific	dimensionless
$RAF_{nc\text{-}inh}$	OHM-specific	dimensionless
EF	0.714	event/day
$ED_{ing\ \&\ derm}$	1	day/event
ED_{inh}	0.333	day/event
EP	182	days
C1	1.0E-06	kg/mg
C2	1.0E-09	kg/µg
C3	1440	min/days
C4	1.0E-03	m^3/L
BW	58.0	kg
$AP_{noncancer}$	182	days
VR_{work}	60	L/min
AF	0.29	mg/cm^2
SA	3473	cm^2/day
$RCAF_{inh\text{-}gi}$	1.5	dimensionless
$RCAF_{inh}$	0.5	dimensionless
PM10	60	$\mu g/m^3$

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Construction Worker - Soil: Table CW-4
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
HI - Hazard Index	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table CW-5.
RfD - Reference Dose	chemical specific	mg/kg-day	see Table CW-5.
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-2.
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific. See Table CW-3.
EPC - Exposure Point Concentration	chemical specific	mg/kg	see Table CW-1.
IR - Soil Ingestion Rate	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm).
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
RAF_{nc} - Relative Absorption Factor for Noncancer Effects	chemical specific	dimensionless	Pathway specific - see Table CW-5.
EF - Exposure Frequency	0.714	event/day	5 events (days) / 7 events (days) in a week; MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-38.
$ED_{ing,derm}$ - Exposure Duration for ingestion or dermal exposure	1	day/event	
ED_{inh} - Exposure Duration for inhalation exposure	0.333	day/event	Represents 8 hours / event.
EP - Exposure Period	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
BW - Body Weight	58.0	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, Females, ages 18 - 25.
$AP_{(lifetime)}$ - Averaging Period for lifetime	25,550	days	Represents 70 years
$AP_{(noncancer)}$ - Averaging Period for noncancer	182	days	6 months; MADEP 1995 Guidance for Disposal Site Risk Characterization.
AF - Adherence Factor	0.29	mg/cm^2	MA DEP. 2002 Technical Update: Weighted Skin-Soil Adherence Factors. (http://www.mass.gov/dep/ors/orspubs.htm)
VR_{work} - Ventilation Rate during work (heavy exertion)	60	L/min	Table B-4 MADEP 1995 Guidance for Disposal Site Risk Characterization.
SA - Surface Area	3473	cm^2/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. 50th percentile for females. Appendix Table B-2.
$IFAF_{inh\text{-}gi}$ - Ingestion Fraction Adjustment Factor, gastrointestinal	1.5	dimensionless	MADEP 2007. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
$IFAF_{inh}$ - Inhalation Fraction Adjustment Factor, inhalation	0.5	dimensionless	MADEP 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers
PM10 - Concentration of PM_{10}	60	$\mu g/m^3$	MADEP 1995 Guidance for Disposal Site Risk Characterization pg B-11

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Construction Worker - Soil: Table CW-5
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	Oral CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}inh}$	Inhalation CSF $(mg/kg\text{-}day)^{-1}$	Subchronic Oral RfD mg/kg-day	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}inh}$	Subchronic Inhalation RfD
zzDi-n-butylphthalate						1.0E-01	1	0.07	1	1.0E-01
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-02	1	0.1	1	4.6E-03	2.0E-02	1	0.1	1	2.0E-03
zzDibenzofuran						4.0E-03	0.96	0.18	1	4.0E-03
Acenaphthene						2.0E-01	0.3	0.1	1	1.4E-01
Acenaphthylene						3.0E-01	0.3	0.1	1	1.4E-01
Anthracene						1.0E+00	0.3	0.1	1	1.4E-01
Benzo(a)anthracene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(a)pyrene	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
Benzo(g,h,i)perylene						3.0E-01	0.3	0.1	1	1.4E-01
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
Chrysene	7.3E-02	0.3	0.02	1	7.3E-02	3.0E-01	0.3	0.02	1	1.4E-01
DIBENZO(a,h)ANTHRACENE	7.3E+00	0.3	0.02	1	7.3E+00	3.0E-01	0.3	0.02	1	1.4E-01
Fluoranthene						1.0E-01	0.3	0.1	1	1.4E-01
Fluorene						4.0E-01	0.3	0.1	1	1.4E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	1	7.3E-01	3.0E-01	0.3	0.02	1	1.4E-01
METHYLNAPHTHALENE, 2-						4.0E-03	0.3	0.1	1	1.4E-01
Naphthalene						2.0E-01	0.3	0.1	1	8.6E-04
Phenanthrene						3.0E-01	0.3	0.1	1	1.4E-01
Pyrene						3.0E-01	0.3	0.1	1	1.4E-01
POLYCHLORINATED BIPHENYLS (PCBs)	2.0E+00	1	0.1	1	3.5E-01	5.0E-05	1	0.1	1	5.7E-06
TCDD, 2,3,7,8- (equivalents)	1.5E+05	1	0.1	1	1.2E+05	7.0E-10	1	0.1	1	5.7E-10
Arsenic	1.5E+00	0.5	0.03	1	1.1E+01	3.0E-04	0.5	0.03	1	5.7E-06
Barium						7.0E-02	1	0.1	1	1.4E-03
Beryllium					8.4E+00	5.0E-03	1	0.1	1	5.7E-06
Cadmium					6.3E+00	5.0E-04	0.5	0.01	1	5.7E-06
CHROMIUM(III)						1.5E+00	1	0.1	1	8.6E-05
Lead						7.5E-04	0.5	0.006	1	2.9E-04
Mercury						3.0E-04	0.5	0.1	1	8.6E-05
Nickel					1.7E+00	2.0E-02	1	0.2	1	2.9E-04
Selenium						5.0E-03	1	0.01	1	8.6E-04
Silver						5.0E-03	1	0.3	1	4.0E-05
Vanadium						9.0E-03	1	0.1	1	2.9E-04
Zinc						3.0E-01	1	0.1	1	4.0E-04

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Construction Worker - Soil: Table CW-6
Cyanide Calculations

The acute concentration of available cyanide in soil is the level at or below which adverse human health effects would not be expected following an acute exposure. For construction workers, the subchronic concentrations calculated in the EPCs tab are more conservative than the acute concentrations. The acute calculation is below.

Acute Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 11-12	58	kg
IR (1-time reasonable max)	Site-specific	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Park Visitor - Soil: Table PS-1 (HS-1: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 4E-06
Chronic HI (all chemicals) = 2E-01
Subchronic HI (all chemicals) = 5E-01

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Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic			Subchronic		
					HQ_{ing}	HQ_{derm}	HQ_{total}	HQ_{ing}	HQ_{derm}	HQ_{total}
POLYCHLORINATED BIPHENYLS (PCBs)	5.9E-03	2.6E-09	2.7E-09	5.4E-09	4.3E-04	3.6E-04	7.9E-04	4.7E-04	2.8E-04	7.5E-04
TCDD, 2,3,7,8- (equivalents)	5.7E-05	1.9E-06	2.0E-06	3.9E-06	1.2E-01	1.0E-01	2.2E-01	3.2E-01	1.9E-01	5.1E-01

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

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Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

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Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

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Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
POLYCHLORINATED BI	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1

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Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) [1-2]	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Park Visitor - Soil: Table PS-1 (HS-2: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 6E-06
Chronic HI (all chemicals) = 9E-01
Subchronic HI (all chemicals) = 2E+00

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Oil or Hazardous Material			EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Chronic HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{total}
Trichlorobenzene, 1,2,4-			1.7E-01				2.5E-05	6.3E-06	3.1E-05	7.6E-06	1.3E-06	8.9E-06
zz1,2,3-Trichlorobenzene			2.1E-01				3.8E-04	3.6E-04	7.3E-04	1.0E-03	6.8E-04	1.7E-03
Acenaphthene			1.6E-01				1.1E-06	3.2E-06	4.4E-06	9.4E-07	1.8E-06	2.8E-06
Acenaphthylene			1.5E-01				2.1E-06	6.0E-06	8.1E-06	5.8E-07	1.1E-06	1.7E-06
Anthracene			3.3E-01				4.8E-07	1.4E-06	1.8E-06	4.0E-07	7.7E-07	1.2E-06
Benzo(a)anthracene			6.1E-01	3.0E-08	2.1E-08	5.0E-08	8.8E-06	5.0E-06	1.4E-05	2.4E-06	9.5E-07	3.4E-06
Benzo(a)pyrene			5.3E-01	2.6E-07	1.8E-07	4.4E-07	7.7E-06	4.4E-06	1.2E-05	2.1E-06	8.2E-07	2.9E-06
Benzo(b)fluoranthene			5.7E-01	2.8E-08	1.9E-08	4.7E-08	8.2E-06	4.7E-06	1.3E-05	2.3E-06	8.8E-07	3.2E-06
Benzo(g,h,i)perylene			3.6E-01				5.3E-06	1.5E-05	2.0E-05	1.4E-06	2.8E-06	4.3E-06
Benzo(k)fluoranthene			2.7E-01	1.3E-09	9.1E-10	2.2E-09	3.9E-06	2.2E-06	6.1E-06	1.1E-06	4.2E-07	1.5E-06
Chrysene			5.9E-01	2.9E-09	2.0E-09	4.9E-09	8.6E-06	4.9E-06	1.3E-05	2.4E-06	9.2E-07	3.3E-06
Dibenzo(a,h)anthracene			1.4E-01	7.0E-08	4.8E-08	1.2E-07	2.1E-06	1.2E-06	3.2E-06	5.7E-07	2.2E-07	7.9E-07
Fluoranthene			1.2E+00				1.3E-05	3.7E-05	5.0E-05	1.4E-05	2.8E-05	4.2E-05
Fluorene			2.1E-01				2.3E-06	6.4E-06	8.7E-06	6.3E-07	1.2E-06	1.8E-06
Indeno(1,2,3-cd)pyrene			4.2E-01	2.0E-08	1.4E-08	3.5E-08	6.0E-06	3.4E-06	9.5E-06	1.7E-06	6.5E-07	2.3E-06
Methylnaphthalene, 2-			1.3E-01				1.5E-05	4.2E-05	5.6E-05	4.0E-05	7.8E-05	1.2E-04
Naphthalene			1.6E-01				3.5E-06	9.8E-06	1.3E-05	9.5E-07	1.9E-06	2.8E-06
Phenanthrene			1.3E+00				1.8E-05	5.2E-05	7.0E-05	5.0E-06	9.8E-06	1.5E-05
Pyrene			1.2E+00				1.7E-05	4.9E-05	6.6E-05	4.7E-06	9.2E-06	1.4E-05
AROMATICS	C9 to C10	GRO	1.5E+01				7.1E-04	1.2E-03	1.9E-03	2.0E-04	2.3E-04	4.2E-04
Polychlorinated biphenyls (PCBs)			4.5E-01	2.0E-07	2.1E-07	4.1E-07	3.2E-02	2.8E-02	6.0E-02	3.6E-02	2.1E-02	5.6E-02
TCDD, 2,3,7,8- (equivalents)			5.7E-05	1.9E-06	2.0E-06	3.9E-06	1.2E-01	1.0E-01	2.2E-01	3.2E-01	1.9E-01	5.1E-01
Arsenic			3.5E+00	5.9E-07	3.7E-07	9.6E-07	8.5E-03	4.3E-03	1.3E-02	2.3E-02	8.2E-03	3.2E-02
Barium			8.8E+01				6.4E-04	5.4E-04	1.2E-03	5.0E-03	2.9E-03	7.9E-03
Beryllium			1.9E-01				1.4E-04	1.1E-04	2.5E-04	1.5E-04	8.7E-05	2.4E-04
Cadmium			6.1E-01				8.8E-04	1.5E-04	1.0E-03	2.4E-03	2.8E-04	2.7E-03
Chromium(III)			1.3E+01				1.2E-05	1.1E-05	2.3E-05	3.4E-05	2.0E-05	5.4E-05
Lead			5.6E+02				5.4E-01	5.6E-02	6.0E-01	1.5E+00	1.1E-01	1.6E+00
MERCURY			1.3E-01				3.1E-04	5.2E-04	8.3E-04	8.5E-04	9.9E-04	1.8E-03
NICKEL			9.3E+00				6.8E-04	1.2E-03	1.8E-03	1.9E-03	2.2E-03	4.0E-03
Silver			1.5E+00				4.4E-04	1.1E-03	1.6E-03	1.2E-03	2.1E-03	3.4E-03
Vanadium			1.5E+01				2.4E-03	2.1E-03	4.5E-03	6.7E-03	3.9E-03	1.1E-02
Zinc			9.1E+01				4.4E-04	3.8E-04	8.2E-04	1.2E-03	7.1E-04	1.9E-03

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Vlookup Version v0114

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

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Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1\text{-}2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1\text{-}8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8\text{-}15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15\text{-}31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1\text{-}2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1\text{-}8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8\text{-}15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15\text{-}31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1\text{-}2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1\text{-}8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8\text{-}15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15\text{-}31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1\text{-}2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1\text{-}8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8\text{-}15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15\text{-}31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1\text{-}2)}$. Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1\text{-}8)}$. Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8\text{-}15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15\text{-}31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
Trichlorobenzene, 1,2,4-				1.0E-02	9.0E-02	1	0.03	1	0.03
zz1,2,3-Trichlorobenzene				8.0E-04	8.0E-04	0.99	0.11	0.99	0.11
Acenaphthene				6.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Acenaphthylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Anthracene				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
Benzo(a)anthracene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(a)pyrene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(g,h,i)perylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Chrysene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Fluoranthene				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
Fluorene				4.0E-02	4.0E-01	0.3	0.1	0.3	0.1
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Methylnaphthalene, 2-				4.0E-03	4.0E-03	0.3	0.1	0.3	0.1
Naphthalene				2.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Phenanthrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Pyrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
AROMATICS C9 to				3.0E-02	3.0E-01	1	0.2	1	0.2
Polychlorinated biphenyls	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1
Arsenic	1.5E+00	0.5	0.03	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03
Barium				2.0E-01	7.0E-02	1	0.1	1	0.1
Beryllium				2.0E-03	5.0E-03	1	0.1	1	0.1
Cadmium				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
Chromium(III)				1.5E+00	1.5E+00	1	0.1	1	0.1
Lead				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
MERCURY				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
NICKEL				2.0E-02	2.0E-02	1	0.2	1	0.2
Silver				5.0E-03	5.0E-03	1	0.3	1	0.3
Vanadium				9.0E-03	9.0E-03	1	0.1	1	0.1
Zinc				3.0E-01	3.0E-01	1	0.1	1	0.1

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Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Park Visitor - Soil: Table PS-1 (HS-3: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 5E-06
Chronic HI (all chemicals) = 1E+00
Subchronic HI (all chemicals) = 4E+00

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Chronic HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{total}
Benzene	3.6E-02	4.4E-10	1.4E-10	5.8E-10	1.3E-05	3.3E-06	1.6E-05	1.4E-05	2.5E-06	1.7E-05
Toluene	4.1E-02				7.4E-07	1.9E-07	9.3E-07	2.1E-07	3.6E-08	2.4E-07
AROMATICS C9 to C10 1,2,4-T	4.6E-02				2.2E-06	3.8E-06	6.0E-06	6.1E-07	7.2E-07	1.3E-06
Anthracene	4.4E-01				6.4E-07	1.8E-06	2.5E-06	5.3E-07	1.0E-06	1.6E-06
Benzo(a)anthracene	7.3E-01	3.6E-08	2.5E-08	6.1E-08	1.1E-05	6.0E-06	1.7E-05	2.9E-06	1.1E-06	4.1E-06
Benzo(a)pyrene	7.5E-01	3.7E-07	2.6E-07	6.3E-07	1.1E-05	6.2E-06	1.7E-05	3.0E-06	1.2E-06	4.2E-06
Benzo(b)fluoranthene	8.2E-01	4.0E-08	2.8E-08	6.8E-08	1.2E-05	6.8E-06	1.9E-05	3.3E-06	1.3E-06	4.6E-06
Benzo(g,h,i)perylene	4.7E-01				6.9E-06	2.0E-05	2.6E-05	1.9E-06	3.7E-06	5.6E-06
Benzo(k)fluoranthene	2.7E-01	1.3E-09	9.0E-10	2.2E-09	3.9E-06	2.2E-06	6.1E-06	1.1E-06	4.1E-07	1.5E-06
Chrysene	7.1E-01	3.5E-09	2.4E-09	5.9E-09	1.0E-05	5.8E-06	1.6E-05	2.8E-06	1.1E-06	3.9E-06
Dibenzo(a,h)anthracene	1.5E-01	7.6E-08	5.2E-08	1.3E-07	2.2E-06	1.3E-06	3.5E-06	6.2E-07	2.4E-07	8.6E-07
Fluoranthene	1.6E+00				1.8E-05	5.1E-05	6.8E-05	2.0E-05	3.8E-05	5.8E-05
Indeno(1,2,3-cd)pyrene	5.9E-01	2.9E-08	2.0E-08	4.9E-08	8.6E-06	4.9E-06	1.4E-05	2.4E-06	9.3E-07	3.3E-06
Naphthalene	7.3E-01				1.6E-05	4.5E-05	6.1E-05	4.4E-06	8.5E-06	1.3E-05
Phenanthrene	1.7E+00				2.4E-05	6.9E-05	9.4E-05	6.7E-06	1.3E-05	2.0E-05
Pyrene	1.5E+00				2.2E-05	6.1E-05	8.3E-05	6.0E-06	1.2E-05	1.8E-05
Polychlorinated biphenyls (PCBs)	1.8E-01	8.0E-08	8.3E-08	1.6E-07	1.3E-02	1.1E-02	2.4E-02	1.4E-02	8.4E-03	2.3E-02
TCDD, 2,3,7,8- (equivalents)	5.7E-05	1.9E-06	2.0E-06	3.9E-06	1.2E-01	1.0E-01	2.2E-01	3.2E-01	1.9E-01	5.1E-01
Barium	1.6E+02				1.2E-03	9.9E-04	2.2E-03	9.2E-03	5.4E-03	1.5E-02
Beryllium	2.9E-01				2.1E-04	1.8E-04	3.9E-04	2.3E-04	1.4E-04	3.7E-04
Lead	1.1E+03				1.1E+00	1.1E-01	1.2E+00	2.9E+00	2.0E-01	3.1E+00
MERCURY	1.5E-01				3.7E-04	6.3E-04	1.0E-03	1.0E-03	1.2E-03	2.2E-03
Nickel	6.4E+00				4.6E-04	7.9E-04	1.3E-03	1.3E-03	1.5E-03	2.8E-03
Silver	7.8E-01				2.3E-04	5.8E-04	8.1E-04	6.3E-04	1.1E-03	1.7E-03
Vanadium	1.3E+01				2.1E-03	1.8E-03	3.9E-03	5.8E-03	3.4E-03	9.2E-03
Zinc	1.3E+02				6.1E-04	5.2E-04	1.1E-03	1.7E-03	9.9E-04	2.7E-03

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Vlookup Version v0114

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1\text{-}2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1\text{-}8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8\text{-}15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15\text{-}31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1\text{-}2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1\text{-}8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8\text{-}15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15\text{-}31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1\text{-}2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1\text{-}8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8\text{-}15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15\text{-}31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1\text{-}2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1\text{-}8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8\text{-}15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15\text{-}31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1\text{-}2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1\text{-}8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8\text{-}15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15\text{-}31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
Benzene	5.5E-02	1	0.03	4.0E-03	1.0E-02	1	0.03	1	0.03
Toluene				8.0E-02	8.0E-01	1	0.03	1	0.03
AROMATICS C9 to				3.0E-02	3.0E-01	1	0.2	1	0.2
Anthracene				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
Benzo(a)anthracene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(a)pyrene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(g,h,i)perylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Chrysene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Fluoranthene				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Naphthalene				2.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Phenanthrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Pyrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Polychlorinated biphenyl:	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1
Barium				2.0E-01	7.0E-02	1	0.1	1	0.1
Beryllium				2.0E-03	5.0E-03	1	0.1	1	0.1
Lead				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
MERCURY				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
Nickel				2.0E-02	2.0E-02	1	0.2	1	0.2
Silver				5.0E-03	5.0E-03	1	0.3	1	0.3
Vanadium				9.0E-03	9.0E-03	1	0.1	1	0.1
Zinc				3.0E-01	3.0E-01	1	0.1	1	0.1

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Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Park Visitor - Soil: Table PS-1 (HS-4: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 9E-06
Chronic HI (all chemicals) = 1E+00
Subchronic HI (all chemicals) = 2E+00

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic			Subchronic		
					HQ_{ing}	HQ_{derm}	HQ_{total}	HQ_{ing}	HQ_{derm}	HQ_{total}
zz4-Bromodiphenyl ether	7.8E-02				1.1E-02	1.8E-02	3.0E-02	3.1E-02	3.5E-02	6.6E-02
bis(2-Ethylhexyl)phthalate	7.6E-02	2.4E-10	2.5E-10	4.9E-10	5.5E-06	4.7E-06	1.0E-05	1.5E-05	8.9E-06	2.4E-05
Acenaphthene	2.1E-01				1.5E-06	4.2E-06	5.7E-06	1.2E-06	2.4E-06	3.6E-06
Acenaphthylene	5.3E-01				7.7E-06	2.2E-05	3.0E-05	2.1E-06	4.1E-06	6.3E-06
Anthracene	5.7E-01				8.3E-07	2.3E-06	3.2E-06	6.8E-07	1.3E-06	2.0E-06
Benzo(a)anthracene	1.2E+00	5.9E-08	4.1E-08	9.9E-08	1.7E-05	9.8E-06	2.7E-05	4.8E-06	1.9E-06	6.6E-06
Benzo(a)pyrene	1.4E+00	6.8E-07	4.7E-07	1.1E-06	2.0E-05	1.1E-05	3.1E-05	5.5E-06	2.1E-06	7.6E-06
Benzo(b)fluoranthene	1.6E+00	7.7E-08	5.4E-08	1.3E-07	2.3E-05	1.3E-05	3.6E-05	6.3E-06	2.5E-06	8.8E-06
Benzo(g,h,i)perylene	7.4E-01				1.1E-05	3.1E-05	4.1E-05	3.0E-06	5.8E-06	8.8E-06
Benzo(k)fluoranthene	5.6E-01	2.8E-09	1.9E-09	4.7E-09	8.2E-06	4.6E-06	1.3E-05	2.2E-06	8.7E-07	3.1E-06
Chrysene	1.3E+00	6.2E-09	4.3E-09	1.1E-08	1.8E-05	1.0E-05	2.9E-05	5.1E-06	2.0E-06	7.1E-06
Dibenzo(a,h)anthracene	2.4E-01	1.2E-07	8.0E-08	2.0E-07	3.4E-06	1.9E-06	5.4E-06	9.4E-07	3.7E-07	1.3E-06
Fluoranthene	2.9E+00				3.1E-05	8.9E-05	1.2E-04	3.4E-05	6.7E-05	1.0E-04
Fluorene	2.7E-01				2.9E-06	8.2E-06	1.1E-05	8.0E-07	1.6E-06	2.4E-06
Indeno(1,2,3-cd)pyrene	7.3E-01	3.6E-08	2.5E-08	6.0E-08	1.1E-05	6.0E-06	1.7E-05	2.9E-06	1.1E-06	4.0E-06
Naphthalene	9.0E-01				2.0E-05	5.6E-05	7.6E-05	5.4E-06	1.1E-05	1.6E-05
Phenanthrene	2.6E+00				3.8E-05	1.1E-04	1.4E-04	1.0E-05	2.0E-05	3.1E-05
Pyrene	2.8E+00				4.0E-05	1.1E-04	1.5E-04	1.1E-05	2.2E-05	3.3E-05
Polychlorinated biphenyls (PCBs)	1.8E+00	8.3E-07	8.6E-07	1.7E-06	1.3E-01	1.1E-01	2.5E-01	1.5E-01	8.6E-02	2.3E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	1.9E-06	2.0E-06	3.9E-06	1.2E-01	1.0E-01	2.2E-01	3.2E-01	1.9E-01	5.1E-01
Antimony	3.9E+00				1.4E-02	1.2E-02	2.6E-02	3.9E-02	2.3E-02	6.1E-02
Arsenic	7.7E+00	1.3E-06	8.0E-07	2.1E-06	1.9E-02	9.5E-03	2.8E-02	5.1E-02	1.8E-02	6.9E-02
Barium	1.6E+02				1.2E-03	1.0E-03	2.2E-03	9.4E-03	5.5E-03	1.5E-02
Beryllium	2.7E-01				1.9E-04	1.7E-04	3.6E-04	2.1E-04	1.3E-04	3.4E-04
Cadmium	9.7E-01				1.4E-03	2.4E-04	1.6E-03	3.9E-03	4.5E-04	4.3E-03
Chromium(III)	2.0E+01				2.0E-05	1.7E-05	3.7E-05	5.4E-05	3.2E-05	8.6E-05
Lead	4.3E+02				4.2E-01	4.3E-02	4.6E-01	1.2E+00	8.1E-02	1.2E+00
MERCURY	1.4E-01				3.5E-04	5.9E-04	9.4E-04	9.6E-04	1.1E-03	2.1E-03
Nickel	2.1E+01				1.5E-03	2.6E-03	4.2E-03	4.2E-03	5.0E-03	9.2E-03
Silver	2.1E+00				6.1E-04	1.6E-03	2.2E-03	1.7E-03	2.9E-03	4.6E-03
Vanadium	2.6E+01				4.2E-03	3.6E-03	7.8E-03	1.2E-02	6.8E-03	1.8E-02
Zinc	2.4E+02				1.2E-03	1.0E-03	2.2E-03	3.2E-03	1.9E-03	5.1E-03

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Vlookup Version v0114

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1\text{-}2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1\text{-}8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8\text{-}15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15\text{-}31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1\text{-}2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1\text{-}8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8\text{-}15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15\text{-}31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1\text{-}2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1\text{-}8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8\text{-}15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15\text{-}31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1\text{-}2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1\text{-}8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8\text{-}15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15\text{-}31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1\text{-}2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1\text{-}8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8\text{-}15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15\text{-}31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
zz4-Bromodiphenyl ether				1.0E-05	1.0E-05	1	0.19	1	0.19
bis(2-Ethylhexyl)phthalat	1.4E-02	1	0.1	2.0E-02	2.0E-02	1	0.1	1	0.1
Acenaphthene				6.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Acenaphthylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Anthracene				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
Benzo(a)anthracene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(a)pyrene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(g,h,i)perylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Chrysene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Fluoranthene				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
Fluorene				4.0E-02	4.0E-01	0.3	0.1	0.3	0.1
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Naphthalene				2.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Phenanthrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Pyrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Polychlorinated biphenyl:	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1
Antimony				4.0E-04	4.0E-04	1	0.1	1	0.1
Arsenic	1.5E+00	0.5	0.03	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03
Barium				2.0E-01	7.0E-02	1	0.1	1	0.1
Beryllium				2.0E-03	5.0E-03	1	0.1	1	0.1
Cadmium				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
Chromium(III)				1.5E+00	1.5E+00	1	0.1	1	0.1
Lead				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
MERCURY				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
Nickel				2.0E-02	2.0E-02	1	0.2	1	0.2
Silver				5.0E-03	5.0E-03	1	0.3	1	0.3
Vanadium				9.0E-03	9.0E-03	1	0.1	1	0.1
Zinc				3.0E-01	3.0E-01	1	0.1	1	0.1

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Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Park Visitor - Soil: Table PS-1 (HS-5: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 3E-05
Chronic HI (all chemicals) = 3E+00
Subchronic HI (all chemicals) = 6E+00

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Chronic HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{total}
zzDibenzofuran	9.8E-01				1.4E-03	2.2E-03	3.6E-03	9.4E-04	1.0E-03	2.0E-03
ACENAPHTHENE	8.5E-01				6.2E-06	1.7E-05	2.4E-05	5.1E-06	9.9E-06	1.5E-05
ACENAPHTHYLENE	1.5E+00				2.2E-05	6.3E-05	8.6E-05	6.2E-06	1.2E-05	1.8E-05
Anthracene	4.3E+00				6.2E-06	1.8E-05	2.4E-05	5.1E-06	1.0E-05	1.5E-05
Benzo(a)anthracene	1.7E+01	8.4E-07	5.8E-07	1.4E-06	2.5E-04	1.4E-04	3.9E-04	6.8E-05	2.6E-05	9.4E-05
Benzo(a)pyrene	1.1E+01	5.4E-06	3.7E-06	9.1E-06	1.6E-04	9.1E-05	2.5E-04	4.4E-05	1.7E-05	6.1E-05
Benzo(b)fluoranthene	1.3E+01	6.4E-07	4.4E-07	1.1E-06	1.9E-04	1.1E-04	3.0E-04	5.2E-05	2.0E-05	7.2E-05
Benzo(g,h,i)perylene	4.1E+00				6.0E-05	1.7E-04	2.3E-04	1.6E-05	3.2E-05	4.9E-05
Benzo(k)fluoranthene	7.4E+00	3.6E-08	2.5E-08	6.1E-08	1.1E-04	6.1E-05	1.7E-04	3.0E-05	1.2E-05	4.1E-05
Chrysene	7.2E+00	3.5E-08	2.4E-08	6.0E-08	1.0E-04	5.9E-05	1.6E-04	2.9E-05	1.1E-05	4.0E-05
Dibenzo(a,h)anthracene	9.4E+00	4.6E-06	3.2E-06	7.8E-06	1.4E-04	7.7E-05	2.1E-04	3.8E-05	1.5E-05	5.2E-05
Fluoranthene	2.1E+01				2.2E-04	6.4E-04	8.6E-04	2.5E-04	4.8E-04	7.3E-04
Fluorene	2.0E+00				2.2E-05	6.3E-05	8.5E-05	6.1E-06	1.2E-05	1.8E-05
Indeno(1,2,3-cd)pyrene	4.0E+00	2.0E-07	1.4E-07	3.3E-07	5.8E-05	3.3E-05	9.1E-05	1.6E-05	6.2E-06	2.2E-05
METHYLNAPHTHALENE, 2-	6.0E-01				6.6E-05	1.9E-04	2.5E-04	1.8E-04	3.5E-04	5.4E-04
Phenanthrene	1.7E+01				2.4E-04	6.9E-04	9.3E-04	6.7E-05	1.3E-04	2.0E-04
Pyrene	1.8E+01				2.6E-04	7.4E-04	1.0E-03	7.2E-05	1.4E-04	2.1E-04
Polychlorinated biphenyls (PCBs)	4.9E+00	2.2E-06	2.3E-06	4.5E-06	3.5E-01	3.0E-01	6.5E-01	3.9E-01	2.3E-01	6.2E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	1.9E-06	2.0E-06	3.9E-06	1.2E-01	1.0E-01	2.2E-01	3.2E-01	1.9E-01	5.1E-01
Arsenic	1.5E+01	2.4E-06	1.5E-06	4.0E-06	3.5E-02	1.8E-02	5.3E-02	9.7E-02	3.4E-02	1.3E-01
Barium	2.1E+02				1.5E-03	1.3E-03	2.8E-03	1.2E-02	6.9E-03	1.9E-02
Cadmium	1.7E+00				2.4E-03	4.1E-04	2.8E-03	6.6E-03	7.8E-04	7.4E-03
Chromium(III)	2.1E+01				2.1E-05	1.8E-05	3.8E-05	5.7E-05	3.3E-05	9.0E-05
Lead	1.8E+03				1.7E+00	1.8E-01	1.9E+00	4.8E+00	3.4E-01	5.1E+00
Mercury	6.0E-01				1.4E-03	2.5E-03	3.9E-03	4.0E-03	4.7E-03	8.6E-03
Silver	6.1E-01				1.8E-04	4.5E-04	6.3E-04	4.9E-04	8.6E-04	1.3E-03

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
zzDibenzofuran				1.0E-03	4.0E-03	0.96	0.18	0.96	0.18
ACENAPHTHENE				6.0E-02	2.0E-01	0.3	0.1	0.3	0.1
ACENAPHTHYLENE				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Anthracene				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
Benzo(a)anthracene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(a)pyrene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(g,h,i)perylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Chrysene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Fluoranthene				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
Fluorene				4.0E-02	4.0E-01	0.3	0.1	0.3	0.1
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
METHYLNAPHTHALENI				4.0E-03	4.0E-03	0.3	0.1	0.3	0.1
Phenanthrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Pyrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Polychlorinated biphenyl:	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1
Arsenic	1.5E+00	0.5	0.03	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03
Barium				2.0E-01	7.0E-02	1	0.1	1	0.1
Cadmium				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
Chromium(III)				1.5E+00	1.5E+00	1	0.1	1	0.1
Lead				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
Mercury				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
Silver				5.0E-03	5.0E-03	1	0.3	1	0.3

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Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Park Visitor - Soil: Table PS-1 (HS-6: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 8E-06
Chronic HI (all chemicals) = 9E-01
Subchronic HI (all chemicals) = 1E+00

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic			Subchronic		
					HQ_{ing}	HQ_{derm}	HQ_{total}	HQ_{ing}	HQ_{derm}	HQ_{total}
Acenaphthene	1.5E-01				1.1E-06	3.1E-06	4.2E-06	9.1E-07	1.8E-06	2.7E-06
Anthracene	3.0E-01				4.3E-07	1.2E-06	1.7E-06	3.6E-07	6.9E-07	1.1E-06
Benzo(a)anthracene	5.2E-01	2.6E-08	1.8E-08	4.3E-08	7.6E-06	4.3E-06	1.2E-05	2.1E-06	8.1E-07	2.9E-06
Benzo(a)pyrene	4.6E-01	2.3E-07	1.6E-07	3.8E-07	6.7E-06	3.8E-06	1.0E-05	1.8E-06	7.2E-07	2.6E-06
Benzo(b)fluoranthene	5.7E-01	2.8E-08	1.9E-08	4.7E-08	8.3E-06	4.7E-06	1.3E-05	2.3E-06	8.9E-07	3.2E-06
Benzo(k)fluoranthene	2.6E-01	1.3E-09	8.7E-10	2.1E-09	3.7E-06	2.1E-06	5.9E-06	1.0E-06	4.0E-07	1.4E-06
Chrysene	5.3E-01	2.6E-09	1.8E-09	4.4E-09	7.6E-06	4.3E-06	1.2E-05	2.1E-06	8.2E-07	2.9E-06
Fluoranthene	9.8E-01				1.1E-05	3.0E-05	4.1E-05	1.2E-05	2.3E-05	3.5E-05
Naphthalene	1.3E-01				2.9E-06	8.2E-06	1.1E-05	8.0E-07	1.6E-06	2.3E-06
Phenanthrene	9.7E-01				1.4E-05	4.0E-05	5.4E-05	3.9E-06	7.5E-06	1.1E-05
Pyrene	8.3E-01				1.2E-05	3.4E-05	4.7E-05	3.3E-06	6.5E-06	9.8E-06
Polychlorinated biphenyls (PCBs)	3.9E+00	1.8E-06	1.8E-06	3.6E-06	2.9E-01	2.4E-01	5.3E-01	3.2E-01	1.8E-01	5.0E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	1.9E-06	2.0E-06	3.9E-06	1.2E-01	1.0E-01	2.2E-01	3.2E-01	1.9E-01	5.1E-01
Barium	3.7E+02				2.7E-03	2.3E-03	4.9E-03	2.1E-02	1.2E-02	3.3E-02
Beryllium	1.9E-01				1.4E-04	1.2E-04	2.5E-04	1.5E-04	8.8E-05	2.4E-04
Cadmium	5.1E-01				7.4E-04	1.3E-04	8.7E-04	2.0E-03	2.4E-04	2.3E-03
Chromium(III)	9.1E+01				8.8E-05	7.5E-05	1.6E-04	2.4E-04	1.4E-04	3.9E-04
Lead	1.4E+02				1.3E-01	1.3E-02	1.4E-01	3.6E-01	2.5E-02	3.9E-01
Mercury	9.1E-02				2.2E-04	3.7E-04	5.9E-04	6.1E-04	7.1E-04	1.3E-03
Nickel	9.6E+00				7.0E-04	1.2E-03	1.9E-03	1.9E-03	2.3E-03	4.2E-03
Vanadium	3.6E+01				5.8E-03	4.9E-03	1.1E-02	1.6E-02	9.3E-03	2.5E-02
Zinc	8.5E+01				4.1E-04	3.5E-04	7.6E-04	1.1E-03	6.6E-04	1.8E-03

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
Acenaphthene				6.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Anthracene				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
Benzo(a)anthracene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(a)pyrene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Chrysene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Fluoranthene				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
Naphthalene				2.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Phenanthrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Pyrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Polychlorinated biphenyls	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1
Barium				2.0E-01	7.0E-02	1	0.1	1	0.1
Beryllium				2.0E-03	5.0E-03	1	0.1	1	0.1
Cadmium				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
Chromium(III)				1.5E+00	1.5E+00	1	0.1	1	0.1
Lead				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
Mercury				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
Nickel				2.0E-02	2.0E-02	1	0.2	1	0.2
Vanadium				9.0E-03	9.0E-03	1	0.1	1	0.1
Zinc				3.0E-01	3.0E-01	1	0.1	1	0.1

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Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Park Visitor - Soil: Table PS-1 (HS-7: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 4E-06
Chronic HI (all chemicals) = 6E-01
Subchronic HI (all chemicals) = 1E+00

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic			Subchronic		
					HQ_{ing}	HQ_{derm}	HQ_{total}	HQ_{ing}	HQ_{derm}	HQ_{total}
Polychlorinated biphenyls (PCBs)	2.2E-01	9.8E-08	1.0E-07	2.0E-07	1.6E-02	1.4E-02	2.9E-02	1.8E-02	1.0E-02	2.8E-02
TCDD, 2,3,7,8- (equivalents)	5.7E-05	1.9E-06	2.0E-06	3.9E-06	1.2E-01	1.0E-01	2.2E-01	3.2E-01	1.9E-01	5.1E-01
Barium	9.0E+01				6.5E-04	5.5E-04	1.2E-03	5.1E-03	3.0E-03	8.1E-03
Beryllium	4.0E-01				2.9E-04	2.5E-04	5.4E-04	3.2E-04	1.9E-04	5.1E-04
Cadmium	1.0E+00				1.5E-03	2.5E-04	1.7E-03	4.0E-03	4.7E-04	4.5E-03
Chromium(III)	1.6E+01				1.5E-05	1.3E-05	2.8E-05	4.2E-05	2.5E-05	6.7E-05
Lead	3.2E+02				3.1E-01	3.1E-02	3.4E-01	8.5E-01	6.0E-02	9.1E-01
Nickel	1.0E+01				7.3E-04	1.3E-03	2.0E-03	2.0E-03	2.4E-03	4.4E-03
Zinc	1.4E+02				6.7E-04	5.7E-04	1.2E-03	1.9E-03	1.1E-03	2.9E-03

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
Polychlorinated biphenyls	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1
Barium				2.0E-01	7.0E-02	1	0.1	1	0.1
Beryllium				2.0E-03	5.0E-03	1	0.1	1	0.1
Cadmium				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
Chromium(III)				1.5E+00	1.5E+00	1	0.1	1	0.1
Lead				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
Nickel				2.0E-02	2.0E-02	1	0.2	1	0.2
Zinc				3.0E-01	3.0E-01	1	0.1	1	0.1

Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Park Visitor - Soil: Table PS-1 (HS-8: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 5E-05

Chronic HI (all chemicals) = 3E+00

Subchronic HI (all chemicals) = 7E+00

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Chronic HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{total}
AROMATICS C9 to C10 ɔropylto	1.2E+00				5.8E-05	9.9E-05	1.6E-04	1.6E-05	1.9E-05	3.5E-05
AROMATICS C9 to C10	5.1E+01				2.5E-03	4.2E-03	6.7E-03	6.8E-04	7.9E-04	1.5E-03
ALIPHATICS C9 to C12	2.5E+01				3.6E-04	6.2E-04	9.8E-04	1.0E-04	1.2E-04	2.2E-04
ALIPHATICS C19 to C36	1.6E+02				1.2E-04	2.0E-04	3.1E-04	1.1E-04	1.2E-04	2.3E-04
AROMATICS C11 to C22	1.2E+02				1.7E-03	4.9E-03	6.7E-03	4.8E-04	9.4E-04	1.4E-03
zzBenzoic Acid	2.4E+00				8.4E-07	1.3E-06	2.2E-06	2.3E-06	2.5E-06	4.8E-06
DIMETHYL PHTHALATE	2.8E-01				4.1E-06	3.5E-06	7.6E-06	1.1E-05	6.6E-06	1.8E-05
zzdi-n-butylphthalate	1.0E+00				1.5E-05	8.7E-06	2.3E-05	4.0E-05	1.6E-05	5.7E-05
zzButylbenzylphthalate	2.4E-01	9.8E-11	1.9E-10	2.9E-10	1.7E-06	2.7E-06	4.3E-06	4.6E-06	5.0E-06	9.6E-06
BIS(2-ETHYLHEXYL)PHTHALATE	3.0E+00	9.5E-09	9.9E-09	1.9E-08	2.2E-04	1.9E-04	4.1E-04	6.1E-04	3.5E-04	9.6E-04
zzCarbazole	2.0E+00	2.5E-09	1.8E-09	4.3E-09	2.7E-05	1.6E-05	4.3E-05	7.4E-06	3.1E-06	1.0E-05
zzDibenzofuran	7.2E-01				1.0E-03	1.6E-03	2.6E-03	6.9E-04	7.5E-04	1.4E-03
Acenaphthene	4.5E+00				3.2E-05	9.2E-05	1.2E-04	2.7E-05	5.2E-05	7.9E-05
Acenaphthylene	6.6E-01				9.5E-06	2.7E-05	3.7E-05	2.6E-06	5.1E-06	7.7E-06
Anthracene	7.9E+00				1.1E-05	3.2E-05	4.4E-05	9.4E-06	1.8E-05	2.8E-05
Benzo(a)anthracene	3.3E+01	1.6E-06	1.1E-06	2.7E-06	4.7E-04	2.7E-04	7.4E-04	1.3E-04	5.1E-05	1.8E-04
Benzo(a)pyrene	2.6E+01	1.3E-05	8.9E-06	2.2E-05	3.8E-04	2.2E-04	6.0E-04	1.0E-04	4.1E-05	1.5E-04
Benzo(b)fluoranthene	4.7E+01	2.3E-06	1.6E-06	3.9E-06	6.8E-04	3.9E-04	1.1E-03	1.9E-04	7.3E-05	2.6E-04
Benzo(g,h,i)perylene	2.9E+00				4.2E-05	1.2E-04	1.6E-04	1.2E-05	2.3E-05	3.4E-05
Benzo(k)fluoranthene	3.9E+00	1.9E-08	1.3E-08	3.2E-08	5.7E-05	3.2E-05	8.9E-05	1.6E-05	6.1E-06	2.2E-05
Chrysene	9.0E+00	4.4E-08	3.1E-08	7.5E-08	1.3E-04	7.4E-05	2.0E-04	3.6E-05	1.4E-05	5.0E-05
DIBENZO(a,h)ANTHRACENE	3.2E+00	1.6E-06	1.1E-06	2.7E-06	4.7E-05	2.6E-05	7.3E-05	1.3E-05	5.0E-06	1.8E-05
Fluoranthene	2.3E+01				2.5E-04	7.1E-04	9.6E-04	2.8E-04	5.4E-04	8.1E-04
Fluorene	4.6E+00				5.0E-05	1.4E-04	1.9E-04	1.4E-05	2.7E-05	4.1E-05
Indeno(1,2,3-cd)pyrene	3.0E+00	1.5E-07	1.0E-07	2.5E-07	4.4E-05	2.5E-05	6.9E-05	1.2E-05	4.7E-06	1.7E-05
METHYLNAPHTHALENE, 2-	2.0E+00				2.1E-04	6.0E-04	8.2E-04	5.9E-04	1.1E-03	1.7E-03
Naphthalene	7.6E+01				1.7E-03	4.7E-03	6.4E-03	4.6E-04	8.9E-04	1.3E-03
Phenanthrene	3.0E+01				4.3E-04	1.2E-03	1.7E-03	1.2E-04	2.3E-04	3.5E-04
Pyrene	1.6E+01				2.3E-04	6.6E-04	8.9E-04	6.4E-05	1.3E-04	1.9E-04
POLYCHLORINATED BIPHENYLS (PCBs)	3.8E+00	1.7E-06	1.8E-06	3.5E-06	2.8E-01	2.4E-01	5.1E-01	3.0E-01	1.8E-01	4.8E-01
TCDD, 2,3,7,8- (equivalents)	1.9E-04	6.3E-06	6.6E-06	1.3E-05	3.9E-01	3.3E-01	7.2E-01	1.1E+00	6.3E-01	1.7E+00
Arsenic	6.9E+00	1.2E-06	7.2E-07	1.9E-06	1.7E-02	8.6E-03	2.5E-02	4.6E-02	1.6E-02	6.2E-02
Barium	8.7E+02				6.3E-03	5.3E-03	1.2E-02	4.9E-02	2.9E-02	7.8E-02
Beryllium	2.0E-01				1.5E-04	1.2E-04	2.7E-04	1.6E-04	9.4E-05	2.5E-04
Cadmium	4.6E+00				6.7E-03	1.1E-03	7.9E-03	1.9E-02	2.2E-03	2.1E-02
CHROMIUM(III)	1.3E+02				1.2E-04	1.0E-04	2.3E-04	3.4E-04	2.0E-04	5.4E-04
Lead	1.6E+03				1.6E+00	1.6E-01	1.7E+00	4.3E+00	3.0E-01	4.6E+00
Mercury	9.8E-01				2.4E-03	4.1E-03	6.4E-03	6.6E-03	7.7E-03	1.4E-02
Nickel	2.7E+01				1.9E-03	3.3E-03	5.2E-03	5.3E-03	6.2E-03	1.2E-02
Selenium	1.1E+00				3.1E-04	2.6E-05	3.3E-04	8.5E-04	5.0E-05	9.0E-04
Silver	1.4E+00				4.1E-04	1.0E-03	1.5E-03	1.1E-03	2.0E-03	3.1E-03
Vanadium	8.1E+01				1.3E-02	1.1E-02	2.4E-02	3.6E-02	2.1E-02	5.7E-02
Zinc	2.7E+02				1.3E-03	1.1E-03	2.4E-03	3.6E-03	2.1E-03	5.7E-03

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
AROMATICS C9 to				3.0E-02	3.0E-01	1	0.2	1	0.2
AROMATICS C9 to				3.0E-02	3.0E-01	1	0.2	1	0.2
ALIPHATICS C9 to C				1.0E-01	1.0E+00	1	0.2	1	0.2
ALIPHATICS C19 to				2.0E+00	6.0E+00	1	0.2	1	0.2
AROMATICS C11 to				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
zzBenzoic Acid				4.0E+00	4.0E+00	0.96	0.18	0.96	0.18
DIMETHYL PHTHALATE				1.0E-01	1.0E-01	1	0.1	1	0.1
zzdi-n-butylphthalate				1.0E-01	1.0E-01	1	0.07	1	0.07
zzButylbenzylphthalate	1.9E-03	0.96	0.18	2.0E-01	2.0E-01	0.96	0.18	0.96	0.18
BIS(2-ETHYLHEXYL)PH	1.4E-02	1	0.1	2.0E-02	2.0E-02	1	0.1	1	0.1
zzCarbazole	2.0E-02	0.28	0.02	3.0E-02	3.0E-01	0.28	0.02	0.28	0.02
zzDibenzofuran				1.0E-03	4.0E-03	0.96	0.18	0.96	0.18
Acenaphthene				6.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Acenaphthylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Anthracene				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
Benzo(a)anthracene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(a)pyrene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(g,h,i)perylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Chrysene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
DIBENZO(a,h)ANTHRAC	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Fluoranthene				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
Fluorene				4.0E-02	4.0E-01	0.3	0.1	0.3	0.1
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
METHYLNAPHTHALENE				4.0E-03	4.0E-03	0.3	0.1	0.3	0.1
Naphthalene				2.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Phenanthrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Pyrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
POLYCHLORINATED BI	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1
Arsenic	1.5E+00	0.5	0.03	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03
Barium				2.0E-01	7.0E-02	1	0.1	1	0.1
Beryllium				2.0E-03	5.0E-03	1	0.1	1	0.1
Cadmium				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
CHROMIUM(III)				1.5E+00	1.5E+00	1	0.1	1	0.1
Lead				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
Mercury				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
Nickel				2.0E-02	2.0E-02	1	0.2	1	0.2
Selenium				5.0E-03	5.0E-03	1	0.01	1	0.01
Silver				5.0E-03	5.0E-03	1	0.3	1	0.3
Vanadium				9.0E-03	9.0E-03	1	0.1	1	0.1
Zinc				3.0E-01	3.0E-01	1	0.1	1	0.1

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Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Park Visitor - Soil: Table PS-1 (HS-9: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 2E-05
Chronic HI (all chemicals) = 4E+00
Subchronic HI (all chemicals) = 1E+01

****Do not insert or delete any rows****

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material		EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Chronic HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{total}
ALIPHATICS C19 to C36		7.6E+01				5.5E-05	9.4E-05	1.5E-04	5.1E-05	5.9E-05	1.1E-04
AROMATICS C11 to C22		3.1E+01				4.5E-04	1.3E-03	1.7E-03	1.2E-04	2.4E-04	3.7E-04
zz4-Methylphenol		7.4E-02				2.2E-05	3.5E-05	5.6E-05	5.9E-05	6.6E-05	1.2E-04
Dimethyl phthalate		3.2E-01				4.6E-06	3.9E-06	8.5E-06	1.3E-05	7.4E-06	2.0E-05
zzDi-n-butylphthalate		3.5E-01				5.1E-06	3.0E-06	8.1E-06	1.4E-05	5.7E-06	2.0E-05
bis(2-Ethylhexyl)phthalate		2.0E+00	6.2E-09	6.4E-09	1.3E-08	1.4E-04	1.2E-04	2.6E-04	3.9E-04	2.3E-04	6.2E-04
zzDibenzofuran		4.5E-01				6.2E-04	9.9E-04	1.6E-03	4.3E-04	4.7E-04	9.0E-04
Acenaphthene		4.6E-01				3.4E-06	9.5E-06	1.3E-05	2.8E-06	5.4E-06	8.2E-06
Acenaphthylene		4.1E-01				6.0E-06	1.7E-05	2.3E-05	1.7E-06	3.2E-06	4.9E-06
Anthracene		1.2E+00				1.8E-06	5.0E-06	6.7E-06	1.4E-06	2.8E-06	4.3E-06
Benzo(a)anthracene		2.9E+00	1.4E-07	9.7E-08	2.4E-07	4.1E-05	2.3E-05	6.5E-05	1.1E-05	4.4E-06	1.6E-05
Benzo(a)pyrene		5.6E+00	2.7E-06	1.9E-06	4.6E-06	8.1E-05	4.6E-05	1.3E-04	2.2E-05	8.7E-06	3.1E-05
Benzo(b)fluoranthene		3.0E+00	1.5E-07	1.0E-07	2.5E-07	4.4E-05	2.5E-05	6.9E-05	1.2E-05	4.7E-06	1.7E-05
Benzo(g,h,i)perylene		1.4E+00				2.1E-05	6.0E-05	8.1E-05	5.8E-06	1.1E-05	1.7E-05
Benzo(k)fluoranthene		1.4E+00	7.0E-09	4.8E-09	1.2E-08	2.1E-05	1.2E-05	3.2E-05	5.7E-06	2.2E-06	7.9E-06
Chrysene		2.7E+00	1.3E-08	9.3E-09	2.3E-08	4.0E-05	2.2E-05	6.2E-05	1.1E-05	4.3E-06	1.5E-05
Dibenzo(a,h)anthracene		4.8E-01	2.3E-07	1.6E-07	4.0E-07	6.9E-06	3.9E-06	1.1E-05	1.9E-06	7.5E-07	2.7E-06
Fluoranthene		5.7E+00				6.3E-05	1.8E-04	2.4E-04	6.9E-05	1.3E-04	2.0E-04
Fluorene		5.5E-01				6.0E-06	1.7E-05	2.3E-05	1.6E-06	3.2E-06	4.8E-06
Indeno(1,2,3-cd)pyrene		1.6E+00	7.8E-08	5.4E-08	1.3E-07	2.3E-05	1.3E-05	3.6E-05	6.4E-06	2.5E-06	8.8E-06
METHYLNAPHTHALENE, 2-		3.0E-01				3.2E-05	9.1E-05	1.2E-04	8.9E-05	1.7E-04	2.6E-04
Naphthalene		4.0E+01				8.7E-04	2.5E-03	3.3E-03	2.4E-04	4.7E-04	7.1E-04
Phenanthrene		4.1E+00				6.0E-05	1.7E-04	2.3E-04	1.6E-05	3.2E-05	4.9E-05
Pyrene		5.7E+00				8.2E-05	2.3E-04	3.2E-04	2.3E-05	4.4E-05	6.7E-05
Polychlorinated biphenyls (PCBs)		3.2E+00	1.4E-06	1.5E-06	2.9E-06	2.3E-01	2.0E-01	4.3E-01	2.6E-01	1.5E-01	4.0E-01
TCDD, 2,3,7,8- (equivalents)		5.7E-05	1.9E-06	2.0E-06	3.9E-06	1.2E-01	1.0E-01	2.2E-01	3.2E-01	1.9E-01	5.1E-01
AROMATICS C9 to C10	GRO	1.2E+01				6.0E-04	1.0E-03	1.6E-03	1.6E-04	1.9E-04	3.6E-04
Antimony		2.3E+02				8.2E-01	7.0E-01	1.5E+00	2.3E+00	1.3E+00	3.6E+00
Arsenic		2.0E+01	3.3E-06	2.1E-06	5.4E-06	4.8E-02	2.4E-02	7.2E-02	1.3E-01	4.6E-02	1.8E-01
Barium		1.4E+03				1.0E-02	8.8E-03	1.9E-02	8.2E-02	4.8E-02	1.3E-01
Beryllium		4.3E-01				3.1E-04	2.7E-04	5.8E-04	3.4E-04	2.0E-04	5.5E-04
Cadmium		3.7E+00				5.4E-03	9.2E-04	6.3E-03	1.5E-02	1.7E-03	1.7E-02
Chromium(III)		7.2E+01				6.9E-05	5.9E-05	1.3E-04	1.9E-04	1.1E-04	3.0E-04
Lead		1.8E+03				1.8E+00	1.8E-01	2.0E+00	4.9E+00	3.4E-01	5.2E+00
Mercury		1.3E+00				3.2E-03	5.5E-03	8.7E-03	8.8E-03	1.0E-02	1.9E-02
Nickel		1.6E+01				1.2E-03	2.0E-03	3.1E-03	3.2E-03	3.7E-03	6.9E-03
Selenium		4.1E+00				1.2E-03	1.0E-04	1.3E-03	3.3E-03	1.9E-04	3.5E-03
Silver		5.0E+00				1.5E-03	3.7E-03	5.2E-03	4.0E-03	7.0E-03	1.1E-02
Vanadium		2.3E+01				3.8E-03	3.2E-03	7.0E-03	1.0E-02	6.0E-03	1.6E-02
Zinc		5.2E+02				2.5E-03	2.2E-03	4.7E-03	7.0E-03	4.1E-03	1.1E-02

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
ALIPHATICS C19 to				2.0E+00	6.0E+00	1	0.2	1	0.2
AROMATICS C11 to				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
zz4-Methylphenol				5.0E-03	5.0E-03	1	0.19	1	0.19
Dimethyl phthalate				1.0E-01	1.0E-01	1	0.1	1	0.1
zzDi-n-butylphthalate				1.0E-01	1.0E-01	1	0.07	1	0.07
bis(2-Ethylhexyl)phthalat	1.4E-02	1	0.1	2.0E-02	2.0E-02	1	0.1	1	0.1
zzDibenzofuran				1.0E-03	4.0E-03	0.96	0.18	0.96	0.18
Acenaphthene				6.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Acenaphthylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Anthracene				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
Benzo(a)anthracene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(a)pyrene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(g,h,i)perylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Chrysene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Dibenzo(a,h)anthracene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Fluoranthene				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
Fluorene				4.0E-02	4.0E-01	0.3	0.1	0.3	0.1
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
METHYLNAPHTHALENI				4.0E-03	4.0E-03	0.3	0.1	0.3	0.1
Naphthalene				2.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Phenanthrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Pyrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Polychlorinated biphenyl:	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1
AROMATICS C9 to				3.0E-02	3.0E-01	1	0.2	1	0.2
Antimony				4.0E-04	4.0E-04	1	0.1	1	0.1
Arsenic	1.5E+00	0.5	0.03	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03
Barium				2.0E-01	7.0E-02	1	0.1	1	0.1
Beryllium				2.0E-03	5.0E-03	1	0.1	1	0.1
Cadmium				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
Chromium(III)				1.5E+00	1.5E+00	1	0.1	1	0.1
Lead				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
Mercury				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
Nickel				2.0E-02	2.0E-02	1	0.2	1	0.2
Selenium				5.0E-03	5.0E-03	1	0.01	1	0.01
Silver				5.0E-03	5.0E-03	1	0.3	1	0.3
Vanadium				9.0E-03	9.0E-03	1	0.1	1	0.1
Zinc				3.0E-01	3.0E-01	1	0.1	1	0.1

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Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Park Visitor - Soil: Table PS-1 (HS-10: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Visitor Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 9E-06
Chronic HI (all chemicals) = 1E+00
Subchronic HI (all chemicals) = 2E+00

****Do not insert or delete any rows****
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	$ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Chronic HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Subchronic HQ_{total}
zzDi-n-butylphthalate	3.0E-01				4.4E-06	2.6E-06	7.0E-06	1.2E-05	5.0E-06	1.7E-05
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-01	4.4E-10	4.6E-10	9.0E-10	1.0E-05	8.7E-06	1.9E-05	2.8E-05	1.6E-05	4.4E-05
zzDibenzofuran	1.4E-01				2.0E-04	3.1E-04	5.1E-04	1.4E-04	1.5E-04	2.8E-04
Acenaphthene	1.9E-01				1.4E-06	4.0E-06	5.4E-06	1.2E-06	2.3E-06	3.4E-06
Acenaphthylene	1.5E-01				2.1E-06	6.0E-06	8.2E-06	5.9E-07	1.1E-06	1.7E-06
Anthracene	4.4E-01				6.3E-07	1.8E-06	2.4E-06	5.2E-07	1.0E-06	1.5E-06
Benzo(a)anthracene	9.9E-01	4.9E-08	3.4E-08	8.3E-08	1.4E-05	8.2E-06	2.3E-05	4.0E-06	1.6E-06	5.5E-06
Benzo(a)pyrene	8.0E-01	3.9E-07	2.7E-07	6.7E-07	1.2E-05	6.6E-06	1.8E-05	3.2E-06	1.3E-06	4.5E-06
Benzo(b)fluoranthene	1.0E+00	5.0E-08	3.4E-08	8.4E-08	1.5E-05	8.4E-06	2.3E-05	4.1E-06	1.6E-06	5.6E-06
Benzo(g,h,i)perylene	3.6E-01				5.3E-06	1.5E-05	2.0E-05	1.5E-06	2.8E-06	4.3E-06
Benzo(k)fluoranthene	3.8E-01	1.9E-09	1.3E-09	3.1E-09	5.5E-06	3.1E-06	8.6E-06	1.5E-06	5.9E-07	2.1E-06
Chrysene	9.2E-01	4.5E-09	3.1E-09	7.7E-09	1.3E-05	7.6E-06	2.1E-05	3.7E-06	1.4E-06	5.1E-06
DIBENZO(a,h)ANTHRACENE	1.4E-01	7.1E-08	4.9E-08	1.2E-07	2.1E-06	1.2E-06	3.3E-06	5.8E-07	2.2E-07	8.0E-07
Fluoranthene	2.0E+00				2.1E-05	6.1E-05	8.2E-05	2.4E-05	4.6E-05	6.9E-05
Fluorene	2.1E-01				2.3E-06	6.6E-06	9.0E-06	6.4E-07	1.3E-06	1.9E-06
Indeno(1,2,3-cd)pyrene	4.2E-01	2.0E-08	1.4E-08	3.5E-08	6.1E-06	3.4E-06	9.5E-06	1.7E-06	6.5E-07	2.3E-06
METHYLNAPHTHALENE, 2-	1.7E-01				1.8E-05	5.1E-05	7.0E-05	5.0E-05	9.7E-05	1.5E-04
Naphthalene	1.5E-01				3.2E-06	9.1E-06	1.2E-05	8.9E-07	1.7E-06	2.6E-06
Phenanthrene	1.9E+00				2.8E-05	7.9E-05	1.1E-04	7.7E-06	1.5E-05	2.3E-05
Pyrene	2.2E+00				3.3E-05	9.2E-05	1.2E-04	9.0E-06	1.7E-05	2.6E-05
POLYCHLORINATED BIPHENYLS (PCBs)	1.4E+00	6.2E-07	6.5E-07	1.3E-06	1.0E-01	8.6E-02	1.9E-01	1.1E-01	6.5E-02	1.8E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	1.9E-06	2.0E-06	3.9E-06	1.2E-01	1.0E-01	2.2E-01	3.2E-01	1.9E-01	5.1E-01
Arsenic	8.8E+00	1.5E-06	9.3E-07	2.4E-06	2.1E-02	1.1E-02	3.2E-02	5.9E-02	2.1E-02	8.0E-02
Barium	3.2E+02				2.3E-03	2.0E-03	4.3E-03	1.8E-02	1.1E-02	2.9E-02
Beryllium	3.9E-01				2.8E-04	2.4E-04	5.2E-04	3.1E-04	1.8E-04	4.9E-04
Cadmium	1.0E+00				1.5E-03	2.5E-04	1.8E-03	4.1E-03	4.8E-04	4.6E-03
CHROMIUM(III)	2.7E+01				2.6E-05	2.2E-05	4.8E-05	7.1E-05	4.2E-05	1.1E-04
Lead	5.6E+02				5.4E-01	5.5E-02	6.0E-01	1.5E+00	1.0E-01	1.6E+00
Mercury	1.2E-01				3.0E-04	5.1E-04	8.1E-04	8.3E-04	9.7E-04	1.8E-03
Nickel	9.4E+00				6.8E-04	1.2E-03	1.8E-03	1.9E-03	2.2E-03	4.1E-03
Selenium	5.7E+00				1.7E-03	1.4E-04	1.8E-03	4.6E-03	2.7E-04	4.9E-03
Silver	7.4E-01				2.1E-04	5.5E-04	7.6E-04	5.9E-04	1.0E-03	1.6E-03
Vanadium	1.8E+01				2.9E-03	2.5E-03	5.5E-03	8.1E-03	4.7E-03	1.3E-02
Zinc	1.7E+02				8.2E-04	7.0E-04	1.5E-03	2.3E-03	1.3E-03	3.6E-03

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Park Visitor - Soil: Table PS-2

Equations to Calculate Cancer Risk for Visitor (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2/day
$SA_{(8\text{-}15)}$	4427	cm^2/day
$SA_{(15\text{-}31)}$	5653	cm^2/day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2

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Park Visitor - Soil: Table PS-3
Equations to Calculate Chronic Noncancer Risk for Visitor (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.247	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-4
Equations to Calculate Subchronic Noncancer Risk for Visitor (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.428	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2/day
SAF	0.35	mg/cm^2

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Park Visitor - Soil: Table PS-5
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table PS-6
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table PS-6
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
EPC - Exposure Point Concentration	chemical specific	mg/kg	
$IR_{(1\text{-}2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-3.
$IR_{(1\text{-}8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8\text{-}15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15\text{-}31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant CSF. See Table PS-6
RAF_{NC} - Relative Absorption Factor for non-Cancer Effects	chemical specific	dimensionless	Adjusts estimated dose to conform to the revelant RfD. See Table PS-6
$EF_{subchronic}$ - Exposure Frequency for subchronic exposure	0.428	event/day	3 events/week
$EF_{chronic,lifetime}$ - Exposure Frequency for chronic or lifetime exposure	0.247	event/day	3 events/week, 30 weeks/year
ED - Exposure Duration	1	day/event	
$EP_{(1\text{-}2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1\text{-}8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8\text{-}15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15\text{-}31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1\text{-}2)}$ - Body Weight for age group 1-2, subchronic	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1\text{-}8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8\text{-}15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15\text{-}31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
$AP_{lifetime}$ - Averaging Period for cancer/lifetime	70	years	
$SA_{(1\text{-}2)}$ - Surface Area for age group 1-2	1670	cm^2/day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females. MADEP 1995 Guidance for Disposal Site Risk Characterization, Appendix Table B-2.
$SA_{(1\text{-}8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8\text{-}15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15\text{-}31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1\text{-}2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg_{soil} / cm^2	All SAFs developed for ShortForm according to procedure outlined in MADEP Technical
$SAF_{(1\text{-}8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg_{soil} / cm^2	Update: Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8\text{-}15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg_{soil} / cm^2	
$SAF_{(15\text{-}31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg_{soil} / cm^2	

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Park Visitor - Soil: Table PS-6
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$
zzDi-n-butylphthalate				1.0E-01	1.0E-01	1	0.07	1	0.07
BIS(2-ETHYLHEXYL)PH	1.4E-02	1	0.1	2.0E-02	2.0E-02	1	0.1	1	0.1
zzDibenzofuran				1.0E-03	4.0E-03	0.96	0.18	0.96	0.18
Acenaphthene				6.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Acenaphthylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Anthracene				3.0E-01	1.0E+00	0.3	0.1	0.3	0.1
Benzo(a)anthracene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(a)pyrene	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(b)fluoranthene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Benzo(g,h,i)perylene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Benzo(k)fluoranthene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Chrysene	7.3E-02	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
DIBENZO(a,h)ANTHRAC	7.3E+00	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
Fluoranthene				4.0E-02	1.0E-01	0.3	0.1	0.3	0.1
Fluorene				4.0E-02	4.0E-01	0.3	0.1	0.3	0.1
Indeno(1,2,3-cd)pyrene	7.3E-01	0.3	0.02	3.0E-02	3.0E-01	0.3	0.02	0.3	0.02
METHYLNAPHTHALENE				4.0E-03	4.0E-03	0.3	0.1	0.3	0.1
Naphthalene				2.0E-02	2.0E-01	0.3	0.1	0.3	0.1
Phenanthrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
Pyrene				3.0E-02	3.0E-01	0.3	0.1	0.3	0.1
POLYCHLORINATED BI	2.0E+00	1	0.1	2.0E-05	5.0E-05	1	0.1	1	0.1
TCDD, 2,3,7,8- (equivale	1.5E+05	1	0.1	7.0E-10	7.0E-10	1	0.1	1	0.1
Arsenic	1.5E+00	0.5	0.03	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03
Barium				2.0E-01	7.0E-02	1	0.1	1	0.1
Beryllium				2.0E-03	5.0E-03	1	0.1	1	0.1
Cadmium				5.0E-04	5.0E-04	0.5	0.01	0.5	0.01
CHROMIUM(III)				1.5E+00	1.5E+00	1	0.1	1	0.1
Lead				7.5E-04	7.5E-04	0.5	0.006	0.5	0.006
Mercury				3.0E-04	3.0E-04	0.5	0.1	0.5	0.1
Nickel				2.0E-02	2.0E-02	1	0.2	1	0.2
Selenium				5.0E-03	5.0E-03	1	0.01	1	0.01
Silver				5.0E-03	5.0E-03	1	0.3	1	0.3
Vanadium				9.0E-03	9.0E-03	1	0.1	1	0.1
Zinc				3.0E-01	3.0E-01	1	0.1	1	0.1

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Park Visitor - Soil: Table PS-7
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by children.

The soil concentration limit to protect park visitors against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Resident - Soil: Table RS-1 (HS-1: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 6.5E-06
Chronic HI (all chemicals) = 3.6E-01
Subchronic HI (all chemicals) = 8.5E-01

Do not insert or delete any rows
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
POLYCHLORINATED BIPHENYLS (PCBs)	5.9E-03	4.4E-09	4.6E-09	9.0E-09	7.1E-04	6.1E-04	1.3E-03	7.9E-04	4.6E-04	1.2E-03
TCDD, 2,3,7,8- (equivalents)	5.7E-05	3.2E-06	3.3E-06	6.5E-06	2.0E-01	1.7E-01	3.6E-01	5.4E-01	3.1E-01	8.5E-01

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Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Version v0114

ELCR (all chemicals) =	2E-06
Chronic HI (all chemicals) =	2E-01
Subchronic HI (all chemicals) =	1E-01

*Vegetable uptake is informational only and NOT included in totals on EPC tab.

Do not insert or delete any rows

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
POLYCHLORINATED BIPHENYLS (PCBs)	5.9E-03	2.1E-06	1.8E-01	1.0E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05			

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1-2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1-8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8-15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15-31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

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Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

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Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Melons, berries: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

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Resident - Soil: Table RS-8
Chemical-Specific Data

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Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
POLYCHLORINATED BI	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equivale	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Resident - Soil: Table RS-1 (HS-2: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ELCR (all chemicals) = 9.9E-06
Chronic HI (all chemicals) = 1.5E+00
Subchronic HI (all chemicals) = 3.7E+00

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Oil or Hazardous Material		EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
Trichlorobenzene, 1,2,4-		1.7E-01				4.1E-05	1.1E-05	5.2E-05	1.3E-05	2.2E-06	1.5E-05
zz1,2,3-Trichlorobenzene		2.1E-01				6.3E-04	6.0E-04	1.2E-03	1.7E-03	1.1E-03	2.9E-03
Acenaphthene		1.6E-01				1.9E-06	5.4E-06	7.3E-06	1.6E-06	3.1E-06	4.6E-06
Acenaphthylene		1.5E-01				3.5E-06	1.0E-05	1.4E-05	9.7E-07	1.9E-06	2.9E-06
Anthracene		3.3E-01				8.0E-07	2.3E-06	3.1E-06	6.6E-07	1.3E-06	1.9E-06
Benzo(a)anthracene		6.1E-01	5.0E-08	3.4E-08	8.4E-08	1.5E-05	8.3E-06	2.3E-05	4.0E-06	1.6E-06	5.6E-06
Benzo(a)pyrene		5.3E-01	4.3E-07	3.0E-07	7.3E-07	1.3E-05	7.3E-06	2.0E-05	3.5E-06	1.4E-06	4.9E-06
Benzo(b)fluoranthene		5.7E-01	4.6E-08	3.2E-08	7.9E-08	1.4E-05	7.8E-06	2.2E-05	3.8E-06	1.5E-06	5.3E-06
Benzo(g,h,i)perylene		3.6E-01				8.8E-06	2.5E-05	3.4E-05	2.4E-06	4.7E-06	7.1E-06
Benzo(k)fluoranthene		2.7E-01	2.2E-09	1.5E-09	3.7E-09	6.5E-06	3.7E-06	1.0E-05	1.8E-06	6.9E-07	2.5E-06
Chrysene		5.9E-01	4.8E-09	3.3E-09	8.2E-09	1.4E-05	8.1E-06	2.2E-05	3.9E-06	1.5E-06	5.5E-06
Dibenzo(a,h)anthracene		1.4E-01	1.2E-07	8.0E-08	2.0E-07	3.4E-06	2.0E-06	5.4E-06	9.5E-07	3.7E-07	1.3E-06
Fluoranthene		1.2E+00				2.2E-05	6.1E-05	8.3E-05	2.4E-05	4.6E-05	7.0E-05
Fluorene		2.1E-01				3.8E-06	1.1E-05	1.5E-05	1.0E-06	2.0E-06	3.1E-06
Indeno(1,2,3-cd)pyrene		4.2E-01	3.4E-08	2.4E-08	5.8E-08	1.0E-05	5.7E-06	1.6E-05	2.8E-06	1.1E-06	3.9E-06
Methylnaphthalene, 2-		1.3E-01				2.4E-05	6.9E-05	9.4E-05	6.7E-05	1.3E-04	2.0E-04
Naphthalene		1.6E-01				5.8E-06	1.6E-05	2.2E-05	1.6E-06	3.1E-06	4.7E-06
Phenanthrene		1.3E+00				3.1E-05	8.7E-05	1.2E-04	8.4E-06	1.6E-05	2.5E-05
Pyrene		1.2E+00				2.9E-05	8.1E-05	1.1E-04	7.9E-06	1.5E-05	2.3E-05
AROMATICS C9 to C10	GRO	1.5E+01				1.2E-03	2.0E-03	3.2E-03	3.3E-04	3.8E-04	7.1E-04
Polychlorinated biphenyls (PCBs)		4.5E-01	3.3E-07	3.5E-07	6.8E-07	5.4E-02	4.6E-02	1.0E-01	5.9E-02	3.5E-02	9.4E-02
TCDD, 2,3,7,8- (equivalents)		5.7E-05	3.2E-06	3.3E-06	6.5E-06	2.0E-01	1.7E-01	3.6E-01	5.4E-01	3.1E-01	8.5E-01
Arsenic		3.5E+00	9.8E-07	6.1E-07	1.6E-06	1.4E-02	7.2E-03	2.1E-02	3.9E-02	1.4E-02	5.3E-02
Barium		8.8E+01				1.1E-03	9.0E-04	2.0E-03	8.4E-03	4.9E-03	1.3E-02
Beryllium		1.9E-01				2.3E-04	1.9E-04	4.2E-04	2.5E-04	1.5E-04	3.9E-04
Cadmium		6.1E-01				1.5E-03	2.5E-04	1.7E-03	4.0E-03	4.7E-04	4.5E-03
Chromium(III)		1.3E+01				2.1E-05	1.8E-05	3.8E-05	5.7E-05	3.3E-05	9.1E-05
Lead		5.6E+02				9.1E-01	9.3E-02	1.0E+00	2.5E+00	1.8E-01	2.7E+00
MERCURY		1.3E-01				5.1E-04	8.7E-04	1.4E-03	1.4E-03	1.7E-03	3.1E-03
NICKEL		9.3E+00				1.1E-03	1.9E-03	3.1E-03	3.1E-03	3.6E-03	6.7E-03
Silver		1.5E+00				7.4E-04	1.9E-03	2.6E-03	2.0E-03	3.6E-03	5.6E-03
Vanadium		1.5E+01				4.0E-03	3.4E-03	7.5E-03	1.1E-02	6.5E-03	1.8E-02
Zinc		9.1E+01				7.4E-04	6.3E-04	1.4E-03	2.0E-03	1.2E-03	3.2E-03

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Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Ver

ELCR (all chemicals) = 2E-04
Chronic HI (all chemicals) = 6E+01
Subchronic HI (all chemicals) = 7E+01

*Vegetable uptake is informational only and NOT included in totals on EPC tab.

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Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
Trichlorobenzene, 1,2,4-	1.7E-01			
zz1,2,3-Trichlorobenzene	2.1E-01			
Acenaphthene	1.6E-01			
Acenaphthylene	1.5E-01			
Anthracene	3.3E-01			
Benzo(a)anthracene	6.1E-01			
Benzo(a)pyrene	5.3E-01			
Benzo(b)fluoranthene	5.7E-01			
Benzo(g,h,i)perylene	3.6E-01			
Benzo(k)fluoranthene	2.7E-01			
Chrysene	5.9E-01			
Dibenzo(a,h)anthracene	1.4E-01			
Fluoranthene	1.2E+00			
Fluorene	2.1E-01			
Indeno(1,2,3-cd)pyrene	4.2E-01			
Methylnaphthalene, 2-	1.3E-01			
Naphthalene	1.6E-01			
Phenanthrene	1.3E+00			
Pyrene	1.2E+00			
AROMATICS C9 to C GRO	1.5E+01			
Polychlorinated biphenyls (PCBs)	4.5E-01	1.6E-04	1.3E+01	7.6E+00
TCDD, 2,3,7,8- (equivalents)	5.7E-05			
Arsenic	3.5E+00	5.5E-05	4.2E-01	5.9E-01
Barium	8.8E+01			
Beryllium	1.9E-01			
Cadmium	6.1E-01		1.6E+00	2.3E+00
Chromium(III)	1.3E+01		5.8E-04	8.3E-04
Lead	5.6E+02		4.0E+01	5.7E+01
MERCURY	1.3E-01			
NICKEL	9.3E+00		1.3E-01	1.8E-01
Silver	1.5E+00			
Vanadium	1.5E+01			
Zinc	9.1E+01		3.3E-01	4.7E-01

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

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Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

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Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

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Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1\text{-}2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1\text{-}8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8\text{-}15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15\text{-}31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1\text{-}2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1\text{-}8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8\text{-}15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15\text{-}31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1\text{-}2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1\text{-}8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8\text{-}15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15\text{-}31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1\text{-}2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1\text{-}8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8\text{-}15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15\text{-}31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1\text{-}2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1\text{-}8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8\text{-}15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15\text{-}31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1\text{-}2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical
$SAF_{(1\text{-}8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8\text{-}15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15\text{-}31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

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Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

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Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Melons, berries: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

Resident - Soil: Table RS-8
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF (mg/kg-day)$^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
Trichlorobenzene, 1,2,4-					1.0E-02	9.0E-02	1	0.03	1	0.03		
zz1,2,3-Trichlorobenzene					8.0E-04	8.0E-04	0.99	0.11	0.99	0.11		
Acenaphthene					6.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Acenaphthylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Anthracene					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
Benzo(a)anthracene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(a)pyrene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(b)fluoranthene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(g,h,i)perylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Benzo(k)fluoranthene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Chrysene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Dibenzo(a,h)anthracene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Fluoranthene					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
Fluorene					4.0E-02	4.0E-01	0.3	0.1	0.3	0.1		
Indeno(1,2,3-cd)pyrene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Methylnaphthalene, 2-					4.0E-03	4.0E-03	0.3	0.1	0.3	0.1		
Naphthalene					2.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Phenanthrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Pyrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
AROMATICS C9 to (					3.0E-02	3.0E-01	1	0.2	1	0.2		
Polychlorinated biphenyls	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equivale	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		
Arsenic	1.5E+00	0.50	0.03	1.00	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03	1	0.05
Barium					2.0E-01	7.0E-02	1	0.1	1	0.1		
Beryllium					2.0E-03	5.0E-03	1	0.1	1	0.1		
Cadmium					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
Chromium(III)					1.5E+00	1.5E+00	1	0.1	1	0.1	1	0.095
Lead					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
MERCURY					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
NICKEL					2.0E-02	2.0E-02	1	0.2	1	0.2	1	0.38
Silver					5.0E-03	5.0E-03	1	0.3	1	0.3		
Vanadium					9.0E-03	9.0E-03	1	0.1	1	0.1		
Zinc					3.0E-01	3.0E-01	1	0.1	1	0.1	1	1.5

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) $_{1\text{-}2}$	10.7	kg
IR $_{\text{(1-time reasonable max)}}$	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Resident - Soil: Table RS-1 (HS-3: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ELCR (all chemicals) = 8.3E-06
Chronic HI (all chemicals) = 2.4E+00
Subchronic HI (all chemicals) = 6.2E+00

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Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
Benzene	3.6E-02	7.4E-10	2.3E-10	9.7E-10	2.2E-05	5.6E-06	2.7E-05	2.4E-05	4.2E-06	2.8E-05
Toluene	4.1E-02				1.2E-06	3.2E-07	1.6E-06	3.4E-07	6.0E-08	4.0E-07
AROMATICS C9 to C10 1,2,4-	4.6E-02				3.7E-06	6.3E-06	1.0E-05	1.0E-06	1.2E-06	2.2E-06
Anthracene	4.4E-01				1.1E-06	3.0E-06	4.1E-06	8.8E-07	1.7E-06	2.6E-06
Benzo(a)anthracene	7.3E-01	6.0E-08	4.1E-08	1.0E-07	1.8E-05	1.0E-05	2.8E-05	4.9E-06	1.9E-06	6.8E-06
Benzo(a)pyrene	7.5E-01	6.2E-07	4.3E-07	1.0E-06	1.8E-05	1.0E-05	2.9E-05	5.0E-06	2.0E-06	7.0E-06
Benzo(b)fluoranthene	8.2E-01	6.7E-08	4.7E-08	1.1E-07	2.0E-05	1.1E-05	3.1E-05	5.5E-06	2.1E-06	7.6E-06
Benzo(g,h,i)perylene	4.7E-01				1.1E-05	3.3E-05	4.4E-05	3.2E-06	6.2E-06	9.3E-06
Benzo(k)fluoranthene	2.7E-01	2.2E-09	1.5E-09	3.7E-09	6.4E-06	3.7E-06	1.0E-05	1.8E-06	6.9E-07	2.5E-06
Chrysene	7.1E-01	5.8E-09	4.0E-09	9.8E-09	1.7E-05	9.7E-06	2.7E-05	4.7E-06	1.8E-06	6.5E-06
Dibenzo(a,h)anthracene	1.5E-01	1.3E-07	8.7E-08	2.1E-07	3.7E-06	2.1E-06	5.8E-06	1.0E-06	4.0E-07	1.4E-06
Fluoranthene	1.6E+00				3.0E-05	8.4E-05	1.1E-04	3.3E-05	6.4E-05	9.7E-05
Indeno(1,2,3-cd)pyrene	5.9E-01	4.9E-08	3.4E-08	8.2E-08	1.4E-05	8.2E-06	2.3E-05	4.0E-06	1.5E-06	5.5E-06
Naphthalene	7.3E-01				2.6E-05	7.5E-05	1.0E-04	7.3E-06	1.4E-05	2.1E-05
Phenanthrene	1.7E+00				4.1E-05	1.2E-04	1.6E-04	1.1E-05	2.2E-05	3.3E-05
Pyrene	1.5E+00				3.6E-05	1.0E-04	1.4E-04	1.0E-05	1.9E-05	2.9E-05
Polychlorinated biphenyls (PCBs)	1.8E-01	1.3E-07	1.4E-07	2.7E-07	2.2E-02	1.8E-02	4.0E-02	2.4E-02	1.4E-02	3.8E-02
TCDD, 2,3,7,8- (equivalents)	5.7E-05	3.2E-06	3.3E-06	6.5E-06	2.0E-01	1.7E-01	3.6E-01	5.4E-01	3.1E-01	8.5E-01
Barium	1.6E+02				1.9E-03	1.7E-03	3.6E-03	1.5E-02	8.9E-03	2.4E-02
Beryllium	2.9E-01				3.5E-04	3.0E-04	6.6E-04	3.9E-04	2.3E-04	6.2E-04
Lead	1.1E+03				1.8E+00	1.8E-01	1.9E+00	4.9E+00	3.4E-01	5.2E+00
MERCURY	1.5E-01				6.2E-04	1.1E-03	1.7E-03	1.7E-03	2.0E-03	3.7E-03
Nickel	6.4E+00				7.7E-04	1.3E-03	2.1E-03	2.1E-03	2.5E-03	4.6E-03
Silver	7.8E-01				3.8E-04	9.7E-04	1.4E-03	1.0E-03	1.8E-03	2.9E-03
Vanadium	1.3E+01				3.5E-03	3.0E-03	6.5E-03	9.7E-03	5.7E-03	1.5E-02
Zinc	1.3E+02				1.0E-03	8.7E-04	1.9E-03	2.8E-03	1.6E-03	4.5E-03

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Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Ver

ELCR (all chemicals) =	6E-05
Chronic HI (all chemicals) =	8E+01
Subchronic HI (all chemicals) =	1E+02

*Vegetable uptake is informational only and NOT included in totals on EPC tab.

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Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
Benzene	3.6E-02			
Toluene	4.1E-02			
AROMATICS C9 to C 1,2,4-Trimethylbenzene	4.6E-02			
Anthracene	4.4E-01			
Benzo(a)anthracene	7.3E-01			
Benzo(a)pyrene	7.5E-01			
Benzo(b)fluoranthene	8.2E-01			
Benzo(g,h,i)perylene	4.7E-01			
Benzo(k)fluoranthene	2.7E-01			
Chrysene	7.1E-01			
Dibenzo(a,h)anthracene	1.5E-01			
Fluoranthene	1.6E+00			
Indeno(1,2,3-cd)pyrene	5.9E-01			
Naphthalene	7.3E-01			
Phenanthrene	1.7E+00			
Pyrene	1.5E+00			
Polychlorinated biphenyls (PCBs)	1.8E-01	6.4E-05	5.4E+00	3.1E+00
TCDD, 2,3,7,8- (equivalents)	5.7E-05			
Barium	1.6E+02			
Beryllium	2.9E-01			
Lead	1.1E+03		7.8E+01	1.1E+02
MERCURY	1.5E-01			
Nickel	6.4E+00		8.6E-02	1.2E-01
Silver	7.8E-01			
Vanadium	1.3E+01			
Zinc	1.3E+02		4.5E-01	6.4E-01

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1-2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1-8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8-15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15-31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

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Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

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Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Melons, berries: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

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Resident - Soil: Table RS-8
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
Benzene	5.5E-02	1.00	0.03		4.0E-03	1.0E-02	1	0.03	1	0.03		
Toluene					8.0E-02	8.0E-01	1	0.03	1	0.03		
AROMATICS C9 to					3.0E-02	3.0E-01	1	0.2	1	0.2		
Anthracene					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
Benzo(a)anthracene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(a)pyrene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(b)fluoranthene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(g,h,i)perylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Benzo(k)fluoranthene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Chrysene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Dibenzo(a,h)anthracene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Fluoranthene					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
Indeno(1,2,3-cd)pyrene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Naphthalene					2.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Phenanthrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Pyrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Polychlorinated biphenyls	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equivale	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		
Barium					2.0E-01	7.0E-02	1	0.1	1	0.1		
Beryllium					2.0E-03	5.0E-03	1	0.1	1	0.1		
Lead					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
MERCURY					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
Nickel					2.0E-02	2.0E-02	1	0.2	1	0.2	1	0.38
Silver					5.0E-03	5.0E-03	1	0.3	1	0.3		
Vanadium					9.0E-03	9.0E-03	1	0.1	1	0.1		
Zinc					3.0E-01	3.0E-01	1	0.1	1	0.1	1	1.5

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) $_{1\text{-}2}$	10.7	kg
IR $_{\text{(1-time reasonable max)}}$	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Resident - Soil: Table RS-1 (HS-4: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12
Vlookup Version v0114

ELCR (all chemicals) = 1.6E-05
Chronic HI (all chemicals) = 1.7E+00
Subchronic HI (all chemicals) = 3.7E+00

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Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
zz4-Bromodiphenyl ether	7.8E-02				1.9E-02	3.1E-02	4.9E-02	5.2E-02	5.8E-02	1.1E-01
bis(2-Ethylhexyl)phthalate	7.6E-02	4.0E-10	4.1E-10	8.1E-10	9.2E-06	7.8E-06	1.7E-05	2.5E-05	1.5E-05	4.0E-05
Acenaphthene	2.1E-01				2.5E-06	7.1E-06	9.6E-06	2.1E-06	4.0E-06	6.1E-06
Acenaphthylene	5.3E-01				1.3E-05	3.7E-05	4.9E-05	3.5E-06	6.9E-06	1.0E-05
Anthracene	5.7E-01				1.4E-06	3.9E-06	5.3E-06	1.1E-06	2.2E-06	3.4E-06
Benzo(a)anthracene	1.2E+00	9.8E-08	6.8E-08	1.7E-07	2.9E-05	1.6E-05	4.5E-05	8.0E-06	3.1E-06	1.1E-05
Benzo(a)pyrene	1.4E+00	1.1E-06	7.8E-07	1.9E-06	3.3E-05	1.9E-05	5.2E-05	9.2E-06	3.6E-06	1.3E-05
Benzo(b)fluoranthene	1.6E+00	1.3E-07	8.9E-08	2.2E-07	3.8E-05	2.2E-05	6.0E-05	1.1E-05	4.1E-06	1.5E-05
Benzo(g,h,i)perylene	7.4E-01				1.8E-05	5.1E-05	6.9E-05	5.0E-06	9.7E-06	1.5E-05
Benzo(k)fluoranthene	5.6E-01	4.6E-09	3.2E-09	7.8E-09	1.4E-05	7.7E-06	2.1E-05	3.7E-06	1.5E-06	5.2E-06
Chrysene	1.3E+00	1.0E-08	7.2E-09	1.8E-08	3.1E-05	1.7E-05	4.8E-05	8.5E-06	3.3E-06	1.2E-05
Dibenzo(a,h)anthracene	2.4E-01	1.9E-07	1.3E-07	3.3E-07	5.7E-06	3.2E-06	8.9E-06	1.6E-06	6.1E-07	2.2E-06
Fluoranthene	2.9E+00				5.2E-05	1.5E-04	2.0E-04	5.7E-05	1.1E-04	1.7E-04
Fluorene	2.7E-01				4.9E-06	1.4E-05	1.9E-05	1.3E-06	2.6E-06	3.9E-06
Indeno(1,2,3-cd)pyrene	7.3E-01	6.0E-08	4.1E-08	1.0E-07	1.8E-05	1.0E-05	2.8E-05	4.8E-06	1.9E-06	6.7E-06
Naphthalene	9.0E-01				3.3E-05	9.3E-05	1.3E-04	9.0E-06	1.8E-05	2.7E-05
Phenanthrene	2.6E+00				6.3E-05	1.8E-04	2.4E-04	1.7E-05	3.4E-05	5.1E-05
Pyrene	2.8E+00				6.7E-05	1.9E-04	2.6E-04	1.9E-05	3.6E-05	5.5E-05
Polychlorinated biphenyls (PCBs)	1.8E+00	1.4E-06	1.4E-06	2.8E-06	2.2E-01	1.9E-01	4.1E-01	2.5E-01	1.4E-01	3.9E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	3.2E-06	3.3E-06	6.5E-06	2.0E-01	1.7E-01	3.6E-01	5.4E-01	3.1E-01	8.5E-01
Antimony	3.9E+00				2.3E-02	2.0E-02	4.3E-02	6.4E-02	3.8E-02	1.0E-01
Arsenic	7.7E+00	2.2E-06	1.3E-06	3.5E-06	3.1E-02	1.6E-02	4.7E-02	8.5E-02	3.0E-02	1.2E-01
Barium	1.6E+02				2.0E-03	1.7E-03	3.7E-03	1.6E-02	9.2E-03	2.5E-02
Beryllium	2.7E-01				3.2E-04	2.8E-04	6.0E-04	3.6E-04	2.1E-04	5.7E-04
Cadmium	9.7E-01				2.3E-03	4.0E-04	2.7E-03	6.5E-03	7.5E-04	7.2E-03
Chromium(III)	2.0E+01				3.3E-05	2.8E-05	6.1E-05	9.1E-05	5.3E-05	1.4E-04
Lead	4.3E+02				7.0E-01	7.1E-02	7.7E-01	1.9E+00	1.3E-01	2.1E+00
MERCURY	1.4E-01				5.8E-04	9.9E-04	1.6E-03	1.6E-03	1.9E-03	3.5E-03
Nickel	2.1E+01				2.6E-03	4.4E-03	6.9E-03	7.1E-03	8.3E-03	1.5E-02
Silver	2.1E+00				1.0E-03	2.6E-03	3.6E-03	2.8E-03	4.9E-03	7.7E-03
Vanadium	2.6E+01				7.1E-03	6.0E-03	1.3E-02	1.9E-02	1.1E-02	3.1E-02
Zinc	2.4E+02				2.0E-03	1.7E-03	3.6E-03	5.4E-03	3.2E-03	8.6E-03

Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Version v0114

ELCR (all chemicals) = 8E-04
Chronic HI (all chemicals) = 9E+01
Subchronic HI (all chemicals) = 8E+01

*Vegetable uptake is informational only and NOT included in totals on EPC tab.
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Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
zz4-Bromodiphenyl ether	7.8E-02			
bis(2-Ethylhexyl)phthalate	7.6E-02			
Acenaphthene	2.1E-01			
Acenaphthylene	5.3E-01			
Anthracene	5.7E-01			
Benzo(a)anthracene	1.2E+00			
Benzo(a)pyrene	1.4E+00			
Benzo(b)fluoranthene	1.6E+00			
Benzo(g,h,i)perylene	7.4E-01			
Benzo(k)fluoranthene	5.6E-01			
Chrysene	1.3E+00			
Dibenzo(a,h)anthracene	2.4E-01			
Fluoranthene	2.9E+00			
Fluorene	2.7E-01			
Indeno(1,2,3-cd)pyrene	7.3E-01			
Naphthalene	9.0E-01			
Phenanthrene	2.6E+00			
Pyrene	2.8E+00			
Polychlorinated biphenyls (PCBs)	1.8E+00	6.5E-04	5.5E+01	3.2E+01
TCDD, 2,3,7,8- (equivalents)	5.7E-05			
Antimony	3.9E+00			
Arsenic	7.7E+00	1.2E-04	9.1E-01	1.3E+00
Barium	1.6E+02			
Beryllium	2.7E-01			
Cadmium	9.7E-01		2.6E+00	3.7E+00
Chromium(III)	2.0E+01		9.2E-04	1.3E-03
Lead	4.3E+02		3.1E+01	4.4E+01
MERCURY	1.4E-01			
Nickel	2.1E+01		2.9E-01	4.1E-01
Silver	2.1E+00			
Vanadium	2.6E+01			
Zinc	2.4E+02		8.6E-01	1.2E+00

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1\text{-}2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1\text{-}8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8\text{-}15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15\text{-}31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1\text{-}2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1\text{-}8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8\text{-}15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15\text{-}31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1\text{-}2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1\text{-}8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8\text{-}15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15\text{-}31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1\text{-}2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1\text{-}8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8\text{-}15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15\text{-}31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1\text{-}2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1\text{-}8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8\text{-}15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15\text{-}31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1\text{-}2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical
$SAF_{(1\text{-}8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8\text{-}15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15\text{-}31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

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Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

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Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans: Ingestion Rate for All g/d (ww)	Corn, Green peas, Lima beans: % of individuals that consumed item.	Corn, Green peas, Lima beans: Ingestion Rate for Consumers g/d (ww)	Melons, berries: Ingestion Rate for All g/d (ww)	Melons, berries: % of individuals that consumed item.	Melons, berries: Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

Resident - Soil: Table RS-8
Chemical-Specific Data

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
zz4-Bromodiphenyl ethe					1.0E-05	1.0E-05	1	0.19	1	0.19		
bis(2-Ethylhexyl)phthalat	1.4E-02	1.00	0.10		2.0E-02	2.0E-02	1	0.1	1	0.1		
Acenaphthene					6.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Acenaphthylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Anthracene					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
Benzo(a)anthracene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(a)pyrene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(b)fluoranthene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(g,h,i)perylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Benzo(k)fluoranthene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Chrysene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Dibenzo(a,h)anthracene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Fluoranthene					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
Fluorene					4.0E-02	4.0E-01	0.3	0.1	0.3	0.1		
Indeno(1,2,3-cd)pyrene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Naphthalene					2.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Phenanthrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Pyrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Polychlorinated biphenyl	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equival	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		
Antimony					4.0E-04	4.0E-04	1	0.1	1	0.1		
Arsenic	1.5E+00	0.50	0.03	1.00	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03	1	0.05
Barium					2.0E-01	7.0E-02	1	0.1	1	0.1		
Beryllium					2.0E-03	5.0E-03	1	0.1	1	0.1		
Cadmium					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
Chromium(III)					1.5E+00	1.5E+00	1	0.1	1	0.1	1	0.095
Lead					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
MERCURY					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
Nickel					2.0E-02	2.0E-02	1	0.2	1	0.2	1	0.38
Silver					5.0E-03	5.0E-03	1	0.3	1	0.3		
Vanadium					9.0E-03	9.0E-03	1	0.1	1	0.1		
Zinc					3.0E-01	3.0E-01	1	0.1	1	0.1	1	1.5

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Resident - Soil: Table RS-1 (HS-5: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 5.4E-05
Chronic HI (all chemicals) = 4.8E+00
Subchronic HI (all chemicals) = 1.1E+01

Do not insert or delete any rows

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
zzDibenzofuran	9.8E-01				2.3E-03	3.6E-03	5.9E-03	1.6E-03	1.7E-03	3.3E-03
ACENAPHTHENE	8.5E-01				1.0E-05	2.9E-05	3.9E-05	8.5E-06	1.7E-05	2.5E-05
ACENAPHTHYLENE	1.5E+00				3.7E-05	1.1E-04	1.4E-04	1.0E-05	2.0E-05	3.0E-05
Anthracene	4.3E+00				1.0E-05	2.9E-05	4.0E-05	8.5E-06	1.7E-05	2.5E-05
Benzo(a)anthracene	1.7E+01	1.4E-06	9.6E-07	2.4E-06	4.1E-04	2.3E-04	6.5E-04	1.1E-04	4.4E-05	1.6E-04
Benzo(a)pyrene	1.1E+01	9.0E-06	6.2E-06	1.5E-05	2.7E-04	1.5E-04	4.2E-04	7.3E-05	2.9E-05	1.0E-04
Benzo(b)fluoranthene	1.3E+01	1.1E-06	7.4E-07	1.8E-06	3.2E-04	1.8E-04	4.9E-04	8.7E-05	3.4E-05	1.2E-04
Benzo(g,h,i)perylene	4.1E+00				1.0E-04	2.8E-04	3.8E-04	2.7E-05	5.4E-05	8.1E-05
Benzo(k)fluoranthene	7.4E+00	6.1E-08	4.2E-08	1.0E-07	1.8E-04	1.0E-04	2.8E-04	4.9E-05	1.9E-05	6.9E-05
Chrysene	7.2E+00	5.9E-08	4.1E-08	1.0E-07	1.7E-04	9.9E-05	2.7E-04	4.8E-05	1.9E-05	6.7E-05
Dibenzo(a,h)anthracene	9.4E+00	7.7E-06	5.3E-06	1.3E-05	2.3E-04	1.3E-04	3.6E-04	6.3E-05	2.4E-05	8.7E-05
Fluoranthene	2.1E+01				3.7E-04	1.1E-03	1.4E-03	4.1E-04	8.0E-04	1.2E-03
Fluorene	2.0E+00				3.7E-05	1.1E-04	1.4E-04	1.0E-05	2.0E-05	3.0E-05
Indeno(1,2,3-cd)pyrene	4.0E+00	3.3E-07	2.3E-07	5.5E-07	9.7E-05	5.5E-05	1.5E-04	2.7E-05	1.0E-05	3.7E-05
METHYLNAPHTHALENE, 2-	6.0E-01				1.1E-04	3.1E-04	4.2E-04	3.0E-04	5.9E-04	8.9E-04
Phenanthrene	1.7E+01				4.0E-04	1.1E-03	1.5E-03	1.1E-04	2.2E-04	3.3E-04
Pyrene	1.8E+01				4.4E-04	1.2E-03	1.7E-03	1.2E-04	2.3E-04	3.6E-04
Polychlorinated biphenyls (PCBs)	4.9E+00	3.6E-06	3.8E-06	7.4E-06	5.9E-01	5.0E-01	1.1E+00	6.5E-01	3.8E-01	1.0E+00
TCDD, 2,3,7,8- (equivalents)	5.7E-05	3.2E-06	3.3E-06	6.5E-06	2.0E-01	1.7E-01	3.6E-01	5.4E-01	3.1E-01	8.5E-01
Arsenic	1.5E+01	4.1E-06	2.5E-06	6.6E-06	5.9E-02	3.0E-02	8.9E-02	1.6E-01	5.7E-02	2.2E-01
Barium	2.1E+02				2.5E-03	2.1E-03	4.7E-03	2.0E-02	1.2E-02	3.1E-02
Cadmium	1.7E+00				4.0E-03	6.8E-04	4.7E-03	1.1E-02	1.3E-03	1.2E-02
Chromium(III)	2.1E+01				3.5E-05	2.9E-05	6.4E-05	9.5E-05	5.6E-05	1.5E-04
Lead	1.8E+03				2.9E+00	3.0E-01	3.2E+00	8.0E+00	5.6E-01	8.6E+00
Mercury	6.0E-01				2.4E-03	4.1E-03	6.5E-03	6.7E-03	7.8E-03	1.4E-02
Silver	6.1E-01				3.0E-04	7.6E-04	1.1E-03	8.2E-04	1.4E-03	2.2E-03

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Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Version v0114

ELCR (all chemicals) = 2E-03
Chronic HI (all chemicals) = 3E+02
Subchronic HI (all chemicals) = 3E+02

*Vegetable uptake is informational only and NOT included in totals on EPC tab.

Do not insert or delete any rows

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
zzDibenzofuran	9.8E-01			
ACENAPHTHENE	8.5E-01			
ACENAPHTHYLENE	1.5E+00			
Anthracene	4.3E+00			
Benzo(a)anthracene	1.7E+01			
Benzo(a)pyrene	1.1E+01			
Benzo(b)fluoranthene	1.3E+01			
Benzo(g,h,i)perylene	4.1E+00			
Benzo(k)fluoranthene	7.4E+00			
Chrysene	7.2E+00			
Dibenzo(a,h)anthracene	9.4E+00			
Fluoranthene	2.1E+01			
Fluorene	2.0E+00			
Indeno(1,2,3-cd)pyrene	4.0E+00			
METHYLNAPHTHALENE, 2-	6.0E-01			
Phenanthrene	1.7E+01			
Pyrene	1.8E+01			
Polychlorinated biphenyls (PCBs)	4.9E+00	1.7E-03	1.5E+02	8.3E+01
TCDD, 2,3,7,8- (equivalents)	5.7E-05			
Arsenic	1.5E+01	2.3E-04	1.7E+00	2.5E+00
Barium	2.1E+02			
Cadmium	1.7E+00		4.5E+00	6.4E+00
Chromium(III)	2.1E+01		9.6E-04	1.4E-03
Lead	1.8E+03		1.3E+02	1.8E+02
Mercury	6.0E-01			
Silver	6.1E-01			

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1-31)} * CSF$$

$$LADD_{ing\ (1-31)} = LADD_{ing\ (1-8)} + LADD_{ing\ (8-15)} + LADD_{ing\ (15-31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1-31)} = LADD_{derm\ (1-8)} + LADD_{derm\ (8-15)} + LADD_{derm\ (15-31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1-31)} * CSF$$

$$LADD_{produce(1-31)} = LADD_{produce(1-8)} + LADD_{produce(8-15)} + LADD_{produce(15-31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1-8)}$	100	mg/day
$IR_{(8-15)}$	50	mg/day
$IR_{(15-31)}$	50	mg/day
$PIR_{(1-8)}$	12,099	mg/day
$PIR_{(8-15)}$	17,809	mg/day
$PIR_{(15-31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1-8)}$	7	years
$EP_{(8-15)}$	7	years
$EP_{(15-31)}$	16	years
C	0.000001	kg/mg
$BW_{(1-8)}$	17.0	kg
$BW_{(8-15)}$	39.9	kg
$BW_{(15-31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1-8)}$	2431	cm^2 / day
$SA_{(8-15)}$	4427	cm^2 / day
$SA_{(15-31)}$	5653	cm^2 / day
$SAF_{(1-8)}$	0.35	mg/cm^2
$SAF_{(8-15)}$	0.14	mg/cm^2
$SAF_{(15-31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1-2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1-8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8-15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15-31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

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Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Vlookup Version v0114

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

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Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Melons, berries Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

Resident - Soil: Table RS-8
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
zzDibenzofuran					1.0E-03	4.0E-03	0.96	0.18	0.96	0.18		
ACENAPHTHENE					6.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
ACENAPHTHYLENE					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Anthracene					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
Benzo(a)anthracene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(a)pyrene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(b)fluoranthene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(g,h,i)perylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Benzo(k)fluoranthene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Chrysene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Dibenzo(a,h)anthracene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Fluoranthene					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
Fluorene					4.0E-02	4.0E-01	0.3	0.1	0.3	0.1		
Indeno(1,2,3-cd)pyrene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
METHYLNAPHTHALENI					4.0E-03	4.0E-03	0.3	0.1	0.3	0.1		
Phenanthrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Pyrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Polychlorinated biphenyl:	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equivale	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		
Arsenic	1.5E+00	0.50	0.03	1.00	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03	1	0.05
Barium					2.0E-01	7.0E-02	1	0.1	1	0.1		
Cadmium					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
Chromium(III)					1.5E+00	1.5E+00	1	0.1	1	0.1	1	0.095
Lead					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
Mercury					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
Silver					5.0E-03	5.0E-03	1	0.3	1	0.3		

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) $_{1-2}$	10.7	kg
IR $_{(1\text{-time reasonable max})}$	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Resident - Soil: Table RS-1 (HS-6: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 1.3E-05
Chronic HI (all chemicals) = 1.5E+00
Subchronic HI (all chemicals) = 2.4E+00

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Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
Acenaphthene	1.5E-01				1.8E-06	5.2E-06	7.0E-06	1.5E-06	3.0E-06	4.5E-06
Anthracene	3.0E-01				7.2E-07	2.0E-06	2.8E-06	5.9E-07	1.2E-06	1.8E-06
Benzo(a)anthracene	5.2E-01	4.3E-08	3.0E-08	7.2E-08	1.3E-05	7.2E-06	2.0E-05	3.5E-06	1.4E-06	4.8E-06
Benzo(a)pyrene	4.6E-01	3.8E-07	2.6E-07	6.4E-07	1.1E-05	6.3E-06	1.7E-05	3.1E-06	1.2E-06	4.3E-06
Benzo(b)fluoranthene	5.7E-01	4.7E-08	3.2E-08	7.9E-08	1.4E-05	7.8E-06	2.2E-05	3.8E-06	1.5E-06	5.3E-06
Benzo(k)fluoranthene	2.6E-01	2.1E-09	1.5E-09	3.6E-09	6.2E-06	3.5E-06	9.8E-06	1.7E-06	6.7E-07	2.4E-06
Chrysene	5.3E-01	4.3E-09	3.0E-09	7.3E-09	1.3E-05	7.2E-06	2.0E-05	3.5E-06	1.4E-06	4.9E-06
Fluoranthene	9.8E-01				1.8E-05	5.1E-05	6.9E-05	2.0E-05	3.8E-05	5.8E-05
Naphthalene	1.3E-01				4.8E-06	1.4E-05	1.8E-05	1.3E-06	2.6E-06	3.9E-06
Phenanthrene	9.7E-01				2.3E-05	6.6E-05	9.0E-05	6.4E-06	1.3E-05	1.9E-05
Pyrene	8.3E-01				2.0E-05	5.7E-05	7.8E-05	5.6E-06	1.1E-05	1.6E-05
Polychlorinated biphenyls (PCBs)	3.9E+00	3.0E-06	3.1E-06	6.0E-06	4.8E-01	4.1E-01	8.8E-01	5.3E-01	3.1E-01	8.3E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	3.2E-06	3.3E-06	6.5E-06	2.0E-01	1.7E-01	3.6E-01	5.4E-01	3.1E-01	8.5E-01
Barium	3.7E+02				4.5E-03	3.8E-03	8.2E-03	3.5E-02	2.0E-02	5.6E-02
Beryllium	1.9E-01				2.3E-04	1.9E-04	4.2E-04	2.5E-04	1.5E-04	4.0E-04
Cadmium	5.1E-01				1.2E-03	2.1E-04	1.4E-03	3.4E-03	4.0E-04	3.8E-03
Chromium(III)	9.1E+01				1.5E-04	1.3E-04	2.7E-04	4.1E-04	2.4E-04	6.4E-04
Lead	1.4E+02				2.2E-01	2.2E-02	2.4E-01	6.0E-01	4.2E-02	6.4E-01
Mercury	9.1E-02				3.7E-04	6.2E-04	9.9E-04	1.0E-03	1.2E-03	2.2E-03
Nickel	9.6E+00				1.2E-03	2.0E-03	3.2E-03	3.2E-03	3.8E-03	7.0E-03
Vanadium	3.6E+01				9.7E-03	8.2E-03	1.8E-02	2.7E-02	1.6E-02	4.2E-02
Zinc	8.5E+01				6.8E-04	5.8E-04	1.3E-03	1.9E-03	1.1E-03	3.0E-03

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Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Version

ELCR (all chemicals) =	1E-03
Chronic HI (all chemicals) =	1E+02
Subchronic HI (all chemicals) =	8E+01

*Vegetable uptake is informational only and NOT included in totals on EPC tab.

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Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
Acenaphthene	1.5E-01			
Anthracene	3.0E-01			
Benzo(a)anthracene	5.2E-01			
Benzo(a)pyrene	4.6E-01			
Benzo(b)fluoranthene	5.7E-01			
Benzo(k)fluoranthene	2.6E-01			
Chrysene	5.3E-01			
Fluoranthene	9.8E-01			
Naphthalene	1.3E-01			
Phenanthrene	9.7E-01			
Pyrene	8.3E-01			
Polychlorinated biphenyls (PCBs)	3.9E+00	1.4E-03	1.2E+02	6.7E+01
TCDD, 2,3,7,8- (equivalents)	5.7E-05			
Barium	3.7E+02			
Beryllium	1.9E-01			
Cadmium	5.1E-01		1.4E+00	2.0E+00
Chromium(III)	9.1E+01		4.1E-03	5.9E-03
Lead	1.4E+02		9.6E+00	1.4E+01
Mercury	9.1E-02			
Nickel	9.6E+00		1.3E-01	1.9E-01
Vanadium	3.6E+01			
Zinc	8.5E+01		3.0E-01	4.3E-01

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1-2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1-8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8-15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15-31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

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Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

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Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Melons, berries: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

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Resident - Soil: Table RS-8
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
Acenaphthene					6.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Anthracene					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
Benzo(a)anthracene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(a)pyrene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(b)fluoranthene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(k)fluoranthene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Chrysene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Fluoranthene					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
Naphthalene					2.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Phenanthrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Pyrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Polychlorinated biphenyls	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equivale	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		
Barium					2.0E-01	7.0E-02	1	0.1	1	0.1		
Beryllium					2.0E-03	5.0E-03	1	0.1	1	0.1		
Cadmium					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
Chromium(III)					1.5E+00	1.5E+00	1	0.1	1	0.1	1	0.095
Lead					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
Mercury					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
Nickel					2.0E-02	2.0E-02	1	0.2	1	0.2	1	0.38
Vanadium					9.0E-03	9.0E-03	1	0.1	1	0.1		
Zinc					3.0E-01	3.0E-01	1	0.1	1	0.1	1	1.5

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

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Resident - Soil: Table RS-1 (HS-7: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 6.8E-06
Chronic HI (all chemicals) = 9.9E-01
Subchronic HI (all chemicals) = 2.4E+00

Do not insert or delete any rows

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
Polychlorinated biphenyls (PCBs)	2.2E-01	1.6E-07	1.7E-07	3.3E-07	2.7E-02	2.3E-02	4.9E-02	2.9E-02	1.7E-02	4.6E-02
TCDD, 2,3,7,8- (equivalents)	5.7E-05	3.2E-06	3.3E-06	6.5E-06	2.0E-01	1.7E-01	3.6E-01	5.4E-01	3.1E-01	8.5E-01
Barium	9.0E+01				1.1E-03	9.3E-04	2.0E-03	8.6E-03	5.0E-03	1.4E-02
Beryllium	4.0E-01				4.8E-04	4.1E-04	8.9E-04	5.3E-04	3.1E-04	8.4E-04
Cadmium	1.0E+00				2.5E-03	4.2E-04	2.9E-03	6.8E-03	7.9E-04	7.5E-03
Chromium(III)	1.6E+01				2.6E-05	2.2E-05	4.7E-05	7.1E-05	4.1E-05	1.1E-04
Lead	3.2E+02				5.1E-01	5.2E-02	5.7E-01	1.4E+00	9.9E-02	1.5E+00
Nickel	1.0E+01				1.2E-03	2.1E-03	3.3E-03	3.4E-03	3.9E-03	7.3E-03
Zinc	1.4E+02				1.1E-03	9.5E-04	2.1E-03	3.1E-03	1.8E-03	4.9E-03

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Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Version v0114

ELCR (all chemicals) = 8E-05
Chronic HI (all chemicals) = 3E+01
Subchronic HI (all chemicals) = 4E+01

*Vegetable uptake is informational only and NOT included in totals on EPC tab.

Do not insert or delete any rows

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
Polychlorinated biphenyls (PCBs)	2.2E-01	7.8E-05	6.5E+00	3.7E+00
TCDD, 2,3,7,8- (equivalents)	5.7E-05			
Barium	9.0E+01			
Beryllium	4.0E-01			
Cadmium	1.0E+00		2.7E+00	3.9E+00
Chromium(III)	1.6E+01		7.1E-04	1.0E-03
Lead	3.2E+02		2.3E+01	3.2E+01
Nickel	1.0E+01		1.4E-01	2.0E-01
Zinc	1.4E+02		4.9E-01	7.1E-01

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1-2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1-8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8-15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15-31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

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Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

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Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Melons, berries Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

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Resident - Soil: Table RS-8
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
Polychlorinated biphenyl	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equival	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		
Barium					2.0E-01	7.0E-02	1	0.1	1	0.1		
Beryllium					2.0E-03	5.0E-03	1	0.1	1	0.1		
Cadmium					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
Chromium(III)					1.5E+00	1.5E+00	1	0.1	1	0.1	1	0.095
Lead					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
Nickel					2.0E-02	2.0E-02	1	0.2	1	0.2	1	0.38
Zinc					3.0E-01	3.0E-01	1	0.1	1	0.1	1	1.5

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) $_{1\text{-}2}$	10.7	kg
IR $_{(1\text{-time reasonable max})}$	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Resident - Soil: Table RS-1 (HS-8: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 8.3E-05
Chronic HI (all chemicals) = 5.1E+00
Subchronic HI (all chemicals) = 1.2E+01

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Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
AROMATICS C9 to C10 ropylt	1.2E+00				9.7E-05	1.6E-04	2.6E-04	2.7E-05	3.1E-05	5.8E-05
AROMATICS C9 to C10	5.1E+01				4.1E-03	7.0E-03	1.1E-02	1.1E-03	1.3E-03	2.5E-03
ALIPHATICS C9 to C12	2.5E+01				6.1E-04	1.0E-03	1.6E-03	1.7E-04	2.0E-04	3.6E-04
ALIPHATICS C19 to C36	1.6E+02				1.9E-04	3.3E-04	5.2E-04	1.8E-04	2.1E-04	3.9E-04
AROMATICS C11 to C22	1.2E+02				2.9E-03	8.2E-03	1.1E-02	8.0E-04	1.6E-03	2.4E-03
zzBenzoic Acid	2.4E+00				1.4E-06	2.2E-06	3.6E-06	3.8E-06	4.2E-06	8.1E-06
DIMETHYL PHTHALATE	2.8E-01				6.9E-06	5.9E-06	1.3E-05	1.9E-05	1.1E-05	3.0E-05
zzdi-n-butylphthalate	1.0E+00				2.4E-05	1.5E-05	3.9E-05	6.7E-05	2.7E-05	9.5E-05
zzButylbenzylphthalate	2.4E-01	1.6E-10	3.2E-10	4.8E-10	2.8E-06	4.4E-06	7.2E-06	7.7E-06	8.4E-06	1.6E-05
BIS(2-ETHYLHEXYL)PHTHALATE	3.0E+00	1.6E-08	1.6E-08	3.2E-08	3.7E-04	3.1E-04	6.8E-04	1.0E-03	5.9E-04	1.6E-03
zzCarbazole	2.0E+00	4.1E-09	3.1E-09	7.2E-09	4.5E-05	2.7E-05	7.2E-05	1.2E-05	5.1E-06	1.7E-05
zzDibenzofuran	7.2E-01				1.7E-03	2.7E-03	4.3E-03	1.1E-03	1.3E-03	2.4E-03
Acenaphthene	4.5E+00				5.4E-05	1.5E-04	2.1E-04	4.5E-05	8.7E-05	1.3E-04
Acenaphthylene	6.6E-01				1.6E-05	4.5E-05	6.1E-05	4.4E-06	8.5E-06	1.3E-05
Anthracene	7.9E+00				1.9E-05	5.4E-05	7.3E-05	1.6E-05	3.1E-05	4.6E-05
Benzo(a)anthracene	3.3E+01	2.7E-06	1.9E-06	4.5E-06	7.9E-04	4.5E-04	1.2E-03	2.2E-04	8.5E-05	3.0E-04
Benzo(a)pyrene	2.6E+01	2.1E-05	1.5E-05	3.6E-05	6.3E-04	3.6E-04	9.9E-04	1.7E-04	6.8E-05	2.4E-04
Benzo(b)fluoranthene	4.7E+01	3.8E-06	2.7E-06	6.5E-06	1.1E-03	6.4E-04	1.8E-03	3.1E-04	1.2E-04	4.3E-04
Benzo(g,h,i)perylene	2.9E+00				7.1E-05	2.0E-04	2.7E-04	1.9E-05	3.8E-05	5.7E-05
Benzo(k)fluoranthene	3.9E+00	3.2E-08	2.2E-08	5.4E-08	9.5E-05	5.4E-05	1.5E-04	2.6E-05	1.0E-05	3.6E-05
Chrysene	9.0E+00	7.4E-08	5.1E-08	1.2E-07	2.2E-04	1.2E-04	3.4E-04	6.0E-05	2.3E-05	8.3E-05
DIBENZO(a,h)ANTHRACENE	3.2E+00	2.6E-06	1.8E-06	4.4E-06	7.8E-05	4.4E-05	1.2E-04	2.1E-05	8.3E-06	3.0E-05
Fluoranthene	2.3E+01				4.2E-04	1.2E-03	1.6E-03	4.6E-04	9.0E-04	1.4E-03
Fluorene	4.6E+00				8.3E-05	2.4E-04	3.2E-04	2.3E-05	4.5E-05	6.8E-05
Indeno(1,2,3-cd)pyrene	3.0E+00	2.5E-07	1.7E-07	4.2E-07	7.3E-05	4.1E-05	1.1E-04	2.0E-05	7.8E-06	2.8E-05
METHYLNAPHTHALENE, 2-	2.0E+00				3.5E-04	1.0E-03	1.4E-03	9.8E-04	1.9E-03	2.9E-03
Naphthalene	7.6E+01				2.8E-03	7.8E-03	1.1E-02	7.6E-04	1.5E-03	2.2E-03
Phenanthrene	3.0E+01				7.2E-04	2.0E-03	2.8E-03	2.0E-04	3.9E-04	5.9E-04
Pyrene	1.6E+01				3.9E-04	1.1E-03	1.5E-03	1.1E-04	2.1E-04	3.2E-04
POLYCHLORINATED BIPHENYLS (PCBs)	3.8E+00	2.8E-06	3.0E-06	5.8E-06	4.6E-01	3.9E-01	8.5E-01	5.1E-01	3.0E-01	8.0E-01
TCDD, 2,3,7,8- (equivalents)	1.9E-04	1.1E-05	1.1E-05	2.2E-05	6.5E-01	5.6E-01	1.2E+00	1.8E+00	1.1E+00	2.8E+00
Arsenic	6.9E+00	1.9E-06	1.2E-06	3.2E-06	2.8E-02	1.4E-02	4.2E-02	7.7E-02	2.7E-02	1.0E-01
Barium	8.7E+02				1.0E-02	8.9E-03	1.9E-02	8.2E-02	4.8E-02	1.3E-01
Beryllium	2.0E-01				2.4E-04	2.1E-04	4.5E-04	2.7E-04	1.6E-04	4.2E-04
Cadmium	4.6E+00				1.1E-02	1.9E-03	1.3E-02	3.1E-02	3.6E-03	3.5E-02
CHROMIUM(III)	1.3E+02				2.0E-04	1.7E-04	3.8E-04	5.6E-04	3.3E-04	8.9E-04
Lead	1.6E+03				2.6E+00	2.7E-01	2.9E+00	7.2E+00	5.0E-01	7.7E+00
Mercury	9.8E-01				4.0E-03	6.8E-03	1.1E-02	1.1E-02	1.3E-02	2.4E-02
Nickel	2.7E+01				3.2E-03	5.5E-03	8.7E-03	8.9E-03	1.0E-02	1.9E-02
Selenium	1.1E+00				5.1E-04	4.4E-05	5.6E-04	1.4E-03	8.3E-05	1.5E-03
Silver	1.4E+00				6.8E-04	1.7E-03	2.4E-03	1.9E-03	3.3E-03	5.2E-03
Vanadium	8.1E+01				2.2E-02	1.9E-02	4.0E-02	6.0E-02	3.5E-02	9.5E-02
Zinc	2.7E+02				2.2E-03	1.8E-03	4.0E-03	6.0E-03	3.5E-03	9.5E-03

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Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Version v(

ELCR (all chemicals) = 1E-03
Chronic HI (all chemicals) = 2E+02
Subchronic HI (all chemicals) = 3E+02

*Vegetable uptake is informational only and NOT included in totals on EPC tab.
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Oil or Hazardous Material			EPC (mg/kg)	Chronic		Subchronic
				$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
AROMATICS	C9 to (	p-Isopropyltoluene	1.2E+00			
AROMATICS	C9 to C10		5.1E+01			
ALIPHATICS	C9 to C12		2.5E+01			
ALIPHATICS	C19 to C36		1.6E+02			
AROMATICS	C11 to C22		1.2E+02			
zzBenzoic Acid			2.4E+00			
DIMETHYL PHTHALATE			2.8E-01			
zzdi-n-butylphthalate			1.0E+00			
zzButylbenzylphthalate			2.4E-01			
BIS(2-ETHYLHEXYL)PHTHALATE			3.0E+00			
zzCarbazole			2.0E+00			
zzDibenzofuran			7.2E-01			
Acenaphthene			4.5E+00			
Acenaphthylene			6.6E-01			
Anthracene			7.9E+00			
Benzo(a)anthracene			3.3E+01			
Benzo(a)pyrene			2.6E+01			
Benzo(b)fluoranthene			4.7E+01			
Benzo(g,h,i)perylene			2.9E+00			
Benzo(k)fluoranthene			3.9E+00			
Chrysene			9.0E+00			
DIBENZO(a,h)ANTHRACENE			3.2E+00			
Fluoranthene			2.3E+01			
Fluorene			4.6E+00			
Indeno(1,2,3-cd)pyrene			3.0E+00			
METHYLNAPHTHALENE, 2-			2.0E+00			
Naphthalene			7.6E+01			
Phenanthrene			3.0E+01			
Pyrene			1.6E+01			
POLYCHLORINATED BIPHENYLS (PCBs)			3.8E+00	1.3E-03	1.1E+02	6.5E+01
TCDD, 2,3,7,8- (equivalents)			1.9E-04			
Arsenic			6.9E+00	1.1E-04	8.2E-01	1.2E+00
Barium			8.7E+02			
Beryllium			2.0E-01			
Cadmium			4.6E+00		1.3E+01	1.8E+01
CHROMIUM(III)			1.3E+02		5.7E-03	8.2E-03
Lead			1.6E+03		1.1E+02	1.6E+02
Mercury			9.8E-01			
Nickel			2.7E+01		3.6E-01	5.2E-01
Selenium			1.1E+00			
Silver			1.4E+00			
Vanadium			8.1E+01			
Zinc			2.7E+02		9.6E-01	1.4E+00

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1-2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1-8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8-15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15-31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

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Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

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Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Melons, berries Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

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Resident - Soil: Table RS-8
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
AROMATICS C9 to					3.0E-02	3.0E-01	1	0.2	1	0.2		
AROMATICS C9 to					3.0E-02	3.0E-01	1	0.2	1	0.2		
ALIPHATICS C9 to (					1.0E-01	1.0E+00	1	0.2	1	0.2		
ALIPHATICS C19 to					2.0E+00	6.0E+00	1	0.2	1	0.2		
AROMATICS C11 to					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
zzBenzoic Acid					4.0E+00	4.0E+00	0.96	0.18	0.96	0.18		
DIMETHYL PHTHALATE					1.0E-01	1.0E-01	1	0.1	1	0.1		
zzdi-n-butylphthalate					1.0E-01	1.0E-01	1	0.07	1	0.07		
zzButylbenzylphthalate	1.9E-03	0.96	0.18	#N/A	2.0E-01	2.0E-01	0.96	0.18	0.96	0.18		
BIS(2-ETHYLHEXYL)PH	1.4E-02	1.00	0.10		2.0E-02	2.0E-02	1	0.1	1	0.1		
zzCarbazole	2.0E-02	0.28	0.02	#N/A	3.0E-02	3.0E-01	0.28	0.02	0.28	0.02		
zzDibenzofuran					1.0E-03	4.0E-03	0.96	0.18	0.96	0.18		
Acenaphthene					6.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Acenaphthylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Anthracene					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
Benzo(a)anthracene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(a)pyrene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(b)fluoranthene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(g,h,i)perylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Benzo(k)fluoranthene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Chrysene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
DIBENZO(a,h)ANTHRAC	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Fluoranthene					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
Fluorene					4.0E-02	4.0E-01	0.3	0.1	0.3	0.1		
Indeno(1,2,3-cd)pyrene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
METHYLNAPHTHALENE					4.0E-03	4.0E-03	0.3	0.1	0.3	0.1		
Naphthalene					2.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Phenanthrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Pyrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
POLYCHLORINATED BI	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equivale	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		
Arsenic	1.5E+00	0.50	0.03	1.00	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03	1	0.05
Barium					2.0E-01	7.0E-02	1	0.1	1	0.1		
Beryllium					2.0E-03	5.0E-03	1	0.1	1	0.1		
Cadmium					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
CHROMIUM(III)					1.5E+00	1.5E+00	1	0.1	1	0.1	1	0.095
Lead					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
Mercury					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
Nickel					2.0E-02	2.0E-02	1	0.2	1	0.2	1	0.38
Selenium					5.0E-03	5.0E-03	1	0.01	1	0.01		
Silver					5.0E-03	5.0E-03	1	0.3	1	0.3		
Vanadium					9.0E-03	9.0E-03	1	0.1	1	0.1		
Zinc					3.0E-01	3.0E-01	1	0.1	1	0.1	1	1.5

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) $_{1\text{-}2}$	10.7	kg
IR $_{(1\text{-time reasonable max})}$	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Resident - Soil: Table RS-1 (HS-9: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 3.0E-05
Chronic HI (all chemicals) = 7.1E+00
Subchronic HI (all chemicals) = 1.7E+01

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Oil or Hazardous Material		EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
ALIPHATICS C19 to C36		7.6E+01				9.2E-05	1.6E-04	2.5E-04	8.5E-05	9.9E-05	1.8E-04
AROMATICS C11 to C22		3.1E+01				7.5E-04	2.1E-03	2.9E-03	2.1E-04	4.0E-04	6.1E-04
zz4-Methylphenol		7.4E-02				3.6E-05	5.8E-05	9.4E-05	9.9E-05	1.1E-04	2.1E-04
Dimethyl phthalate		3.2E-01				7.7E-06	6.5E-06	1.4E-05	2.1E-05	1.2E-05	3.3E-05
zzDi-n-butylphthalate		3.5E-01				8.5E-06	5.1E-06	1.4E-05	2.3E-05	9.6E-06	3.3E-05
bis(2-Ethylhexyl)phthalate		2.0E+00	1.0E-08	1.1E-08	2.1E-08	2.4E-04	2.0E-04	4.4E-04	6.6E-04	3.8E-04	1.0E-03
zzDibenzofuran		4.5E-01				1.0E-03	1.7E-03	2.7E-03	7.1E-04	7.8E-04	1.5E-03
Acenaphthene		4.6E-01				5.6E-06	1.6E-05	2.1E-05	4.6E-06	9.0E-06	1.4E-05
Acenaphthylene		4.1E-01				1.0E-05	2.8E-05	3.8E-05	2.8E-06	5.4E-06	8.1E-06
Anthracene		1.2E+00				2.9E-06	8.3E-06	1.1E-05	2.4E-06	4.7E-06	7.1E-06
Benzo(a)anthracene		2.9E+00	2.3E-07	1.6E-07	4.0E-07	6.9E-05	3.9E-05	1.1E-04	1.9E-05	7.4E-06	2.6E-05
Benzo(a)pyrene		5.6E+00	4.6E-06	3.2E-06	7.7E-06	1.4E-04	7.7E-05	2.1E-04	3.7E-05	1.4E-05	5.2E-05
Benzo(b)fluoranthene		3.0E+00	2.5E-07	1.7E-07	4.2E-07	7.4E-05	4.2E-05	1.2E-04	2.0E-05	7.9E-06	2.8E-05
Benzo(g,h,i)perylene		1.4E+00				3.5E-05	9.9E-05	1.3E-04	9.7E-06	1.9E-05	2.8E-05
Benzo(k)fluoranthene		1.4E+00	1.2E-08	8.0E-09	2.0E-08	3.4E-05	2.0E-05	5.4E-05	9.5E-06	3.7E-06	1.3E-05
Chrysene		2.7E+00	2.2E-08	1.5E-08	3.8E-08	6.6E-05	3.8E-05	1.0E-04	1.8E-05	7.1E-06	2.5E-05
Dibenzo(a,h)anthracene		4.8E-01	3.9E-07	2.7E-07	6.6E-07	1.2E-05	6.6E-06	1.8E-05	3.2E-06	1.2E-06	4.4E-06
Fluoranthene		5.7E+00				1.0E-04	3.0E-04	4.0E-04	1.1E-04	2.2E-04	3.4E-04
Fluorene		5.5E-01				1.0E-05	2.8E-05	3.8E-05	2.7E-06	5.3E-06	8.1E-06
Indeno(1,2,3-cd)pyrene		1.6E+00	1.3E-07	9.0E-08	2.2E-07	3.9E-05	2.2E-05	6.0E-05	1.1E-05	4.1E-06	1.5E-05
METHYLNAPHTHALENE, 2-		3.0E-01				5.4E-05	1.5E-04	2.1E-04	1.5E-04	2.9E-04	4.4E-04
Naphthalene		4.0E+01				1.5E-03	4.1E-03	5.6E-03	4.0E-04	7.8E-04	1.2E-03
Phenanthrene		4.1E+00				1.0E-04	2.8E-04	3.8E-04	2.7E-05	5.3E-05	8.1E-05
Pyrene		5.7E+00				1.4E-04	3.9E-04	5.3E-04	3.8E-05	7.4E-05	1.1E-04
Polychlorinated biphenyls (PCBs)		3.2E+00	2.4E-06	2.5E-06	4.9E-06	3.9E-01	3.3E-01	7.2E-01	4.3E-01	2.5E-01	6.7E-01
TCDD, 2,3,7,8- (equivalents)		5.7E-05	3.2E-06	3.3E-06	6.5E-06	2.0E-01	1.7E-01	3.6E-01	5.4E-01	3.1E-01	8.5E-01
AROMATICS C9 to C10	GRO	1.2E+01				9.9E-04	1.7E-03	2.7E-03	2.7E-04	3.2E-04	5.9E-04
Antimony		2.3E+02				1.4E+00	1.2E+00	2.5E+00	3.8E+00	2.2E+00	6.0E+00
Arsenic		2.0E+01	5.6E-06	3.5E-06	9.0E-06	8.0E-02	4.1E-02	1.2E-01	2.2E-01	7.7E-02	3.0E-01
Barium		1.4E+03				1.7E-02	1.5E-02	3.2E-02	1.4E-01	8.0E-02	2.2E-01
Beryllium		4.3E-01				5.2E-04	4.4E-04	9.7E-04	5.7E-04	3.4E-04	9.1E-04
Cadmium		3.7E+00				9.0E-03	1.5E-03	1.1E-02	2.5E-02	2.9E-03	2.8E-02
Chromium(III)		7.2E+01				1.2E-04	9.9E-05	2.1E-04	3.2E-04	1.9E-04	5.1E-04
Lead		1.8E+03				3.0E+00	3.0E-01	3.3E+00	8.1E+00	5.7E-01	8.7E+00
Mercury		1.3E+00				5.4E-03	9.1E-03	1.4E-02	1.5E-02	1.7E-02	3.2E-02
Nickel		1.6E+01				1.9E-03	3.3E-03	5.2E-03	5.3E-03	6.2E-03	1.1E-02
Selenium		4.1E+00				2.0E-03	1.7E-04	2.2E-03	5.5E-03	3.2E-04	5.8E-03
Silver		5.0E+00				2.4E-03	6.2E-03	8.6E-03	6.7E-03	1.2E-02	1.8E-02
Vanadium		2.3E+01				6.3E-03	5.3E-03	1.2E-02	1.7E-02	1.0E-02	2.7E-02
Zinc		5.2E+02				4.2E-03	3.6E-03	7.8E-03	1.2E-02	6.8E-03	1.8E-02

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Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Version v0114

ELCR (all chemicals) = 1E-03
Chronic HI (all chemicals) = 2E+02
Subchronic HI (all chemicals) = 3E+02

*Vegetable uptake is informational only and NOT included in totals on EPC tab.

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Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
ALIPHATICS C19 to C36	5.9E+01			
AROMATICS C11 to C22	3.1E+01			
zz4-Methylphenol	7.4E-02			
Dimethyl phthalate	3.2E-01			
zzDi-n-butylphthalate	3.5E-01			
bis(2-Ethylhexyl)phthalate	2.0E+00			
zzDibenzofuran	4.5E-01			
Acenaphthene	4.6E-01			
Acenaphthylene	4.1E-01			
Anthracene	1.2E+00			
Benzo(a)anthracene	2.9E+00			
Benzo(a)pyrene	5.6E+00			
Benzo(b)fluoranthene	3.0E+00			
Benzo(g,h,i)perylene	1.4E+00			
Benzo(k)fluoranthene	1.4E+00			
Chrysene	2.7E+00			
Dibenzo(a,h)anthracene	4.8E-01			
Fluoranthene	5.7E+00			
Fluorene	5.5E-01			
Indeno(1,2,3-cd)pyrene	1.6E+00			
METHYLNAPHTHALENE, 2-	3.0E-01			
Naphthalene	4.0E+01			
Phenanthrene	4.1E+00			
Pyrene	5.7E+00			
Polychlorinated biphenyls (PCBs)	3.2E+00	1.1E-03	9.5E+01	5.5E+01
TCDD, 2,3,7,8- (equivalents)	5.7E-05			
AROMATICS C9 to C GRO	1.2E+01			
Antimony	2.3E+02			
Arsenic	2.0E+01	3.1E-04	2.3E+00	3.4E+00
Barium	1.4E+03			
Beryllium	4.3E-01			
Cadmium	3.7E+00		1.0E+01	1.4E+01
Chromium(III)	7.2E+01		3.2E-03	4.6E-03
Lead	1.8E+03		1.3E+02	1.9E+02
Mercury	1.3E+00			
Nickel	1.6E+01		2.1E-01	3.1E-01
Selenium	4.1E+00			
Silver	5.0E+00			
Vanadium	2.3E+01			
Zinc	5.2E+02		1.9E+00	2.7E+00

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1-2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1-8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8-15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15-31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$ - Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(1-8)}$ - Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

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Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans: Ingestion Rate for All g/d (ww)	Corn, Green peas, Lima beans: % of individuals that consumed item.	Corn, Green peas, Lima beans: Ingestion Rate for Consumers g/d (ww)	Melons, berries: Ingestion Rate for All g/d (ww)	Melons, berries: % of individuals that consumed item.	Melons, berries: Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

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Resident - Soil: Table RS-8
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
ALIPHATICS C19 to					2.0E+00	6.0E+00	1	0.2	1	0.2		
AROMATICS C11 to					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
zz4-Methylphenol					5.0E-03	5.0E-03	1	0.19	1	0.19		
Dimethyl phthalate					1.0E-01	1.0E-01	1	0.1	1	0.1		
zzDi-n-butylphthalate					1.0E-01	1.0E-01	1	0.07	1	0.07		
bis(2-Ethylhexyl)phthalat	1.4E-02	1.00	0.10		2.0E-02	2.0E-02	1	0.1	1	0.1		
zzDibenzofuran					1.0E-03	4.0E-03	0.96	0.18	0.96	0.18		
Acenaphthene					6.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Acenaphthylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Anthracene					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
Benzo(a)anthracene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(a)pyrene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(b)fluoranthene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(g,h,i)perylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Benzo(k)fluoranthene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Chrysene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Dibenzo(a,h)anthracene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Fluoranthene					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
Fluorene					4.0E-02	4.0E-01	0.3	0.1	0.3	0.1		
Indeno(1,2,3-cd)pyrene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
METHYLNAPHTHALENI					4.0E-03	4.0E-03	0.3	0.1	0.3	0.1		
Naphthalene					2.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Phenanthrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Pyrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Polychlorinated biphenyl	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equival	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		
AROMATICS C9 to					3.0E-02	3.0E-01	1	0.2	1	0.2		
Antimony					4.0E-04	4.0E-04	1	0.1	1	0.1		
Arsenic	1.5E+00	0.50	0.03	1.00	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03	1	0.05
Barium					2.0E-01	7.0E-02	1	0.1	1	0.1		
Beryllium					2.0E-03	5.0E-03	1	0.1	1	0.1		
Cadmium					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
Chromium(III)					1.5E+00	1.5E+00	1	0.1	1	0.1	1	0.095
Lead					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
Mercury					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
Nickel					2.0E-02	2.0E-02	1	0.2	1	0.2	1	0.38
Selenium					5.0E-03	5.0E-03	1	0.01	1	0.01		
Silver					5.0E-03	5.0E-03	1	0.3	1	0.3		
Vanadium					9.0E-03	9.0E-03	1	0.1	1	0.1		
Zinc					3.0E-01	3.0E-01	1	0.1	1	0.1	1	1.5

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

Resident - Soil: Table RS-1 (HS-10: 0-15' bgs)
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

ShortForm Version 10-12

Vlookup Version v0114

ELCR (all chemicals) = 1.4E-05
Chronic HI (all chemicals) = 1.8E+00
Subchronic HI (all chemicals) = 4.1E+00

Do not insert or delete any rows
Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	$ELCR_{ingestion}$	$ELCR_{dermal}$	Derm & Ing $ELCR_{total}$	Chronic HQ_{ing}	Chronic HQ_{derm}	Derm & Ing HQ_{total}	Subchronic HQ_{ing}	Subchronic HQ_{derm}	Derm & Ing HQ_{total}
zzDi-n-butylphthalate	3.0E-01				7.4E-06	4.4E-06	1.2E-05	2.0E-05	8.3E-06	2.9E-05
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-01	7.3E-10	7.6E-10	1.5E-09	1.7E-05	1.4E-05	3.1E-05	4.7E-05	2.7E-05	7.4E-05
zzDibenzofuran	1.4E-01				3.3E-04	5.2E-04	8.5E-04	2.3E-04	2.5E-04	4.7E-04
Acenaphthene	1.9E-01				2.3E-06	6.7E-06	9.0E-06	1.9E-06	3.8E-06	5.7E-06
Acenaphthylene	1.5E-01				3.5E-06	1.0E-05	1.4E-05	9.8E-07	1.9E-06	2.9E-06
Anthracene	4.4E-01				1.1E-06	3.0E-06	4.1E-06	8.7E-07	1.7E-06	2.6E-06
Benzo(a)anthracene	9.9E-01	8.2E-08	5.6E-08	1.4E-07	2.4E-05	1.4E-05	3.8E-05	6.6E-06	2.6E-06	9.2E-06
Benzo(a)pyrene	8.0E-01	6.6E-07	4.5E-07	1.1E-06	1.9E-05	1.1E-05	3.0E-05	5.4E-06	2.1E-06	7.4E-06
Benzo(b)fluoranthene	1.0E+00	8.3E-08	5.7E-08	1.4E-07	2.5E-05	1.4E-05	3.9E-05	6.8E-06	2.6E-06	9.4E-06
Benzo(g,h,i)perylene	3.6E-01				8.8E-06	2.5E-05	3.4E-05	2.4E-06	4.7E-06	7.2E-06
Benzo(k)fluoranthene	3.8E-01	3.1E-09	2.1E-09	5.3E-09	9.2E-06	5.2E-06	1.4E-05	2.5E-06	9.9E-07	3.5E-06
Chrysene	9.2E-01	7.6E-09	5.2E-09	1.3E-08	2.2E-05	1.3E-05	3.5E-05	6.2E-06	2.4E-06	8.6E-06
DIBENZO(a,h)ANTHRACENE	1.4E-01	1.2E-07	8.2E-08	2.0E-07	3.5E-06	2.0E-06	5.5E-06	9.6E-07	3.8E-07	1.3E-06
Fluoranthene	2.0E+00				3.6E-05	1.0E-04	1.4E-04	3.9E-05	7.7E-05	1.2E-04
Fluorene	2.1E-01				3.9E-06	1.1E-05	1.5E-05	1.1E-06	2.1E-06	3.2E-06
Indeno(1,2,3-cd)pyrene	4.2E-01	3.4E-08	2.4E-08	5.8E-08	1.0E-05	5.7E-06	1.6E-05	2.8E-06	1.1E-06	3.9E-06
METHYLNAPHTHALENE, 2-	1.7E-01				3.0E-05	8.6E-05	1.2E-04	8.3E-05	1.6E-04	2.5E-04
Naphthalene	1.5E-01				5.4E-06	1.5E-05	2.1E-05	1.5E-06	2.9E-06	4.4E-06
Phenanthrene	1.9E+00				4.6E-05	1.3E-04	1.8E-04	1.3E-05	2.5E-05	3.8E-05
Pyrene	2.2E+00				5.4E-05	1.5E-04	2.1E-04	1.5E-05	2.9E-05	4.4E-05
POLYCHLORINATED BIPHENYLS (PCBs)	1.4E+00	1.0E-06	1.1E-06	2.1E-06	1.7E-01	1.4E-01	3.1E-01	1.9E-01	1.1E-01	2.9E-01
TCDD, 2,3,7,8- (equivalents)	5.7E-05	3.2E-06	3.3E-06	6.5E-06	2.0E-01	1.7E-01	3.6E-01	5.4E-01	3.1E-01	8.5E-01
Arsenic	8.8E+00	2.5E-06	1.5E-06	4.0E-06	3.6E-02	1.8E-02	5.4E-02	9.8E-02	3.4E-02	1.3E-01
Barium	3.2E+02				3.9E-03	3.3E-03	7.2E-03	3.1E-02	1.8E-02	4.8E-02
Beryllium	3.9E-01				4.7E-04	4.0E-04	8.7E-04	5.2E-04	3.0E-04	8.2E-04
Cadmium	1.0E+00				2.5E-03	4.3E-04	2.9E-03	6.9E-03	8.0E-04	7.7E-03
CHROMIUM(III)	2.7E+01				4.3E-05	3.7E-05	8.0E-05	1.2E-04	7.0E-05	1.9E-04
Lead	5.6E+02				9.1E-01	9.2E-02	1.0E+00	2.5E+00	1.7E-01	2.7E+00
Mercury	1.2E-01				5.0E-04	8.5E-04	1.4E-03	1.4E-03	1.6E-03	3.0E-03
Nickel	9.4E+00				1.1E-03	1.9E-03	3.1E-03	3.1E-03	3.7E-03	6.8E-03
Selenium	5.7E+00				2.8E-03	2.4E-04	3.0E-03	7.6E-03	4.5E-04	8.1E-03
Silver	7.4E-01				3.6E-04	9.1E-04	1.3E-03	9.9E-04	1.7E-03	2.7E-03
Vanadium	1.8E+01				4.9E-03	4.2E-03	9.1E-03	1.4E-02	7.9E-03	2.1E-02
Zinc	1.7E+02				1.4E-03	1.2E-03	2.5E-03	3.8E-03	2.2E-03	6.0E-03

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Resident - Soil: Table RS-2
Exposure Point Concentration (EPC)
Based on Resident Ages 1-31 (Cancer), 1-8 (Chronic Noncancer), and 1-2 (Subchronic Noncancer)

Vlookup Version v0114

ELCR (all chemicals) = 6E-04
Chronic HI (all chemicals) = 9E+01
Subchronic HI (all chemicals) = 9E+01

*Vegetable uptake is informational only and NOT included in totals on EPC tab.

Do not insert or delete any rows

Click on empty cell below and select OHM using arrow.

Oil or Hazardous Material	EPC (mg/kg)	Chronic		Subchronic
		$ELCR_{vegetable*}$	$HQ_{vegetable*}$	$HQ_{vegetable*}$
zzDi-n-butylphthalate	3.0E-01			
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-01			
zzDibenzofuran	1.4E-01			
Acenaphthene	1.9E-01			
Acenaphthylene	1.5E-01			
Anthracene	4.4E-01			
Benzo(a)anthracene	9.9E-01			
Benzo(a)pyrene	8.0E-01			
Benzo(b)fluoranthene	1.0E+00			
Benzo(g,h,i)perylene	3.6E-01			
Benzo(k)fluoranthene	3.8E-01			
Chrysene	9.2E-01			
DIBENZO(a,h)ANTHRACENE	1.4E-01			
Fluoranthene	2.0E+00			
Fluorene	2.1E-01			
Indeno(1,2,3-cd)pyrene	4.2E-01			
METHYLNAPHTHALENE, 2-	1.7E-01			
Naphthalene	1.5E-01			
Phenanthrene	1.9E+00			
Pyrene	2.2E+00			
POLYCHLORINATED BIPHENYLS (PCBs)	1.4E+00	4.9E-04	4.2E+01	2.4E+01
TCDD, 2,3,7,8- (equivalents)	5.7E-05			
Arsenic	8.8E+00	1.4E-04	1.0E+00	1.5E+00
Barium	3.2E+02			
Beryllium	3.9E-01			
Cadmium	1.0E+00		2.8E+00	4.0E+00
CHROMIUM(III)	2.7E+01		1.2E-03	1.7E-03
Lead	5.6E+02		4.0E+01	5.7E+01
Mercury	1.2E-01			
Nickel	9.4E+00		1.3E-01	1.8E-01
Selenium	5.7E+00			
Silver	7.4E-01			
Vanadium	1.8E+01			
Zinc	1.7E+02		6.1E-01	8.7E-01

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Resident - Soil: Table RS-3

Equations to Calculate Cancer Risk for Resident (Age 1-31 years)

Vlookup Version v0114

Cancer Risk from Ingestion

$$ELCR_{ing} = LADD_{ing(1\text{-}31)} * CSF$$

$$LADD_{ing\ (1\text{-}31)} = LADD_{ing\ (1\text{-}8)} + LADD_{ing\ (8\text{-}15)} + LADD_{ing\ (15\text{-}31)}$$

$$LADD_{ing\ (age\ group\ x)} = \frac{[OHM]_{soil} * IR_x * RAF_{c\text{-}ing} * EF_{ing} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Dermal Absorption

$$ELCR_{derm} = LADD_{derm} * CSF$$

$$LADD_{derm\ (1\text{-}31)} = LADD_{derm\ (1\text{-}8)} + LADD_{derm\ (8\text{-}15)} + LADD_{derm\ (15\text{-}31)}$$

$$LADD_{derm(age\ group\ x)} = \frac{[OHM]_{soil} * SA_x * RAF_{c\text{-}derm} * SAF_x * EF_{derm} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Cancer Risk from Homegrown Produce

$$ELCR_{produce} = LADD_{produce(1\text{-}31)} * CSF$$

$$LADD_{produce(1\text{-}31)} = LADD_{produce(1\text{-}8)} + LADD_{produce(8\text{-}15)} + LADD_{produce(15\text{-}31)}$$

$$LADD_{produce(age\ x)} = \frac{[OHM_{soil}] * PUF * PIR_x * RAF_{produce} * EF_{produce} * ED * EP_x * C}{BW_x * AP_{lifetime}}$$

Parameter	Value	Units
CSF	OHM specific	$(mg/kg\text{-}day)^{-1}$
LADD	age/OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
$IR_{(1\text{-}8)}$	100	mg/day
$IR_{(8\text{-}15)}$	50	mg/day
$IR_{(15\text{-}31)}$	50	mg/day
$PIR_{(1\text{-}8)}$	12,099	mg/day
$PIR_{(8\text{-}15)}$	17,809	mg/day
$PIR_{(15\text{-}31)}$	24,420	mg/day
$RAF_{c\text{-}ing}$	OHM specific	dimensionless
$RAF_{c\text{-}derm}$	OHM specific	dimensionless
$RAF_{c\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
$EP_{(1\text{-}8)}$	7	years
$EP_{(8\text{-}15)}$	7	years
$EP_{(15\text{-}31)}$	16	years
C	0.000001	kg/mg
$BW_{(1\text{-}8)}$	17.0	kg
$BW_{(8\text{-}15)}$	39.9	kg
$BW_{(15\text{-}31)}$	58.7	kg
$AP_{(lifetime)}$	70	years
$SA_{(1\text{-}8)}$	2431	cm^2 / day
$SA_{(8\text{-}15)}$	4427	cm^2 / day
$SA_{(15\text{-}31)}$	5653	cm^2 / day
$SAF_{(1\text{-}8)}$	0.35	mg/cm^2
$SAF_{(8\text{-}15)}$	0.14	mg/cm^2
$SAF_{(15\text{-}31)}$	0.13	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-4
Equations to Calculate Chronic Noncancer Risk for Resident Child (Age 1-8 years)

Vlookup Version v0114

Chronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{ing,derm}}{RfD}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Chronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	12,099	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.412	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	7	years
C	0.000001	kg/mg
BW	17.0	kg
AP	7	year
SA	2431	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-5

Equations to Calculate Subchronic Noncancer Risk for Resident Child (Age 1-2 years)

Vlookup Version v0114

Subchronic Noncancer Risk from Ingestion

$$HQ_{ing} = \frac{ADD_{ing}}{RfD_{subchronic}}$$

$$ADD_{ing} = \frac{[OHM]_{soil} * IR * RAF_{nc\text{-}ing} * EF_{ing} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Dermal Absorption

$$HQ_{derm} = \frac{ADD_{derm}}{RfD_{subchronic}}$$

$$ADD_{derm} = \frac{[OHM]_{soil} * SA * RAF_{nc\text{-}derm} * SAF * EF_{derm} * ED * EP * C}{BW * AP}$$

Subchronic Noncancer Risk from Homegrown Produce

$$HQ_{produce} = \frac{ADD_{produce}}{RfD_{subchronic}}$$

$$ADD_{produce} = \frac{[OHM_{soil}] * PUF * PIR * RAF_{produce} * EF_{produce} * ED * EP * C}{BW * AP}$$

Parameter	Value	Units
RfD	OHM specific	mg/kg-day
ADD	OHM specific	mg/kg-day
$[OHM]_{soil}$	OHM specific	mg/kg
IR	100	mg/day
PIR	10,900	mg/day
$RAF_{nc\text{-}ing}$	OHM specific	dimensionless
$RAF_{nc\text{-}derm}$	OHM specific	dimensionless
$RAF_{nc\text{-}produce}$	OHM specific	dimensionless
$EF_{ing,derm}$	0.714	event/day
$EF_{produce}$	1.00	event/day
ED	1	day/event
EP	0.577	years
C	0.000001	kg/mg
BW	10.7	kg
AP	0.577	year
SA	1670	cm^2 / day
SAF	0.35	mg/cm^2
PUF	OHM specific	$(mg/mg)(mg/mg)^{-1}$

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Resident - Soil: Table RS-6
Definitions and Exposure Factors

Vlookup Version v0114

Parameter	Value	Units	Notes
ELCR - Excess Lifetime Cancer Risk	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
CSF - Cancer Slope Factor	chemical specific	$(mg/kg\text{-}day)^{-1}$	see Table RS-7
LADD - Lifetime Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
LADE - Lifetime Average Daily Exposure	chemical specific	$\mu g/m^3$	
HQ - Hazard Quotient	chemical specific	dimensionless	Pathway specific (ing =ingestion, derm=dermal, inh=inhalation)
RfD - Reference Dose	chemical specific	mg/kg-day	see Table RS-7
ADD - Average Daily Dose	chemical specific	mg/kg-day	Pathway specific
ADE - Average Daily Exposure	chemical specific	mg/m^3	
EPC - Exposure Point Concentration	chemical specific	mg/kg	
PUF - Plant Uptake Factor	chemical specific	$(mg/mg)(mg/mg)^{-1}$	See Table RS-7; $(mg_{OHM}/mg_{plant})/(mg_{OHM}/mg_{soil})^{-1}$
$IR_{(1-2)}$ - Soil Ingestion Rate for age group 1-2	100	mg/day	MADEP. 2002. Technical Update: Calculation of an Enhanced Soil Ingestion Rate. (http://www.mass.gov/dep/ors/orspubs.htm)
$IR_{(1-8)}$ - Soil Ingestion Rate for age group 1-8	100	mg/day	Ibid
$IR_{(8-15)}$ - Soil Ingestion Rate for age group 8-15	50	mg/day	Ibid
$IR_{(15-31)}$ - Soil Ingestion Rate for age group 15-31	50	mg/day	Ibid
$PIR_{(1-2)}$ = Produce Ingestion Rate for age group 1-2	10,900	mg/day	see Table RS-6
$PIR_{(1-8)}$ = Produce Ingestion Rate for age group 1-8	12,099	mg/day	see Table RS-6
$PIR_{(8-15)}$ = Produce Ingestion Rate for age group 8-15	17,809	mg/day	Ibid
$PIR_{(15-31)}$ = Produce Ingestion Rate for age group 15-31	24,420	mg/day	Ibid
RAF_c - Relative Absorption Factor for Cancer Effects	chemical specific	dimensionless	
$EF_{subchronic}$ - Exposure Frequency for subchronic ingestion or dermal exposure	0.714	event/day	5 days/week
$EF_{chronic}$ - Exposure Frequency for chronic ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
EF_{cancer} - Exposure Frequency for cancer, ingestion or dermal exposure	0.412	event/day	5 days/week, 30 weeks/year
$EF_{produce}$ - Exposure Frequency for produce ingestion, cancer and noncancer	1.00	event/day	
ED - Exposure Duration	1	day/event	
$EP_{(1-2)}$ - Exposure Period for age group 1-2	0.577	years	30 weeks
$EP_{(1-8)}$ - Exposure Period for age group 1-8	7	years	
$EP_{(8-15)}$ - Exposure Period for age group 8-15	7	years	
$EP_{(15-31)}$ - Exposure Period for age group 15-31	16	years	
$BW_{(1-2)}$ - Body Weight for age group 1-2	10.7	kg	U.S. EPA. 1997. Exposure Factors Handbook. Table 7-7, females.
$BW_{(1-8)}$ - Body Weight for age group 1-8	17.0	kg	Ibid
$BW_{(8-15)}$ - Body Weight for age group 8-15	39.9	kg	Ibid
$BW_{(15-31)}$ - Body Weight for age group 15-31	58.7	kg	Ibid
$AP_{subchronic}$ - Averaging Period for subchronic noncancer	0.577	years	30 weeks
$AP_{chronic}$ - Averaging Period for chronic noncancer	7	years	
AP_{cancer} - Averaging Period for lifetime	70	years	
$SA_{(1-2)}$ - Surface Area for age group 1-2	1670	cm^2 / day	50th percentile of face (1/3 head), forearms, hands, lower legs, and feet for females MADEP. 1995. Guidance for Disposal Site Risk Characterization. Appendix Table B-2.
$SA_{(1-8)}$ - Surface Area for age group 1-8	2431	cm^2 / day	Ibid
$SA_{(8-15)}$ - Surface Area for age group 8-15	4427	cm^2 / day	Ibid
$SA_{(15-31)}$ - Surface Area for age group 15-31	5653	cm^2 / day	Ibid
$SAF_{(1-2)}$. Surface Adherence Factor for age group 1-2	0.35	mg/cm^2	All SAFs developed for ShortForm according to procedure outlined in MA DEP Technical
$SAF_{(1-8)}$. Surface Adherence Factor for age group 1-8	0.35	mg/cm^2	Update:Weighted Skin-Soil Adherence Factors, April 2002
$SAF_{(8-15)}$ - Surface Adherence Factor for age group 8-15	0.14	mg/cm^2	
$SAF_{(15-31)}$ - Surface Adherence Factor for age group 15-31	0.13	mg/cm^2	

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Resident - Soil: Table RS-7
Homegrown Produce Ingestion Rate

Data on mean produce ingestion rates (wet weight, ww) in the Northeast was obtained from the 1994-1996 Continuing Survey of Food Intakes by Individuals (USDA). Data for both genders were used for children under 6, while data for males was used for individuals 6 and older. The mean ingestion rates presented in the survey represent the arithmetic average of all individuals surveyed, regardless of whether or not they had consumed the produce item (e.g., an individual that did not consume the produce item was assigned a rate of 0 g/day). To determine the mean ingestion rate for individuals who ate each produce item, the ingestion rate for all individuals (consumers and nonconsumers) was divided by the percentage of individuals who ate the item (Table RS-7A). These mean ingestion rates for the produce consumers were summed to determine the total produce ingestion rate for each age-group and converted to dry weight assuming the produce items were all 90% water.

To convert mean ingestion rates for the age-groups studied in the survey to age-groups used in risk calculations, each age-group ingestion rate from the survey (i.e., 1 - 2 year olds, 3 - 5 year olds, 6 - 11 year olds, 12 - 19 year olds, and 20 - 39 year olds) was weighted according to the number of years spent in the risk calculation age group (i.e., 1 - 8 year olds, 8 - 15 year olds, and 15 - 31 year olds) (Table RS-7B). It was assumed that 25% of produce ingested was home-grown (Table RS-7C).

Table RS-7

	White Potatoes			Dark-green vegetables			Deep-yellow vegetables		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	28	40.3	69.5	6	10.1	59.4	5	12.7	39.4
3-5	30	37.1	80.9	5	6.5	76.9	7	12.7	55.1
6-11	47	44.2	106.3	6	9.1	65.9	2	8.5	23.5
12-19	59	40.3	146.4	2	2.3	87.0	11	15.8	69.6
20-39	76	45.1	168.5	25	14.7	170.1	4	5.7	70.2

	Tomatoes			Lettuce			Green Beans		
Age-groups studied in survey	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)
1-2	10	27.9	35.8	1	6	16.7	7	12.1	57.9
3-5	10	37.1	27.0	4	14	28.6	3	5.7	52.6
6-11	20	42	47.6	8	14.9	53.7	1	2	50.0
12-19	29	45.2	64.2	19	28.7	66.2	2	2.4	83.3
20-39	48	50.9	94.3	18	29.6	60.8	4	3.7	108.1

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Table RS-7a (continued)

Age-groups studied in survey	Corn, Green peas, Lima beans: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Melons, berries: Ingestion Rate for All g/d (ww)	% of individuals that consumed item.	Ingestion Rate for Consumers g/d (ww)	Totals Wet Weight WWI g/day	Totals Dry Weight DWI g/day
1-2	12	15	80.0	7	9	77.8	436.4	43.6
3-5	14	21.7	64.5	14	11.6	120.7	506.3	50.6
6-11	9	13.6	66.2	5	5.9	84.7	498.0	49.8
12-19	14	9.9	141.4	17	5	340.0	998.1	99.8
20-39	12	7.3	164.4	6	4.5	133.3	969.7	97.0

Table RS-7B

Age-groups studied in survey	Years spent in age-group 1-8 year old	Years spent in age-group 8-15 year old	Years spent in age-group 15-31 year old
1-2	2		
3-5	3		
6-11	2	4	
12-19		3	4
20-39			12
	7	7	16

Table RS-7C

	Produce Intake, dry weight			
	Child 1-2 years g/day	Child 1-8 years g/day	Child 8-15 years g/day	Adult 15-31 g/day
All Produce:	43.6	48.4	71.2	97.7
Homegrown:	10.9	12.1	17.8	24.4

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Resident - Soil: Table RS-8
Chemical-Specific Data

Vlookup Version v0114

Oil or Hazardous Material	CSF $(mg/kg\text{-}day)^{-1}$	$RAF_{c\text{-}ing}$	$RAF_{c\text{-}derm}$	$RAF_{c\text{-}prod}$	Chronic RfD mg/kg-day	Subchronic RfD mg/kg-day	Chronic $RAF_{nc\text{-}ing}$	Chronic $RAF_{nc\text{-}derm}$	Subchronic $RAF_{nc\text{-}ing}$	Subchronic $RAF_{nc\text{-}derm}$	$RAF_{nc\text{-}prod}$	PUF
zzDi-n-butylphthalate					1.0E-01	1.0E-01	1	0.07	1	0.07		
BIS(2-ETHYLHEXYL)PH	1.4E-02	1.00	0.10		2.0E-02	2.0E-02	1	0.1	1	0.1		
zzDibenzofuran					1.0E-03	4.0E-03	0.96	0.18	0.96	0.18		
Acenaphthene					6.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Acenaphthylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Anthracene					3.0E-01	1.0E+00	0.3	0.1	0.3	0.1		
Benzo(a)anthracene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(a)pyrene	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(b)fluoranthene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Benzo(g,h,i)perylene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Benzo(k)fluoranthene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Chrysene	7.3E-02	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
DIBENZO(a,h)ANTHRAC	7.3E+00	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
Fluoranthene					4.0E-02	1.0E-01	0.3	0.1	0.3	0.1		
Fluorene					4.0E-02	4.0E-01	0.3	0.1	0.3	0.1		
Indeno(1,2,3-cd)pyrene	7.3E-01	0.30	0.02		3.0E-02	3.0E-01	0.3	0.02	0.3	0.02		
METHYLNAPHTHALENE					4.0E-03	4.0E-03	0.3	0.1	0.3	0.1		
Naphthalene					2.0E-02	2.0E-01	0.3	0.1	0.3	0.1		
Phenanthrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
Pyrene					3.0E-02	3.0E-01	0.3	0.1	0.3	0.1		
POLYCHLORINATED BI	2.0E+00	1.00	0.10	1.00	2.0E-05	5.0E-05	1	0.1	1	0.1	1	0.84
TCDD, 2,3,7,8- (equivale	1.5E+05	1.00	0.10		7.0E-10	7.0E-10	1	0.1	1	0.1		
Arsenic	1.5E+00	0.50	0.03	1.00	3.0E-04	3.0E-04	0.5	0.03	0.5	0.03	1	0.05
Barium					2.0E-01	7.0E-02	1	0.1	1	0.1		
Beryllium					2.0E-03	5.0E-03	1	0.1	1	0.1		
Cadmium					5.0E-04	5.0E-04	0.5	0.01	0.5	0.01	1	1.9
CHROMIUM(III)					1.5E+00	1.5E+00	1	0.1	1	0.1	1	0.095
Lead					7.5E-04	7.5E-04	0.5	0.006	0.5	0.006	0.5	0.15
Mercury					3.0E-04	3.0E-04	0.5	0.1	0.5	0.1		
Nickel					2.0E-02	2.0E-02	1	0.2	1	0.2	1	0.38
Selenium					5.0E-03	5.0E-03	1	0.01	1	0.01		
Silver					5.0E-03	5.0E-03	1	0.3	1	0.3		
Vanadium					9.0E-03	9.0E-03	1	0.1	1	0.1		
Zinc					3.0E-01	3.0E-01	1	0.1	1	0.1	1	1.5

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Resident - Soil: Table RS-9
Cyanide Calculations

The acute concentration of *available* cyanide in soil is the level *below which* adverse human health effects would not be expected following an acute exposure. The concentration is based on a potential one-time ingestion of 1000 mg of contaminated soil by child residents.

The residential soil concentration limit to protect against adverse effects from an acute (one-time) exposure to cyanide is 100 mg/kg.

Concentration Calculation for Cyanide

$$\text{Concentration} = \frac{\text{HQ x Acute Dose Limit x BW}}{\text{IR x RAF x Conversion Factor}}$$

Parameter	Value	Units
HQ (Hazard Quotient)	1	(unitless)
Acute Dose Limit	0.01	mg CN/ kg BW
BW (Body Weight) 1-2	10.7	kg
IR (1-time reasonable max)	1000	mg
Conversion Factor	1.0E-06	kg soil / mg soil
RAF	1	(unitless)

The toxicological basis for estimating an allowable one-time dose is documented in MassDEP's 1992 *Background Documentation for the Development of an "Available Cyanide" Benchmark Concentration,* which is published at: http://www.mass.gov/eea/docs/dep/toxics/stypes/dscyanide.pdf

APPENDIX C-9

RISK AND HAZARD CALCULATIONS FOR GROUNDWATER

Table 1
Future Construction/Utility Worker
Dermal Contact with Groundwater - Site-wide
New Bedford High School
New Bedford, Massachusetts

	Constituent	Ground Water Concentration (mg/l)	Kp cm/hr	RAF Dermal Cancer (--)	LADD Cancer (mg/kg-d)	RAF Dermal Noncancer (--)	ADD Noncancer (mg/kg-d)	Toxicity Values: Cancer Slope Factor (mg/kg-d)-1	Toxicity Values: Subchronic Non-Cancer Reference Dose (mg/kg-d)	Risk Estimates: Cancer Risk (--)	Risk Estimates: Non-Cancer Hazard Quotient (--)
VOCs											
75-01-4	Vinyl chloride	3.9E-03	5.6E-03	1.00	2.7E-08	1.00	3.7E-06	1.4E+00	3.0E-03	4.E-08	1.2E-03
75-15-0	Carbon disulfide	1.3E-03	1.1E-02	NC	NA	1.00	2.5E-06	NA	1.0E-01	NA	2.5E-05
156-59-2	cis-1,2-Dichloroethylene	3.1E-02	7.7E-03	NC	NA	1.00	4.1E-05	NA	2.0E-02	NA	2.0E-03
79-01-6	Trichloroethylene	6.4E-03	1.2E-02	1.00	9.0E-08	1.00	1.3E-05	5.0E-02	5.0E-04	5.E-09	2.5E-02
127-18-4	Tetrachloroethylene	4.8E-02	3.3E-02	1.00	1.9E-06	1.00	2.7E-04	2.0E-02	6.0E-03	4.E-08	4.5E-02
C9-C10	p-Isopropyltoluene	3.6E-03	1.3E-01	NC	NA	1.00	8.2E-05	NA	3.0E-01	NA	2.7E-04
PAHs											
85-01-8	Phenanthrene	1.8E-04	1.4E-01	NC	NA	1.00	4.3E-06	NA	3.0E-01	NA	1.4E-05
PCBs											
1336-36-3	Total PCBs	1.1E-04	6.3E-01	1.00	8.4E-08	1.00	1.2E-05	2.0E+00	5.0E-05	2.E-07	2.4E-01
Metals											
7440-38-2	Arsenic	1.5E-02	1.0E-03	1.00	1.8E-08	1.00	2.6E-06	1.5E+00	3.0E-04	3.E-08	8.6E-03
7440-39-3	Barium	5.6E+00	1.0E-03	NC	NA	1.00	9.7E-04	NA	7.0E-02	NA	1.4E-02
18540-29-9	Chromium	5.2E-02	2.0E-03	NC	NA	1.00	1.8E-05	NA	2.0E-02	NA	8.9E-04
7439-92-1	Lead	1.9E-02	1.0E-04	NC	NA	1.00	3.3E-07	NA	7.5E-04	NA	4.4E-04
7440-02-0	Nickel	2.9E-02	2.0E-04	NC	NA	1.00	1.0E-06	NA	2.0E-02	NA	5.0E-05
7440-22-4	Silver	5.0E-03	6.0E-04	NC	NA	1.00	5.1E-07	NA	5.0E-03	NA	1.0E-04
7440-28-0	Thallium	1.3E-03	1.0E-03	NC	NA	1.00	2.2E-07	NA	4.0E-05	NA	5.5E-03
7440-66-6	Zinc	8.9E-01	6.0E-04	NC	NA	1.00	9.2E-05	NA	3.0E-01	NA	3.1E-04

NA = Not Applicable
NC = No Criteria

LADD = Lifetime Average Daily Dose
RAF = Relative Absorption Coefficient
ADD = Average Daily Dose

	Cancer Risk	Hazard Index
TOTAL:	2.8.E-07	3.4E-01

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+00

Where:
LADD = (EPC x SA x Kp x RAF x ED x EF x EP x UC)/(BW x APcancer)
ADD = (EPC x SA x Kp x RAF x ED x EF x EP x UC)/(BW x APnoncancer)

Constituent Specific (CS)

Exposure Point Concentration (EPC):	CS	mg/l
Skin surface area (SA):	3477	cm2 [1]
Permeability constant (Kp):	CS	cm/h
Exposure Duration (ED):	8	hours/event [2]
Exposure Frequency (EF):	0.36	events/d [2]
Exposure Period (EP):	182	days [1]
Units Conversion (UC):	0.001	l/cm3
Body Weight (BW):	58	kg [1]
Averaging Period (APcancer):	25550	days [1]
Averaging Period (APnoncancer):	182	days [1]

[1] MADEP, 2014
[2] Best Professional Judgement

Table 2
Construction/Utility Worker
Inhalation of Trench Air Exposure Pathway - Site-wide Shallow Groundwater
New Bedford High School
New Bedford, Massachusetts

		EPC	Estimated Dose		Toxicity Values		Risk Estimates	
	Constituent	Trench Air Concentration µg/m3	ADEcancer (Cancer) µg/m3	ADEnon-cancer (Non-cancer) µg/m3	Unit Risk µg/m3	Subchronic Noncancer Reference Concentration µg/m3	Cancer Risk (--)	Hazard Quotient (--)
VOCs								
156-59-2	cis-1,2-Dichloroethene	1.38E+00	1.2E-03	1.7E-01	NA	6.0E+01	NA	3.E-03
75-15-0	Carbon disulfide	6.37E-02	5.4E-05	7.6E-03	NA	7.0E+02	NA	1.E-05
127-18-4	Tetrachloroethene	1.64E+00	1.4E-03	2.0E-01	3.0E-06	4.0E+01	4.E-09	5.E-03
79-01-6	Trichloroethene	2.45E-01	2.1E-04	2.9E-02	4.0E-06	2.0E+00	8.E-10	1.E-02
75-01-4	Vinyl chloride	2.19E-01	1.9E-04	2.6E-02	8.8E-06	1.0E+02	2.E-09	3.E-04
C9-C10	C9-C10 Aromatics	1.44E-02	1.2E-05	1.7E-03	NA	5.0E+02	NA	3.E-06

	Cancer Risk	Hazard Index
TOTAL:	6.7E-09	2.3E-02

Bold = Cancer Risk >1.0E-05 or Hazard Quotient > 1.0E+01

Where:

LADEcancer = IAC x EFx ED x EP/APcance
ADEnon-cancer = IAC x EF x ED x EP / APnon-cance
Cancer Risk = LADEcancer x UR
Hazard Quotient = ADEnon-cancer / Inhalation Reference Concentration

LADE = Life Time Average Daily Exposure
ADE = Average Daily Exposure
EPC = Exposure Point Concentration
$\mu g/m^3$ = micrograms per cubic meter

And where:

Exposure Frequency (EF) =	130	days/year (5 days a week for 26 weeks of exposure
Exposure Duration (ED) =	8	hrs/day [1]
Exposure Period (EP) =	0.5	yr [1]
Unit Conversion (UC) =	0.042	days/hr
Averaging Period (APcancer) =	25550	days [1]
Averaging Period (APnon-cancer) =	182	days [1]

[1] MADEP, 2014

APPENDIX C-10

RISK SUMMARY TABLES

Table C-10.1
Summary of Receptor Risks and Hazards - 0-1' Soil Interval
New Bedford High School
New Bedford, Massachusetts

Exposure Point	Scenario/ Receptor	Exposure Media	Exposure Pathway	ELCR	HI	Major contributors to risk/hazard
HS-1	Older Child/Teenage Student	0-1' Soil	Ingestion	2E-07	3E-02	N/A
			Dermal	3E-07	3E-02	
			Inhalation	1E-09	1E-04	
			Total	4E-07	6E-02	
	Day Care Child	0-1' Soil	Ingestion	3E-07	1E-01	N/A
			Dermal	2E-07	1E-01	
			Inhalation	3E-10	2E-04	
			Total	5E-07	3E-01	
	Adult Staff	0-1' Soil	Ingestion	4E-07	1E-02	N/A
			Dermal	8E-08	2E-03	
			Inhalation	1E-08	3E-04	
			Total	5E-07	1E-02	
HS-2	Older Child/Teenage Student	0-1' Soil	Ingestion	2E-07	8E-02	N/A
			Dermal	4E-07	6E-02	
			Inhalation	4E-09	1E-03	
			Total	6E-07	1E-01	
	Day Care Child	0-1' Soil	Ingestion	4E-07	5E-01	N/A
			Dermal	3E-07	2E-01	
			Inhalation	1E-09	2E-03	
			Total	7E-07	7E-01	
	Adult Staff	0-1' Soil	Ingestion	6E-07	4E-02	N/A
			Dermal	1E-07	5E-03	
			Inhalation	2E-08	3E-03	
			Total	7E-07	4E-02	
HS-3	Older Child/Teenage Student	0-1' Soil	Ingestion	2E-07	6E-02	N/A
			Dermal	3E-07	4E-02	
			Inhalation	1E-09	6E-04	
			Total	5E-07	1E-01	
	Day Care Child	0-1' Soil	Ingestion	3E-07	4E-01	N/A
			Dermal	3E-07	2E-01	
			Inhalation	4E-10	9E-04	
			Total	6E-07	5E-01	
	Adult Staff	0-1' Soil	Ingestion	5E-07	3E-02	N/A
			Dermal	9E-08	3E-03	
			Inhalation	1E-08	1E-03	
			Total	6E-07	3E-02	
HS-4	Older Child/Teenage Student	0-1' Soil	Ingestion	2E-07	6E-02	N/A
			Dermal	3E-07	4E-02	
			Inhalation	1E-09	5E-04	
			Total	5E-07	1E-01	
	Day Care Child	0-1' Soil	Ingestion	3E-07	3E-01	N/A
			Dermal	3E-07	1E-01	
			Inhalation	4E-10	7E-04	
			Total	6E-07	5E-01	
	Adult Staff	0-1' Soil	Ingestion	4E-07	2E-02	N/A
			Dermal	9E-08	3E-03	
			Inhalation	1E-08	8E-04	
			Total	5E-07	3E-02	
HS-6	Older Child/Teenage Student	0-1' Soil	Ingestion	2E-07	6E-02	N/A
			Dermal	3E-07	4E-02	
			Inhalation	1E-09	6E-04	
			Total	5E-07	1E-01	
	Day Care Child	0-1' Soil	Ingestion	3E-07	3E-01	N/A
			Dermal	3E-07	2E-01	
			Inhalation	4E-10	9E-04	
			Total	6E-07	5E-01	
	Adult Staff	0-1' Soil	Ingestion	5E-07	3E-02	N/A
			Dermal	1E-07	3E-03	
			Inhalation	1E-08	1E-03	
			Total	6E-07	3E-02	
HS-7	Older Child/Teenage Student	0-1' Soil	Ingestion	2E-07	1E-01	N/A
			Dermal	3E-07	5E-02	
			Inhalation	2E-09	1E-03	
			Total	5E-07	1E-01	
	Day Care Child	0-1' Soil	Ingestion	3E-07	5E-01	N/A
			Dermal	3E-07	2E-01	
			Inhalation	5E-10	2E-03	
			Total	6E-07	7E-01	
	Adult Staff	0-1' Soil	Ingestion	5E-07	4E-02	N/A
			Dermal	1E-07	4E-03	
			Inhalation	1E-08	2E-03	
			Total	6E-07	5E-02	

Table C-10.1
Summary of Receptor Risks and Hazards - 0-1' Soil Interval
New Bedford High School
New Bedford, Massachusetts

Exposure Point	Scenario/ Receptor	Exposure Media	Exposure Pathway	ELCR	HI	Major contributors to risk/hazard
HS-8	Adult Solar Worker	0-1' Soil	Ingestion	2E-07	2E-02	N/A
			Dermal	5E-08	2E-03	
			Inhalation	6E-09	1E-03	
			Total	3E-07	2E-02	
HS-10	Older Child/Teenage Student	0-1' Soil	Ingestion	2E-07	1E-01	N/A
			Dermal	4E-07	6E-02	
			Inhalation	2E-09	1E-03	
			Total	6E-07	2E-01	
	Day Care Child	0-1' Soil	Ingestion	4E-07	6E-01	N/A
			Dermal	3E-07	2E-01	
			Inhalation	6E-10	2E-03	
			Total	7E-07	8E-01	
	Adult Staff	0-1' Soil	Ingestion	6E-07	5E-02	N/A
			Dermal	1E-07	5E-03	
			Inhalation	2E-08	4E-03	
			Total	7E-07	6E-02	

Notes
Bolded values exceed a cancer risk of 1E-05 or a target organ HI of 1.
HI - Hazard Index
ELCR - Excess Lifetime Cancer Risk
(C) - Carcinogenic Risk
(NC) - Noncarcinogenic Risk
N/A - Not Applicable

Table C-10.2
Summary of Receptor Risks and Hazards - 0-3' Soil Interval
New Bedford High School
New Bedford, Massachusetts

Exposure Point	Scenario/ Receptor	Exposure Media	Exposure Pathway	ELCR	HI	Major contributors to risk/hazard
HS-1	Older Child/Teenage Student	0-3' Soil	Ingestion	2E-07	3E-02	N/A
			Dermal	3E-07	4E-02	
			Inhalation	1E-09	2E-04	
			Total	5E-07	7E-02	
	Day Care Child	0-3' Soil	Ingestion	4E-07	2E-01	N/A
			Dermal	3E-07	1E-01	
			Inhalation	4E-10	2E-04	
			Total	7E-07	3E-01	
	Adult Staff	0-3' Soil	Ingestion	5E-07	1E-02	N/A
			Dermal	1E-07	3E-03	
			Inhalation	1E-08	4E-04	
			Total	6E-07	1E-02	
HS-2	Older Child/Teenage Student	0-3' Soil	Ingestion	4E-07	1E-01	N/A
			Dermal	5E-07	7E-02	
			Inhalation	4E-09	2E-03	
			Total	9E-07	2E-01	
	Day Care Child	0-3' Soil	Ingestion	6E-07	6E-01	N/A
			Dermal	5E-07	2E-01	
			Inhalation	1E-09	2E-03	
			Total	1E-06	9E-01	
	Adult Staff	0-3' Soil	Ingestion	9E-07	5E-02	N/A
			Dermal	2E-07	5E-03	
			Inhalation	3E-08	3E-03	
			Total	1E-06	6E-02	
HS-3	Older Child/Teenage Student	0-3' Soil	Ingestion	4E-07	2E-01	N/A
			Dermal	5E-07	7E-02	
			Inhalation	3E-09	2E-03	
			Total	9E-07	2E-01	
	Day Care Child	0-3' Soil	Ingestion	6E-07	9E-01	N/A
			Dermal	5E-07	2E-01	
			Inhalation	1E-09	3E-03	
			Total	1E-06	1E+00	
	Adult Staff	0-3' Soil	Ingestion	9E-07	6E-02	N/A
			Dermal	2E-07	5E-03	
			Inhalation	3E-08	3E-03	
			Total	1E-06	7E-02	
HS-4	Older Child/Teenage Student	0-3' Soil	Ingestion	4E-07	1E-01	N/A
			Dermal	5E-07	8E-02	
			Inhalation	3E-09	1E-03	
			Total	9E-07	2E-01	
	Day Care Child	0-3' Soil	Ingestion	7E-07	7E-01	N/A
			Dermal	5E-07	3E-01	
			Inhalation	1E-09	2E-03	
			Total	1E-06	1E+00	
	Adult Staff	0-3' Soil	Ingestion	9E-07	6E-02	N/A
			Dermal	2E-07	6E-03	
			Inhalation	3E-08	3E-03	
			Total	1E-06	6E-02	
HS-6	Older Child/Teenage Student	0-3' Soil	Ingestion	7E-07	2E-01	N/A
			Dermal	1E-06	1E-01	
			Inhalation	4E-09	2E-02	
			Total	2E-06	3E-01	
	Day Care Child	0-3' Soil	Ingestion	1E-06	1E+00	N/A
			Dermal	1E-06	5E-01	
			Inhalation	1E-09	3E-02	
			Total	2E-06	2E+00	
	Adult Staff	0-3' Soil	Ingestion	2E-06	1E-01	N/A
			Dermal	3E-07	2E-02	
			Inhalation	4E-08	5E-02	
			Total	2E-06	2E-01	
HS-7	Older Child/Teenage Student	0-3' Soil	Ingestion	2E-07	1E-01	N/A
			Dermal	4E-07	6E-02	
			Inhalation	2E-09	2E-03	
			Total	6E-07	2E-01	
	Day Care Child	0-3' Soil	Ingestion	4E-07	6E-01	N/A
			Dermal	3E-07	2E-01	
			Inhalation	7E-10	2E-03	
			Total	7E-07	8E-01	
	Adult Staff	0-3' Soil	Ingestion	6E-07	4E-02	N/A
			Dermal	1E-07	4E-03	
			Inhalation	2E-08	3E-03	
			Total	7E-07	5E-02	
HS-8	Adult Solar Worker	0-3' Soil	Ingestion	7E-06	2E-01	N/A
			Dermal	1E-06	2E-02	
			Inhalation	2E-07	1E-02	
			Total	8E-06	2E-01	

Table C-10.2
Summary of Receptor Risks and Hazards - 0-3' Soil Interval
New Bedford High School
New Bedford, Massachusetts

Exposure Point	Scenario/ Receptor	Exposure Media	Exposure Pathway	ELCR	HI	Major contributors to risk/hazard
HS-10	Older Child/Teenage Student	0-3' Soil	Ingestion	8E-07	3E-01	N/A
			Dermal	9E-07	1E-01	
			Inhalation	1E-08	5E-03	
			Total	2E-06	4E-01	
	Day Care Child	0-3' Soil	Ingestion	1E-06	2E+00	N/A
			Dermal	9E-07	4E-01	
			Inhalation	4E-09	6E-03	
			Total	2E-06	2E+00	
	Adult Staff	0-3' Soil	Ingestion	2E-06	1E-01	N/A
			Dermal	3E-07	1E-02	
			Inhalation	7E-08	8E-03	
			Total	2E-06	1E-01	

Notes
Bolded values exceed a cancer risk of 1E-05 or a target organ HI of 1.
HI - Hazard Index
ELCR - Excess Lifetime Cancer Risk

(C) - Carcinogenic Risk
(NC) - Noncarcinogenic Risk
N/A - Not Applicable

Table C-10.3
Summary of Receptor Risks and Hazards
New Bedford High School - 0-6' Soil and Shallow Groundwater Scenarios
New Bedford, Massachusetts

Exposure Point	Scenario/ Receptor	Exposure Media	Exposure Pathway	ELCR	HI	Major contributors to risk/hazard
HS-1	Utility Worker (6-Month)	0-15' Soil	Ingestion	7E-08	1E-01	N/A
			Dermal	8E-08	1E-01	
			Inhalation	2E-09	4E-03	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	4E-07	6E-01	
HS-2	Utility Worker (6-Month)	0-15' Soil	Ingestion	1E-07	6E-01	N/A
			Dermal	1E-07	2E-01	
			Inhalation	8E-09	5E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	5E-07	1E+00	
HS-3	Utility Worker (6-Month)	0-15' Soil	Ingestion	1E-07	1E+00	N/A
			Dermal	9E-08	2E-01	
			Inhalation	5E-09	8E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	5E-07	2E+00	
HS-4	Utility Worker (6-Month)	0-15' Soil	Ingestion	2E-07	5E-01	N/A
			Dermal	2E-07	2E-01	
			Inhalation	1E-08	5E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	7E-07	1E+00	
HS-5	Utility Worker (3-Day)	0-15' Soil	Ingestion	4E-07	1E+00	N/A
			Dermal	3E-07	3E-01	
			Inhalation	3E-08	9E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	1E-06	2E+00	
HS-6	Utility Worker (6-Month)	0-3' Soil	Ingestion	2E-07	3E-01	N/A
			Dermal	2E-07	2E-01	
			Inhalation	7E-09	4E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	6E-07	1E+00	
HS-7	Utility Worker (6-Month)	0-15' Soil	Ingestion	8E-08	4E-01	N/A
			Dermal	8E-08	1E-01	
			Inhalation	3E-09	3E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	4E-07	9E-01	
HS-8	Utility Worker (3-Day)	0-15' Soil	Ingestion	7E-07	1E+00	N/A
			Dermal	5E-07	4E-01	
			Inhalation	4E-08	1E-01	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	1E-06	2E+00	
HS-9	Utility Worker (2-Day)	0-15' Soil	Ingestion	2E-07	1E+00	N/A
			Dermal	1E-07	5E-01	
			Inhalation	2E-08	1E-01	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	6E-07	2E+00	
HS-10	Utility Worker (6-Month)	0-15' Soil	Ingestion	2E-07	4E-01	N/A
			Dermal	1E-07	2E-01	
			Inhalation	1E-08	5E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	6E-07	1E+00	

Bolded values exceed a cancer risk of 1E-05 or a target organ HI of 1.
HI - Hazard Index
ELCR - Excess Lifetime Cancer Risk

(C) - Carcinogenic Risk
(NC) - Noncarcinogenic Risk
N/A - Not Applicable

Table C-10.4
Summary of Receptor Risks and Hazards
New Bedford High School - 0-15' Soil and Shallow Groundwater Scenarios
New Bedford, Massachusetts

Exposure Point	Scenario/ Receptor	Exposure Media	Exposure Pathway	ELCR	HI	Major contributors to risk/hazard
HS-1	Older Child/Teenage Student	0-15' Soil	Ingestion	5E-07	7E-02	N/A
			Dermal	7E-07	9E-02	
			Inhalation	3E-09	4E-04	
			Total	1E-06	2E-01	
	Day Care Child	0-15' Soil	Ingestion	8E-07	4E-01	N/A
			Dermal	7E-07	3E-01	
			Inhalation	9E-10	5E-04	
			Total	1E-06	7E-01	
	Adult Staff	0-15' Soil	Ingestion	1E-06	3E-02	N/A
			Dermal	2E-07	6E-03	
			Inhalation	3E-08	8E-04	
			Total	1E-06	3E-02	
	Park Visitor	0-15' Soil	Ingestion	2E-06	3E-01	N/A
			Dermal	2E-06	2E-01	
			Total	4E-06	5E-01	
	Resident	0-15' Soil	Ingestion	3E-06	5E-01	N/A
			Dermal	3E-06	3E-01	
			Produce	2E-06	2E-01	
			Total	9E-06	1E+00	
	Construction Worker	0-15' Soil	Ingestion	7E-08	1E-01	N/A
			Dermal	8E-08	1E-01	
			Inhalation	2E-09	4E-03	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	4E-07	6E-01	
HS-2	Older Child/Teenage Student	0-15' Soil	Ingestion	8E-07	4E-01	N/A
			Dermal	1E-06	2E-01	
			Inhalation	1E-08	5E-03	
			Total	2E-06	6E-01	
	Day Care Child	0-15' Soil	Ingestion	1E-06	2E+00	(NC) lead
			Dermal	9E-07	6E-01	
			Inhalation	3E-09	7E-03	
			Total	2E-06	**3E+00**	
	Adult Staff	0-15' Soil	Ingestion	2E-06	2E-01	N/A
			Dermal	3E-07	1E-02	
			Inhalation	7E-08	8E-03	
			Total	2E-06	2E-01	
	Park Visitor	0-15' Soil	Ingestion	3E-06	2E+00	(NC) lead
			Dermal	3E-06	3E-01	
			Total	6E-06	**2E+00**	
	Resident	0-15' Soil	Ingestion	5E-06	3E+00	(NC) lead
			Dermal	5E-06	6E-01	Produce: PCBs, arsenic, cadmium, lead
			Produce	2E-04	7E+01	
			Total	**2E-04**	**7E+01**	
	Construction Worker	0-15' Soil	Ingestion	1E-07	6E-01	N/A
			Dermal	1E-07	2E-01	
			Inhalation	8E-09	5E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	5E-07	1E+00	
HS-3	Older Child/Teenage Student	0-15' Soil	Ingestion	6E-07	7E-01	N/A
			Dermal	9E-07	2E-01	
			Inhalation	6E-09	7E-03	
			Total	1E-06	9E-01	
	Day Care Child	0-15' Soil	Ingestion	1E-06	4E+00	(NC) lead
			Dermal	8E-07	7E-01	
			Inhalation	2E-09	1E-02	
			Total	2E-06	**5E+00**	
	Adult Staff	0-15' Soil	Ingestion	1E-06	3E-01	N/A
			Dermal	3E-07	1E-02	
			Inhalation	5E-08	1E-02	
			Total	2E-06	3E-01	
	Park Visitor	0-15' Soil	Ingestion	3E-06	3E+00	(NC) lead
			Dermal	2E-06	4E-01	
			Total	5E-06	**4E+00**	
	Resident	0-15' Soil	Ingestion	4E-06	5E+00	(NC) lead
			Dermal	4E-06	7E-01	Produce: PCBs, lead
			Produce	6E-05	1E+02	
			Total	7E-05	**1E+02**	
	Construction Worker	0-15' Soil	Ingestion	1E-07	1E+00	N/A
			Dermal	9E-08	2E-01	
			Inhalation	5E-09	7E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	5E-07	2E+00	

Table C-10.4
Summary of Receptor Risks and Hazards
New Bedford High School - 0-15' Soil and Shallow Groundwater Scenarios
New Bedford, Massachusetts

Exposure Point	Scenario/ Receptor	Exposure Media	Exposure Pathway	ELCR	HI	Major contributors to risk/hazard
HS-4	Older Child/Teenage Student	0-15' Soil	Ingestion	1E-06	4E-01	N/A
			Dermal	2E-06	2E-01	
			Inhalation	2E-08	6E-03	
			Total	3E-06	6E-01	
	Day Care Child	0-15' Soil	Ingestion	2E-06	2E+00	(NC) lead
			Dermal	1E-06	8E-01	
			Inhalation	6E-09	9E-03	
			Total	3E-06	**3E+00**	
	Adult Staff	0-15' Soil	Ingestion	3E-06	2E-01	N/A
			Dermal	5E-07	2E-02	
			Inhalation	1E-07	1E-02	
			Total	4E-06	2E-01	
	Park Visitor	0-15' Soil	Ingestion	5E-06	2E+00	(NC) lead
			Dermal	4E-06	5E-01	
			Total	9E-06	**2E+00**	
	Resident	0-15' Soil	Ingestion	8E-06	3E+00	(NC) lead; (C) dioxin/PCB TEQ Produce: PCBs, arsenic, cadmium, lead
			Dermal	7E-06	8E-01	
			Produce	8E-04	9E+01	
			Total	8E-04	**9E+01**	
	Construction Worker	0-15' Soil	Ingestion	2E-07	5E-01	N/A
			Dermal	2E-07	2E-01	
			Inhalation	2E-08	6E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	7E-07	1E+00	
HS-5	Older Child/Teenage Student	0-15' Soil	Ingestion	4E-06	1E+00	(NC) lead
			Dermal	5E-06	4E-01	
			Inhalation	5E-08	2E-02	
			Total	1E-05	**2E+00**	
	Day Care Child	0-15' Soil	Ingestion	7E-06	7E+00	(NC) PCBs, dioxin/PCB TEQ, lead
			Dermal	5E-06	1E+00	
			Inhalation	2E-08	2E-02	
			Total	1E-05	**8E+00**	
	Adult Staff	0-15' Soil	Ingestion	1E-05	5E-01	N/A
			Dermal	2E-06	3E-02	
			Inhalation	4E-07	2E-02	
			Total	1E-05	6E-01	
	Park Visitor	0-15' Soil	Ingestion	2E-05	6E+00	(NC) PCBs, dioxin/PCB TEQ, lead (C) carcinogenic PAHs, PCBs, dioxin/PCB TEQ
			Dermal	1E-05	8E-01	
			Total	3E-05	**6E+00**	
	Resident	0-15' Soil	Ingestion	3E-05	9E+00	(NC) PCBs, dioxin/PCB TEQ, lead (C) carcinogenic PAHs, PCBs, dioxin/PCB TEQ Produce: PCBs, arsenic, cadmium, lead
			Dermal	2E-05	1E+00	
			Produce	2E-03	3E+02	
			Total	**2E-03**	**3E+02**	
	Construction Worker	0-15' Soil	Ingestion	7E-07	2E+00	(NC) lead
			Dermal	5E-07	4E-01	
			Inhalation	4E-08	2E-01	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	2E-06	**3E+00**	
HS-6	Older Child/Teenage Student	0-15' Soil	Ingestion	1E-06	2E-01	N/A
			Dermal	1E-06	2E-01	
			Inhalation	8E-09	4E-03	
			Total	2E-06	4E-01	
	Day Care Child	0-15' Soil	Ingestion	2E-06	1E+00	(NC) PCBs, dioxin/PCB TEQ
			Dermal	1E-06	7E-01	
			Inhalation	2E-09	6E-03	
			Total	3E-06	**2E+00**	
	Adult Staff	0-15' Soil	Ingestion	2E-06	1E-01	N/A
			Dermal	5E-07	2E-02	
			Inhalation	7E-08	1E-02	
			Total	3E-06	2E-01	
	Park Visitor	0-15' Soil	Ingestion	4E-06	1E+00	N/A
			Dermal	4E-06	4E-01	
			Total	8E-06	1E+00	
	Resident	0-15' Soil	Ingestion	7E-06	2E+00	(NC) PCBs, dioxin/PCB TEQ Produce: PCBs, cadmium, lead
			Dermal	7E-06	7E-01	
			Produce	1E-03	1E+02	
			Total	1E-03	**1E+02**	
	Construction Worker	0-15' Soil	Ingestion	2E-07	3E-01	N/A
			Dermal	2E-07	2E-01	
			Inhalation	7E-09	4E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	6E-07	1E+00	

Table C-10.4
Summary of Receptor Risks and Hazards
New Bedford High School - 0-15' Soil and Shallow Groundwater Scenarios
New Bedford, Massachusetts

Exposure Point	Scenario/ Receptor	Exposure Media	Exposure Pathway	ELCR	HI	Major contributors to risk/hazard
HS-7	Older Child/Teenage Student	0-15' Soil	Ingestion	5E-07	3E-01	N/A
			Dermal	7E-07	1E-01	
			Inhalation	6E-09	3E-03	
			Total	1E-06	4E-01	
	Day Care Child	0-15' Soil	Ingestion	8E-07	1E+00	(NC) lead
			Dermal	7E-07	5E-01	
			Inhalation	2E-09	4E-03	
			Total	2E-06	**2E+00**	
	Adult Staff	0-15' Soil	Ingestion	1E-06	1E-01	N/A
			Dermal	2E-07	8E-03	
			Inhalation	4E-08	5E-03	
			Total	1E-06	1E-01	
	Park Visitor	0-15' Soil	Ingestion	2E-06	1E+00	N/A
			Dermal	2E-06	3E-01	
			Total	4E-06	1E+00	
	Resident	0-15' Soil	Ingestion	3E-06	2E+00	(NC) lead
			Dermal	3E-06	4E-01	Produce: PCBs, cadmium, lead
			Produce	8E-05	4E+01	
			Total	8E-05	**4E+01**	
	Construction Worker	0-15' Soil	Ingestion	8E-08	4E-01	N/A
			Dermal	8E-08	1E-01	
			Inhalation	5E-09	3E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	4E-07	9E-01	
HS-8	Adult Solar Worker	0-15' Soil	Ingestion	6E-06	2E-01	N/A
			Dermal	1E-06	2E-02	
			Inhalation	2E-07	1E-02	
			Total	8E-06	2E-01	
	Park Visitor	0-15' Soil	Ingestion	3E-05	6E+00	(NC) PCBs, dioxin/PCB TEQ, lead
			Dermal	2E-05	1E+00	(C) carcinogenic PAHs, PCBs,
			Total	5E-05	**7E+00**	dioxin/PCB TEQ
	Resident	0-15' Soil	Ingestion	5E-05	1E+01	(NC) PCBs, dioxin/PCB TEQ, lead
			Dermal	4E-05	2E+00	(C) carcinogenic PAHs, PCBs,
			Produce	1E-03	3E+02	dioxin/PCB TEQ Produce: PCBs,
			Total	**2E-03**	**3E+02**	cadmium, lead
	Construction Worker	0-15' Soil	Ingestion	1E-06	2E+00	(NC) lead
			Dermal	8E-07	6E-01	
			Inhalation	6E-08	2E-01	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	2E-06	**3E+00**	
HS-9	Older Child/Teenage Student	0-15' Soil	Ingestion	2E-06	2E+00	(NC) lead
			Dermal	3E-06	1E+00	
			Inhalation	4E-08	2E-02	
			Total	5E-06	**3E+00**	
	Day Care Child	0-15' Soil	Ingestion	4E-06	1E+01	(NC) lead, antimony
			Dermal	3E-06	4E+00	
			Inhalation	1E-08	3E-02	
			Total	7E-06	**1E+01**	
	Adult Staff	0-15' Soil	Ingestion	6E-06	7E-01	N/A
			Dermal	9E-07	7E-02	
			Inhalation	3E-07	4E-02	
			Total	7E-06	8E-01	
	Park Visitor	0-15' Soil	Ingestion	1E-05	8E+00	(NC) lead, antimony (C)
			Dermal	8E-06	2E+00	carcinogenic PAHs, PCBs,
			Total	2E-05	**1E+01**	dioxin/PCB TEQ
	Resident	0-15' Soil	Ingestion	2E-05	1E+01	(NC) PCBs, dioxin/PCB TEQ, lead,
			Dermal	1E-05	4E+00	antimony (C)
			Produce	1E-03	3E+02	carcinogenic PAHs, PCBs,
			Total	**1E-03**	**3E+02**	dioxin/PCB TEQ Produce: PCBs,
	Construction Worker	0-15' Soil	Ingestion	4E-07	2E+00	(NC) lead, antimony
			Dermal	3E-07	1E+00	
			Inhalation	3E-08	2E-01	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	1E-06	**4E+00**	
HS-10	Older Child/Teenage Student	0-15' Soil	Ingestion	1E-06	5E-01	N/A
			Dermal	1E-06	2E-01	
			Inhalation	2E-08	7E-03	
			Total	3E-06	6E-01	
	Day Care Child	0-15' Soil	Ingestion	2E-06	2E+00	(NC) lead
			Dermal	1E-06	7E-01	
			Inhalation	6E-09	1E-02	
			Total	3E-06	**3E+00**	
	Adult Staff	0-15' Soil	Ingestion	3E-06	2E-01	N/A
			Dermal	5E-07	1E-02	
			Inhalation	1E-07	1E-02	
			Total	3E-06	2E-01	
	Park Visitor	0-15' Soil	Ingestion	5E-06	2E+00	(NC) lead
			Dermal	4E-06	4E-01	
			Total	9E-06	**2E+00**	
	Resident	0-15' Soil	Ingestion	8E-06	3E+00	(NC) lead
			Dermal	7E-06	7E-01	Produce: PCBs, arsenic, cadmium,
			Produce	6E-04	9E+01	lead
			Total	6E-04	**9E+01**	
	Construction Worker	0-15' Soil	Ingestion	2E-07	6E-01	N/A
			Dermal	2E-07	2E-01	
			Inhalation	1E-08	7E-02	
		Shallow Groundwater	Dermal	3E-07	3E-01	
			Inhalation	7E-09	2E-02	
			Total	6E-07	1E+00	

Notes
Bolded values exceed a cancer risk of 1E-05 or a target organ HI of 1.
HI - Hazard Index
ELCR - Excess Lifetime Cancer Risk

(C) - Carcinogenic Risk
(NC) - Noncarcinogenic Risk
N/A - Not Applicable

APPENDIX D

DATA USABILITY ASSESSMENT

Data Usability Assessment	
1: Discuss appropriateness of selected analytical methods to quantitatively support disposal site's RAO. Discuss any impacts to the data used to support the RAO if generated with non-CAM methods. Justify that the data used to support the RAO is adequate in spite of the use of non-CAM methods.	**Appropriateness of Analytical Methods Used** • The following methods were utilized to respond to all contaminants of concern in soil: VOCs, VPH, EPH, PAHs, SVOCs, TPH (GRO), total metals, PCB Aroclors, PCB Congeners and dioxins/furans. • The following methods were utilized to respond to all contaminants of concern in groundwater: VOCs, PAHs, total metals, dissolved metals, and PCB Aroclors. • Tables, DUA-1 and DUA-2 summarizes all samples used for the RAO and included in this data usability assessment. It should be noted that excavated sampling locations were not included in this data usability assessment. • Soil sample analyses were performed under the CAM with the exception of PCB congeners (EPA Method 1668A) and dioxins/furans (SW-846 Method 8290) analysis which are non-CAM methods. ➢ PCB congeners and dioxins/furans analyses were performed using non-CAM methods. The methods were performed with sufficient quality control analyses (i.e. method blanks, laboratory control spikes, matrix spikes, etc.) and the quality control provided acceptable results. ➢ Soil samples analyses that were performed prior to July 2010 were performed in accordance with the 2004 CAM. Mercury data was not in accordance with the more recent 2010 CAM which requires the use of a larger sample aliquot (0.6 grams) in the sample digestion. The representativeness of the mercury results may be affected. However, since all mercury results were significantly below the project action levels, the use of a smaller sample aliquot (0.1 to 0.3 grams) in the sample digestion most likely did not have an adverse effect on the sample results.
2: Discuss appropriateness of selected analytical methods' Reporting Limits (RL) to quantitatively support the disposal site's RAO.	• Analytical reporting limits, as documented by the laboratory, meet or exceed sensitivity requirements required to assess level of risk and cleanup standards for contaminants of concern previously identified for this response action for groundwater. • Analytical reporting limits, as documented by the laboratory, meet or exceed sensitivity requirements required to assess level of risk and cleanup standards for contaminants of concern previously identified for this response action for soil, with the following exceptions: <u>Exception #1:</u> The nondetect results for bis(2-Chloroethyl)ether in samples COMP SS-13-A,F,S,T/0.5-4, COMP SS-13-U-Z-AA,BB/1-4, COMP SS-13-AQ,AM,AN,AJ,AL/1-4, HG4_HG3/1-3, HH13/1.5-3, HI3+HH3/1-3 exceeded the Method 1 S-1 standard of 0.7 mg/kg at a range of 0.72 mg/kg to 2.1. The nondetect results for hexachloroethane in samples HH13/1.5-3 exceeded the Method 1 S-1 standard of 3 mg/kg at 13 mg/kg. The nondetect results for hexachlorobutadiene in samples HH13/1.5-3 exceeded the Method 1 S-1 standard of 6 mg/kg at 13 mg/kg. The nondetect results for 2,4,6-trichlorophenol in samples HH13/1.5-3 exceeded the Method 1 S-1 standard of 20 mg/kg at 26 mg/kg. The nondetect results for 2,4-dinitrophenol in samples HH13/1.5-3 exceeded the Method 1 S-1 standard of 50 mg/kg at 64 mg/kg. The nondetect results for 2,4-dinitrotoluene in samples COMP SS-13-A,F,S,T/0.5-4, COMP SS-13-U-Z-AA,BB/1-4, COMP SS-13-AQ,AM,AN,AJ,AL/1-4, HH13/1.5-3 exceeded the Method 1 S-1 standard of 2 mg/kg at a range of 2.1 mg/kg to 13 mg/kg. The nondetect results for hexachlorobenzene in samples COMP SS-13-A,F,S,T/0.5-4, COMP SS-13-U-Z-AA,BB/1-4, COMP SS-13-AQ,AM,AN,AJ,AL/1-4, HH13/1.5-3, HI3+HH3/1-3 exceeded the Method 1 S-1 standard of 0.7 mg/kg at a range of 0.72 mg/kg to 13 mg/kg. The nondetect results for pentachlorophenol in samples HH13/1.5-3 exceeded the Method 1 S-1 standard of 10 mg/kg at 64 mg/kg. The nondetect results for benzo(a)pyrene in samples COMP SS-13-A,F,S,T/0.5-4, COMP SS-13-U-Z-AA,BB/1-4. COMP SS-13-AQ,AM,AN,AJ,AL/1-4 exceeded the Method 1 S-1 standard of 2 mg/kg at 2.1 mg/kg. The nondetect results for 3,3'-dichlorobenzene in samples COMP SS-13-A,F,S,T/0.5-4, COMP SS-13-U-Z-AA,BB/1-4. COMP SS-13-AQ,AM,AN,AJ,AL/1-4 HH13/1.5-3 exceeded the Method 1 S-1 standard of 1 mg/kg at a range of 4.2 mg/kg to 13 mg/kg. The nondetect results for dibenz(a,h)anthracene in samples COMP SS-13-A,F,S,T/0.5-4, COMP SS-13-U-Z-

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	AA,BB/1-4. COMP SS-13-AQ,AM,AN,AJ,AL/1-4 HH13/1.5-3, HI3+HH3/1-3, HB-26/3-5, HF-40/1-3, HF-40/3-5, HG-2/1-3, HRC-33N/1-3, SB-359/8, SB-365/9, SS-19/1, SB-281/8, SB-285/3.5, SB-287/4, SB-289/3.5, SB-293/9, SB-300/8, SB-303/10 exceeded the Method 1 S-1 standard of 0.7 mg/kg at a range of 0.72 mg/kg to 13 mg/kg. The non-detect results for thallium in samples SB-359/8, SB-362/6.5, SB-364/9.5, SB-365/9, SB-349/11, NBHS-1/12 exceeded the Method 1 S-1 standard of 8 mg/kg at a range of 8.93 mg/kg to 25.3 mg/kg. The non-detect results for antimony in samples SB-359/8, SB-365/9, SB-303/10, SB-307/6 exceeded the Method 1 S-1 standard of 20 mg/kg at a range of 21.6 mg/kg to 33.7 mg/kg. Justifications for Exception #1: For dibenz(a,h)anthracene in samples COMP SS-13-A,F,S,T/0.5-4, COMP SS-13-U-Z-AA,BB/1-4. COMP SS-13-AQ,AM,AN,AJ,AL/1-4 HH13/1.5-3, HI3+HH3/1-3, HB-26/3-5, HF-40/1-3, HF-40/3-5, HG-2/1-3, HRC-33N/1-3, SB-359/8, SB-365/9, SS-19/1, SB-281/8, SB-285/3.5, SB-287/4, SB-289/3.5, SB-293/9, SB-300/8, SB-303/10, , and for benzo(a)pyrene in samples COMP SS-13-A,F,S,T/0.5-4, COMP SS-13-U-Z-AA,BB/1-4. COMP SS-13-AQ,AM,AN,AJ,AL/1-4 the decision-making process was not adversely affected by the sensitivity issues as other detected PAHs or metals, as appropriate, in the affected samples exceeded project action levels. For thallium in samples SB-359/8, SB-362/6.5, SB-364/9.5, SB-365/9, SB-349/11, NBHS-1/12, no other metals exceed project action levels; however, based on the results of the many other soil samples submitted for thallium analyses, this metal is not a contaminant of concern at this site. The decision-making process was therefore not adversely affected by the sensitivity issue for thallium.
B-3: Discuss laboratory performance criteria and data quality indicators utilized to assess overall Analytical Accuracy (continuing calibration, laboratory control spikes, etc.) and Analytical Precision (laboratory duplicates, laboratory control spike duplicates, etc.) CAM Data: Review Certification Form and discuss data quality issues noted in narrative. Non-CAM Data: Discuss data quality indicators used to assess data and any data quality issues noted.	( ) *Meets all CAM requirements and performance standards without qualification.* (√) *Does not meet all CAM requirements and performance standards without qualification. If NO, discuss data usability implications* No data quality issues were noted for the non-CAM data. Issues associated with the CAM data are summarized below. Issue #1: Potential low bias exists for arsenic results in sample HC-22/1-3 due a low recovery in the quantitation limit check standard. This result for arsenic is slightly below the project action levels should be used with caution as the results are slightly below the project action levels and the decision making process may be affected. Justification for Issue #1: Although a potential low bias exists for arsenic in sample HC-22/1-3 there are a sufficient number of arsenic results to adequately quantify the EPC in this exposure area. Therefore this uncertainty does not significantly affect the outcome or conclusions of this RAO. Issue #2: Potential high bias exists for chromium results in samples HB-23H/1-3, and HF-40/3-5 due to high recoveries in the LCS. The results for chromium in samples HB-23H/1-3, and HF-40/3-5 are just slightly above the project action levels and therefore the decision-making process may be affected by the high bias. Justification for Issue #2: Although a potential high bias exists for chromium in two samples, there are a sufficient number of chromium results to adequately quantify the EPC in this exposure area. Therefore this uncertainty does not significantly affect the outcome or conclusions of this RAO. Issue #3: Potential uncertainty exists for lead results in samples SB-362/0-1, SB-363/0-1, HF-43G/1-3 and HF-43H/1-3 and the cadmium results in samples HB-39C/0-1 and HB-39D/0-1 due to laboratory duplicate variability. The results for lead and cadmium in the affected samples are just slightly below the project action levels and therefore the decision-making process may be affected by the variability. Justification for Issue #3: Although a potential uncertainty exists for lead in four samples, and for cadmium in two samples, there are a sufficient number of lead and cadmium samples to adequately quantify the EPC in this exposure area. Therefore this uncertainty does not significantly affect the outcome or conclusions of this RAO. Issue #4: Potential uncertainty exists for lead results in samples SB-360V/1-3 and SB-362/6.5 due to laboratory duplicate variability. The results for lead in these samples are just slightly above the project

action levels and therefore the decision-making process may be affected by the variability.

Justification for Issue #4: Although a potential uncertainty exists for lead in two samples, there are a sufficient number of lead samples to adequately quantify the EPC in this exposure area. Therefore this uncertainty does not significantly affect the outcome or conclusions of this RAO.

Issue #5: Caution should be used with the lead result in samples SB-266-4 and SS-27-2 due to low recovery in the LCS analysis. The results for lead in these samples are just slightly below the project action levels and therefore the decision-making process may be affected by the low bias. Caution should be used with these results as the actual results may be higher and above the project action levels.

Justification for Issue #5: Although a potential uncertainty exists for lead in two samples, there are a sufficient number of lead samples to adequately quantify the EPC in this exposure area. Therefore this uncertainty does not significantly affect the outcome or conclusions of this RAO.

Data usability was not adversely affected as the issues listed below would not cause a significant bias to the reported values.

Accuracy:

Low Biases:

- Low recovery of acetone in VOC LSCD: HRJ.75-17-1-2.5, HRM-25-1.5-3, HRP.5-33-1.5-3.
- Low recovery of aniline and 4-chloroaniline in LCS/LCSD: soil sample Comp SS-13-A,F,S,T
- Low recovery of aniline in LCS/LCSD: soil samples Comp SS-13-M,N,O,P/1-4; Comp SS-13-Q,R,C,D/1-4; Comp SS-13-E,L,K,B/1-4; Comp SS-13-G,H,I,J/0.5-4; Comp SS-13-V,W,X,Y/0.5-4; Comp SS-13-U,Z,AA,AB/1-4.
- Low recovery of aniline in SVOC LCS/LCSD: soil samples Comp SS-13-AC,AD,AE,AF/0.5-4; Comp SS-13-AS,AT,AU,AV/0.5-4; Comp SS-13-AW,AX,AY,AZ/0.5-4; Comp SS-13-AQ,AM,AN,AJ,AL/1-4
- Low recovery of 2-methylnaphthalene in LCS: soil samples SB-359/0-1, SB-359/1-3, SB-359/4, SB-359/8, SB-360D/1-3, SB-361/0-1, SB-361/1-3, SB-361/6.5, SB-362/0-1, SB-362/1-3, SB-362/5, SB-362/6.5, SB-363/0-1, SB-363/1-3, SB-363/5, SB-364/0-1, SB-364/1-3, SB-364/6, SB-364/9.5, SB-365/0-1, SB-365/1-3, SB-365/5-7, SB-365/9, SB-365D/5-7.
- Holding time exce3edance for PAHs: soil samples HD-19A/0-1, HD-19A/1-3, HD-19B/0-1, HD-19B/1-3, HD-19D/0-1, HD-19D/1-3, HD-21F/1-3.
- Low recovery of lead in LCSD: soil samples HF-14H/0-1, HF-14H/1-3.
- Low recovery of arsenic quantitation limit standard: soil sample HC-22C/0-1, HC-22D/0-1.
- Low recovery of bromomethane, 1,4-dioxane, tetrahydrofuran, and acetone in LSC and/or LCSD: soil sample HG-2/5-7.
- Holding time exceedance for mercury: soil samples SB-293/12, SB-294/12, SB-297/11, SB-307/9.
- Low recovery of bromomethane, chloromethane, and methylene chloride in LSC/LCSD: groundwater sample MW-4 (January 2010)
- Low recovery of bromomethane in LSC/LCSD: groundwater sample MW-5 (January 2010).
- Lowe recovery of methylene chloride in LCS: groundwater samples MW-6, MW-7 (January 2010)
- Low recovery of dichlorodifluoromethane in LCSD: groundwater samples MW-4, MW-5, MW-7, MW-HRC-33 (February 2010).
- Low recovery of 1,2-dibromo-3-chloropropane in LCS/LCSD: groundwater samples MW-11, MW-12, MW-13, MW-14, MW-16, MW-19, MW-HH-13 (February 2010).

High Biases:

- High recovery of tetrachloroethene in VOC LCS: HRJ.75-17-1-2.5, HRM-25-1.5-3, HRP.5-33-1.5-3
- High surrogate recovery of 4-bromofluorobenzene for VOCs: soil sample HRM-25-1.5-3.
- High surrogate recovery of 2,4,6-tribromophenol for SVOCs: soil samples Comp SS-13-AC,AD,AE,AF/0.5-4.
- High recovery of 4-nitroaniline and 3,3'-dichlorobenzidine in LCS: soil samples Comp SS-13-

AC,AD,AE,AF/0.5-4; Comp SS-13-AS,AT,AU,AV/0.5-4; Comp SS-13-AW,AX,AY,AZ/0.5-4; Comp SS-13-AQ,AM,AN,AJ,AL/1-4, HG2.5+HH2.5/1-3, HI2.5+HJ2.5/0.5-3, HK2.5+HM2.5/0.5-1.5, HO2.5+HO3/0.5-3, HN3+HM30.75-2.

- High surrogate recovery of 2,4,6-tribromophenol for SVOCs: soil samples HG10+HG9/1.5-3, HB25+HB26/0.5-3, HA29+HB29/1-3, HB28+HB27/1-3, HB41+HB42/0.2-3.
- High surrogate recovery of terphenyl-d14 for SVOCs: soil samples HG10+HG9/1.5-3, HI6+HH6/1-3, HJ44+HI43/1.5-3.
- SVOC method blank contamination for di-n-butylphthalate: soil samples HG10+HG9/1.5-3, HJ8+HI8/0.5-3, HI6+HH6/1-3, HB25+HB26/0.5-3, HA29+HB29/1-3, HB28+HB27/1-3, HB31+HB32/0.5-3, HB33+HB36/0.2-3, HB37+HB38/0.2-3, HB41+HB42/0.2-3, HB43+HB44/0.5-3, HF44+HG44/0.5-3, HH44+HI44/1-3, HJ44+HI43/1.53, HH43+HI42/1.5-3. HH10+HI10/1-3, HJ10/1-3, HG4+HG3/1-3, HG2/1-3, HB12+HB16/2.5-3, HC16+HC15+HC14/1.5-3, HC13+HC12+HD12/1-3, HD13+HD14+HD15/1.5-3, HL3+HJ3/0.25-3, HI3+HH3/1-3, HG3+HG4/1-3, HH4+HI4/1-3, HJ4+HK4/0.5-3, HL4/2-3.
- High recovery of 4-methylphenol and 4-nitroaniline in LCS: soil sample HJ5+HK5/1-3.
- Method blank contamination for zinc: soil samples SB-359/0-1, SB-359/1-3, SB-359/4, SB-359/8, SB-360/5, SB-360/8, SB-360D/1-3, SB-362/0-1, SB-362/1-3, SB-362/5, SB-362/6.5, SB-363/0-1, SB-363/1-3, HD-19A/0-1, HD-19A/1-3, HD-19B/0-1, HD-19B/1-3. SB-275/9.5, SB-277/9, SB-285/7.5, SB-287/9, SB-303/10, SB-308/6, SB-310/7, SB-311/9.
- High recoveries of barium in LCS or LCS duplicate: soil samples HB-23G/0-1, HB-23G/1-3, HB-23H/0-1, HB-23H/1-3, HB-23I/0-1, HB-40H/1-3, HD-21F/1-3.
- High recovery of chromium in LCS: soil samples HB-23G/0-1, HB-23G/1-3, HB-23H/0-1.
- High recovery of arsenic, cadmium and lead in LCS: soil samples HB-23G/0-1, HB-23G/1-3, HB-23H/0-1, HB-23H/1-3.
- High recovery of cadmium and lead in LCS: soil samples HF-40C/0-1, HF-40C/1-3, HF-40D/0-1, HF-40D/1-3, HF-40E/0-1, HF-40E/1-3, HF-40G/0-1, HF-40G/1-3, HF-40H/0-1, HF-40H/1-3.
- Method blank contamination for lead: soil samples HRC-033M/1-3, HRC-033N/1-3, HRE-29/1-3, HRF-30A/1-3, HRG-29/1-3, HRI-17/1-3, HRG-17/1-3, HRK-21/1-3, HRN-26/1-3, HRO-30/1-3, PG-2A/1-3, SB-293/12, SB-297/11, SB-307/9, SB-349/14, SB-335/4.
- High recovery of barium and lead in LCS: soil samples HB-22/0-1, HB-22/1-3, HB-23M/1-3, HB-23N/1-3, HD-22/0-1, HD-22/1-3.
- High recovery of lead in LCS: soil samples HF-40I/1-3, HF-40J/1-3.
- High recoveries of n-butylbenzene, carbon disulfide, chloroethane, dichlorodifluoromethane, 1,1-dichloroethene, isopropylbenzene, methylene chloride, and trichlorofluoromethane in LCS and/or LCD duplicate: soil sample HG-2/5-7.
- Method blank contamination for nickel: soil samples SB-285/7.5, SB-287/9.
- High recovery of acetone, bromoform, 2-butanone, and tetrahydrofuran in LCS and LCS duplicate: soil sample SB-362/0-1.
- High recovery of 1,4-dioxane in LCS and/or LCSD: MW-6, MW-7 (January 2010); MW-11, MW-12, MW-13, MW-14, MW-16, MW-19, MW-HH-13 (February 2010).
- High recovery of 1,4-dioxane, hexachlorobutadiene, naphthalene, 1,2,3-trichlorobenzene, and 1,2,4-trichlorobenzene in LCS and/or LCSD: groundwater sample MW-5 (January 2010).
- High recovery of acetone in LCS: groundwater samples MW-4, MW-5, MW-7, MW-HRC-33 (February 2010).

Precision:

- High variability of all SVOC compounds in LCS/LCSD: soil sample Comp-12-A,F,S,T/0.5-4.
- High variability for 2,4-dimethylphenol in LCS/LCSD: soil samples Comp SS-13-M,N,O,P/1-4; Comp SS-13-Q,R,C,D/1-4; Comp SS-13-E,L,K,B/1-4; Comp SS-13-G,H,I,J/0.5-4; Comp SS-13-V,W,X,Y/0.5-4; Comp SS-13-U,Z,AA,AB/1-4.
- High variability for 2,4-dimethylphenol in SVOC LCS/LCSD: soil samples Comp SS-13-AC,AD,AE,AF/0.5-4; Comp SS-13-AS,AT,AU,AV/0.5-4; Comp SS-13-AW,AX,AY,AZ/0.5-4; Comp SS-13-AQ,AM,AN,AJ,AL/1.4.
- High variability for barium in LSC/LCSD: soil samples HB-22/0-1, HB-22/1-3, HD-22/0-1, HD-22/1-3.
- High variability for lead in laboratory duplicate analysis: soil samples HF-35A/0-1, HF-35A/1-3, HF-35B/0-1, HF-35B/1-3, HF-35C/0-1, HF-35C/1-3, HF-35D/0-1, HF-35D/1-3, HF-43A/0-1, HF-43A/1-3, HF-43B/0-1, HF-43B/1-3, HF-43G/0-1, SB-360W/1-3, SB-362/1-3, SB-362/5, SB-363/1-3, SB-363/5.

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	• High variability for barium in laboratory duplicate analysis: soil samples HB-39A/0-1, HB-39A/1-3, HB-39D/0-1, HB-39D/1-3, HH-13E/0-1, HH-13E/1-3, HH-13F/0-1, HH-13F/1-3, HH-13G/0-1, HH-13G/1-3, HH-13H/0-1, HH-13H/1-3. • High variability for cadmium in laboratory duplicate analysis: soil samples HB-39A/0-1, HB-39A/1-3, HB-39D/1-3, HF-40C/0-1, HF-40C/1-3, HF-40D/0-1, HF-40D/1-3, HF-40E/0-1, HF-40G/0-1, HF-40G/1-3, HF-40H/0-1, HF-40H/1-3, HF-43A/0-1, HF-43A/1-3, HF-43B/0-1, HF-43B/1-3, HF-43G/0-1, HF-43G/1-3. • High variability for arsenic in laboratory duplicate analysis: soil sample HD-20F/1-3. • High variability for silver in laboratory duplicate: soil samples HG-2/0-1, HG-2/1-3, HG-2/5-7, HB-26/0-1, HB-26/1-3, HB-26/3-5, HF-31D/4-6, HF-40/3-5, HF-14/3-4. • High variability for silver in laboratory duplicate analysis: soil samples SB-281/4, SB-281/8, SB-293/6.5, SB-293/9, SB-294/4, SB-294/8.5, SB-296/5, SB-296/10, SB-297/6, SB-297/8, SB-300/4, SB-300/8, SB-302/2.5, SB-302/8, NBHS-1/8, NBHS-1/12, NBHS-4/6, NBHS-4/8, NBHS-5/4, NBHS-5/8, NBHS-6/3, NBHS-6/6, NBHS-7/3, NBHS-7/7, SS-38 thru SS-41 (all depths). • High variability for lead in laboratory duplicate analysis: soil samples SB-281/4, SB-281/8, SB-293/9, SB-294/4, SB-294/8.5, SB-296/10, SB-297/6, SB-297/8, SB-300/4, SB-300/8, SB-302/2.5, SB-302/8, SB-303/5, SS-38 thru SS-41 (all depths). • High variability for chromium in laboratory duplicate analysis: soil samples SB-279/4, SB-279/11, SB-280/9.5, SB-303/10, SB-305/4, SB-305/9, SB-307/3, SB-307/6, SB-308/3.5, SB-308/6, SB-310/3, SB-310/7, SB-311/9, SS-11 thru SS-24 (all depths). • High variability for nickel in laboratory duplicate analysis: soil samples SS-18/2, SS-19 thru SS-24 (all depths) • High variability for arsenic, barium, and vanadium in laboratory duplicate analysis: soil samples SS-18/2, SS-19 thru SS-24 (all depths). • High variability for fluoranthene in LSC/LCSD: soil samples SB-270 thru SB-274 (all depths), SB-275/4, SB-275/9.5, SB-283/3.5, SB-283/6, SB-287/4. • High variability for naphthalene, benzo(b)fluoranthene, 2-methylnaphthalene, pyrene, and benzo(k)fluoranthene in LSC/LCSD: soil samples SS-11/0.5, SS-11/2. • High variability for benzo(b)fluoranthene, pyrene, and benzo(k)fluoranthene in LSC/LCSD: soil samples SS-18/2, SS-19 thru SS-24 (all depths). • High variability for naphthalene, benzo(b)fluoranthene, benzo(k)fluoranthene, 2-methylnaphthalene, and pyrene in LSC/LCSD: soil samples SS-25 thru SS-29 (all depths), SS-30/0.5. • High variability for barium and chromium in laboratory duplicate analysis: soil samples TREE-TI-2/0-2, TREE-TI-2/1-3, TREE-TI-3/0-1, and TREE-TI-3/1-3. • High variability for pyrene in LCS/LCSD: soil samples SB-368/0-1, SB-368/1-2.5, SB-369/0-1, SB-369/1-3, SB-370/0-1, and SB-370/1-3. • High variability for hexachlorobutadiene, naphthalene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene in LCS/LCSD: groundwater sample MW-5 (January 2010).
B-4: Discuss laboratory performance criteria and data quality indicators utilized to assess overall Field Data Usability (sample preservation compliance, sample subsampling/compositing, field QC samples, etc.)	**Sample Preservation:** Sample preservation procedures performed as per required methods for all rounds of soil and groundwater sampling. **Field QC:** <u>Accuracy:</u> soil and groundwater data assessed using MS/MSD analyses, trip blanks for VOC analyses and cooler temperature blanks for all coolers. <u>Precision:</u> soil and groundwater data assessed using field duplicates and MS/MSD analyses. ♦ <u>Soil Field Duplicates:</u> HJ8+HI8/0.5-3 (SVOCs, metals), HB28+HB27/1-3 (metals), HA43+HA44/0.75-3 (metals), HA-19C/1-3 (metals), HB-26/1-3 (PAHs, PCB Aroclors, metals, dioxins/furans), HD-20/1-3 (metals), HD-20B/1-3 (metals), HD-21C/1-3 (metals), HD-21K/1-3 (lead), HF-35C/1-3 (cadmium, lead), HH-13D/1-3 (metals), HRG-29/1-3 (PAHs, metals), SB-LSD-2/1-3 (PCB Aroclors), SB-360/1-3 (metals), SB-360C/1-3 (barium, chromium, lead), SB-360X/1-3 (lead), SB-365/5-7 (PAHs, metals), SS-31/1-3 (PAHs, metals), SS-36D/1-3 (lead), SS-36N/1-3 (lead), SB-274/4 (PAHs, metals), SB-281/4 (PAHs, metals), SB-283/3.5 (PAHs, metals), SB-296/5 (PAHs, metals), SB-311/6 (PAHs, metals), SB-349/8 (PAHs, metals),

NBHS-4/6 (PAHs, metals), SS-20/1 (PAHs, metals), SS-28/1.5 (PAHs, metals), SS-37/2 (PAHs, metals), SB-370/1-3 (PAHs, metals),

- Groundwater Field Duplicates: MW-5 (VOCs), MW-7 (VOCs), .
- Soil MS/MSDs: HA-19K/1-3 (lead, cadmium), HB-10/0-1 (metals), HB-39C/0-1 (metals), HB-40D/1-3 (metals), HB-40Q/1-3 (lead), HC-22/1-3 (metals), HC-22C/1-3 (metals), HD-19B/1-3 (metals), HD-20A/1-3 (metals), HD-21A/1-3 (metals), HE-10C/1-3 (PAHs, metals), HF-10B/0-1 (metals), HF-14H/0-1 (PAHs, metals), HF-31D/1-3 (metals), HF-31D/4-6 (PAHs, metals), HF-35D/1-3 (metals), HF-40A/1-3 (metals), HF-43G/1-3 (metals), HF-43H/1-3 (lead), HH-13C/0-1 (metals), HH-13CC/1-3 (chromium, hexavalent chromium), HRG-17/1-3 (metals), SB-LSD-3/1-3 (PCB Aroclors), SB-270A/0-1 (lead), SB-270F/0-1 (lead), SB-360A/1-3 (metals), SB-360I/1-3 (lead), SB-360M/1-3 (lead), SB-360X/1-3 (lead), SB-362/1-3 (PAHs, metals), SB-364/1-3 (PAHs), SS-36B/1-3 (lead), SS-38/1-3 (PAHs, metals), SB-275/4 (PAHs, metals). SB-279/4 (PAHs, metals), SB-287/4 (PAHs, metals), SB-293/6.5 (PAHs, metals), SB-303/5 (PAHs, metals) NBHS-5/4 (PAHs, metals), SS-14/2 (PAHs, metals), SS-19/1 (PAHs, metals), SS-20/2 (metals), SS-30/0.5 (PAHs, metals), SS-30/1.5 (PAHs), SS-40/2 (PAHs, metals), SB-297/11 (mercury), SB-312/5 (mercury), SS-35/0.5 (mercury), TREE-TI-1/0-1 (arsenic, barium, cadmium, chromium, lead), TREE-TI-2/0-1 (arsenic, barium, cadmium, chromium, lead), TREE-DS-1/0-1 (arsenic, barium, cadmium, chromium, lead)
- Groundwater MS/MSD: MW-39 (VOCs)

Issue #1: Potential uncertainty exists for select results due to field duplicate variability. In these instances listed below, either the original or field duplicate result exceeds the project action levels. In all instances, the results exceeding the project action levels are recommended for use in decision-making: the original result for lead in sample SS-36D/1-3; and the original results for barium in sample SB-365/5-7.

Justification for Issue #1: In calculating the EPC, the field duplicate results are combined to account for field duplicate variability. Therefore, these uncertainties do not significantly affect the outcome or conclusions of this RAO.

Issue #2: Potential uncertainty exists for lead in sample SS-36E/1-3, and cadmium in sample HA-19D/0-1 due to field duplicate variability. The results for lead and cadmium in these samples slightly exceed the project action levels and therefore should be used with caution based on the variability in the associated field duplicates.

Justification for Issue #2: In calculating the EPC, the field duplicate results are combined to account for field duplicate variability. Therefore, these uncertainties do not significantly affect the outcome or conclusions of this RAO.

Issue #3: Results for antimony in samples SB-270 thru SB-275 (all depths), SB-281 and SB-283 (all depths), SB-293 and SB-294 (all depths), SB-296 and SB-297 (all depths), SB-300 and SB-302 (all depths), and SB-303-5 and thallium in samples SB-270 thru SB-274 (all depths), SB-275-9.5, SB-279 thru SB-281 (all depths), SB-283-3.5, SB-283-6, SB-287-4, SB-293 and SB-294 (all depths), SB-296 and SB-297 (all depths), SB-300-4, SB-300-8, SB-302-2.5, SB-302-8, SB-303-10, SB-305-4, SB-305-9, SB-307 and SB-308 (all depths), and SB-310 and SB-311 (all depths) cannot be used to achieve project objectives due to matrix spike recoveries below 30%. As per Appendix IV of the MassDEP Policy # WSC-07-350, MCP Representativeness Evaluations and Data Usability Assessments, these results were rejected

Justification for Issue #3: Although certain data points were rejected, there are a sufficient number of antimony results to adequately quantify the EPC in this exposure area, and thallium is not a chemical of concern at the Site. Therefore this uncertainty does not significantly affect the outcome or conclusions of this RAO.

Issue #4: Caution should be used with the results for nickel in samples SB-280-4, SB-280-9.5, and SB-311-6 due to low recoveries in the MS analyses. The results for nickel in samples SB-280-4, SB-280-9.5, and SB-311-6 are just slightly below the project action levels and therefore the decision-making process may be affected by the low bias. Caution should be used with these results as the actual results may be higher and above the project action levels.

Justification for Issue #4: Although a potential low bias exists for nickel in three samples, there are a sufficient number of nickel results to adequately quantify the EPC in this exposure area. Therefore this

Data Usability Assessment	
	uncertainty does not significantly affect the outcome or conclusions of this RAO. Issue #5: Caution should be used with the chromium result in sample SB-294-4 due to high recovery in the MS analysis. The result for chromium in this sample is just slightly above the project action levels and therefore the decision-making process may be affected by the high bias. Caution should be used with this result as the actual result may be lower and below the project action levels. Justification for Issue #5: Although a potential high bias exists for chromium in one sample, there are a sufficient number of chromium results to adequately quantify the EPC in this exposure area. Therefore this uncertainty does not significantly affect the outcome or conclusions of this RAO. Issue #6: Caution should be used with the benzo(a)pyrene results in samples SB-275-4 and SS-40-2 and the chromium results in samples SB-280-4 and SB-311-6 due to MS/MSD variability. The results for benzo(a)pyrene and chromium in the affected samples are just slightly below the project action levels and therefore the decision-making process may be affected by the variability. Caution should be used with these results as the actual results may be higher and above the project action levels. Justification for Issue #6: Although a potential uncertainty exists for benzo(a)pyrene and chromium in two samples, there are a sufficient number of benzo(a)pyrene and chromium results to adequately quantify the EPC in this exposure area. Therefore this uncertainty does not significantly affect the outcome or conclusions of this RAO. Issue #7: Caution should be used with the lead results in samples SB-296-5 and SB-322-3.5 and the chromium result in sample SB-294-4 due to MS/MSD variability. The results for lead and chromium in the affected samples are just slightly above the project action levels and therefore the decision-making process may be affected by the variability. Caution should be used with these results as the actual results may be lower and below the project action levels. Justification for Issue #7: Although potential uncertainty exists for lead in two samples and for chromium in one sample, there are a sufficient number of lead and chromium results to adequately quantify the EPC in this exposure area. Therefore this uncertainty does not significantly affect the outcome or conclusions of this RAO. Issue #8: The original results for barium in sample SB-274-4, zinc in sample SB-349-8, and benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene in sample SS-37-2 exceed the project action levels but the results in the field duplicate samples fall below the project action level. In order to remain conservative, the results from the original samples should be used at these locations. Justification for Issue #8: In calculating the EPC, the field duplicate results are combined to account for field duplicate variability. Therefore, these uncertainties do not significantly affect the outcome or conclusions of this RAO. Issue #9: The field duplicate results for nickel in sample SB-311-6 and cadmium in sample SS-20-1 exceed the project action levels but the results in the original samples fall below the project action levels. In order to remain conservative, the results from the field duplicate samples should be used at these locations Justification for Issue #9: In calculating the EPC, the field duplicate results are combined to account for field duplicate variability. Therefore, these uncertainties do not significantly affect the outcome or conclusions of this RAO. Issue #10: Although the variability in the field duplicate pair was within the acceptance criteria for chromium in samples SB-283-3.5 and SB-311-6 and lead in sample SS-37-2, the results in the original samples of SB-283-3.5 and SS-37-2 and the result in the field duplicate sample of SB-311-6 exceeded the project action level while the corresponding original or field duplicate result fell below the project action level. In order to remain conservative, the higher chromium or lead results should be used for these locations. Justification for Issue #10: In calculating the EPC, the field duplicate results are combined to account for field duplicate variability. Therefore, these uncertainties do not significantly affect the outcome or conclusions of this RAO.

Data Usability Assessment	
	Data usability not adversely affected as the issues listed below would not cause a significant bias to the reported values. ***Accuracy of Field QC:*** *Low Biases:* • Low recovery of MS/MSD for arsenic, barium, chromium, and selenium: Comp SS-13-AS,AT,AU,AV/0.5-4 • Low recovery of MS/MSD for chromium: soil samples Comp SS-13-AW,AX,AY,AZ/0.5-4; Comp SS-13-AQ,AM,AN,AJ,AL/1-4. • Low recovery of MS/MSD for arsenic, barium, chromium, and selenium: soil sample Comp SS-13-AS,AT,AU,AV/0.5-4 • Low recovery of MS/MSD for arsenic, cadmium, chromium, mercury, selenium and silver in MS: soil samples HA33+HA35/1-3, HA38+HA40/0.5-3, HA41+HA42/0.75-3, HA43+HA44/0.75-3. • Low recovery of benzo(g,h,i)perylene, dibenz(a,h)anthracene, fluoranthene, and indeno(1,2,3-cd)pyrene in MS and/or MSD: soil sample SB-364/1-3. • Low recovery of benzo(g,h,i)perylene, dibenz(a,h)anthracene, fluoranthene in MS and/or MSD: soil sample HF-14H/0-1. • Low recovery of antimony and thallium in MS and/or MSD: soil samples HB-26/0-1, HB-26/1-3, HB-26/3-5, HF-14/3-4, HF-40/3-5, HG-2/0-1, HG-2/1-3, HG-2/5-7. • Low recovery of antimony in MS and/or MSD: soil samples SB-362/0-1, SB-362/1-3, SB-362/5, SB-362/6.5, SB-363/0-1, SB-363/1-3, SB-363/5, HD-19A/0-1, HD-19A/1-3, HD-19B/0-1, HD-19B/1-3, HD-19D/0-1, HD-19D/1-3. • Low recovery of barium in MS and/or MSD: soil samples HB-9/0-1, HH-13E/0-1, HH-13E/1-3, HH-13F/0-1, HH-13F/1-3, HH-13G/0-1, HH-13G/1-3, HH-13H/0-1, HH-13H/1-3. • Low recovery of mercury in MS and/or MSD: soil samples SB-281/4, SB-281/8, SB-293/9, SB-294/4, SB-294/8.5, SB-296/5, SB-296/10, SB-297/6, SB-297/8, SB-300/4, SB-300/8, SB-302/2.5, SB-302/8, SB-303/5, SS-18/2, SS-19 thru SS-24 (all depths), SS-38 thru SS-41 (all depths). • Low recovery of antimony in MS and/or MSD: soil samples SB-287/4, SB-338 thru SB-341 (all depths), SB-350/5, SB-350/8, NBHS-1/8, NBHS-1/12, NBHS-4/6, NBHS-4/8, NBHS-5/4, NBHS-5/8, NBHS-6/3, NBHS-6/6, NBHS-7/3, NBHS-7/7, SS-11 thru SS-24 (all depths), SS-30-0.5, SS-38 thru SS-41 (all depths), • Low recovery of selenium in MS and/or MSD: soil samples SB-270 thru SB-274 (all depths), SB-275/9.5, SB-283/3.5, SB-283/6, SB-287/4, SB-350/5, SB-350/8, SS-18/2, SS-19 thru SS-24 (all depths), SS-30/0.5. • Low recovery of lead in MS: soil samples SB-349/8, SB-349/11, SB-350/5, SB-350/8, SS-11 thru SS-17 (all depths), SS-18/0.5, SS-25 thru SS-26 (all depths), SS-27/0.5, SS-28 thru SS-29 (all depths), SS-30/0.5. • Low recovery of thallium in MS and/or MSD: soil samples SB-275/4, SS-18/2, SS-19 thru SS-24 (all depths). • Low recovery of vanadium in MS: soil samples SB-270 thru SB-275 (all depths), SB-283/3.5, SB-283/6. • Low recovery of nickel in MS: soil samples SB-279/4, SB-279/11, SB-303/10, SB-305/4, SB-305/9, SB-307/3, SB-307/6, SB-308/3.5, SB-308/6, SB-310/3, SB-310/7, SB-311/9. • Low recovery of zinc in MS: soil samples SB-349/8, SB-349/11, SB-350/5, SB-350/8, SS-11 thru SS-17 (all depths), SS-18/0.5, SS-25 thru SS-29 (all depths), SS-30/0.5. • Low recovery of benzo(b)fluoranthene in MS: soil sample SS-99/1. • Low recovery of lead in MS: soil samples TREE-HS-1/0-1, TREE-HS-1/1-3, TREE-HS-2/0-1, TREE-HS-2/1-3, TREE-HS-3/0-1, TREE-HS-3/1-3, TREE-HS-4/0-1, TREE-HS-4/1-3, TREE-DS-1/0-1, TREE-DS-1/1-3, TREE-DS-2/0-1, and TREE-DS-2/1-3. *High Biases:* • High recovery of mercury in MS/MSD: soil samples. Comp SS-13-AC,AD,AE,AF/0.5-4; Comp SS-13-AS,AT,AU,AV/0.5-4; Comp SS-13-AW,AX,AY,AZ/0.5-4/0.5-4; Comp SS-13-AQ,AM,AN,AJ,AL/1-4 • High recovery of lead in MS/MSD: soil samples SS-13-AD/1-4, SS-13-AE/1-4, SS-13-AF/0.5-4, SS-13-AG/1-4, SS-13-AO/1-4, SS-13-AR/0.5-4, SS-13-AS/0.5-4, SS-13-AT/1-4, SS-13-AU/1-

4, SS-13-AV/1-4, SS-13-AW/1-4, SS-13-AI/1-4, SS-13-AJ/1-4, SS-13-AN/1-4, SS-13-AQ/1-4, SS-13-AM/1-4, SS-13-BD/1-4.

- High recovery of arsenic, barium, selenium in MS/MSD: Comp SS-13-AW,AX,AY,AZ/0.5-4; Comp SS-13-AQ,AM,AN,AJ,AL/1-4.
- High recovery of lead, and cadmium in MS/MSD: Comp SS-13-AS,AT,AU,AV/0.5-4.
- VOC trip blank contamination for chloromethane (34 ug/Kg), acetone (78 ug/Kg): soil samples HRI29/1.5-3, HRG25/0.5-3, HRA33/1-3.
- High recovery of benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene in MS and/or MSD: soil sample HF-31D/4-6.
- High recovery of zinc in MS: soil samples SB-362/0-1, SB-362/1-3, SB-362/5, SB-362/6.5, SB-363/0-1, SB-363/1-3, SB-363/5.
- High recovery of barium and selenium in MS and/or MSD: soil samples HB-26/0-1, HB-26/1-3, HB-26/3-5, HF-14/3-4, HF-31D/4-6, HF-40/3-5, HG-2/0-1, HG-2/1-3, HG-2/5-7.
- High recovery of chromium in MS: soil samples HB-26/1-3, HB-26/3-5, HF-14/3-4, HF-31D/4-6, HG-2/0-1, HG-2/1-3, HG-2/5-7, HB-26/0-1, SB-281/4, SB-281/8, SB-293/6.5, SB-293/9, SB-294/8.5, SB-296/5, SB-296/10, SB-297/6, SB-297/8, SB-300/4, SB-300/8, SB-302/2.5, SB-302/8, SS-18/2, SS-19 thru SS-24 (all depths), SS-38 thru SS-41 (all depths).
- High recovery of cadmium in MS: soil samples SB-270 thru SB-274 (all depths), SB-275/9.5, SB-283/3.5, SB-283/6, SB-287/4.
- High recovery of benzo(a)anthracene, chrysene, fluoranthene, and phenanthrene in MSD: soil sample SS-19-1.
- High recovery of barium in MS: soil samples TREE-TI-2/0-2, TREE-TI-2/1-3, TREE-TI-3/0-1, TREE-TI-3/1-3.
- High recovery of 1,4-dioxane, hexachlorobutadiene, isopropyl benzene, naphthalene, 1,2,3-trichlorobenzene, and 1,2,4-trichlorobenzene in MS and/or MSD: groundwater sample MW-4 (January 2010).
- High recovery of trichlorofluoromethane, chloroethane, 1,1-dichloroethene, ethyl ether, and 1,4-dioxane in MS and/or MSD: groundwater sample MW-17 (February 2010).

Precision of Field QC (Field duplicate criteria: RPD ≤30 for aqueous and ≤50 for soils):

- High variability for barium, cadmium, chromium, and lead for MS/MSD: soil samples Comp SS-13-M,N,O,P/1-4; Comp SS-13-Q,R,C,D/1-4; Comp SS-13-E,L,K,B/1-4; Comp SS-13-A,F,S,T/0.5-4; Comp SS-13-G,H,I,J/0.5-4; Comp SS-13-V,W,X,Y/0.5-4; and Comp SS-13-U,Z,AA,AB/1-4..
- High variability for MS/MSD for mercury: soil samples Comp SS-13-AC,AD,AE,AF/0.5-4; Comp SS-13-AS,AT,AU,AV/0.5-4; Comp SS-13-AW,AX,AY,AZ/0.5-4; Comp SS-13-AQ,AM,AN,AJ,AL/1-4.
- High variability for MS/MSD for chromium: Comp SS-13-AW,AX,AY,AZ/0.5-4; Comp SS-13-AQ,AM,AN,AJ,AL/1-4.
- High variability for MS/MSD for arsenic, barium, chromium, lead, and selenium: Comp SS-13-AS,AT,AU,AV/0.5-4.
- High variability for naphthalene, dibenzofuran, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene field in field duplicate: soil sample HJ8+HI8/1.5-3.
- High variability for arsenic, barium, cadmium, chromium, mercury, and silver in field duplicate: soil samples HG10+HG9/1.5-3, HH9+HI9/0.75-3, HJ8+HI8/0.5-3, HH8+HG8/0.5-3, HG7+HH7/0.75-3, HI7+HJ7/1-3, HK7+HL7/1-3, HK6+HJ6/0.25-3, HI6+HH6/1-3, HG6+HG5/0.5-3, HH5+HI5/0.75-3, HJ5+HK5/1-3.
- High variability for mercury MS/MSD: soil samples HA33+HA35/1-3, HA38+HA40/0.5-3, HA41+HA42/0.75-3, HA43+HA44/0.75-3.
- High variability for benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene in MS/MSD: soil sample SB-362/1-3.
- High variability for benzo(g,h,i)perylene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene in MS/MSD: soil sample HF-14H/0-1.
- High variability for benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene in MS/MSD: HF-31D/4-6.
- High variability for chromium in field duplicate analysis: soil samples HRE-29/1-3, HRF-30A/1-3, HRG-29/1-3.
- High variability for barium, chromium, and lead in field duplicate analysis: soil samples SB-

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	360/5, SB-360/8. • High variability for lead in field duplicate analysis: soil samples SS-36V/1-3, SS-36W/1-3. • High variability for anthracene, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene in field duplicate analysis: soil sample SB-365/5-7. • High variability for lead, silver, and vanadium in field duplicate analysis: soil samples SB-365/0-1, SB-365/1-3, SB-365/5-7, SB-365/9. • High variability for pyrene in field duplicate analysis: soil sample HB-26/1-3. • High variability for mercury in MS/MSD: soil samples SB-270 thru SB-275 (all depths), SB-281/4, SB-281/8, SB-283/3.5, SB-283/6, SB-287/4, SB-293/6.5, SB-293/9, SB-294/4, SB-294/8.5, SB-296/5, SB-296/10, SB-297/6, SB-297/8, SB-300/4, SB-300/8, SB-302/2.5, SB-302/8, SB-303/5. • High variability for mercury in field duplicate analysis: soil sample SS-28/1.5. • High variability for antimony in MS/MSD: soil samples SB-279/4, SB-279/11, SB-280/4, SB-280/9.5, SB-305/4, SB-305/9, SB-307/3, SB-308/3.5, SB-308/6, SB-310/3, SB-310/7, SB-311/6, SB-311/9. • High variability for nickel in field duplicate analysis: soil samples SB-274/4, SB-349/8. • High variability for cadmium, silver, zinc, and mercury in field duplicate analysis: soil samples SB-296/5. • High variability for pyrene in field duplicate analysis: soil samples SS-20/1. • High variability for most PAHs in field duplicate analysis: soil sample NBHS-4/6. • High variability for benzo(g,h,i)perylene in field duplicate analysis: soil sample SB-283/3.5. • High variability for benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene in MS/MSD: soil sample SB-275/4. • High variability for anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene in MS/MSD: soil sample SS-40/2. • High variability for anthracene, chrysene, phenanthrene, and mercury in field duplicate analysis: soil sample SB-274/4. • High variability for benzo(b)fluoranthene, fluoranthene, 2-methylnaphthalene, naphthalene, phenanthrene, and silver in field duplicate analysis: soil sample SB-281/4. • High variability for methylene chloride, hexachlorobutadiene, naphthalene, 1,2,3-trichlorobenzene, and 1,2,4-trichlorobenzene in MS/MSD: groundwater sample MW-4 (January 2010). • High variability for acetone in MS/MSD: groundwater sample MW-17 (February 2010).
B-5: Analytical Completeness of Data Used to Support the RAO: Discuss any data rejected pursuant to Appendix II, Rejection Criteria – Analytical Data Usability Assessments	• >90% analytical completeness achieved for all site data. • A number of gross failures of quality control in the antimony analyses of soil samples was noted due to significantly low recovery (<10%) of antimony in the matrix spike analysis. These results for antimony in these soil samples cannot be used for project objectives or decision-making purposes. This does not affect the conclusions of the RAO because there are a sufficient number of antimony samples to adequately quantify the EPC at the Site.

Table DUA-1
Summary of Soil Samples and Parameters Included in RAO and Data Usability Assessment
New Bedford High School, New Bedford, MA

Sample Location			Sample Date		VOCs	PAHs	EPH	VPH	PCBs	Metals	TPH	Dioxin/PCB Congener
Exposure Point 1												
PG-1/0-0.5	PG-1	0-0.5	2/22/2006						x			
PG-2/0-0.5	PG-2	0-0.5	2/22/2006						x			
PG-2A/1-3	PG-2A	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
PG-3/0-0.5	PG-3	0-0.5	2/22/2006						x			
PG-3/0.5-1.5	PG-3	0.5-1.5	2/22/2006			x			x	x(RCRA 8)		
PG-4/0-0.5	PG-4	0-0.5	2/22/2006						x			
PG-5/0-0.5	PG-5	0-0.5	2/22/2006						x			
PG-6/0-0.5	PG-6	0-0.5	2/22/2006			x			x			
PG-6/0.5-3	PG-6	0.5-3	2/22/2006			x			x	x(RCRA 8)		
PG-6/0-1	PG-6	0-1	6/10/2011						x			x
PG-6/1-3	PG-6	1-3	6/10/2011						x			x
SS-63/0-0.5	SS-63	0-0.5	12/15/2008			x				x		
SS-64/0-0.5	SS-64	0-0.5	12/15/2008			x				x		
SS-65/0-0.5	SS-65	0-0.5	12/15/2008			x				x		
Exposure Point 2												
HRA30/0.75-1	HRA30	0.75-1	2/22/2006						x			
HRE-29/0.67-1	HRE-29	0.67-1	2/22/2006						x			
HRE-29/1-3	HRE-29	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRF-30/1-2	HRF-30	1-2	2/22/2006						x			
HRF-30A/1-3	HRF-30A	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRG23/2.5-3	HRG23	2.5-3	2/21/2006						x			
HRG25/0.5-3	HRG25	0.5-3	2/21/2006		x				x			
HRG25/1-3	HRG25	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)	x(GRO)	
HRG27/0.5-3	HRG27	0.5-3	2/21/2006						x			
HRG27/1-3	HRG27	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRG29/0.75-1	HRG29	0.75-1	2/22/2006						x			
HRG-29/1-3	HRG-29	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRI23/2-3	HRI23	2-3	2/21/2006						x			
HRI27/1.25-3	HRI27	1.25-3	2/21/2006						x			
HRI29/1.5-3	HRI29	1.5-3	2/21/2006		x				x		x(GRO)	
HRJ-26/2.5-4	HRJ-26	2.5-4	2/21/2006						x			
HRJ-30/2-3.5	HRJ-30	2-3.5	2/21/2006						x			
NBHS-SS-7/0-0.5	NBHS-SS-7	0-0.5	8/6/2008						x			
SB-366/1	SB-366	1	2/26/2009						x	x		
SB-366/1-3	SB-366	1-3	2/26/2009						x	x		
SB-366/4	SB-366	4	2/26/2009						x	x		
SB-366/7	SB-366	7	2/26/2009						x	x		
SB-367/1	SB-367	1	2/26/2009						x	x		
SB-367/1-3	SB-367	1-3	2/26/2009						x	x		
SB-367/5-6	SB-367	5-6	2/26/2009						x	x		
SB-367/8-9	SB-367	8-9	2/26/2009						x	x		
SS-9/0-0.5	SS-9	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-10/0-0.5	SS-10	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-10/0.5-1	SS-10	0.5-1	7/23/2001						x	x(RCRA 8)		
SS-11/0-0.5	SS-11	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-11/0.5	SS-11	0.5	8/6/2008			x			x	x		
SS-11/2	SS-11	2	8/6/2008			x			x	x		
SS-12/0.5	SS-12	0.5	8/6/2008			x			x	x		
SS-12/2	SS-12	2	8/6/2008			x			x	x		
SS-13/0.5	SS-13	0.5	8/6/2008			x			x	x		
SS-13/1.5	SS-13	1.5	8/6/2008			x			x	x		
SS-14/0.5	SS-14	0.5	8/6/2008			x			x	x		
SS-14/2	SS-14	2	8/6/2008			x			x	x		
SS-15/0.5	SS-15	0.5	8/6/2008			x			x	x		
SS-15/2	SS-15	2	8/6/2008			x			x	x		
SS-16/0.5	SS-16	0.5	8/6/2008			x			x	x		
SS-16/1	SS-16	1	8/6/2008			x			x	x		
SS-16/2	SS-16	2	8/6/2008			x			x	x		
SS-17/0.5	SS-17	0.5	8/6/2008			x			x	x		
SS-17/1.5	SS-17	1.5	8/6/2008			x			x	x		
SS-18/0.5	SS-18	0.5	8/6/2008			x			x	x		
SS-18/2	SS-18	2	8/6/2008			x			x	x		
SS-19/0.5	SS-19	0.5	8/7/2008			x			x	x		
SS-19/1	SS-19	1	8/7/2008			x			x	x		
SS-19/2	SS-19	2	8/7/2008			x			x	x		
SS-20/0.5	SS-20	0.5	8/7/2008			x			x	x		
SS-20/1	SS-20	1	8/7/2008			x			x	x		
SS-20/2	SS-20	2	8/7/2008			x			x	x		
SS-21/0.5	SS-21	0.5	8/7/2008			x			x	x		
SS-21/2	SS-21	2	8/7/2008			x			x	x		
SS-22/0.5	SS-22	0.5	8/7/2008			x			x	x		
SS-22/1.5	SS-22	1.5	8/7/2008			x			x	x		
SS-23/0.5	SS-23	0.5	8/7/2008			x			x	x		
SS-23/2	SS-23	2	8/7/2008			x			x	x		
SS-24/0.5	SS-24	0.5	8/7/2008			x			x	x		
SS-24/1.5	SS-24	1.5	8/7/2008			x			x	x		
SS-24/1-3	SS-24	1-3	3/31/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
SS-25/0.5	SS-25	0.5	8/7/2008			x			x	x		
SS-25/1.5	SS-25	1.5	8/7/2008			x			x	x		
SS-26/0.5	SS-26	0.5	8/7/2008			x			x	x		
SS-26/1.5	SS-26	1.5	8/7/2008			x			x	x		
SS-26/2	SS-26	2	8/7/2008			x			x	x		
SS-27/0.5	SS-27	0.5	8/7/2008			x			x	x		
SS-27/2	SS-27	2	8/7/2008			x			x	x		
SS-27/1-3	SS-27	1-3	3/31/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
SS-28/0.5	SS-28	0.5	8/7/2008			x			x	x		
SS-28/1.5	SS-28	1.5	8/7/2008			x			x	x		
SS-28/0-1	SS-28	0-1	6/8/2011									x
SS-28/1-3	SS-28	1-3	6/8/2011									x
SS-29/0.5	SS-29	0.5	8/7/2008			x			x	x		
SS-29/2	SS-29	2	8/7/2008			x			x	x		
SS-30/0.5	SS-30	0.5	8/7/2008			x			x	x		

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New Bedford High School, New Bedford, MA

Sample Location			Sample Date		VOCs	PAHs	EPH	VPH	PCBs	Metals	TPH	Dioxin/PCB Congener
SS-30/1.5	SS-30	1.5	8/7/2008			x			x	x		
SS-31/0.5	SS-31	0.5	8/7/2008			x			x	x		
SS-31/2	SS-31	2	8/7/2008			x			x	x		
SS-31/1-3	SS-31	1-3	3/31/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
SS-32A/0-1	SS-32A	0-1	2/26/2009						x			
SS-32A/1-3	SS-32A	1-3	2/26/2009						x			
SS-32B/0-1	SS-32B	0-1	2/27/2009						x			
SS-32B/1-3	SS-32B	1-3	2/27/2009						x			
SS-32C/0-1	SS-32C	0-1	2/27/2009						x			
SS-32C/1-3	SS-32C	1-3	2/27/2009						x			
SS-32D/0-1	SS-32D	0-1	2/27/2009						x			
SS-32D/1-3	SS-32D	1-3	2/27/2009						x			
SS-33/0.5	SS-33	0.5	8/7/2008			x			x	x		
SS-33/2	SS-33	2	8/7/2008			x			x	x		
SS-34/0.5	SS-34	0.5	8/7/2008			x			x	x		
SS-34/2	SS-34	2	8/7/2008			x			x	x		
SS-35/0.5	SS-35	0.5	8/7/2008			x			x	x		
SS-35/1.5	SS-35	1.5	8/7/2008			x			x	x		
SS-35/1-3	SS-35	1-3	3/31/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
Exposure Point 3												
HRG17/2.5-3	HRG17	2.5-3	2/21/2006						x			
HRG17/1-3	HRG17	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRG21/2.5-3	HRG21	2.5-3	2/21/2006						x			
HRI-17/2-3	HRI-17	2-3	2/21/2006						x			
HRI-17/1-3	HRI-17	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRI-19/1.5-2.5	HRI-19	1.5-2.5	2/21/2006						x			
HRJ.75-17/1-2.5	HRJ.75-17	1-2.5	2/21/2006		x				x			
HRK-19/1-3	HRK-19	1-3	2/21/2006						x			
HRK-21/1-3	HRK-21	1-3	2/21/2006						x			
HRK-21/1-3	HRK-21	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRK23/0.5-3	HRK23	0.5-3	2/21/2006						x			
NBHS-SS-5/0-0.5	NBHS-SS-5	0-0.5	8/6/2008						x			
NBHS-SS-6/0-0.5	NBHS-SS-6	0-0.5	8/6/2008						x			
SS-6/0-0.5	SS-6	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-7/0-0.5	SS-7	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-8/0-0.5	SS-8	0-0.5	7/23/2001						x	x(RCRA 8)		
SB-360/5	SB-360	5	3/4/2009			x			x	x		
SB-360/8	SB-360	8	3/4/2009			x			x	x		
SB-360D/1-3	SB-360D	1-3	3/4/2009							x(Ba, Cr, Pb)		
SB-360V/1-3	SB-360V	1-3	7/6/2009							x(Pb)		
SB-360W/1-3	SB-360W	1-3	7/6/2009							x(Pb)		
SB-360X/1-3	SB-360X	1-3	8/19/2009							x(Pb)		
SS-36E/1-3	SS-36E	1-3	3/9/2009							x(Pb)		
SS-36I/1-3	SS-36I	1-3	5/21/2009							x(Pb)		
SS-36V/1-3	SS-36V	1-3	7/6/2009							x(Pb)		
SS-36W/1-3	SS-36W	1-3	7/6/2009							x(Pb)		
SS-37/0.5	SS-37	0.5	8/8/2008						x	x		
SS-37/2	SS-37	2	8/8/2008			x			x	x		
SS-38/0.5	SS-38	0.5	8/8/2008			x			x	x		
SS-38/1.5	SS-38	1.5	8/8/2008			x			x	x		
SS-38/1-3	SS-38	1-3	3/31/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
SS-38/0-1	SS-38	0-1	6/8/2011									x
SS-38/1-3	SS-38	1-3	6/8/2011									x
SS-39/0.5	SS-39	0.5	8/8/2008			x			x	x		
SS-39/2	SS-39	2	8/8/2008			x			x	x		
SS-39/1-3	SS-39	1-3	3/31/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
SS-40/0.5	SS-40	0.5	8/8/2008			x			x	x		
SS-40/2	SS-40	2	8/8/2008			x			x	x		
SS-41/0.5	SS-41	0.5	8/8/2008			x			x	x		
SS-41/2	SS-41	2	8/8/2008			x			x	x		
Exposure Point 4												
HE-44C/0-1	HE-44C	0-1	3/31/2009						x	x(Cd, Pb)		
HE-44C/1-3	HE-44C	1-3	3/31/2009						x	x(Cd, Pb)		
HE-44F/0-1	HE-44F	0-1	3/31/2009							x(Pb)		
HF-31A/0-1	HF-31A	0-1	4/2/2009						x	x(Cd, Pb)		
HF-31A/1-3	HF-31A	1-3	4/2/2009						x	x(Cd, Pb)		
HF-31B/0-1	HF-31B	0-1	4/2/2009						x	x(Cd, Pb)		
HF-31B/1-3	HF-31B	1-3	4/2/2009						x	x(Cd, Pb)		
HF-31D/4-6	HF-31D	4-6	4/15/2010			x			x	x		
HF-31G/1-3	HF-31G	1-3	4/2/2009						x			
HF-31H/1-3	HF-31H	1-3	4/2/2009						x			
HF35/2.5-3.5	HF35	2.5-3.5	12/30/2004						x			
HF-35A/0-1	HF-35A	0-1	4/1/2009						x	x(Cd, Pb)		
HF-35A/1-3	HF-35A	1-3	4/1/2009						x	x(Cd, Pb)		
HF-35B/0-1	HF-35B	0-1	4/1/2009						x	x(Cd, Pb)		
HF-35B/1-3	HF-35B	1-3	4/1/2009						x	x(Cd, Pb)		
HF-35C/0-1	HF-35C	0-1	4/1/2009						x	x(Cd, Pb)		
HF-35C/1-3	HF-35C	1-3	4/1/2009						x	x(Cd, Pb)		
HF-35D/0-1	HF-35D	0-1	4/1/2009						x	x(Cd, Pb)		
HF-35D/1-3	HF-35D	1-3	4/1/2009						x	x(Cd, Pb)		
HF-38/1-3	HF-38	1-3	4/2/2009			x(SVOC)			x	x(As, Ba, Cd, Cr, Pb)		
HF40/3-5	HF40	3-5	4/15/2010			x			x	x		x
HF-40C/0-1	HF-40C	0-1	3/10/2009						x	x(Cd, Pb)		
HF-40C/1-3	HF-40C	1-3	3/10/2009						x	x(Cd, Pb)		
HF-40D/0-1	HF-40D	0-1	3/9/2009						x	x(Cd, Pb)		
HF-40D/1-3	HF-40D	1-3	3/9/2009						x	x(Cd, Pb)		
HF-40E/0-1	HF-40E	0-1	3/10/2009							x(Cd, Pb)		
HF-40E/1-3	HF-40E	1-3	3/10/2009							x(Cd, Pb)		
HF-40G/0-1	HF-40G	0-1	3/10/2009							x(Cd, Pb)		
HF-40G/1-3	HF-40G	1-3	3/10/2009							x(Cd, Pb)		
HF-40H/0-1	HF-40H	0-1	3/9/2009							x(Cd, Pb)		
HF-40H/1-3	HF-40H	1-3	3/9/2009							x(Cd, Pb)		
HF-40I/1-3	HF-40I	1-3	4/9/2009							x(Cd, Pb)		

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New Bedford High School, New Bedford, MA

Sample Location			Sample Date		VOCs	PAHs	EPH	VPH	PCBs	Metals	TPH	Dioxin/PCB Congener
HF-40J/1-3	HF-40J	1-3	4/9/2009							x(Cd, Pb)		
HF-43 0-1 NW/NE/SW/SE/0-1	HF-43 0-1 NW	0-1	7/11/2011						x	x(Cd, Pb)		
HF-43 1-3 NW/NE/SW/SE/1-3	HF-43 1-3 NW	1-3	7/11/2011						x	x(Cd, Pb)		
HF-43A/0-1	HF-43A	0-1	4/1/2009						x	x(Cd, Pb)		
HF-43A/1-3	HF-43A	1-3	4/1/2009						x	x(Cd, Pb)		
HF-43B/0-1	HF-43B	0-1	3/31/2009						x	x(Cd, Pb)		
HF-43B/1-3	HF-43B	1-3	3/31/2009						x	x(Cd, Pb)		
HF-43G/0-1	HF-43G	0-1	4/1/2009						x	x(Cd, Pb)		
HF-43G/1-3	HF-43G	1-3	4/1/2009						x	x(Cd, Pb)		
HF-43H/1-3	HF-43H	1-3	4/1/2009						x	x(Pb)		
HF44/0.5-3	HF44	0.5-3	12/30/2004						x			
HF44+HG44/0.5-3	HF44+HG44	0.5-3	12/30/2004			x(SVOC)				x(RCRA 8)		
HG-31/1-3	HG-31	1-3	4/2/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HG44/1-3	HG44	1-3	12/30/2004						x			
HH43/1.5-3	HH43	1.5-3	12/30/2004						x			
HH43+HI42/1.5-3	HH43+HI42	1.5-3	12/30/2004			x(SVOC)				x(RCRA 8)		
HH44/2.5-3	HH44	2.5-3	12/30/2004						x			
HH44+HI44/1-3	HH44+HI44	1-3	12/30/2004			x(SVOC)			x	x(RCRA 8)		
HI42/2.5-3	HI42	2.5-3	12/30/2004						x			
HI43/1.5-3	HI43	1.5-3	12/30/2004						x			
HI44/1-3	HI44	1-3	12/30/2004						x			
HJ-42A/0-1	HJ-42A	0-1	4/2/2009						x	x(Cd, Pb)		
HJ-42A/1-3	HJ-42A	1-3	4/2/2009						x	x(Cd, Pb)		
HJ-42B/0-1	HJ-42B	0-1	4/2/2009						x	x(Cd, Pb)		
HJ-42B/1-3	HJ-42B	1-3	4/2/2009						x	x(Cd, Pb)		
HJ-42C/0-1	HJ-42C	0-1	4/2/2009						x	x(Cd, Pb)		
HJ-42C/1-3	HJ-42C	1-3	4/2/2009						x	x(Cd, Pb)		
HJ-42D/0-1	HJ-42D	0-1	4/1/2009						x	x(Cd, Pb)		
HJ-42D/1-3	HJ-42D	1-3	4/1/2009						x	x(Cd, Pb)		
HJ44/2.75-3	HJ44	2.75-3	12/30/2004						x			
HJ44+HI43/1.5-3	HJ44+HI43	1.5-3	12/30/2004			x				x(RCRA 8)		
HS-7/0-0.5	HS-7	0-0.5	9/9/2004						x			
HS-9/0-0.5	HS-9	0-0.5	9/9/2004						x			
HS-10/0-0.5	HS-10	0-0.5	9/9/2004						x			
SB-267/1	SB-267	1	7/14/2008			x			x	x		
SB-267/3.5	SB-267	3.5	7/14/2008			x			x	x		
SB-267/9	SB-267	9	7/14/2008			x			x	x		
SB-365/0-1	SB-365	0-1	3/4/2009			x			x	x		
SB-365/1-3	SB-365	1-3	3/4/2009			x			x	x		
SB-365/5-7	SB-365	5-7	3/4/2009			x			x	x		
SB-365/9	SB-365	9	3/4/2009			x			x	x		
SB-365/12	SB-365	12	3/4/2009						x			
SB-365/0-1	SB-365	0-1	6/8/2011									x
SB-365/1-3	SB-365	1-3	6/8/2011									x
NBHS-1/8	NBHS-1	8	7/29/2008			x			x	x		
NBHS-1/12	NBHS-1	12	7/29/2008			x			x	x		
NBHS-SS-8/0-0.5	NBHS-SS-8	0-0.5	8/6/2008						x			
NBHS-SS-9/0-0.5	NBHS-SS-9	0-0.5	8/6/2008						x			
VSS-12/0-0.5	VSS-12	0-0.5	7/23/2001						x	x(RCRA 8)		
VSS-12/1-2	VSS-12	1-2	7/23/2001						x	x(RCRA 8)		
SS-42/0-0.5	SS-42	0-0.5	12/2/2008			x			x	x		
SS-43/0-0.5	SS-43	0-0.5	12/2/2008			x			x	x		
SS-44/0-0.5	SS-44	0-0.5	12/2/2008			x			x	x		
SS-45/0-0.5	SS-45	0-0.5	12/2/2008			x			x	x		
SS-46/0-0.5	SS-46	0-0.5	12/2/2008			x			x	x		
Exposure Point 5												
COMP SS-13 -AG, AK, AO, AR/0.5-	COMP SS-13 -	0.5-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-AQ, AM,AN,AJ,AL/1-	COMP SS-13-A	1-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-E,L,K,B/1-4	COMP SS-13-E	1-4	9/2/2004			x(SVOC)				x(RCRA 8)		
SS-13-AJ/1-4	SS-13-AJ	1-4	9/2/2004						x	x(Pb)		
SS-13-AL/1-4	SS-13-AL	1-4	9/2/2004						x	x(Pb)		
SS-13-AM/1-4	SS-13-AM	1-4	9/2/2004						x	x(Pb)		
SS-13-AN/1-4	SS-13-AN	1-4	9/2/2004						x	x(Pb)		
SS-13-AO/1-4	SS-13-AO	1-4	9/2/2004						x	x(Pb)		
SS-13-K/0.5-4	SS-13-K	0.5-4	9/2/2004						x	x(Pb)		
Exposure Point 6												
HD-19A/0-1	HD-19A	0-1	3/9/2009			x			x	x		
HD-19A/1-3	HD-19A	1-3	3/9/2009			x			x	x		
HD-19B/0-1	HD-19B	0-1	3/9/2009			x			x	x		
HD-19B/1-3	HD-19B	1-3	3/9/2009			x			x	x		
HD-19D/0-1	HD-19D	0-1	3/9/2009			x			x	x		
HD-19D/1-3	HD-19D	1-3	3/9/2009			x			x	x		
HD-20F/1-3	HD-20F	1-3	5/19/2009							x(As, Ba, Cd, Cr, Pb)		
HD-21F/1-3	HD-21F	1-3	5/20/2009			x				x(As, Ba, Cd, Cr, Pb)		
HD22/1-3	HD22	1-3	12/29/2004						x			
HD22/0-1	HD22	0-1	4/9/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HD22/1-3	HD22	1-3	4/9/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HD23/2-3	HD23	2-3	12/29/2004						x			
HD23/0-1	HD23	0-1	3/31/2009			x				x(As, Ba, Cd, Cr, Pb)		
HD23/1-3	HD23	1-3	3/31/2009			x				x(As, Ba, Cd, Cr, Pb)		
HF14/3-4	HF14	3-4	4/15/2010			x			x	x		
HF-14B/1-3	HF-14B	1-3	3/11/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HF-14H/0-1	HF-14H	0-1	3/11/2009			x			x	x(As, Ba, Cd, Cr, Pb, Hg)		
HF-14H/1-3	HF-14H	1-3	3/11/2009			x			x	x(As, Ba, Cd, Cr, Pb, Hg)		
HH-13E/0-1	HH-13E	0-1	3/11/2009							x(As, Ba, Cd, Cr, Pb)		
HH-13E/1-3	HH-13E	1-3	3/11/2009						x	x(As, Ba, Cd, Cr, Pb)		
HH-13F/0-1	HH-13F	0-1	3/11/2009							x(As, Ba, Cd, Cr, Pb)		
HH-13F/1-3	HH-13F	1-3	3/11/2009							x(As, Ba, Cd, Cr, Pb)		
HH-13G/0-1	HH-13G	0-1	3/11/2009							x(As, Ba, Cd, Cr, Pb)		
HH-13G/1-3	HH-13G	1-3	3/11/2009							x(As, Ba, Cd, Cr, Pb)		
HH-13H/0-1	HH-13H	0-1	3/11/2009							x(As, Ba, Cd, Cr, Pb)		
HH-13H/1-3	HH-13H	1-3	3/11/2009							x(As, Ba, Cd, Cr, Pb)		
HH-13I/1-3	HH-13I	1-3	4/8/2009							x(Ba, Cd, Cr)		

Table DUA-1
Summary of Soil Samples and Parameters Included in RAO and Data Usability Assessment
New Bedford High School, New Bedford, MA

Sample Location			Sample Date		VOCs	PAHs	EPH	VPH	PCBs	Metals	TPH	Dioxin/PCB Congener
HH-13J/1-3	HH-13J	1-3	4/8/2009						x	x(As, Ba, Cd, Cr, Pb)		
HH-30A/1-3	HH-30A	1-3	4/2/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HJ-25A/1-3	HJ-25A	1-3	4/1/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRE-10/1-3	HRE-10	1-3	3/31/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRG-12A/1-3	HRG-12A	1-3	4/1/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRG-14A/1-3	HRG-14A	1-3	4/1/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HS-11/0-0.5	HS-11	0-0.5	9/9/2004			x			x			
HS-12/0-0.5	HS-12	0-0.5	9/9/2004						x			
NBHS-SS-1/0-0.5	NBHS-SS-1	0-0.5	8/6/2008						x			
NBHS-SS-2/0-0.5	NBHS-SS-2	0-0.5	8/6/2008						x			
NBHS-SS-3/0-0.5	NBHS-SS-3	0-0.5	8/6/2008						x			
NBHS-SS-4/0-0.5	NBHS-SS-4	0-0.5	8/6/2008						x			
NBHS-SS-10/0-0.5	NBHS-SS-10	0-0.5	8/6/2008						x			
SB-361/0-1	SB-361	0-1	3/4/2009			x			x	x		
SB-361/1-3	SB-361	1-3	3/4/2009			x			x	x		
SB-361/6.5	SB-361	6.5	3/4/2009			x			x	x		
SS-5/0-0.5	SS-5	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-50/0-0.5	SS-50	0-0.5	12/2/2008			x			x	x		
SS-52/0-0.5	SS-52	0-0.5	12/2/2008			x			x	x		
SS-52/1-3	SS-52	1-3	3/31/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
SS-52/0-1	SS-52	0-1	06/08/2011									x
SS-52/1-3	SS-52	1-3	06/08/2011									x
Exposure Point 7												
VSS-4/0-0.5	VSS-4	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-53/0-0.5	SS-53	0-0.5	12/2/2008			x			x	x		
SS-54/0-0.5	SS-54	0-0.5	12/2/2008			x			x	x		
SS-55/0-0.5	SS-55	0-0.5	12/2/2008			x			x	x		
SS-56/0-0.5	SS-56	0-0.5	12/2/2008			x			x	x		
SS-57/0-0.5	SS-57	0-0.5	12/2/2008			x			x	x		
SB-362/0-1	SB-362	0-1	3/4/2009		x	x			x	x		
SB-362/1-3	SB-362	1-3	3/4/2009			x			x	x		
SB-362/5	SB-362	5	3/4/2009			x			x	x		
SB-362/6.5	SB-362	6.5	3/4/2009			x			x	x		
SB-362/0-1	SB-362	0-1	06/08/2011									x
SB-362/1-3	SB-362	1-3	06/08/2011									x
SB-363/0-1	SB-363	0-1	3/4/2009			x			x	x		
SB-363/1-3	SB-363	1-3	3/4/2009			x			x	x		
SB-363/5	SB-363	5	3/4/2009			x			x	x		
Exposure Point 8												
HG-2/1-3	HG-2	1-3	12/29/2004			x(SVOC)			x	x		
HG-2/0-1	HG-2	0-1	4/15/2010			x			x	x(RCRA 8)		x
HG-2/1-3	HG-2	1-3	4/15/2010			x			x	x		x
HG-2/5-7	HG-2	5-7	4/15/2010		x	x	x	x	x	x		x
HG2.5/1-3	HG2.5	1-3	2/22/2005						x			
HG2.5+HH2.5/1-3	HG2.5+HH2.5	1-3	2/22/2005			x(SVOC)				x(RCRA 8)		
HG3/1-3	HG3	1-3	12/29/2004						x			
HG3/1-3	HG3	1-3	2/22/2005						x			
HG4/1-3	HG4	1-3	12/29/2004						x			
HG4/1-3	HG4	1-3	2/22/2005						x			
HG4+HG3/1-3	HG4+HG3	1-3	12/29/2004			x(SVOC)				x		
HG3+HG4/1-3	HG3+HG4	1-3	2/22/2005			x(SVOC)				x		
HG5/0.5-3	HG5	0.5-3	12/28/2004						x			
HG6/0.5-3	HG6	0.5-3	12/28/2004						x			
HG6+HG5/0.5-3	HG6+HG5	0.5-3	12/28/2004							x		
HG7/0.75-3	HG7	3	12/28/2004						x			
HG7+HH7/0.75-3	HG7+HH7	3	12/28/2004							x		
HG8/1.5-3	HG8	1.5-3	12/28/2004						x			
HG9/1.5-3	HG9	1.5-3	12/28/2004						x			
HG10/2-3	HG10	2-3	12/28/2004						x			
HG10+HG9/1.5-3	HG10+HG9	1.5-3	12/28/2004			x(SVOC)				x(RCRA 8)		
HH2.5/1.5-3	HH2.5	1.5-3	2/22/2005						x			
HH3/0-1.5	HH3	0-1.5	2/22/2005			x(SVOC)			x	x(RCRA 8)		
HH3/1.5-3	HH3	1.5-3	2/22/2005						x			
HH4/1-3	HH4	1-3	2/22/2005						x			
HH4+HI4/1-3	HH4+HI4	1-3	2/22/2005			x(SVOC)				x(RCRA 8)		
HH5/0.75-3	HH5	0.75-3	12/28/2004						x			
HH5+HI5/0.75-3	HH5+HI5	0.75-3	12/28/2004							x(RCRA 8)		
HH7/1.25-3	HH7	1.25-3	12/28/2004						x			
HH8/0.5-3	HH8	0.5-3	12/28/2004						x			
HH8+HG8/0.5-3	HH8+HG8	0.5-3	12/28/2004							x(RCRA 8)		
HH9/1-3	HH9	1-3	12/28/2004						x			
HH9+HI9/0.75-3	HH9+HI9	0.75-3	12/28/2004							x(RCRA 8)		
HH10/1.5-3	HH10	1.5-3	12/29/2004						x			
HH10+HI10/1-3	HH10+HI10	1-3	12/29/2004			x(SVOC)				x(RCRA 8)		
HI2.5/1-2	HI2.5	1-2	2/22/2005						x			
HI2.5+HJ2.5/0-2	HI2.5+HJ2.5	0-2	2/22/2005			x(SVOC)				x(RCRA 8)		
HI3/1-3	HI3	1-3	2/22/2005						x			
HI3+HH3/1-3	HI3+HH3	1-3	2/22/2005			x(SVOC)				x(RCRA 8)		
HI4/1-3	HI4	1-3	2/22/2005						x			
HI5/1-3	HI5	1-3	12/28/2004						x			
HI6/1-3	HI6	1-3	12/28/2004						x			
HI6+HH6/1-3	HI6+HH6	1-3	12/28/2004			x(SVOC)				x(RCRA 8)		
HI7+HJ7/1-3	HI7+HJ7	1-3	12/28/2004							x(RCRA 8)		
HI7/1-2	HI7	1-2	12/28/2004						x			
HI8/0.75-3	HI8	0.75-3	12/28/2004						x			
HI9/0.75-3	HI9	0.75-3	12/28/2004						x			
HI10/1-3	HI10	1-3	12/29/2004						x			
HI-10A/0-1	HI-10A	0-1	3/11/2009						x			
HI-10A/1-3	HI-10A	1-3	3/11/2009						x			
HI-10B/0-1	HI-10B	0-1	3/11/2009						x			
HI-10B/1-3	HI-10B	1-3	3/11/2009						x			
HI-10C/0-1	HI-10C	0-1	3/11/2009						x			
HI-10C/1-2	HI-10C	1-2	3/11/2009						x			

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HI-10E/1-3	HI-10E	1-3	3/11/2009						x			
HJ2.5/0-2	HJ2.5	0-2	2/22/2005			x(SVOC)			x	x(RCRA 8)		
HJ2.5/2-3	HJ2.5	2-3	2/22/2005						x			
HJ3/2.5-3	HJ3	2.5-3	2/22/2005						x			
HJ4/1.5-3	HJ4	1.5-3	2/22/2005						x			
HJ4+HK4/0.5-3	HJ4+HK4	0.5-3	2/22/2005			x(SVOC)				x(RCRA 8)		
HJ5/2-3	HJ5	2-3	12/28/2004						x			
HJ5+HK5/1-3	HJ5+HK5	1-3	12/28/2004			x(SVOC)				x(RCRA 8)		
HJ6/1-2.5	HJ6	1-2.5	12/28/2004						x			
HJ7/1-3	HJ7	1-3	12/28/2004						x			
HJ8/0.5-2.5	HJ8	0.5-2.5	12/28/2004						x			
HJ8+HI8/0.5-3	HJ8+HI8	0.5-3	12/28/2004			x(SVOC)				x(RCRA 8)		
HJ9/1-3	HJ9	1-3	12/28/2004						x			
HJ9+HK8/0.5-2.5	HJ9+HK8	0.5-2.5	12/28/2004							x(RCRA 8)		
HJ10/1-3	HJ10	1-3	12/29/2004			x(SVOC)			x	x(RCRA 8)		
HJ-10A/1-3	HJ-10A	1-3	3/11/2009						x			
HJ-10B/1-3	HJ-10B	1-3	3/11/2009						x			
HJ-10C/0-1	HJ-10C	0-1	3/11/2009						x	x(Cd, Cr, Pb)		
HJ-10C/1-3	HJ-10C	1-3	3/11/2009						x	x(Cd, Cr, Pb)		
HJ-10D/0-1	HJ-10D	0-1	3/11/2009						x	x(Cd, Cr, Pb)		
HJ-10D/1-3	HJ-10D	1-3	3/11/2009						x	x(Cd, Cr, Pb)		
HJ-10F/0-1	HJ-10F	0-1	3/11/2009						x	x(Cd, Cr, Pb)		
HJ-10F/1-3	HJ-10F	1-3	3/11/2009						x	x(Cd, Cr, Pb)		
HK2.5/0.5-3	HK2.5	0.5-3	2/22/2005						x			
HK2.5+HM2.5/0.5-3	HK2.5+HM2.5	0.5-3	2/22/2005			x(SVOC)				x(RCRA 8)		
HK4/0.5-3	HK4	0.5-3	2/22/2005						x			
HK5/1-3	HK5	1-3	12/28/2004						x			
HK6/0.25-3	HK6	0.25-3	12/28/2004						x			
HK6+HJ6/0.25-3	HK6+HJ6	0.25-3	12/28/2004							x(RCRA 8)		
HK7/2-3	HK7	2-3	12/28/2004						x			
HK7+HL7/1-3	HK7+HL7	1-3	12/28/2004							x(RCRA 8)		
HK8/1-2	HK8	1-2	12/28/2004						x			
HL3/0.25-3	HL3	0.25-3	2/22/2005						x			
HL3+HJ3/0.25-3	HL3+HJ3	0.25-3	2/22/2005			x(SVOC)				x(RCRA 8)		
HL4/2-3	HL4	2-3	2/22/2005			x(SVOC)			x	x(RCRA 8)		
HL7/1-1.5	HL7	1-1.5	12/28/2004						x			
HM2.5/1-2	HM2.5	1-2	2/22/2005						x			
HM3/0.75-1.5	HM3	0.75-1.5	2/22/2005						x			
HN3/1-2	HN3	1-2	2/22/2005						x			
HN3+HM3/0.75-2	HN3+HM3	0.75-2	2/22/2005			x(SVOC)				x(RCRA 8)		
HO2.5/0.5-1.5	HO2.5	0.5-1.5	2/22/2005						x			
HO2.5+HO3/0.5-1.5	HO2.5+HO3	0.5-1.5	2/22/2005			x(SVOC)				x(RCRA 8)		
HO3/0.5-1.25	HO3	0.5-1.25	2/22/2005						x			
HS-2/0-0.5	HS-2	0-0.5	9/9/2004						x			
SB-350/0.5	SB-350	0.5	8/21/2008						x			
SB-350/5	SB-350	5	8/21/2008			x			x	x		
SB-350/8	SB-350	8	8/21/2008			x			x	x		
SB-368/0-1	SB-368	0-1	7/15/2011			x			x	x		
SB-368/1-2.5	SB-368	1-2.5	7/15/2011			x			x	x		
SB-369/0-1	SB-369	0-1	7/15/2011			x			x	x		
SB-369/1-3	SB-369	1-3	7/15/2011			x			x	x		
SB-370/0-1	SB-370	0-1	7/15/2011			x			x	x		
SB-370/1-3	SB-370	1-3	7/15/2011			x			x	x		
SS-1/0-0.5	SS-1	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-1/0.5-1	SS-1	0.5-1	7/23/2001				x		x	x(RCRA 8)		
SS-2/0-0.5	SS-2	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-15/0-0.5	SS-15	0-0.5	7/23/2001						x	x(RCRA 8)		
SS-58/0-0.5	SS-58	0-0.5	12/2/2008			x			x	x		
SS-59/0-0.5	SS-59	0-0.5	12/2/2008			x			x	x		
SS-60/0-0.5	SS-60	0-0.5	12/2/2008			x			x	x		
SS-61/0-0.5	SS-61	0-0.5	12/2/2008			x			x	x		
SS-62/0-0.5	SS-62	0-0.5	12/2/2008			x			x	x		
Exposure Point 9												
HA29/1-2.5	HA29	1-2.5	12/30/2004						x			
HA29+HB29/1-3	HA29+HB29	1-3	12/30/2004			x(SVOC)				x(RCRA 8)		
HB25/1-3	HB25	1-3	12/30/2004						x			
HB25+HB26/0.5-3	HB25+HB26	0.5-3	12/30/2004			x(SVOC)				x(RCRA 8)		
HB26/0.5-3	HB26	0.5-3	12/30/2004						x			
HB-26/1-3	HB-26	1-3	4/15/2010			x			x	x		
HB-26/3-5	HB-26	3-5	4/15/2010			x			x	x		
HB27/1-3	HB27	1-3	12/30/2004						x			
HB28/1.5-3	HB28	1.5-3	12/30/2004						x			
HB28+HB27/1-3	HB28+HB27	1-3	12/30/2004			x(SVOC)				x(RCRA 8)		
HB29/1-3	HB29	1-3	12/30/2004						x			
COMP SS-13-A,F,S,T/0.5-4	COMP SS-13-A	0.5-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-AC,AD,AE,AF/0.5-4	COMP SS-13-A	0.5-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-AS,AT,AU,AV/0.5-4	COMP SS-13-A	0.5-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-AW,AX,AY,AZ/0.5-4	COMP SS-13-A	0.5-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-G,H,I,J/0.5-4	COMP SS-13-G	0.5-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-M,N,O,P/1-4	COMP SS-13-M	1-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-Q,R,C,D/1-4	COMP SS-13-Q	1-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-U,Z,AA,AB/1-4	COMP SS-13-U	1-4	9/2/2004			x(SVOC)				x(RCRA 8)		
COMP SS-13-V,W, X, Y/0.5-4	COMP SS-13-V	0.5-4	9/2/2004			x(SVOC)				x(RCRA 8)		
SS-13-A/0.5-4	SS-13-A	0.5-4	9/2/2004						x	x(Pb)		
SS-13-AB/2.5-4	SS-13-AB	2.5-4	9/2/2004						x	x(Pb)		
SS-13-AC/2-4	SS-13-AC	2-4	9/2/2004						x	x(Pb)		
SS-13-AD/1-4	SS-13-AD	1-4	9/2/2004						x	x(Pb)		
SS-13-AE/1-4	SS-13-AE	1-4	9/2/2004						x	x(Pb)		
SS-13-AF/0.5-4	SS-13-AF	0.5-4	9/2/2004						x	x(Pb)		
SS-13-AG/1-4	SS-13-AG	1-4	9/2/2004						x	x(Pb)		
SS-13-AI/1-4	SS-13-AI	1-4	9/2/2004						x	x(Pb)		
SS-13-AQ/1-4	SS-13-AQ	1-4	9/2/2004						x	x(Pb)		
SS-13-AR/0.5-1.5	SS-13-AR	0.5-1.5	9/2/2004						x	x(Pb)		

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SS-13-AS/0.5-4	SS-13-AS	0.5-4	9/2/2004						x	x(Pb)		
SS-13-AT/1-4	SS-13-AT	1-4	9/2/2004						x	x(Pb)		
SS-13-AU/1-4	SS-13-AU	1-4	9/2/2004						x	x(Pb)		
SS-13-AV/1-4	SS-13-AV	1-4	9/2/2004						x	x(Pb)		
SS-13-AW/1-4	SS-13-AW	1-4	9/2/2004						x	x(Pb)		
SS-13-B/0.5-4	SS-13-B	0.5-4	9/2/2004						x	x(Pb)		
SS-13-C/1-4	SS-13-C	1-4	9/2/2004						x	x(Pb)		
SS-13-D/1-4	SS-13-D	1-4	9/2/2004						x	x(Pb)		
SS-13-E/1-4	SS-13-E	1-4	9/2/2004						x	x(Pb)		
SS-13-F/0.5-4	SS-13-F	0.5-4	9/2/2004						x	x(Pb)		
SS-13-G/0.5-4	SS-13-G	0.5-4	9/2/2004						x	x(Pb)		
SS-13-H/1-4	SS-13-H	1-4	9/2/2004						x	x(Pb)		
SS-13-I/1-4	SS-13-I	1-4	9/2/2004						x	x(Pb)		
SS-13-J/2-4	SS-13-J	2-4	9/2/2004						x	x(Pb)		
SS-13-L/0.5-4	SS-13-L	0.5-4	9/2/2004						x	x(Pb)		
SS-13-M/1-4	SS-13-M	1-4	9/2/2004						x	x(Pb)		
SS-13-N/1-4	SS-13-N	1-4	9/2/2004						x	x(Pb)		
SS-13-O/1-4	SS-13-O	1-4	9/2/2004						x	x(Pb)		
SS-13-P/1-4	SS-13-P	1-4	9/2/2004						x	x(Pb)		
SS-13-V/0.5-1.5	SS-13-V	0.5-1.5	9/2/2004						x	x(Pb)		
SS-13-W/1-4	SS-13-W	1-4	9/2/2004						x	x(Pb)		
SS-13-X/0.5-4	SS-13-X	0.5-4	9/2/2004						x	x(Pb)		
SS-13-Y/0.5-4	SS-13-Y	0.5-4	9/2/2004						x	x(Pb)		
SB-349/8	SB-349	8	8/21/2008			x			x	x		
SB-349/11	SB-349	11	8/21/2008			x			x	x		
SB-349/14	SB-349	14	8/21/2008							x		
SS-13/1-2	SS-13	1-2	7/23/2001			x(SVOC)	x		x	x(RCRA 8)		
HB12/2.5-3	HB12	2.5-3	12/29/2004						x			
HB12+HB16/2.5-3	HB12+HB16	2.5-3	12/29/2004			x(SVOC)				x(RCRA 8)		
HB16/2.5-3	HB16	2.5-3	12/29/2004						x			
HC12/2-3	HC12	2-3	12/29/2004						x			
HC13/1.5-3	HC13	1.5-3	12/29/2004						x			
HC13+HC12+HD12/1-3	HC13+HC12+H	1-3	12/29/2004			x(SVOC)				x(RCRA 8)		
HC14/2.5-3	HC14	2.5-3	12/29/2004						x			
HC15/2-3	HC15	2-3	12/29/2004						x			
HC16/1.5-3	HC16	1.5-3	12/29/2004						x			
HC16+HC15+HC14/1.5-3	HC16+HC15+H	1.5-3	12/29/2004			x(SVOC)				x(RCRA 8)		
HD12/1-3	HD12	1-3	12/29/2004						x			
HD13+HD14+HD15/1.5-3	HD13+HD14+H	1.5-3	12/29/2004			x(SVOC)				x(RCRA 8)		
HD14/2-3	HD14	2-3	12/29/2004						x			
HD-14A/1-3	HD-14A	1-3	3/10/2009						x			
HD-14B/1-3	HD-14B	1-3	3/10/2009						x			
HD-14C/1-3	HD-14C	1-3	3/10/2009						x			
HD-14D/1-3	HD-14D	1-3	3/10/2009						x			
HD15/1.5-3	HD15	1.5-3	12/29/2004						x			
HRA33/1-3	HRA33	1-3	2/22/2006						x		x(GRO)	
HRC-33/0.67-2	HRC-33	0.67-2	2/22/2006						x			
HRC-33A/1-3	HRC-33A	1-3	2/27/2009		x				x			
HRC-33B/1-3	HRC-33B	1-3	2/27/2009						x			
HRC-33C/1-3	HRC-33C	1-3	2/27/2009						x			
HRC-33D/1-3	HRC-33D	1-3	2/27/2009						x			
HRC-33E/1-3	HRC-33E	1-3	2/27/2009						x			
HRC-33F/1-3	HRC-33F	1-3	2/27/2009						x			
HRC-33I/1-3	HRC-33I	1-3	3/24/2009						x			
HRC-33J/1-3	HRC-33J	1-3	3/24/2009						x			
HRC-33L/1-3	HRC-33L	1-3	4/3/2009			x				x(As, Ba, Cd, Cr, Pb)		
HRC-33M/1-3	HRC-33M	1-3	4/3/2009			x				x(As, Ba, Cd, Cr, Pb)		
HRC-33N/1-3	HRC-33N	1-3	4/3/2009			x				x(As, Ba, Cd, Cr, Pb)		
HRE33/0.5-3	HRE33	0.5-3	2/22/2006						x			
HRG-33/1-3	HRG-33	1-3	2/22/2006						x			
SB-273/5.5	SB-273	5.5	7/16/2008			x			x	x		
SB-273/8	SB-273	8	7/16/2008			x			x	x		
SB-274/4	SB-274	4	7/16/2008			x			x	x		
SB-274/8	SB-274	8	7/16/2008			x			x	x		
SB-275/4	SB-275	4	7/16/2008			x			x	x		
SB-275/9.5	SB-275	9.5	7/16/2008			x			x	x		
SB-276/4	SB-276	4	7/16/2008						x			
SB-276/9.5	SB-276	9.5	7/16/2008						x			
SB-277/4	SB-277	4	7/16/2008			x			x	x		
SB-277/9	SB-277	9	7/16/2008			x			x	x		
SB-278/4	SB-278	4	7/17/2008						x			
SB-278/6	SB-278	6	7/17/2008						x			
SB-279/4	SB-279	4	7/23/2008			x			x	x		
SB-279/11	SB-279	11	7/23/2008			x			x	x		
SB-280/4	SB-280	4	7/23/2008						x	x		
SB-280/9.5	SB-280	9.5	7/23/2008						x	x		
SB-281/4	SB-281	4	7/21/2008			x			x	x		
SB-281/8	SB-281	8	7/21/2008			x			x	x		
SB-282/3.5	SB-282	3.5	7/21/2008						x			
SB-282/8	SB-282	8	7/21/2008						x			
SB-283/3.5	SB-283	3.5	7/17/2008			x			x	x		
SB-283/6	SB-283	6	7/17/2008			x			x	x		
SB-284/3	SB-284	3	7/17/2008						x			
SB-284/5	SB-284	5	7/17/2008						x			
SB-285/3.5	SB-285	3.5	7/17/2008			x			x	x		
SB-285/7.5	SB-285	7.5	7/17/2008			x			x	x		
SB-286/4	SB-286	4	7/17/2008						x			
SB-286/9	SB-286	9	7/17/2008						x			
SB-287/4	SB-287	4	7/17/2008			x			x	x		
SB-287/9	SB-287	9	7/17/2008			x			x	x		
SB-288/4	SB-288	4	7/17/2008						x			
SB-288/9	SB-288	9	7/17/2008						x			
SB-289/3.5	SB-289	3.5	7/17/2008			x			x	x		

Table DUA-1
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New Bedford High School, New Bedford, MA

Sample Location			Sample Date		VOCs	PAHs	EPH	VPH	PCBs	Metals	TPH	Dioxin/PCB Congener
SB-289/6	SB-289	6	7/17/2008			x			x	x		
SB-290/2.5	SB-290	2.5	7/21/2008						x			
SB-290/6	SB-290	6	7/21/2008						x			
SB-291/2	SB-291	2	7/21/2008						x			
SB-291/6	SB-291	6	7/21/2008						x			
SB-292/2	SB-292	2	7/21/2008						x			
SB-292/5	SB-292	5	7/21/2008						x			
SB-293/6.5	SB-293	6.5	7/21/2008			x			x	x		
SB-293/9	SB-293	9	7/21/2008			x			x	x		
SB-293/12	SB-293	12	7/21/2008							x		
SB-294/4	SB-294	4	7/21/2008						x	x		
SB-294/8.5	SB-294	8.5	7/21/2008						x	x		
SB-294/12	SB-294	12	7/21/2008							x		
SB-295/5.5	SB-295	5.5	7/22/2008						x			
SB-295/9	SB-295	9	7/22/2008						x			
SB-296/5	SB-296	5	7/22/2008			x			x	x		
SB-296/10	SB-296	10	7/22/2008			x			x	x		
SB-297/6	SB-297	6	7/22/2008			x			x	x		
SB-297/8	SB-297	8	7/22/2008			x			x	x		
SB-297/11	SB-297	11	7/22/2008							x		
SB-298/4	SB-298	4	8/4/2008						x	x		
SB-298/8	SB-298	8	8/4/2008						x	x		
SB-299/4	SB-299	4	8/4/2008						x			
SB-299/8	SB-299	8	8/4/2008						x			
SB-300/4	SB-300	4	7/22/2008			x			x	x		
SB-300/8	SB-300	8	7/22/2008			x			x	x		
SB-301/7	SB-301	7	7/22/2008						x			
SB-301/10.5	SB-301	10.5	7/22/2008						x			
SB-302/2.5	SB-302	2.5	7/22/2008						x	x		
SB-302/8	SB-302	8	7/22/2008						x	x		
SB-303/5	SB-303	5	7/22/2008			x			x	x		
SB-303/10	SB-303	10	7/22/2008			x			x	x		
SB-304/5	SB-304	5	7/22/2008						x			
SB-304/8	SB-304	8	7/22/2008						x			
SB-305/4	SB-305	4	7/22/2008						x	x		
SB-305/9	SB-305	9	7/22/2008						x	x		
SB-307/3	SB-307	3	7/23/2008						x	x		
SB-307/6	SB-307	6	7/23/2008						x	x		
SB-307/9	SB-307	9	7/23/2008							x		
SB-308/6	SB-308	6	7/23/2008			x			x	x		
SB-308/3-4	SB-308	3-4	5/20-21/2009			x						
SB-309/4	SB-309	4	7/23/2008						x			
SB-309/8	SB-309	8	7/23/2008						x			
SB-310/3	SB-310	3	7/23/2008						x	x		
SB-310/7	SB-310	7	7/23/2008						x	x		
SB-311/6	SB-311	6	7/23/2008			x			x	x		
SB-311/9	SB-311	9	7/23/2008			x			x	x		
SB-312/5	SB-312	5	8/5/2008			x			x	x		
SB-312/9	SB-312	9	8/5/2008			x			x	x		
SB-313/5	SB-313	5	8/4/2008						x			
SB-313/8	SB-313	8	8/4/2008						x			
SB-364/1-3	SB-364	1-3	3/4/2009			x			x	x		
SB-364/6	SB-364	6	3/4/2009			x			x	x		
SB-364/9.5	SB-364	9.5	3/4/2009			x			x	x		
SS-3/1-2	SS-3	1-2	7/23/2001			x(SVOC)			x	x(RCRA 8)		
NBHS-2/1.5	NBHS-2	1.5	8/4/2008						x			
NBHS-2/3.5	NBHS-2	3.5	8/4/2008						x			
NBHS-2/5	NBHS-2	5	8/4/2008						x			
NBHS-3/4	NBHS-3	4	7/30/2008						x			
NBHS-3/6	NBHS-3	6	7/30/2008						x			
NBHS-4/2	NBHS-4	2	7/31/2008						x			
NBHS-4/6	NBHS-4	6	7/31/2008			x			x	x		
NBHS-4/8	NBHS-4	8	7/31/2008			x			x	x		
NBHS-5/4	NBHS-5	4	7/30/2008						x	x		
NBHS-5/8	NBHS-5	8	7/30/2008						x	x		
NBHS-6/3	NBHS-6	3	7/28/2008						x	x		
NBHS-6/6	NBHS-6	6	7/28/2008						x	x		
NBHS-7/3	NBHS-7	3	7/29/2008			x			x	x		
NBHS-7/7	NBHS-7	7	7/29/2008			x			x	x		
NBHS-8/2.5	NBHS-8	2.5	7/28/2008						x			
NBHS-8/6	NBHS-8	6	7/28/2008						x			
HE-44B/0-1	HE-44B	0-1	3/31/2009						x	x(Cd, Pb)		
HE-44B/1-3	HE-44B	1-3	3/31/2009						x	x(Cd, Pb)		
Exposure Point 10												
HA-19D/0-1	HA-19D	0-1	5/19/2009						x	x(As, Ba, Cd, Cr, Pb)		
HA-19D/1-3	HA-19D	1-3	5/19/2009						x	x(As, Ba, Cd, Cr, Pb)		
HA-19S/1-3	HA-19S	1-3	7/7/2009							x(Pb)		
HA33/1-3	HA33	1-3	1/11/2005						x			
HA33+HA35/1-3	HA33+HA35	1-3	1/11/2005			x(SVOC)				x(RCRA 8)		
HA35/1-1.5	HA35	1-1.5	1/11/2005						x			
HA-36/1-3	HA-36	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HA38/1-3	HA38	1-3	1/11/2005						x			
HA38+HA40/0.5-3	HA38+HA40	0.5-3	1/11/2005			x(SVOC)				x(RCRA 8)		
HA40/0.5-3	HA40	0.5-3	1/11/2005						x			
HA41+HA42/0.75-3	HA41+HA42	0.75-3	1/11/2005			x(SVOC)				x(RCRA 8)		
HA42/0.5-3	HA42	0.5-3	1/11/2005						x			
HA43/0.75-3	HA43	0.75-3	1/11/2005						x			
HA43+HA44/0.75-3	HA43+HA44	0.75-3	1/11/2005			x(SVOC)				x(RCRA 8)		
HA-43/44/0-1	HA-43/44	0-1	06/07/2011									x
HA-43/44/1-2	HA-43/44	1-2	06/07/2011									x
HA44/0.75-3	HA44	0.75-3	1/11/2005						x			
HB-23 E/N/W/0-1	HB-23 E/N/W	0-1	7/13/2011						x	x(Ba, Cd, Cr)		
HB-23 E/N/W/1-3	HB-23 E/N/W	1-3	7/13/2011						x	x(Ba, Cd, Cr)		

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New Bedford High School, New Bedford, MA

Sample Location			Sample Date		VOCs	PAHs	EPH	VPH	PCBs	Metals	TPH	Dioxin/PCB Congener
HB-23G/0-1	HB-23G	0-1	3/10/2009						x	x(As, Ba, Cd, Cr, Pb)		
HB-23G/1-3	HB-23G	1-3	3/10/2009						x	x(As, Ba, Cd, Cr, Pb)		
HB-23H/0-1	HB-23H	0-1	3/10/2009						x	x(As, Ba, Cd, Cr, Pb)		
HB-23H/1-3	HB-23H	1-3	3/10/2009						x	x(As, Ba, Cd, Cr, Pb)		
HB-23M/1-3	HB-23M	1-3	4/9/2009							x(Pb)		
HB-23N/1-3	HB-23N	1-3	4/9/2009							x(Pb)		
HB-26/0-1	HB-26	0-1	4/15/2010									x
HB-26/1-3	HB-26	1-3	4/15/2010			x			x	x		x
HB-26/3-5	HB-26	3-5	4/15/2010			x			x	x		x
HB31+HB32/0.5-3	HB31+HB32	0.5-3	12/30/2004			x(SVOC)				x(RCRA8)		
HB32/0.5-3	HB32	0.5-3	12/30/2004						x			
HB33/0.2-3	HB33	0.2-3	12/30/2004						x			
HB33+HB36/0.2-3	HB33+HB36	0.2-3	12/30/2004			x(SVOC)				x(RCRA8)		
HB36/0.5-3	HB36	0.5-3	12/30/2004						x			
HB37/0.5-3	HB37	0.5-3	12/30/2004						x			
HB37+HB38/0.2-3	HB37+HB38	0.2-3	12/30/2004			x(SVOC)				x(RCRA8)		
HB38/0.2-3	HB38	0.2-3	12/30/2004						x			
HB-39A/0-1	HB-39A	0-1	6/16/2009							x(As, Ba, Cd, Cr, Pb)		
HB-39A/1-3	HB-39A	1-3	6/16/2009							x(As, Ba, Cd, Cr, Pb)		
HB-39D/0-1	HB-39D	0-1	6/16/2009							x(As, Ba, Cd, Cr, Pb)		
HB-39D/1-3	HB-39D	1-3	6/16/2009							x(As, Ba, Cd, Cr, Pb)		
HB-40H/1-3	HB-40H	1-3	6/16/2009							x(As, Ba, Cd, Cr, Pb)		
HB41+HB42/0.2-3	HB41+HB42	0.2-3	12/30/2004			x(SVOC)				x(RCRA8)		
HB42/0.2-3	HB42	0.2-3	12/30/2004						x			
HB43/1.5-3	HB43	1.5-3	12/30/2004						x			
HB43+HB44/0.5-3	HB43+HB44	0.5-3	12/30/2004			x(SVOC)				x(RCRA8)		
HB44/0.5-3	HB44	0.5-3	12/30/2004						x			
HC-22C/0-1	HC-22C	0-1	5/21/2009						x	x(As, Ba, Cd, Cr, Pb)		
HC-22C/1-3	HC-22C	1-3	5/21/2009						x	x(As, Ba, Cd, Cr, Pb)		
HC-22E/1-3	HC-22E	1-3	5/21/2009						x	x(Pb)		
HC-22H/1-3	HC-22H	1-3	5/21/2009							x(Pb)		
HC23/1-3	HC23	1-3	12/29/2004						x			
HRK-33A/1-3	HRK-33A	1-3	4/2/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRM-23/2-3	HRM-23	2-3	2/21/2006						x			
HRM-23/1-3	HRM-23	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRM-25/1.5-3	HRM-25	1.5-3	2/21/2006		x				x			
HRN26/0.5-3	HRN26	0.5-3	2/22/2006						x			
HRN-26/1-3	HRN-26	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRN28/1.5-3	HRN28	1.5-3	2/22/2006						x			
HRO-30/1.5-3	HRO-30	1.5-3	2/22/2006						x			
HRO-30/1-3	HRO-30	1-3	4/7/2009			x			x	x(As, Ba, Cd, Cr, Pb)		
HRO-33/2-3	HRO-33	2-3	2/22/2006						x			
HRP.5-33/1.5-3	HRP.5-33	1.5-3	2/22/2006		x				x			
HRP31/1.5-3	HRP31	1.5-3	2/22/2006						x			
HS-8/0-0.5	HS-8	0-0.5	9/9/2004						x			
SB-01/1	SB-01	1	3/31/2008			x			x	x		
SB-01/3	SB-01	3	3/31/2008			x			x	x		
SB-02/1	SB-02	1	3/31/2008			x			x	x		
SB-02/3	SB-02	3	3/31/2008			x			x	x		
SB-03/1	SB-03	1	3/31/2008			x			x	x		
SB-03/3	SB-03	3	3/31/2008			x			x	x		
SB-04/1	SB-04	1	3/31/2008			x			x	x		
SB-04/3.5	SB-04	3.5	3/31/2008			x			x	x		
SB-05/1	SB-05	1	3/31/2008			x			x	x		
SB-05/8	SB-05	8	3/31/2008			x			x	x		
SB-270/9.5	SB-270	9.5	7/16/2008			x			x	x		
SB-270J/1-3	SB-270J	1-3	6/16/2009							x(Pb)		
SB-270U/1-3	SB-270U	1-3	7/6/2009							x(Pb)		
SB-271/1	SB-271	1	7/16/2008						x			
SB-271/3.5	SB-271	3.5	7/16/2008			x			x	x		
SB-271/10	SB-271	10	7/16/2008			x			x	x		
SB-272/1	SB-272	1	7/16/2008						x			
SB-272/3	SB-272	3	7/16/2008			x			x	x		
SB-272/10	SB-272	10	7/16/2008			x			x	x		
SB-306/1	SB-306	1	7/23/2008						x			
SB-306/4	SB-306	4	7/23/2008						x			
SB-306/7	SB-306	7	7/23/2008						x			
SB-359/0-1	SB-359	0-1	3/4/2009			x			x	x		
SB-359/1-3	SB-359	1-3	3/4/2009			x			x	x		
SB-359/4	SB-359	4	3/4/2009			x			x	x		
SB-359/8	SB-359	8	3/4/2009						x	x		
SB-359/12	SB-359	12	3/4/2009							x		
SB-359/0-1	SB-359	0-1	06/08/2011									x
SB-359/1-3	SB-359	1-3	06/08/2011									x
SB-364/1-3	SB-364	1-3	3/4/2009			x			x	x		
SB-364/6	SB-364	6	3/4/2009			x			x	x		
SB-364/9.5	SB-364	9.5	3/4/2009			x			x	x		
SS-3/1-2	SS-3	1-2	7/23/2001			x(SVOC)	x		x	x(RCRA8)		
SB-LSD-1/0-1	SB-LSD-1	0-1	5/12/2010						x			
SB-LSD-1/1-3	SB-LSD-1	1-3	5/12/2010						x			
SB-LSD-1/3-4	SB-LSD-1	3-4	5/12/2010						x			
SB-LSD-2/0-1	SB-LSD-2	0-1	5/12/2010						x			
SB-LSD-2/1-3	SB-LSD-2	1-3	5/12/2010						x			
SB-LSD-2/3-4	SB-LSD-2	3-4	5/12/2010						x			
SB-LSD-3/4-5	SB-LSD-3	4-5	5/12/2010						x			
TREE-DS-1/0-1	TREE-DS-1	0-1	8/24/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-DS-1/1-3	TREE-DS-1	1-3	8/24/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-DS-2/0-1	TREE-DS-2	0-1	8/24/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-DS-2/1-3	TREE-DS-2	1-3	8/24/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-HS-1/0-1	TREE-HS-1	0-1	8/23/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-HS-1/1-3	TREE-HS-1	1-3	8/23/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-HS-2/0-1	TREE-HS-2	0-1	8/23/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-HS-2/1-3	TREE-HS-2	1-3	8/23/2011						x	x(As, Ba, Cd, Cr, Pb)		

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Sample Location			Sample Date		VOCs	PAHs	EPH	VPH	PCBs	Metals	TPH	Dioxin/PCB Congener
TREE-HS-3/0-1	TREE-HS-3	0-1	8/23/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-HS-3/1-3	TREE-HS-3	1-3	8/23/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-HS-4/0-1	TREE-HS-4	0-1	8/23/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-HS-4/1-3	TREE-HS-4	1-3	8/23/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-TI-1/0-1	TREE-TI-1	0-1	8/22/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-TI-1/1-3	TREE-TI-1	1-3	8/22/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-TI-2/0-1	TREE-TI-2	0-1	8/25/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-TI-2/1-3	TREE-TI-2	1-3	8/25/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-TI-3/0-1	TREE-TI-3	0-1	8/25/2011						x	x(As, Ba, Cd, Cr, Pb)		
TREE-TI-3/1-3	TREE-TI-3	1-3	8/25/2011						x	x(As, Ba, Cd, Cr, Pb)		

Table DUA-2

Summary ofGroundwater Samples and Parameters Included in RAO and Data Usability Assessment

New Bedford High School, New Bedford, MA

Sample Location	VOCs	PAHs	PCBs	MCP Metals (total)	MCP Metals (dissolved)
MW-4		x	x	x	x
MW-5		x	x	x	x
MW-6		x	x	x	x
MW-7	x		x		
MW-7D	x				
MW-8B		x	x	x	x
MW-20	x				
MW-21	x				
MW-22	x				
MW-23	x				
MW-24	x				
MW-25	x				
MW-26	x				
MW-30	x				
MW-HH-13	x	x	x	x	x
MW-HRC-33	x	x	x	x	x

APPENDIX E

PUBLIC NOTIFICATION LETTERS

Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854

978.970.5600 PHONE
978.453.1995 FAX

www.TRCsolutions.com

TRC Reference Number: 115058

_____, 2016

Board of Health
City of New Bedford
133 William Street
New Bedford, Massachusetts 02740

Re: Notice of Availability
Partial Permanent Solution with Conditions Statement Report
New Bedford High School campus
New Bedford, Massachusetts
Release Tracking Number (RTN) 4-15685

Release Tracking Number (RTN) 4-15685

To Whom It May Concern:

TRC has prepared this notification letter on behalf of the New Bedford School Department, to inform you of the availability of a Permanent Solution with Conditions Statement for the above-referenced Site in New Bedford, Massachusetts. This notification is being submitted to you in accordance with the Massachusetts Contingency Plan, 310 CMR 40.1403(3)(f).

The Permanent Solution with Condition Statement for the above-referenced property can be reviewed at the Massachusetts Department of Environmental Protection, Southeast Regional Office, located at 20 Riverside Drive in Lakeville, Massachusetts.

Sincerely,

TRC Environmental Corporation

David M. Sullivan, LSP
Sr. Project Manager

Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854

978.970.5600 PHONE
978.453.1995 FAX

www.TRCsolutions.com

TRC Reference Number: 115058

_____, 2016

Mayor Jonathan F. Mitchell
City of New Bedford
133 William Street
New Bedford, Massachusetts 02740

Re: Notice of Availability
Partial Permanent Solution with Conditions Statement Report
New Bedford High School campus
New Bedford, Massachusetts
Release Tracking Number (RTN) 4-15685

Release Tracking Number (RTN) 4-15685

Dear Mayor Mitchell:

TRC has prepared this notification letter on behalf of the New Bedford School Department, to inform you of the availability of a Permanent Solution with Conditions Statement Report for the above-referenced Site in New Bedford, Massachusetts. This notification is being submitted to you in accordance with the Massachusetts Contingency Plan, 310 CMR 40.1403(3)(f).

The Permanent Solution with Conditions Statement for the above-referenced property can be reviewed at the Massachusetts Department of Environmental Protection, Southeast Regional Office, located at 20 Riverside Drive in Lakeville, Massachusetts.

Sincerely,

TRC Environmental Corporation

David M. Sullivan, LSP
Sr. Project Manager