APPENDIX D

Human Health Risk Assessment in Support of the Site Wide RCRA Facility Investigation at Fort Buchanan U.S. Army Garrison Fort Buchanan, Puerto Rico

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D.10.3.1 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Scenario Timeframe: Current/Future, Receptor Population: Recreational User, Age: Adult

D.10.3.2 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Scenario Timeframe: Current/Future, Receptor Population: Recreational User, Age: Adolescent

D.10.3.3 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Scenario Timeframe: Future, Receptor Population: Commercial Worker, Age: Adult

D.10.3.4 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Scenario Timeframe: Future, Receptor Population: Construction Worker, Age: Adult

D.10.3.5 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Scenario Timeframe: Future, Receptor Population: Resident, Age: Child & Adult; Surface Soil

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D.10.4.1 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan-Site 9; Scenario Timeframe: Future, Receptor Population: Construction Worker, Age: Adult

D.10.4.2 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan-Site 9; Scenario Timeframe: Future, Receptor Population: Resident, Age: Child & Adult; Subsurface Soil

D.10.5.1 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan-Site 12; Scenario Timeframe: Current/Future, Receptor Population: Recreational User, Age: Adult

D.10.5.2 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan- Site 12; Scenario Timeframe: Current/Future, Receptor Population: Recreational User, Age: Adolescent

D.10.5.3 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan- Site 12; Scenario Timeframe: Future, Receptor Population: Commercial Worker, Age: Adult

D.10.5.4 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan- Site 12; Scenario Timeframe: Future, Receptor Population: Construction Worker, Age: Adult

D.10.5.5 Risk Assessment Summary; Reasonable Maximum Exposure; Fort Buchanan- Site 12; Scenario Timeframe: Future, Receptor Population: Resident, Age: Child & Adult; Surface Media

D.10.6.1 Risk Assessment Summary; Reasonable Maximum Exposure; Northwest Boundary Area, Fort Buchanan; Scenario Timeframe: Future, Receptor Population: Off-site Resident, Age: Adult and Child

D.10.6.2 Risk Assessment Summary; Reasonable Maximum Exposure; Northwest Boundary Area, Fort Buchanan; Scenario Timeframe: Future, Receptor Population: Construction Worker, Age: Adult

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D.11.1.2 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 1; Timeframe: Current/Future, Receptor Population: Recreational User, Receptor Age: Adolescent

D.11.1.3 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 1; Timeframe: Future, Receptor Population: Commercial Worker, Receptor Age: Adult

D.11.1.4 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 1; Timeframe: Future, Receptor Population: Construction Worker, Receptor Age: Adult

D.11.1.5 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 1; Timeframe: Future, Receptor Population: Resident, Receptor Age: Child & Adult, Surface Soil

D.11.1.6 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 1; Timeframe: Future, Receptor Population: Resident, Receptor Age: Child & Adult, Subsurface Soil

D.11.2.1 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 2; Timeframe: Future, Receptor Population: Construction Worker, Receptor Age: Adult

D.11.2.2 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 2; Timeframe: Future, Receptor Population: Resident, Receptor Age: Child & Adult, Subsurface Soil

D.11.3.1 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Timeframe: Current/Future, Receptor Population: Recreational User, Receptor Age: Adult

D.11.3.2 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Timeframe: Current/Future, Receptor Population: Recreational User, Receptor Age: Adolescent

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D.11.3.3 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Timeframe: Future, Receptor Population: Commercial Worker, Receptor Age: Adult

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D.11.3.5 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Timeframe: Future, Receptor Population: Resident, Receptor Age: Child & Adult, Surface Soil

D.11.3.6 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Grouping 3; Timeframe: Future, Receptor Population: Resident, Receptor Age: Child & Adult, Subsurface Soil

D.11.4.1 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Site 9; Timeframe: Future, Receptor Population: Construction Worker, Receptor Age: Adult

D.11.4.2 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan- Site 9; Timeframe: Future, Receptor Population: Resident, Receptor Age: Child & Adult, Subsurface Soil

D.11.5.1 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan-Site 12; Timeframe: Current/Future, Receptor Population: Recreational User, Receptor Age: Adult

D.11.5.2 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan- Site 12; Timeframe: Current/Future, Receptor Population: Recreational User, Receptor Age: Adolescent

D.11.5.3 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan- Site 12; Timeframe: Future, Receptor Population: Commercial Worker, Receptor Age: Adult

D.11.5.4 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan- Site 12; Timeframe: Future, Receptor Population: Construction Worker, Receptor Age: Adult

D.11.5.5 Risk Assessment Conclusions-Consideration of Background; Reasonable Maximum Exposure; Fort Buchanan- Site 12; Timeframe: Future, Receptor Population: Resident, Receptor Age: Child & Adult, Surface Media

LIST OF ATTACHMENTS

A Samples Used in the Human Health Risk Assessment

B Risk-Based Screening for Individual Sites

C ProUCL Outputs

D Blood Lead and Vapor Intrusion Model Results

LIST OF ACRONYMS

95UCLM	95th Upper Confidence Limit of the Mean
ABS	Dermal Absorption Factor
ADI	Average Daily Intake
AF	Adherence Factor
AT	Averaging Time
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	Below ground surface
BW	Body Weight
CalEPA	California Environmental Protection Agency
CDC	Center for Disease Control
CF	Conversion Factor
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CPR	Caribbean Petroleum Refinery
CSM	Conceptual Site Model
DAD	Dermal Absorbed Dose
ED	Exposure Duration
EF	Exposure Frequency
EPC	Exposure Point Concentration
ET	Exposure Time
EV	Event Frequency
FA	Fraction Absorbed
FOD	Frequency of Detection
FORSCOM	U.S. Army Forces Command
GIABS	Gastrointestinal Dermal Absorption Factor
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
HI	Hazard Index
IEUBK	Integrated Exposure Uptake Biokinetic
IR	Ingestion Rate
IRIS	Integrated Risk Information System
IUR	Inhalation Unit Risk
K_p	Permeability Constant

LIST OF ACRONYMS

LADI	Lifetime Average Daily Intake
LOAEL	Lowest Observed Adverse Effects Level
MF	Modifying Factor
mg/kg	milligram per kilogram
MMRP	Military Munitions Response Program
MRL	Minimal Risk Levels
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NOAEL	No Observed Adverse Effects Level
NRC	National Research Council
NWBA	Northwest Boundary Area
OEHHA	Office of Environmental Health Hazard Assessment
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PEF	Particulate Emission Factor
PPRTV	Provisional Peer Reviewed Toxicity Values
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RfC	Reference Concentration
RfD	Reference Dose
RFI	RCRA Facility Investigation
RL	Reporting Limit
RME	Reasonable Maximum Exposure
ROTC	Reserve officer Training Corps
RSL	USEPA Regional Screening Level
SA	Surface Area
SF	Slope Factor
SQL	Sample Quantitation Level
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
UF	Uncertainty Factor
USARSO	U.S. Army South
UPL	Upper Prediction Limit
USEPA	United States Environmental Protection Agency

LIST OF ACRONYMS

VOC	Volatile Organic Compound
VF	Volatilization Factor

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1. HUMAN HEALTH RISK ASSESSMENT

1.1 INTRODUCTION

This Human Health Risk Assessment (HHRA) was conducted to support the Site Wide Resource Conservation and Recovery Act (RCRA) Facility Sites Investigation (RFI) for 14 sites at Fort Buchanan, Puerto Rico. The objectives of the Site Wide RFI are to characterize potential contaminants of concern in surface soil, subsurface soil, surface water, sediment, and groundwater at the Sites and to prepare baseline risk assessments for human and ecological receptors in order to support decisions regarding the need for further investigation or action at the sites. While 14 sites are included in this report, 15 total sites are part of the RFI. Site 14, the Small Arms Firing Range, is being investigated under the Military Munitions Response Program (MMRP), and therefore was not evaluated.

Previous environmental investigations have identified a number of Solid Waste Management Units (SWMUs) and other areas of potential contamination at Fort Buchanan. These areas have been designated as Sites, and the 14 Sites evaluated in this HHRA include:

- Site 1, SWMU 1: Old Hazardous Waste Containers
- Site 2, SWMU 3: Pesticides and Chemicals Burial Trench
- Site 3, SWMU 4: Spent Solvents Storage Area
- Site 4, SWMU 5: PCB Transformer Storage Area #1
- Site 5, SWMU 6: PCB Transformer Storage Area #2
- Site 6: Pesticide Storage Area
- Site 7: Building 541
- Site 8: Building S-563
- Site 9: Used Oil Staging Area
- Site 10: 65th Army Reserve Command Refueling Area
- Site 11: Heavy Equipment Storage Area
- Site 12: Old Landfill
- Site 13: Potential Hazardous Material Burial Site
- Site 15: Building S-159

Many of the sites evaluated in this Site Wide RFI are located adjacent to the old DPW complex and are within the area investigated as part of the Northwest Boundary Area (NWBA) RFI

(EA 2012). It is important to note that the NWBA RFI and associated risk assessments were focused on a groundwater trichloroethene (TCE) plume and potential source areas. The NWBA RFI evaluated risks associated with groundwater exposure on a plume-wide basis and not site by site, which presented a better indication of potential groundwater exposures. To allow for separate investigations, the Site Wide RFI is the document that characterizes potential contamination and associated risks in other media. The Site Wide RFI does include surface media data generated as part of the NWBA RFI. The individual site evaluations included in the Site Wide RFI will refer to and summarize the findings of the NWBA RFI and associated HHRA as they apply to each site. Groundwater evaluations for Sites 12 and 13, which are not within the NWBA, are included in the Site Wide RFI and HHRA.

1.2 SITE BACKGROUND

Fort Buchanan is located approximately 10 kilometers southwest of the city of San Juan, Puerto Rico. The installation is bordered by Roosevelt Avenue to the east (main gate), road PR-No. 2 to the south, Caribbean Petroleum Refinery Company (CPR) to the west, and De Diego Expressway to the north. The installation occupies approximately 746 acres within two municipalities, Bayamon and Guaynabo.

Camp Buchanan was established in 1923, originally located on a 300-acre tract of land approximately six miles south of San Juan Bay. From 1926 to 1930 Camp Buchanan was used as a maneuver training area and range by the regular Army, by National Guard troops, and as a Citizen Military Training Camp. In 1940 it was designated as Fort Buchanan and expanded to 1,514 acres, later expanding to 4,500 acres just after the end of World War II.

During World War II, Fort Buchanan housed a depot supplying the Army Antilles Department. It also processed local troops through its replacement center. The industrial complex included pier facilities, ammunition storage areas, and an extensive railroad network connecting it to the bay. After World War II, the Installation was gradually reduced in size to its present 746 acres. Until closure as an Army Installation in 1966, it remained a Command Depot with post facilities, a personnel center, and a special training center. With the deactivation of the Antilles Command in 1966, Fort Buchanan came under U.S. Army control. A detachment of Army personnel remained as a residual element designated as U.S. Army Command Group and placed under command of the U.S. Army Forces Southern Command in Panama. This element consisted of a small command group and support detachment, Rodriguez U.S. Army Hospital (inactivated in 1971), and advisory groups for the U.S. Army Reserve, the National Guard, and the Reserve Officer Training Corps (ROTC). While not related to the command, an Armed Forces

Examining and Entrance Station and Intelligence Corps Detachment (inactivated in 1971) also received support from the command.

In 1971, Fort Buchanan returned to U.S. Army control under the Third Army. It continued to support the Army Reserve, including support of seven Army Reserve Centers throughout Puerto Rico, serving as host to a number of tenant activities through the Navy, Coast Guard, Air Force Reserve components, and several non-military federal agencies. In 1973, during reorganization, the installation was re-designated as U.S. Army Garrison, Fort Buchanan, under direct control of the U.S. Army Forces Command (FORSCOM). Fort Buchanan became a U.S. Army South (USARSO) installation in June 1997, and USARSO headquarters moved to the installation in 1999. In October 2003, Fort Buchanan was transferred from an active military installation under USARSO to a reserve installation under the U.S. Army Reserve Command. Today, Fort Buchanan continues to support the both active and reserve component soldiers in Puerto Rico and the U.S. Virgin Islands. The installation also provides support to DoD operations in the Caribbean area.

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2. RISK ASSESSMENT METHODOLOGY

The HHRA evaluates the potential source of contamination and routes of migration based on current and potential future site uses to determine complete exposure pathways. The HHRA evaluates potential exposure pathways that can occur or are reasonably likely to occur under these uses. The HHRA is conducted to determine baseline risks associated with exposure to the 14 sites at Fort Buchanan. The baseline risk assumes no remedial actions or other means of exposure reduction (i.e., the use of personal protective equipment [PPE], digging restrictions, etc.). The HHRA evaluates the reasonable maximum exposure (RME) that has the potential to occur at the site. As a result, HHRA results are considered potential and should be used as a guideline in making risk management decisions.

The HHRA is performed in accordance with the U.S. Environmental Protection Agency (USEPA) guidance as referenced in this report. The HHRA evaluates the RME that has the potential to occur in accordance with USEPA guidance (USEPA 1989). The HHRA specifically follows the analysis methods set forth in the following USEPA guidance:

- *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A) (Interim Final).* Report No. EPA/540/1-89/002. Office of Emergency and Remedial Response. USEPA, December 1989.
- *Risk Assessment Guidance for Superfund Volume I-Human Health Evaluation Manual: (Part B - Development of Risk-Based Preliminary Remediation Goals) (Interim Final).* Publication 9285.7-01B. Interim. USEPA, 1991a.
- *Memorandum: Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors".* Office of Solid Waste and Emergency Response. OSWER Directive: 9285.6-03. March 25. USEPA, 1991b.
- *Exposure Factors Handbook: 2011 Version*. EPA/600/R-90/052F. USEPA, September, 2011a.
- *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part D)*. Office of Emergency and Remedial Response. Publication 9285.7-47. USEPA, December 2002a.
- *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)*. Final. Office of Superfund Remedial and Technology Innovation. EPA/540/R/99/005, OSWER 9285.7-02EP. USEPA, July 2004a.

- *Risk Assessment Guidance for Superfund, Volume I*: *Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment*). Final. Office of Superfund Remediation and Technology Innovation. EPA-540-R-070-002, OSWER 9285.7-82. USEPA, January 2009.
- *Regional Screening Levels for Chemical Contaminants at Superfund Sites*. USEPA, November 2011b.
- *ProUCL Version 4.1.00*. Software developed by USEPA. Obtained on the Internet at http://www.epa.gov/osp/hstl/tsc/software.htm. Site Characterization and Monitoring Technical Support Center. USEPA, 2011c.

These guidance documents set forth risk assessment methodology in the RCRA program and are intended to provide a conservative estimate of potential risk to be protective of human health. The HHRA methodology involves a four-step process: data collection and evaluation, exposure assessment, toxicity assessment, and risk characterization. The following chapters present details about HHRA methodology. Data collection and evaluation, including a conceptual site model (CSM), are presented in Chapter 2. The exposure assessment is presented in Chapter 3, and the toxicity assessment is presented in Chapter 4. The risk characterization is presented in Chapter 5. A discussion of uncertainties is presented in Chapter 6. Uncertainties and results of the risk characterization are considered together in developing the conclusions which are presented in Chapter 7. References consulted for this report are provided in Chapter 8.

2.1 DATA EVALUATION

Data evaluation is the first step of the HHRA. In this step, site-specific data are compiled and analyzed for data quality. The second step of data evaluation is the determination of chemicals of potential concern (COPCs) that were used to determine potential human health risks.

2.1.1 Data Used in the HHRA

For each site, a various number of samples and chemical analysis were performed. RFI field activities began in April 2007 and were completed in September 2011. Section 3 of the Site Wide RFI presents details about field activities and methodology within the 14 sites. An overview of the site sampling plans, including media sampled, number of samples taken, depth of samples, and analyses is presented in Table D.1.1. Surface soil samples were collected from 0 to 2 feet (ft) below ground surface (bgs). Subsurface soil samples were mostly collected from 2 to 6 ft bgs. However, three subsurface soil samples for Site 2 were collected from 20 to 24 ft bgs, 26 to 28 ft bgs, and 37 to 36 ft bgs.

Groundwater

Groundwater data was collected at Sites 1, 2, 3, 7, 8, 10, 12, and 13. The results for all of these sites, except Sites 12 and 13, are evaluated in the NWBA RFI (EA 2012). The NWBA RFI evaluated 153 samples collected throughout the Northwest Boundary. The samples were analyzed for inorganics, pesticides, PCBs, SVOCs, and VOCs. The groundwater risk results presented in the NWBA are presented in this HHRA. Additionally, Sites 12 and 13 will undergo additional evaluation to determine risks to potential receptors in this HHRA.

Background

The comparison of on-site data to background data is perhaps the most effective way to identify site-related impacts. This is especially true for a site with unique geology, such as Fort Buchanan, where elevated concentrations of some compounds are naturally occurring. The screening levels used in this HHRA do not take into account the natural concentrations of inorganic compounds found at the site, and thus can result in misleading conclusions.

The 95% Upper Prediction Limits (UPL) of the background dataset were calculated using the USEPA's ProUCL software (USEPA 2011c). The 95% UPL represents a cut-off value at the upper end of the range of the background data, and any on-site sample concentrations that are greater than the 95% UPL are statistically significantly different from the background dataset.

Table D.1.2 presents the range of concentrations detected in the background samples, the frequency of detection, and the 95% UPL. Appendix H of the Site Wide RFI presents the background technical memorandum, which describes in detail the statistical process for calculating background comparison values, laboratory analytical reports, data validation reports, and the ProUCL outputs for the background dataset.

2.1.2 Data Quality Evaluation

Attachment A presents a list of all samples evaluated in the HHRA. All data used in the HHRA were validated per protocols identified in USEPA guidance for data usability (USEPA 1992). Inclusion or exclusion of data in the HHRA on the basis of analytical qualifiers was performed in accordance with USEPA guidance (USEPA 1989 and 1992). The evaluation of analytical data, on the basis of qualifiers in each medium of concern, is performed using the rationale below. Analytical qualifiers are applied during the data validation process.

- Analytical results bearing the R qualifier (indicating that the data was rejected during the validation process) were not used in the HHRA.
- Analytical results bearing the U or UJ qualifier (indicating that the analyte is not detected at the given reporting limit [RL]) were retained in the data set and considered non-detects. Where warranted for statistical purposes, each analytical result bearing the U or UJ qualifier was assigned a numerical value equal to its RL.
- Analytical results bearing the J qualifier (the reported value is estimated) were retained at the measured concentration.
- Analytical results bearing the B or BJ qualifier were retained for further analysis. Analytical results for inorganic compounds are evaluated according to USEPA guidance (USEPA 1989) for inorganic COPCs bearing the B or BJ qualifiers (which indicate that the reported value was less than the contract-required detection limit, but greater than the instrument detection limit). Inorganic COPCs bearing the B or BJ qualifiers were retained in the data set at the measured concentration. Analytical results for organic compounds bearing the B qualifier (blank-related data) were evaluated as non-detects.

If duplicate samples were collected or duplicate analyses were conducted on a single sample, the following guidelines were employed to select the appropriate sample measurement:

- If both samples/analyses show that the analyte was present, the average of the two detected concentrations was retained for analysis, based on conservative professional judgment;
- If both samples/analyses were not detected, the average of the two DL concentrations was retained for analysis; and
- If only one sample/analysis indicated that the analyte was present, it was retained for analysis and the non-detect value was discarded.

2.1.3 Selection of Chemicals of Potential Concern

COPCs were selected in a risk-screening process to limit the number of chemicals and exposure routes quantitatively evaluated in the HHRA to chemicals that contribute to overall potential risks. The screening process involved risk-based chemical concentrations that take into account chemical toxicity and potential exposure routes. A chemical was selected as a COPC and retained for further evaluation in the HHRA if the maximum detected concentration in a sample medium exceeded the risk-based screening concentration. Chemicals not considered COPCs were detected at levels that present minimal risks to potential human receptors.

The USEPA Regional Screening Levels (RSLs) (USEPA 20011b) were used for risk-based screening purposes in the HHRA. The USEPA RSLs combine human health toxicity values with standard exposure scenarios to estimate analyte concentrations in environmental media that are considered by the USEPA to be protective of human exposures (including sensitive populations), over a lifetime. The screening values are based on specific, conservative, fixed levels of risk. For carcinogens, this is 10^{-6}, which is the lower bound for potential acceptable carcinogenic risk as defined by the NCP (USEPA 1990). For non-carcinogens, the screening values are based on a hazard quotient of 1.0. To account for potential additivity or cumulative effects of multiple contaminants to the same target organ, one-tenth of the acceptable non-carcinogenic threshold is used for screening. The USEPA RSL table identifies some carcinogenic contaminants where the carcinogenic RSL is greater than $1/10^{th}$ the non-carcinogenic RSL (identified in the USEPA RSL tables as "c^{**}"). In these instances, the more conservative $1/10^{th}$ the non-carcinogenic RSL is used. Background values for inorganics and selected organochlorine pesticides in soil for Fort Buchanan (Appendix H of the RFI and Table D.1.2) are provided for comparison purposes and were evaluated in the uncertainty analysis and conclusions.

Risk-based screening concentrations that are used in the selection of COPCs are scenario-specific. For areas where a recreational and residential use is evaluated, soil concentrations were compared to residential soil RSLs as a conservative measure. For areas where an industrial scenario was evaluated (i.e., commercial worker, construction worker), soil concentrations were compared to industrial soil RSLs. For the purposes of this HHRA, both the residential and industrial soil RSLs were used for surface and subsurface soil. For sediment, a medium which is contacted less than soil, an order of magnitude increase modification (i.e., 10 times) of the RSL was used as a conservative measure based on the lack of RSLs for sediment.

For groundwater, the USEPA tap water RSL values were used for screening purposes. It should be noted that the use of the tap water RSLs is conservative given that groundwater at the site is not used as tap water. Any current human exposure to groundwater at the site would, under any scenario, be much less than that of exposure to tap water in a building (e.g., tap water exposure includes showering, drinking water ingestion, general daily use). In addition, any volatile organic compounds (VOCs) detected in groundwater were screened for the potential to be a concern to indoor air through vapor intrusion. The indoor air exposure pathway screening values are taken from Table 2C of the *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* (USEPA 2002b). For surface water, a medium which is contacted much less than tap water, an order of magnitude increase modification (i.e., 10 times) of the RSL is used as a conservative measure based on the lack of RSLs for surface water.

For detected constituents not included in the USEPA RSL table, surrogate chemicals with similar toxicity were chosen where available. Specific surrogates are indicated in footnotes of the screening tables (Tables D.2.1.1 through D.2.6.2). Surrogates used in this HHRA include: acenaphthene for acenaphthylene, anthracene for phenanthrene, pyrene for benzo(g,h,i)perylene, cyclohexane for methylcyclohexane, endosulfan for endosulfan Iand endosulfan sulfate, chlordane for alpha- and gamma-chlordane, and endrin for endrin aldehyde and endrin ketone. Surrogate compounds were identified on the basis of similarity in chemical structure and toxic properties. The examples listed above demonstrate this process; a surrogate non-carcinogenic PAH (pyrene) was chosen to represent other non-carcinogenic polycyclic aromatic hydrocarbons (PAHs) [benzo(g,h,i)perlyene] that lack RSL values. In addition, structurally similar chemicals such as endosulfan for endosulfan I amd endosulfan sulfate were identified as surrogates.

In accordance with USEPA guidance, an analyte may be eliminated from the list of COPCs if it is an essential human nutrient of low toxicity, and its reported maximum concentration is unlikely to be associated with adverse health impacts (USEPA 1989). Human nutrients include magnesium, calcium, potassium, and sodium. These analytes were considered nutrients in the screening tables were not evaluated in the HHRA.

2.1.4 Analytes Exceeding Risk-Based Screening Levels

The occurrence, distribution, and selection of COPCs are represented in specific tables following the Risk Assessment Guidance for Superfund (RAGS) D format (USEPA 2002a). The tables are scenario-specific (i.e., residential or industrial) and present the minimum and maximum detected concentrations, the location of the maximum detected concentrations, as well as the frequency of detection (FOD) for each chemical detected. Analytes that exceed screening criteria are presented in bold type.

The risk-based screening was performed for each individual site and presented in Attachment B of this Appendix. Several sites did not have any analytes detected or revealed no COPCs in soil. Soil at Sites 4 and 5 was analyzed for polychlorinated biphenyls (PCBs) (Aroclors) only because these sites are associated with PCB transformer storage areas. No PCBs were detected at these sites. Therefore, no further action is required for Sites 4 and 5. Site 6 was analyzed for herbicides and pesticides because the site is associated with a pesticide mixing and storage area. No COPCs were identified for Site 6 in soil and sediment. Therefore, no further action is required for Site 6. Site 10 soil was evaluated for VOCs and total petroleum hydrocarbons because the area was used for refueling. There were no COPCs for Site 10 soil; therefore,

Site 10 will not be evaluated further. It is noted that Site 10 did reveal COPCs in groundwater. However, groundwater at this site was evaluated for the entire NWBA exposure area. These groundwater results are summarized in Section 5.5.6.

The results of the screening indicate that several sites have similar COPCs at similar concentrations. Based on both the similar COPCs and the proximity of sites, several groupings of sites were carried through the HHRA as a whole. Sites 1, 7, and 8 were combined to form one grouping. These sites are located in close proximity and are associated with buildings where storage occurred. Sampling for these sites occurred near drain outlets from the buildings. Sample analysis for these sites was similar, except Site 1 was not analyzed for inorganics. Sites 2, 3, and 11 were combined to form a second grouping. These sites are located in close proximity. Two of the sites, Sites 3 and 11, are associated with buildings where storage occurred, and Site 2 is associated with a suspected burial trench. Sampling for these sites consisted of only subsurface samples. These sites had similar sample analysis, and the COPCs are also similar (inorganics). Sites 13 and 15 were combined into a third grouping. These sites are located in close proximity and COPCs (inorganics) identified for these sites are similar. Sites 9 and 12 are not grouped and were assessed individually. Risk-based screening results for each grouping are presented in Tables D.2.1.1 through D.2.5.6. Risk-based screening results for the NWBA groundwater are presented in Tables D.2.6.1 and D.2.6.2.

2.1.5 Grouping 1, Sites 1, 7, and 8

Grouping 1 includes Sites 1, 7, and 8. These sites are in close proximity to each other and also have primarily the same COPCs, inorganics and PAHs, at relatively similar levels (Attachment B). In addition, groundwater samples were collected at Sites 7 and 8. However, the groundwater screening is presented for information purposes only. Groundwater is evaluated for the entire NWBA, as presented in the NWBA RFI (EA 2012). Results from the NWBA HHRA are presented in Section 5.5.6.

Surface Soil

For surface soil, a comparison to industrial soil RSLs is presented in Table D.2.1.1. The only analytes detected in surface soil above industrial screening levels were inorganics and PAHs: arsenic, total chromium, and benzo(a)pyrene.

For surface soil, a comparison to residential soil RSLs is presented in Table D.2.1.2. The only analytes detected in surface soil above residential screening levels were inorganics and PAHs:

aluminum, arsenic, total chromium, cobalt, iron, manganese, vanadium, benz(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene.

Subsurface Soil

For subsurface soil, a comparison to industrial soil RSLs is presented in Table D.2.1.3. The only analytes detected in surface soil above industrial screening levels were inorganics: arsenic, total chromium, and cobalt.

For subsurface soil, a comparison to residential soil RSLs is presented in Table D.2.1.4. The only analytes detected in surface soil above residential screening levels were inorganics and PAHs: aluminum, arsenic, total chromium, cobalt, iron, manganese, mercury, vanadium, benzo(a)pyrene, and dibenz(a,h)anthracene.

Groundwater

For groundwater, a comparison to tap water RSLs is presented in Table D.2.1.5. The comparison was completed for both total (unfiltered) and dissolved (filtered) inorganic samples. The analytes detected in groundwater above screening levels were: arsenic (dissolved only), total and dissolved chromium, total and dissolved cobalt, total and dissolved manganese, total vanadium, 1,1,2-trichloroethane, 1,2-dichloroethane, chloroform, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride.

2.1.6 COPCs at Grouping 2, Sites 2, 3, and 11

Grouping 2 includes Sites 2, 3, and 11 where only subsurface soil samples were collected. For each of these sites, inorganics are the primary COPCs. Groundwater was also evaluated for this grouping. Groundwater samples were collected at Sites 2 and 3. However, the groundwater screening is presented for informational purposes only. Groundwater is evaluated for the entire NWBA as presented in the Northwest Boundary RFI (EA 2012). Results from the NWBA HHRA are presented in Section 5.5.6. Sites 2, 3, and 11 are all in relatively close proximity to each other. Ethylbenzene was the only organic chemical detected above screening levels in soil. Combination of ethylbenzene data with other site data does not bias the results low because so few detections (one of twenty-three) were observed that the maximum detection is the exposure point concentration (EPC). Therefore, these sites were combined as Grouping 2 for the HHRA.

Subsurface Soil

For subsurface soil, a comparison to industrial soil RSLs is presented in Table D.2.2.1. The only analytes detected in surface soil above industrial screening levels were inorganics: arsenic, total chromium, cobalt, manganese, and thallium.

For subsurface soil, a comparison to residential soil RSLs is presented in Table D.2.2.2. The only analytes detected in surface soil above residential screening levels are inorganics and one VOC: aluminum, arsenic, total chromium, cobalt, iron, manganese, thallium, vanadium, and ethylbenzene.

Groundwater

For groundwater, a comparison to tap water RSLs is presented in Table D.2.2.3. The comparison was performed for both total (unfiltered) and dissolved (filtered) inorganic samples. The analytes detected in groundwater above screening levels were: aluminum (total), arsenic, barium, total chromium, iron (total), manganese, mercury, nickel (total), naphthalene, 1,4-dichlorobenzene, benzene, chloroform, ethylbenzene, and trichloroethene.

2.1.7 COPCs at Grouping 3, Sites 13 and 15

Grouping 3 is comprised of Sites 13 and 15. These sites have surface and subsurface soil as media of concern and primarily have inorganics detected above screening levels. Based on their proximity to each other and the relative consistency of inorganic detections, these sites were combined as Grouping 3. In addition, a groundwater sample was collected at Site 13. No analytes were detected in this groundwater sample. Therefore, groundwater was not evaluated further for Site 13.

Surface Soil

For surface soil, a comparison to industrial soil RSLs is presented in Table D.2.3.1. The only analytes detected in surface soil above industrial screening levels were inorganics: arsenic and total chromium, and thallium.

For surface soil, a comparison to residential soil RSLs is presented in Table D.2.3.2. The only analytes detected in surface soil above residential screening levels were inorganics: aluminum, arsenic, total chromium, cobalt, iron, lead, manganese, thallium, and vanadium.

Subsurface Soil

For subsurface soil, a comparison to industrial soil RSLs is presented in Table D.2.3.3. The only analytes detected in surface soil above industrial screening levels were inorganics: arsenic and total chromium.

For subsurface soil, a comparison to residential soil RSLs is presented in Table D.2.3.4. The only analytes detected in surface soil above residential screening levels were inorganics and PAHs: aluminum, arsenic, total chromium, cobalt, iron, manganese, thallium, vanadium, benzo(a)pyrene, and benzo(b)fluoranthene.

Groundwater

For groundwater, no analytes were detected in the groundwater sample from Site 13.

2.1.8 COPCs at Site 9

Site 9 was evaluated separately and the only medium of concern is subsurface soil.

Subsurface Soil

For subsurface soil, a comparison to industrial soil RSLs is presented in Table D.2.4.1. The only analytes detected in subsurface soil above industrial screening levels were inorganics: arsenic, total chromium, cobalt, iron, and manganese.

For subsurface soil, a comparison to residential soil RSLs is presented in Table D.2.4.2. The only analytes detected in subsurface soil above residential screening levels are inorganics: aluminum, arsenic, total chromium, cobalt, iron, manganese, and vanadium.

2.1.9 COPCs at Site 12

Site 12 is evaluated separately and the media of concern are surface soil, sediment, groundwater, and surface water. Groundwater at Site 12 was not evaluated in the NWBA RFI (EA 2012). Therefore, groundwater is evaluated for Site 12 in this HHRA.

Surface Soil

For surface soil, a comparison to industrial soil RSLs is presented in Table D.2.5.1. The only analytes detected in surface soil above industrial screening levels are inorganics: arsenic and total chromium.

For surface soil, a comparison to residential soil RSLs is presented in Table D.2.5.2. The only analytes detected in surface soil above residential screening levels are inorganics: aluminum, arsenic, total chromium, cobalt, iron, manganese, and vanadium.

Sediment

For sediment, a comparison to ten times the industrial soil RSLs is presented in Table D.2.5.3. The only analyte detected in surface soil above industrial screening levels is: arsenic.

For sediment, a comparison to ten times the residential soil RSLs is presented in Table D.2.5.4. The only analytes detected in surface soil above residential screening levels are inorganics: arsenic, total chromium, and vanadium.

Groundwater

For groundwater, a comparison to the tap water RSLs is presented in Table D.2.5.5. For Site 12, groundwater is evaluated with monitoring well samples and sediment pore water samples. Sediment pore water samples were collected downgradient of Site 12 to further evaluate groundwater because monitoring well samples could not be collected in this area. Analytes detected in groundwater above the tap water screening levels are: total arsenic, total barium, total cadmium, total chromium, total cobalt, total copper, total iron, total manganese, total nickel, total thallium, total vanadium, total zinc, bis(2-ethylhexyl)phthalate, and chloroform.

Surface Water

For surface water, a comparison to ten times the tap water RSLs is presented in Table D.2.5.6. Analytes detected in surface water above the modified tap water screening levels are: total arsenic, total chromium, total cobalt, and bis(2-ethylhexyl)phthalate.

2.1.10 COPCs in Northwest Boundary Area Groundwater

For groundwater within the entire Northwest Boundary Area, a comparison to the tap water RSLs is presented in Table D.2.6.1. Analytes detected in groundwater above the tap water screening levels are: total aluminum, dissolved and total arsenic, dissolved and total barium, total cadmium, dissolved and total cobalt, total copper, dissolved and total iron, dissolved and total manganese, dissolved and total mercury, total nickel, naphthalene, 1,1,2-trichloroethane, 1,2-dichloroethane, chloroform, cis-1,2-dichloroethene, tetrachloroethene, trans-1,2-dichloroethene, trichloroethene, and vinyl chloride.

Groundwater results are also compared to screening levels for indoor air (see Table D.2.6.2). COPCs in groundwater that are also evaluated for potential vapor intrusion to indoor air include

the following: 1,1,2-trichloroethane, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride.

2.1.11 Analytes With Reporting Limits Higher Than Screening Levels

Table D.2.7.1 presents an analysis of the reporting limits (RLs) for analytes that were not detected at any of the sites to the risk-based screening levels. As shown in Table D.2.7.1, quite a few analytes had RLs greater than the risk-based screening levels. Therefore, the RLs for these analytes present an uncertainty in the final risk results for this HHRA. Section 6.6 presents a discussion of this uncertainty and the effects on the overall risk conclusions.

3. EXPOSURE ASSESSMENT

In the exposure assessment, the human population, or groups of individuals potentially exposed to site media (i.e., potential human receptors) are identified. Pathways applicable to potential receptors at the site are identified from the many potential pathways of exposure. The COPCs in site media are converted into systemic doses, taking into account rates of contact (e.g., ingestion rates) and absorption rates of different COPCs. The magnitude, frequency, and duration of these exposures are then integrated to obtain estimates of daily doses over a specified period of time (e.g., lifetime, activity-specific duration).

3.1 CONCEPTUAL SITE MODEL

A CSM was developed for each of the site groupings to depict the potential pathways of concern at the site. The model is provided in Figures D-1 through D-5. Fort Buchanan is located approximately 10 kilometers southwest of the city of San Juan, Puerto Rico. The installation is bordered by Roosevelt Avenue to the east (main gate), road PR-No. 2 to the south, CPR to the west, and De Diego Expressway to the north. The installation occupies approximately 746 acres within two municipalities, Bayamon and Guaynabo. The current and likely future land use of Fort Buchanan is a mixture of industrial, residential and recreational. There are also child care and primary through secondary schooling facilities within Fort Buchanan.

3.1.1 Site-Specific Land Use

All of the 14 sites evaluated in the HHRA are located within industrial or commercial-type land use areas. Sites 13 and 15 are the closest sites to residential housing. None of the sites are within areas proposed for residential housing within the Fort Buchanan Master Plan. Planned future land use is expected to remain the same for all sites, except Sites 3, 9, and 11. Sites 3, 9, and 11 are located within an area identified for a future solar panel bank. In addition, there are plans to construct an elementary school north (downgradient) of Site 12 – Old Landfill.

3.1.2 Media of Concern

Based upon the suspected sources, the media of concern at the 14 sites are surface soil, subsurface soil, surface water, sediment, and groundwater. Section 3 of the RCRA RFI report details the site sampling strategies and suspected media of concern. Media of concern vary by site based on the presence of surface water and sediment, the previous evaluation of groundwater, or lack of documented contamination in surface soil or subsurface soil.

Under normal circumstances, groundwater and surface waters originating on Fort Buchanan are not utilized as a drinking water supply on Fort Buchanan or off-site. While private wells in the

surrounding community adjacent to Fort Buchanan may exist, and groundwater from such wells (as well as downstream surface waters) may be utilized for human consumption, those potential sources are not currently documented. Based on interviews with USGS water resource personnel in October 2005, no groundwater wells for human consumption are known to exist in the vicinity of Fort Buchanan. Additionally, the Installation's Master Plan does not identify any current or planned residential development within the 14 sites evaluated in this HHRA. Therefore, a potential exposure pathway and on-site receptor via groundwater as a potable water supply is highly unlikely to be present now or in the future. Due to the depth of groundwater greater than 25 ft bgs within the NWBA, direct contact with groundwater within excavations or trenches is not expected. However, irrigation activities do occur within Fort Buchanan. Contact with groundwater used as irrigation water during construction or maintenance activities could occur.

The NWBA RFI (EA 2012) evaluated the potential for impact to human health from a potential TCE source and the groundwater plume. The NWBA RFI evaluated an off-site resident as the potential receptor for groundwater since on-site residents are not expected. Many of the 14 sites evaluated in this HHRA are located adjacent to the old DPW complex and are within the area investigated as part of the NWBA RFI (EA 2012). The NWBA RFI evaluated subsurface soil and groundwater. Groundwater sample results from Sites 1, 2, 3, 4, 7, 8, and 10 were evaluated in the NWBA HHRA and risk results from the NWBA HHRA are summarized in this HHRA. However, groundwater sample results from Sites 12 and 13 were not evaluated in the NWBA RFI since they are not located within this area. Groundwater in this area has the potential to be used for irrigation; and therefore is considered a media of concern. It is noted that no analytes were detected within Site 13 groundwater samples. Therefore, Site 13 groundwater was not evaluated further in this HHRA.

A stream is present near Site 12. Surface water and sediment within the stream could be impacted by releases and/or constituents from Fort Buchanan either by overland flow from surface soil into the surface water body or by receiving discharge from a groundwater aquifer. Therefore, surface water and sediment were considered media of concern for Site 12. Additionally, Site 6 contains an open-banked drainage ditch that receives stormwater runoff from the site. Only sediment samples were collected within the Site 6 drainage ditch.

3.1.3 Receptors of Concern

Currently, there are no deed restrictions prohibiting future development of any of the sites in this assessment from future development. However, the Installation's Master Plan does not identify any residential development within the 14 sites evaluated in this HHRA. A hypothetical scenario that evaluates future residential use is evaluated to assist in risk management decisions, although

such use is not likely. Currently, the sites are located near buildings that have a primarily industrial purpose (e.g., warehouse, workout area, storage, etc.). Therefore, the primary receptors are expected to be workers or trespassers/recreational users. Fort Buchanan has identified plans to construct an elementary school near Site 12. Receptors of concern evaluated for all sites include trespassers/recreational users (both adult and adolescent), commercial workers, construction workers, and residents (both adult and child). Exposure to media within Site 12 by elementary school children is expected to be similar to that of a adolescent trespasser/recreational user.

3.2 EXPOSURE PATHWAYS OF CONCERN

An exposure pathway describes a mechanism by which a population or individual may be exposed to chemicals present at a site. A completed exposure pathway requires the following four components:

- A source and mechanism of chemical release to the environment;
- An environmental transport medium for the released chemical;
- A point of potential human contact with the contaminated medium; and
- A human exposure route at the point of exposure.

All four components must exist for an exposure pathway to be complete and for exposure to occur. Incomplete exposure pathways do not result in actual human exposure and are not included in the exposure assessment and resulting risk characterization. Figures D-1 through D-5 present potential exposure pathways for each site grouping.

3.2.1 Exposures via Surface Soil

Any current or future site user could contact surface soils in unpaved areas or undisturbed areas (absence of excavation/earth moving activities). Therefore, the following direct exposure pathways are considered to be complete: incidental ingestion of surface soils and dermal contact with surface soils. These pathways are considered complete for all current receptors (recreational user/trespasser adult and adolescent and commercial workers) and also for a future resident (adult and child) as a conservative measure.

3.2.2 Exposures via Subsurface Soil

A future site user could contact subsurface soils that have been brought to the surface during construction activities or at depth during excavation related activities. Therefore, the following direct exposure pathways are considered to be complete: incidental ingestion of subsurface soils

and dermal contact with subsurface soils. These pathways were assessed for construction workers and, as a conservative measure, for residents (adult and child).

3.2.3 Exposures via Air

Entrainment of dust via wind erosion of non-paved areas and during future construction activities may introduce site-related contamination into the air. Although surface soils are most likely to be subject to wind erosion, deeper soils may also be exposed at the surface during and after excavation activities. Therefore airborne particulate concentrations are estimated for both surface and subsurface soils for all receptors.

3.2.4 Groundwater Exposure

Groundwater within Fort Buchanan is not used as a potable water supply; therefore any on-site use (i.e., residential or worker in buildings) is not of concern. Additionally, the Installation's Master Plan does not identify any planned residential development within the 14 sites evaluated in this HHRA. The NWBA HHRA (EA 2012) evaluated the potential for impact to human health from a potential TCE source and the groundwater plume for off-site residents who may use groundwater as a potable water supply. In addition, the NWBA HHRA also evaluated potential vapor intrusion of VOCs from groundwater to indoor air for both off-site residents and workers in buildings within the NWBA. Many of the sites evaluated in this HHRA are located adjacent to the old DPW complex and are within the area investigated as part of the NWBA RFI (EA 2012). Groundwater sample results from Sites 1, 2, 3, 4, 7, 8, and 10 were evaluated in the NWBA HHRA and are also presented in this HHRA. However, groundwater sample results from Site 12 were not evaluated in the NWBA HHRA because this site is not located within this area. Groundwater in this area has the potential to be used for irrigation; and therefore a complete exposure pathway is present for industrial receptor contact with groundwater.

3.2.5 Sediment and Surface Water Exposure

Sediment and surface water can be contacted during recreational activities at sites where these media are present. A streambed is present only at Site 12, and surface water and sediment were evaluated for this site. Sediment was collected from within a drainage ditch at Site 6. No COPCs were identified for Site 6 sediment; therefore, this exposure pathway was not evaluated further. Receptors that may contact sediment and surface water are the trespasser/recreational user (adult and adolescent), the construction worker, and the resident (adult and child).

3.3 EXPOSURE POINT CONCENTRATION

To assess human health risks, a statistical analysis of the COPC concentrations was performed to determine the upper bound of the mean to approximate reasonable maximum exposure

(USEPA 1989). The USEPA software program ProUCL is utilized to determine the 95th upper confidence limit of the mean (95UCLM) (USEPA 2011c). The 95%UCLM represents the exposure point concentration (EPC) for each COPC in media of concern that potential receptors were expected to contact. The 95%UCLM is used because assuming long-term contact with the maximum concentration is not reasonable (USEPA 1989). Outputs from the ProUCL program are provided by site grouping for each COPC in each medium in Attachment C. In cases where the 95UCLM value exceeds the maximum detected concentration, the maximum detected concentration was used as the EPC (USEPA 2011c).

For the vapor intrusion pathway, the EPC was calculated based upon a smaller dataset then identified for other media or exposure pathways. To determine the EPC for the vapor intrusion pathway into buildings within the NWBA, it was assumed that a building would be located over the area of highest groundwater contamination. This area is approximately south of Columbus Street and includes an area encompassed by monitoring wells: G-03-MW14A, G-03-MW-14B, G-03-MW-15, G-03-MW-15A, G-03-MW-20, G-03-MW-21, G-03-MW-25, and G-03-MW-26. The ProUCL outputs for this EPC are presented in Table D.3.6.1 and Attachment D. For residents, it was assumed that any construction would occur outside the Fort Buchanan boundary in an area near PR-22. Due to the large spatial distribution between wells in this area, the well with the highest TCE detection was used to determine groundwater COPC EPCs. Historically, monitoring well G-03-OP-06 has the highest detections of TCE. The maximum concentration of groundwater to indoor air COPCs was selected from the sample results of this monitoring well. The EPCs for this exposure pathway are presented on Table D.3.6.2.

3.4 EXPOSURE INTAKE EQUATIONS

The last step of exposure assessment is to estimate COPC intakes for each complete exposure pathway considered in the HHRA. Figures D-1 through D-5 present the complete exposure pathways for each grouping. Intakes for each potential receptor were calculated using current USEPA risk assessment guidance and are presented in applicable RAGS spreadsheets. Most exposure parameters used to estimate intakes are based on default assumptions described in USEPA guidance documents (USEPA 1989, 1991a, 1991b, 2004a, 2009, and 2011a). Tables D.4.1 through D.4.19 present the exposure parameters for each complete exposure pathway evaluated.

Two different measures of intake were evaluated, depending on the nature of the effect being evaluated. When evaluating longer-term (i.e., chronic) exposures to chemicals that produce adverse non-carcinogenic effects, intakes are averaged over the period of exposure (i.e., the averaging time [AT]) (USEPA 1989). This measure of intake is referred to as the average daily

intake (ADI) and is a less than lifetime exposure. For chemicals that produce carcinogenic effects, intakes are averaged over an entire lifetime and are referred to as the lifetime average daily intake (LADI) (USEPA 1989).

3.4.1 Incidental Ingestion of Soil and Sediment

Intake for the incidental ingestion of soil and sediment was estimated using the following equation:

$$(L)ADI = \frac{EPC \ x \ IR \ x \ EF \ x \ ED \ x \ CF}{BW \ x \ AT} \qquad \text{(Equation 1)}$$

where:

(L)ADI	=	(Lifetime) Average daily intake [milligram per kilogram (mg/kg)-day]
EPC	=	Concentration in soil or sediment (mg/kg)
IR	=	Ingestion Rate (mg/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
CF	=	Conversion Factor (10^{-6} kg/mg)
BW	=	Body weight (kg)
AT	=	Averaging time (days) For non-carcinogens, AT = ED x 365 days/yr For carcinogens, AT = 70 years x 365 days/yr

3.4.2 Dermal Contact with Soil and Sediment

Exposure associated with dermal contact with soil or sediment was estimated based upon the following equation:

$$(L)ADI = \frac{EPC \ x \ SA \ x \ AF \ x \ ABS \ x \ EF \ x \ ED \ x \ CF}{BW \ x \ AT} \qquad \text{(Equation 2)}$$

where:

(L)ADI	=	(Lifetime) Average daily intake (mg/kg-day)
EPC	=	Concentration of a COPC in a soil or sediment (mg/kg)
SA	=	Surface Area for Contact (cm^2)
AF	=	Skin adherence factor (mg/cm^2-event)
ABS	=	Absorption factor (dimensionless)

EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
CF	=	Conversion Factor (10^{-6} kg/mg)
BW	=	Body weight (kg)
AT	=	Averaging time (days)
		For non-carcinogens, AT = ED x 365 days/yr
		For carcinogens, AT = 70 years x 365 days/yr

Most exposure assumptions used to estimate intake from dermal contact with soil and sediment are based upon USEPA default assumptions (USEPA 2004a). However, dermal absorption factors (ABS) are only available for a short list of chemicals in Exhibit 3-4 of USEPA RAGS E (USEPA 2004a). The uncertainty associated with the lack of ABS factors is discussed in the uncertainty analysis section of the HHRA.

3.4.3 Inhalation of Air Containing Fugitive Dust/Volatiles Emitted from Soil

The intake of both particulates and vapors/gases were calculated using the same equation (USEPA 2009):

$$EC = \frac{C_{air}\ x\ ET\ x\ EF\ x\ ED}{AT} \qquad \text{(Equation 3)}$$

Where,

EC	=	Exposure concentration (mg/m^3)
C_{air}	=	Concentration of chemical in air (mg/m^3)
ET	=	Exposure time (hours)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
AT	=	Averaging time (days)
		For non-carcinogens, AT = ED x 365 days/yr x 24 hours/day
		For carcinogens, AT = 70 years x 365 days/yr x 24 hours/day

The concentration of chemicals in air resulting from emissions from soil was developed following procedures presented in the USEPA Soil Screening guidance (USEPA 2002c). The chemical concentration in air is calculated from:

$$C_{air} = C_{soil}\ x \left[\frac{1}{PEF} + \frac{1}{VF} \right] \qquad \text{(Equation 4)}$$

Where,

C_{air}	=	Concentration of chemical in air (mg/m^3)
C_{soil}	=	Chemical concentration in soil (mg/kg)
PEF	=	Particulate emission factor (m^3/kg)
VF	=	Volatilization factor (m^3/kg)

The PEF relates the concentration of a chemical in soil with the concentration of dust particles in air. A PEF value of 1.36×10^9 is used (USEPA 2011b). No VOCs were COPCs within nay of the sites evaluated in the HHRA. Therefore, the VF was not used in the HHRA to estimate chemical concentrations in air.

3.4.4 Ingestion of Groundwater and Surface Water

Ingestion of groundwater, as an irrigation water source, is a potential for industrial workers at Site 12. Incidental ingestion of groundwater by construction workers may occur during construction or excavations. In addition, residents and trespassers/recreational users may incidentally ingest surface water while at the Site 12. Intakes for groundwater and surface water ingestion were calculated based upon the following equation:

$$(L)ADI = \frac{EPC \ x \ IR \ x \ EF \ x \ ED}{BW \ x \ AT} \qquad \text{(Equation 5)}$$

Where,

(L)ADI	=	(Lifetime) Average daily intake (mg/kg-day)
EPC	=	Concentration in groundwater or surface water (mg/L)
IR	=	Ingestion Rate (L/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (days)
		For non-carcinogens, AT = ED x 365 days/yr
		For carcinogens, AT = 70 years x 365 days/yr

3.4.5 Dermal Contact with Groundwater and Surface Water

Dermal contact with groundwater, as an irrigation water source, can occur during construction activities. In addition, the resident and trespasser were assumed have dermal contact with surface water at Site 12. The following equation was used to assess dermal contact exposures:

$$DAD = \frac{DA_{event} \ x \ SA \ x \ EV \ x \ EF \ x \ ED \ x \ CF}{BW \ x \ AT}$$ (Equation 6)

Where,

DAD	=	Dermal absorbed dose (mg/kg-day)
DA_{event}	=	Dermal absorbed dose per event (mg/cm^2-event)
SA	=	Skin-surface area available for contact (cm^2)
EV	=	Event frequency (events/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (days)
		For non-carcinogens, AT = ED x 365 days/yr
		For carcinogens, AT = 70 years x 365 days/yr

The absorbed dose per event (DA_{event}) was estimated using a non-steady state approach for organic compounds and a steady-state approach for inorganics, except for surface water. Limited COPCs were detected in surface water. As a result, a steady-state approach was used. For organics in groundwater, the following equations apply:

$$If \ t_{event} < t^* \ then: DA_{event} = 2 \cdot K_p \cdot FA \cdot C_w \cdot CF \cdot \left(\sqrt{\frac{6\tau \, t_{event}}{\pi}} \right)$$ (Equation 7)

$$If \ t_{event} > t^* \ then: DA_{event} = K_p \cdot FA \cdot C_w \cdot CF \cdot \left(\frac{t_{event}}{1+B} + 2\tau \left[\frac{1+3B+3B^2}{(1+B)^2} \right] \right)$$

Where,

t_{event}	=	Event duration (hour/event)
t^*	=	Time to reach steady-state conditions (hour)
K_p	=	Permeability coefficient of water through skin (cm/hr)
FA	=	Chemical-specific fraction absorbed (dimensionless)
C_w	=	Chemical concentration in water (mg/L)
τ	=	Lag time (hour)
π	=	Pi (dimensionless; equal to 3.14)
CF	=	Conversion factor (0.011 L/cm^3)

B = Dimensionless ratio of the permeability of the stratum corneum relative to permeability across the viable epidermis

For inorganics in groundwater and surface water, the following steady-state equation to estimate DA_{event}:

$$DA_{event} = (K_p) \times (C_w) \times (t_{event}) \qquad \text{(Equation 8)}$$

A majority of the exposure assumptions for dermal contact with water are based on default assumptions presented in USEPA RAGS E guidance (USEPA 2004a). For the construction worker, the exposed surface area of the body available for contact was based on assumed activities and is similar to the assumptions outlined for industrial dermal contact with soil and sediment.

For surface water, the water body adjacent to the Site 12 is not sufficient or appropriate for swimming. Therefore, the exposure to surface water assumes contact on a limited basis, similar to the assumptions outlined for dermal contact with soil and sediment.

3.4.6 Inhalation of Volatiles in Groundwater

For VOCs in groundwater, there is potential exposure for off-site residents to chemicals through inhalation while showering, bathing, washing dishes, or other household uses. For residential receptors, chemical intakes from inhalation of VOCs are estimated for the adult only (USEPA 2011b). The following equation was used to estimate inhalation exposures:

$$EC = \frac{C_{air} \; x \; ET \; x \; EF \; x \; ED}{AT} \qquad \text{(Equation 9)}$$

Where,

EC	=	Exposure concentration (mg/m^3)
C_{air}	=	Concentration of chemical in air (mg/m^3)
		C_{air} = Chemical concentration in water (mg/L) x K
K	=	Andelman volatilization factor (L/m^3)
		= 0.5 L/m^3 (USEPA 2011b)
ET	=	Exposure time (hours)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
AT	=	Averaging time (days)

For non-carcinogens, AT = ED x 365 days/yr x 24 hours/day
For carcinogens, AT = 70 years x 365 days/yr x 24 hours/day

3.4.6.1 Inhalation of Volatiles in Indoor Air

Currently, the only building located in the above the VOC groundwater plume is a warehouse that is not regularly occupied. The NWBA RFI (EA 2012) evaluated vapor intrusion into indoor air for the entire Northwest Boundary assuming there are no restrictions on future construction in the area and future buildings are constructed. Modeling this exposure pathway requires the USEPA's Johnson and Ettinger model (USEPA 2004b). The Johnson and Ettinger model incorporates both convective and diffusive mechanisms for estimating the transport of contaminant vapors emanating from groundwater into indoor air spaces located directly above the source of contamination. The Johnson and Ettinger model is a one-dimensional analytical solution to convective and diffusive vapor transport into indoor spaces. Inputs to the model include chemical properties of the COPCs, saturated and unsaturated zone soil properties, and structural properties of the building. Structural properties of buildings at the Northwest Boundary Area are not known at this time. As a result, default values were used for structural properties of the buildings. Site-specific soil types were entered into the model; however, default model values are used for soil parameters (i.e., soil vapor permeability, dry bulk density, etc.). Calculations for the Johnson and Ettinger model are included in Attachment D. Calculations are provided for both the commercial worker and the resident adult.

3.5 SELECTION OF EXPOSURE PARAMETERS

All exposure factor values used in estimating intakes were developed based on current USEPA guidance and best professional judgment for the site. Tables D.4.1 through D.4.16 present the exposure factor values. The following guidance documents were used in defining exposure factor values for estimating intakes for exposure pathways evaluated:

- Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual Part A, December 1989 (USEPA 1989).

- Memorandum: Risk Assessment Guidance for Superfund Volume I-Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors". Publication 9285.6-03, March 25, 1991 (USEPA 1991b).

- Risk Assessment Guidance for Superfund Volume I-Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals) (Interim Final). Publication 9285.7-01B, December 1991 (USEPA 1991a).

- Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F, September 2011 (USEPA 2011a).

- Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment, Final Guidance. OSWER 9285.7-02EP, July 2004 (USEPA 2004a).

- Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part F, Supplemental Guidance for Inhalation Risk Assessment. Final. OSWER 9285.7-82, January 2009 (USEPA 2009)

4. TOXICITY ASSESSMENT

The toxicity assessment considers the types of potential adverse health effects associated with exposures to COPCs; the relationship between the magnitude of exposure and potential adverse effects; and related uncertainties, such as the weight of evidence of a particular COPC's carcinogenicity in humans. USEPA guidance (USEPA 1989) specifies that the assessment be accomplished in two steps: hazard identification and dose-response assessment. Hazard identification is the process of determining whether studies claim that exposure to a COPC may cause the incidence of an adverse effect. USEPA specifies the dose-response assessment, which involves: (1) USEPA's quantitative evaluation of the existing toxicity information, and (2) USEPA's characterization of the relationship between the dose of the COPC administered or received, and the incidence of potentially adverse health effects in the exposed population. From this quantitative dose-response relationship, specific toxicity values are derived by USEPA that can be used to estimate the incidence of potentially adverse effects occurring in humans at different exposure levels (USEPA 1989). Compounds lacking toxicity values, for which surrogates cannot be substituted, are not assessed quantitatively. Qualitative analysis of these compounds is provided in the Uncertainties Section (Section 5 of this appendix).

Toxicity values are selected in keeping with appropriate exposure duration and USEPA guidance (USEPA 1989 and 2003). Tier 1 values are found using the Integrated Risk Information System (IRIS) (USEPA 2012) for established, current values. When toxicity values are not available from IRIS, Tier 2 values are then examined.

Tier 2 values are USEPA's Provisional Peer Reviewed Toxicity Values (PPRTVs), which are developed by the Office of Research and Development, the National Center for Environmental Assessment (NCEA), and the Superfund Health Risk Technical Support Center on a chemical-specific basis when requested by the Superfund program.

Tier 3, other toxicity values, are considered when Tier 1 or Tier 2 toxicity values are not available. These toxicity values are taken from additional USEPA and non-USEPA sources and are chosen based on the most current and best peer-reviewed source available. The California EPA Office of Environmental Health Hazard Assessment (OEHHA) Cancer Potency Values (CalEPA 2009), and the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) (ATSDR 2012) are the Tier 3 sources utilized for this HHRA.

4.1 TOXICITY ASSESSMENT FOR NON-CARCINOGENS

USEPA-derived toxicity values for evaluating potential chronic non-carcinogenic effects for COPCs are summarized in Tables D.5.1 and D.5.2. Table D.5.3 presents relative chemical-specific parameters utilized in calculating dermal exposure.

The methodology used by USEPA for deriving non-cancer reference values for non-carcinogens and site-specific considerations for modifying or using these concentrations are discussed in detail in USEPA guidance (USEPA 2012). Non-carcinogens are typically judged to have a threshold daily dose below which deleterious or harmful effects are unlikely to occur. This concentration is called the no-observed-adverse-effect-level (NOAEL), and may be derived from either animal laboratory experiments or human epidemiology investigations (usually workplace studies). In developing a toxicity value or human NOAEL for non-carcinogens [i.e., a reference dose (RfD)], the regulatory approach is to (1) identify the critical toxic effect associated with chemical exposure (i.e., the most sensitive adverse effect); (2) identify the threshold dose in either an animal or human study; and (3) modify this dose to account for interspecies variability (where appropriate), differences in individual sensitivity (within-species variability), and other uncertainty and modifying factors.

Uncertainty factors (UFs) are intended to account for specific types of uncertainty inherent in extrapolation from the available data. The modifying factor (MF) accounts for the confidence in the scientific studies from which toxicity values are derived, according to such parameters as study quality and study reproducibility. The UFs are generally 10-fold, default factors used in operationally deriving the RfD and reference concentration (RfC) from experimental data. UFs less than 10 can be used. A UF of 3 can be used in place of one-half power ($10^{0.5}$) when appropriate. The UFs are intended to account for (1) variation in susceptibility among the members of the human population (i.e., inter-individual or intraspecies variability); (2) uncertainty in extrapolating animal data to humans (i.e., interspecies uncertainty); (3) uncertainty in extrapolating from data obtained in a study with less-than-lifetime exposure (i.e., extrapolating from subchronic to chronic exposure); (4) uncertainty in extrapolating from a lowest-observed-adverse-effect-level (LOAEL) rather than from a NOAEL; and (5) uncertainty associated with extrapolation when the database is incomplete. The maximum UF for the derivation of the RfC is 3,000. The theoretical maximum UF for the derivation of the RfD is 10,000. However, the USEPA has recently begun limiting the total uncertainty factors applied to 3,000.

A MF ranging from 0 to 10 is included to reflect a qualitative professional assessment of additional uncertainties in the critical study and in the entire database not addressed by the

uncertainty factors. The default value for the MF is 1. The USEPA discontinued the use of the modifying factor in 2004. However, toxicity values for some chemicals, derived before 2004, still contain a modifying factor. The use of these factors is a conservative approach for protection of human health and is likely to overestimate the toxic potency associated with chemical exposure. The RfDs and RfCs provided in this HHRA take into account the associated uncertainty/modifying factors identified by the USEPA. To calculate the RfD/RfC, the appropriate NOAEL is divided by the product of all the applicable UFs and the MF.
This is expressed as:

$$RfD/RfC = NOAEL / (UF_1 \times UF_2 \ldots \times MF) \qquad \text{(Equation 10)}$$

The resulting RfD is expressed in units of milligrams of chemical per kilogram of body weight per day (mg/kg-bw/day). The RfC is expressed in units of mg/m^3.

4.2 TOXICITY ASSESSMENT FOR CARCINOGENICITY

USEPA-derived toxicity values for evaluating potential carcinogenic effects for COPCs are summarized in Tables D.6.1 and D.6.2. Unlike non-carcinogens, carcinogens are generally assumed to have no threshold. There is presumed to be no level of exposure below which carcinogenic effects will not manifest themselves. This "non-threshold" concept supports the idea that there are small, finite probabilities of inducing a carcinogenic response associated with every level of exposure to a potential carcinogen. USEPA uses a two-part evaluation for carcinogenic effects. This evaluation includes the assignment of a weight-of-evidence classification and the quantification of a cancer toxic potency concentration. Quantification is expressed as a slope factor (SF) or an inhalation unit risk (IUR), which reflects the dose-response data for the carcinogenic endpoint(s) (USEPA 2012).

The weight-of-evidence classification system assigns a letter or alphanumeric (A through E) to each potential carcinogen that reflects an assessment of its potential to be a human carcinogen.[1] The weight-of-evidence classification is based on a thorough scientific examination of the body of available data. USEPA has also established five recommended standard hazard descriptors: "*Carcinogenic to Humans*," "*Likely to Be Carcinogenic to Humans*," "*Suggestive Evidence of*

[1] A = a known human carcinogen; B1 = a probable human carcinogen, based on sufficient animal data and limited human data; B2 = a probable human carcinogen based on sufficient animal data and inadequate or no human data; C = a possible human carcinogen; D = not classifiable as to human carcinogenicity; and E = evidence of non-carcinogenicity for humans.

Carcinogenic Potential," "*Inadequate Information to Assess Carcinogenic Potential*," and "*Not Likely to Be Carcinogenic to Humans*" (USEPA 2005a). The weight-of-evidence classification is based on a thorough scientific examination of the body of available data.

The SF and the IUR is the upper 95th percentile confidence limit of the probability of response per unit daily intake of a chemical over a lifetime. Typically, the SF and IUR is used to estimate the upper-bound lifetime probability of a person developing cancer from exposure to a given concentration of a carcinogen. SFs and IURs are generally based on experimental animal data, unless suitable epidemiological studies are available. Because of the difficulty in detecting and measuring carcinogenic endpoints at low exposure concentrations, SFs and IURs are typically developed by using a model to fit the available high-dose, experimental animal data, and then extrapolating downward to the low-dose range to which humans are typically exposed. USEPA recommends the linear multistage model to derive an SF and IUR. The model is conservative and provides an upper bound estimate of excess lifetime cancer risk.

COPCs that are determined to have sufficient weight of evidence for carcinogenic endpoints are also assessed for mutagenic modes of action. The mutagenic mode of action is assessed with a linear approach (USEPA 2005a). COPCs identified as mutagenic have sensitivity pertaining to cancer risks associated with early-life exposures. To account for the early-life exposure and the mutagenic mode of action, the cancer potency estimates are adjusted. USEPA recommends, for mutagenic chemicals, when no chemical-specific data exist, a default approach using estimates from chronic studies (i.e., cancer slope factors) with appropriate modifications to address the potential for differential risk of early-life stage exposure (USEPA 2005a,b). A modification for early-life stage exposure to mutagenic COPCs is required because available studies indicate higher cancer risks resulting from a given exposure occurring early in life when compared with the same amount of exposure during adulthood (USEPA 2005a). For this HHRA, the carcinogenic intakes for COPCs identified with a mutagenic mode of action are modified for the following (USEPA 2005b):

- For exposures between infant and <3 years of age, a 10-fold adjustment is made.
- For exposures between 3 and <16 years of age, a 3-fold adjustment is made.
- For exposures after turning 16 years of age, no adjustment is made.

4.3 MODIFICATIONS FOR DERMAL CONTACT

Toxicity values specific to dermal exposures are not available and require adjustment of the oral toxicity values (oral RfDs or SFs). This adjustment accounts for the difference between the daily

intakedoses through dermal contact as opposed to ingestion. Most toxicity values are based on the actual administered dose and must be corrected for the percent of chemical-specific absorption that occurs across the gastrointestinal tract prior to use in dermal contact risk assessment (USEPA 1989 and 2004a). USEPA recommends utilizing oral absorption efficiency factors (GIABS) in converting oral toxicity values to dermal toxicity values (USEPA 2004a). This adjustment accounts for the absorption efficiency in the "critical study," which is utilized in determining the RfD and SF. Where oral absorption in the critical study is essentially complete (i.e., 100 percent), the absorbed dose is equivalent to the administered dose, and no adjustment of oral toxicity values is necessary when evaluating dermal exposures. When gastrointestinal absorption of a chemical in the critical study is poor (e.g., 1 percent), the absorbed dose is smaller than the administered dose, and toxicity values for dermal exposure are adjusted to account for the difference in the absorbed dose relative to the administered dose. To account for the differences between the administered (oral) and the absorbed (dermal) dose, RfDs and SFs are modified by the GIABS.

4.4 SPECIAL CHEMICALS: LEAD

Lead is classified as a B2-probable human carcinogen. However, the USEPA has not published a SF or IUR for quantifying carcinogenic risks. Blood-lead levels are the indicator of excess lead exposure in humans. Modeled blood level results are compared to the established cutoff value or acceptable blood-lead threshold of 10 µg lead/dL. This blood level is considered protective of human health for children. Lead is a COPC in surface soil for a residential scenario at Grouping 3, Sites 13 and 15. Lead risks for potential residents are evaluated using USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Lead Model (USEPA 2010a) using a mean lead concentration for soil. The IEUBK blood-lead level modeling is presented in Attachment D.

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5. RISK CHARACTERIZATION

In risk characterization, the calculated chemical intakes (Section 3) are combined with toxicity values (Section 4) for the receptor populations to quantitatively estimate both carcinogenic and non-carcinogenic risks. Risks are calculated for each potential receptor.

5.1 HAZARD INDEX FOR NON-CARCINOGENIC EFFECTS

The potential human health risks associated with exposures to non-carcinogenic COPCs are calculated by comparing the ADI with the chemical-specific RfD, as per USEPA Guidance (USEPA 1989). A hazard quotient (HQ) is derived for each COPC, as shown in the equation below:

$$HQ = \frac{ADI}{RfD} \quad \text{or} \quad HQ = \frac{ADI}{RfC} \qquad \text{(Equation 11)}$$

where:

HQ	=	Hazard Quotient; ratio of average daily intake level to acceptable daily intake level (unitless)
ADI	=	Calculated non-carcinogenic average daily intake (mg/kg-day or mg/m^3)
RfD	=	Reference dose (mg/kg-day)
RfC	=	Reference concentration (mg/m^3)

If the average daily dose exceeds the RfD or RfC, the HQ will exceed a ratio of one (1.0) and there may be concern that potential adverse systemic health effects will be observed in the exposed populations. If the ADI does not exceed the RfD or the RfC, the HQ will not exceed 1.0 and there will be no concern that potential adverse systemic health effects will be observed in the exposed populations. However, if the sum of several HQs exceeds 1.0, and the COPCs affect the same target organ, there may be concern that potential adverse systemic health effects will be observed in the exposed populations. In general, the greater the value of the HQ above 1.0, the greater the level of concern. However, the HQ does not represent a statistical probability that an adverse health effect will occur.

For consideration of exposures to more than one chemical causing systemic toxicity via several different pathways, the individual HQs are summed to provide an overall hazard index (HI). If the HI is less than 1.0, then no adverse health effects are likely to be associated with exposures at the site. However, if the total HI is greater than 1.0, separate endpoint-specific HIs may be calculated based on toxic endpoint of concern or target organ (e.g., HQs for neurotoxins are

summed separately from HQs for renal toxins). Only if an endpoint-specific HI is greater than 1.0 is there reason for concern about potential health effects for that endpoint.

5.2 CARCINOGENIC RISKS

Carcinogenic risk is calculated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. The numerical estimate of excess lifetime cancer risk is calculated by multiplying the LADI by the risk per unit dose (the SF).

This is shown in the following equation:

$$Risk = LADI \times SF/IUR \qquad \text{(Equation 12)}$$

where:

Risk	=	Unitless probability of an exposed individual developing cancer
LADI	=	Lifetime cancer average daily intake (mg/kg-day or ug/m^3)
SF	=	Cancer slope factor (mg/kg-day)$^{-1}$
IUR	=	Inhalation Unit Risk (ug/m^3)$^{-1}$

Because the SF and the IUR are the statistical 95th percent upper-bound confidence limit on the dose-response slope, this method provides a conservative, upper-bound estimate of risk.

It should be noted that the interpretation of the significance of the cancer risk estimate is based on the appropriate public policy. USEPA in the NCP (40 CFR Part 300) (USEPA 1990) states that:

> *"...For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}."*

5.3 LEAD MODEL

Lead is detected as a COPC in only one grouping, Grouping 3, Sites 13 and 15 in residential surface soil. It is not a COPC for any other sites or in any other media.

In the absence of any USEPA-published toxicity values for lead, it is currently not possible to perform a quantitative risk estimate for lead exposures using standard USEPA methodology. The USEPA has created a software program of the IEUBK Model, for predicting blood lead levels in children 0-84 months (USEPA 2010a). The IEUBK Model was used in this risk

assessment for estimating blood lead levels in children for Grouping 3. Standard default values used as input parameters for the model are described in USEPA guidance (USEPA 1994). The model output is a probability distribution function describing the percentage of children predicted to have blood-lead levels exceeding 10 μg/dL. To achieve a specific level of protectiveness, the USEPA has established that no more than a 5% probability of children exposed to lead would exceed a blood lead level of 10 μg/dL (USEPA 1994). The 10 μg/dL blood lead level is based upon analyses by the Centers for Disease Control (CDC) and the USEPA that reveal blood lead levels of 10 μg/L and higher result in health effects in children (USEPA 1994). More specific information on this model is contained in USEPA's *Guidance Manual for the IEUBK Model for Lead in Children*, December 1994. Model results are presented in Attachment D.

5.4 INDOOR AIR MODEL

The USEPA Johnson and Ettinger vapor intrusion model version 3.1 (USEPA 2004b) was used to model potential indoor air risks from VOCs in groundwater. The model estimates indoor air concentrations of vapors from the groundwater that may move up the soil column and pass through building foundations into a building. The model relies on chemical-specific parameters and makes general assumptions regarding building specifications so as to conservatively assess any future buildings on the site. The model also provides a conservative estimate of indoor air concentrations as it assumes that little air circulation occurs. Model results are presented in Attachment D.

Currently, the only building located in the Northwest Boundary Area is a warehouse that is not regularly occupied. However, there are no restrictions on future construction in the area. As a result, VOCs in groundwater also have the potential to migrate into indoor air through vapor intrusion. The Johnson and Ettinger model incorporates both convective and diffusive mechanisms for estimating the transport of contaminant vapors emanating from groundwater into indoor air spaces located directly above the source of contamination. The Johnson and Ettinger model is a one-dimensional analytical solution to convective and diffusive vapor transport into indoor spaces. Inputs to the model include chemical properties of the COPCs, saturated and unsaturated zone soil properties, and structural properties of the building. Structural properties of buildings at the Northwest Boundary Area are not known at this time. As a result, default values are used for structural properties of the buildings. Site-specific soil types are entered into the model; however, default model values are used for soil parameters (i.e., soil vapor permeability, dry bulk density, etc.). Calculations for the Johnson and Ettinger model are included in Attachment D. Calculations are provided for both the commercial worker and the resident adult.

For the vapor intrusion pathway, the EPC was calculated based upon a smaller dataset then identified for other media or exposure pathways. To determine the EPC for the vapor intrusion pathway into buildings within the NWBA, it was assumed that a building would be located over the area of highest groundwater contamination. This area is approximately south of Columbus Street and includes an area encompassed by monitoring wells: G-03-MW14A, G-03-MW-14B, G-03-MW-15, G-03-MW-15A, G-03-MW-20, G-03-MW-21, G-03-MW-25, and G-03-MW-26. The ProUCL outputs for this EPC are presented in Table D.3.6.1 and Attachment D. For residents, it was assumed that any construction would occur outside the Fort Buchanan boundary in an area near PR-22. Due to the large spatial distribution between wells in this area, the well with the highest TCE detection was used to determine groundwater COPC EPCs. Historically, monitoring well G-03-OP-06 has had the highest detections of TCE. The maximum concentration of groundwater to indoor air COPCs was selected from the sample results of this monitoring well. The EPCs for this exposure pathway are presented on Table D.3.6.2.

5.5 RISK CHARACTERIZATION RESULTS

Calculations are presented by receptor in Tables D.7.1.1 through D.7.5.7. The tables are provided by site grouping. Groundwater within the NWBA is presented as a separate risk calculation and was not included within the site groupings. Table D.7.6.1 through D.7.6.5 present the calculations for the NWBA groundwater evaluation.

Estimates of cumulative risks across all pathways for non-carcinogenic and carcinogenic effects for all receptors are presented in Tables D.9.1.1 through D.9.6.3. A summary of contributors to risk is presented in Tables D-10.1.1 through D.10.6.3; these tables also present a summary of non-carcinogenic risk for target organs across all media evaluated. COPCs are only identified on Tables D.10.1.1 through D.10.6.3 if cumulative carcinogenic risks are greater than the target risk range of 10^{-6} to 10^{-4} or cumulative non-carcinogenic risks are greater than 1.0. Contributors to risk are identified as COPCs with carcinogenic risks greater than 10^{-6} or non-carcinogenic risks greater than 0.1.

5.5.1 Grouping 1, Sites 1, 7 and 8

5.5.1.1 Adult Recreational User Results

The adult recreational user receptor was evaluated for COPC exposure in surface soil at grouping 1 (Table D.9.1.1).

Non-Carcinogenic Results

The total non-carcinogenic HI for the adult recreational user is 0.03, which is below the acceptable threshold of 1 (Table D.9.1.1).

Carcinogenic Results

The cumulative carcinogenic risk for the adult recreational user is 5×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.1.1). Both arsenic and total chromium have carcinogenic risk results greater than 10^{-6} (Table D.10.1.1).

5.5.1.2 Adolescent Recreational User Results

The adolescent recreational user receptor was evaluated for COPC exposure in surface soil at Grouping 1 (Table D.9.1.2).

Non-Carcinogenic Results

The total non-carcinogenic HI for the adolescent recreational user is 0.3, which is below the acceptable threshold of 1 (Table D.9.1.2).

Carcinogenic Results

The cumulative carcinogenic risk for the adolescent recreational user is 4×10^{-6}, which is within the USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.1.2). Both arsenic and total chromium have carcinogenic risk results greater than 10^{-6} (Table D.10.1.2).

5.5.1.3 Commercial Worker Results

The commercial worker receptor was evaluated for COPC exposure in surface soil at Grouping 1 (Table D.9.1.3).

Non-Carcinogenic Results

The total non-carcinogenic HI for the commercial worker is 0.1, which is below the acceptable threshold of 1 (Table D.9.1.3).

Carcinogenic Results

The cumulative carcinogenic risk for the commercial worker is 2×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.1.3). Arsenic has carcinogenic risks greater than 10^{-5} and total chromium has carcinogenic risks greater than 10^{-6} (Table D.10.1.3).

5.5.1.4 Construction Worker Results

The construction worker receptor was evaluated for COPC exposure in subsurface soil at Grouping 1 (Table D.9.1.4).

Non-Carcinogenic Results

The total non-carcinogenic HI for the construction worker is 1, which is equal to the acceptable threshold of 1 (Table D.9.1.4). A breakdown by target organ (Table D.10.1.4) indicates that no target organ exceeds the threshold of 1.0.

Carcinogenic Results

The cumulative carcinogenic risk for the construction worker is 5×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.1.4). Both arsenic and total chromium have carcinogenic risk results greater than 10^{-6} (Table D.10.1.4).

5.5.1.5 Resident Adult and Child Surface Soil Exposure Results

The resident adult and child receptors were evaluated for COPC exposure in surface soil. Subsurface soil exposure is evaluated in Section 5.5.1.6.

Non-Carcinogenic Results

The total non-carcinogenic HI for adult resident exposure to surface soil is 0.5, which is below the acceptable threshold of 1 (Table D.9.1.5). The total non-carcinogenic HI for child resident exposure to surface soil is 4, which is above the acceptable threshold of 1 (Table D.9.1.5). A breakdown by target organ (Table D.10.1.5) indicates that the only target organ above the 1.0 threshold is skin, driven entirely by arsenic.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 2×10^{-4}, which is above USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.1.5). This is driven primarily by arsenic (1×10^{-4}) and total chromium ($8\text{x}10^{-5}$) (Table D.10.1.5). In addition, all PAH COPCs (benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene) have carcinogenic risks greater than 10^{-6}.

5.5.1.6 Resident Adult and Child Subsurface Soil Exposure Results

The resident adult and child receptors were evaluated for COPC exposure in subsurface soil. Surface soil exposure is evaluated in Section 5.5.1.5.

Non-Carcinogenic Results

The total non-carcinogenic HI for adult resident exposure to subsurface soil is 0.7, which is below the acceptable threshold of 1 (Table D.9.1.6). The total non-carcinogenic HI for child resident exposure to surface soil is 6, which is above the acceptable threshold of 1 (Table D.9.1.5). A breakdown by target organ (Table D.10.1.5) indicates that the target organ above the 1.0 threshold is the thyroid driven by cobalt.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 1×10^{-4}, which is at the upper end of the USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.1.6). This is driven primarily by arsenic (7×10^{-5}) and total chromium ($5x10^{-5}$) (Table D.10.1.5). In addition, benzo(a)pyrene and dibenz(a,h)anthracene have carcinogenic risks greater than 10^{-6}.

5.5.2 Grouping 2, Sites 2, 3, and 11

Only subsurface soil and groundwater were evaluated for Grouping 2. As a result, the adult recreational user, adolescent recreational user, and commercial worker were not evaluated for this grouping.

5.5.2.1 Construction Worker Results

The construction worker receptor was evaluated for COPC exposure in subsurface soil at Grouping 2 (Table D.9.2.1).

Non-Carcinogenic Results

The total non-carcinogenic HI for the construction worker is 3, which is above the acceptable threshold of 1 (Table D.9.2.1). A breakdown by target organ (Table D.10.2.1) indicates no target organ exceeds the threshold of 1.

Carcinogenic Results

The cumulative carcinogenic risk for the construction worker is 1×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.2.1). Both arsenic and total chromium have carcinogenic risks greater than 10^{-6}.

5.5.2.2 Resident Adult and Child Subsurface Soil Exposure Results

The resident adult and child receptors are potential receptors for COPC exposure in subsurface soil (Table D.9.2.2).

Non-Carcinogenic Results

The total non-carcinogenic HI for adult resident exposure to subsurface soil is 1, which is equal to the acceptable threshold of 1 (Table D.9.2.2). The total non-carcinogenic HI for child resident exposure to subsurface soil is 10, which is above the acceptable threshold of 1 (Table D.9.2.2). A breakdown by target organ for the resident child (Table D.10.2.2) indicates the target organs exceeding the 1.0 threshold are skin and the central nervous system. These risks are driven primarily by arsenic and manganese, which are the only COPCs with an HQ greater than 1.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 2×10^{-4}, which is above USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.2.2). This result is driven primarily by arsenic (2×10^{-4}) (Table D.10.2.2). In addition, total chromium has carcinogenic risks greater than 10^{-5}.

5.5.3 Grouping 3, Sites 13 and 15

5.5.3.1 Adult Recreational User Results

The adult recreational user receptor was evaluated for COPC exposure in surface soil at Grouping 3 (Table D.9.3.1).

Non-Carcinogenic Results

The total non-carcinogenic HI for the adult recreational user is 0.0006, which is below the acceptable threshold of 1 (Table D.9.3.1).

Carcinogenic Results

The cumulative carcinogenic risk for the adult recreational user is 1×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.3.1). No COPCs have carcinogenic risks greater than 10^{-6}.

5.5.3.2 Adolescent Recreational User Results

The adolescent recreational user receptor was evaluated for COPC exposure in surface soil at Grouping 3 (Table D.9.3.2).

Non-Carcinogenic Results

The total non-carcinogenic HI for the adolescent recreational user is 0.006, which is below the acceptable threshold of 1 (Table D.9.3.2).

Carcinogenic Results

The cumulative carcinogenic risk for the adolescent recreational user is 1×10^{-6}, which is within the USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.3.2). No COPCs have carcinogenic risks greater than 10^{-6}.

5.5.3.3 Commercial Worker Results

The commercial worker receptor was evaluated for COPC exposure in surface soil at Grouping 3 (Table D.9.3.3).

Non-Carcinogenic Results

The total non-carcinogenic HI for the commercial worker is 0.001, which is below the acceptable threshold of 1 (Table D.9.3.3).

Carcinogenic Results

The cumulative carcinogenic risk for the commercial worker is 7×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.3.3). Both arsenic and total chromium have carcinogenic risks greater than 10^{-6} (Table D.10.3.3).

5.5.3.4 Construction Worker Results

The construction worker receptor was evaluated for COPC exposure in subsurface soil at Grouping 3 (Table D.9.3.4).

Non-Carcinogenic Results

The total non-carcinogenic HI for the construction worker is 0.9, which is below to the acceptable threshold of 1 (Table D.9.3.4).

Carcinogenic Results

The cumulative carcinogenic risk for the construction worker is 8×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.3.4). Both arsenic and total chromium have carcinogenic risks greater than 10^{-6} (Table D.10.3.4).

5.5.3.5 Resident Adult and Child Surface Soil Exposure Results

The resident adult and child receptors were evaluated for COPC exposure in surface soil. Subsurface soil is evaluated in Section 5.5.3.6.

Non-Carcinogenic Results

The total non-carcinogenic HI for adult resident exposure to surface soil is 0.3, which is below the acceptable threshold of 1 (Table D.9.3.5). The total non-carcinogenic HI for child resident exposure to surface soil is 3, which is above the acceptable threshold of 1 (Table D.9.3.5). However, a breakdown by target organ (Table D.10.3.5) indicates that no target organ exceeds the 1.0 threshold.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 6×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.1.5). Both arsenic and total chromium have carcinogenic risks greater than 10^{-5} (Table D.10.3.5).

5.5.3.6 Resident Adult and Child Subsurface Soil Exposure Results

The resident adult and child receptors were evaluated for COPC exposure in subsurface soil. Surface soil is evaluated in Section 5.5.3.5.

Non-Carcinogenic Results

The total non-carcinogenic HI for adult resident exposure to subsurface soil is 0.5, which is below the acceptable threshold of 1 (Table D.9.3.6). The total non-carcinogenic HI for child resident exposure to subsurface soil is 5, which is above the acceptable threshold of 1 (Table D.9.3.6). A breakdown by target organ (Table D.10.3.6) indicates that the only target organ above the 1.0 threshold is skin; this is driven entirely by arsenic. Arsenic is the only COPC with an HQ greater than 1.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 2×10^{-4}, which is above USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.3.6). These risks are driven by arsenic ($1x10^{-4}$) (Table D.10.3.6). In addition, total chromium ($7x10^{-5}$) and benzo(a)pyrene ($1x10^{-5}$) have carcinogenic risks greater than 10^{-5}.

5.5.3.7 Lead Evaluation

Lead was a COPC at Grouping 3 in surface soil for a residential scenario. The arithmetic average surface soil lead concentration was 92 mg/kg. The maximum detected soil lead concentration was 562 mg/kg. Lead was evaluated through the use of the IEUBK model. The IEUBK model was run on the arithmetic average site concentration (USEPA 1994). The results of the IEUBK model reveal a geometric mean blood lead level of 1.7 µg/dL blood, with 0.009%

exceeding the 10 µg/dL blood. The outputs for the IEUBK model results are found in Attachment D and indicate that lead is not a concern for residential use of sites in Grouping 3.

5.5.4 Site 9

Only subsurface soil was evaluated for Site 9. As a result, the adult recreational user, adolescent recreational user, and commercial worker were not evaluated for this site.

5.5.4.1 Construction Worker Results

The construction worker receptor was evaluated for COPC exposure in subsurface soil at Site 9 (Table D.9.4.1).

Non-Carcinogenic Results

The total non-carcinogenic HI for the construction worker is 6, which is above the acceptable threshold of 1 (Table D.9.4.1). A breakdown by target organ (Table D.10.4.1) indicates that skin and thyroid target organ exceed the 1.0 threshold, which is driven by arsenic and cobalt. Arsenic and cobalt are the only COPCs with an HQ greater than 1.

Carcinogenic Results

The cumulative carcinogenic risk for the construction worker is 2×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.4.1). Arsenic has carcinogenic risk above 10^{-5} (Table D.10.4.1), and total chromium has carcinogenic risks greater than 10^{-6}.

5.5.4.2 Resident Adult and Child Subsurface Soil Exposure Results

The resident adult and child receptors were evaluated for COPC exposure in subsurface soil (Table D.9.4.2).

Non-Carcinogenic Results

The total non-carcinogenic HI for adult resident exposure to subsurface soil is 2, which is above the acceptable threshold of 1 (Table D.9.4.2). The total non-carcinogenic HI for child resident exposure to subsurface soil is 17, which is above the acceptable threshold of 1 (Table D.9.4.2). A breakdown by target organ for the resident adult reveals no target organics above the acceptable threshold of 1.0 (Table D.10.4.2). For the resident child, the breakdown by target organ indicates that the target organs above the 1.0 threshold are skin, gastrointestinal system, thyroid, and central nervous system, driven primarily by arsenic, cobalt, iron, and manganese. Arsenic, cobalt, iron, and manganese are the only COPCs with an HQ greater than 1.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 5×10^{-4}, which is above USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.4.2). This carcinogenic risk is driven by arsenic (4×10^{-4}) and total chromium ($1x10^{-4}$) (Table D.10.4.2).

5.5.5 Site 12

Media evaluated for Site 12 include surface soil, surface water, sediment, and groundwater. Groundwater was evaluated with monitoring well samples and sediment pore water samples. Sediment pore water samples were collected because the collection of groundwater samples via monitoring wells or direct push technology is not feasible due to the topography and vegetation at Site 12. The pore water samples were collected immediately downgradient of the landfill and upgradient of the creek that is present at the base of the ravine near Site 12. Groundwater within Site 12 was only evaluated for potential construction worker exposure.

5.5.5.1 Adult Recreational User Results

The adult recreational user receptor was evaluated for COPC exposure in surface soil, surface water, and sediment at Site 12 (Table D.9.5.1).

Non-Carcinogenic Results

The total non-carcinogenic HI for the adult recreational user is 0.1, which is below the acceptable threshold of 1 (Table D.9.5.1). The non-carcinogenic HI for exposure to surface soil is 0.01, for exposure to surface water is 0.08, and for exposure to sediment is 0.007.

Carcinogenic Results

The cumulative carcinogenic risk for the adult recreational user is 2×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.5.1). Carcinogenic risks are primarily from contact with surface water, which has risk greater than 10^{-5} (Table D.10.5.1). Contact with sediment has carcinogenic risks greater than 10^{-6}. Arsenic in surface water has carcinogenic risks greater than 10^{-5}. Total chromium in surface water and arsenic in sediment have carcinogenic risks greater than 10^{-6}.

5.5.5.2 Adolescent Recreational User Results

The adolescent recreational user receptor was evaluated for COPC exposure in surface soil, surface water, and sediment at Site 12 (Table D.9.5.2).

Non-Carcinogenic Results

The total non-carcinogenic HI for the adolescent recreational user is 0.2, which is below the acceptable threshold of 1 (Table D.9.5.2). The non-carcinogenic HI for exposure to surface soil is 0.02, for exposure to surface water is 0.1, and for exposure to sediment is 0.02.

Carcinogenic Results

The cumulative carcinogenic risk for the adolescent recreational user is 8×10^{-6}, which is within the USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.5.2). Carcinogenic risks for exposure to surface soil, surface water, and sediment are $4x10^{-7}$, $6x10^{-6}$, and $1x10^{-6}$, respectively. Arsenic in surface water and sediment has carcinogenic risks greater than 10^{-6} (Table D.10.5.2).

5.5.5.3 Commercial Worker Results

The commercial worker receptor was evaluated for COPC exposure in surface soil at Site 12 (Table D.9.5.3).

Non-Carcinogenic Results

The total non-carcinogenic HI for the commercial worker is 0.02, which is below the acceptable threshold of 1 (Table D.9.5.3).

Carcinogenic Results

The cumulative carcinogenic risk for the commercial worker is 5×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.5.3). Both arsenic and total chromium in surface soil have carcinogenic risks greater than 10^{-6} (Table D.10.5.3).

5.5.5.4 Construction Worker Results

The construction worker receptor was evaluated for COPC exposure in surface soil, groundwater, surface water, and sediment at Site 12 (Table D.9.5.4).

Non-Carcinogenic Results

The total non-carcinogenic HI for the construction worker is 1, which is equal to the acceptable threshold of 1 (Table D.9.5.4). The non-carcinogenic HI for exposure to surface soil is 0.2, for exposure to groundwater 0.9, for exposure to surface water is 0.3, and for exposure to sediment is 0.01.

Carcinogenic Results

The cumulative carcinogenic risk for the construction worker is 7×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.5.4). Carcinogenic risks for exposure to

surface soil, groundwater, surface water, and sediment are $2x10^{-6}$, $4x10^{-6}$, $1x10^{-6}$, and $9x10^{-8}$, respectively. Only total chromium in groundwater has carcinogenic risks greater than 10^{-6}.

5.5.5.5 Resident Adult and Child Surface Soil Exposure Results

The resident adult and child receptors were evaluated for COPC exposure in surface soil, surface water, and sediment (Tables D.7.5.5 and D.7.5.6).

Non-Carcinogenic Results

The total non-carcinogenic HI for adult resident exposure is 0.3, which is below the acceptable threshold of 1 (Table D.9.5.5). The non-carcinogenic HI for exposure to surface soil is 0.2, for exposure to surface water is 0.08, and for exposure to sediment is 0.007.

The total non-carcinogenic HI for child resident exposure to surface soil is 2, which is above the acceptable threshold of 1 (Table D.9.5.5). The non-carcinogenic HI for exposure to surface soil is 2, for exposure to surface water is 0.3, and for exposure to sediment is 0.1. A breakdown by target organ (Table D.10.5.5) indicates that no target organ exceeds the 1.0 threshold.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 7×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.9.5.5). Carcinogenic risks are primarily from contact with surface soil and surface water, which have risk greater than 10^{-5} (Table D.10.5.5). Contact with sediment has carcinogenic risks greater than 10^{-6}. Arsenic and total chromium in surface soil and arsenic in surface water have carcinogenic risks greater than 10^{-5}. Total chromium in surface water and sediment, bis(2-ethylhexyl)phthalate in surface water, and arsenic in sediment have carcinogenic risks greater than 10^{-6}.

5.5.6 Northwest Boundary Area Groundwater

The off-site resident adult and child were evaluated for exposure to groundwater as a tap water source that migrates off-site from the NWBA (EA 2012). The construction worker was evaluated for exposure to groundwater within the NWBA used as an irrigation water supply. In addition, a potential commercial worker, located within any future buildings in the NWBA, was evaluated for exposure to VOCs in indoor air through vapor intrusion from groundwater. The exposure scenario calculations are presented in Table D.7.6.1 through Table D.7.6.3 for the resident adult, resident child, and construction worker. Calculations for the vapor intrusion pathway are included in Attachment D for the commercial worker and the resident adult. Tables D.7.6.4 and D.7.6.5 present the estimate of the dermal absorbed dose for COPCs in groundwater for the resident adult, resident child and construction worker. The carcinogenic and

non-carcinogenic risk assessment results are summarized in Tables D.9.6.1 through D.9.6.3. For the resident adult, inhalation of VOCs from groundwater was evaluated in two separate exposure pathways. Table D.7.6.1 presents the calculations for inhalation of VOCs for general household uses (i.e., showering, cooking, cleaning, etc.). The resident adult was also evaluated for inhalation of VOCs in indoor air from vapor intrusion. Calculations for this exposure pathway are presented in Attachment D. Table D.9.6.1 presents a summation of both inhalation exposure pathways for the resident adult.

It is noted that the results for the NWBA groundwater are a summary of the HHRA evaluation provided in the NWBA HHRA (EA 2012). However, the USEPA has set forth updated toxicity values for tetrachloroethene since the completion of the NWBA HHRA (USEPA 2012). To account for the update, the HHRA risk calculations for tetrachloroethene were revised to include the revised toxicity values. Tables D.7.6.1 through D.7.6.3 present the HHRA risk calculations and the revised tetrachloroethene toxicity values.

5.5.6.1 Off-Site Resident Adult and Child Results

Non-Carcinogenic Results

The total non-carcinogenic HI for the off-site resident child is 67, which exceeds the acceptable threshold of 1.0 (Table D.9.6.1). TCE is the primary contributor to the non-carcinogenic hazard with an HQ of 60. In addition, iron, manganese, and cis-1,2-dichloroethene also have HQs greater than 1. Table D.10.6.1 presents the COPCs that contribute to the non-carcinogenic hazard and a breakdown by target organ.

The total non-carcinogenic HI for the off-site resident adult is 37, which is above the acceptable threshold of 1.0 (Table D.9.6.1). TCE is the primary contributor to the non-carcinogenic hazard with an HQ of 34. No other chemicals have an HQ greater than 1. Table D.10.1 presents the COPCs that contribute to the non-carcinogenic hazard and a breakdown by target organ.

Carcinogenic Results

The total lifetime carcinogenic risk for the off-site resident (adult and child combined) exposure to groundwater is $5x10^{-4}$ (Table D.9.6.1). This carcinogenic risk is above the USEPA's "acceptable risk range" of 10^{-6} to 10^{-4}. Arsenic and TCE have carcinogenic risks greater than 10^{-4}. In addition, 1,1,2-trichloroethene and vinyl chloride have carcinogenic risks greater than 10^{-6}.

5.5.6.2 Construction Worker Results

Non-Carcinogenic Results

The total non-carcinogenic HI for the construction worker is 0.4, which is below the acceptable threshold of 1.0 (Table D.9.6.2).

Carcinogenic Results

The cumulative carcinogenic risk for the construction worker is 2×10^{-7}, which is below USEPA's "acceptable risk range" of 10^{-4} to 10^{-6} (Table D.9.6.2).

5.5.6.3 Commercial Worker Results

The commercial worker was evaluated for exposure to VOCs in indoor air through vapor intrusion from groundwater. Calculations for this exposure pathway are provided in Attachment D.

Non-Carcinogenic Results

The total non-carcinogenic HI for the commercial worker is 3, which is above the acceptable threshold of 1.0 (Table D.9.6.3). A breakdown by target organ is provided in Table D.10.6.3. TCE is the only COPC with an HQ greater than 1. The immune system, entirely attributable to TCE, is the only target organ with an HI greater than 1.

Carcinogenic Results

The cumulative carcinogenic risk for the construction worker is 8×10^{-6}, which is within USEPA's "acceptable risk range" of 10^{-4} to 10^{-6} (Table D.9.6.3). TCE is the only COPC with carcinogenic risks greater than 10^{-6}.

6. RISK ASSESSMENT UNCERTAINTY

There are numerous uncertainties involved in the HHRA process. These are discussed briefly in the following sections.

6.1 CHEMICALS NOT ASSESSED IN THE HHRA

Thallium is identified as a COPC at Grouping 2: Sites 2, 3, and 11 in subsurface soil, Grouping 3: Sites 13 ad 15 in surface and subsurface soil, and Site 12 in groundwater. Thallium is not quantitatively evaluated in this HHRA due to uncertainties with the oral RfD (USEPA 2010b). The toxicity values presented by USEPA for thallium are provisional values. The studies utilized in determining an RfD are of low quality and result in high uncertainty factors that the USEPA considers unreliable. Therefore, the RfD presented for thallium is only to be used for screening purposes (USEPA 2011b). Thallium is evaluated qualitatively below to determine potential effects on risk results.

<u>Grouping 2: Sites 2, 3, and 11</u>

Thallium is considered a COPC for both industrial and residential exposure scenarios in subsurface soil. The maximum detected concentration of thallium in subsurface soil is 4 mg/kg at Site 3. The USEPA industrial and residential soil RSLs are 10 mg/kg and 0.78 mg/kg (unadjusted), respectively. The maximum detected concentration does not exceed the industrial soil RSL; therefore, thallium is not a concern for industrial receptors. A risk ratio of the maximum concentration to the residential soil RSL reveals an HQ of 5 for residential exposures, which exceeds the target of 1. The HHRA did reveal a concern for non-carcinogenic hazards for residential children for this grouping. The primary contributors are arsenic and manganese. Therefore, the exclusion of thallium would not change the risk conclusions for this grouping.

<u>Grouping 3: Sites 13 and 15</u>

Thallium is considered a COPC for both industrial and residential exposure scenarios in surface soil and residential receptors in subsurface soil. The maximum detected concentration of thallium in surface soil is 1.1 mg/kg at Site 15. The maximum detected concentfration of thallium in subsurface soil is 0.8 mg/kg. The USEPA industrial and residential soil RSLs are 10 mg/kg and 0.78 mg/kg (unadjusted), respectively. The maximum detected concentration in surface soil does not exceed the industrial soil RSL; therefore, thallium is not a concern for industrial receptors. A risk ratio of the maximum concentration in both surface soil and subsurface soil to the residential soil RSL reveals an HQ of 1.4 and 1, respectively, for residential exposures. Neither of these results exceeds the target threshold of 1, when rounding

is taken into account. Therefore, the exclusion of thallium would not change the risk conclusions for this grouping.

Site 12

Thallium is considered a COPC for Site 12 groundwater. The maximum detected concentration of thallium in the total fraction is 2.1 ug/L. The USEPA tap water RSL is 0.16 ug/L (unadjusted). A risk ratio of the maximum concentration to the tap water RSL reveals an HQ of 13. However, the tap water RSL takes into account the use of groundwater as a potable water supply. Groundwater at Site 12 is evaluated for the industrial receptor for exposure as an irrigation water source. This type of exposure is significantly less than the RSL assumption of tap water. The non-carcinogenic risk results shown on Table D.9.5.4 reveal the construction worker exposure to groundwater is about an order of magnitude less than that of tap water. Therefore, it is not expected that the exclusion of thallium would change the risk conclusions for this grouping.

6.2 SAMPLING AND ANALYSIS UNCERTAINTIES

The sampling plan can have a significant impact on the results obtained in calculating human health risks at a site. To the extent that samples are taken in areas that are expected to be contaminated (biased sampling), the EPC used in calculating risk exposures and risks is likely to overestimate the actual concentration encountered from random exposure across the site. This sampling bias will generally result in an overestimate of exposures and risks at a site. As the majority of the samples collected are biased toward potentially contaminated areas, the measured concentrations and calculated health risks would tend to be overestimated.

6.3 UNCERTAINTIES ANALYSIS OF EXPOSURE ASSESSMENT

An analysis of uncertainties is an important aspect of the exposure assessment. It provides the risk assessor and reviewer with information relevant to the individual uncertainties associated with exposure factor assumptions and their potential impact on the final assessment. Conservative assumptions are made about exposure to these media that may result in an overestimate of potential health risks. For example, this HHRA evaluates the resident adult and child receptors; however, it is unlikely that residential use of this industrial area will occur in the future.

6.4 EXPOSURE POINT CONCENTRATIONS

An uncertainty exists with the basic approach used in arriving at EPCs for the COPCs. The USEPA ProUCL program eliminates many uncertainties associated with EPC calculation; however, COPCs with low FODs or total number of samples (N<5) still have uncertainties

within ProUCL. Generally, the maximum detected concentration was used as the EPC for COPCs with low FODs or a low number of samples. The use of the maximum detected concentration generally results in an overestimate of potential risk concerns because it was assumed that any receptors would have long-term contact with the maximum detected concentration.

6.4.1 Soil Ingestion Rate

Soil ingestion rates for construction workers are based on studies performed by Hawley (1985). These were short-term studies, and as they were not based on average long-term exposures, they represent an overestimate of exposure. Additionally, the USEPA's 2011 Exposure Factors Handbook recommends a total soil and dust ingestion rate of 50 mg/day for an adult (USEPA 2011a). While this rate does not necessarily take into account the high soil contact rates associated with the construction worker, this does reveal the ingestion rate used in the HHRA is conservative. Therefore, risk results for the construction worker may be overestimated.

6.5 UNCERTAINTIES OF TOXICITY ASSESSMENT

There are numerous uncertainties associated with the toxicity assessment. These are generally due to the unavailability of data to thoroughly calculate the toxicity of COPCs. These uncertainties are described in more detail in the following sections.

6.5.1 Uncertainties Associated With Non-Carcinogenic Effects

Interspecies Extrapolation

The majority of toxicological information comes from experiments with laboratory animals. Experimental animal data have been relied on by regulatory agencies to assess the hazards of chemical exposures to humans. Interspecies differences in chemical absorption, metabolism, excretion, and toxic response are not well understood; therefore, conservative assumptions are applied to animal data when extrapolating to humans. These probably result in an overestimation of toxicity.

Intraspecies Extrapolation

Differences in individual human susceptibilities to the effects of chemical exposures may be caused by such variables as genetic factors (e.g., glucose-6-phosphate dehydrogenase deficiency), lifestyle (e.g., cigarette smoking and alcohol consumption), age, hormonal status (e.g., pregnancy), and disease. To take into account the diversity of human populations and their

differing susceptibilities to chemically induced injury or disease, a safety factor is used. USEPA uses a factor between 1 and 10. This uncertainty may lead to overestimates of human health effects at given doses.

Exposure Routes

When experimental data available on one route of administration are different from the actual route of exposure that is of interest, route-to-route extrapolation must be performed before the risk can be assessed. Several criteria must be satisfied before route-to-route extrapolation can be undertaken. The most critical assumption is that a chemical injures the same organ(s) regardless of route, even though the injury can vary in degree. Another assumption is that the behavior of a substance in the body is similar by all routes of contact. This may not be the case when, for example, materials absorbed via the gastrointestinal tract pass through the liver prior to reaching the systemic circulation, whereas by inhalation the same chemical will reach other organs before the liver. However, when data are limited, these extrapolations are made and may result in overestimates of human toxicity.

6.5.2 Uncertainties Associated With Carcinogenic Effects

Interspecies Extrapolation

The majority of toxicological information for carcinogenic assessments comes from experiments with laboratory animals. There is uncertainty about whether animal carcinogens are also carcinogenic in humans. While many chemical substances are carcinogenic in one or more animal species, only a very small number of chemical substances are known to be human carcinogens. The fact that some chemicals are carcinogenic in some animal species but not in others raises the possibility that not all animal carcinogens are human carcinogens. Regulatory agencies assume that humans are as sensitive to carcinogens as the most sensitive animal species. This policy decision, designed to prevent underestimation of risk, introduces the potential to overestimate carcinogenic risk.

High-Dose to Low-Dose Extrapolation

Typical cancer bioassays provide limited low-dose data on responses in experimental animals for chemicals being assessed for carcinogenic or chronic effects. The usual dose regime involves three dose groups per assay. The first dose group is given the highest dose that can be tolerated, the second is exposed to one-half that dose, and the third group is unexposed (control group) (National Research Council [NRC] 1983). Because this dosing method does not reflect how

animals would react to much lower doses of a chemical, a dose-response assessment normally requires extrapolation from high to low doses using mathematical modeling that incorporates to varying degrees information about physiologic processes in the body (NRC 1983).

A central problem with the low-dose extrapolation models is that they all too often fit the data from animal bioassays equally well, and it is not possible to determine their validity based on goodness of fit. Several models may fit experimental data equally well, but all may not be equally plausible biologically. The dose-response curves derived from different models diverge substantially in the dose range of interest (NRC 1983). Therefore, low-dose extrapolation is more than a curve-fitting process, and considerations of biological plausibility of the models must be taken into account before choosing the best model for a particular set of data.

6.5.3 Uncertainties Associated Chromium Toxicity Assumptions

Sample analysis for chromium was conducted for total chromium. Chromium is most often found in two states, trivalent and hexavalent. The hexavalent form is carcinogenic and has greater relative toxicity than the trivalent form. However, in nature, the trivalent form is more prevalent. Because speciation analyses were not performed, it is conservatively assumed in the toxicity assessment that all of the chromium at Fort Buchanan is in the more toxic hexavalent form. This assumption likely biases the results for chromium higher than would actually be found.

6.6 CHEMICALS PRESENT BELOW LABORATORY ANALYTICAL DETECTION LIMITS

Uncertainty is often associated with equipment and laboratory abilities to quantitatively capture the presence of an analyte in a given medium. Chemicals may be designated as a non-detect based on an inability to achieve precision below a certain detection limit. In cases where analytes were not detected at the site based on potentially high detection limits, further analysis is undertaken in this assessment to quantify their associated potential risk. Chemicals that had detection limits in exceedance of screening limits for any given medium are identified in Table D.2.7.1. Risks results for each site grouping may be underestimated because these chemicals were not evaluated in the calculations. However, it is not anticipated that the overall conclusions in the HHRA would change due to these chemicals.

6.7 UNCERTAINTIES IN RISK CHARACTERIZATION

Uncertainties in the risk characterization can stem from the inherent uncertainties in the data evaluation, the exposure assessment process, including any modeling of exposure point concentrations in secondary media from primary media, and the toxicity assessment process.

The individual uncertainties in these respective processes were addressed in the previous sections. A primary source of error in the risk characterization is the inclusion of COPCs that are detected below site background concentrations. An analysis of results with consideration of background is presented in Section 6 of this appendix.

7. CONSIDERATION OF BACKGROUND

Inorganic constituents occur naturally in the environment. It is likely that detected concentrations of some inorganic constituents are not associated with site use and are measured at naturally occurring levels (background). Therefore, it is probable that some of the calculated risks are contributed by naturally occurring background concentrations of inorganics in site soil and are not the result of activities at the site.

The risk characterization section of this HHRA conservatively assessed the effects of analytes detected at Fort Buchanan without consideration of background. This section presents the results of the risk characterization if background is considered.

To consider background, a comparison is made between the maximum detected site concentration to the background concentration (Section 3.15 of the RFI). This comparison is presented in Tables D.2.1.1 through D.2.5.6. In these tables, it is noted that several inorganic COPCs are detected above screening levels and carried through the risk characterization although they were below background concentrations. To account for background, these analytes are not considered as COPCs. The risk assessment summary tables (Tables D.10.1.1 through D.10.5.6) are re-evaluated, with only COPCs that exceed background and presented in Tables D.11.1.1 through D.11.5.6.

7.1 GROUPING 1, SITES 1, 7, AND 8 BACKGROUND RESULTS

7.1.1 Adult Recreational User Results

The only medium of concern for the adult recreational user receptor in Grouping 1 is surface soil. COPCs eliminated based on background are aluminum, arsenic, cobalt, iron, and manganese. The only remaining COPCs are total chromium, vanadium, and five PAHs. The only significant contributors to risk (risk > 1×10^{-6}) before the consideration of background are arsenic and total chromium (Table D.10.1.1). However, arsenic concentrations are not above background levels. Non-carcinogenic hazards are not above a level of concern. Table D.11.1.1 presents the results with consideration of background for the adult recreational user.

Carcinogenic Results

The cumulative carcinogenic risk for the adult recreational user is 2×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.1.1). Total chromium is the only contributor to this carcinogenic risk.

7.1.2 Adolescent Recreational User Results

The only medium of concern for the adolescent recreational user receptor in Grouping 1 is surface soil. COPCs eliminated based on background are aluminum, arsenic, cobalt, iron, and manganese. The only remaining COPCs are total chromium, vanadium, and five PAHs. The only significant contributors to risk (risk > 1×10^{-6}) before the consideration of background are arsenic and total chromium (Table D.10.1.2). However, arsenic concentrations are not above background levels. Non-carcinogenic hazards are not above a level of concern. Table D.11.1.2 presents the results with consideration of background for the adolescent recreational user.

Carcinogenic Results

The cumulative carcinogenic risk for the adult recreational user is 1×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.1.2). Total chromium is the only contributor to this carcinogenic risk.

7.1.3 Commercial Worker Results

The commercial worker receptor is evaluated for COPC exposure in surface soil at Grouping 1 (Table D.11.1.3). The only significant contributors to risk (risk > 1×10^{-6}) before the consideration of background are arsenic and total chromium (Table D.10.1.3). However, arsenic concentrations are not above background levels. Non-carcinogenic hazards are not above a level of concern. Table D.11.1.3 presents the results with consideration of background for the commercial worker.

Carcinogenic Results

The cumulative carcinogenic risk for the commercial worker is 9×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.1.3). Total chromium is the only contributor to this carcinogenic risk.

7.1.4 Construction Worker Results

The construction worker receptor is evaluated for COPC exposure in subsurface soil at Grouping 1 (Table D.11.1.4). The only medium of concern for the construction worker receptor in Grouping 1 is subsurface soil. No COPCs are eliminated based on background, which means arsenic, total chromium, and cobalt are considered. The only significant contributors to risk (risk>1×10^{-6}) before the consideration of background are arsenic and total chromium (Table D.10.1.4). Non-carcinogenic hazards are not above a level of concern. Table D.11.1.4 presents the results with consideration of background for the construction worker.

Carcinogenic Results

The cumulative carcinogenic risk for the commercial worker is 5×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.1.4). Arsenic and total chromium contribute equally to this carcinogenic risk.

7.1.5 Resident Adult and Child Surface Soil Exposure Results

The resident adult and child receptors are evaluated for COPC exposure in surface soil. COPCs eliminated based on background are aluminum, arsenic, cobalt, iron, and manganese. The only remaining COPCs are total chromium, vanadium, and five PAHs. The significant contributors to risk (risk>1×10^{-6} or HQ>1) before the consideration of background are arsenic, total chromium, benzo(a)pyrene, and dibenz(a,h)anthracene (Table D.10.1.5). However, arsenic concentrations are not above background levels. With consideration of background, only total chromium, benzo(a)pyrene and dibenz(a,h)anthracene are contributors to risk. Non-carcinogenic hazards are not a concern because arsenic is eliminated based upon the background comparison.
Table D.11.1.5 presents the results with consideration of background for the resident.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 1×10^{-4}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.1.5). Total chromium ($7x10^{-5}$) is the primary contributor to carcinogenic risks. In addition, benzo(a)pyrene ($3x10^{-5}$) and dibenz(a,h)anthracene ($6x10^{-6}$) also contribute to the carcinogenic risk results.

7.1.6 Resident Adult and Child Subsurface Soil Exposure Results

The resident adult and child receptors are evaluated for COPC exposure in subsurface soil. COPCs eliminated based on background are arsenic, total chromium, and vanadium. The only remaining COPCs are aluminum, cobalt, iron, manganese, mercury, and two PAHs. The significant contributors to risk (risk>1×10^{-6} or HQ>1) before the consideration of background are arsenic, total chromium, cobalt, benzo(a)pyrene, and dibenz(a,h)anthracene (Table D.10.1.6). However, arsenic and total chromium are not considered because concentrations are not above background levels. With consideration of background, only cobalt, benzo(a)pyrene, and dibenz(a,h)anthracene are contributors to risk. Table D.11.1.6 presents the results with consideration of background for the resident.

Non-Carcinogenic Results

The total non-carcinogenic HI for child resident exposure to surface soil is 2, which is above the acceptable threshold of 1 (Table D.11.1.6). Non-carcinogenic hazards are entirely attributable to cobalt.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 6×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.1.6). Benzo(a)pyrene ($5x10^{-6}$) and dibenz(a,h)anthracene ($1x10^{-6}$) are the only contributors to the carcinogenic risk results.

7.2 GROUPING 2, SITES 2, 3, AND 11 BACKGROUND RESULTS

7.2.1 Adult Recreational User Results

Surface soil is not evaluated for Grouping 2, so there is no need for a background comparison. There are no concerns for the adult recreational user as the only medium of concern for this receptor is surface soil.

7.2.2 Adolescent Recreational User Results

Surface soil is not evaluated for Grouping 2, so there is no need for a background comparison. There are no concerns for the adolescent recreational user as the only medium of concern for this receptor is surface soil.

7.2.3 Commercial Worker Results

Surface soil is not evaluated for Grouping 2, so there is no need for a background comparison. There are no concerns for the commercial worker user as the only medium of concern for this receptor is surface soil.

7.2.4 Construction Worker Results

Subsurface soil is the only medium of concern for the construction worker at Grouping 2. A comparison to soil background data indicates that no COPCs are below background. Arsenic, chromium, cobalt, manganese, and thallium are COPCs with consideration of background for subsurface soil. The significant contributors to risk (risk>1×10^{-6} or HQ>1) before the consideration of background are arsenic and total chromium (Table D.10.2.1). Non-carcinogenic hazards are not a concern. Table D.11.2.1 presents the results with consideration of background for the construction worker.

Carcinogenic Results

The cumulative carcinogenic risk for the commercial worker is 1×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.2.1). Arsenic ($7x10^{-6}$) and total chromium ($3x10^{-6}$) contribute to this carcinogenic risk.

7.2.5 Resident Adult and Child Subsurface Soil Exposure Results

Subsurface soil is the only medium of concern for the resident at Grouping 2. A comparison to soil background data indicates that no COPCs are below background. Aluminum, arsenic, chromium, cobalt, iron, manganese, thallium, and vanadium are COPCs with consideration of background for subsurface soil. The significant contributors to risk (risk>1×10^{-6} or HQ>1) before the consideration of background are arsenic, total chromium, and manganese (Table D.10.2.2). Table D.11.2.2 presents the results with consideration of background for the resident.

Non-Carcinogenic Results

The total non-carcinogenic HI for child resident exposure to subsurface soil is 7, which is above the acceptable threshold of 1 (Table D.11.1.6). Non-carcinogenic hazards are attributable to arsenic and manganese.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 2×10^{-4}, which is above USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.1.6). Arsenic ($2x10^{-4}$) is the primary contributor to carcinogenic risks. Total chromium ($7x10^{-5}$) also contributes to carcinogenic risk results.

7.3 GROUPING 3, SITES 13 AND 15 BACKGROUND RESULTS

7.3.1 Adult Recreational User Results

Surface soil is the medium of concern for the adult recreational user. COPCs eliminated based on background are aluminum, arsenic, total chromium, iron, and thallium. Lead, manganese, and vanadium are the only inorganics above background. Table D.10.3.1 reveals there are no COPCs above levels of concern. As a result, Table D.11.3.1 presents the results with consideration of background for the adult recreational user for Grouping 3. There are no non-carcinogenic or carcinogenic risks for this receptor.

7.3.2 Adolescent Recreational User Results

Surface soil is the medium of concern for the adolescent recreational user. COPCs eliminated based on background are aluminum, arsenic, total chromium, iron, and thallium. Lead, manganese, and vanadium are the only inorganics above background. Table D.10.3.2 reveals there are no COPCs above levels of concern. As a result, Table D.11.3.2 presents the results

with consideration of background for the adolescent recreational user for Grouping 3. There are no non-carcinogenic or carcinogenic risks for this receptor.

7.3.3 Commercial Worker Results

The commercial worker receptor is evaluated for COPC exposure in surface soil at Grouping 3. Based on the comparison to background, no inorganics are detected above background. Table D.11.3.3 presents the results with consideration of background. There are no COPCs above levels of concern. Therefore, the results of the risk calculations do not change, and there are no concerns for this receptor.

7.3.4 Construction Worker Results

The construction worker receptor is evaluated for COPC exposure in subsurface soil. A comparison to surface soil background data indicates that the only COPCs above background are arsenic and total chromium. Non-carcinogenic hazards are not a concern. As a result, Table D.11.3.4 presents the results with consideration of background for the construction worker for Grouping 3.

Carcinogenic Results

The cumulative carcinogenic risk for the commercial worker is 8×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.2.1). Arsenic ($8x10^{-6}$) and total chromium ($3x10^{-6}$) contribute to this carcinogenic risk.

7.3.5 Resident Adult and Child Surface Soil Exposure Results

The resident adult and child receptors are evaluated for COPC exposure in surface soil. COPCs eliminated based on background are aluminum, arsenic, total chromium, iron, and thallium. Lead, manganese, and vanadium are the only inorganics above background. The significant contributors to risk (risk>1×10^{-6}) before the consideration of background are arsenic and total chromium (Table D.10.3.5). Non-carcinogenic hazards are not a concern. Table D.11.3.5 presents the results with consideration of background. No COPCs, that are greater than background, are above levels of concern.

7.3.6 Resident Adult and Child Subsurface Soil Exposure Results

The resident adult and child receptors are evaluated for COPC exposure in subsurface soil. A comparison to soil background data indicates that the only COPCs above background are arsenic and total chromium. Aluminum, cobalt, iron, manganese, thallium, and vanadium are below background. The significant contributors to risk (risk>1×10^{-6} or HQ>1) before the consideration

of background are arsenic, total chromium, and benzo(a)pyrene (Table D.10.3.6). Table D.11.3.6 presents the results of the background comparison.

Non-Carcinogenic Results

The total non-carcinogenic HI for child resident exposure to subsurface soil is 2, which is above the acceptable threshold of 1 (Table D.11.1.6). Non-carcinogenic hazards are attributable to arsenic.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 2×10^{-4}, which is above USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.1.6). Arsenic ($1x10^{-4}$) is the primary contributor to carcinogenic risks. Total chromium ($6x10^{-5}$) and benzo(a)pyrene ($1x10^{-6}$) also contribute to carcinogenic risk results.

7.3.7 Lead Evaluation

A comparison to background indicates that lead is above background. The results of the lead modeling reveal there is not a concern for a resident child exposure to lead in surface soil.

7.4 SITE 9 BACKGROUND RESULTS

7.4.1 Adult Recreational User Results

The adult recreational user is a potential receptor for COPC exposure in surface soil at Site 9. Surface soil is not a medium of concern for Site 9; therefore, there are no concerns for the adult recreational user.

7.4.2 Adolescent Recreational User Results

The adolescent recreational user is a potential receptor for COPC exposure in surface soil at Site 9. Surface soil is not a medium of concern for Site 9; therefore, there are no concerns for the adolescent recreational user.

7.4.3 Commercial Worker Results

The commercial worker is a potential receptor for COPC exposure in surface soil at Site 9. Surface soil is not a medium of concern for Site 9; therefore, there are no concerns for the commercial worker.

7.4.4 Construction Worker Results

The construction worker receptor is evaluated for COPC exposure in subsurface soil at Site 9. A comparison to surface soil background data indicates that all COPCs for this receptor are above background. The significant contributors to risk (risk>1×10^{-6} or HQ>1) are arsenic, total chromium, and cobalt (Table D.10.4.1). Table D.11.4.1 presents the major contributors to risk after the background comparison. The overall risk conclusions do not change for this receptor.

7.4.5 Resident Adult and Child Subsurface Soil Exposure Results

The resident adult and child receptors are evaluated for COPC exposure in subsurface soil. A comparison to soil background data indicates that the COPCs above background are arsenic, total chromium, cobalt, iron, manganese, and vanadium. Aluminum is below background. The significant contributors to risk (risk>1×10^{-6} or HQ>1) are arsenic, total chromium, cobalt, and manganese (Table D.10.4.2). Table D.11.4.2 presents the major contributors to risk after the background comparison. The results of the risk calculations do not change; arsenic, cobalt, and manganese are the primary risk contributors (Table D.11.4.2).

7.5 SITE 12 BACKGROUND RESULTS

7.5.1 Adult Recreational User Results

The adult recreational user receptor is evaluated for COPC exposure in surface soil, surface water and sediment at Site 12. All COPCs identified in surface soil are eliminated based on a comparison to background. The significant contributors to risk (risk>1×10^{-6}) are arsenic in surface water and sediment and total chromium in sediment (Table D.10.5.1). Non-carcinogenic hazards are not a concern. Table D.11.5.1 presents the results with consideration of background for the adult recreational user.

Carcinogenic Results

The cumulative carcinogenic risk for the adult recreational user is 2×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.5.1). Arsenic ($1x10^{-5}$) in surface water is the primary contributor to carcinogenic risks. Total chromium ($2x10^{-6}$) in surface water and arsenic ($1x10^{-6}$) in sediment also contribute to carcinogenic risk results.

7.5.2 Adolescent Recreational User Results

The adolescent recreational user receptor is evaluated for COPC exposure in surface soil, surface water and sediment at Site 12. All COPCs identified in surface soil are eliminated based on a comparison to background. The significant contributors to risk (risk>1×10^{-6}) are arsenic in surface water and sediment (Table D.10.5.2). Non-carcinogenic hazards are not a concern.

Table D.11.5.2 presents the results with consideration of background for the adolescent recreational user.

Carcinogenic Results

The cumulative carcinogenic risk for the adolescent recreational user is 6×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.5.2). Arsenic ($5x10^{-6}$) in surface water is the primary contributor to carcinogenic risks. Arsenic ($1x10^{-6}$) in sediment also contributes to carcinogenic risk results.

7.5.3 Commercial Worker Results

The commercial worker receptor is evaluated for COPC exposure in surface soil at Site 12. All surface soil COPCs are eliminated from consideration based on the background comparison Table D.11.4.3 presents the results with consideration of background for the commercial worker. There are no concerns for the commercial worker.

7.5.4 Construction Worker Results

The construction worker receptor is evaluated for COPC exposure in surface soil, surface water and sediment at Site 12. A comparison to soil background data indicates that there are no inorganic COPCs above background. The significant contributors to risk (risk>1×10^{-6}) are total chromium in groundwater (Table D.10.5.4). Non-carcinogenic hazards are not a concern. Table D.11.5.4 presents the results with consideration of background for the construction worker.

Carcinogenic Results

The cumulative carcinogenic risk for the construction worker is 4×10^{-6}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.5.4). Total chromium ($4x10^{-6}$) in groundwater is the only contributor to carcinogenic risks.

7.5.5 Resident Adult and Child Surface Soil Exposure Results

The resident adult and child receptors are evaluated for COPC exposure in surface soil, surface water, and sediment. A comparison to soil background data indicates that there are no inorganic COPCs above background. The significant contributors to risk (risk>1×10^{-6}) are arsenic and total chromium in surface water and sediment and bis(2-ethylhexyl)phthalate in surface water (Table D.10.5.5). Non-carcinogenic hazards are not a concern. Table D.11.5.5 presents the results with consideration of background for the construction worker.

Carcinogenic Results

The cumulative carcinogenic risk for the lifetime resident (adult and child combined) is 3×10^{-5}, which is within USEPA's target risk range of 10^{-4} to 10^{-6} (Table D.11.5.5). Arsenic ($2x10^{-5}$) in surface water is the primary contributor to carcinogenic risks. Arsenic ($5x10^{-6}$) in sediment, total chromium in surface water ($3x10^{-6}$) and sediment ($1x10^{-6}$), and bis(2-ethylhexyl)phthalate ($1x10^{-6}$) also contributes to carcinogenic risk results.

8. CONCLUSIONS

This HHRA evaluated potential cumulative risks for 14 sites at Fort Buchanan. Initially, all sites were assessed individually to determine COPCs. The risk-based screening was performed for each individual site and is presented in Attachment B of this Appendix. Several sites did not have any analytes detected or revealed no COPCs in soil. Soil at Sites 4 and 5 was analyzed for PCBs (Aroclors) only because these sites are associated with PCB transformer storage areas. No PCBs were detected at these sites. Therefore, no further action is required for Sites 4 and 5. Site 6 was analyzed for herbicides and pesticides because the site is associated with a pesticide mixing and storage area. No COPCs were identified for Site 6 in soil and sediment. Therefore, no further action is required for Site 6. Site 10 soil was evaluated for VOCs and total petroleum hydrocarbons because the area was used for refueling. There were no COPCs for Site 10 soil; therefore, Site 10 will not be evaluated further. It is noted that Site 10 did reveal COPCs in groundwater. However, groundwater at this site was evaluated for the entire NWBA exposure area. These groundwater results are summarized for the entire NWBA exposure area.

The results of the risk-based screening indicate that several sites have similar COPCs at similar concentrations. Based on both the similar COPCs and the proximity of sites, several groupings of sites were carried through the HHRA as a whole. Sites 1, 7, and 8 were combined to form one grouping. These sites are located in close proximity and are associated with buildings where storage occurred. Sampling for these sites occurred near drain outlets from the buildings. Sample analysis for these sites was similar, except Site 1 was not analyzed for inorganics. Sites 2, 3, and 11 were combined to form a second grouping. These sites are located in close proximity. Two of the sites, Sites 3 and 11, are associated with buildings where storage occurred, and Site 2 is associated with a suspected burial trench. Sampling for these sites consisted of only subsurface samples. These sites had similar sample analysis, and the COPCs are also similar (inorganics). Sites 13 and 15 were combined into a third grouping. These sites are located in close proximity and COPCs (inorganics) identified for these sites are similar. Sites 9 and 12 are not grouped and were assessed individually. Sites 9 and 12 were assessed separately.

A summary of the risk results are presented in Tables D.12.1 through D.12.5 for the sites and groupings evaluated in this HHRA. These tables only present the results that exceed the upper end of the USEPA acceptable risk range ($>10^{-4}$) or an HI >1. The results indicate there are no exceedances of the carcinogenic or non-carcinogenic risk thresholds for current users, the adult and adolescent trespasser, and commercial worker, for any site. The only potential concerns are for future residential use of sites in Grouping 1 (surface and subsurface soil), sites in Grouping 2

(subsurface soil), sites in Grouping 3 (subsurface soil), and Site 9 (subsurface soil). Future construction worker exposure to Site 9 subsurface soil may also be of potential concern. The sites that revealed an exceedance are discussed below to further identify analytes that contribute to the risk results and their distribution.

Grouping 1: Sites 1, 7, and 8

The HHRA determined potential risk concerns for the resident child exposure to surface and subsurface soil (Table D.12.1). For surface soil, arsenic and total chromium were the chemicals of concern (COCs) for carcinogenic risks. In addition, arsenic is the only COC in surface soil with non-carcinogenic hazards above 1. Only one surface soil was collected for inorganic analysis within Grouping 1, at Site 7. Therefore, the EPC used in the risk calculations is the maximum concentration. The maximum concentration of arsenic and total chromium were elevated above both the industrial and residential soil RSL. The maximum concentration of arsenic in surface soil (43.9 mg/kg) is consistent with the background UPL (43.9 mg/kg). The maximum concentration of total chromium in surface soil (102 mg/kg) was above with the background UPL (69.8 mg/kg). It is noted that the HHRA evaluates potential risks assuming hexavalent chromium, so the carcinogenic risk results are most likely over-estimated for this analyte. Therefore, no further action is recommended for surface soil because the primary risk contributor, to both carcinogenic and non-carcinogenic, is consistent with background UPLs. The risk results for all other COPCs are within the USEPA acceptable risk range.

As shown on Table D.12.1, cobalt in subsurface soil is the only COC with non-carcinogenic hazards greater than 1. The maximum detection of cobalt is at Site 8 in sample location S-08-08-01 at 4 to 6 ft bgs. This was the only location that exceeds both the USEPA residential soil RSL and the Fort Buchanan soil background UPL. Furthermore, the HHRA risk results are based upon the maximum detected concentration because the 95%UCLM exceeds the maximum detected concentration. Based upon the one sample location that exceeds the screening criteria, the use of the maximum concentration in the HHRA risk evaluation, and the depth of the sample, cobalt is not a concern for potential receptors at Grouping 1. Therefore, no further action is recommended for subsurface soil at Grouping 1.

Grouping 2: Sites 2, 3, and 11

The HHRA determined potential non-carcinogenic risk concerns for the resident child and carcinogenic risk concerns for the resident adult and child combined for exposure to subsurface soil (Table D.12.2). As shown on Table D.12.2, arsenic and total chromium contribute to the carcinogenic risk, and arsenic and manganese have non-carcinogenic hazards above 1. All detections of arsenic and total chromium at this grouping are above the USEPA residential and

industrial soil RSLs. In addition, approximately half of the arsenic and total chromium detections are above the Fort Buchanan background UPL. A majority of the highest detections for both analytes are within the 1 to 4 ft bgs of soil. It is noted that the HHRA evaluates potential risks assuming hexavalent chromium, so the carcinogenic risk results are most likely over-estimated for this analyte. However, based upon the distribution of detections for arsenic and total chromium and the concentrations, there are potential risk concerns for residential exposure to arsenic and total chromium in subsurface soil. Manganese is an additional COC at Grouping 2 based upon a resident child exposure to subsurface soil. The maximum detection of manganese is at Site 3 in sample location S-03-08-01 at 1 to 2 ft bgs. Three sample locations exceed both the USEPA residential soil RSL and the Fort Buchanan soil background UPL. Manganese detections do not exceed the USEPA industrial soil RSL at any of the sample locations. Furthermore, the HHRA risk results for manganese are based upon the maximum concentration (12,800 mg/kg) because the 95%UCLM is greater than the maximum concentration. Manganese may present potential risk concerns for residential receptors at this grouping.

Grouping 3: Sites 13 and 15

The HHRA determined potential non-carcinogenic risk concerns for the resident child and carcinogenic risk concerns for the resident adult and child combined for exposure to subsurface soil (Table D.12.3). As shown on Table D.12.3, arsenic, total chromium, and benzo(a)pyrene contribute to the carcinogenic risk, and arsenic has non-carcinogenic hazards above 1. It is noted that only three subsurface soil samples were collected for inorganics and one sample for PAHs for this grouping. As a result, the risk results are based upon the maximum detected concentration for all analytes detected. All detections of arsenic and total chromium at this grouping are above the USEPA residential and industrial soil RSLs. Benzo(a)pyrene only exceeds the USEPA residential soil RSL. Only the maximum detected concentration of the arsenic (45.2 mg/kg) and total chromium (89.3 mg/kg) exceeds the Fort Buchanan background UPLs of 43.9 mg/kg and 69.8 mg/kg, respectively. The maximum detected concentration for both analytes is within Site 15 at sample location S-15-08-01 at 2 to 4 ft bgs. It is noted that the HHRA evaluates potential risks assuming hexavalent chromium, so the carcinogenic risk results are most likely over-estimated for this analyte. Because the maximum detected concentration is the only location which exceeds the Fort Buchanan soil background UPLs, only Site 15 contributes to potential risk concerns for this grouping. The results for arsenic and total chromium at Site 13 are below the Fort Buchanan background UPLs. However, the maximum detected concentration of arsenic and total chromium at Site 15 only minimally exceed the Fort Buchanan background UPL. Therefore, it appears the concentration of these analytes may be consistent with background UPLs. Benzo(a)pyrene is only detected once at Site 13. As shown

on Table D.11.6, the carcinogenic risk level of benzo(a)pyrene ($1x10^{-5}$) is within the USEPA acceptable risk range and does not reveal a concern for residential exposure.

Site 9

The HHRA determined potential non-carcinogenic risk concerns for the construction worker and resident child and carcinogenic risk concerns for the resident adult and child combined for exposure to subsurface soil (Table D.12.4). As shown on Table D.12.4, arsenic and total chromium contribute to the carcinogenic risk, and arsenic, cobalt, iron, and manganese have non-carcinogenic hazards above 1. All detections of arsenic and total chromium at this grouping are above the USEPA residential and industrial soil RSLs. In addition, most of the arsenic and half of the total chromium detections are above the Fort Buchanan background UPL. It is noted that the HHRA evaluates potential risks assuming hexavalent chromium, so the carcinogenic risk results are most likely over-estimated for this analyte. However, based upon the distribution of detections for arsenic and total chromium and the concentrations, there are potential risk concerns for residential exposure to arsenic and total chromium in subsurface soil. For cobalt, one sample location, S-09-08-02 at 2 to 4 ft and 4 to 6 ft, exceeds both the USEPA residential soil RSL and the Fort Buchanan soil background UPL. Furthermore, the HHRA risk results for cobalt are based upon the maximum concentration (104 mg/kg) because the 95%UCLM is greater than the maximum concentration. Based upon the one sample location that exceeds the screening criteria, the use of the maximum concentration in the HHRA risk evaluation, and the depth of the sample, cobalt is not a concern for potential receptors at Site 9. For iron and manganese, approximately half of the sample locations exceed both the USEPA residential soil RSL and the Fort Buchanan soil background UPL. Based upon the risk results, it appears that iron and manganese may be a concern for human health.

Site 12

As shown in Table D.12.5, the HHRA risk results for all receptors are below the levels of concern. Therefore, there are no concerns for potential receptors contact with Site 12.

Northwest Boundary Area Groundwater

Groundwater below 12 of the 14 sites evaluated in this HHRA was evaluated for the entire exposure area in the NWBA RFI (EA 2012). This evaluation focused on the TCE plume located within the NWBA and presented a complete representation of potential receptors exposure to groundwater. Therefore, a summary of the risk results from the NWBA HHRA (EA 2012) are presented in this HHRA. Direct contact exposure to groundwater was evaluated for the off-site resident and the construction worker. In addition, the commercial worker and the resident were evaluated for potential vapor intrusion of VOCs from groundwater to indoor air. A summary of

the risk results are provided in Table D.12.6. The NWBA groundwater evaluation revealed potential risk concerns for the off-site resident adult and child exposure to groundwater. The total non-carcinogenic HI for the off-site resident child and resident adult is 67 and 37, respectively. TCE is the primary contributor to the non-carcinogenic hazards. In addition, iron, manganese, and cis-1,2-dichloroethene also have HQs greater than 1 for the resident child. The total lifetime carcinogenic risk for the off-site resident (adult and child combined) exposure to groundwater is $5x10^{-4}$. This carcinogenic risk reveals there are potential carcinogenic risk concerns for the resident exposure to groundwater near the NWBA. The primary contributors to carcinogenic risks are arsenic and TCE. The highest detections of TCE are found within an area bounded by Sites 1, 8, 9, and 10. Additionally, there are potential risk concerns for vapor intrusion of VOCs from groundwater to indoor air for both the commercial worker and the resident.

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FIGURES

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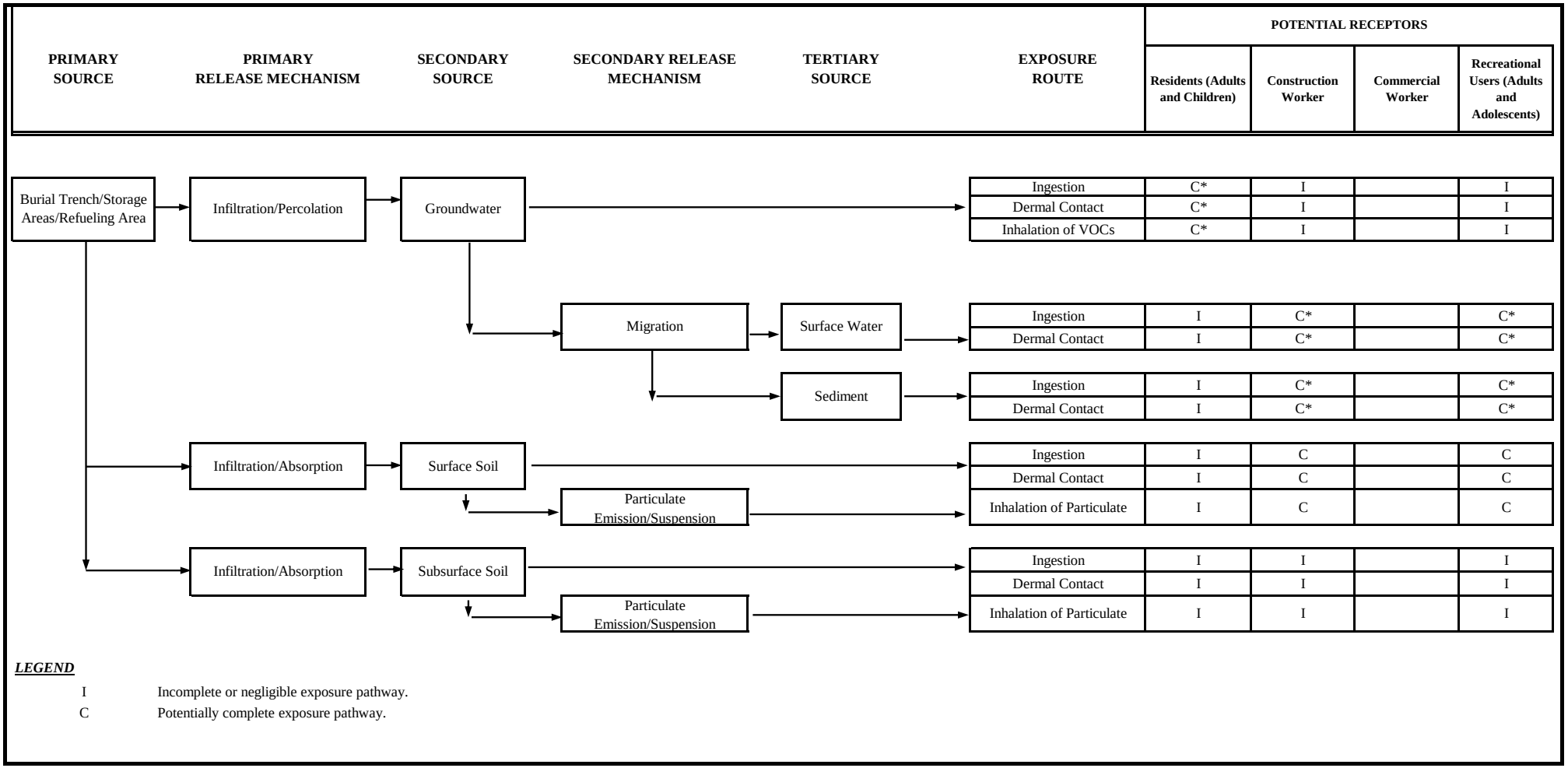
FIGURE D-1
HUMAN HEALTH CONCEPTUAL SITE MODEL
SITES 1, 7, AND 8
FORT BUCHANAN

PRIMARY SOURCE	PRIMARY RELEASE MECHANISM	SECONDARY SOURCE	SECONDARY RELEASE MECHANISM	TERTIARY SOURCE	EXPOSURE ROUTE	POTENTIAL RECEPTORS: Residents (Adults and Children)	Construction Worker	Commercial Worker	Recreational Users (Adults and Adolescents)
Hazardous Waste Containers/ Bldg. 541/ Bldg. S-563	Infiltration/Percolation	Groundwater			Ingestion	C*	I	I	I
					Dermal Contact	C*	I	I	I
					Inhalation of VOCs	C*	I	I	I
			Volatization	Indoor Air	Inhalation of VOCs	C	I	C	I
	Infiltration/Absorption	Surface Soil			Ingestion	C	I	C	C
					Dermal Contact	C	I	C	C
			Particulate Emission/Suspension		Inhalation of Particulate	C	I	C	C
	Infiltration/Absorption	Subsurface Soil			Ingestion	C	C	I	I
					Dermal Contact	C	C	I	I
			Particulate Emission/Suspension		Inhalation of Particulate	C	C	I	I

LEGEND

I	Incomplete or negligible exposure pathway.
C	Potentially complete exposure pathway.
C*	Potentially complete exposure pathway, evaluated in EA, 2012. *Northwest Boundary Remedial Investigation.*

FIGURE D-2
HUMAN HEALTH CONCEPTUAL SITE MODEL
SITES 2, 3, AND 11
FORT BUCHANAN

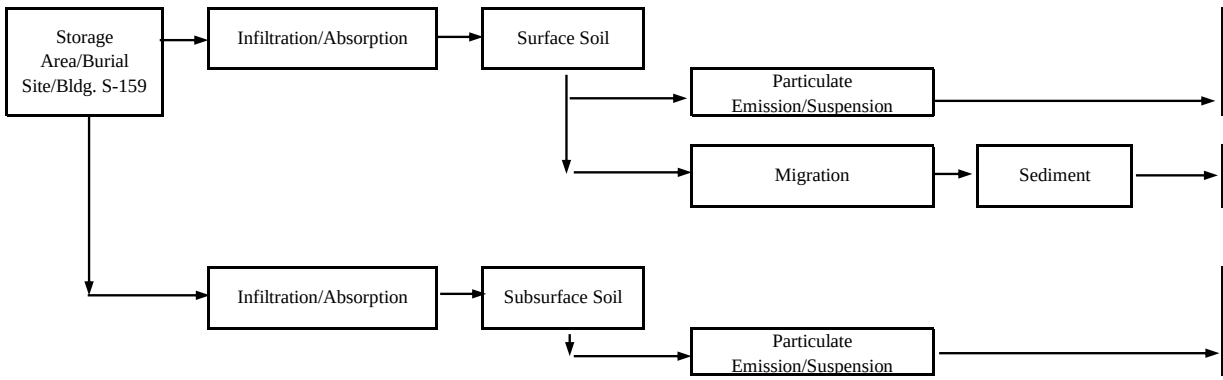


LEGEND

I Incomplete or negligible exposure pathway.

C Potentially complete exposure pathway.

FIGURE D-3
HUMAN HEALTH CONCEPTUAL SITE MODEL
SITES 13 AND 15
FORT BUCHANAN



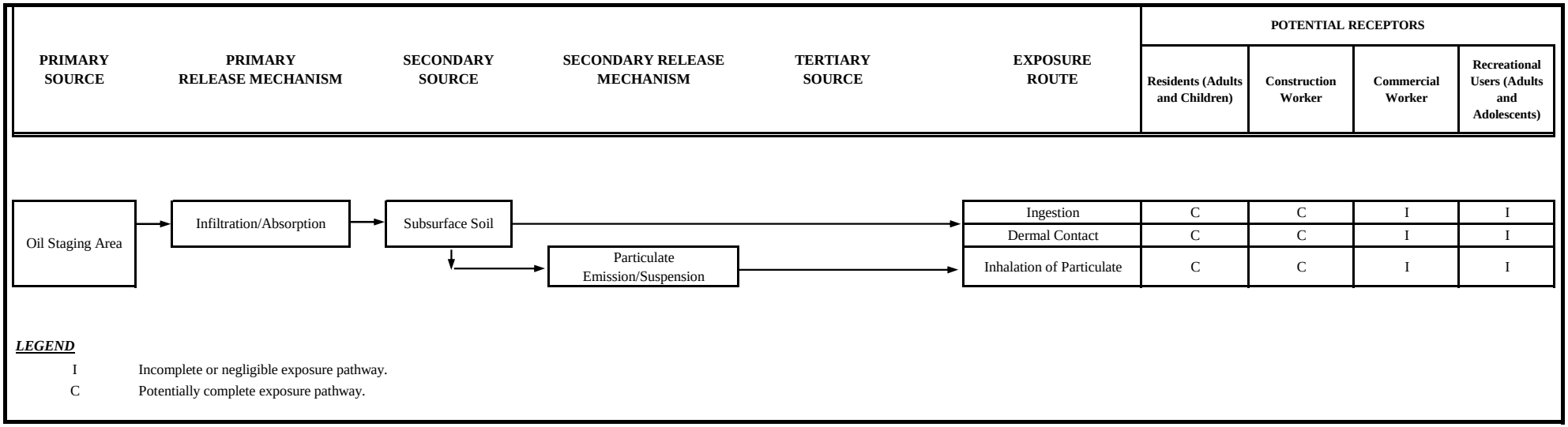
PRIMARY SOURCE	PRIMARY RELEASE MECHANISM	SECONDARY SOURCE	SECONDARY RELEASE MECHANISM	TERTIARY SOURCE	EXPOSURE ROUTE	POTENTIAL RECEPTORS: Residents (Adults and Children)	Construction Worker	Commercial Worker	Recreational Users (Adults and Adolescents)
Storage Area/Burial Site/Bldg. S-159	Infiltration/Absorption	Surface Soil	Particulate Emission/Suspension		Ingestion	C	I	C	C
					Dermal Contact	C	I	C	C
					Inhalation of Particulate	C	I	C	C
			Migration	Sediment	Ingestion	C	I	I	C
					Dermal Contact	C	I	I	C
	Infiltration/Absorption	Subsurface Soil	Particulate Emission/Suspension		Ingestion	C	C	I	I
					Dermal Contact	C	C	I	I
					Inhalation of Particulate	C	C	I	I

LEGEND

I Incomplete or negligible exposure pathway.

C Potentially complete exposure pathway.

FIGURE D-4
HUMAN HEALTH CONCEPTUAL SITE MODEL
SITE 9
FORT BUCHANAN



LEGEND

I Incomplete or negligible exposure pathway.

C Potentially complete exposure pathway.

FIGURE D-5
HUMAN HEALTH CONCEPTUAL SITE MODEL
SITE 12
FORT BUCHANAN

PRIMARY SOURCE	PRIMARY RELEASE MECHANISM	SECONDARY SOURCE	SECONDARY RELEASE MECHANISM	TERTIARY SOURCE	EXPOSURE ROUTE	POTENTIAL RECEPTORS: Residents (Adults and Children)	Construction Worker	Commercial Worker	Recreational Users (Adults and Adolescents)
Landfill	Infiltration/Percolation	Groundwater			Ingestion	C*	C	I	I
					Dermal Contact	C*	C	I	I
					Inhalation of VOCs	C*	C	I	I
			Volatization	Indoor Air	Inhalation of VOCs	C	I	C	I
			Migration	Surface Water	Ingestion	I	C*		C*
					Dermal Contact	I	C*		C*
				Sediment	Ingestion	I	C*		C*
					Dermal Contact	I	C*		C*
Landfill	Infiltration/Absorption	Surface Soil			Ingestion	C	I	C	C
					Dermal Contact	C	I	C	C
			Particulate Emission/Suspension		Inhalation of Particulate	C	I	C	C
			Migration	Sediment	Ingestion	C	I	I	C
					Dermal Contact	C	I	I	C

LEGEND

I Incomplete or negligible exposure pathway.

C Potentially complete exposure pathway.

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TABLES

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TABLE D.1.1.
SUMMARY OF RFI FIELD ACTIVITIES
FORT BUCHANAN

Site	Number of Samples						Analyses Performed					
	Soil			Sediment	Surface Water	Groundwater	VOC	SVOC	Metals	PCBs	Pesticides/ Herbicides	TPH
	# Samples	# Locations	Depth Interval (ft)									
1: Old Hazardous Waste Containers	8	4	0-2, 2-4	0	0	10	x	x	x	x	x	x
2: SWMU 3	8	4	4-8, 20-24, 26-28, 37-36	0	0	17	x	x	x	x	x	x
3: Spent Solvent Storage Area	8	9	1-2, 2-4,	0	0	7	x	x	x	x	x	x
4: PCB Storage Area #1	6	6	0-2	0	0	6	x	x	x	x	x	
5: PCB Storage Area #2	4	2	1-2, 2-4	0	0	0				x		
6:Pesticide Storage Area	7	3	0-2, 2-4	3	0	0					x	
7: Building 541	3	1	0-2, 2-4	0	0	5	x	x	x	x	x	x
8: Building S-563	4	2	2-4, 4-6	0	0	2	x	x	x	x	x	x
9: Used Oil Staging Area	7	3	2-4, 4-6	0	0	0	x	x	x	x	x	x
10: 65th Army Reserve Command Refueling Area	6	3	0-2, 2-4	0	0	2	x	x	x	x	x	x
11: Heavy Equipment Storage Area	5	4	2-4	0	0	0	x		x	x		x
12: Old Landfill	9	8	0-0.5	8	6	7	x	x	x	x	x	x
13: Potential Hazardous Material Burial Site	9	7	0-2, 2-4	0	0	1	x	x	x	x	x	x
15: Building S-159	4	2	0-1, 2-4	0	0	0			x			x
Totals:	***88***	***58***		***12***	***6***	***58***						

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TABLE D.1.2
UPPER PREDICTION LIMITS OF BACKGROUND SAMPLES
FORT BUCHANAN

Analyte	Frequency of Detection	Chemical Concentration		95% UPL
		Average	Maximum	
Inorganics (mg/kg)				
Aluminum	30/30	23,063	34,000	30,027
Antimony	1/30	0.939	2.2	1
Arsenic	30/30	16.3	47.1	43.9
Barium	30/30	61.8	118	102
Beryllium	30/30	0.368	0.77	0.647
Cadmium	25/30	0.614	3.05	0.858
Calcium	30/30	27,905	117,000	105,848
Chromium	30/30	43.8	89.7	69.8
Cobalt	30/30	11.1	28	16.6
Copper	30/30	43	111	83.7
Iron	30/30	30,169	54,300	47,064
Lead	30/30	27.5	152	27.5
Magnesium	30/30	2997	8920	5131
Manganese	30/30	706.5	1280	1184
Mercury	30/30	0.184	1.1	0.32
Nickel	30/30	14.3	42.3	23.0
Potassium	30/30	848	1710	1459
Selenium	1/30	0.933	1	1
Silver	3/30	0.81	2	0.22
Sodium	20/30	165	271	238
Thallium	2/30	1.01	1.1	1.1
Vanadium	30/30	96.1	176	145
Zinc	30/30	84.2	603	81.0
Pesticides (mg/kg)				
4,4-DDD	1/12	0.502	0.0422	0.00051
4,4-DDE	6/12	0.65	0.0556	0.00337
4,4-DDT	6/12	0.198	0.0177	0.00265
alpha-Chlordane	1/12	0.009	0.00123	0.00064
Endosulfan II	1/12	0.0082	0.00118	0.00065
Endosulfan Sulfate	1/12	0.0022	0.00086	0.0009
trans-Chlordane	1/12	0.0085	0.00109	0.00051

UPL = Upper Prediction Limit calculated with U.S. EPA ProUCL.

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D.2.1.1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 1, 7 and 8

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	ALUMINUM	2.52E+04		2.52E+04		mg/kg	S-07-08-01-0-2	1/1	2.60E+01 - 2.60E+01	2.52E+04	3.00E+04	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	1.10E+00	J	1.10E+00	J	mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	1.10E+00	1.00E+00	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.38E+01**		**4.38E+01**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**3.90E-01 - 3.90E-01**	**4.38E+01**	**4.39E+01**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.34E+01	J	2.34E+01	J	mg/kg	S-07-08-01-0-2	1/1	2.60E+01 - 2.60E+01	2.34E+01	1.02E+02	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	3.20E-01	J	3.20E-01	J	mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	3.20E-01	6.47E-01	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	7.70E-01		7.70E-01		mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	7.70E-01	8.58E-01	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	3.79E+04		3.79E+04		mg/kg	S-07-08-01-0-2	1/1	6.50E+02 - 6.50E+02	3.79E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.02E+02**		**1.02E+02**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.30E+00 - 1.30E+00**	**1.02E+02**	**6.98E+01**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	6.60E+00		6.60E+00		mg/kg	S-07-08-01-0-2	1/1	6.50E+00 - 6.50E+00	6.60E+00	1.66E+01	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	4.59E+01		4.59E+01		mg/kg	S-07-08-01-0-2	1/1	3.20E+00 - 3.20E+00	4.59E+01	8.37E+01	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	4.26E+04		4.26E+04		mg/kg	S-07-08-01-0-2	1/1	1.30E+01 - 1.30E+01	4.26E+04	4.71E+04	7.20E+04	N	NA	NA	No	BSL
7439-92-1	LEAD	3.93E+01		3.93E+01		mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	3.93E+01	2.75E+01	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.25E+03		1.25E+03		mg/kg	S-07-08-01-0-2	1/1	6.50E+02 - 6.50E+02	1.25E+03	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	5.78E+02		5.78E+02		mg/kg	S-07-08-01-0-2	1/1	1.90E+00 - 1.90E+00	5.78E+02	1.18E+03	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	1.20E-01		1.20E-01		mg/kg	S-07-08-01-0-2	1/1	4.00E-02 - 4.00E-02	1.20E-01	3.20E-01	4.30E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.72E+01		1.72E+01		mg/kg	S-07-08-01-0-2	1/1	5.20E+00 - 5.20E+00	1.72E+01	2.30E+01	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.91E+02	J	5.91E+02	J	mg/kg	S-07-08-01-0-2	1/1	1.30E+03 - 1.30E+03	5.91E+02	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.70E+00		1.70E+00		mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	1.70E+00	1.00E+00	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	8.70E+01	J	8.70E+01	J	mg/kg	S-07-08-01-0-2	1/1	1.30E+03 - 1.30E+03	8.70E+01	2.38E+02	NA		NA	NA	No	NUT
7440-31-5	TIN	3.60E+00	J	3.60E+00	J	mg/kg	S-07-08-01-0-2	1/1	6.50E+00 - 6.50E+00	3.60E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	VANADIUM	1.63E+02	J	1.63E+02	J	mg/kg	S-07-08-01-0-2	1/1	1.30E+00 - 1.30E+00	1.63E+02	1.45E+02	5.20E+02	N	NA	NA	No	BSL
7440-66-6	ZINC	7.36E+01		7.36E+01		mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	7.36E+01	8.10E+01	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	1.49E-02		5.26E-02		mg/kg	S-01-08-01-0-2	4/5	1.50E-03 - 7.90E-03	5.26E-02	5.10E-04	7.20E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	9.70E-03		9.70E-01		mg/kg	S-01-08-01-0-2	5/5	1.60E-03 - 2.90E-02	9.70E-01	3.37E-03	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	6.20E-03		5.17E-01		mg/kg	S-01-08-04-0-2	5/5	1.60E-03 - 2.90E-02	5.17E-01	2.65E-03	7.00E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.50E-03		1.21E-02		mg/kg	S-01-08-04-0-2	3/5	1.50E-03 - 7.90E-03	1.21E-02	6.40E-04	6.50E+00	C	NA	NA	No	BSL
11096-82-5	AROCLOR 1260	6.55E-02		9.11E-02		mg/kg	S-01-08-02-0-2	2/5	3.70E-02 - 4.30E-02	9.11E-02	NA	7.40E-01	C	NA	NA	No	BSL
60-57-1	DIELDRIN	3.30E-03		4.40E-03		mg/kg	S-07-08-01-0-2	2/5	1.50E-03 - 7.90E-03	4.40E-03	NA	1.10E-01	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
208-96-8	ACENAPHTHYLENE	8.41E-03		8.41E-03		mg/kg	S-01-08-04-0-2	1/5	7.30E-03 - 8.70E-03	8.41E-03	NA	3.30E+03	N	NA	NA	No	BSL
120-12-7	ANTHRACENE	2.50E-02	J	2.50E-02	J	mg/kg	S-01-08-04-0-2	1/5	3.60E-02 - 4.40E-02	2.50E-02	NA	1.70E+04	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	9.53E-03		2.77E-01		mg/kg	S-01-08-04-0-2	5/5	7.30E-03 - 4.10E-02	2.77E-01	NA	2.10E+00	C	NA	NA	No	BSL
50-32-8	**BENZO(A)PYRENE**	**5.36E-02**		**4.21E-01**		**mg/kg**	**S-01-08-04-0-2**	**3/5**	**7.30E-03 - 4.10E-02**	**4.21E-01**	**NA**	**2.10E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	BENZO(B)FLUORANTHENE	9.57E-02		4.30E-01		mg/kg	S-01-08-04-0-2	3/5	7.30E-03 - 4.10E-02	4.30E-01	NA	2.10E+00	C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	2.34E-02		2.85E-01		mg/kg	S-01-08-04-0-2	3/5	7.30E-03 - 4.10E-02	2.85E-01	NA	1.70E+03	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	5.82E-02		3.81E-01		mg/kg	S-01-08-04-0-2	3/5	7.30E-03 - 4.10E-02	3.81E-01	NA	2.10E+01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	7.61E-03	J	3.66E-01		mg/kg	S-01-08-04-0-2	4/5	7.30E-03 - 4.10E-02	3.66E-01	NA	2.10E+02	C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	1.66E-02		9.30E-02		mg/kg	S-01-08-04-0-2	2/5	7.30E-03 - 8.70E-03	9.30E-02	NA	2.10E-01	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	3.72E-02		2.69E-01		mg/kg	S-01-08-04-0-2	3/5	3.60E-02 - 4.40E-02	2.69E-01	NA	2.20E+03	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	1.98E-02		2.58E-01		mg/kg	S-01-08-04-0-2	3/5	7.30E-03 - 4.10E-02	2.58E-01	NA	2.10E+00	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	1.28E-02		5.49E-02		mg/kg	S-01-08-03-0-2	3/5	7.30E-03 - 8.70E-03	5.49E-02	NA	1.70E+04	N	NA	NA	No	BSL
129-00-0	PYRENE	3.85E-02		3.04E-01		mg/kg	S-01-08-04-0-2	3/5	3.60E-02 - 4.40E-02	3.04E-01	NA	1.70E+03	N	NA	NA	No	BSL

D.2.1.1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 1, 7 and 8

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
TOTAL PETROLEUM HYDROCARBONS																
TPH-DRO	TPH-DRO (C10-C28)	1.37E+01		1.37E+01		mg/kg	S-07-08-01-0-2	1/1	8.60E+00 - 8.60E+00	1.37E+01	NA	NA	NA	NA	No	NSL
VOLATILE ORGANIC COMPOUNDS																
67-64-1	ACETONE	5.10E-03	J	2.03E-02		mg/kg	S-07-08-01-0-2	4/5	6.60E-03 - 1.00E-02	2.03E-02	NA	6.30E+04 N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011.*Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations*. November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, Acenaphthene for Acenaphthylene, Pyrene for Benzo[g,h,i]perylene.

D.2.1.2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563 - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 1, 7 and 8

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	**ALUMINUM**	**2.52E+04**		**2.52E+04**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**2.60E+01 - 2.60E+01**	**2.52E+04**	**3.00E+04**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	1.10E+00	J	1.10E+00	J	mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	1.10E+00	1.00E+00	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.38E+01**		**4.38E+01**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**3.90E-01 - 3.90E-01**	**4.38E+01**	**4.39E+01**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.34E+01	J	2.34E+01	J	mg/kg	S-07-08-01-0-2	1/1	2.60E+01 - 2.60E+01	2.34E+01	1.02E+02	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	3.20E-01	J	3.20E-01	J	mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	3.20E-01	6.47E-01	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	7.70E-01		7.70E-01		mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	7.70E-01	8.58E-01	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	3.79E+04		3.79E+04		mg/kg	S-07-08-01-0-2	1/1	6.50E+02 - 6.50E+02	3.79E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.02E+02**		**1.02E+02**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.30E+00 - 1.30E+00**	**1.02E+02**	**6.98E+01**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**6.60E+00**		**6.60E+00**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**6.50E+00 - 6.50E+00**	**6.60E+00**	**1.66E+01**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	4.59E+01		4.59E+01		mg/kg	S-07-08-01-0-2	1/1	3.20E+00 - 3.20E+00	4.59E+01	8.37E+01	3.10E+02	N	NA	NA	No	BSL
7439-89-6	**IRON**	**4.26E+04**		**4.26E+04**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.30E+01 - 1.30E+01**	**4.26E+04**	**4.71E+04**	**5.50E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	3.93E+01		3.93E+01		mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	3.93E+01	2.75E+01	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.25E+03		1.25E+03		mg/kg	S-07-08-01-0-2	1/1	6.50E+02 - 6.50E+02	1.25E+03	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**5.78E+02**		**5.78E+02**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.90E+00 - 1.90E+00**	**5.78E+02**	**1.18E+03**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	1.20E-01		1.20E-01		mg/kg	S-07-08-01-0-2	1/1	4.00E-02 - 4.00E-02	1.20E-01	3.20E-01	1.00E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.72E+01		1.72E+01		mg/kg	S-07-08-01-0-2	1/1	5.20E+00 - 5.20E+00	1.72E+01	2.30E+01	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.91E+02	J	5.91E+02	J	mg/kg	S-07-08-01-0-2	1/1	1.30E+03 - 1.30E+03	5.91E+02	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.70E+00		1.70E+00		mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	1.70E+00	1.00E+00	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	8.70E+01	J	8.70E+01	J	mg/kg	S-07-08-01-0-2	1/1	1.30E+03 - 1.30E+03	8.70E+01	2.38E+02	NA		NA	NA	No	NUT
7440-31-5	TIN	3.60E+00	J	3.60E+00	J	mg/kg	S-07-08-01-0-2	1/1	6.50E+00 - 6.50E+00	3.60E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**1.63E+02**	**J**	**1.63E+02**	**J**	**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.30E+00 - 1.30E+00**	**1.63E+02**	**1.45E+02**	**3.90E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	7.36E+01		7.36E+01		mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	7.36E+01	8.10E+01	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	1.49E-02		5.26E-02		mg/kg	S-01-08-01-0-2	4/5	1.50E-03 - 7.90E-03	5.26E-02	5.10E-04	2.00E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	9.70E-03		9.70E-01		mg/kg	S-01-08-01-0-2	5/5	1.60E-03 - 2.90E-02	9.70E-01	3.37E-03	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	6.20E-03		5.17E-01		mg/kg	S-01-08-04-0-2	5/5	1.60E-03 - 2.90E-02	5.17E-01	2.65E-03	1.70E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.50E-03		1.21E-02		mg/kg	S-01-08-04-0-2	3/5	1.50E-03 - 7.90E-03	1.21E-02	6.40E-04	1.60E+00	C	NA	NA	No	BSL
11096-82-5	AROCLOR 1260	6.55E-02		9.11E-02		mg/kg	S-01-08-02-0-2	2/5	3.70E-02 - 4.30E-02	9.11E-02	NA	2.20E-01	C	NA	NA	No	BSL
60-57-1	DIELDRIN	3.30E-03		4.40E-03		mg/kg	S-07-08-01-0-2	2/5	1.50E-03 - 7.90E-03	4.40E-03	NA	3.00E-02	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
208-96-8	ACENAPHTHYLENE	8.41E-03		8.41E-03		mg/kg	S-01-08-04-0-2	1/5	7.30E-03 - 8.70E-03	8.41E-03	NA	3.40E+02	N	NA	NA	No	BSL
120-12-7	ANTHRACENE	2.50E-02	J	2.50E-02	J	mg/kg	S-01-08-04-0-2	1/5	3.60E-02 - 4.40E-02	2.50E-02	NA	1.70E+03	N	NA	NA	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	**9.53E-03**		**2.77E-01**		**mg/kg**	**S-01-08-04-0-2**	**5/5**	**7.30E-03 - 4.10E-02**	**2.77E-01**	**NA**	**1.50E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	**5.36E-02**		**4.21E-01**		**mg/kg**	**S-01-08-04-0-2**	**3/5**	**7.30E-03 - 4.10E-02**	**4.21E-01**	**NA**	**1.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	**9.57E-02**		**4.30E-01**		**mg/kg**	**S-01-08-04-0-2**	**3/5**	**7.30E-03 - 4.10E-02**	**4.30E-01**	**NA**	**1.50E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	2.34E-02		2.85E-01		mg/kg	S-01-08-04-0-2	3/5	7.30E-03 - 4.10E-02	2.85E-01	NA	1.70E+02	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	5.82E-02		3.81E-01		mg/kg	S-01-08-04-0-2	3/5	7.30E-03 - 4.10E-02	3.81E-01	NA	1.50E+00	C	NA	NA	No	BSL
218-01-9	CHRYSENE	7.61E-03	J	3.66E-01		mg/kg	S-01-08-04-0-2	4/5	7.30E-03 - 4.10E-02	3.66E-01	NA	1.50E+01	C	NA	NA	No	BSL
53-70-3	**DIBENZ(A,H)ANTHRACENE**	**1.66E-02**		**9.30E-02**		**mg/kg**	**S-01-08-04-0-2**	**2/5**	**7.30E-03 - 8.70E-03**	**9.30E-02**	**NA**	**1.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
206-44-0	FLUORANTHENE	3.72E-02		2.69E-01		mg/kg	S-01-08-04-0-2	3/5	3.60E-02 - 4.40E-02	2.69E-01	NA	2.30E+02	N	NA	NA	No	BSL
193-39-5	**INDENO(1,2,3-C,D)PYRENE**	**1.98E-02**		**2.58E-01**		**mg/kg**	**S-01-08-04-0-2**	**3/5**	**7.30E-03 - 4.10E-02**	**2.58E-01**	**NA**	**1.50E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
85-01-8	PHENANTHRENE	1.28E-02		5.49E-02		mg/kg	S-01-08-03-0-2	3/5	7.30E-03 - 8.70E-03	5.49E-02	NA	1.70E+03	N	NA	NA	No	BSL
129-00-0	PYRENE	3.85E-02		3.04E-01		mg/kg	S-01-08-04-0-2	3/5	3.60E-02 - 4.40E-02	3.04E-01	NA	1.70E+02	N	NA	NA	No	BSL

D.2.1.2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563 - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 1, 7 and 8

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
TOTAL PETROLEUM HYDROCARBONS																
TPH-DRO	TPH-DRO (C10-C28)	1.37E+01		1.37E+01		mg/kg	S-07-08-01-0-2	1/1	8.60E+00 - 8.60E+00	1.37E+01	NA	NA	NA	NA	No	NSL
VOLATILE ORGANIC COMPOUNDS																
67-64-1	ACETONE	5.10E-03	J	2.03E-02		mg/kg	S-07-08-01-0-2	4/5	6.60E-03 - 1.00E-02	2.03E-02	NA	6.10E+03 N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011.*Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations*. November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, Acenaphthene for Acenaphthylene, Pyrene for Benzo[g,h,i]perylene.

D.2.1.3

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563 - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 1, 7 and 8

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
							HERBICIDES										
87-86-5	PENTACHLOROPHENOL	3.70E-03		3.70E-03		mg/kg	S-01-08-02-2-4	1/8	1.95E-03 - 4.60E-01	3.70E-03	NA	2.70E+00	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	ALUMINUM	1.02E+04		3.18E+04	J	mg/kg	S-08-08-01-4-6	5/5	2.35E+01 - 3.10E+01	3.18E+04	3.00E+04	9.90E+04	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**7.55E+00**		**3.37E+01**		**mg/kg**	**S-08-08-01-4-6**	**5/5**	**3.50E-01 - 4.70E-01**	**3.37E+01**	**4.39E+01**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	1.48E+01	J / J	1.56E+02		mg/kg	S-08-09-02-4-6	5/5	2.35E+01 - 3.10E+01	1.56E+02	1.02E+02	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.75E-01	J / J	5.80E-01	J / J	mg/kg	S-08-09-02-4-6 / S-08-08-01-4-6	5/5	5.90E-01 - 7.80E-01	5.80E-01	6.47E-01	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.80E-01	J	4.20E-01	J	mg/kg	S-08-09-02-4-6	5/5	6.60E-01 - 5.70E+00	4.20E-01	8.58E-01	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.68E+03		2.19E+05		mg/kg	S-07-08-01-2-4	5/5	6.70E+02 - 5.90E+03	2.19E+05	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.47E+01**		**6.63E+01**		**mg/kg**	**S-08-08-01-4-6**	**5/5**	**1.15E+00 - 1.60E+00**	**6.63E+01**	**6.98E+01**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**6.05E+00**	**/ J**	**5.66E+01**		**mg/kg**	**S-08-08-01-4-6**	**5/5**	**5.90E+00 - 7.80E+00**	**5.66E+01**	**1.66E+01**	**3.00E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.59E+01		6.11E+01	J	mg/kg	S-08-08-01-4-6	5/5	2.90E+00 - 3.90E+00	6.11E+01	8.37E+01	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	1.44E+04		4.94E+04		mg/kg	S-08-08-01-4-6	5/5	1.15E+01 - 3.10E+01	4.94E+04	4.71E+04	7.20E+04	N	NA	NA	No	BSL
7439-92-1	LEAD	1.35E+00	J / J	2.77E+01		mg/kg	S-08-08-02-1-2	5/5	2.35E+00 - 7.90E+00	2.77E+01	2.75E+01	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.57E+03		3.85E+03		mg/kg	S-08-08-02-1-2	5/5	5.90E+02 - 7.80E+02	3.85E+03	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	1.91E+02	J	2.05E+03	J	mg/kg	S-08-08-01-4-6	5/5	1.75E+00 - 2.30E+00	2.05E+03	1.18E+03	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	4.50E-02		3.01E+00	J /	mg/kg	S-07-08-01-2-4	5/5	3.90E-02 - 1.99E-01	3.01E+00	3.20E-01	4.30E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	6.95E+00		2.05E+01		mg/kg	S-08-08-01-4-6	5/5	4.70E+00 - 6.30E+00	2.05E+01	2.30E+01	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	6.72E+02	J	1.15E+03	J /	mg/kg	S-07-08-01-2-4	5/5	1.15E+03 - 1.60E+03	1.15E+03	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.10E+00		5.70E+00	J	mg/kg	S-07-08-01-2-4	3/5	6.60E-01 - 6.10E+00	5.70E+00	1.00E+00	5.10E+02	N	NA	NA	No	BSL
7440-22-4	SILVER	4.10E-01	J	1.50E+00		mg/kg	S-08-08-01-4-6	3/5	1.15E+00 - 1.60E+00	1.50E+00	2.20E-01	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	6.98E+01	J / J	2.17E+02	J	mg/kg	S-08-08-02-1-2	5/5	1.15E+03 - 1.60E+03	2.17E+02	2.38E+02	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	2.30E-01	J / J	6.50E-01	J	mg/kg	S-08-08-01-4-6	3/5	1.15E+00 - 1.60E+00	6.50E-01	1.10E+00	NA		NA	NA	No	NSL
7440-31-5	TIN	2.05E+00	J / J	2.90E+00	J	mg/kg	S-08-08-01-4-6	4/4	5.90E+00 - 6.90E+00	2.90E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	VANADIUM	3.86E+01	J / J	1.39E+02		mg/kg	S-08-09-02-4-6	5/5	1.15E+00 - 1.60E+00	1.39E+02	1.45E+02	5.20E+02	N	NA	NA	No	BSL
7440-66-6	ZINC	1.92E+01		9.06E+01	J	mg/kg	S-08-09-02-4-6	5/5	2.35E+00 - 3.10E+00	9.06E+01	8.10E+01	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	1.80E-03		4.30E-03		mg/kg	S-01-08-03-2-4	2/5	1.55E-03 - 1.70E-03	4.30E-03	5.10E-04	7.20E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.80E-03		2.73E-02	J	mg/kg	S-01-08-01-2-4	2/5	1.55E-03 - 1.70E-03	2.73E-02	3.37E-03	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	8.70E-03		9.10E-03	J	mg/kg	S-01-08-01-2-4	2/5	1.55E-03 - 1.70E-03	9.10E-03	2.65E-03	7.00E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.50E-03		2.50E-03		mg/kg	S-01-08-03-2-4	1/5	1.55E-03 - 1.70E-03	2.50E-03	6.40E-04	6.50E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
56-55-3	BENZO(A)ANTHRACENE	6.82E-02		6.82E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	6.82E-02	NA	2.10E+00	C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	7.34E-02		7.34E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	7.34E-02	NA	2.10E-01	C	NA	NA	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	9.65E-02		9.65E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	9.65E-02	NA	2.10E+00	C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	5.32E-02		5.32E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	5.32E-02	NA	1.70E+03	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	8.83E-02		8.83E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	8.83E-02	NA	2.10E+01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	6.41E-02		6.41E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	6.41E-02	NA	2.10E+02	C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	1.83E-02		1.83E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	1.83E-02	NA	2.10E-01	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	9.31E-02		9.31E-02		mg/kg	S-01-08-03-2-4	1/9	3.85E-02 - 5.30E-02	9.31E-02	NA	2.20E+03	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	4.84E-02		4.84E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	4.84E-02	NA	2.10E+00	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	3.13E-02		3.13E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	3.13E-02	NA	1.70E+04	N	NA	NA	No	BSL
129-00-0	PYRENE	8.95E-02		8.95E-02		mg/kg	S-01-08-03-2-4	1/9	3.85E-02 - 5.30E-02	8.95E-02	NA	1.70E+03	N	NA	NA	No	BSL

D.2.1.3

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563 - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 1, 7 and 8

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
TOTAL PETROLEUM HYDROCARBONS																	
TPH-DRO	TPH-DRO (C10-C28)	1.04E+01	J	1.29E+02		mg/kg	S-08-08-02-1-2	3/5	7.90E+00 - 2.40E+01	1.29E+02	NA	NA		NA	NA	No	NSL
VOLATILE ORGANIC COMPOUNDS																	
75-35-4	1,1-DICHLOROETHENE	6.10E-04	J	1.10E-03	J / J	mg/kg	S-07-08-01-2-4	2/9	4.00E-03 - 8.10E-01	1.10E-03	NA	1.10E+02	N	NA	NA	No	BSL
78-93-3	2-BUTANONE	6.30E-03	J	1.51E-02		mg/kg	S-08-08-01-4-6	2/9	8.00E-03 - 1.60E+00	1.51E-02	NA	2.00E+04	N	NA	NA	No	BSL
67-64-1	ACETONE	3.70E-03	J	1.84E-01		mg/kg	S-08-08-01-4-6	6/9	8.00E-03 - 1.60E+00	1.84E-01	NA	6.30E+04	N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	1.10E-03	J	3.00E-03	J	mg/kg	S-08-08-01-2-4	4/9	4.00E-03 - 8.10E-01	3.00E-03	NA	3.70E+02	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011.*Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations*. November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, and Pyrene for Benzo[g,h,i]perylene.

D.2.1.4

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563 - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 1, 7 and 8

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
							HERBICIDES										
87-86-5	PENTACHLOROPHENOL	3.70E-03		3.70E-03		mg/kg	S-01-08-02-2-4	1/8	1.95E-03 - 4.60E-01	3.70E-03	NA	8.90E-01	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	**ALUMINUM**	**1.02E+04**		**3.18E+04**	**J**	**mg/kg**	**S-08-08-01-4-6**	**5/5**	**2.35E+01 - 3.10E+01**	**3.18E+04**	**3.00E+04**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-38-2	**ARSENIC**	**7.55E+00**		**3.37E+01**		**mg/kg**	**S-08-08-01-4-6**	**5/5**	**3.50E-01 - 4.70E-01**	**3.37E+01**	**4.39E+01**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	1.48E+01	J / J	1.56E+02		mg/kg	S-08-09-02-4-6	5/5	2.35E+01 - 3.10E+01	1.56E+02	1.02E+02	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.75E-01	J / J	5.80E-01	J / J	mg/kg	S-08-09-02-4-6 / S-08-08-01-4-6	5/5	5.90E-01 - 7.80E-01	5.80E-01	6.47E-01	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.80E-01	J	4.20E-01	J	mg/kg	S-08-09-02-4-6	5/5	6.60E-01 - 5.70E+00	4.20E-01	8.58E-01	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.68E+03		2.19E+05		mg/kg	S-07-08-01-2-4	5/5	6.70E+02 - 5.90E+03	2.19E+05	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.47E+01**		**6.63E+01**		**mg/kg**	**S-08-08-01-4-6**	**5/5**	**1.15E+00 - 1.60E+00**	**6.63E+01**	**6.98E+01**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**6.05E+00**	**/ J**	**5.66E+01**		**mg/kg**	**S-08-08-01-4-6**	**5/5**	**5.90E+00 - 7.80E+00**	**5.66E+01**	**1.66E+01**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.59E+01		6.11E+01	J	mg/kg	S-08-08-01-4-6	5/5	2.90E+00 - 3.90E+00	6.11E+01	8.37E+01	3.10E+02	N	NA	NA	No	BSL
7439-89-6	**IRON**	**1.44E+04**		**4.94E+04**		**mg/kg**	**S-08-08-01-4-6**	**5/5**	**1.15E+01 - 3.10E+01**	**4.94E+04**	**4.71E+04**	**5.50E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	1.35E+00	J / J	2.77E+01		mg/kg	S-08-08-02-1-2	5/5	2.35E+00 - 7.90E+00	2.77E+01	2.75E+01	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.57E+03		3.85E+03		mg/kg	S-08-08-02-1-2	5/5	5.90E+02 - 7.80E+02	3.85E+03	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.91E+02**	**J**	**2.05E+03**	**J**	**mg/kg**	**S-08-08-01-4-6**	**5/5**	**1.75E+00 - 2.30E+00**	**2.05E+03**	**1.18E+03**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	**MERCURY**	**4.50E-02**		**3.01E+00**	**J /**	**mg/kg**	**S-07-08-01-2-4**	**5/5**	**3.90E-02 - 1.99E-01**	**3.01E+00**	**3.20E-01**	**1.00E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-02-0	NICKEL	6.95E+00		2.05E+01		mg/kg	S-08-08-01-4-6	5/5	4.70E+00 - 6.30E+00	2.05E+01	2.30E+01	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	6.72E+02	J	1.15E+03	J /	mg/kg	S-07-08-01-2-4	5/5	1.15E+03 - 1.60E+03	1.15E+03	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.10E+00		5.70E+00	J	mg/kg	S-07-08-01-2-4	3/5	6.60E-01 - 6.10E+00	5.70E+00	1.00E+00	3.90E+01	N	NA	NA	No	BSL
7440-22-4	SILVER	4.10E-01	J	1.50E+00		mg/kg	S-08-08-01-4-6	3/5	1.15E+00 - 1.60E+00	1.50E+00	2.20E-01	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	6.98E+01	J / J	2.17E+02	J	mg/kg	S-08-08-02-1-2	5/5	1.15E+03 - 1.60E+03	2.17E+02	2.38E+02	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	2.30E-01	J / J	6.50E-01	J	mg/kg	S-08-08-01-4-6	3/5	1.15E+00 - 1.60E+00	6.50E-01	1.10E+00	NA		NA	NA	No	NSL
7440-31-5	TIN	2.05E+00	J / J	2.90E+00	J	mg/kg	S-08-08-01-4-6	4/4	5.90E+00 - 6.90E+00	2.90E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**3.86E+01**	**J / J**	**1.39E+02**		**mg/kg**	**S-08-09-02-4-6**	**5/5**	**1.15E+00 - 1.60E+00**	**1.39E+02**	**1.45E+02**	**3.90E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.92E+01		9.06E+01	J	mg/kg	S-08-09-02-4-6	5/5	2.35E+00 - 3.10E+00	9.06E+01	8.10E+01	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	1.80E-03		4.30E-03		mg/kg	S-01-08-03-2-4	2/5	1.55E-03 - 1.70E-03	4.30E-03	5.10E-04	2.00E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.80E-03		2.73E-02	J	mg/kg	S-01-08-01-2-4	2/5	1.55E-03 - 1.70E-03	2.73E-02	3.37E-03	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	8.70E-03		9.10E-03	J	mg/kg	S-01-08-01-2-4	2/5	1.55E-03 - 1.70E-03	9.10E-03	2.65E-03	1.70E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.50E-03		2.50E-03		mg/kg	S-01-08-03-2-4	1/5	1.55E-03 - 1.70E-03	2.50E-03	6.40E-04	1.60E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
56-55-3	BENZO(A)ANTHRACENE	6.82E-02		6.82E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	6.82E-02	NA	1.50E-01	C	NA	NA	No	BSL
50-32-8	**BENZO(A)PYRENE**	**7.34E-02**		**7.34E-02**		**mg/kg**	**S-01-08-03-2-4**	**1/9**	**7.75E-03 - 1.10E-02**	**7.34E-02**	**NA**	**1.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	BENZO(B)FLUORANTHENE	9.65E-02		9.65E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	9.65E-02	NA	1.50E-01	C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	5.32E-02		5.32E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	5.32E-02	NA	1.70E+02	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	8.83E-02		8.83E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	8.83E-02	NA	1.50E+00	C	NA	NA	No	BSL
218-01-9	CHRYSENE	6.41E-02		6.41E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	6.41E-02	NA	1.50E+01	C	NA	NA	No	BSL
53-70-3	**DIBENZ(A,H)ANTHRACENE**	**1.83E-02**		**1.83E-02**		**mg/kg**	**S-01-08-03-2-4**	**1/9**	**7.75E-03 - 1.10E-02**	**1.83E-02**	**NA**	**1.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
206-44-0	FLUORANTHENE	9.31E-02		9.31E-02		mg/kg	S-01-08-03-2-4	1/9	3.85E-02 - 5.30E-02	9.31E-02	NA	2.30E+02	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	4.84E-02		4.84E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	4.84E-02	NA	1.50E-01	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	3.13E-02		3.13E-02		mg/kg	S-01-08-03-2-4	1/9	7.75E-03 - 1.10E-02	3.13E-02	NA	1.70E+03	N	NA	NA	No	BSL
129-00-0	PYRENE	8.95E-02		8.95E-02		mg/kg	S-01-08-03-2-4	1/9	3.85E-02 - 5.30E-02	8.95E-02	NA	1.70E+02	N	NA	NA	No	BSL

D.2.1.4

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563 - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 1, 7 and 8

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
TOTAL PETROLEUM HYDROCARBONS																	
TPH-DRO	TPH-DRO (C10-C28)	1.04E+01	J	1.29E+02		mg/kg	S-08-08-02-1-2	3/5	7.90E+00 - 2.40E+01	1.29E+02	NA	NA		NA	NA	No	NSL
VOLATILE ORGANIC COMPOUNDS																	
75-35-4	1,1-DICHLOROETHENE	6.10E-04	J	1.10E-03	J / J	mg/kg	S-07-08-01-2-4	2/9	4.00E-03 - 8.10E-01	1.10E-03	NA	2.40E+01	N	NA	NA	No	BSL
78-93-3	2-BUTANONE	6.30E-03	J	1.51E-02		mg/kg	S-08-08-01-4-6	2/9	8.00E-03 - 1.60E+00	1.51E-02	NA	2.80E+03	N	NA	NA	No	BSL
67-64-1	ACETONE	3.70E-03	J	1.84E-01		mg/kg	S-08-08-01-4-6	6/9	8.00E-03 - 1.60E+00	1.84E-01	NA	6.10E+03	N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	1.10E-03	J	3.00E-03	J	mg/kg	S-08-08-01-2-4	4/9	4.00E-03 - 8.10E-01	3.00E-03	NA	8.20E+01	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011.*Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations*. November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, and Pyrene for Benzo[g,h,i]perylene.

D.2.1.5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563 - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 1, 7 and 8

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-DISSOLVED										
7440-38-2	**ARSENIC**	**6.00E+00**	**J**	**6.00E+00**	**J**	**ug/L**	**G-03-07-MW-11B**	**1/4**	**3.00E+00 - 8.00E+00**	**6.00E+00**	**NA**	**4.50E-02**	**C**	**1.00E+01**	**MCL**	**Yes**	**ASL**
7440-39-3	BARIUM	3.29E+01	J	1.20E+02	J / J	ug/L	G-03-08-MW-19A / G-03-08-MW-23	4/4	2.00E+02 - 2.00E+02	1.20E+02	NA	2.90E+02	N	2.00E+03	MCL	No	BSL
7440-70-2	CALCIUM	1.32E+05		1.32E+05		ug/L	G-03-08-MW-23	1/1	5.00E+03 - 5.00E+03	1.32E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.10E+00**	**J**	**1.30E+00**	**J**	**ug/L**	**G-03-07-MW-11A**	**2/4**	**1.00E+01 - 1.00E+01**	**1.30E+00**	**NA**	**3.10E-02**	**C**	**1.00E+02**	**MCL**	**Yes**	**ASL**
7440-48-4	**COBALT**	**2.30E+00**	**J**	**2.80E+00**	**J**	**ug/L**	**G-03-08-MW-23**	**3/4**	**5.00E+01 - 5.00E+01**	**2.80E+00**	**NA**	**4.70E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-89-6	IRON	1.84E+01	J	1.84E+01	J	ug/L	G-03-08-MW-23	1/1	1.00E+02 - 1.00E+02	1.84E+01	NA	1.10E+03	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.68E+04		1.68E+04		ug/L	G-03-08-MW-23	1/1	5.00E+03 - 5.00E+03	1.68E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**3.21E+02**		**3.21E+02**		**ug/L**	**G-03-08-MW-23**	**1/1**	**1.50E+01 - 1.50E+01**	**3.21E+02**	**NA**	**3.20E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	8.00E-02	J	9.30E-02	J	ug/L	G-03-07-MW-11A	2/4	2.00E-01 - 2.00E-01	9.30E-02	NA	1.60E-01	N	2.00E+00	MCL	No	BSL
7440-02-0	NICKEL	4.00E+00	J	7.40E+00	J	ug/L	G-03-07-MW-11A	2/4	4.00E+01 - 4.00E+01	7.40E+00	NA	3.00E+01	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	2.02E+03	J	2.02E+03	J	ug/L	G-03-08-MW-23	1/1	1.00E+04 - 1.00E+04	2.02E+03	NA	NA		NA	NA	No	NUT
7440-22-4	SILVER	2.80E+00	J	2.80E+00	J	ug/L	G-03-07-MW-11A	1/4	1.00E+01 - 1.00E+01	2.80E+00	NA	7.10E+00	N	NA	NA	No	BSL
7440-23-5	SODIUM	3.53E+04		3.53E+04		ug/L	G-03-08-MW-23	1/1	1.00E+04 - 1.00E+04	3.53E+04	NA	NA		NA	NA	No	NUT
7440-62-2	VANADIUM	1.60E+00	J	2.60E+00	J	ug/L	G-03-07-MW-11A	2/4	5.00E+01 - 5.00E+01	2.60E+00	NA	7.80E+00	N	NA	NA	No	BSL
7440-66-6	ZINC	7.90E+00	J	9.90E+00	J	ug/L	G-03-08-MW-23	3/4	2.00E+01 - 2.00E+01	9.90E+00	NA	4.70E+02	N	NA	NA	No	BSL
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	7.73E+01	J	7.73E+01	J	ug/L	G-03-08-MW-23	1/1	2.00E+02 - 2.00E+02	7.73E+01	NA	1.60E+03	N	NA	NA	No	BSL
7440-39-3	BARIUM	3.36E+01	J	1.45E+02	J	ug/L	G-03-08-MW-19A	4/4	2.00E+02 - 2.00E+02	1.45E+02	NA	2.90E+02	N	2.00E+03	MCL	No	BSL
7440-70-2	CALCIUM	1.31E+05		1.31E+05		ug/L	G-03-08-MW-23	1/1	5.00E+03 - 5.00E+03	1.31E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**8.00E-01**	**J**	**9.00E-01**	**J**	**ug/L**	**G-03-08-MW-23**	**2/4**	**1.00E+01 - 1.00E+01**	**9.00E-01**	**NA**	**3.10E-02**	**C**	**1.00E+02**	**MCL**	**Yes**	**ASL**
7440-48-4	**COBALT**	**3.00E+00**	**J**	**5.40E+00**	**J**	**ug/L**	**G-03-08-MW-19A**	**2/4**	**5.00E+01 - 5.00E+01**	**5.40E+00**	**NA**	**4.70E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	4.50E+00	J	4.50E+00	J	ug/L	G-03-08-MW-19A	1/4	2.50E+01 - 2.50E+01	4.50E+00	NA	6.10E+01	N	1.30E+03	MCL	No	BSL
7439-89-6	IRON	1.02E+02		1.02E+02		ug/L	G-03-08-MW-23	1/1	1.00E+02 - 1.00E+02	1.02E+02	NA	1.10E+03	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.67E+04		1.67E+04		ug/L	G-03-08-MW-23	1/1	5.00E+03 - 5.00E+03	1.67E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**3.47E+02**		**3.47E+02**		**ug/L**	**G-03-08-MW-23**	**1/1**	**1.50E+01 - 1.50E+01**	**3.47E+02**	**NA**	**3.10E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	5.10E-02	J	1.60E-01	J	ug/L	G-03-07-MW-11A	2/4	2.00E-01 - 2.00E-01	1.60E-01	NA	1.60E-01	N	2.00E+00	MCL	No	BSL
7440-02-0	NICKEL	4.80E+00	J	8.00E+00	J	ug/L	G-03-07-MW-11A	2/4	4.00E+01 - 4.00E+01	8.00E+00	NA	3.00E+01	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.99E+03	J	1.99E+03	J	ug/L	G-03-08-MW-23	1/1	1.00E+04 - 1.00E+04	1.99E+03	NA	NA		NA	NA	No	NUT
7440-23-5	SODIUM	3.52E+04		3.52E+04		ug/L	G-03-08-MW-23	1/1	1.00E+04 - 1.00E+04	3.52E+04	NA	NA		NA	NA	No	NUT
7440-62-2	**VANADIUM**	**2.00E+00**	**J**	**9.80E+00**	**J**	**ug/L**	**G-03-08-MW-19A**	**2/4**	**5.00E+01 - 5.00E+01**	**9.80E+00**	**NA**	**7.80E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	5.70E+00	J	1.37E+01	J	ug/L	G-03-07-MW-11A	2/4	2.00E+01 - 2.00E+01	1.37E+01	NA	4.70E+02	N	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS										
79-00-5	**1,1,2-TRICHLOROETHANE**	**6.90E-01**	**J**	**1.30E+00**		**ug/L**	**G-03-07-MW-11B**	**6/10**	**1.00E+00 - 2.00E+00**	**1.30E+00**	**NA**	**4.10E-02**	**N**	**5.00E+00**	**MCL**	**Yes**	**ASL**
75-35-4	1,1-DICHLOROETHENE	3.80E-01	J	7.20E-01	J	ug/L	G-03-07-MW-11B	4/10	1.00E+00 - 2.00E+00	7.20E-01	NA	2.60E+01	N	7.00E+00	MCL	No	BSL
107-06-2	**1,2-DICHLOROETHANE**	**3.10E-01**	**J**	**3.60E-01**	**J**	**ug/L**	**G-03-09-MW-11A**	**2/10**	**1.00E+00 - 2.00E+00**	**3.60E-01**	**NA**	**1.50E-01**	**C**	**5.00E+00**	**MCL**	**Yes**	**ASL**
67-64-1	ACETONE	1.60E+01		1.60E+01		ug/L	G-07-09-01	1/10	1.00E+01 - 2.00E+01	1.60E+01	NA	1.20E+03	N	NA	NA	No	BSL
67-66-3	**CHLOROFORM**	**5.60E-01**	**J**	**7.50E-01**	**J**	**ug/L**	**G-03-09-MW-11A**	**3/10**	**1.00E+00 - 2.00E+00**	**7.50E-01**	**NA**	**1.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
74-87-3	CHLOROMETHANE	5.00E-01	J	5.00E-01	J	ug/L	G-03-09-MW-11A	1/10	1.00E+00 - 2.00E+00	5.00E-01	NA	1.90E+01	N	NA	NA	No	BSL
156-59-2	**CIS-1,2-DICHLOROETHENE**	**1.40E+01**		**2.10E+01**		**ug/L**	**G-03-09-MW-11A**	**4/8**	**1.00E+00 - 2.00E+00**	**2.10E+01**	**NA**	**2.80E+00**	**N**	**7.00E+01**	**MCL**	**Yes**	**ASL**
127-18-4	**TETRACHLOROETHENE**	**6.70E+00**		**1.15E+01**		**ug/L**	**G-03-07-MW-11B**	**6/10**	**1.00E+00 - 2.00E+00**	**1.15E+01**	**NA**	**7.20E-02**	**C**	**5.00E+00**	**MCL**	**Yes**	**ASL**
156-60-5	TRANS-1,2-DICHLOROETHENE	7.60E-01	J	1.10E+00		ug/L	G-03-07-MW-11B	6/10	1.00E+00 - 2.00E+00	1.10E+00	NA	8.60E+00	N	1.00E+02	MCL	No	BSL
79-01-6	**TRICHLOROETHENE**	**1.63E+02**		**2.40E+02**		**ug/L**	**G-03-09-MW-11B**	**6/10**	**1.00E+00 - 5.00E+00**	**2.40E+02**	**NA**	**2.60E-01**	**N**	**5.00E+00**	**MCL**	**Yes**	**ASL**
75-01-4	**VINYL CHLORIDE**	**4.50E-01**	**J**	**8.30E-01**	**J**	**ug/L**	**G-03-07-MW-11B**	**3/10**	**1.00E+00 - 2.00E+00**	**8.30E-01**	**NA**	**1.50E-02**	**C**	**2.00E+00**	**MCL**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.

(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE D.2.2.1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 2, 3 AND 11: PESTICIDES AND CHEMICALS BURIAL TRENCH, SPENT SOLVENTS STORAGE AREA, AND HEAVY EQUIPMENT STORAGE AREA - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 2, 3 and 11

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
							HERBICIDES										
120-36-5	DICHLORPROP	1.17E-01		1.17E-01		mg/kg	S-03-08-03-1-2	1/8	1.80E-02 - 2.20E-02	1.17E-01	NA	NA		NA	NA	No	BSL
87-86-5	PENTACHLOROPHENOL	2.45E-02		5.78E-02		mg/kg	S-03-08-01-2-4	2/16	1.80E-03 - 8.90E-01	5.78E-02	NA	2.70E+00	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	ALUMINUM	1.80E+04	J	3.22E+04	J	mg/kg	S-03-08-01-2-4	12/12	2.10E+01 - 2.70E+01	3.22E+04	3.00E+04	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	3.90E-01	J	1.20E+00	J	mg/kg	S-03-08-02-2-4	7/20	2.10E+00 - 4.50E+01	1.20E+00	1.00E+00	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.60E+00**		**1.22E+02**		**mg/kg**	**S-03-08-03-2-4**	**17/20**	**3.20E-01 - 4.50E+01**	**1.22E+02**	**4.39E+01**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	5.00E+00	J	1.42E+02		mg/kg	S-03-08-01-2-4	13/20	2.10E+01 - 4.50E+02	1.42E+02	1.02E+02	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	9.70E-02	J	8.20E-01		mg/kg	SB-03-06-04-(4-8)	11/20	5.30E-01 - 1.10E+01	8.20E-01	6.47E-01	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	8.50E-02	J	1.80E+00		mg/kg	SB-03-06-01-(4-8)	14/20	5.30E-01 - 1.10E+01	1.80E+00	8.58E-01	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	9.91E+02		1.39E+04	J / J	mg/kg	S-11-08-04-2-4	12/12	5.30E+02 - 6.80E+02	1.39E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.25E+01**	**J**	**1.67E+02**		**mg/kg**	**S-03-08-02-2-4**	**20/20**	**1.10E+00 - 2.30E+01**	**1.67E+02**	**6.98E+01**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**1.30E+00**	**J**	**4.53E+01**		**mg/kg**	**S-03-08-01-2-4**	**15/20**	**5.30E+00 - 1.10E+02**	**4.53E+01**	**1.66E+01**	**3.00E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.10E+01	J	7.33E+01	J	mg/kg	S-03-08-01-2-4	19/20	2.60E+00 - 5.70E+01	7.33E+01	8.37E+01	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	3.24E+04		9.53E+04		mg/kg	S-03-08-02-2-4	12/12	1.10E+01 - 3.80E+01	9.53E+04	4.71E+04	7.20E+04	N	NA	NA	No	BSL
7439-92-1	LEAD	4.50E+00	J	1.99E+01		mg/kg	S-03-08-01-2-4	16/20	2.10E+00 - 4.50E+01	1.99E+01	2.75E+01	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.60E+02	J	1.01E+04		mg/kg	S-03-08-02-1-2	12/12	5.30E+02 - 6.80E+02	1.01E+04	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.61E+02**	**J**	**1.28E+04**	**J**	**mg/kg**	**S-03-08-01-1-2**	**12/12**	**1.60E+00 - 1.80E+01**	**1.28E+04**	**1.18E+03**	**2.30E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	1.40E-02	J	3.80E-01	J	mg/kg	SB-03-06-01-(4-8)	17/20	3.30E-02 - 4.20E-02	3.80E-01	3.20E-01	4.30E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	5.30E+00	J	3.98E+01		mg/kg	SB-03-06-03-(4-8)	17/20	4.20E+00 - 9.10E+01	3.98E+01	2.30E+01	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.63E+02	J	7.75E+02	J	mg/kg	S-03-08-03-1-2	12/12	1.10E+03 - 1.40E+03	7.75E+02	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	7.80E-01		4.40E+00		mg/kg	SB-03-06-01-(4-8)	12/20	5.30E-01 - 4.50E+01	4.40E+00	1.00E+00	5.10E+02	N	NA	NA	No	BSL
7440-22-4	SILVER	1.10E+00		3.00E+00		mg/kg	S-03-08-02-2-4	7/20	1.10E+00 - 2.30E+01	3.00E+00	2.20E-01	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	3.42E+01	J	6.15E+02	J	mg/kg	S-03-08-03-1-2	12/12	1.10E+03 - 1.40E+03	6.15E+02	2.38E+02	NA		NA	NA	No	NUT
7440-28-0	**THALLIUM**	**5.75E-01**	**J / J**	**4.00E+00**	**J**	**mg/kg**	**S-03-08-01-1-2**	**7/20**	**1.10E+00 - 2.30E+01**	**4.00E+00**	**NA**	**1.00E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-31-5	TIN	2.20E+00	J	4.50E+00	J	mg/kg	S-03-08-02-1-2	12/20	5.30E+00 - 1.10E+02	4.50E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	VANADIUM	2.34E+01	J	2.91E+02		mg/kg	S-03-08-02-2-4	19/20	1.10E+00 - 1.10E+02	2.91E+02	1.45E+02	5.20E+02	N	NA	NA	No	BSL
7440-66-6	ZINC	1.64E+01		8.87E+01		mg/kg	SB-03-06-03-(20-22)	20/20	2.10E+00 - 4.50E+01	8.87E+01	8.10E+01	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	9.27E-02		9.27E-02		mg/kg	S-03-08-02-1-2	1/16	1.50E-03 - 5.20E-03	9.27E-02	5.10E-04	7.20E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	2.80E-03		1.61E-02		mg/kg	S-03-08-02-1-2	2/16	1.50E-03 - 5.20E-03	1.61E-02	3.37E-03	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	3.70E-03		2.41E-02		mg/kg	S-03-08-02-1-2	3/16	1.50E-03 - 5.20E-03	2.41E-02	2.65E-03	7.00E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.40E-03		2.21E-01		mg/kg	S-03-08-03-1-2	3/16	1.50E-03 - 1.50E-02	2.21E-01	6.40E-04	6.50E+00	C	NA	NA	No	BSL
60-57-1	DIELDRIN	9.00E-03		9.00E-03		mg/kg	S-03-08-03-1-2	1/16	1.50E-03 - 5.20E-03	9.00E-03	NA	1.10E-01	C	NA	NA	No	BSL
959-98-8	ENDOSULFAN I	2.60E-03		2.60E-03		mg/kg	S-03-08-02-1-2	1/16	1.50E-03 - 5.20E-03	2.60E-03	NA	3.70E+02	N	NA	NA	No	BSL
76-44-8	HEPTACHLOR	6.29E-02		6.29E-02		mg/kg	S-03-08-03-1-2	1/16	1.50E-03 - 5.20E-03	6.29E-02	NA	3.80E-01	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
91-57-6	2-METHYLNAPHTHALENE	1.63E+00		1.63E+00		mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-02	1.63E+00	NA	4.10E+02	N	NA	NA	No	BSL
83-32-9	ACENAPHTHENE	5.34E-02	J	5.34E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	5.34E-02	NA	3.30E+03	N	NA	NA	No	BSL
120-12-7	ANTHRACENE	3.92E-02	J	3.92E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	3.92E-02	NA	1.70E+04	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	2.91E-02		2.91E-02		mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-03	2.91E-02	NA	2.10E+00	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.91E-02	J	1.91E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-03	1.91E-02	NA	2.10E+02	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	9.09E-02		9.09E-02		mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	9.09E-02	NA	2.20E+03	N	NA	NA	No	BSL
86-73-7	FLUORENE	1.45E-01		1.45E-01		mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	1.45E-01	NA	2.20E+03	N	NA	NA	No	BSL
91-20-3	NAPHTHALENE	1.51E+00		1.51E+00		mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-02	1.51E+00	NA	1.80E+01	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	8.33E-02	J	8.33E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-03	8.33E-02	NA	1.70E+04	N	NA	NA	No	BSL
129-00-0	PYRENE	7.36E-02	J	7.36E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	7.36E-02	NA	1.70E+03	N	NA	NA	No	BSL

TABLE D.2.2.1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 2, 3 AND 11: PESTICIDES AND CHEMICALS BURIAL TRENCH, SPENT SOLVENTS STORAGE AREA, AND HEAVY EQUIPMENT STORAGE AREA - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 2, 3 and 11

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
SEMI-VOLATILE ORGANIC COMPOUNDS																	
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	7.09E-02	J	7.23E-02	J	mg/kg	SB-03-06-03-(4-8)	3/16	7.30E-02 - 8.90E-02	7.23E-02	NA	1.20E+02	C	NA	NA	No	BSL
132-64-9	DIBENZOFURAN	3.04E-02	J	3.04E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-02 - 8.90E-02	3.04E-02	NA	1.00E+02	N	NA	NA	No	BSL
VOLATILE ORGANIC COMPOUNDS																	
67-64-1	ACETONE	5.40E-03	J	5.23E-02		mg/kg	S-11-08-01-2-4	6/17	5.40E-03 - 1.30E-02	5.23E-02	NA	6.30E+04	N	NA	NA	No	BSL
71-43-2	BENZENE	1.04E+00		1.04E+00		mg/kg	SB-03-06-04-(4-8)	1/20	5.40E-04 - 1.00E-01	1.04E+00	NA	5.40E+00	C	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	4.30E-04	J	4.30E-04	J	mg/kg	S-03-08-02-1-2	1/20	2.70E-03 - 5.20E-01	4.30E-04	NA	3.70E+02	N	NA	NA	No	BSL
100-41-4	ETHYLBENZENE	1.86E+01		1.86E+01		mg/kg	SB-03-06-04-(4-8)	1/20	5.40E-04 - 1.00E-01	1.86E+01	NA	2.70E+01	C	NA	NA	No	BSL
78-83-1	ISOBUTYL ALCOHOL	6.51E+01		6.51E+01		mg/kg	SB-03-06-04-(4-8)	1/13	2.70E-02 - 5.20E+00	6.51E+01	NA	3.10E+04	N	NA	NA	No	BSL
108-88-3	TOLUENE	6.60E-04	J	6.60E-04	J	mg/kg	S-11-08-01-2-4	1/20	5.40E-04 - 1.00E-01	6.60E-04	NA	4.50E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011.*Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations*. November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Endosulfan for Endosulfan I, and Anthracene for Phenanthrene.

TABLE D.2.2.2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 2, 3 AND 11: PESTICIDES AND CHEMICALS BURIAL TRENCH, SPENT SOLVENTS STORAGE AREA, AND HEAVY EQUIPMENT STORAGE AREA - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 2, 3 and 11

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
							HERBICIDES										
120-36-5	DICHLORPROP	1.17E-01		1.17E-01		mg/kg	S-03-08-03-1-2	1/8	1.80E-02 - 2.20E-02	1.17E-01	NA	NA		NA	NA	No	BSL
87-86-5	PENTACHLOROPHENOL	2.45E-02		5.78E-02		mg/kg	S-03-08-01-2-4	2/16	1.80E-03 - 8.90E-01	5.78E-02	NA	8.90E-01	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	**ALUMINUM**	**1.80E+04**	**J**	**3.22E+04**	**J**	**mg/kg**	**S-03-08-01-2-4**	**12/12**	**2.10E+01 - 2.70E+01**	**3.22E+04**	**3.00E+04**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	3.90E-01	J	1.20E+00	J	mg/kg	S-03-08-02-2-4	7/20	2.10E+00 - 4.50E+01	1.20E+00	1.00E+00	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.60E+00**		**1.22E+02**		**mg/kg**	**S-03-08-03-2-4**	**17/20**	**3.20E-01 - 4.50E+01**	**1.22E+02**	**4.39E+01**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	5.00E+00	J	1.42E+02		mg/kg	S-03-08-01-2-4	13/20	2.10E+01 - 4.50E+02	1.42E+02	1.02E+02	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	9.70E-02	J	8.20E-01		mg/kg	SB-03-06-04-(4-8)	11/20	5.30E-01 - 1.10E+01	8.20E-01	6.47E-01	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	8.50E-02	J	1.80E+00		mg/kg	SB-03-06-01-(4-8)	14/20	5.30E-01 - 1.10E+01	1.80E+00	8.58E-01	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	9.91E+02		1.39E+04	J / J	mg/kg	S-11-08-04-2-4	12/12	5.30E+02 - 6.80E+02	1.39E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.25E+01**	**J**	**1.67E+02**		**mg/kg**	**S-03-08-02-2-4**	**20/20**	**1.10E+00 - 2.30E+01**	**1.67E+02**	**6.98E+01**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**1.30E+00**	**J**	**4.53E+01**		**mg/kg**	**S-03-08-01-2-4**	**15/20**	**5.30E+00 - 1.10E+02**	**4.53E+01**	**1.66E+01**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.10E+01	J	7.33E+01	J	mg/kg	S-03-08-01-2-4	19/20	2.60E+00 - 5.70E+01	7.33E+01	8.37E+01	3.10E+02	N	NA	NA	No	BSL
7439-89-6	**IRON**	**3.24E+04**		**9.53E+04**		**mg/kg**	**S-03-08-02-2-4**	**12/12**	**1.10E+01 - 3.80E+01**	**9.53E+04**	**4.71E+04**	**5.50E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	4.50E+00	J	1.99E+01		mg/kg	S-03-08-01-2-4	16/20	2.10E+00 - 4.50E+01	1.99E+01	2.75E+01	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.60E+02	J	1.01E+04		mg/kg	S-03-08-02-1-2	12/12	5.30E+02 - 6.80E+02	1.01E+04	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.61E+02**	**J**	**1.28E+04**	**J**	**mg/kg**	**S-03-08-01-1-2**	**12/12**	**1.60E+00 - 1.80E+01**	**1.28E+04**	**1.18E+03**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	1.40E-02	J	3.80E-01	J	mg/kg	SB-03-06-01-(4-8)	17/20	3.30E-02 - 4.20E-02	3.80E-01	3.20E-01	1.00E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	5.30E+00	J	3.98E+01		mg/kg	SB-03-06-03-(4-8)	17/20	4.20E+00 - 9.10E+01	3.98E+01	2.30E+01	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.63E+02	J	7.75E+02	J	mg/kg	S-03-08-03-1-2	12/12	1.10E+03 - 1.40E+03	7.75E+02	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	7.80E-01		4.40E+00		mg/kg	SB-03-06-01-(4-8)	12/20	5.30E-01 - 4.50E+01	4.40E+00	1.00E+00	3.90E+01	N	NA	NA	No	BSL
7440-22-4	SILVER	1.10E+00		3.00E+00		mg/kg	S-03-08-02-2-4	7/20	1.10E+00 - 2.30E+01	3.00E+00	2.20E-01	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	3.42E+01	J	6.15E+02	J	mg/kg	S-03-08-03-1-2	12/12	1.10E+03 - 1.40E+03	6.15E+02	2.38E+02	NA		NA	NA	No	NUT
7440-28-0	**THALLIUM**	**5.75E-01**	**J / J**	**4.00E+00**	**J**	**mg/kg**	**S-03-08-01-1-2**	**7/20**	**1.10E+00 - 2.30E+01**	**4.00E+00**	**NA**	**7.80E-02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-31-5	TIN	2.20E+00	J	4.50E+00	J	mg/kg	S-03-08-02-1-2	12/20	5.30E+00 - 1.10E+02	4.50E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**2.34E+01**	**J**	**2.91E+02**		**mg/kg**	**S-03-08-02-2-4**	**19/20**	**1.10E+00 - 1.10E+02**	**2.91E+02**	**1.45E+02**	**3.90E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.64E+01		8.87E+01		mg/kg	SB-03-06-03-(20-22)	20/20	2.10E+00 - 4.50E+01	8.87E+01	8.10E+01	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	9.27E-02		9.27E-02		mg/kg	S-03-08-02-1-2	1/16	1.50E-03 - 5.20E-03	9.27E-02	5.10E-04	2.00E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	2.80E-03		1.61E-02		mg/kg	S-03-08-02-1-2	2/16	1.50E-03 - 5.20E-03	1.61E-02	3.37E-03	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	3.70E-03		2.41E-02		mg/kg	S-03-08-02-1-2	3/16	1.50E-03 - 5.20E-03	2.41E-02	2.65E-03	1.70E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.40E-03		2.21E-01		mg/kg	S-03-08-03-1-2	3/16	1.50E-03 - 1.50E-02	2.21E-01	6.40E-04	1.60E+00	C	NA	NA	No	BSL
60-57-1	DIELDRIN	9.00E-03		9.00E-03		mg/kg	S-03-08-03-1-2	1/16	1.50E-03 - 5.20E-03	9.00E-03	NA	3.00E-02	C	NA	NA	No	BSL
959-98-8	ENDOSULFAN I	2.60E-03		2.60E-03		mg/kg	S-03-08-02-1-2	1/16	1.50E-03 - 5.20E-03	2.60E-03	NA	3.70E+01	N	NA	NA	No	BSL
76-44-8	HEPTACHLOR	6.29E-02		6.29E-02		mg/kg	S-03-08-03-1-2	1/16	1.50E-03 - 5.20E-03	6.29E-02	NA	1.10E-01	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
91-57-6	2-METHYLNAPHTHALENE	1.63E+00		1.63E+00		mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-02	1.63E+00	NA	3.10E+01	N	NA	NA	No	BSL
83-32-9	ACENAPHTHENE	5.34E-02	J	5.34E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	5.34E-02	NA	3.40E+02	N	NA	NA	No	BSL
120-12-7	ANTHRACENE	3.92E-02	J	3.92E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	3.92E-02	NA	1.70E+03	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	2.91E-02		2.91E-02		mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-03	2.91E-02	NA	1.50E-01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.91E-02	J	1.91E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-03	1.91E-02	NA	1.50E+01	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	9.09E-02		9.09E-02		mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	9.09E-02	NA	2.30E+02	N	NA	NA	No	BSL
86-73-7	FLUORENE	1.45E-01		1.45E-01		mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	1.45E-01	NA	2.30E+02	N	NA	NA	No	BSL
91-20-3	NAPHTHALENE	1.51E+00		1.51E+00		mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-02	1.51E+00	NA	3.60E+00	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	8.33E-02	J	8.33E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-03 - 8.90E-03	8.33E-02	NA	1.70E+03	N	NA	NA	No	BSL
129-00-0	PYRENE	7.36E-02	J	7.36E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	3.70E-02 - 8.90E-02	7.36E-02	NA	1.70E+02	N	NA	NA	No	BSL

TABLE D.2.2.2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

FORT BUCHANAN

SITE 2, 3 AND 11: PESTICIDES AND CHEMICALS BURIAL TRENCH, SPENT SOLVENTS STORAGE AREA, AND HEAVY EQUIPMENT STORAGE AREA - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 2, 3 and 11

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
SEMI-VOLATILE ORGANIC COMPOUNDS																	
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	7.09E-02	J	7.23E-02	J	mg/kg	SB-03-06-03-(4-8)	3/16	7.30E-02 - 8.90E-02	7.23E-02	NA	3.50E+01	C	NA	NA	No	BSL
132-64-9	DIBENZOFURAN	3.04E-02	J	3.04E-02	J	mg/kg	SB-03-06-04-(4-8)	1/16	7.30E-02 - 8.90E-02	3.04E-02	NA	7.80E+00	N	NA	NA	No	BSL
VOLATILE ORGANIC COMPOUNDS																	
67-64-1	ACETONE	5.40E-03	J	5.23E-02		mg/kg	S-11-08-01-2-4	6/17	5.40E-03 - 1.30E-02	5.23E-02	NA	6.10E+03	N	NA	NA	No	BSL
71-43-2	BENZENE	1.04E+00		1.04E+00		mg/kg	SB-03-06-04-(4-8)	1/20	5.40E-04 - 1.00E-01	1.04E+00	NA	1.10E+00	C	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	4.30E-04	J	4.30E-04	J	mg/kg	S-03-08-02-1-2	1/20	2.70E-03 - 5.20E-01	4.30E-04	NA	8.20E+01	N	NA	NA	No	BSL
100-41-4	**ETHYLBENZENE**	**1.86E+01**		**1.86E+01**		**mg/kg**	**SB-03-06-04-(4-8)**	**1/20**	**5.40E-04 - 1.00E-01**	**1.86E+01**	**NA**	**5.40E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
78-83-1	ISOBUTYL ALCOHOL	6.51E+01		6.51E+01		mg/kg	SB-03-06-04-(4-8)	1/13	2.70E-02 - 5.20E+00	6.51E+01	NA	2.30E+03	N	NA	NA	No	BSL
108-88-3	TOLUENE	6.60E-04	J	6.60E-04	J	mg/kg	S-11-08-01-2-4	1/20	5.40E-04 - 1.00E-01	6.60E-04	NA	5.00E+02	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011.*Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations*. November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Endosulfan for Endosulfan I, and Anthracene for Phenanthrene.

TABLE D.2.2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 2, 3 AND 11: PESTICIDES AND CHEMICALS BURIAL TRENCH, SPENT SOLVENTS STORAGE AREA, AND HEAVY EQUIPMENT STORAGE AREA - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 2, 3, and 11

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-DISSOLVED										
7440-38-2	**ARSENIC**	**2.00E+00**	**J**	**2.00E+00**	**J**	**ug/L**	**G-03-08-MW-20**	**1/11**	**3.00E+00 - 8.00E+00**	**2.00E+00**	**NA**	**4.50E-02**	**C**	**1.00E+01**	**MCL**	**Yes**	**ASL**
7440-39-3	**BARIUM**	**8.90E+00**	**J**	**4.50E+02**		**ug/L**	**G-03-07-MW-04B**	**5/11**	**2.00E+02 - 2.00E+02**	**4.50E+02**	**NA**	**2.90E+02**	**N**	**2.00E+03**	**MCL**	**Yes**	**ASL**
7440-70-2	CALCIUM	9.53E+04		9.53E+04		ug/L	G-03-08-MW-20	1/1	5.00E+03 - 5.00E+03	9.53E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM, TOTAL**	**6.00E-01**	**J**	**5.10E+00**	**J**	**ug/L**	**G-03-07-MW-10B**	**3/11**	**1.00E+01 - 1.00E+01**	**5.10E+00**	**NA**	**3.10E-02**	**C**	**1.00E+02**	**MCL**	**Yes**	**ASL**
7439-89-6	IRON	4.33E+01	J	4.33E+01	J	ug/L	G-03-08-MW-20	1/1	1.00E+02 - 1.00E+02	4.33E+01	NA	1.10E+03	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.64E+04		2.64E+04		ug/L	G-03-08-MW-20	1/1	5.00E+03 - 5.00E+03	2.64E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**2.08E+02**		**2.08E+02**		**ug/L**	**G-03-08-MW-20**	**1/1**	**1.50E+01 - 1.50E+01**	**2.08E+02**	**NA**	**3.20E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	**MERCURY**	**3.80E-01**		**3.80E-01**		**ug/L**	**G-03-07-MW-10B**	**1/11**	**2.00E-01 - 2.00E-01**	**3.80E-01**	**NA**	**1.60E-01**	**N**	**2.00E+00**	**MCL**	**Yes**	**ASL**
7440-02-0	NICKEL	3.40E+00	J	3.40E+00	J	ug/L	G-03-07-MW-10B	1/11	4.00E+01 - 4.00E+01	3.40E+00	NA	3.00E+01	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	2.76E+03	J	2.76E+03	J	ug/L	G-03-08-MW-20	1/1	1.00E+04 - 1.00E+04	2.76E+03	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	2.10E+00	J	2.10E+00	J	ug/L	G-03-08-MW-20	1/11	1.00E+01 - 1.00E+01	2.10E+00	NA	7.80E+00	N	5.00E+01	MCL	No	BSL
7440-23-5	SODIUM	5.65E+04		5.65E+04		ug/L	G-03-08-MW-20	1/1	1.00E+04 - 1.00E+04	5.65E+04	NA	NA		NA	NA	No	NUT
7440-62-2	VANADIUM	8.00E-01	J	3.20E+00	J	ug/L	G-03-07-MW-10B	3/11	5.00E+01 - 5.00E+01	3.20E+00	NA	7.80E+00	N	NA	NA	No	BSL
7440-66-6	ZINC	5.20E+00	J	6.50E+00	J	ug/L	G-03-07-MW-10B	2/11	2.00E+01 - 2.00E+01	6.50E+00	NA	4.70E+02	N	NA	NA	No	BSL
							INORGANICS-TOTAL										
7429-90-5	**ALUMINUM**	**2.35E+02**		**3.40E+03**		**ug/L**	**G-03-07-MW-04A**	**3/6**	**2.00E+02 - 2.00E+02**	**3.40E+03**	**NA**	**1.60E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-38-2	**ARSENIC**	**2.20E+00**	**J**	**2.20E+00**	**J**	**ug/L**	**G-03-08-MW-20**	**1/11**	**3.00E+00 - 8.00E+00**	**2.20E+00**	**NA**	**4.50E-02**	**C**	**1.00E+01**	**MCL**	**Yes**	**ASL**
7440-39-3	**BARIUM**	**9.40E+00**	**J**	**4.42E+02**		**ug/L**	**G-03-07-MW-04B**	**5/11**	**2.00E+02 - 2.00E+02**	**4.42E+02**	**NA**	**2.90E+02**	**N**	**2.00E+03**	**MCL**	**Yes**	**ASL**
7440-70-2	CALCIUM	9.94E+04		1.71E+05		ug/L	G-03-07-MW-03A	7/7	5.00E+03 - 5.00E+03	1.71E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM, TOTAL**	**1.50E+00**	**J**	**1.98E+01**		**ug/L**	**G-03-07-MW-03A**	**5/11**	**1.00E+01 - 1.00E+01**	**1.98E+01**	**NA**	**3.10E-02**	**C**	**1.00E+02**	**MCL**	**Yes**	**ASL**
7440-48-4	**COBALT**	**6.00E-01**	**J**	**6.00E-01**	**J**	**ug/L**	**G-03-08-MW-20**	**1/11**	**5.00E+01 - 5.00E+01**	**6.00E-01**	**NA**	**4.70E-01**	**N**	**NA**	**NA**	**T**	**ASL**
7440-50-8	COPPER	3.20E+00	J	3.20E+00	J	ug/L	G-03-08-MW-20	1/11	2.50E+01 - 2.50E+01	3.20E+00	NA	6.20E+01	N	1.30E+03	MCL	No	BSL
7439-89-6	**IRON**	**2.24E+02**		**3.45E+03**		**ug/L**	**G-03-07-MW-04A**	**6/6**	**1.00E+02 - 1.00E+02**	**3.45E+03**	**NA**	**1.10E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-95-4	MAGNESIUM	5.89E+03		2.82E+04		ug/L	G-03-07-MW-05B	7/7	5.00E+03 - 5.00E+03	2.82E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.92E+01**		**2.19E+02**		**ug/L**	**G-03-08-MW-20**	**7/7**	**1.50E+01 - 1.50E+01**	**2.19E+02**	**NA**	**3.20E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	**MERCURY**	**1.50E-01**	**J**	**1.40E+00**		**ug/L**	**G-03-07-MW-01**	**5/11**	**2.00E-01 - 2.00E-01**	**1.40E+00**	**NA**	**1.60E-01**	**N**	**2.00E+00**	**MCL**	**Yes**	**ASL**
7440-02-0	**NICKEL**	**1.80E+00**	**J**	**4.23E+01**		**ug/L**	**G-03-07-MW-10B**	**2/11**	**4.00E+01 - 4.00E+01**	**4.23E+01**	**NA**	**3.00E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-09-7	POTASSIUM	2.80E+03	J	2.80E+03	J	ug/L	G-03-08-MW-20	1/7	5.00E+03 - 1.00E+04	2.80E+03	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	4.10E+00	J	4.10E+00	J	ug/L	G-03-08-MW-20	1/11	1.00E+01 - 1.00E+01	4.10E+00	NA	7.80E+00	N	5.00E+01	MCL	No	BSL
7440-23-5	SODIUM	1.72E+04		5.69E+04		ug/L	G-03-08-MW-20	7/7	1.00E+04 - 1.00E+04	5.69E+04	NA	NA		NA	NA	No	NUT
7440-62-2	VANADIUM	1.90E+00	J	4.60E+00	J	ug/L	G-03-07-MW-10A	3/11	5.00E+01 - 5.00E+01	4.60E+00	NA	7.80E+00	N	NA	NA	No	BSL
7440-66-6	ZINC	4.20E+00	J	5.60E+00	J	ug/L	G-03-07-MW-10B	3/11	2.00E+01 - 2.00E+01	5.60E+00	NA	4.70E+02	N	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
91-20-3	**NAPHTHALENE**	**7.96E-01**		**1.51E+00**		**ug/L**	**G-03-07-MW-04B**	**2/11**	**2.00E-01 - 2.10E-01**	**1.51E+00**	**NA**	**1.40E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
							SEMI-VOLATILE ORGANIC COMPOUNDS										
95-50-1	1,2-DICHLOROBENZENE	8.10E-01	J	4.40E+00		ug/L	G-03-07-MW-05B	2/9	2.00E+00 - 2.10E+00	4.40E+00	NA	3.70E+01	N	NA	NA	No	BSL
106-46-7	**1,4-DICHLOROBENZENE**	**1.50E+00**	**J**	**1.50E+00**	**J**	**ug/L**	**G-03-07-MW-05B**	**1/9**	**2.00E+00 - 2.10E+00**	**1.50E+00**	**NA**	**4.30E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	2.90E+00		2.90E+00		ug/L	G-03-07-MW-02	1/11	2.00E+00 - 2.10E+00	2.90E+00	NA	4.80E+00	C	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS										
71-43-2	**BENZENE**	**4.90E-01**	**J**	**7.30E-01**	**J / J**	**ug/L**	**G-03-07-MW-04A**	**2/17**	**1.00E+00 - 1.00E+00**	**7.30E-01**	**NA**	**4.10E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
67-66-3	**CHLOROFORM**	**3.10E-01**	**J**	**3.10E-01**	**J**	**ug/L**	**G-03-09-MW-5A**	**1/17**	**1.00E+00 - 1.00E+00**	**3.10E-01**	**NA**	**1.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
100-41-4	**ETHYLBENZENE**	**4.40E-01**	**J**	**2.15E+00**	**J /**	**ug/L**	**G-03-07-MW-04B**	**2/17**	**1.00E+00 - 1.00E+00**	**2.15E+00**	**NA**	**1.50E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
79-01-6	**TRICHLOROETHENE**	**6.20E-01**	**J**	**5.50E+00**		**ug/L**	**G-03-09-MW-5A**	**4/17**	**1.00E+00 - 1.00E+00**	**5.50E+00**	**NA**	**2.00E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.

(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value.
(5) Rationale Codes — Selection Reason: ASL = Above Screening Toxicity Level; Deletion Reason: BSL = Below Screening Toxicity Level; NSL = No Screening Level; NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE D.2.3.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 13 and 15

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES										
94-75-7	2,4-D	2.88E-01		2.88E-01		mg/kg	S-13-08-01-0-2	1/7	1.90E-02 - 2.00E-01	2.88E-01	NA	7.70E+02	N	NA	NA	No	BSL
87-86-5	PENTACHLOROPHENOL	5.40E-03		1.10E-01		mg/kg	S-13-08-01-0-2	6/7	1.90E-03 - 2.00E-02	1.10E-01	NA	2.70E+00	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	ALUMINUM	1.38E+04		2.57E+04		mg/kg	S-15-08-01-0-1	9/9	2.30E+01 - 2.50E+01	2.57E+04	3.00E+04	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	3.10E-01	J	2.70E+00	J	mg/kg	S-15-08-01-0-1	8/9	2.30E+00 - 2.50E+00	2.70E+00	1.00E+00	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**2.40E+00**		**2.05E+01**		**mg/kg**	**S-15-08-02-0-1**	**9/9**	**3.40E-01 - 3.80E-01**	**2.05E+01**	**4.39E+01**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.97E+01		9.33E+01		mg/kg	S-13-08-02-0-2	9/9	2.30E+01 - 2.50E+01	9.33E+01	1.02E+02	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.00E-01	J	1.40E+00		mg/kg	S-15-08-01-0-1	9/9	5.70E-01 - 6.40E-01	1.40E+00	6.47E-01	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	3.70E-01	J	1.40E+00		mg/kg	S-15-08-01-0-1	4/9	5.70E-01 - 6.40E-01	1.40E+00	8.58E-01	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.67E+03		4.29E+04		mg/kg	S-15-08-01-0-1	9/9	5.70E+02 - 6.40E+02	4.29E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**9.00E+00**		**4.83E+01**	**J**	**mg/kg**	**S-15-08-01-0-1**	**9/9**	**1.10E+00 - 1.30E+00**	**4.83E+01**	**6.98E+01**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	4.60E+00	J	1.84E+01		mg/kg	S-13-08-01-0-2	9/9	5.70E+00 - 6.40E+00	1.84E+01	1.66E+01	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	1.74E+01		1.11E+02		mg/kg	S-15-08-01-0-1	9/9	2.80E+00 - 3.20E+00	1.11E+02	8.37E+01	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	1.46E+04		4.13E+04		mg/kg	S-15-08-01-0-1	9/9	1.10E+01 - 1.30E+01	4.13E+04	4.71E+04	7.20E+04	N	NA	NA	No	BSL
7439-92-1	LEAD	3.10E+00		5.62E+02		mg/kg	S-13-08-06-0-2	9/9	2.30E+00 - 2.50E+00	5.62E+02	2.75E+01	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.55E+03		1.32E+04		mg/kg	S-15-08-01-0-1	9/9	5.70E+02 - 6.40E+02	1.32E+04	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	5.96E+01		1.23E+03		mg/kg	S-13-08-02-0-2	9/9	1.70E+00 - 1.90E+00	1.23E+03	1.18E+03	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	3.20E-02	J	4.10E-01		mg/kg	S-13-08-06-0-2	8/9	3.40E-02 - 4.10E-02	4.10E-01	3.20E-01	4.30E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.30E+00	J	3.52E+01		mg/kg	S-15-08-01-0-1	9/9	4.50E+00 - 5.10E+00	3.52E+01	2.30E+01	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.29E+02	J	2.27E+03		mg/kg	S-13-08-03-0-2	9/9	1.10E+03 - 1.30E+03	2.27E+03	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	3.40E-01	J	2.80E+00		mg/kg	S-13-08-01-0-2	9/9	5.70E-01 - 6.40E-01	2.80E+00	1.00E+00	5.10E+02	N	NA	NA	No	BSL
7440-22-4	SILVER	1.40E-01	J	2.70E-01	J	mg/kg	S-13-08-01-0-2	2/9	1.10E+00 - 1.30E+00	2.70E-01	2.20E-01	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	9.32E+01	J	4.05E+02	J	mg/kg	S-15-08-01-0-1	9/9	1.10E+03 - 1.30E+03	4.05E+02	2.38E+02	NA		NA	NA	No	NUT
7440-28-0	**THALLIUM**	**3.50E-01**	**J**	**1.10E+00**	**J**	**mg/kg**	**S-15-08-01-0-1**	**4/9**	**1.10E+00 - 1.30E+00**	**1.10E+00**	**1.10E+00**	**1.00E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-31-5	TIN	2.70E+00	J / J	1.36E+01		mg/kg	S-15-08-01-0-1	9/9	5.70E+00 - 6.40E+00	1.36E+01	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	VANADIUM	2.49E+01		1.62E+02		mg/kg	S-15-08-01-0-1	9/9	1.10E+00 - 1.30E+00	1.62E+02	1.45E+02	5.20E+02	N	NA	NA	No	BSL
7440-66-6	ZINC	2.45E+01		2.60E+02	J	mg/kg	S-15-08-01-0-1	9/9	2.30E+00 - 2.50E+00	2.60E+02	8.10E+01	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	6.72E-02		6.72E-02		mg/kg	S-13-08-07-0-2	1/7	1.50E-03 - 1.70E-03	6.72E-02	5.10E-04	7.20E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	4.69E-01		4.69E-01		mg/kg	S-13-08-07-0-2	1/7	1.50E-03 - 1.60E-02	4.69E-01	3.37E-03	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	7.00E-03		5.43E-01		mg/kg	S-13-08-07-0-2	2/7	1.50E-03 - 1.60E-02	5.43E-01	2.65E-03	7.00E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	1.56E-02		1.56E-02		mg/kg	S-13-08-07-0-2	1/7	1.50E-03 - 1.70E-03	1.56E-02	6.40E-04	6.50E+00	C	NA	NA	No	BSL
60-57-1	DIELDRIN	4.10E-03		4.10E-03		mg/kg	S-13-08-07-0-2	1/7	1.50E-03 - 1.70E-03	4.10E-03	NA	1.10E-01	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
191-24-2	BENZO(G,H,I)PERYLENE	3.25E-02		3.25E-02		mg/kg	S-13-08-06-0-2	1/7	7.60E-03 - 8.50E-03	3.25E-02	NA	1.70E+03	N	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS										
75-35-4	1,1-DICHLOROETHENE	1.10E-03	J	2.10E-03	J	mg/kg	S-13-08-03-0-2	4/7	5.40E-03 - 8.30E-03	2.10E-03	NA	1.10E+02	N	NA	NA	No	BSL
67-64-1	ACETONE	1.44E-01		1.44E-01		mg/kg	S-13-08-02-0-2	1/7	1.10E-02 - 1.70E-02	1.44E-01	NA	6.30E+04	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011. *Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations*. November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Pyrene for Benzo[g,h,i]perylene.

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TABLE D.2.3.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159 - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 13 and 15

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES										
94-75-7	2,4-D	2.88E-01		2.88E-01		mg/kg	S-13-08-01-0-2	1/7	1.90E-02 - 2.00E-01	2.88E-01	NA	6.90E+01	N	NA	NA	No	BSL
87-86-5	PENTACHLOROPHENOL	5.40E-03		1.10E-01		mg/kg	S-13-08-01-0-2	6/7	1.90E-03 - 2.00E-02	1.10E-01	NA	8.90E-01	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	**ALUMINUM**	**1.38E+04**		**2.57E+04**		**mg/kg**	**S-15-08-01-0-1**	**9/9**	**2.30E+01 - 2.50E+01**	**2.57E+04**	**3.00E+04**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	3.10E-01	J	2.70E+00	J	mg/kg	S-15-08-01-0-1	8/9	2.30E+00 - 2.50E+00	2.70E+00	1.00E+00	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**2.40E+00**		**2.05E+01**		**mg/kg**	**S-15-08-02-0-1**	**9/9**	**3.40E-01 - 3.80E-01**	**2.05E+01**	**4.39E+01**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.97E+01		9.33E+01		mg/kg	S-13-08-02-0-2	9/9	2.30E+01 - 2.50E+01	9.33E+01	1.02E+02	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.00E-01	J	1.40E+00		mg/kg	S-15-08-01-0-1	9/9	5.70E-01 - 6.40E-01	1.40E+00	6.47E-01	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	3.70E-01	J	1.40E+00		mg/kg	S-15-08-01-0-1	4/9	5.70E-01 - 6.40E-01	1.40E+00	8.58E-01	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.67E+03		4.29E+04		mg/kg	S-15-08-01-0-1	9/9	5.70E+02 - 6.40E+02	4.29E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**9.00E+00**		**4.83E+01**	**J**	**mg/kg**	**S-15-08-01-0-1**	**9/9**	**1.10E+00 - 1.30E+00**	**4.83E+01**	**6.98E+01**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**4.60E+00**	**J**	**1.84E+01**		**mg/kg**	**S-13-08-01-0-2**	**9/9**	**5.70E+00 - 6.40E+00**	**1.84E+01**	**1.66E+01**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.74E+01		1.11E+02		mg/kg	S-15-08-01-0-1	9/9	2.80E+00 - 3.20E+00	1.11E+02	8.37E+01	3.10E+02	N	NA	NA	No	BSL
7439-89-6	**IRON**	**1.46E+04**		**4.13E+04**		**mg/kg**	**S-15-08-01-0-1**	**9/9**	**1.10E+01 - 1.30E+01**	**4.13E+04**	**4.71E+04**	**5.50E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	**LEAD**	**3.10E+00**		**5.62E+02**		**mg/kg**	**S-13-08-06-0-2**	**9/9**	**2.30E+00 - 2.50E+00**	**5.62E+02**	**2.75E+01**	**4.00E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-95-4	MAGNESIUM	1.55E+03		1.32E+04		mg/kg	S-15-08-01-0-1	9/9	5.70E+02 - 6.40E+02	1.32E+04	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**5.96E+01**		**1.23E+03**		**mg/kg**	**S-13-08-02-0-2**	**9/9**	**1.70E+00 - 1.90E+00**	**1.23E+03**	**1.18E+03**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	3.20E-02	J	4.10E-01		mg/kg	S-13-08-06-0-2	8/9	3.40E-02 - 4.10E-02	4.10E-01	3.20E-01	1.00E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.30E+00	J	3.52E+01		mg/kg	S-15-08-01-0-1	9/9	4.50E+00 - 5.10E+00	3.52E+01	2.30E+01	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.29E+02	J	2.27E+03		mg/kg	S-13-08-03-0-2	9/9	1.10E+03 - 1.30E+03	2.27E+03	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	3.40E-01	J	2.80E+00		mg/kg	S-13-08-01-0-2	9/9	5.70E-01 - 6.40E-01	2.80E+00	1.00E+00	3.90E+01	N	NA	NA	No	BSL
7440-22-4	SILVER	1.40E-01	J	2.70E-01	J	mg/kg	S-13-08-01-0-2	2/9	1.10E+00 - 1.30E+00	2.70E-01	2.20E-01	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	9.32E+01	J	4.05E+02	J	mg/kg	S-15-08-01-0-1	9/9	1.10E+03 - 1.30E+03	4.05E+02	2.38E+02	NA		NA	NA	No	NUT
7440-28-0	**THALLIUM**	**3.50E-01**	**J**	**1.10E+00**	**J**	**mg/kg**	**S-15-08-01-0-1**	**4/9**	**1.10E+00 - 1.30E+00**	**1.10E+00**	**1.10E+00**	**7.80E-02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-31-5	TIN	2.70E+00	J / J	1.36E+01		mg/kg	S-15-08-01-0-1	9/9	5.70E+00 - 6.40E+00	1.36E+01	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**2.49E+01**		**1.62E+02**		**mg/kg**	**S-15-08-01-0-1**	**9/9**	**1.10E+00 - 1.30E+00**	**1.62E+02**	**1.45E+02**	**3.90E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	2.45E+01		2.60E+02	J	mg/kg	S-15-08-01-0-1	9/9	2.30E+00 - 2.50E+00	2.60E+02	8.10E+01	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	6.72E-02		6.72E-02		mg/kg	S-13-08-07-0-2	1/7	1.50E-03 - 1.70E-03	6.72E-02	5.02E-01	2.00E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	4.69E-01		4.69E-01		mg/kg	S-13-08-07-0-2	1/7	1.50E-03 - 1.60E-02	4.69E-01	6.50E-01	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	7.00E-03		5.43E-01		mg/kg	S-13-08-07-0-2	2/7	1.50E-03 - 1.60E-02	5.43E-01	1.98E-01	1.70E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	1.56E-02		1.56E-02		mg/kg	S-13-08-07-0-2	1/7	1.50E-03 - 1.70E-03	1.56E-02	9.00E-03	1.60E+00	C	NA	NA	No	BSL
60-57-1	DIELDRIN	4.10E-03		4.10E-03		mg/kg	S-13-08-07-0-2	1/7	1.50E-03 - 1.70E-03	4.10E-03	NA	3.00E-02	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
191-24-2	BENZO(G,H,I)PERYLENE	3.25E-02		3.25E-02		mg/kg	S-13-08-06-0-2	1/7	7.60E-03 - 8.50E-03	3.25E-02	NA	1.70E+02	N	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS										
75-35-4	1,1-DICHLOROETHENE	1.10E-03	J	2.10E-03	J	mg/kg	S-13-08-03-0-2	4/7	5.40E-03 - 8.30E-03	2.10E-03	NA	2.40E+01	N	NA	NA	No	BSL
67-64-1	ACETONE	1.44E-01		1.44E-01		mg/kg	S-13-08-02-0-2	1/7	1.10E-02 - 1.70E-02	1.44E-01	NA	6.10E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011. *Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations* . November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Biphenyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Pyrene for Benzo[g,h,i]perylene.

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TABLE D.2.3.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159 - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 13 and 15

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
							HERBICIDES										
87-86-5	PENTACHLOROPHENOL	5.70E-03		5.70E-03		mg/kg	S-13-08-07-2-4	1/1	2.10E-03 - 2.10E-03	5.70E-03	NA	2.70E+00	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	ALUMINUM	1.82E+04	J / J	2.75E+04		mg/kg	S-15-08-01-2-4	3/3	2.45E+01 - 2.70E+01	2.75E+04	3.00E+04	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	6.45E-01	J / J	2.70E+00	J	mg/kg	S-15-08-01-2-4	3/3	2.45E+00 - 2.70E+00	2.70E+00	1.00E+00	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**1.66E+01**		**4.52E+01**		**mg/kg**	**S-15-08-01-2-4**	**3/3**	**3.65E-01 - 4.10E-01**	**4.52E+01**	**4.39E+01**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.88E+01		6.01E+01	J / J	mg/kg	S-13-08-07-2-4	3/3	2.45E+01 - 2.70E+01	6.01E+01	1.02E+02	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.30E-01	J	4.40E-01	J	mg/kg	S-15-08-01-2-4	3/3	6.10E-01 - 6.80E-01	4.40E-01	6.47E-01	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.70E-01	J	5.50E-01	J	mg/kg	S-15-08-01-2-4	3/3	6.10E-01 - 6.80E-01	5.50E-01	8.58E-01	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	2.54E+03		4.64E+04	J / J	mg/kg	S-13-08-07-2-4	3/3	6.30E+02 - 9.10E+02	4.64E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**2.95E+01**		**8.93E+01**	**J**	**mg/kg**	**S-15-08-01-2-4**	**3/3**	**1.20E+00 - 1.40E+00**	**8.93E+01**	**6.98E+01**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	3.80E+00	J	1.34E+01		mg/kg	S-13-08-07-2-4	3/3	6.10E+00 - 6.80E+00	1.34E+01	1.66E+01	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	1.56E+01		6.22E+01		mg/kg	S-15-08-01-2-4	3/3	3.05E+00 - 3.40E+00	6.22E+01	8.37E+01	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	2.55E+04		4.58E+04		mg/kg	S-15-08-01-2-4	3/3	1.20E+01 - 1.40E+01	4.58E+04	4.71E+04	7.20E+04	N	NA	NA	No	BSL
7439-92-1	LEAD	5.50E+00		1.28E+02	J / J	mg/kg	S-13-08-07-2-4	3/3	2.50E+00 - 3.65E+00	1.28E+02	2.75E+01	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	8.80E+02		2.91E+03	J / J	mg/kg	S-13-08-07-2-4	3/3	6.10E+02 - 6.80E+02	2.91E+03	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	1.05E+02		9.17E+02		mg/kg	S-15-08-01-2-4	3/3	1.85E+00 - 2.00E+00	9.17E+02	1.18E+03	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	4.80E-02		3.25E-01		mg/kg	S-13-08-07-2-4	3/3	3.80E-02 - 4.10E-02	3.25E-01	3.20E-01	4.30E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.30E+00	J	1.40E+01		mg/kg	S-15-08-01-2-4	3/3	4.90E+00 - 5.50E+00	1.40E+01	2.30E+01	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	4.46E+02	J	7.12E+02	J / J	mg/kg	S-13-08-07-2-4	3/3	1.20E+03 - 1.40E+03	7.12E+02	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.60E+00		2.00E+00		mg/kg	S-15-08-01-2-4	3/3	6.10E-01 - 6.80E-01	2.00E+00	1.00E+00	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	4.35E+01	J	1.26E+02	J / J	mg/kg	S-13-08-07-2-4	3/3	1.20E+03 - 1.40E+03	1.26E+02	NA	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	2.50E-01	J	8.00E-01	J	mg/kg	S-15-08-01-2-4	2/3	1.20E+00 - 1.40E+00	8.00E-01	1.10E+00	1.00E+00	N	NA	NA	No	BSL
7440-31-5	TIN	3.10E+00	J	4.40E+00	J	mg/kg	S-15-08-01-2-4	3/3	6.10E+00 - 6.80E+00	4.40E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	VANADIUM	7.17E+01	J / J	1.39E+02		mg/kg	S-15-08-01-2-4	3/3	1.20E+00 - 1.40E+00	1.39E+02	1.45E+02	5.20E+02	N	NA	NA	No	BSL
7440-66-6	ZINC	1.53E+01	J	1.14E+02	J / J	mg/kg	S-13-08-07-2-4	3/3	2.45E+00 - 2.70E+00	1.14E+02	8.10E+01	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	2.26E-02	J	2.26E-02	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-03 - 1.70E-03	2.26E-02	5.10E-04	7.20E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.65E-01	J	3.65E-01	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-02 - 1.70E-02	3.65E-01	3.37E-03	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	1.36E-01	J	1.36E-01	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-02 - 1.70E-02	1.36E-01	2.65E-03	7.00E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	7.10E-03	J	7.10E-03	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-03 - 1.70E-03	7.10E-03	6.40E-04	6.50E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
208-96-8	ACENAPHTHYLENE	1.37E-02	J	1.37E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.37E-02	NA	3.30E+03	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	8.03E-02	J	8.03E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	8.03E-02	NA	2.10E+00	C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	8.78E-02	J	8.78E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	8.78E-02	NA	2.10E-01	C	NA	NA	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	1.74E-01	J	1.74E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.74E-01	NA	2.10E+00	C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	2.47E-02	J	2.47E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	2.47E-02	NA	1.70E+03	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	1.18E-01	J	1.18E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.18E-01	NA	2.10E+01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.06E-01	J	1.06E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.06E-01	NA	2.10E+02	C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	1.25E-02	J	1.25E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.25E-02	NA	2.10E-01	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	1.12E-01		1.12E-01		mg/kg	S-13-08-07-2-4	1/1	4.10E-02 - 4.10E-02	1.12E-01	NA	2.20E+03	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	2.91E-02	J	2.91E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	2.91E-02	NA	2.10E+00	C	NA	NA	No	BSL
129-00-0	PYRENE	1.09E-01		1.09E-01		mg/kg	S-13-08-07-2-4	1/1	4.10E-02 - 4.10E-02	1.09E-01	NA	1.70E+03	N	NA	NA	No	BSL

TABLE D.2.3.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159 - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 13 and 15

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
SEMI-VOLATILE ORGANIC COMPOUNDS																	
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	6.25E-02	J	6.25E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.60E-02 - 8.60E-02	6.25E-02	NA	1.20E+02	C	NA	NA	No	BSL
VOLATILE ORGANIC COMPOUNDS																	
75-35-4	1,1-DICHLOROETHENE	1.20E-03	J	1.20E-03	J	mg/kg	S-13-08-07-2-4	1/1	6.60E-03 - 6.60E-03	1.20E-03	NA	1.10E+02	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011. *Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations* . November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Acenaphthene for Acenaphthylene, and Pyrene for Benzo[g,h,i]perylene.

TABLE D.2.3.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159 - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 13 and 15

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
							HERBICIDES										
87-86-5	PENTACHLOROPHENOL	5.70E-03		5.70E-03		mg/kg	S-13-08-07-2-4	1/1	2.10E-03 - 2.10E-03	5.70E-03	NA	8.90E-01	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	**ALUMINUM**	**1.82E+04**	**J / J**	**2.75E+04**		**mg/kg**	**S-15-08-01-2-4**	**3/3**	**2.45E+01 - 2.70E+01**	**2.75E+04**	**3.00E+04**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	6.45E-01	J / J	2.70E+00	J	mg/kg	S-15-08-01-2-4	3/3	2.45E+00 - 2.70E+00	2.70E+00	1.00E+00	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**1.66E+01**		**4.52E+01**		**mg/kg**	**S-15-08-01-2-4**	**3/3**	**3.65E-01 - 4.10E-01**	**4.52E+01**	**4.39E+01**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.88E+01		6.01E+01	J / J	mg/kg	S-13-08-07-2-4	3/3	2.45E+01 - 2.70E+01	6.01E+01	1.02E+02	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.30E-01	J	4.40E-01	J	mg/kg	S-15-08-01-2-4	3/3	6.10E-01 - 6.80E-01	4.40E-01	6.47E-01	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.70E-01	J	5.50E-01	J	mg/kg	S-15-08-01-2-4	3/3	6.10E-01 - 6.80E-01	5.50E-01	8.58E-01	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	2.54E+03		4.64E+04	J / J	mg/kg	S-13-08-07-2-4	3/3	6.30E+02 - 9.10E+02	4.64E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**2.95E+01**		**8.93E+01**	**J**	**mg/kg**	**S-15-08-01-2-4**	**3/3**	**1.20E+00 - 1.40E+00**	**8.93E+01**	**6.98E+01**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**3.80E+00**	**J**	**1.34E+01**		**mg/kg**	**S-13-08-07-2-4**	**3/3**	**6.10E+00 - 6.80E+00**	**1.34E+01**	**1.66E+01**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.56E+01		6.22E+01		mg/kg	S-15-08-01-2-4	3/3	3.05E+00 - 3.40E+00	6.22E+01	8.37E+01	3.10E+02	N	NA	NA	No	BSL
7439-89-6	**IRON**	**2.55E+04**		**4.58E+04**		**mg/kg**	**S-15-08-01-2-4**	**3/3**	**1.20E+01 - 1.40E+01**	**4.58E+04**	**4.71E+04**	**5.50E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	5.50E+00		1.28E+02	J / J	mg/kg	S-13-08-07-2-4	3/3	2.50E+00 - 3.65E+00	1.28E+02	2.75E+01	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	8.80E+02		2.91E+03	J / J	mg/kg	S-13-08-07-2-4	3/3	6.10E+02 - 6.80E+02	2.91E+03	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.05E+02**		**9.17E+02**		**mg/kg**	**S-15-08-01-2-4**	**3/3**	**1.85E+00 - 2.00E+00**	**9.17E+02**	**1.18E+03**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	4.80E-02		3.25E-01		mg/kg	S-13-08-07-2-4	3/3	3.80E-02 - 4.10E-02	3.25E-01	3.20E-01	1.00E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.30E+00	J	1.40E+01		mg/kg	S-15-08-01-2-4	3/3	4.90E+00 - 5.50E+00	1.40E+01	2.30E+01	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	4.46E+02	J	7.12E+02	J / J	mg/kg	S-13-08-07-2-4	3/3	1.20E+03 - 1.40E+03	7.12E+02	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.60E+00		2.00E+00		mg/kg	S-15-08-01-2-4	3/3	6.10E-01 - 6.80E-01	2.00E+00	1.00E+00	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	4.35E+01	J	1.26E+02	J / J	mg/kg	S-13-08-07-2-4	3/3	1.20E+03 - 1.40E+03	1.26E+02	NA	NA		NA	NA	No	NUT
7440-28-0	**THALLIUM**	**2.50E-01**	**J**	**8.00E-01**	**J**	**mg/kg**	**S-15-08-01-2-4**	**2/3**	**1.20E+00 - 1.40E+00**	**8.00E-01**	**1.10E+00**	**7.80E-02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-31-5	TIN	3.10E+00	J	4.40E+00	J	mg/kg	S-15-08-01-2-4	3/3	6.10E+00 - 6.80E+00	4.40E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**7.17E+01**	**J / J**	**1.39E+02**		**mg/kg**	**S-15-08-01-2-4**	**3/3**	**1.20E+00 - 1.40E+00**	**1.39E+02**	**1.45E+02**	**3.90E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.53E+01	J	1.14E+02	J / J	mg/kg	S-13-08-07-2-4	3/3	2.45E+00 - 2.70E+00	1.14E+02	8.10E+01	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	2.26E-02	J	2.26E-02	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-03 - 1.70E-03	2.26E-02	5.10E-04	2.00E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.65E-01	J	3.65E-01	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-02 - 1.70E-02	3.65E-01	3.37E-03	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	1.36E-01	J	1.36E-01	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-02 - 1.70E-02	1.36E-01	2.65E-03	1.70E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	7.10E-03	J	7.10E-03	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-03 - 1.70E-03	7.10E-03	6.40E-04	1.60E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
208-96-8	ACENAPHTHYLENE	1.37E-02	J	1.37E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.37E-02	NA	3.40E+02	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	8.03E-02	J	8.03E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	8.03E-02	NA	1.50E-01	C	NA	NA	No	BSL
50-32-8	**BENZO(A)PYRENE**	**8.78E-02**	**J**	**8.78E-02**	**J**	**mg/kg**	**S-13-08-07-2-4**	**1/1**	**8.20E-03 - 8.20E-03**	**8.78E-02**	**NA**	**1.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	**1.74E-01**	**J**	**1.74E-01**	**J**	**mg/kg**	**S-13-08-07-2-4**	**1/1**	**8.20E-03 - 8.20E-03**	**1.74E-01**	**NA**	**1.50E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	2.47E-02	J	2.47E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	2.47E-02	NA	1.70E+02	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	1.18E-01	J	1.18E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.18E-01	NA	1.50E+00	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.06E-01	J	1.06E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.06E-01	NA	1.50E+01	C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	1.25E-02	J	1.25E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.25E-02	NA	1.50E-02	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	1.12E-01		1.12E-01		mg/kg	S-13-08-07-2-4	1/1	4.10E-02 - 4.10E-02	1.12E-01	NA	2.30E+02	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	2.91E-02	J	2.91E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	2.91E-02	NA	1.50E-01	C	NA	NA	No	BSL
129-00-0	PYRENE	1.09E-01		1.09E-01		mg/kg	S-13-08-07-2-4	1/1	4.10E-02 - 4.10E-02	1.09E-01	NA	1.70E+02	N	NA	NA	No	BSL

TABLE D.2.3.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159 - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 13 and 15

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
SEMI-VOLATILE ORGANIC COMPOUNDS																
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	6.25E-02	J	6.25E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.60E-02 - 8.60E-02	6.25E-02	NA	3.50E+01 C	NA	NA	No	BSL
VOLATILE ORGANIC COMPOUNDS																
75-35-4	1,1-DICHLOROETHENE	1.20E-03	J	1.20E-03	J	mg/kg	S-13-08-07-2-4	1/1	6.60E-03 - 6.60E-03	1.20E-03	NA	2.40E+01 N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011. *Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations*. November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Acenaphthene for Acenaphthylene, and Pyrene for Benzo[g,h,i]perylene.

TABLE D.2.4.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 9: USED OIL STAGING AREA - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 9

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	ALUMINUM	1.46E+04		2.28E+04		mg/kg	S-09-08-03-2-4	6/6	2.30E+01 - 2.65E+01	2.28E+04	3.00E+04	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	3.50E-01	J	3.50E-01	J	mg/kg	S-09-08-01-2-4	1/6	2.30E+00 - 2.65E+00	3.50E-01	1.00E+00	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**3.57E+01**		**1.89E+02**	**J / J**	**mg/kg**	**S-09-08-03-2-4**	**6/6**	**3.50E-01 - 1.10E+00**	**1.89E+02**	**4.39E+01**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	6.00E+00	J	1.84E+02		mg/kg	S-09-08-02-2-4	6/6	2.30E+01 - 2.65E+01	1.84E+02	1.02E+02	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.30E-01	J	6.80E-01		mg/kg	S-09-08-02-2-4	6/6	5.80E-01 - 6.60E-01	6.80E-01	6.47E-01	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	3.90E-01	J	1.05E+00	J / J	mg/kg	S-09-08-03-2-4	6/6	5.80E-01 - 1.65E+00	1.05E+00	8.58E-01	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	5.39E+02	J	1.53E+04		mg/kg	S-09-08-02-2-4	6/6	5.80E+02 - 6.60E+02	1.53E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**3.54E+01**		**1.63E+02**		**mg/kg**	**S-09-08-03-2-4**	**6/6**	**1.20E+00 - 2.60E+00**	**1.63E+02**	**6.98E+01**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**1.90E+00**	**J**	**1.04E+02**		**mg/kg**	**S-09-08-02-2-4**	**6/6**	**5.80E+00 - 6.60E+00**	**1.04E+02**	**1.66E+01**	**3.00E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	2.96E+01		8.78E+01		mg/kg	S-09-08-02-2-4	6/6	2.90E+00 - 8.25E+00	8.78E+01	8.37E+01	4.10E+03	N	NA	NA	No	BSL
7439-89-6	**IRON**	**3.79E+04**		**1.23E+05**		**mg/kg**	**S-09-08-03-2-4**	**6/6**	**1.20E+01 - 3.30E+01**	**1.23E+05**	**4.71E+04**	**7.20E+04**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	3.30E+00		2.29E+01		mg/kg	S-09-08-02-2-4	6/6	2.30E+00 - 7.40E+00	2.29E+01	2.75E+01	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.86E+02	J	4.23E+02	J / J	mg/kg	S-09-08-03-2-4	6/6	5.80E+02 - 6.60E+02	4.23E+02	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**4.27E+01**		**7.15E+03**		**mg/kg**	**S-09-08-02-2-4**	**6/6**	**1.70E+00 - 5.60E+00**	**7.15E+03**	**1.18E+03**	**2.30E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	1.70E-02	J	4.40E-01		mg/kg	S-09-08-02-4-6	6/6	3.80E-02 - 4.35E-02	4.40E-01	3.20E-01	4.30E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.10E+00	J	1.70E+01		mg/kg	S-09-08-02-2-4	6/6	4.60E+00 - 1.35E+01	1.70E+01	2.30E+01	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	3.64E+02	J	6.19E+02	J	mg/kg	S-09-08-02-2-4	6/6	1.20E+03 - 1.30E+03	6.19E+02	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.20E+00		1.07E+01		mg/kg	S-09-08-02-2-4	6/6	5.80E-01 - 1.90E+00	1.07E+01	1.00E+00	5.10E+02	N	NA	NA	No	BSL
7440-22-4	SILVER	1.30E+00	J	1.30E+00	J	mg/kg	S-09-08-02-2-4	1/6	1.20E+00 - 2.50E+00	1.30E+00	2.20E-01	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	2.24E+01	J	4.35E+01	J	mg/kg	S-09-08-01-2-4	6/6	1.20E+03 - 1.30E+03	4.35E+01	2.38E+02	NA		NA	NA	No	NUT
7440-31-5	TIN	1.20E+00	J	1.90E+00	J	mg/kg	S-09-08-03-4-6	6/6	5.80E+00 - 6.50E+00	1.90E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	VANADIUM	1.40E+02		2.22E+02		mg/kg	S-09-08-02-2-4	6/6	1.20E+00 - 1.30E+00	2.22E+02	1.45E+02	5.20E+02	N	NA	NA	No	BSL
7440-66-6	ZINC	1.52E+01		6.77E+01		mg/kg	S-09-08-02-2-4	6/6	2.30E+00 - 2.65E+00	6.77E+01	8.10E+01	3.10E+04	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.54E+01		3.45E+01		mg/kg	S-09-08-02-2-4	2/6	7.90E+00 - 8.70E+00	3.45E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	1.06E-02	J	1.06E-02	J	mg/kg	S-09-08-03-2-4	1/6	9.20E-03 - 1.30E-02	1.06E-02	NA	6.30E+04	N	NA	NA	No	BSL
108-88-3	TOLUENE	8.60E-04	J	1.70E-03		mg/kg	S-09-08-03-2-4	2/6	9.20E-04 - 1.30E-03	1.70E-03	NA	4.50E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011.*Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations*. November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

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TABLE D.2.4.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 9: USED OIL STAGING AREA - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 9

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	**ALUMINUM**	**1.46E+04**		**2.28E+04**		**mg/kg**	**S-09-08-03-2-4**	**6/6**	**2.30E+01 - 2.65E+01**	**2.28E+04**	**3.00E+04**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	3.50E-01	J	3.50E-01	J	mg/kg	S-09-08-01-2-4	1/6	2.30E+00 - 2.65E+00	3.50E-01	1.00E+00	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**3.57E+01**		**1.89E+02**	**J / J**	**mg/kg**	**S-09-08-03-2-4**	**6/6**	**3.50E-01 - 1.10E+00**	**1.89E+02**	**4.39E+01**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	6.00E+00	J	1.84E+02		mg/kg	S-09-08-02-2-4	6/6	2.30E+01 - 2.65E+01	1.84E+02	1.02E+02	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.30E-01	J	6.80E-01		mg/kg	S-09-08-02-2-4	6/6	5.80E-01 - 6.60E-01	6.80E-01	6.47E-01	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	3.90E-01	J	1.05E+00	J / J	mg/kg	S-09-08-03-2-4	6/6	5.80E-01 - 1.65E+00	1.05E+00	8.58E-01	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	5.39E+02	J	1.53E+04		mg/kg	S-09-08-02-2-4	6/6	5.80E+02 - 6.60E+02	1.53E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**3.54E+01**		**1.63E+02**		**mg/kg**	**S-09-08-03-2-4**	**6/6**	**1.20E+00 - 2.60E+00**	**1.63E+02**	**6.98E+01**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**1.90E+00**	**J**	**1.04E+02**		**mg/kg**	**S-09-08-02-2-4**	**6/6**	**5.80E+00 - 6.60E+00**	**1.04E+02**	**1.66E+01**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	2.96E+01		8.78E+01		mg/kg	S-09-08-02-2-4	6/6	2.90E+00 - 8.25E+00	8.78E+01	8.37E+01	3.10E+02	N	NA	NA	No	BSL
7439-89-6	**IRON**	**3.79E+04**		**1.23E+05**		**mg/kg**	**S-09-08-03-2-4**	**6/6**	**1.20E+01 - 3.30E+01**	**1.23E+05**	**4.71E+04**	**5.50E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	3.30E+00		2.29E+01		mg/kg	S-09-08-02-2-4	6/6	2.30E+00 - 7.40E+00	2.29E+01	2.75E+01	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.86E+02	J	4.23E+02	J / J	mg/kg	S-09-08-03-2-4	6/6	5.80E+02 - 6.60E+02	4.23E+02	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**4.27E+01**		**7.15E+03**		**mg/kg**	**S-09-08-02-2-4**	**6/6**	**1.70E+00 - 5.60E+00**	**7.15E+03**	**1.18E+03**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	1.70E-02	J	4.40E-01		mg/kg	S-09-08-02-4-6	6/6	3.80E-02 - 4.35E-02	4.40E-01	3.20E-01	1.00E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.10E+00	J	1.70E+01		mg/kg	S-09-08-02-2-4	6/6	4.60E+00 - 1.35E+01	1.70E+01	2.30E+01	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	3.64E+02	J	6.19E+02	J	mg/kg	S-09-08-02-2-4	6/6	1.20E+03 - 1.30E+03	6.19E+02	1.46E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.20E+00		1.07E+01		mg/kg	S-09-08-02-2-4	6/6	5.80E-01 - 1.90E+00	1.07E+01	1.00E+00	3.90E+01	N	NA	NA	No	BSL
7440-22-4	SILVER	1.30E+00	J	1.30E+00	J	mg/kg	S-09-08-02-2-4	1/6	1.20E+00 - 2.50E+00	1.30E+00	2.20E-01	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	2.24E+01	J	4.35E+01	J	mg/kg	S-09-08-01-2-4	6/6	1.20E+03 - 1.30E+03	4.35E+01	2.38E+02	NA		NA	NA	No	NUT
7440-31-5	TIN	1.20E+00	J	1.90E+00	J	mg/kg	S-09-08-03-4-6	6/6	5.80E+00 - 6.50E+00	1.90E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**1.40E+02**		**2.22E+02**		**mg/kg**	**S-09-08-02-2-4**	**6/6**	**1.20E+00 - 1.30E+00**	**2.22E+02**	**1.45E+02**	**3.90E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.52E+01		6.77E+01		mg/kg	S-09-08-02-2-4	6/6	2.30E+00 - 2.65E+00	6.77E+01	8.10E+01	2.30E+03	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.54E+01		3.45E+01		mg/kg	S-09-08-02-2-4	2/6	7.90E+00 - 8.70E+00	3.45E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	1.06E-02	J	1.06E-02	J	mg/kg	S-09-08-03-2-4	1/6	9.20E-03 - 1.30E-02	1.06E-02	NA	6.10E+03	N	NA	NA	No	BSL
108-88-3	TOLUENE	8.60E-04	J	1.70E-03		mg/kg	S-09-08-03-2-4	2/6	9.20E-04 - 1.30E-03	1.70E-03	NA	5.00E+02	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process. Background values taken from EA, 2011. *Technical Memorandum Background Concentrations of Metals and Organochlorine Pesticides for use in the Fort Buchanan RCRA Facility Investigations* . November.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Biphenyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

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TABLE D.2.5.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 12: OLD LANDFILL - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 12

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	ALUMINUM	1.70E+04	J / J	1.91E+04	J	mg/kg	SS-12-07-01-0.5	4/4	2.50E+01 - 2.90E+01	1.91E+04	3.00E+04	9.90E+04	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**6.90E+00**		**7.90E+00**		**mg/kg**	**SS-12-07-02-0.5**	**4/4**	**2.50E+00 - 2.90E+00**	**7.90E+00**	**4.39E+01**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	3.81E+01		5.65E+01		mg/kg	SS-12-07-04-0.5	4/4	2.50E+01 - 2.90E+01	5.65E+01	1.02E+02	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	2.00E-01	J	3.10E-01	J	mg/kg	SS-12-07-02-0.5	4/4	6.30E-01 - 7.30E-01	3.10E-01	6.47E-01	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.80E-01	J	1.30E+00		mg/kg	SS-12-07-03-0.5	3/4	6.30E-01 - 7.30E-01	1.30E+00	8.58E-01	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	5.32E+03	J	5.48E+04	J	mg/kg	SS-12-07-01-0.5	4/4	6.30E+02 - 7.30E+02	5.48E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.96E+01**		**2.72E+01**		**mg/kg**	**SS-12-07-01-0.5**	**4/4**	**1.30E+00 - 1.50E+00**	**2.72E+01**	**6.98E+01**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	6.80E+00	J / J	9.40E+00	J	mg/kg	SS-12-07-01-0.5	4/4	6.30E+00 - 7.30E+00	9.40E+00	1.66E+01	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	2.92E+01		3.47E+01		mg/kg	SS-12-07-04-0.5	4/4	3.10E+00 - 3.60E+00	3.47E+01	8.37E+01	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	2.02E+04	J / J / J	2.34E+04	J	mg/kg	SS-12-07-04-0.5	4/4	1.30E+01 - 1.50E+01	2.34E+04	4.71E+04	7.20E+04	N	NA	NA	No	BSL
7439-92-1	LEAD	8.70E+00		4.27E+01		mg/kg	SS-12-07-03-0.5	4/4	2.50E+00 - 2.90E+00	4.27E+01	2.75E+01	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.75E+03		3.24E+03		mg/kg	SS-12-07-01-0.5	4/4	6.30E+02 - 7.30E+02	3.24E+03	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	2.78E+02		4.06E+02		mg/kg	SS-12-07-01-0.5	4/4	1.90E+00 - 2.20E+00	4.06E+02	1.18E+03	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	7.40E-02		1.50E-01		mg/kg	SS-12-07-03-0.5	4/4	3.90E-02 - 4.60E-02	1.50E-01	3.20E-01	4.30E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	6.60E+00		1.07E+01		mg/kg	SS-12-07-01-0.5	4/4	5.00E+00 - 5.80E+00	1.07E+01	2.30E+01	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.88E+02	J	8.55E+02		mg/kg	SS-12-07-02-0.5	4/4	6.30E+02 - 7.30E+02	8.55E+02	1.46E+03	NA		NA	NA	No	NUT
7440-22-4	SILVER	3.10E-01	J	3.10E-01	J	mg/kg	SS-12-07-01-0.5	1/4	1.30E+00 - 1.50E+00	3.10E-01	2.20E-01	5.10E+02	N	NA	NA	No	BSL
7440-62-2	VANADIUM	6.05E+01		7.76E+01		mg/kg	SS-12-07-04-0.5	4/4	6.30E+00 - 7.30E+00	7.76E+01	1.45E+02	5.20E+02	N	NA	NA	No	BSL
7440-66-6	ZINC	3.96E+01		7.80E+01		mg/kg	SS-12-07-01-0.5	4/4	2.50E+00 - 2.90E+00	7.80E+01	8.10E+01	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-55-9	4,4-DDE	2.20E-03		2.20E-03		mg/kg	SS-12-07-01-0.5	1/4	1.70E-03 - 2.00E-03	2.20E-03	3.37E-03	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	1.90E-03		3.70E-03		mg/kg	SS-12-07-01-0.5	2/4	1.70E-03 - 2.00E-03	3.70E-03	2.65E-03	7.00E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
56-55-3	BENZO(A)ANTHRACENE	2.18E-02		2.18E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	2.18E-02	NA	2.10E+00	C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	1.47E-02		1.47E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	1.47E-02	NA	2.10E-01	C	NA	NA	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	1.98E-02		1.98E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	1.98E-02	NA	2.10E+00	C	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	1.62E-02		1.62E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	1.62E-02	NA	2.10E+01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.89E-02		1.89E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	1.89E-02	NA	2.10E+02	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	3.39E-02	J	3.39E-02	J	mg/kg	SS-12-07-01-0.5	1/4	8.80E-02 - 9.90E-02	3.39E-02	NA	2.20E+03	N	NA	NA	No	BSL
85-01-8	PHENANTHRENE	2.85E-02		2.85E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	2.85E-02	NA	1.70E+04	N	NA	NA	No	BSL
129-00-0	PYRENE	2.82E-02	J	2.82E-02	J	mg/kg	SS-12-07-01-0.5	1/4	8.80E-02 - 9.90E-02	2.82E-02	NA	1.70E+03	N	NA	NA	No	BSL
							SEMI-VOLATILE ORGANIC COMPOUNDS										
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.63E-02	J	5.63E-02	J	mg/kg	SS-12-07-03-0.5	1/4	8.70E-02 - 9.90E-02	5.63E-02	NA	1.20E+02	C	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.07E+01		4.79E+01		mg/kg	S-12-08-02	4/4	7.80E+00 - 8.20E+00	4.79E+01	NA	NA		NA	NA	No	NSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Anthracene for Phenanthrene.

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TABLE D.2.5.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 12: OLD LANDFILL - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 12

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	**ALUMINUM**	**1.70E+04**	**J / J**	**1.91E+04**	**J**	**mg/kg**	**SS-12-07-01-0.5**	**4/4**	**2.50E+01 - 2.90E+01**	**1.91E+04**	**3.00E+04**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-38-2	**ARSENIC**	**6.90E+00**		**7.90E+00**		**mg/kg**	**SS-12-07-02-0.5**	**4/4**	**2.50E+00 - 2.90E+00**	**7.90E+00**	**4.39E+01**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	3.81E+01		5.65E+01		mg/kg	SS-12-07-04-0.5	4/4	2.50E+01 - 2.90E+01	5.65E+01	1.02E+02	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	2.00E-01	J	3.10E-01	J	mg/kg	SS-12-07-02-0.5	4/4	6.30E-01 - 7.30E-01	3.10E-01	6.47E-01	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.80E-01	J	1.30E+00		mg/kg	SS-12-07-03-0.5	3/4	6.30E-01 - 7.30E-01	1.30E+00	8.58E-01	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	5.32E+03	J	5.48E+04	J	mg/kg	SS-12-07-01-0.5	4/4	6.30E+02 - 7.30E+02	5.48E+04	1.06E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.96E+01**		**2.72E+01**		**mg/kg**	**SS-12-07-01-0.5**	**4/4**	**1.30E+00 - 1.50E+00**	**2.72E+01**	**6.98E+01**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**6.80E+00**	**J / J**	**9.40E+00**	**J**	**mg/kg**	**SS-12-07-01-0.5**	**4/4**	**6.30E+00 - 7.30E+00**	**9.40E+00**	**1.66E+01**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	2.92E+01		3.47E+01		mg/kg	SS-12-07-04-0.5	4/4	3.10E+00 - 3.60E+00	3.47E+01	8.37E+01	3.10E+02	N	NA	NA	No	BSL
7439-89-6	**IRON**	**2.02E+04**	**J / J / J**	**2.34E+04**	**J**	**mg/kg**	**SS-12-07-04-0.5**	**4/4**	**1.30E+01 - 1.50E+01**	**2.34E+04**	**4.71E+04**	**5.50E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	8.70E+00		4.27E+01		mg/kg	SS-12-07-03-0.5	4/4	2.50E+00 - 2.90E+00	4.27E+01	2.75E+01	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.75E+03		3.24E+03		mg/kg	SS-12-07-01-0.5	4/4	6.30E+02 - 7.30E+02	3.24E+03	5.13E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**2.78E+02**		**4.06E+02**		**mg/kg**	**SS-12-07-01-0.5**	**4/4**	**1.90E+00 - 2.20E+00**	**4.06E+02**	**1.18E+03**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	7.40E-02		1.50E-01		mg/kg	SS-12-07-03-0.5	4/4	3.90E-02 - 4.60E-02	1.50E-01	3.20E-01	1.00E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	6.60E+00		1.07E+01		mg/kg	SS-12-07-01-0.5	4/4	5.00E+00 - 5.80E+00	1.07E+01	2.30E+01	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.88E+02	J	8.55E+02		mg/kg	SS-12-07-02-0.5	4/4	6.30E+02 - 7.30E+02	8.55E+02	1.46E+03	NA		NA	NA	No	NUT
7440-22-4	SILVER	3.10E-01	J	3.10E-01	J	mg/kg	SS-12-07-01-0.5	1/4	1.30E+00 - 1.50E+00	3.10E-01	2.20E-01	3.90E+01	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**6.05E+01**		**7.76E+01**		**mg/kg**	**SS-12-07-04-0.5**	**4/4**	**6.30E+00 - 7.30E+00**	**7.76E+01**	**1.45E+02**	**3.90E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	3.96E+01		7.80E+01		mg/kg	SS-12-07-01-0.5	4/4	2.50E+00 - 2.90E+00	7.80E+01	8.10E+01	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-55-9	4,4-DDE	2.20E-03		2.20E-03		mg/kg	SS-12-07-01-0.5	1/4	1.70E-03 - 2.00E-03	2.20E-03	3.37E-03	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	1.90E-03		3.70E-03		mg/kg	SS-12-07-01-0.5	2/4	1.70E-03 - 2.00E-03	3.70E-03	2.65E-03	1.70E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
56-55-3	BENZO(A)ANTHRACENE	2.18E-02		2.18E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	2.18E-02	NA	1.50E-01	C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	1.47E-02		1.47E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	1.47E-02	NA	1.50E-02	C	NA	NA	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	1.98E-02		1.98E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	1.98E-02	NA	1.50E-01	C	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	1.62E-02		1.62E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	1.62E-02	NA	1.50E+00	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.89E-02		1.89E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	1.89E-02	NA	1.50E+01	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	3.39E-02	J	3.39E-02	J	mg/kg	SS-12-07-01-0.5	1/4	8.80E-02 - 9.90E-02	3.39E-02	NA	2.30E+02	N	NA	NA	No	BSL
85-01-8	PHENANTHRENE	2.85E-02		2.85E-02		mg/kg	SS-12-07-01-0.5	1/4	8.80E-03 - 9.90E-03	2.85E-02	NA	1.70E+03	N	NA	NA	No	BSL
129-00-0	PYRENE	2.82E-02	J	2.82E-02	J	mg/kg	SS-12-07-01-0.5	1/4	8.80E-02 - 9.90E-02	2.82E-02	NA	1.70E+02	N	NA	NA	No	BSL
							SEMI-VOLATILE ORGANIC COMPOUNDS										
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.63E-02	J	5.63E-02	J	mg/kg	SS-12-07-03-0.5	1/4	8.70E-02 - 9.90E-02	5.63E-02	NA	3.50E+01	C	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.07E+01		4.79E+01		mg/kg	S-12-08-02	4/4	7.80E+00 - 8.20E+00	4.79E+01	NA	NA		NA	NA	No	NSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Anthracene for Phenanthrene.

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TABLE D.2.5.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 12: OLD LANDFILL - SEDIMENT - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Site 12

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7440-38-2	**ARSENIC**	**1.64E+01**		**3.58E+01**		**mg/kg**	**SD-12-07-03**	**6/6**	**2.10E+00 - 4.00E+00**	**3.58E+01**	**NA**	**1.60E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	8.83E+01		2.31E+02		mg/kg	SD-12-07-03	6/6	2.10E+01 - 4.00E+01	2.31E+02	NA	1.90E+05	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.70E-01	J	4.10E-01	J	mg/kg	SD-12-07-03	6/6	5.30E-01 - 1.00E+00	4.10E-01	NA	2.00E+03	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.80E-01	J	7.20E-01		mg/kg	SD-12-07-03	6/6	5.30E-01 - 1.00E+00	7.20E-01	NA	8.00E+02	N	NA	NA	No	BSL
7440-47-3	CHROMIUM	1.60E+01		2.45E+01		mg/kg	SD-12-07-01	6/6	1.10E+00 - 2.00E+00	2.45E+01	NA	5.60E+01	C	NA	NA	No	BSL
7440-48-4	COBALT	6.60E+00	J / J	1.52E+01		mg/kg	SD-12-07-03	6/6	5.30E+00 - 1.00E+01	1.52E+01	NA	3.00E+02	N	NA	NA	No	BSL
7440-50-8	COPPER	1.16E+01		2.89E+01		mg/kg	SD-12-07-01	6/6	2.60E+00 - 5.00E+00	2.89E+01	NA	4.10E+04	N	NA	NA	No	BSL
7439-92-1	LEAD	5.80E+00		2.21E+01		mg/kg	SD-12-07-01	6/6	2.10E+00 - 4.00E+00	2.21E+01	NA	8.00E+02	N	NA	NA	No	BSL
7439-97-6	MERCURY	3.10E-02	J	1.40E-01		mg/kg	SD-12-07-01	6/6	4.60E-02 - 6.80E-02	1.40E-01	NA	4.30E+01	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.40E+00	J	8.20E+00		mg/kg	SD-12-07-01	6/6	4.20E+00 - 8.00E+00	8.20E+00	NA	2.00E+04	N	NA	NA	No	BSL
7782-49-2	SELENIUM	1.90E+00	J	3.50E+00		mg/kg	SD-12-07-03	6/6	2.10E+00 - 4.00E+00	3.50E+00	NA	5.10E+03	N	NA	NA	No	BSL
7440-22-4	SILVER	2.70E-01	J	6.90E-01	J	mg/kg	SD-12-07-03	2/6	1.00E+00 - 2.00E+00	6.90E-01	NA	5.10E+03	N	NA	NA	No	BSL
7440-31-5	TIN	1.20E+00	J	3.50E+00	J	mg/kg	SD-12-07-02	6/6	5.30E+00 - 1.00E+01	3.50E+00	NA	6.10E+05	N	NA	NA	No	BSL
7440-62-2	VANADIUM	2.99E+01		5.62E+01		mg/kg	SD-12-07-03	6/6	5.30E+00 - 1.00E+01	5.62E+01	NA	5.20E+03	N	NA	NA	No	BSL
7440-66-6	ZINC	3.48E+01		8.05E+01		mg/kg	SD-12-07-01	6/6	2.10E+00 - 4.00E+00	8.05E+01	NA	3.10E+05	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	2.74E-01		2.74E-01		mg/kg	SD-12-07-04	1/6	5.60E-03 - 1.10E-02	2.74E-01	NA	7.20E+01	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.41E-02		3.41E-02		mg/kg	SD-12-07-04	1/6	2.20E-03 - 9.40E-03	3.41E-02	NA	5.10E+01	C	NA	NA	No	BSL
50-29-3	4,4-DDT	6.80E-03		1.20E-02		mg/kg	SD-12-07-04	2/6	2.20E-03 - 9.40E-03	1.20E-02	NA	7.00E+01	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	5.52E-02		5.52E-02		mg/kg	SD-12-07-05	1/6	5.60E-03 - 9.40E-03	5.52E-02	NA	6.50E+01	C	NA	NA	No	BSL
60-57-1	DIELDRIN	1.16E-02		1.16E-02		mg/kg	SD-12-07-04	1/6	2.20E-03 - 9.40E-03	1.16E-02	NA	1.10E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
120-12-7	ANTHRACENE	8.48E-02	J	8.48E-02	J	mg/kg	SD-12-07-06	1/6	3.00E-03 - 1.60E-01	8.48E-02	NA	1.70E+05	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	2.25E-01		2.25E-01		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	2.25E-01	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	1.22E-01		1.22E-01		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	1.22E-01	NA	2.10E+00	C	NA	NA	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	1.74E-01		1.74E-01		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	1.74E-01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	6.28E-02		6.28E-02		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	6.28E-02	NA	1.70E+04	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	5.26E-02		5.26E-02		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	5.26E-02	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.50E-01		1.50E-01		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	1.50E-01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	2.56E-02		2.56E-02		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	2.56E-02	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	2.53E-02	J	4.14E-01		mg/kg	SD-12-07-06	2/6	3.00E-03 - 1.60E-01	4.14E-01	NA	2.20E+04	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	6.38E-02		6.38E-02		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	6.38E-02	NA	2.10E+01	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	2.66E-02		2.51E-01		mg/kg	SD-12-07-06	2/6	9.80E-03 - 1.60E-02	2.51E-01	NA	1.70E+05	N	NA	NA	No	BSL
129-00-0	PYRENE	2.35E-02	J	3.44E-01		mg/kg	SD-12-07-06	2/6	3.00E-03 - 1.60E-01	3.44E-01	NA	1.70E+04	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	7.07E+01		7.07E+01		mg/kg	SD12-09-6	1/6	1.20E+01 - 1.90E+01	7.07E+01	NA	NA		NA	NA	No	NSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, June 2011. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value. The resulting values have been increased by a factor of ten to account for reduced sediment exposures.
(5) Rationale Codes — Selection Reason: ASL = Above Screening Toxicity Level; Deletion Reason: BSL = Below Screening Toxicity Level; NSL = No Screening Level; NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, Pyrene for Benzo[g,h,i]perylene.

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TABLE D.2.5.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 12: OLD LANDFILL - SEDIMENT - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Site 12

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7440-38-2	**ARSENIC**	**1.64E+01**		**3.58E+01**		**mg/kg**	**SD-12-07-03**	**6/6**	**2.10E+00 - 4.00E+00**	**3.58E+01**	**NA**	**3.90E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	8.83E+01		2.31E+02		mg/kg	SD-12-07-03	6/6	2.10E+01 - 4.00E+01	2.31E+02	NA	1.50E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.70E-01	J	4.10E-01	J	mg/kg	SD-12-07-03	6/6	5.30E-01 - 1.00E+00	4.10E-01	NA	1.60E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.80E-01	J	7.20E-01		mg/kg	SD-12-07-03	6/6	5.30E-01 - 1.00E+00	7.20E-01	NA	7.00E+01	N	NA	NA	No	BSL
7440-47-3	**CHROMIUM**	**1.60E+01**		**2.45E+01**		**mg/kg**	**SD-12-07-01**	**6/6**	**1.10E+00 - 2.00E+00**	**2.45E+01**	**NA**	**2.90E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	6.60E+00	J / J	1.52E+01		mg/kg	SD-12-07-03	6/6	5.30E+00 - 1.00E+01	1.52E+01	NA	2.30E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	1.16E+01		2.89E+01		mg/kg	SD-12-07-01	6/6	2.60E+00 - 5.00E+00	2.89E+01	NA	3.10E+03	N	NA	NA	No	BSL
7439-92-1	LEAD	5.80E+00		2.21E+01		mg/kg	SD-12-07-01	6/6	2.10E+00 - 4.00E+00	2.21E+01	NA	4.00E+02	N	NA	NA	No	BSL
7439-97-6	MERCURY	3.10E-02	J	1.40E-01		mg/kg	SD-12-07-01	6/6	4.60E-02 - 6.80E-02	1.40E-01	NA	7.80E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.40E+00	J	8.20E+00		mg/kg	SD-12-07-01	6/6	4.20E+00 - 8.00E+00	8.20E+00	NA	1.50E+03	N	NA	NA	No	BSL
7782-49-2	SELENIUM	1.90E+00	J	3.50E+00		mg/kg	SD-12-07-03	6/6	2.10E+00 - 4.00E+00	3.50E+00	NA	3.90E+02	N	NA	NA	No	BSL
7440-22-4	SILVER	2.70E-01	J	6.90E-01	J	mg/kg	SD-12-07-03	2/6	1.00E+00 - 2.00E+00	6.90E-01	NA	3.90E+02	N	NA	NA	No	BSL
7440-31-5	TIN	1.20E+00	J	3.50E+00	J	mg/kg	SD-12-07-02	6/6	5.30E+00 - 1.00E+01	3.50E+00	NA	4.70E+04	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**2.99E+01**		**5.62E+01**		**mg/kg**	**SD-12-07-03**	**6/6**	**5.30E+00 - 1.00E+01**	**5.62E+01**	**NA**	**3.90E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	3.48E+01		8.05E+01		mg/kg	SD-12-07-01	6/6	2.10E+00 - 4.00E+00	8.05E+01	NA	2.30E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	2.74E-01		2.74E-01		mg/kg	SD-12-07-04	1/6	5.60E-03 - 1.10E-02	2.74E-01	NA	2.00E+01	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.41E-02		3.41E-02		mg/kg	SD-12-07-04	1/6	2.20E-03 - 9.40E-03	3.41E-02	NA	1.40E+01	C	NA	NA	No	BSL
50-29-3	4,4-DDT	6.80E-03		1.20E-02		mg/kg	SD-12-07-04	2/6	2.20E-03 - 9.40E-03	1.20E-02	NA	1.70E+01	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	5.52E-02		5.52E-02		mg/kg	SD-12-07-05	1/6	5.60E-03 - 9.40E-03	5.52E-02	NA	1.60E+01	C	NA	NA	No	BSL
60-57-1	DIELDRIN	1.16E-02		1.16E-02		mg/kg	SD-12-07-04	1/6	2.20E-03 - 9.40E-03	1.16E-02	NA	3.00E-01	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
120-12-7	ANTHRACENE	8.48E-02	J	8.48E-02	J	mg/kg	SD-12-07-06	1/6	3.00E-03 - 1.60E-01	8.48E-02	NA	1.70E+04	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	2.25E-01		2.25E-01		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	2.25E-01	NA	1.50E+00	C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	1.22E-01		1.22E-01		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	1.22E-01	NA	1.50E-01	C	NA	NA	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	1.74E-01		1.74E-01		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	1.74E-01	NA	1.50E+00	C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	6.28E-02		6.28E-02		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	6.28E-02	NA	1.70E+03	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	5.26E-02		5.26E-02		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	5.26E-02	NA	1.50E+01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.50E-01		1.50E-01		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	1.50E-01	NA	1.50E+02	C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	2.56E-02		2.56E-02		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	2.56E-02	NA	1.50E-01	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	2.53E-02	J	4.14E-01		mg/kg	SD-12-07-06	2/6	3.00E-03 - 1.60E-01	4.14E-01	NA	2.30E+03	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	6.38E-02		6.38E-02		mg/kg	SD-12-07-06	1/6	9.80E-03 - 1.60E-02	6.38E-02	NA	1.50E+00	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	2.66E-02		2.51E-01		mg/kg	SD-12-07-06	2/6	9.80E-03 - 1.60E-02	2.51E-01	NA	1.70E+04	N	NA	NA	No	BSL
129-00-0	PYRENE	2.35E-02	J	3.44E-01		mg/kg	SD-12-07-06	2/6	3.00E-03 - 1.60E-01	3.44E-01	NA	1.70E+03	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	7.07E+01		7.07E+01		mg/kg	SD12-09-6	1/6	1.20E+01 - 1.90E+01	7.07E+01	NA	NA		NA	NA	No	NSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, June 2011. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value. The resulting values have been increased by a factor of ten to account for reduced sediment exposures.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, Pyrene for Benzo[g,h,i]perylene.

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TABLE D.2.5.5
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 12: OLD LANDFILL - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 12

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-DISSOLVED										
7429-90-5	ALUMINUM	9.60E+00		9.60E+00		ug/L	S12-PW-11-1	1/3	2.00E+02 - 2.00E+02	9.60E+00	NA	1.60E+03	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**1.03E+01**		**3.67E+01**		**ug/L**	**S12-PW-11-1**	**4/6**	**3.00E+00 - 8.00E+00**	**3.67E+01**	**NA**	**4.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	**BARIUM**	**1.05E+02**	**J**	**6.59E+02**		**ug/L**	**S12-PW-11-3**	**6/6**	**2.00E+02 - 2.00E+02**	**6.59E+02**	**NA**	**2.90E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-43-9	CADMIUM	3.00E-01		5.50E-01		ug/L	S12-PW-11-3	3/6	3.00E+00 - 4.00E+00	5.50E-01	NA	6.90E-01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	1.23E+05		1.53E+05		ug/L	S12-PW-11-1	3/3	5.00E+03 - 5.00E+03	1.53E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.00E+00**		**1.10E+00**	**J /**	**ug/L**	**G-12-07-MW-03 / S12-PW-11-2**	**4/6**	**1.00E+01 - 1.00E+01**	**1.10E+00**	**NA**	**3.10E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**1.20E+00**		**7.75E+00**		**ug/L**	**S12-PW-11-3**	**2/6**	**5.00E+01 - 5.00E+01**	**7.75E+00**	**NA**	**4.70E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-89-6	**IRON**	**5.09E+03**		**1.61E+04**		**ug/L**	**S12-PW-11-2**	**3/3**	**1.00E+02 - 1.00E+02**	**1.61E+04**	**NA**	**1.10E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-95-4	MAGNESIUM	1.21E+04		1.25E+04		ug/L	S12-PW-11-3	3/3	5.00E+03 - 5.00E+03	1.25E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.74E+03**		**4.54E+03**		**ug/L**	**S12-PW-11-3**	**3/3**	**1.50E+01 - 1.50E+01**	**4.54E+03**	**NA**	**3.20E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	4.00E-02	J	4.60E-02	J	ug/L	G-12-07-MW-02	2/6	2.00E-01 - 2.00E-01	4.60E-02	NA	1.60E-01	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.30E+00		8.10E+00	J	ug/L	G-12-07-MW-02	6/6	1.00E+01 - 4.00E+01	8.10E+00	NA	3.00E+01	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.01E+03		5.48E+03		ug/L	S12-PW-11-3	3/3	1.00E+04 - 1.00E+04	5.48E+03	NA	NA		NA	NA	No	NUT
7440-23-5	SODIUM	3.36E+04		4.28E+04		ug/L	S12-PW-11-1	3/3	1.00E+04 - 1.00E+04	4.28E+04	NA	NA		NA	NA	No	NUT
7440-28-0	**THALLIUM**	**1.00E+00**		**1.90E+00**		**ug/L**	**S12-PW-11-3**	**2/6**	**2.00E+00 - 1.00E+01**	**1.90E+00**	**NA**	**1.60E-02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-62-2	VANADIUM	3.10E+00	J	4.80E+00	J	ug/L	G-12-07-MW-01	2/6	5.00E+01 - 5.00E+01	4.80E+00	NA	7.80E+00	N	NA	NA	No	BSL
7440-66-6	ZINC	6.50E+00	J	1.31E+01	J	ug/L	G-12-07-MW-02	3/6	2.00E+01 - 2.00E+01	1.31E+01	NA	4.70E+02	N	NA	NA	No	BSL
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	4.68E+02		1.40E+03		ug/L	S12-PW-11-2	3/3	2.00E+02 - 2.00E+02	1.40E+03	NA	1.60E+03	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**8.90E+00**		**6.89E+01**		**ug/L**	**G-12-07-MW-02**	**5/6**	**3.00E+00 - 8.00E+00**	**6.89E+01**	**NA**	**4.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	**BARIUM**	**1.13E+02**	**J**	**6.62E+02**		**ug/L**	**S12-PW-11-3**	**6/6**	**2.00E+02 - 2.00E+02**	**6.62E+02**	**NA**	**2.90E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-41-7	BERYLLIUM	1.20E+00		1.20E+00		ug/L	G-12-07-MW-02	1/6	1.00E+00 - 1.00E+00	1.20E+00	NA	1.60E+00	N	NA	NA	No	BSL
7440-43-9	**CADMIUM**	**4.00E-01**		**2.60E+00**	**J**	**ug/L**	**G-12-07-MW-02**	**4/6**	**3.00E+00 - 4.00E+00**	**2.60E+00**	**NA**	**6.90E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-70-2	CALCIUM	1.30E+05		1.44E+05		ug/L	S12-PW-11-1	3/3	5.00E+03 - 5.00E+03	1.44E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.85E+00**		**2.06E+02**		**ug/L**	**G-12-07-MW-02**	**6/6**	**1.00E+01 - 1.00E+01**	**2.06E+02**	**NA**	**4.30E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**1.90E+00**		**2.01E+01**	**J**	**ug/L**	**G-12-07-MW-02**	**6/6**	**5.00E+01 - 5.00E+01**	**2.01E+01**	**NA**	**4.70E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	**COPPER**	**2.10E+00**		**8.39E+01**		**ug/L**	**G-12-07-MW-02**	**5/6**	**1.00E+01 - 2.50E+01**	**8.39E+01**	**NA**	**6.20E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-89-6	**IRON**	**6.47E+03**		**2.05E+04**		**ug/L**	**S12-PW-11-2**	**3/3**	**1.00E+02 - 1.00E+02**	**2.05E+04**	**NA**	**1.10E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	3.20E+00		1.49E+01		ug/L	G-12-07-MW-02	3/6	3.00E+00 - 3.00E+00	1.49E+01	NA	1.50E+01		NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.15E+04		1.27E+04		ug/L	S12-PW-11-2	3/3	5.00E+03 - 5.00E+03	1.27E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**2.08E+03**		**4.55E+03**		**ug/L**	**S12-PW-11-3**	**3/3**	**1.50E+01 - 1.50E+01**	**4.55E+03**	**NA**	**3.10E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	6.30E-02	J	7.10E-02	J	ug/L	G-12-07-MW-01	2/6	2.00E-01 - 2.00E-01	7.10E-02	NA	1.60E-01	N	NA	NA	No	BSL
7440-02-0	**NICKEL**	**4.20E+00**		**9.07E+01**		**ug/L**	**G-12-07-MW-02**	**6/6**	**1.00E+01 - 4.00E+01**	**9.07E+01**	**NA**	**3.00E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-09-7	POTASSIUM	1.11E+03		5.50E+03		ug/L	S12-PW-11-3	3/3	1.00E+04 - 1.00E+04	5.50E+03	NA	NA		NA	NA	No	NUT
7440-22-4	SILVER	1.60E+00	J	1.60E+00	J	ug/L	G-12-07-MW-02	1/6	1.00E+01 - 1.00E+01	1.60E+00	NA	7.10E+00	N	NA	NA	No	BSL
7440-23-5	SODIUM	3.40E+04		4.19E+04		ug/L	S12-PW-11-1	3/3	1.00E+04 - 1.00E+04	4.19E+04	NA	NA		NA	NA	No	NUT
7440-28-0	**THALLIUM**	**1.40E+00**		**2.10E+00**		**ug/L**	**S12-PW-11-3**	**2/6**	**6.00E+00 - 1.00E+01**	**2.10E+00**	**NA**	**1.60E-02**	**N**	**NA**	**NA**	**Yes**	**No**
7440-62-2	**VANADIUM**	**1.45E+00**		**1.24E+02**		**ug/L**	**G-12-07-MW-02**	**6/6**	**5.00E+01 - 5.00E+01**	**1.24E+02**	**NA**	**7.80E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	**ZINC**	**2.40E+00**		**6.51E+02**		**ug/L**	**G-12-07-MW-02**	**6/6**	**2.00E+01 - 2.00E+01**	**6.51E+02**	**NA**	**4.70E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
							SEMI-VOLATILE ORGANIC COMPOUNDS										
117-81-7	**BIS(2-ETHYLHEXYL) PHTHALATE**	**1.30E+00**	**J**	**7.50E+00**		**ug/L**	**S12-PW-11-3**	**2/6**	**2.00E+00 - 2.30E+00**	**7.50E+00**	**NA**	**7.10E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
							VOLATILE ORGANIC COMPOUNDS										
75-15-0	CARBON DISULFIDE	4.60E-01	J	4.60E-01	J	ug/L	G-12-07-MW-02	1/6	2.00E+00 - 2.00E+00	4.60E-01	NA	7.20E+01	N	NA	NA	No	BSL
67-66-3	**CHLOROFORM**	**4.60E-01**	**J**	**5.30E+00**		**ug/L**	**G-12-07-MW-01**	**2/6**	**1.00E+00 - 1.00E+00**	**5.30E+00**	**NA**	**1.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE D.2.5.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 12: OLD LANDFILL - SURFACE WATER

Scenario Timeframe: Current/Future
Medium: Surface water
Exposure Medium: Surface water
Exposure Point: Site 12

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
INORGANICS-TOTAL																	
7440-38-2	**ARSENIC**	**1.04E+01**		**8.90E+01**		**ug/L**	**SW-12-07-01**	**3/6**	**8.00E+00 - 8.00E+00**	**8.90E+01**	**NA**	**4.50E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	1.10E+02	J	5.89E+02		ug/L	SW-12-07-01	6/6	2.00E+02 - 2.00E+02	5.89E+02	NA	2.90E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	4.80E-01	J	4.80E-01	J	ug/L	SW-12-07-02	1/6	1.00E+00 - 1.00E+00	4.80E-01	NA	1.60E+01	N	NA	NA	No	BSL
7440-47-3	**CHROMIUM**	**1.40E+00**	**J**	**8.30E+00**	**J**	**ug/L**	**SW-12-07-02**	**5/6**	**1.00E+01 - 1.00E+01**	**8.30E+00**	**NA**	**3.10E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**2.20E+00**	**J**	**9.50E+00**	**J / J**	**ug/L**	**SW-12-07-02 / SW-12-07-01**	**4/6**	**5.00E+01 - 5.00E+01**	**9.50E+00**	**NA**	**4.70E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	3.60E+00	J	4.64E+01		ug/L	SW-12-07-02	5/6	2.50E+01 - 2.50E+01	4.64E+01	NA	6.20E+02	N	NA	NA	No	BSL
7439-92-1	LEAD	3.40E+00		6.90E+00		ug/L	SW-12-07-02	3/6	3.00E+00 - 3.00E+00	6.90E+00	NA	1.50E+01		NA	NA	No	BSL
7439-97-6	MERCURY	3.80E-02	J	1.20E-01	J	ug/L	SW-12-07-02	6/6	2.00E-01 - 2.00E-01	1.20E-01	NA	1.60E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.00E+00	J	5.30E+00	J	ug/L	SW-12-07-02	3/6	4.00E+01 - 4.00E+01	5.30E+00	NA	3.00E+02	N	NA	NA	No	BSL
7782-49-2	SELENIUM	6.30E+00	J	7.90E+00	J	ug/L	SW-12-07-04	2/6	1.00E+01 - 1.00E+01	7.90E+00	NA	7.80E+01	N	NA	NA	No	BSL
7440-62-2	VANADIUM	3.20E+00	J	2.32E+01	J	ug/L	SW-12-07-02	6/6	5.00E+01 - 5.00E+01	2.32E+01	NA	7.80E+01	N	NA	NA	Yes	ASL
7440-66-6	ZINC	5.50E+00	J	4.06E+01		ug/L	SW-12-07-02	6/6	2.00E+01 - 2.00E+01	4.06E+01	NA	4.70E+03	N	NA	NA	No	BSL
PESTICIDES/PCBS																	
72-55-9	4,4-DDE	2.70E-02		2.70E-02		ug/L	SW-12-07-01	1/6	2.00E-02 - 2.20E-02	2.70E-02	NA	2.00E+00	C	NA	NA	No	BSL
SEMI-VOLATILE ORGANIC COMPOUNDS																	
117-81-7	**BIS(2-ETHYLHEXYL) PHTHALATE**	**1.70E+00**	**J**	**1.70E+00**	**J**	**ug/L**	**SW-12-07-01**	**1/6**	**2.00E+00 - 2.20E+00**	**1.70E+00**	**NA**	**7.10E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, November 2011. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value. The resulting values have been increased by a factor of ten to account for reduced surface water exposures.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE D.2.6.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN HUMAN HEALTH RISK ASSESSMENT
NORTHWEST BOUNDARY AREA - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Fort Buchanan Northwest Boundary

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential (5) ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (6) Contaminant Deletion or Selection
							INORGANICS-DISSOLVED										
7429-90-5	ALUMINUM	1.23E+02	J	5.61E+02		ug/L	G-03-09-OP-6	2/14	2.00E+02 - 2.00E+02	5.61E+02	NA	3.70E+03	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	1.80E+00	J	6.10E+00		ug/L	G-03-08-MW-17A	2/48	6.00E+00 - 6.00E+00	6.10E+00	NA	1.50E+00	N	6.0E+00	MCL	No	LOW
7440-38-2	**ARSENIC**	**1.70E+00**	**J**	**3.08E+01**		**ug/L**	**G-03-09-OP-6**	**11/48**	**3.00E+00 - 8.00E+00**	**3.08E+01**	**NA**	**4.50E-02**	**C**	**1.0E+01**	**MCL**	**Yes**	**ASL**
7440-39-3	**BARIUM**	**8.90E+00**	**J**	**1.14E+03**		**ug/L**	**G-03-09-OP-6**	**38/48**	**2.00E+02 - 2.00E+02**	**1.14E+03**	**NA**	**7.30E+02**	**N**	**2.0E+03**	**MCL**	**Yes**	**ASL**
7440-41-7	BERYLLIUM	2.00E-01	J	3.00E-01	J	ug/L	G-03-09-OP-04 / G-03-09-	6/48	1.00E+00 - 1.00E+00	3.00E-01	NA	7.30E+00	N	4.0E+00	MCL	No	BSL
7440-43-9	CADMIUM	3.50E-01	J	6.00E-01	J	ug/L	G-03-09-OP-6	4/48	3.00E+00 - 4.00E+00	6.00E-01	NA	1.80E+00	N	5.0E+00	MCL	No	BSL
7440-70-2	CALCIUM	6.63E+04		4.92E+05		ug/L	G-03-09-OP-6	14/14	5.00E+03 - 1.00E+04	4.92E+05	NA	NUT		NA	NA	No	NUT
7440-47-3	CHROMIUM	6.00E-01	J	7.54E+01		ug/L	G-03-09-OP-03	17/48	1.00E+01 - 1.00E+01	7.54E+01	NA	4.30E-02	C	1.0E+02	MCL	No	BSL
7440-48-4	**COBALT**	**9.00E-01**	**J**	**3.70E+00**	**J**	**ug/L**	**G-03-08-MW-16A / G-03-**	**16/48**	**5.00E+01 - 5.00E+01**	**3.70E+00**	**NA**	**1.10E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	3.10E+00	J	3.10E+00	J	ug/L	G-03-08-MW-16A	1/48	1.00E+01 - 2.50E+01	3.10E+00	NA	1.50E+02	N	1.3E+03	MCL	No	BSL
7439-89-6	**IRON**	**1.48E+01**	**J**	**2.13E+04**		**ug/L**	**G-03-09-OP-6**	**8/14**	**1.00E+02 - 1.00E+02**	**2.13E+04**	**NA**	**2.60E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	1.40E+00	J	3.50E+00		ug/L	G-03-08-MW-17A	7/48	3.00E+00 - 3.00E+00	3.50E+00	NA	1.50E+01		1.5E+01	MCL	No	BSL
7439-95-4	MAGNESIUM	1.27E+04		9.30E+04		ug/L	G-03-09-OP-6	14/14	5.00E+03 - 5.00E+03	9.30E+04	NA	NUT		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**5.20E+01**		**2.72E+03**		**ug/L**	**G-03-09-MW-26**	**14/14**	**1.50E+01 - 1.50E+01**	**2.72E+03**	**NA**	**8.80E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	**MERCURY**	**4.20E-02**	**J**	**3.80E-01**		**ug/L**	**G-03-07-MW-10B**	**11/48**	**2.00E-01 - 2.00E-01**	**3.80E-01**	**NA**	**6.30E-02**	**N**	**2.0E+00**	**MCL**	**Yes**	**ASL**
7440-02-0	NICKEL	1.00E+00	J	7.40E+00	J	ug/L	G-03-07-MW-11A	13/48	1.00E+01 - 4.00E+01	7.40E+00	NA	7.30E+01	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.99E+03	J	7.99E+03	J	ug/L	G-03-08-MW-24	14/14	1.00E+04 - 1.00E+04	7.99E+03	NA	NUT		NA	NA	No	NUT
7782-49-2	SELENIUM	1.70E+00	J	6.80E+00	J	ug/L	G-03-07-MW-12A	4/48	1.00E+01 - 1.00E+01	6.80E+00	NA	1.80E+01	N	5.0E+01	MCL	No	BSL
7440-22-4	SILVER	1.40E+00	J	4.10E+00	J	ug/L	G-03-08-MW-16A	6/48	1.00E+01 - 1.00E+01	4.10E+00	NA	1.80E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	3.08E+04		3.99E+05		ug/L	G-03-09-OP-6	14/14	1.00E+04 - 1.00E+04	3.99E+05	NA	NUT		NA	NA	No	NUT
7440-62-2	VANADIUM	8.00E-01	J	3.20E+00	J	ug/L	G-03-07-MW-10B	18/48	5.00E+01 - 5.00E+01	3.20E+00	NA	1.80E+01	N	NA	NA	No	BSL
7440-66-6	ZINC	3.00E+00	J	1.97E+02		ug/L	G-03-09-OP-7	18/48	2.00E+01 - 2.00E+01	1.97E+02	NA	1.10E+03	N	NA	NA	No	BSL
							INORGANICS-TOTAL										
7429-90-5	**ALUMINUM**	**2.51E+01**	**J**	**1.51E+04**		**ug/L**	**G-03-09-OP-05**	**17/21**	**2.00E+02 - 2.00E+02**	**1.51E+04**	**NA**	**3.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	1.90E+00	J	2.98E+01		ug/L	G-03-08-MW-14A	2/48	6.00E+00 - 1.20E+01	2.98E+01	NA	1.50E+00	N	6.0E+00	MCL	No	LOW
7440-38-2	**ARSENIC**	**1.70E+00**	**J**	**2.74E+02**		**ug/L**	**G-03-07-MW-08A**	**13/48**	**3.00E+00 - 1.60E+01**	**2.74E+02**	**NA**	**4.50E-02**	**C**	**1.0E+01**	**MCL**	**Yes**	**ASL**
7440-39-3	**BARIUM**	**9.40E+00**	**J**	**1.92E+03**		**ug/L**	**G-03-09-OP-6**	**38/48**	**2.00E+02 - 4.00E+02**	**1.92E+03**	**NA**	**7.30E+02**	**N**	**2.0E+03**	**MCL**	**Yes**	**ASL**
7440-41-7	BERYLLIUM	3.00E-01	J	5.90E+00		ug/L	G-03-07-MW-08A	8/48	1.00E+00 - 2.00E+00	5.90E+00	NA	7.30E+00	N	4.0E+00	MCL	No	BSL
7440-43-9	**CADMIUM**	**5.00E-01**	**J**	**2.23E+01**		**ug/L**	**G-03-07-MW-08A**	**7/48**	**3.00E+00 - 8.00E+00**	**2.23E+01**	**NA**	**1.80E+00**	**N**	**5.0E+00**	**MCL**	**Yes**	**ASL**
7440-70-2	CALCIUM	6.67E+04		4.84E+05		ug/L	G-03-09-OP-6	22/22	5.00E+03 - 1.00E+04	4.84E+05	NA	NUT		NA	NA	No	NUT
7440-47-3	CHROMIUM	8.00E-01	J	4.90E+02		ug/L	G-03-07-MW-08A	22/48	1.00E+01 - 2.00E+01	4.90E+02	NA	4.30E-02	C	1.0E+02	MCL	No	BSL
7440-48-4	**COBALT**	**6.00E-01**	**J**	**1.77E+01**	**J**	**ug/L**	**G-03-09-OP-05**	**21/48**	**5.00E+01 - 1.00E+02**	**1.77E+01**	**NA**	**1.10E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	**COPPER**	**1.50E+00**	**J**	**5.04E+02**		**ug/L**	**G-03-07-MW-08A**	**13/48**	**1.00E+01 - 5.00E+01**	**5.04E+02**	**NA**	**1.50E+02**	**N**	**1.3E+03**	**MCL**	**Yes**	**ASL**
7439-89-6	**IRON**	**4.70E+01**	**J**	**3.33E+04**		**ug/L**	**G-03-09-OP-05**	**20/21**	**1.00E+02 - 1.00E+02**	**3.33E+04**	**NA**	**2.60E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-92-1	LEAD	2.00E+00	J	3.49E+02		ug/L	G-03-07-MW-08A	7/48	3.00E+00 - 6.00E+00	3.49E+02	NA	1.50E+01		1.5E+01	MCL	No	BSL
7439-95-4	MAGNESIUM	5.89E+03		9.34E+04		ug/L	G-03-09-OP-6	22/22	5.00E+03 - 5.00E+03	9.34E+04	NA	NUT		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.92E+01**		**2.83E+03**		**ug/L**	**G-03-09-MW-26**	**22/22**	**1.50E+01 - 1.50E+01**	**2.83E+03**	**NA**	**8.80E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	**MERCURY**	**5.10E-02**	**J**	**3.70E+00**		**ug/L**	**G-03-09-OP-03**	**18/48**	**2.00E-01 - 8.00E-01**	**3.70E+00**	**NA**	**6.30E-02**	**N**	**2.0E+00**	**MCL**	**Yes**	**ASL**
7440-02-0	**NICKEL**	**8.00E-01**	**J**	**9.40E+01**		**ug/L**	**G-03-07-MW-08A**	**18/48**	**1.00E+01 - 8.00E+01**	**9.40E+01**	**NA**	**7.30E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-09-7	POTASSIUM	1.99E+03	J	7.83E+03	J	ug/L	G-03-08-MW-24	14/22	5.00E+03 - 1.00E+04	7.83E+03	NA	NUT		NA	NA	No	NUT
7782-49-2	SELENIUM	1.70E+00	J	4.10E+00	J	ug/L	G-03-08-MW-20	3/48	1.00E+01 - 2.00E+01	4.10E+00	NA	1.80E+01	N	5.0E+01	MCL	No	BSL
7440-22-4	SILVER	1.40E+00	J	6.90E+00	J	ug/L	G-03-08-MW-14A	3/48	1.00E+01 - 2.00E+01	6.90E+00	NA	1.80E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	1.59E+04		3.97E+05		ug/L	G-03-09-OP-6	22/22	1.00E+04 - 1.00E+04	3.97E+05	NA	NUT		NA	NA	No	NUT
7440-28-0	THALLIUM	1.70E+00	J	1.80E+00	J	ug/L	G-03-09-OP-6	2/48	2.00E+00 - 2.00E+01	1.80E+00	NA	3.70E-02	N	2.0E+00	MCL	No	LOW
7440-31-5	TIN	9.50E+00	J	9.50E+00	J	ug/L	G-03-08-MW-14A	1/35	1.00E+01 - 2.00E+01	9.50E+00	NA	2.20E+03	N	NA	NA	No	BSL
7440-62-2	VANADIUM	7.00E-01	J	1.20E+03		ug/L	G-03-07-MW-08A	22/48	5.00E+01 - 1.00E+02	1.20E+03	NA	1.80E+01	N	NA	NA	No	BSL
7440-66-6	ZINC	3.20E+00	J	4.52E+02		ug/L	G-03-07-MW-08A	23/48	2.00E+01 - 4.00E+01	4.52E+02	NA	1.10E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
76-44-8	HEPTACHLOR	9.60E-01	J	9.60E-01	J	ug/L	G-03-09-OP-03	1/48	2.00E-02 - 2.20E-02	9.60E-01	NA	1.50E-02	C	4.0E-01	MCL	No	LOW
							POLYCYCLIC AROMATIC HYDROCARBONS										
91-20-3	**NAPHTHALENE**	**7.96E-01**		**1.51E+00**		**ug/L**	**G-03-07-MW-04B**	**3/48**	**2.00E-01 - 2.70E-01**	**1.51E+00**	**NA**	**1.40E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**

TABLE D.2.6.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN HUMAN HEALTH RISK ASSESSMENT
NORTHWEST BOUNDARY AREA - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Fort Buchanan Northwest Boundary

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential (5) ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (6) Contaminant Deletion or Selection
SEMI-VOLATILE ORGANIC COMPOUNDS																	
95-50-1	1,2-DICHLOROBENZENE	8.10E-01	J	4.80E+00		ug/L	G-03-07-MW-06A	4/42	2.00E+00 - 2.10E+00	4.80E+00	NA	3.70E+01	N	6.0E+02	MCL	No	BSL
106-46-7	1,4-DICHLOROBENZENE	1.50E+00	J	1.50E+00	J	ug/L	G-03-07-MW-05B	1/42	2.00E+00 - 2.10E+00	1.50E+00	NA	4.30E-01	C	7.5E+01	MCL	Yes	LOW
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	2.40E+00		3.50E+00		ug/L	G-03-07-MW-07A	4/48	2.00E+00 - 2.70E+00	3.50E+00	NA	4.80E+00	C	6.0E+00	MCL	No	BSL
117-84-0	DI-N-OCTYL PHTHALATE	4.00E+00		4.00E+00		ug/L	G-03-09-OP-05	1/48	2.00E+00 - 2.70E+00	4.00E+00	NA	NA		NA	NA	No	NSL
VOLATILE ORGANIC COMPOUNDS																	
79-00-5	**1,1,2-TRICHLOROETHANE**	**2.90E-01**	**J**	**2.57E+01**		**ug/L**	**G-03-09-MW-25**	**23/153**	**1.00E+00 - 2.00E+01**	**2.57E+01**	**NA**	**4.20E-02**	**N**	**5.0E+00**	**MCL**	**Yes**	**ASL**
75-35-4	1,1-DICHLOROETHENE	3.30E-01	J	7.80E+00	J	ug/L	G-03-10-MW-25	16/153	1.00E+00 - 2.00E+01	7.80E+00	NA	3.40E+01	N	7.0E+00	MCL	No	BSL
107-06-2	**1,2-DICHLOROETHANE**	**3.10E-01**	**J**	**5.75E-01**	**J / J**	**ug/L**	**G-03-07-MW-12A**	**10/153**	**1.00E+00 - 2.00E+01**	**5.75E-01**	**NA**	**1.50E-01**	**C**	**5.0E+00**	**MCL**	**Yes**	**ASL**
67-64-1	ACETONE	7.60E+00	J	7.60E+00	J	ug/L	G-03-08-MW-18B	1/140	1.00E+01 - 2.00E+02	7.60E+00	NA	2.20E+03	N	NA	NA	No	BSL
71-43-2	BENZENE	4.90E-01	J	9.30E-01	J	ug/L	G-03-07-MW-04A	3/153	1.00E+00 - 2.00E+01	9.30E-01	NA	4.10E-01	C	5.0E+00	MCL	No	LOW
75-27-4	BROMODICHLOROMETHANE	5.00E-01	J	5.00E-01	J	ug/L	G-03-09-OP-05	1/153	1.00E+00 - 2.00E+01	5.00E-01	NA	1.20E-01	C	8.00E+01	MCL	No	LOW
75-15-0	CARBON DISULFIDE	8.90E-01	J	2.50E+00		ug/L	G-03-08-MW-18B	3/153	2.00E+00 - 4.00E+01	2.50E+00	NA	1.00E+02	N	NA	NA	No	BSL
67-66-3	**CHLOROFORM**	**2.00E-01**	**J**	**7.40E+00**		**ug/L**	**G-03-09-OP-05**	**35/153**	**1.00E+00 - 2.00E+01**	**7.40E+00**	**NA**	**1.90E-01**	**C**	**8.00E+01**	**MCL**	**Yes**	**ASL**
74-87-3	CHLOROMETHANE	5.00E-01	J	1.80E+00		ug/L	G-03-08-MW-08B	3/152	1.00E+00 - 2.00E+01	1.80E+00	NA	1.90E+01	N	NA	NA	No	BSL
156-59-2	**CIS-1,2-DICHLOROETHENE**	**3.10E-01**	**J**	**2.75E+02**		**ug/L**	**G-03-09-MW-25**	**56/91**	**1.00E+00 - 2.00E+01**	**2.75E+02**	**NA**	**7.30E+00**	**N**	**7.0E+01**	**MCL**	**Yes**	**ASL**
100-41-4	ETHYLBENZENE	4.00E-01	J	3.90E+00		ug/L	G-03-07-MW-04B	3/153	1.00E+00 - 2.00E+01	3.90E+00	NA	1.50E+00	C	7.0E+02	MCL	No	LOW
75-09-2	METHYLENE CHLORIDE	1.19E+01	J	1.19E+01	J	ug/L	G-03-09-MW-25	1/153	2.00E+00 - 4.00E+01	1.19E+01	NA	4.80E+00	C	5.0E+00	MCL	No	LOW
127-18-4	**TETRACHLOROETHENE**	**3.10E-01**	**J**	**3.41E+01**		**ug/L**	**G-03-08-MW-15A**	**45/153**	**1.00E+00 - 2.00E+01**	**3.41E+01**	**NA**	**1.10E-01**	**C**	**5.0E+00**	**MCL**	**Yes**	**ASL**
156-60-5	**TRANS-1,2-DICHLOROETHENE**	**2.95E-01**	**J / J**	**3.54E+01**		**ug/L**	**G-03-09-MW-07B**	**49/153**	**1.00E+00 - 2.00E+01**	**3.54E+01**	**NA**	**1.10E+01**	**N**	**1.0E+02**	**MCL**	**Yes**	**ASL**
79-01-6	**TRICHLOROETHENE**	**2.50E-01**	**J**	**4.04E+03**		**ug/L**	**G-03-09-MW-25**	**94/153**	**1.00E+00 - 5.00E+01**	**4.04E+03**	**NA**	**2.00E+00**	**C**	**5.0E+00**	**MCL**	**Yes**	**ASL**
75-01-4	**VINYL CHLORIDE**	**4.50E-01**	**J**	**2.56E+01**		**ug/L**	**G-03-09-MW-07B**	**18/153**	**1.00E+00 - 2.00E+01**	**2.56E+01**	**NA**	**1.60E-02**	**C**	**2.0E+00**	**MCL**	**Yes**	**ASL**
1330-20-7	XYLENES, TOTAL	5.80E-01	J	5.80E-01	J	ug/L	G-03-07-MW-04B	1/153	1.00E+00 - 2.00E+01	5.80E-01	NA	2.00E+01	N	1.0E+04	MCL	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.

(4) USEPA Regional Screening Levels, USEPA, June 2011. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value.
(5) ARAR value is the Maximum Contaminant Level (MCL) from USEPA, 2009, *National Primary Drinking Water Regulations* , EPA 816-F-09-004, May.
(6) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient
LOW = Low Frequency of Detection

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter
Data Qualifiers: J = Value is estimated.

TABLE D.2.6.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN HUMAN HEALTH RISK ASSESSMENT
NORTHWEST BOUNDARY AREA - GROUNDWATER TO INDOOR AIR

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Fort Buchanan Northwest Boundary

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential (5) ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (6) Contaminant Deletion or Selection
							PESTICIDES/PCBS										
76-44-8	HEPTACHLOR	9.60E-01	J	9.60E-01	J	ug/L	G-03-09-OP-03	1/48	2.00E-02 - 2.20E-02	9.60E-01	NA	4.00E-01	C	4.0E-01	MCL	No	LOW
							POLYCYCLIC AROMATIC HYDROCARBONS										
91-20-3	NAPHTHALENE	7.96E-01		1.51E+00		ug/L	G-03-07-MW-04B	3/48	2.00E-01 - 2.70E-01	1.51E+00	NA	1.50E+02	N	NA	NA	No	BSL
							SEMI-VOLATILE ORGANIC COMPOUNDS										
95-50-1	1,2-DICHLOROBENZENE	8.10E-01	J	4.80E+00		ug/L	G-03-07-MW-06A	4/42	2.00E+00 - 2.10E+00	4.80E+00	NA	2.60E+03	N	6.0E+02	MCL	No	BSL
106-46-7	1,4-DICHLOROBENZENE	1.50E+00	J	1.50E+00	J	ug/L	G-03-07-MW-05B	1/42	2.00E+00 - 2.10E+00	1.50E+00	NA	8.20E+03	N	7.5E+01	MCL	No	LOW
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	2.40E+00		3.50E+00		ug/L	G-03-07-MW-07A	4/48	2.00E+00 - 2.70E+00	3.50E+00	NA	NA		6.0E+00	MCL	No	NSL
117-84-0	DI-N-OCTYL PHTHALATE	4.00E+00		4.00E+00		ug/L	G-03-09-OP-05	1/48	2.00E+00 - 2.70E+00	4.00E+00	NA	NA		NA	NA	No	LOW
							VOLATILE ORGANIC COMPOUNDS										
79-00-5	**1,1,2-TRICHLOROETHANE**	**2.90E-01**	**J**	**2.57E+01**		**ug/L**	**G-03-09-MW-25**	**23/153**	**1.00E+00 - 2.00E+01**	**2.57E+01**	**NA**	**5.00E+00**		**5.0E+00**	**MCL**	**Yes**	**ASL**
75-35-4	1,1-DICHLOROETHENE	3.30E-01	J	7.80E+00	J	ug/L	G-03-10-MW-25	16/153	1.00E+00 - 2.00E+01	7.80E+00	NA	2.20E+03	N	7.0E+00	MCL	No	BSL
107-06-2	1,2-DICHLOROETHANE	3.10E-01	J	5.75E-01	J / J	ug/L	G-03-07-MW-12A	10/153	1.00E+00 - 2.00E+01	5.75E-01	NA	5.00E+00	C	5.0E+00	MCL	No	BSL
67-64-1	ACETONE	7.60E+00	J	7.60E+00	J	ug/L	G-03-08-MW-18B	1/140	1.00E+01 - 2.00E+02	7.60E+00	NA	2.20E+05	N	NA	NA	No	BSL
71-43-2	BENZENE	4.90E-01	J	9.30E-01	J	ug/L	G-03-07-MW-04A	3/153	1.00E+00 - 2.00E+01	9.30E-01	NA	5.00E+00	C	5.0E+00	MCL	No	LOW
75-27-4	BROMODICHLOROMETHANE	5.00E-01	J	5.00E-01	J	ug/L	G-03-09-OP-05	1/153	1.00E+00 - 2.00E+01	5.00E-01	NA	2.10E+00	C	NA	NA	No	LOW
75-15-0	CARBON DISULFIDE	8.90E-01	J	2.50E+00		ug/L	G-03-08-MW-18B	3/153	2.00E+00 - 4.00E+01	2.50E+00	NA	5.60E+02	N	NA	NA	No	LOW
67-66-3	CHLOROFORM	2.00E-01	J	7.40E+00		ug/L	G-03-09-OP-05	35/153	1.00E+00 - 2.00E+01	7.40E+00	NA	8.00E+01	C	NA	NA	No	BSL
74-87-3	CHLOROMETHANE	5.00E-01	J	1.80E+00		ug/L	G-03-08-MW-08B	3/152	1.00E+00 - 2.00E+01	1.80E+00	NA	6.70E+00	C	NA	NA	No	LOW
156-59-2	**CIS-1,2-DICHLOROETHENE**	**3.10E-01**	**J**	**2.75E+02**		**ug/L**	**G-03-09-MW-25**	**56/91**	**1.00E+00 - 2.00E+01**	**2.75E+02**	**NA**	**2.10E+02**	**C**	**7.0E+01**	**MCL**	**Yes**	**ASL**
100-41-4	ETHYLBENZENE	4.00E-01	J	3.90E+00		ug/L	G-03-07-MW-04B	3/153	1.00E+00 - 2.00E+01	3.90E+00	NA	7.00E+02	C	7.0E+02	MCL	No	LOW
75-09-2	METHYLENE CHLORIDE	1.19E+01	J	1.19E+01	J	ug/L	G-03-09-MW-25	1/153	2.00E+00 - 4.00E+01	1.19E+01	NA	6.70E+00	C	5.0E+00	MCL	No	LOW
127-18-4	**TETRACHLOROETHENE**	**3.10E-01**	**J**	**3.41E+01**		**ug/L**	**G-03-08-MW-15A**	**45/153**	**1.00E+00 - 2.00E+01**	**3.41E+01**	**NA**	**5.00E+00**	**C**	**5.0E+00**	**MCL**	**Yes**	**ASL**
156-60-5	TRANS-1,2-DICHLOROETHENE	2.95E-01	J / J	3.54E+01		ug/L	G-03-09-MW-07B	49/153	1.00E+00 - 2.00E+01	3.54E+01	NA	1.80E+02	N	1.0E+02	MCL	No	BSL
79-01-6	**TRICHLOROETHENE**	**2.50E-01**	**J**	**4.04E+03**		**ug/L**	**G-03-09-MW-25**	**94/153**	**1.00E+00 - 5.00E+01**	**4.04E+03**	**NA**	**5.00E+00**	**C**	**5.0E+00**	**MCL**	**Yes**	**ASL**
75-01-4	**VINYL CHLORIDE**	**4.50E-01**	**J**	**2.56E+01**		**ug/L**	**G-03-09-MW-07B**	**18/153**	**1.00E+00 - 2.00E+01**	**2.56E+01**	**NA**	**2.00E+00**	**C**	**2.0E+00**	**MCL**	**Yes**	**ASL**
1330-20-7	XYLENES, TOTAL	5.80E-01	J	5.80E-01	J	ug/L	G-03-07-MW-04B	1/153	1.00E+00 - 2.00E+01	5.80E-01	NA	2.20E+04	N	1.0E+04	MCL	No	LOW

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Generic Screening Levels for Risk = 1x10E-6. USEPA, 2002, *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).* EPA 530-D-02-004. November.
(5) ARAR value is the Maximum Contaminant Level (MCL) from USEPA 2009.
(6) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient
LOW = Low Frequency of Detection

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE D.2.7.1
COMPARISON OF NON-DETECT CONCENTRATIONS TO SCREENING LEVELS
FORT BUCHANAN

CAS No.	Analyte	Maximum Non-Detect Concentration (mg/kg)	Residential Soil RSL (mg/kg)	Non-Detect Exceeds RSL?
	Surface Soil			
96-18-4	1,2,3-TRICHLOROPROPANE	0.0083	0.005	yes
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.017	0.0054	yes
53-96-3	2-ACETYLAMINOFLUORENE	0.25	0.13	yes
119-93-7	3,3'-DIMETHYLBENZIDINE	0.25	0.044	yes
56-49-5	3-METHYLCHOLANTHRENE	0.0099	0.0052	yes
92-67-1	4-AMINOBIPHENYL	0.25	0.023	yes
57-97-6	7,12-DIMETHYLBENZ(A)ANTHRACENE	0.0099	0.00043	yes
50-32-8	BENZO(A)PYRENE	0.041	0.015	yes
143-50-0	KEPONE	0.25	0.049	yes
55-18-5	N-NITROSODIETHYLAMINE	0.25	0.00077	yes
62-75-9	N-NITROSODIMETHYLAMINE	0.099	0.0023	yes
924-16-3	N-NITROSODI-N-BUTYLAMINE	0.25	0.087	yes
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.099	0.069	yes
10595-95-6	N-NITROSOMETHYLETHYLAMINE	0.25	0.022	yes
59-89-2	N-NITROSOMORPHOLINE	0.25	0.073	yes
100-75-4	N-NITROSOPIPERIDINE	0.25	0.052	yes
930-55-2	N-NITROSOPYRROLIDINE	0.25	0.23	yes
60-11-7	P-(DIMETHYLAMINE)AZOBENZENE	0.25	0.11	yes
110-57-6	TRANS-1,4-DICHLORO-2-BUTENE	0.0083	0.0069	yes
	Subsurface Soil			
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.81	0.56	yes
96-18-4	1,2,3-TRICHLOROPROPANE	0.81	0.005	yes
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.6	0.0054	yes
106-93-4	1,2-DIBROMOETHANE	0.16	0.034	yes
123-91-1	1,4-DIOXANE	20	4.9	yes
53-96-3	2-ACETYLAMINOFLUORENE	0.27	0.13	yes
119-93-7	3,3'-DIMETHYLBENZIDINE	0.27	0.044	yes
56-49-5	3-METHYLCHOLANTHRENE	0.011	0.0052	yes
92-67-1	4-AMINOBIPHENYL	0.27	0.023	yes
57-97-6	7,12-DIMETHYLBENZ(A)ANTHRACENE	0.011	0.00043	yes
107-02-8	ACROLEIN	8.1	0.15	yes
107-13-1	ACRYLONITRILE	8.1	0.24	yes
107-05-1	ALLYL CHLORIDE	0.81	0.68	yes
75-27-4	BROMODICHLOROMETHANE	0.81	0.27	yes
56-23-5	CARBON TETRACHLORIDE	0.81	0.61	yes
67-66-3	CHLOROFORM	0.81	0.29	yes
126-99-8	CHLOROPRENE	0.81	0.0094	yes
124-48-1	DIBROMOCHLOROMETHANE	0.81	0.68	yes
143-50-0	KEPONE	0.27	0.049	yes
55-18-5	N-NITROSODIETHYLAMINE	0.27	0.00077	yes
62-75-9	N-NITROSODIMETHYLAMINE	0.11	0.0023	yes
924-16-3	N-NITROSODI-N-BUTYLAMINE	0.27	0.087	yes
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.11	0.069	yes
10595-95-6	N-NITROSOMETHYLETHYLAMINE	0.27	0.022	yes
59-89-2	N-NITROSOMORPHOLINE	0.27	0.073	yes
100-75-4	N-NITROSOPIPERIDINE	0.27	0.052	yes
930-55-2	N-NITROSOPYRROLIDINE	0.27	0.23	yes
60-11-7	P-(DIMETHYLAMINE)AZOBENZENE	0.27	0.11	yes

TABLE D.2.7.1
COMPARISON OF NON-DETECT CONCENTRATIONS TO SCREENING LEVELS
FORT BUCHANAN

CAS No.	Analyte	Maximum Non-Detect Concentration (mg/kg)	Residential Soil RSL (mg/kg)	Non-Detect Exceeds RSL?
Subsurface Soil				
127-18-4	TETRACHLOROETHENE	0.81	0.55	yes
110-57-6	TRANS-1,4-DICHLORO-2-BUTENE	0.81	0.0069	yes
75-01-4	VINYL CHLORIDE	0.81	0.06	yes
Sediment				
96-18-4	1,2,3-TRICHLOROPROPANE	1.7	0.05	yes
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	3.3	0.054	yes
92-67-1	4-AMINOBIPHENYL	0.39	0.23	yes
57-97-6	7,12-DIMETHYLBENZ(A)ANTHRACENE	0.016	0.0043	yes
107-02-8	ACROLEIN	17	1.5	yes
107-13-1	ACRYLONITRILE	17	2.4	yes
126-99-8	CHLOROPRENE	1.7	0.094	yes
55-18-5	N-NITROSODIETHYLAMINE	0.39	0.0077	yes
62-75-9	N-NITROSODIMETHYLAMINE	0.16	0.023	yes
10595-95-6	N-NITROSOMETHYLETHYLAMINE	0.39	0.22	yes
110-57-6	TRANS-1,4-DICHLORO-2-BUTENE	1.7	0.069	yes
75-01-4	VINYL CHLORIDE	1.7	0.6	yes

1) Taken from Regional Screening Level Summary Table, November 2011. For surface and subsurface soil, the value shown is equal to the Residential Soil RSL and is not modified. For sediment, the residential soil RSL is increased by a factor of ten.

D.3.1.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563
SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 1, 7 and 8

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ARSENIC	mg/kg	NA	NA	4.38E+01		mg/kg	4.38E+01	Maximum	N < 5
CHROMIUM	mg/kg	NA	NA	1.02E+02		mg/kg	1.02E+02	Maximum	N < 5
POLYCYCLIC AROMATIC HYDROCARBONS									
BENZO(A)PYRENE	mg/kg	2.24E-01	NA	4.21E-01		mg/kg	4.21E-01	Maximum	Low %Detects

Note: Statistics calculated by the EPA program ProUCL.
N < 5 indicates that the number of samples is less than 5, so the maximum detected value was used.
Low %Detects indicates low percentage of detects.
NA = Not Applicable

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D.3.1.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563
SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 1, 7 and 8

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ALUMINUM	mg/kg	NA	NA	2.52E+04		mg/kg	2.52E+04	Maximum	N < 5
ARSENIC	mg/kg	NA	NA	4.38E+01		mg/kg	4.38E+01	Maximum	N < 5
CHROMIUM	mg/kg	NA	NA	1.02E+02		mg/kg	1.02E+02	Maximum	N < 5
COBALT	mg/kg	NA	NA	6.60E+00		mg/kg	6.60E+00	Maximum	N < 5
IRON	mg/kg	NA	NA	4.26E+04		mg/kg	4.26E+04	Maximum	N < 5
MANGANESE	mg/kg	NA	NA	5.78E+02		mg/kg	5.78E+02	Maximum	N < 5
VANADIUM	mg/kg	NA	NA	1.63E+02	J	mg/kg	1.63E+02	Maximum	N < 5
POLYCYCLIC AROMATIC HYDROCARBONS									
BENZO(A)ANTHRACENE	mg/kg	1.00E-01	2.09E-01	2.77E-01		mg/kg	2.09E-01	95%UCLM-N	USEPA ProUCL
BENZO(A)PYRENE	mg/kg	2.24E-01	NA	4.21E-01		mg/kg	4.21E-01	Maximum	Low %Detects
BENZO(B)FLUORANTHENE	mg/kg	2.39E-01	NA	4.30E-01		mg/kg	4.30E-01	Maximum	Low %Detects
DIBENZ(A,H)ANTHRACENE	mg/kg	5.48E-02	NA	9.30E-02		mg/kg	9.30E-02	Maximum	Low %Detects
INDENO(1,2,3-C,D)PYRENE	mg/kg	1.35E-01	NA	2.58E-01		mg/kg	2.58E-01	Maximum	Low %Detects

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
N < 5 indicates that the number of samples is less than 5, so the maximum detected value was used.
Low %Detects indicates low percentage of detects.
NA = Not Applicable

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D.3.1.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563
SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 1, 7 and 8

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ARSENIC	mg/kg	1.72E+01	2.68E+01	3.37E+01		mg/kg	2.68E+01	95%UCLM-N	USEPA ProUCL
CHROMIUM	mg/kg	4.97E+01	7.04E+01	6.63E+01		mg/kg	6.63E+01	Maximum	UCLM>Maximum
COBALT	mg/kg	2.04E+01	5.95E+01	5.66E+01		mg/kg	5.66E+01	Maximum	UCLM>Maximum

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
NA = Not Applicable

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D.3.1.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563
SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 1, 7 and 8

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ALUMINUM	mg/kg	2.28E+04	3.14E+04	3.18E+04	J	mg/kg	3.14E+04	95%UCLM-N	USEPA ProUCL
ARSENIC	mg/kg	1.72E+01	2.68E+01	3.37E+01		mg/kg	2.68E+01	95%UCLM-N	USEPA ProUCL
CHROMIUM	mg/kg	4.97E+01	7.04E+01	6.63E+01		mg/kg	6.63E+01	Maximum	UCLM>Maximum
COBALT	mg/kg	2.04E+01	5.95E+01	5.66E+01		mg/kg	5.66E+01	Maximum	UCLM>Maximum
IRON	mg/kg	2.92E+04	4.37E+04	4.94E+04		mg/kg	4.37E+04	95%UCLM-N	USEPA ProUCL
MANGANESE	mg/kg	6.65E+02	4.97E+03	2.05E+03	J	mg/kg	2.05E+03	Maximum	UCLM>Maximum
MERCURY	mg/kg	6.73E-01	6.48E+00	3.01E+00	J	mg/kg	3.01E+00	Maximum	UCLM>Maximum
VANADIUM	mg/kg	8.45E+01	1.21E+02	1.39E+02		mg/kg	1.21E+02	95%UCLM-N	USEPA ProUCL
POLYCYCLIC AROMATIC HYDROCARBONS									
BENZO(A)PYRENE	mg/kg	NA	NA	7.34E-02		mg/kg	7.34E-02	Maximum	Low %Detects
DIBENZ(A,H)ANTHRACENE	mg/kg	NA	NA	1.83E-02		mg/kg	1.83E-02	Maximum	Low %Detects

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
Low %Detects indicates low percentage of detects.
NA = Not Applicable

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D.3.1.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 1, 7 AND 8: OLD HAZARDOUS WASTE CONTAINERS, BUILDING 541 AND BUILDING S-563
GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 1, 7 and 8

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS-DISSOLVED									
ARSENIC	ug/L	NA	NA	6.00E+00	J	ug/L	6.00E+00	Maximum	N < 5
CHROMIUM	ug/L	1.20E+00	NA	1.10E+00	J	ug/L	1.10E+00	Maximum	N < 5
COBALT	ug/L	2.50E+00	NA	2.80E+00	J	ug/L	2.80E+00	Maximum	N < 5
MANGANESE	ug/L	NA	NA	3.21E+02		ug/L	3.21E+02	Maximum	N < 5
INORGANICS-TOTAL									
CHROMIUM	ug/L	8.50E-01	NA	9.00E-01	J	ug/L	9.00E-01	Maximum	N < 5
COBALT	ug/L	4.20E+00	NA	5.40E+00	J	ug/L	5.40E+00	Maximum	N < 5
MANGANESE	ug/L	NA	NA	3.47E+02		ug/L	3.47E+02	Maximum	N < 5
VANADIUM	ug/L	5.90E+00	NA	9.80E+00		ug/L	9.80E+00	Maximum	N < 5
VOLATILE ORGANIC COMPOUNDS									
1,1,2-TRICHLOROETHANE	ug/L	9.63E-01	1.02E+00	1.30E+00		ug/L	1.02E+00	95%UCLM-KMp	USEPA ProUCL
1,2-DICHLOROETHANE	ug/L	3.40E-01	NA	3.60E-01	J	ug/L	3.60E-01	Maximum	Low %Detects
CHLOROFORM	ug/L	6.40E-01	NA	7.50E-01	J	ug/L	7.50E-01	Maximum	Low %Detects
CIS-1,2-DICHLOROETHENE	ug/L								
TETRACHLOROETHENE	ug/L	9.75E+00	1.04E+01	1.15E+01		ug/L	1.04E+01	95%UCLM-KMp	USEPA ProUCL
TRICHLOROETHENE	ug/L	1.94E+02	1.99E+02	2.40E+02		ug/L	1.99E+02	95%UCLM-KMp	USEPA ProUCL
VINYL CHLORIDE	ug/L	6.50E-01	NA	8.30E-01	J	ug/L	8.30E-01	Maximum	Low %Detects

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-KMp indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) percentile boostrap test.
Low %Detects indicates low percentage of detects.
N < 5 indicates that the number of samples is less than 5, so the maximum detected value was used.
NA = Not Applicable

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TABLE D.3.2.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 2, 3 AND 11: PESTICIDES AND CHEMICALS BURIAL TRENCH, SPENT SOLVENTS STORAGE AREA, AND HEAVY EQUIPMENT STORAGE AREA
SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 2, 3 and 11

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ARSENIC	mg/kg	5.90E+01	6.62E+01	1.22E+02		mg/kg	6.62E+01	95%UCLM-KMt	USEPA ProUCL
CHROMIUM	mg/kg	8.04E+01	9.77E+01	1.67E+02		mg/kg	9.77E+01	95%UCLM-N	USEPA ProUCL
COBALT	mg/kg	1.60E+01	1.81E+01	4.53E+01		mg/kg	1.81E+01	95%UCLM-KMp	USEPA ProUCL
MANGANESE	mg/kg	2.08E+03	1.32E+04	1.28E+04	J	mg/kg	1.28E+04	Maximum	UCLM>Maximum

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-KMp indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) percentile boostrap test.
95%UCLM-KMt indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) student's t-test.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
NA = Not Applicable

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TABLE D.3.2.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 2, 3 AND 11: PESTICIDES AND CHEMICALS BURIAL TRENCH, SPENT SOLVENTS STORAGE AREA, AND HEAVY EQUIPMENT STORAGE AREA
SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 2, 3 and 11

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ALUMINUM	mg/kg	2.54E+04	2.75E+04	3.22E+04	J	mg/kg	2.75E+04	95%UCLM-N	USEPA ProUCL
ARSENIC	mg/kg	5.90E+01	6.62E+01	1.22E+02		mg/kg	6.62E+01	95%UCLM-KMt	USEPA ProUCL
CHROMIUM	mg/kg	8.04E+01	9.77E+01	1.67E+02		mg/kg	9.77E+01	95%UCLM-N	USEPA ProUCL
COBALT	mg/kg	1.60E+01	1.81E+01	4.53E+01		mg/kg	1.81E+01	95%UCLM-KMp	USEPA ProUCL
IRON	mg/kg	6.18E+04	7.16E+04	9.53E+04		mg/kg	7.16E+04	95%UCLM-N	USEPA ProUCL
MANGANESE	mg/kg	2.08E+03	1.32E+04	1.28E+04	J	mg/kg	1.28E+04	Maximum	UCLM>Maximum
VANADIUM	mg/kg	1.53E+02	1.77E+02	2.91E+02		mg/kg	1.77E+02	95%UCLM-KMt	USEPA ProUCL
VOLATILE ORGANIC COMPOUNDS									
ETHYLBENZENE	mg/kg	NA	NA	1.86E+01		mg/kg	1.86E+01	Maximum	Low %Detects

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-KMp indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) percentile boostrap test.
95%UCLM-KMt indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) student's t-test.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
Low %Detects indicates low percentage of detects.
NA = Not Applicable

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TABLE D.3.2.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 2, 3 AND 11: PESTICIDES AND CHEMICALS BURIAL TRENCH, SPENT SOLVENTS STORAGE AREA, AND HEAVY EQUIPMENT STORAGE AREA
GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 2, 3 and 11

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS-DISSOLVED									
ARSENIC	ug/L	NA	NA	2.00E+00	J	ug/L	2.00E+00	Maximum	Low %Detects
BARIUM	ug/L	1.89E+02	2.05E+02	4.50E+02		ug/L	2.05E+02	95%UCLM-KMp	USEPA ProUCL
CHROMIUM	ug/L	NA	NA	6.00E-01	J	ug/L	6.00E-01	Maximum	Low %Detects
MANGANESE	ug/L	NA	NA	2.08E+02		ug/L	2.08E+02	Maximum	N < 5
MERCURY	ug/L	NA	NA	3.80E-01		ug/L	3.80E-01	Maximum	Low %Detects
VANADIUM	ug/L	NA	NA	8.00E-01	J	ug/L	8.00E-01	Maximum	Low %Detects
INORGANICS-TOTAL									
ALUMINUM	ug/L	1.40E+03	NA	3.40E+03		ug/L	3.40E+03	Maximum	Low %Detects
ARSENIC	ug/L	NA	NA	2.20E+00	J	ug/L	2.20E+00	Maximum	Low %Detects
BARIUM	ug/L	1.85E+02	2.04E+02	4.42E+02		ug/L	2.04E+02	95%UCLM-KMp	USEPA ProUCL
CHROMIUM	ug/L	7.72E+00	8.53E+00	1.98E+01		ug/L	8.53E+00	95%UCLM-KMp	USEPA ProUCL
COBALT	ug/L	NA	NA	6.00E-01		ug/L	6.00E-01	Maximum	Low %Detects
IRON	ug/L	1.09E+03	2.85E+03	3.45E+03		ug/L	2.85E+03	95%UCLM-G	USEPA ProUCL
MANGANESE	ug/L	8.97E+01	1.41E+02	2.19E+02		ug/L	1.41E+02	95%UCLM-N	USEPA ProUCL
MERCURY	ug/L	5.98E-01	6.65E-01	1.40E+00		ug/L	6.65E-01	95%UCLM-KMp	USEPA ProUCL
NICKEL	ug/L	2.21E+01	NA	4.23E+01		ug/L	4.23E+01	Maximum	Low %Detects
POLYCYCLIC AROMATIC HYDROCARBONS									
NAPHTHALENE	ug/L	NA	NA	1.51E+00	J / J	ug/L	1.51E+00	Maximum	Low %Detects
SEMI-VOLATILE ORGANIC COMPOUNDS									
1,4-DICHLOROBENZENE	ug/L	NA	NA	1.50E+00	J / J	ug/L	1.50E+00	Maximum	Low %Detects
VOLATILE ORGANIC COMPOUNDS									
BENZENE	ug/L	NA	NA	7.30E-01	J / J	ug/L	7.30E-01	Maximum	Low %Detects
CHLOROFORM	ug/L	NA	NA	3.10E-01	J	ug/L	3.10E-01	Maximum	Low %Detects
ETHYLBENZENE	ug/L	NA	NA	2.15E+00	J /	ug/L	2.15E+00	Maximum	Low %Detects
TRICHLOROETHENE	ug/L	2.78E+00	4.00E+00	5.50E+00		ug/L	4.00E+00	95%UCLM-KMp	USEPA ProUCL

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-G indicates that the 95 percent upper confidence limit on the mean is based on the approximate or adjusted gamma distribution.
95%UCLM-KMp indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) percentile boostrap test.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
Low %Detects indicates low percentage of detects.
N < 5 indicates that the number of samples is less than 5, so the maximum detected value was used.
NA = Not Applicable

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TABLE D.3.3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159
SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Sites 13 and 15

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ARSENIC	mg/kg	9.30E+00	1.28E+01	2.05E+01		mg/kg	1.28E+01	95%UCLM-N	USEPA ProUCL
CHROMIUM	mg/kg	2.47E+01	3.35E+01	4.83E+01	J	mg/kg	3.35E+01	95%UCLM-N	USEPA ProUCL

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-G indicates that the 95 percent upper confidence limit on the mean is based on the approximate or adjusted gamma distribution.
95%UCLM-KMp indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) percentile boostrap test.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
NA = Not Applicable

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TABLE D.3.3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159
SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Sites 13 and 15

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ALUMINUM	mg/kg	1.85E+04	2.16E+04	2.57E+04		mg/kg	2.16E+04	95% H-UCL	USEPA ProUCL
ARSENIC	mg/kg	9.30E+00	1.28E+01	2.05E+01		mg/kg	1.28E+01	95%UCLM-N	USEPA ProUCL
CHROMIUM	mg/kg	2.47E+01	3.35E+01	4.83E+01	J	mg/kg	3.35E+01	95%UCLM-N	USEPA ProUCL
COBALT	mg/kg	1.13E+01	1.50E+01	1.84E+01		mg/kg	1.50E+01	95%UCLM-N	USEPA ProUCL
IRON	mg/kg	2.32E+04	2.86E+04	4.13E+04		mg/kg	2.86E+04	95%UCLM-N	USEPA ProUCL
LEAD	mg/kg	9.20E+01	6.98E+02	5.62E+02		mg/kg	9.20E+01	Mean	USEPA 1994
MANGANESE	mg/kg	6.56E+02	9.17E+02	1.23E+03		mg/kg	9.17E+02	95%UCLM-N	USEPA ProUCL
VANADIUM	mg/kg	6.38E+01	9.68E+01	1.62E+02		mg/kg	9.68E+01	95%UCLM-G	USEPA ProUCL

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-G indicates that the 95 percent upper confidence limit on the mean is based on the approximate or adjusted gamma distribution.
95%UCLM-KMp indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) percentile boostrap test.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
USEPA 1994 = The arithmetic mean is used per USEPA lead model guidance (USEPA 1994).
NA = Not Applicable

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TABLE D.3.3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159
SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Sites 13 and 15

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ARSENIC	mg/kg	NA	NA	4.52E+01		mg/kg	4.52E+01	Maximum	N < 5
CHROMIUM	mg/kg	NA	NA	8.93E+01	J	mg/kg	8.93E+01	Maximum	N < 5

Note: Statistics calculated by the EPA program ProUCL.
N < 5 indicates that the number of samples is less than 5, so the maximum detected value was used.
NA = Not Applicable

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TABLE D.3.3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 13 AND 15: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE AND BUILDING S-159
SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Sites 13 and 15

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ALUMINUM	mg/kg	2.16E+04	NA	2.75E+04		mg/kg	2.75E+04	Maximum	N < 5
ARSENIC	mg/kg	2.66E+01	NA	4.52E+01		mg/kg	4.52E+01	Maximum	N < 5
CHROMIUM	mg/kg	5.19E+01	NA	8.93E+01	J	mg/kg	8.93E+01	Maximum	N < 5
COBALT	mg/kg	8.82E+00	NA	1.34E+01	/	mg/kg	1.34E+01	Maximum	N < 5
IRON	mg/kg	3.47E+04	NA	4.58E+04		mg/kg	4.58E+04	Maximum	N < 5
MANGANESE	mg/kg	5.57E+02	NA	9.17E+02		mg/kg	9.17E+02	Maximum	N < 5
VANADIUM	mg/kg	9.70E+01	NA	1.39E+02		mg/kg	1.39E+02	Maximum	N < 5
POLYCYCLIC AROMATIC HYDROCARBONS									
BENZO(A)PYRENE	mg/kg	NA	NA	8.78E-02	J	mg/kg	8.78E-02	Maximum	N < 5
BENZO(B)FLUORANTHENE	mg/kg	NA	NA	1.74E-01	J	mg/kg	1.74E-01	Maximum	N < 5

Note: Statistics calculated by the EPA program ProUCL.
N < 5 indicates that the number of samples is less than 5, so the maximum detected value was used.
NA = Not Applicable

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TABLE D.3.4.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 9: USED OIL STAGING AREA - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 9

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ARSENIC	mg/kg	1.01E+02	1.52E+02	1.89E+02	J / J	mg/kg	1.52E+02	95%UCLM-N	USEPA ProUCL
CHROMIUM	mg/kg	9.42E+01	1.35E+02	1.63E+02		mg/kg	1.35E+02	95%UCLM-N	USEPA ProUCL
COBALT	mg/kg	2.78E+01	1.15E+02	1.04E+02		mg/kg	1.04E+02	Maximum	UCLM>Maximum
IRON	mg/kg	7.48E+04	1.01E+05	1.23E+05		mg/kg	1.01E+05	95%UCLM-N	USEPA ProUCL
MANGANESE	mg/kg	1.73E+03	1.82E+04	7.15E+03		mg/kg	7.15E+03	Maximum	UCLM>Maximum

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
NA = Not Applicable

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TABLE D.3.4.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 9: USED OIL STAGING AREA - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 9

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ALUMINUM	mg/kg	2.01E+04	2.25E+04	2.28E+04		mg/kg	2.25E+04	95%UCLM-N	USEPA ProUCL
ARSENIC	mg/kg	1.01E+02	1.52E+02	1.89E+02	J / J	mg/kg	1.52E+02	95%UCLM-N	USEPA ProUCL
CHROMIUM	mg/kg	9.42E+01	1.35E+02	1.63E+02		mg/kg	1.35E+02	95%UCLM-N	USEPA ProUCL
COBALT	mg/kg	2.78E+01	1.15E+02	1.04E+02		mg/kg	1.04E+02	Maximum	UCLM>Maximum
IRON	mg/kg	7.48E+04	1.01E+05	1.23E+05		mg/kg	1.01E+05	95%UCLM-N	USEPA ProUCL
MANGANESE	mg/kg	1.73E+03	1.82E+04	7.15E+03		mg/kg	7.15E+03	Maximum	UCLM>Maximum
VANADIUM	mg/kg	1.81E+02	2.08E+02	2.22E+02		mg/kg	2.08E+02	95%UCLM-N	USEPA ProUCL

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
NA = Not Applicable

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TABLE D.3.5.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 12: OLD LANDFILL - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 12

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ARSENIC	mg/kg	7.56E+00	NA	7.90E+00		mg/kg	7.90E+00	Maximum	N < 5
CHROMIUM	mg/kg	2.35E+01	NA	2.72E+01		mg/kg	2.72E+01	Maximum	N < 5

Note: Statistics calculated by the EPA program ProUCL.
N < 5 indicates that the number of samples is less than 5, so the maximum detected value was used.
NA = Not Applicable

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TABLE D.3.5.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 12: OLD LANDFILL - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 12

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ALUMINUM	mg/kg	1.79E+04	NA	1.91E+04	J	mg/kg	1.91E+04	Maximum	N < 5
ARSENIC	mg/kg	7.56E+00	NA	7.90E+00		mg/kg	7.90E+00	Maximum	N < 5
CHROMIUM	mg/kg	2.35E+01	NA	2.72E+01		mg/kg	2.72E+01	Maximum	N < 5
COBALT	mg/kg	8.28E+00	NA	9.40E+00	J	mg/kg	9.40E+00	Maximum	N < 5
IRON	mg/kg	2.16E+04	NA	2.34E+04		mg/kg	2.34E+04	Maximum	N < 5
MANGANESE	mg/kg	3.73E+02	NA	4.06E+02		mg/kg	4.06E+02	Maximum	N < 5
VANADIUM	mg/kg	6.85E+01	NA	7.76E+01		mg/kg	7.76E+01	Maximum	N < 5

Note: Statistics calculated by the EPA program ProUCL.
N < 5 indicates that the number of samples is less than 5, so the maximum detected value was used.
NA = Not Applicable

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TABLE D.3.5.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 12: OLD LANDFILL - SEDIMENT - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Site 12

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ARSENIC	mg/kg	2.38E+01	2.93E+01	3.58E+01		mg/kg	2.93E+01	95%UCLM-N	Regional Guidance

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
NA = Not Applicable

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TABLE D.3.5.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 12: OLD LANDFILL - SEDIMENT - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Site 12

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS									
ARSENIC	mg/kg	2.38E+01	2.93E+01	3.58E+01		mg/kg	2.93E+01	95%UCLM-N	Regional Guidance
CHROMIUM	mg/kg	1.96E+01	2.24E+01	2.45E+01		mg/kg	2.24E+01	95%UCLM-N	Regional Guidance
VANADIUM	mg/kg	4.03E+01	4.96E+01	5.62E+01		mg/kg	4.96E+01	95%UCLM-N	Regional Guidance

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
NA = Not Applicable

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TABLE D.3.5.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 12: OLD LANDFILL - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 12

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS-DISSOLVED									
ARSENIC	ug/L	2.34E+01	3.00E+01	3.67E+01		ug/L	3.00E+01	95%UCLM-KMp	USEPA ProUCL
CHROMIUM	ug/L	1.05E+00	NA	1.10E+00	J /	ug/L	1.10E+00	Maximum	% LowDetets
COBALT	ug/L	4.48E+00	NA	7.75E+00		ug/L	7.75E+00	Maximum	% LowDetets
IRON	ug/L	NA	NA	1.61E+04		ug/L	1.61E+04	Maximum	N < 5
MANGANESE	ug/L	NA	NA	4.54E+03		ug/L	4.54E+03	Maximum	N < 5
THALLIUM	ug/L	1.45E+00	2.00E+00	1.90E+00		ug/L	2.00E+00	95%UCLM-KMt	% LowDetets
INORGANICS-TOTAL									
ARSENIC	ug/L	3.40E+01	4.87E+01	6.89E+01		ug/L	4.87E+01	95%UCLM-KMt	USEPA ProUCL
BARIUM	ug/L	2.84E+02	4.50E+02	6.62E+02	J	ug/L	4.50E+02	95%UCLM-N	USEPA ProUCL
CADMIUM	ug/L	9.63E-01	1.50E+00	2.60E+00	J	ug/L	1.50E+00	95%UCLM-BCA	USEPA ProUCL
CHROMIUM	ug/L	6.07E+01	1.26E+02	2.06E+02		ug/L	1.26E+02	95%UCLM-N	USEPA ProUCL
COBALT	ug/L	6.58E+00	1.71E+01	2.01E+01	J	ug/L	1.71E+01	95%UCLM-G	USEPA ProUCL
COPPER	ug/L	2.71E+01	4.58E+01	8.39E+01	J	ug/L	4.58E+01	95%UCLM-BCA	USEPA ProUCL
IRON	ug/L	1.29E+04	NA	2.05E+04		ug/L	2.05E+04	Maximum	N < 5
MANGANESE	ug/L	2.93E+03	NA	4.55E+03		ug/L	4.55E+03	Maximum	N < 5
NICKEL	ug/L	2.95E+01	5.71E+01	9.07E+01		ug/L	5.71E+01	95%UCLM-N	USEPA ProUCL
THALLIUM	ug/L	1.75E+00	2.18E+00	2.10E+00		ug/L	2.18E+00	95%UCLM-KMt	USEPA ProUCL
VANADIUM	ug/L	2.63E+01	1.18E+02	1.24E+02		ug/L	1.18E+02	95%UCLM-G	USEPA ProUCL
ZINC	ug/L	1.17E+02	1.18E+03	6.51E+02		ug/L	6.51E+02	Maximum	USEPA ProUCL
SEMI-VOLATILE ORGANIC COMPOUNDS									
BIS(2-ETHYLHEXYL) PHTHALATE	ug/L	4.40E+00	7.50E+00	7.50E+00		ug/L	7.50E+00	95%UCLM-BCA	USEPA ProUCL
VOLATILE ORGANIC COMPOUNDS									
CHLOROFORM	ug/L	2.88E+00	7.77E+00	5.30E+00		ug/L	5.30E+00	95%UCLM-KMC	USEPA ProUCL

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-BCA indicates that the 95 percent upper confidence limit on the mean is based on the Kaplan-Meier (KM) Bias-Corrected Accelerated (BCA) percentile bootstrap test.
95%UCLM-G indicates that the 95 percent upper confidence limit on the mean is based on the approximate or adjusted gamma distribution.
95%UCLM-KMC indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) Chebyshev test.
95%UCLM-KMp indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) percentile boostrap test.
95%UCLM-KMt indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) student's t-test.
95%UCLM-N indicates that the 95 percent upper confidence limit on the mean is based on the student's t-test for normal distributions.
N < 5 indicates that the number of samples is less than 5, so the maximum detected value was used.
NA = Not Applicable

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TABLE D.3.5.6
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN
SITE 12: OLD LANDFILL - SURFACE WATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Surface water
Exposure Point: Site 12

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCLM	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS-TOTAL									
ARSENIC	ug/L	NA	NA	8.90E+01		ug/L	8.90E+01	Maximum	Low %Detects
CHROMIUM	ug/L	3.22E+00	7.85E+00	8.30E+00	J	ug/L	7.85E+00	95%UCLM-KMC	Regional Guidance
COBALT	ug/L	5.98E+00	7.93E+00	9.50E+00	J	ug/L	7.93E+00	95%UCLM-KMt	Regional Guidance
7.934									
BIS(2-ETHYLHEXYL)PHTHLATE	ug/L	NA	NA	1.70E+00	J	ug/L	1.70E+00	Maximum	Low %Detects

Note: Statistics calculated by the EPA program ProUCL.
95%UCLM-G indicates that the 95 percent upper confidence limit on the mean is based on the approximate or adjusted gamma distribution.
95%UCLM-KMt indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) student's t-test.
Low %Detects indicates low percentage of detects.
NA = Not Applicable

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TABLE D.3.6.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN HUMAN HEALTH RISK ASSESSMENT
GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Fort Buchanan Northwest Boundary

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS-DISSOLVED									
ARSENIC	ug/L	8.60E+00	4.57E+00	3.08E+01		ug/L	4.57E+00	95%UCLM-KMt	ProUCL 4.1
BARIUM	ug/L	1.67E+02	1.88E+02	1.14E+03		ug/L	1.88E+02	95%UCLM-BCA	ProUCL 4.1
COBALT	ug/L	2.01E+00	1.56E+00	3.70E+00	J	ug/L	1.56E+00	95%UCLM-KMp	ProUCL 4.1
IRON	ug/L	2.69E+03	1.71E+04	2.13E+04		ug/L	1.71E+04	95%UCLM-KMC	ProUCL 4.1
MANGANESE	ug/L	7.27E+02	1.26E+03	2.72E+03		ug/L	1.26E+03	95%UCLM-G	ProUCL 4.1
MERCURY	ug/L	1.14E-01	7.86E-02	3.80E-01		ug/L	7.86E-02	95%UCLM-KMt	ProUCL 4.1
INORGANICS-TOTAL									
ALUMINUM	ug/L	1.37E+03	8.31E+03	1.51E+04		ug/L	8.31E+03	95%UCLM-KMC	ProUCL 4.1
ARSENIC	ug/L	3.04E+01	2.14E+01	2.74E+02		ug/L	2.14E+01	95%UCLM-BCA	ProUCL 4.1
BARIUM	ug/L	2.11E+02	3.65E+02	1.92E+03		ug/L	3.65E+02	95%UCLM-KMC	ProUCL 4.1
CADMIUM	ug/L	3.90E+00	2.01E+00	2.23E+01		ug/L	2.01E+00	95%UCLM-KMC	ProUCL 4.1
COBALT	ug/L	2.77E+00	2.37E+00	1.77E+01	J	ug/L	2.37E+00	95%UCLM-KMC	ProUCL 4.1
COPPER	ug/L	5.71E+01	3.50E+01	5.04E+02		ug/L	3.50E+01	95%UCLM-KMC	ProUCL 4.1
IRON	ug/L	3.28E+03	2.12E+04	3.33E+04		ug/L	2.12E+04	95%UCLM-KMC	ProUCL 4.1
MANGANESE	ug/L	6.75E+02	1.12E+03	2.83E+03		ug/L	1.12E+03	95%UCLM-G	ProUCL 4.1
MERCURY	ug/L	5.74E-01	4.49E-01	3.70E+00		ug/L	4.49E-01	95%UCLM-BCA	ProUCL 4.1
NICKEL	ug/L	1.50E+01	1.09E+01	9.40E+01		ug/L	1.09E+01	95%UCLM-BCA	ProUCL 4.1

TABLE D.3.6.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN HUMAN HEALTH RISK ASSESSMENT
GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Fort Buchanan Northwest Boundary

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
POLYCYCLIC AROMATIC HYDROCARBONS									
NAPHTHALENE	ug/L	NA	NA	1.51E+00		ug/L	1.51E+00	Maximum	ProUCL 4.1
VOLATILE ORGANIC COMPOUNDS									
1,1,2-TRICHLOROETHANE	ug/L	4.94E+00	1.69E+00	2.56E+01		ug/L	1.69E+00	95%UCLM-BCA	ProUCL 4.1
1,2-DICHLOROETHANE	ug/L	4.61E-01	4.09E-01	5.75E-01	J	ug/L	4.09E-01	95%UCLM-KMp	ProUCL 4.1
CHLOROFORM	ug/L	1.73E+00	7.44E-01	7.40E+00		ug/L	7.44E-01	95%UCLM-KMt	ProUCL 4.1
CIS-1,2-DICHLOROETHENE	ug/L	3.39E+01	5.62E+01	2.61E+02		ug/L	5.62E+01	95%UCLM-KMC	ProUCL 4.1
TETRACHLOROETHENE	ug/L	7.18E+00	3.09E+00	3.33E+01		ug/L	3.09E+00	95%UCLM-KMt	ProUCL 4.1
TRANS-1,2-DICHLOROETHENE	ug/L	5.20E+00	2.72E+00	3.54E+01		ug/L	2.72E+00	95%UCLM-BCA	ProUCL 4.1
TRICHLOROETHENE	ug/L	2.19E+02	4.02E+02	3.70E+03		ug/L	4.02E+02	95%UCLM-KMC	ProUCL 4.1
VINYL CHLORIDE	ug/L	5.96E+00	1.75E+00	2.56E+01		ug/L	1.75E+00	95%UCLM-BCA	ProUCL 4.1

Note: Statistics calculated by the EPA program ProUCL. ProUCL outputs are presented in Appendix M.
95%UCLM-BCA indicates that the 95 percent upper confidence limit on the mean is based on the Kaplan-Meier (KM) Bias-Corrected Accelerated (BCA) percentile bootstrap test.
95%UCLM-G indicates that the 95 percent upper confidence limit on the mean is based on the approximate or adjusted gamma distribution.
95%UCLM-KMC indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) Chebyshev test.
95%UCLM-KMNP indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) standard bootstrap test.
95%UCLM-KMp indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) percentile boostrap test.
95%UCLM-KMt indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) student's t-test.
NA = not applicable.

TABLE D.3.6.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
FORT BUCHANAN HUMAN HEALTH RISK ASSESSMENT
GROUNDWATER TO INDOOR AIR

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Fort Buchanan Northwest Boundary

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
VOLATILE ORGANIC COMPOUNDS									
1,1,2-TRICHLOROETHANE	ug/L	1.02E+01	9.80E+00	2.57E+01		ug/L	9.80E+00	95%UCLM-BCA	ProUCL 4.1
CIS-1,2-DICHLOROETHENE	ug/L	1.15E+02	1.22E+02	2.75E+02		ug/L	1.22E+02	95%UCLM-BCA	ProUCL 4.1
TETRACHLOROETHENE	ug/L	1.91E+01	1.73E+01	3.41E+01		ug/L	1.73E+01	95%UCLM-BCA	ProUCL 4.1
TRICHLOROETHENE	ug/L	1.33E+03	1.43E+03	4.04E+03		ug/L	1.43E+03	95%UCLM-BCA	ProUCL 4.1
VINYL CHLORIDE	ug/L	3.52E+00	3.28E+00	7.00E+00		ug/L	3.28E+00	95%UCLM-BCA	ProUCL 4.1

Note: Statistics calculated by the EPA program ProUCL. ProUCL outputs are presented in Appendix N.
95%UCLM-BCA indicates that the 95 percent upper confidence limit on the mean is based on the Kaplan-Meier (KM) Bias-Corrected Accelerated (BCA) percentile bootstrap test.
95%UCLM-KMC indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) Chebyshev test.
95%UCLM-KMt indicates that the 95 percent upper confidence limit on the mean is based on the non-parametric Kaplan-Meier (KM) student's t-test.

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TABLE D.4.1
VALUES USED FOR ADULT TRESPASSER/RECREATONAL USER DAILY SURFACE SOIL INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface Soil, Air
Exposure Point: Fort Buchanan
Receptor Population: Trespasser/Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	50	USEPA 2011a (1)	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	39	BPJ (2)	
	ED	Exposure Duration	yr	30	BPJ (2)	
	BW	Body Weight	kg	70	USEPA 1991a,b	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	mg/cm^2	5,700	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	AF	Adherence Factor	mg/cm^2	0.07	USEPA 2004a	
	EF	Exposure Frequency	event/yr	39	BPJ (2)	
	ED	Exposure Duration	yr	30	BPJ (2)	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Inhalation	CA	Chemical Concentration in Air	mg/m^3	Chemical-Specific	USPEA 2011c	Exposure Concentration (ug/m^3) =
	ET	Exposure Time	hr/day	1	USEPA 2009	CA x CF_1 x ET x EF x ED / AT x CF_2
	CF_1	Conversion Factor	ug/mg	1,000	USEPA 2009	Note: CF_1 is only used in determining carcinogenic exposure concentrations
	EF	Exposure Frequency	day/yr	39	BPJ (2)	
	ED	Exposure Duration	yr	1	BPJ (2)	
	CF_2	Conversion Factor	hr/day	24	USEPA 2009	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental soil ingestion rate is based upon Table 5-1 of USEPA 2011 EFH for age range adult.
(2) The exposure frequency is based on best professional judgment, assumed exposure at 1 day/week for three-fourths of the year (thirty-nine weeks).

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TABLE D.4.2
VALUES USED FOR ADOLESCENT TRESPASSER/RECREATIONAL USER DAILY SURFACE SOIL INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface Soil, Air
Exposure Point: Fort Buchanan
Receptor Population: Trespasser/Recreational User
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	100	USEPA 2011a (1)	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	39	BPJ (3)	
	ED	Exposure Duration	yr	8	BPJ (3)	
	BW	Body Weight	kg	45	USEPA 2011a	
	AT-NC	Averaging time - Noncancer	days	2,920	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	mg/cm^2	4,530	USEPA 2011a (2)	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004	
	AF	Adherence Factor	mg/cm^2	0.11	USEPA 2011a (2)	
	EF	Exposure Frequency	event/yr	39	BPJ (3)	
	ED	Exposure Duration	yr	8	BPJ (3)	
	BW	Body Weight	kg	45	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	2,920	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Inhalation	CA	Chemical Concentration in Air	mg/m^3	Chemical-Specific	USPEA 2011c	Exposure Concentration (ug/m^3) =
	ET	Exposure Time	hr/day	1	USEPA 2009	CA x CF_1 x ET x EF x ED / AT x CF_2
	CF_1	Conversion Factor	ug/mg	1,000	USEPA 2009	Note: CF_1 is only used in determining carcinogenic exposure concentrations
	EF	Exposure Frequency	day/yr	39	BPJ (3)	
	ED	Exposure Duration	yr	1	BPJ (3)	
	CF_2	Conversion Factor	hr/day	24	USEPA 2009	
	AT-NC	Averaging time - Noncancer	days	2,920	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental soil ingestion rate is based upon Table 5-1 of USEPA 2011 EFH for age range 6 to <21 years.

(2) Table 7-1 of USEPA 2011 Exposure Factors Handbook (EFH) gives a mean body surface area of 1.08 m^2 for ages 6 to <11 years and 1.59 m^2 for ages 11 to <16 years. The average of the two age ranges is 1.34 m^2. Table 7-17 of USEPA 2011 EFH notes a mean body area for contact during gardening/yardwork (due to age 5 to 17) of 33.8%. Therefore, a surface area (SA) available for contact is 4,530 cm^2. The adherence factor (AF) is taken from Table 7-20 of USEPA 2011 EFH for a soccer player No. 1 assuming the soil adherence to hands as the most conservative body part.
(3) The exposure frequency is based on best professional judgment, assumed exposure at 1 day/week for three-fourths of the year (thirty-nine weeks). Assumes exposure duration is similar to a resident. The exposure duration is based on the age range evaluated (8 - 16 years of age).

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TABLE D.4.3
VALUES USED FOR COMMERCIAL WORKER DAILY SOIL INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil, Air
Exposure Point: Fort Buchanan
Receptor Population: Commercial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	50	USEPA 2011a (1)	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	250	USEPA 1991a,b	
	ED	Exposure Duration	yr	25	USEPA 1991a,b	
	BW	Body Weight	kg	70	USEPA 1989a	
	AT-NC	Averaging time - Noncancer	days	9,125	USEPA 1989a	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989a	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989a	
Dermal	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	mg/cm^2	3,300	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	AF	Adherence Factor	mg/cm^2	0.07	USEPA 2004a (2)	
	EF	Exposure Frequency	event/yr	250	USEPA 1991a,b	
	ED	Exposure Duration - Cancer	yr	25	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	9,125	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Inhalation	CA	Chemical Concentration in Air	mg/m^3	Chemical-Specific	USPEA 2011c	Exposure Concentration (ug/m^3) =
	CF_1	Conversion Factor	ug/mg	1,000	USEPA 2009	CA x CF_1 x ET x EF x ED / AT x CF_2
	ET	Exposure Time	hr/day	1	USEPA 1991a,b	
	ED	Exposure Duration	yr	25	USEPA 1991a,b	Note: CF_1 is only used in determining carcinogenic
	CF_2	Conversion Factor	hr/day	24	USEPA 2009	exposure concentrations
	AT-NC	Averaging time - Noncancer	days	9,125	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	

Note : BPJ = Best Professional Judgement
(1) The incidental soil ingestion rate is based upon Table 5-1 of USEPA 2011 EFH for age range adult.
(2) The adherence factor is equal to the resident adult due to low contact rate assumed for commercial worker exposure to soil.

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TABLE D.4.4
VALUES USED FOR CONSTRUCTION WORKER DAILY SOIL INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil, Air
Exposure Point: Fort Buchanan
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	480	USEPA 1991a,b	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	250	USEPA 1991a,b	
	ED	Exposure Duration	yr	1	BPJ (1)	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	365	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	mg/cm^2	3,300	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	AF	Adherence Factor	mg/cm2	0.2	USEPA 1991 a,b	
	EF	Exposure Frequency	event/yr	250	USEPA 1991 a,b	
	ED	Exposure Duration	yr	1	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	365	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Inhalation	CA	Chemical Concentration in Air	mg/m^3	Chemical-Specific	USPEA 2011c	Exposure Concentration (ug/m^3) =
	CF_1	Conversion Factor	ug/mg	1,000	USEPA 2009	CA x CF_1 x ET x EF x ED / AT x CF_2
	ET	Exposure Time	hr/day	8	USEPA 1991a,b	
	ED	Exposure Duration	yr	1	USEPA 1989	
	CF_2	Conversion Factor	hr/day	24	USEPA 2009	Note: CF_1 is only used in determining carcinogenic
	AT-NC	Averaging time - Noncancer	days	365	USEPA 1989	exposure concentrations
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) Construction events are assumed to extend for up to one year total in duration.

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TABLE D.4.5
VALUES USED FOR RESIDENT CHILD DAILY SOIL INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil, Air
Exposure Point: Fort Buchanan
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	200	USEPA 2011a	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	350	USEPA 1991a,b	
	ED	Exposure Duration	yr	6	USEPA 1991a,b	
	BW	Body Weight	kg	15	USEPA 1991a,b	
	AT-NC	Averaging time - Noncancer	days	2,190	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	mg/cm^2	2,800	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	AF	Adherence Factor	mg/cm2	0.2	USEPA 2004a	
	EF	Exposure Frequency	event/yr	350	USEPA 1991a,b	
	ED	Exposure Duration	yr	6	USEPA 1991a,b	
	BW	Body Weight	kg	15	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	2,190	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	0	USEPA 1989	
Inhalation	CA	Chemical Concentration in Air	mg/m^3	Chemical-Specific	USPEA 2011c	Exposure Concentration (ug/m^3) =
	CF_1	Conversion Factor	ug/mg	1,000	USEPA 2009	CA x CF_1 x ET x EF x ED / AT x CF_2
	ET	Exposure Time	hr/day	24	USEPA 1991a,b	
	EF	Exposure Frequency	day/yr	350	USEPA 1991a,b	
	ED	Exposure Duration	yr	6	USEPA 1991a,b	
	CF_2	Conversion Factor	hr/day	24	USEPA 2009	Note: CF_1 is only used in determining carcinogenic exposure
	AT-NC	Averaging time - Noncancer	days	2,190	USEPA 1989	concentrations
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	

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TABLE D.4.6
VALUES USED FOR RESIDENT ADULT DAILY SOIL INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil, Air
Exposure Point: Fort Buchanan
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	Chronic Daily Intake (CDI) (mg/kg/day) =
	CR	Ingestion Rate	mg/day	100	USEPA 2011a	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	350	USEPA 1991a,b	
	ED-NC	Exposure Duration - Noncancer	yr	30	USEPA 1991a,b	
	ED-C	Exposure Duration-Cancer	yr	24	USEPA 1991a,b	
	BW	Body Weight	kg	70	USEPA 1991a,b	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	mg/cm^2	5,700	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	AF	Adherence Factor	mg/cm2	0.07	USEPA 2004a	
	EF	Exposure Frequency	event/yr	350	USEPA 1991a,b	
	ED-NC	Exposure Duration - Noncancer	yr	30	USEPA 1991a,b	
	ED-C	Exposure Duration - Cancer	yr	24	USEPA 1991a,b	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Inhalation	CA	Chemical Concentration in Air	mg/m^3	Chemical-Specific	Chemical-Specific	Exposure Concentration (ug/m^3) =
	CF_1	Conversion Factor	ug/mg	1,000	USEPA 2009	CA x CF_1 x ET x EF x ED / AT x CF_2
	ET	Exposure Time	hr/day	24	USEPA 1991a,b	
	EF	Exposure Frequency	day/yr	350	USEPA 1991a,b	Note: CF_1 is only used in determining carcinogenic exposure
	ED-NC	Exposure Duration - Noncancer	yr	30	USEPA 1991a,b	concentrations
	ED-C	Exposure Duration - Cancer	yr	24	USEPA 1991a,b	
	CF_2	Conversion Factor	hr/day	24	USEPA 2009	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	

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TABLE D.4.7
VALUES USED FOR ADULT TRESPASSER/RECREATIONAL USER DAILY SURFACE WATER INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Fort Buchanan
Receptor Population: Trespasser/Recreational User
Receptor Age: Adult - Wading

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	L/hr	0.1	USEPA 2011a (1)	CW x CR x ET x EF x ED / (BW x AT)
	ET	Exposure Time	hr/day	2	BPJ (2)	
	EF	Exposure Frequency	day/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	30	BPJ (2)	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time-Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
Dermal	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	PC	Permeability Coefficient	cm/hr	Chemical-Specific	USEPA 2004a	DA_{event} x SA x EF x ED / (BW x AT)
	SA	Surface Area for Contact	cm^2	5,700	BPJ (3)	
	ET	Exposure Time	hr/day	2	BPJ (2)	DA_{event} = PC x ET x CW
	EF	Exposure Frequency	day/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	30	BPJ (2)	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	L/cm^3	0.001	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental ingestion rate of surface water is assumed to be 0.05 L/hr.
(2) The event frequency and exposure frequency are based on best professional judgment assuming that the trespasser would contact surface water 1 day per week for 6 months per year for 2 hour per day. The exposure duration is based on the age range evaluated (adult).
(3) Assumes exposure similar to that of resident adult. Surface water does not involve full body contact, so surface area is similar to the soil/sediment surface area.

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TABLE D.4.8
VALUES USED FOR ADOLESCENT TRESPASSER/RECREATIONAL USER DAILY SURFACE WATER INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Fort Buchanan
Receptor Population: Trespasser/Recreational User
Receptor Age: Adolescent - Wading

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	L/hr	0.1	USEPA 2011a (1)	CW x CR x ET x EF x ED / (BW x AT)
	ET	Exposure Time	hr/day	2	BPJ (2)	
	EF	Exposure Frequency	day/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	8	BPJ (2)	
	BW	Body Weight	kg	45	USEPA 1989	
	AT-NC	Averaging time-Noncancer	days	2,920	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
Dermal	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	PC	Permeability Coefficient	cm/hr	Chemical-Specific	USEPA 2004a	DA_{event} x SA x EF x ED / (BW x AT)
	SA	Surface Area for Contact	cm^2	4,530	BPJ (3)	
	ET	Exposure Time	hr/day	2	BPJ (2)	DA_{event} = PC x ET x CW
	EF	Exposure Frequency	day/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	8	BPJ (2)	
	BW	Body Weight	kg	45	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	2,920	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	L/cm^3	0.001	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental ingestion rate of surface water is assumed to be 0.05 L/hr.
(2) The event frequency and exposure frequency are based on best professional judgment assuming that the trespasser would contact surface water 1 day per week for 6 months per year for 2 hour per day. The exposure duration is based on the age range evaluated (8 - 16 years of age).
(3) Assumes exposure similar to that of resident child. Surface water does not involve full body contact, so surface area is similar to the soil/sediment surface area.

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TABLE D.4.9
VALUES USED FOR CONSTRUCTION WORKER DAILY SURFACE WATER INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Fort Buchanan
Receptor Population: Construction Worker
Receptor Age: Adult - Wading

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	L/hr	0.022	USEPA 2011a (1)	CW x CR x ET x EF x ED / (BW x AT)
	ET	Exposure Time	hr/day	2	BPJ (2)	
	EF	Exposure Frequency	day/yr	52	BPJ (2)	
	ED	Exposure Duration	yr	1	BPJ (3)	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time-Noncancer	days	365	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
Dermal	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	PC	Permeability Coefficient	cm/hr	Chemical-Specific	USEPA 2004a	DA_{event} x SA x EF x ED / (BW x AT)
	SA	Surface Area for Contact	cm^2	3,300	BPJ (4)	
	ET	Exposure Time	hr/day	2	BPJ (2)	DA_{event} = PC x ET x CW
	EF	Exposure Frequency	day/yr	52	BPJ (3)	
	ED	Exposure Duration	yr	1	BPJ (3)	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	365	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	L/cm^3	0.001	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental ingestion rate of surface water is taken from Table 3-93 of USEPA 2011 EFH, assuming fishing activities. The UCL of 10.8 mL/hr is used as a conservative measure.
(2) Assumed contact with surface water occurs for 2 hours/day. Assumed an exposure frequency of 1 day/week throughout the year.
(3) Construction events are assumed to extend for up to one year total in duration.
(4) Assumes exposure surface water exposure does not involve full body contact, so surface area is similar to the soil/sediment surface area.

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TABLE D.4.10
VALUES USED FOR RESIDENT CHILD DAILY SURFACE WATER INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Fort Buchanan
Receptor Population: Resident
Receptor Age: Child - Wading

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	L/hr	0.1	USEPA 2011a (1)	CW x CR x ET x EF x ED / (BW x AT)
	ET	Exposure Time	hr/day	2	BPJ (2)	
	EF	Exposure Frequency	day/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	6	USEPA 1991a,b	
	BW	Body Weight	kg	15	USEPA 1991a,b	
	AT-NC	Averaging time-Noncancer	days	2,190	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
Dermal	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2	2,800	USEPA 2004a (3)	DA_{event} x SA x EF x ED / (BW x AT)
	PC	Permeability Coefficient	cm/hr	Chemical-Specific	USEPA 2004a (3)	
	ET	Exposure Time	hr/day	2	BPJ (2)	
	EF	Exposure Frequency	day/yr	26	BPJ (2)	DA_{event} = PC x ET x CW
	ED	Exposure Duration	yr	6	USEPA 1991a,b	
	BW	Body Weight	kg	15	USEPA 1991a,b	
	AT-NC	Averaging time - Noncancer	days	2,190	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	L/cm^3	0.001	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental ingestion rate of surface water is assumed to be 0.05 L/hr.
(2) The event frequency and exposure frequency are based on best professional judgment assuming that the child would contact surface water 1 day per week for 6 months per year for 2 hour per day.
(3) Assumes surface water does not involve full body contact, so surface area is similar to the soil/sediment surface area.

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TABLE D.4.11
VALUES USED FOR RESIDENT ADULT DAILY SURFACE WATER INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Fort Buchanan
Receptor Population: Resident
Receptor Age: Adult - Wading

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	L/hr	0.1	USEPA 2011a (1)	CW x CR x ET x EF x ED / (BW x AT)
	ET	Exposure Time	hr/day	2	BPJ (2)	
	EF	Exposure Frequency	day/yr	26	BPJ (2)	
	ED-NC	Exposure Duration - Noncancer	yr	30	USEPA 1991a,b	
	ED-C	Exposure Duration - Cancer	yr	24	USEPA 1991a,b	
	BW	Body Weight	kg	70	USEPA 1991a,b	
	AT-NC	Averaging time-Noncancer	days	8,760	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
Dermal	CW	Concentration in Water	mg/L	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2	5,700	USEPA 2004a (3)	DA_{event} x SA x EF x ED / (BW x AT)
	PC	Permeability Coefficient	cm/hr	Chemical-Specific	USEPA 2004a	
	ET	Exposure Time	hr/day	2	BPJ (2)	
	EF	Exposure Frequency	day/yr	26	BPJ (2)	DA_{event} = PC x ET x CW
	ED-NC	Exposure Duration - Noncancer	yr	30	USEPA 1991a,b	
	ED-C	Exposure Duration - Cancer	yr	24	USEPA 1991a,b	
	BW	Body Weight	kg	70	USEPA 1991a,b	
	AT-NC	Averaging time - Noncancer	days	8,760	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	L/cm^3	0.001	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental ingestion rate of surface water is assumed to be 0.05 L/day.
(2) The event frequency and exposure frequency are based on best professional judgment assuming that the adult would contact surface water 1 day per week for 6 months per year for 2 hour per day.
(3) Assumes surface water does not involve full body contact, so surface area is similar to the soil/sediment surface area.

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TABLE D.4.12
VALUES USED FOR ADULT TRESPASSER/RECREATIONAL USER DAILY SEDIMENT INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Fort Buchanan
Receptor Population: Trespasser/Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	50	USEPA 2011a (1)	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	30	USEPA 1991a,b	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2/event	5,700	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	AF	Adherence Factor	mg/cm^2	0.07	USEPA 2004a	
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	EF	Exposure Frequency	event/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	30	USEPA 1991a,b	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental sediment ingestion rate is assumed to be equal to adult soil ingestion.
(2) The event frequency and exposure frequency are based on best professional judgment assuming that the trespasser would contact surface water/sediment 1 day per week for 6 months per year for 2 hour per day. The exposure duration is based on the age range evaluated (adult).

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TABLE D.4.13
VALUES USED FOR ADOLESCENT TRESPASSER/RECREATIONAL USER DAILY SEDIMENT INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Fort Buchanan
Receptor Population: Trespasser/Recreational User
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	100	USEPA 2011a (1)	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	8	BPJ (2)	
	BW	Body Weight	kg	45	USEPA 2011a	
	AT-NC	Averaging time - Noncancer	days	2,920	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2/event	4,530	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	AF	Adherence Factor	mg/cm^2	0.2	USEPA 2004a (3)	
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	EF	Exposure Frequency	event/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	8	BPJ (2)	
	BW	Body Weight	kg	45	USEPA 2011a	
	AT-NC	Averaging time - Noncancer	days	2,920	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental sediment ingestion rate is assumed to be equal to soil ingestion rate.
(2) The event frequency and exposure frequency are based on best professional judgment assuming that the trespasser would contact surface water/sediment 1 day per week for 6 months per year for 2 hour per day. The exposure duration is based on the age range evaluated (8 - 16 years of age).
(3) Assumes children playing in wet soil.

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TABLE D.4.14
VALUES USED FOR CONSTRUCTION WORKER DAILY SEDIMENT INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Fort Buchanan
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	50	USEPA 2011a (1)	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	52	BPJ (2)	
	ED	Exposure Duration	yr	1	BPJ (2)	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	365	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2/event	3,300	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	AF	Adherence Factor	mg/cm^2	0.2	USEPA 2004a	
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	EF	Exposure Frequency	event/yr	52	BPJ (2)	
	ED	Exposure Duration	yr	1	BPJ (2)	
	BW	Body Weight	kg	70	USEPA 1989	
	AT-NC	Averaging time - Noncancer	days	365	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental sediment ingestion rate is assumed to be equal to adult soil ingestion.
(2) Construction events are assumed to extend for up to one year total in duration and asssumes contact one day per week.

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TABLE D.4.15
VALUES USED FOR RESIDENT CHILD DAILY SEDIMENT INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Fort Buchanan
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	200	USEPA 2011a (1)	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	6	USEPA 1991a,b	
	BW	Body Weight	kg	15	USEPA 1991a,b	
	AT-NC	Averaging time - Noncancer	days	2,190	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2/event	2,800	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	AF	Adherence Factor	mg/cm^2	0.2	USEPA 2004a	
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	EF	Exposure Frequency	event/yr	26	BPJ (2)	
	ED	Exposure Duration	yr	6	USEPA 1991a,b	
	BW	Body Weight	kg	15	USEPA 1991a,b	
	AT-NC	Averaging time - Noncancer	days	2,190	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The sediment ingestion rate is assumed to be similar to soil.
(2) Based on the age range of the child, exposure frequency to sediment is assumed at 1 day per week for 6 months per year.

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TABLE D.4.16
VALUES USED FOR RESIDENT ADULT DAILY SEDIMENT INTAKE EQUATIONS
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Fort Buchanan
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	CR	Ingestion Rate	mg/day	50	USEPA 2011a (1)	CS x CR x EF x ED x CF / (BW x AT)
	EF	Exposure Frequency	day/yr	26	BPJ (1)	
	ED-NC	Exposure Duration - Noncancer	yr	30	USEPA 1991a,b	
	ED-C	Exposure Duration - Cancer	yr	24	USEPA 1991a,b	
	BW	Body Weight	kg	70	USEPA 1991a,b	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	
Dermal	CS	Chemical Concentration in Sediment	Chemical-Specific	Chemical-Specific	USPEA 2011c	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2/event	5,700	USEPA 2004a	CS x SA x AF x ABS x EF x ED x CF / (BW x AT)
	AF	Adherence Factor	mg/cm^2	0.07	USEPA 2004a	
	ABS	Dermal Absorption Fraction	unitless	Chemical-Specific	USEPA 2004a	
	EF	Exposure Frequency	event/yr	26	BPJ (1)	
	ED-NC	Exposure Duration - Noncancer	days	30	USEPA 1991a,b	
	ED-C	Exposure Duration - Cancer	yr	24	USEPA 1991a,b	
	BW	Body Weight	kg	70	USEPA 1991a,b	
	AT-NC	Averaging time - Noncancer	days	10,950	USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	

Note : BPJ = Best Professional Judgment
(1) The incidental sediment ingestion rate is assumed to be equal to soil.
(2) Assumes an exposure frequency of 1 day per week for 6 months per year to sediment.

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TABLE D.4.17
VALUES USED FOR OFF-SITE RESIDENT ADULT DAILY TOTAL GROUNDWATER INTAKE EQUATIONS
NORTHWEST BOUNDARY AREA
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Tap Water
Exposure Point: Northwest Boundary Area
Receptor Population: Off-site Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CW	Chemical Concentration in Water	mg/L	Chemical-Specific	Chemical-Specific	CDI (mg/kg/day) =
	CR	Ingestion Rate	L/day	2.45	U.S. EPA 2011a	CW x CR x EF x ED / (BW x AT)
	EF	Exposure Frequency	day/yr	350	U.S. EPA 1991a,b	
	ED-NC	Exposure Duration - Noncancer	yr	30	U.S. EPA 1991a,b	
	ED-C	Exposure Duration - Cancer	yr	24	U.S. EPA 1991a,b	
	BW	Body Weight	kg	70	U.S. EPA 1989	
	AT-NC	Averaging time - Noncancer	days	10,950	U.S. EPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	U.S. EPA 1989	
Dermal	CW	Chemical Concentration in Water	mg/L	Chemical-Specific	Chemical-Specific	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2	18,000	U.S. EPA 2004a	CW x SA x PC x ET x EF x ED x CF / (BW x AT)
	PC	Permeability Coefficient	cm/hr	Chemical-Specific	Chemical-Specific	
	ET	Event Time	hr/day	0.58	U.S. EPA 2004a	
	EF	Exposure Frequency	day/yr	350	U.S. EPA 1991a,b	For organic compounds
	ED-NC	Exposure Duration - Noncancer	days	30	U.S. EPA 1991a,b	CDI (mg/kg/day) =
	ED-C	Exposure Duration - Cancer	yr	24	U.S. EPA 1991a,b	DA_{event} x SA x EF x ED / (BW x AT)
	BW	Body Weight	kg	70	U.S. EPA 1989	
	AT-NC	Averaging time - Noncancer	days	10,950	U.S. EPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	U.S. EPA 1989	
	CF	Conversion Factor	L/cm^3	0.001	U.S. EPA 1989	
Inhalation	CA	Chemical Concentration in Air	mg/m^3	Chemical-Specific	Chemical-Specific	Exposure Concentration (ug/m^3) =
	ET	Event Time	hr/day	24	U.S. EPA 2004a	CA x CF_1 x ET x EF x ED / AT x CF_2
	EF	Exposure Frequency	day/yr	350	U.S. EPA 1991a,b	
	VF	Volatilization Factor	L/m^3	0.5	U.S. EPA 2011b	where, CA = VF x CW
	CF_1	Conversion Factor	ug/mg	1,000	U.S. EPA 2009	
	CF_2	Conversion Factor	hr/day	24	U.S. EPA 2009	
	ED-NC	Exposure Duration - Noncancer	yr	30	U.S. EPA 1991a,b	
	ED-C	Exposure Duration - Cancer	yr	24	U.S. EPA 1991a,b	
	AT-NC	Averaging Time - Noncancer	days	10,950	U.S. EPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	U.S. EPA 1989	

(1) Refer to Table D.7.6.4 for details on calculation of DA_{event}.

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TABLE D.4.18
VALUES USED FOR OFF-SITE RESIDENT CHILD DAILY TOTAL GROUNDWATER INTAKE EQUATIONS
NORTHWEST BOUNDARY AREA
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Tap Water
Exposure Point: Northwest Boundary Area
Receptor Population: Off-site Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CW	Chemical Concentration in Water	mg/L	Chemical-Specific	Chemical-Specific	CDI (mg/kg/day) =
	CR	Ingestion Rate	L/day	1	U.S. EPA 2011a	CW x CR x EF x ED / (BW x AT)
	EF	Exposure Frequency	day/yr	350	U.S. EPA 1991a,b	
	ED	Exposure Duration	yr	6	U.S. EPA 1991a,b	
	BW	Body Weight	kg	15	U.S. EPA 1989	
	AT-NC	Averaging time - Noncancer	days	2,190	U.S. EPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	U.S. EPA 1989	
Dermal	CW	Chemical Concentration in Water	mg/L	Chemical-Specific	Chemical-Specific	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2	6,600	U.S. EPA 2004a	CW x SA x PC x ET x EF x ED x CF / (BW x AT)
	PC	Permeability Coefficient	cm/hr	Chemical-Specific	Chemical-Specific	
	ET	Event Time	hr/day	1	U.S. EPA 2004a	
	EF	Exposure Frequency	day/yr	350	U.S. EPA 1991a,b	For organic compounds
	ED	Exposure Duration	yr	6	U.S. EPA 1991a,b	CDI (mg/kg/day) =
	BW	Body Weight	kg	15	U.S. EPA 1989	DA_{event} x SA x EF x ED / (BW x AT)
	AT-NC	Averaging time - Noncancer	days	2,190	U.S. EPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	U.S. EPA 1989	
	CF	Conversion Factor	L/cm^3	0.001	U.S. EPA 1989	

(1) Refer to Table D.7.6.4 for details on calculation of DA_{event}.

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TABLE D.4.19
VALUES USED FOR CONSTRUCTION WORKER DAILY GROUNDWATER INTAKE EQUATIONS
NORTHWEST BOUNDARY AREA
FORT BUCHANAN

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Northwest Boundary Area
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CW	Chemical Concentration in Water	mg/L	Chemical-Specific	Chemical-Specific	CDI (mg/kg/day) =
	CR	Ingestion Rate	L/day	0.02	U.S. EPA 2011a (1)	CW x CR x EF x ED / (BW x AT)
	EF	Exposure Frequency	day/yr	50	BPJ (2)	
	ED-C	Exposure Duration	yr	1	BPJ (3)	
	BW	Body Weight	kg	70	U.S. EPA 1989	
	AT-NC	Averaging time - Noncancer	days	365	U.S. EPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	U.S. EPA 1989	
Dermal	CW	Chemical Concentration in Water	mg/L	Chemical-Specific	Chemical-Specific	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2	3,300	U.S. EPA 2004a	CW x SA x PC x ET x EF x ED x CF / (BW x AT)
	PC	Permeability Coefficient	cm/hr	Chemical-Specific	Chemical-Specific	
	ET	Event Time	hr/day	4	BPJ (4)	
	EF	Exposure Frequency	day/yr	50	BPJ (2)	For organic compounds
	ED-C	Exposure Duration	yr	1	BPJ (3)	CDI (mg/kg/day) =
	BW	Body Weight	kg	70	U.S. EPA 1989	DA_{event} x SA x EF x ED / (BW x AT)
	AT-NC	Averaging time - Noncancer	days	365	U.S. EPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	U.S. EPA 1989	
	CF	Conversion Factor	L/cm^3	0.001	U.S. EPA 1989	

Note : BPJ = Best Professional Judgment
(1) Incidental ingestion of groundwater is assumed equal 1/100th of ingestion rate of resident adult tap water.
(2) Construction workers are assumed to contact groundwater only 50 days out of the year.
(3) Construction events are assumed to extend for up to one year total in duration.
(4) Construction events are assumed to contact groundwater for half of their time on the site per day.

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TABLE D.5.1
NON-CANCER TOXICITY DATA - ORAL/DERMAL
FORT BUCHANAN

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value (mg/kg-day)	Oral to Dermal Adjustment Factor (GI ABS) (1)	Adjusted Dermal RfD (2) (mg/kg bw-day)	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (mm/dd/yy)
Inorganics								
ALUMINUM	Chronic	1.00E+00	1	1.00E+00	Central Nervous System	100/1	PPRTV	10/23/2006
ARSENIC	Chronic	3.00E-04	1	3.00E-04	Skin	3/1	IRIS	1/28/2012
CHROMIUM, TOTAL	Chronic	3.00E-03	0.025	7.50E-05	None	300/1	IRIS	1/28/2012
COBALT	Chronic	3.00E-04	1	3.00E-04	Thyroid	3000/1	PPTRV	8/25/2008
IRON	Chronic	7.00E-01	1	7.00E-01	Gastrointestinal System	1.5/1	PPRTV	9/11/2006
MANGANESE	Chronic	4.70E-02	0.04	1.88E-03	Central Nervous System	1/3	IRIS	1/28/2012
MERCURY	Chronic	1.00E-04	1	1.00E-04	Central Nervous System	10/1	IRIS	1/28/2012
VANADIUM	Chronic	5.00E-03	1	5.00E-03	Hair	100/1	IRIS	1/28/2012
PAHs								
BENZ(A)ANTHRACENE	NA	NA	1	NA	NA	NA/NA	IRIS	1/28/2012
BENZO(B)FLUORANTHENE	NA	NA	1	NA	NA	NA/NA	IRIS	1/28/2012
BENZO(A)PYRENE	NA	NA	1	NA	NA	NA/NA	IRIS	1/28/2012
DIBENZ(A,H)ANTHRACENE	NA	NA	1	NA	NA	NA/NA	IRIS	1/28/2012
INDENO(1,2,3-C,D)PYRENE	NA	NA	1	NA	NA	NA/NA	IRIS	1/28/2012
Semivolatiles								
BIS(2-ETHYLHEXYL)PHTHALATE	Chronic	2.00E-02	1	2.00E-02	Liver	1000/1	IRIS	1/28/2012
Volatiles								
BENZENE	Chronic	4.00E-03	1	4.00E-03	Liver	300/1	IRIS	1/28/2012
CHLOROFORM	Chronic	1.00E-02	1	1.00E-02	Liver	100/1	IRIS	1/28/2012
1,4-DICHLOROBENZENE	Chronic	7.00E-02	1	7.00E-02	Liver	100/1	ATSDR	12/1/2010
TRICHLOROETHENE	Chronic	5.00E-04	1	5.00E-04	Immune System and Cardiovascular	100/1	IRIS	1/28/2012

NA = Not Applicable
(1) Taken from USEPA 2004 Guidance.
(2) Dermal toxicological values adjusted from oral values using USEPA 2004 recommended chemical-specific gastrointestinal absorption factors (GI ABS). RfDs are multiplied by the GI ABS.
(3) IRIS - Integrated Risk Information System. For IRIS values, the date IRIS was searched is provided.
ATSDR - Agency for Toxic Substances and Disease Registry. For ATSDR values, the date of the MRL is provided.
PPRTV - Provisional Peer-Reviewed Toxicity Value. For PPRTV values, the date of the issue paper is provided.
CalEPA - Calfornia Environmental Protection Agency. For CalEPA values, the date searched is provided.

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TABLE D.5.2
NON-CANCER TOXICITY DATA - INHALATION
FORT BUCHANAN

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation (RfC) (mg/m^3)	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (1) (mm/dd/yy)
Inorganics						
ALUMINUM	Chronic	5.00E-03	Respiratory System	300/1	PPRTV	10/23/2006
ARSENIC	Chronic	1.50E-05	Developmental System	NA	CalEPA	1/28/2012
CHROMIUM, TOTAL	Chronic	1.00E-04	Blood	300/1	IRIS	1/28/2012
COBALT	Chronic	6.00E-06	Respiratory System	300/1	PPRTV	8/25/2008
IRON	NA	NA	NA	NA	PPRTV	9/11/2006
MANGANESE	Chronic	5.00E-05	Central Nervous System	1000/1	IRIS	1/28/2012
MERCURY	Chronic	3.00E-04	Central Nervous System	30/1	IRIS	1/28/2012
MOLYBDENUM	NA	NA	NA	NA	IRIS	1/28/2012
VANADIUM	NA	NA	NA	NA	IRIS	1/28/2012
PAHs						
BENZ(A)ANTHRACENE	NA	NA	NA	NA	IRIS	1/28/2012
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	IRIS	1/28/2012
BENZO(A)PYRENE	NA	NA	NA	NA	IRIS	1/28/2012
DIBENZ(A,H)ANTHRACENE	NA	NA	NA	NA	IRIS	1/28/2012
INDENO(1,2,3-C,D)PYRENE	NA	NA	NA	NA	IRIS	1/28/2012
Semivolatiles						
BIS(2-ETHYLHEXYL)PHTHALAT	NA	NA	NA	NA	IRIS	1/28/2012
Volatiles						
BENZENE	Chronic	3.00E-02	Liver	300/1	IRIS	1/28/2012
CHLOROFORM	Chronic	9.80E-02	Liver	100/1	ATSDR	12/1/2010
1,4-DICHLOROBENZENE	Chronic	8.00E-01	Liver	100/1	IRIS	1/28/2012
TRICHLOROETHENE	Chronic	2.00E-03	Immune System and Cardiovascular	100/1	IRIS	1/28/2012

NA = Not Applicable

(1) IRIS - Integrated Risk Information System. For IRIS values, the date IRIS was searched is provided.
PPRTV - Provisional Peer-Reviewed Toxicity Value. For PPRTV values, the date of the issue paper is provided.
CalEPA - Calfornia Environmental Protection Agency. For CalEPA values, the date searched is provided.
ATSDR - Agency for Toxic Substances and Disease Registry. For ATSDR values, the date of the MRL is provided.

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TABLE D.5.3
CHEMICAL-SPECIFIC PARAMETERS
FORT BUCHANAN

Chemical of Potential Concern	Absorption Factor	Reference	GI ABS	Reference	Permeability Constant (cm/hr)	Reference
Inorganics						
ALUMINUM	NA	U.S. EPA, 2004	1	U.S. EPA, 2004	1.00E-03	U.S. EPA 2004
ARSENIC	0.03	U.S. EPA, 2004	1	U.S. EPA, 2004	1.00E-03	U.S. EPA 2004
CHROMIUM, TOTAL	NA	U.S. EPA, 2004	0.025	U.S. EPA, 2004	2.00E-03	U.S. EPA 2004
COBALT	NA	U.S. EPA, 2004	1	U.S. EPA, 2004	4.00E-04	U.S. EPA 2004
IRON	NA	U.S. EPA, 2004	1.00E+00	U.S. EPA, 2004	1.00E-03	U.S. EPA 2004
MANGANESE	NA	U.S. EPA, 2004	0.04	U.S. EPA, 2004	1.00E-03	U.S. EPA 2004
MERCURY	NA	U.S. EPA, 2004	1	U.S. EPA, 2004	1.00E-03	U.S. EPA 2004
VANADIUM	NA	U.S. EPA, 2004	1	U.S. EPA, 2004	1.00E-03	U.S. EPA 2004
PAHs						
BENZ(A)ANTHRACENE	0.13	U.S. EPA, 2004	1	U.S. EPA, 2004	4.70E-01	U.S. EPA 2004
BENZO(B)FLUORANTHENE	0.13	U.S. EPA, 2004	1	U.S. EPA, 2004	7.00E-01	U.S. EPA 2004
BENZO(A)PYRENE	0.13	U.S. EPA, 2004	1	U.S. EPA, 2004	7.00E-01	U.S. EPA 2004
DIBENZ(A,H)ANTHRACENE	0.13	U.S. EPA, 2004	1	U.S. EPA, 2004	1.50E+00	U.S. EPA 2004
INDENO(1,2,3-C,D)PYRENE	0.13	U.S. EPA, 2004	1	U.S. EPA, 2004	1.00E+00	U.S. EPA 2004
Semivolatiles						
BIS(2-ETHYLHEXYL)PHTHALATE	0.1	U.S. EPA, 2004	1	U.S. EPA, 2004	1.13E+00	On-line Database(1)
Volatiles						
BENZENE	NA	U.S. EPA, 2004	1	U.S. EPA, 2004	1.50E-02	U.S. EPA 2004
CHLOROFORM	NA	U.S. EPA, 2004	1	U.S. EPA, 2004	6.80E-03	U.S. EPA 2004
1,4-DICHLOROBENZENE	NA	U.S. EPA, 2004	1	U.S. EPA, 2004	4.20E-02	U.S. EPA 2004
TRICHLOROETHENE	NA	U.S. EPA, 2004	1	U.S. EPA, 2004	1.20E-02	U.S. EPA 2004

NA = Data not available.
GI ABS = Gastrointestional Absorption factors
(1) Toxicity and Chemical-Specific Factors Database. Http://risk.lsd.ornl.gov/cgi-bin/tox. January 2012.
U.S. EPA, 2004 = U.S. Environmental Protection Agency, 2004. *Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment).* Final Guidance.

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TABLE D.6.1
CANCER TOXICITY DATA - ORAL/DERMAL
FORT BUCHANAN

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral Absorption Efficiency for Dermal (GI ABS)(1)	Absorbed Cancer Slope Factor for Dermal (2)	Units	Weight of Evidence/Cancer Guideline Description	Mutagenic Compound	Source	Date (3) (mm/dd/yy)
Inorganics								
ALUMINUM	NA	1	NA	per (mg/kg-day)	NA		PPRTV	10/23/2006
ARSENIC	1.50E+00	1	1.50E+00	per (mg/kg-day)	A		IRIS	1/28/2012
CHROMIUM, TOTAL	5.00E-01	0.025	2.00E+01	per (mg/kg-day)	B2		NJDEP	4/8/2009
COBALT	NA	1	NA	per (mg/kg-day)	NA		PPTRV	8/25/2008
IRON	NA	1	NA	per (mg/kg-day)	NA		PPRTV	9/11/2006
MANGANESE	NA	0.04	NA	per (mg/kg-day)	D		IRIS	1/28/2012
MERCURY	NA	1	NA	per (mg/kg-day)	D		IRIS	1/28/2012
VANADIUM	NA	1	NA	per (mg/kg-day)	NA		IRIS	1/28/2012
PAHs								
BENZ(A)ANTHRACENE	7.30E-01	1	7.30E-01	per (mg/kg-day)	B2	M	IRIS	1/28/2012
BENZO(B)FLUORANTHENE	7.30E-01	1	7.30E-01	per (mg/kg-day)	B2	M	IRIS	1/28/2012
BENZO(A)PYRENE	7.30E+00	1	7.30E+00	per (mg/kg-day)	B2	M	IRIS	1/28/2012
DIBENZ(A,H)ANTHRACENE	7.30E+00	1	7.30E+00	per (mg/kg-day)	B2	M	IRIS	1/28/2012
INDENO(1,2,3-C,D)PYRENE	7.30E-01	1	7.30E-01	per (mg/kg-day)	B2	M	IRIS	1/28/2012
Semivolatiles								
BIS(2-ETHYLHEXYL)PHTHALATE	1.40E-02	1	1.40E-02	per (mg/kg-day)	B2		IRIS	1/28/2012
Volatiles								
BENZENE	5.50E-02	1	5.50E-02	per (mg/kg-day)	A		IRIS	1/28/2012
CHLOROFORM	3.10E-02	1	3.10E-02	per (mg/kg-day)	B2		CalEPA	5/1/2009
1,4-DICHLOROBENZENE	5.40E-03	1	5.30E-03	per (mg/kg-day)	NA		CalEPA	5/1/2009
TRICHLOROETHENE	4.60E-02	1	4.60E-02	per (mg/kg-day)	A		IRIS	1/28/2012

NA = Not Applicable
(1) Taken from USEPA 2004 Guidance.
(2) Dermal Toxicological values adjusted from oral values using USEPA 2004 recommended chemical-specific gastrointestinal absorption factors (GI ABS). CSFs are divided by the GI ABS.
(3) IRIS - Integrated Risk Information System. For IRIS values, the date IRIS was searched is provided.
CalEPA - California EPA Office of Environmental Health Hazard Assessment
PPRTV - Provisional Peer-Reviewed Toxicity Value, the date of the issue paper is provided.
NJDEP - New Jersey Department of Environmental Protection

Weight of Evidence: A - Human carcinogen
B1 - Probable human carcinogen - indicate that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

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TABLE D.6.2
CANCER TOXICITY DATA - INHALATION
FORT BUCHANAN

Chemical of Potential Concern	Unit Risk		Weight of Evidence/Cancer Guideline Description	Mutagenic	Unit Risk - Inhalation CSF	
	Value	Units			Source	Date (1)
Inorganics						
ALUMINUM	NA	$(ug/m^3)^{-1}$	NA		PPRTV	10/23/2006
ARSENIC	4.30E-03	$(ug/m^3)^{-1}$	A		IRIS	1/28/2012
CHROMIUM, TOTAL	8.40E-02	$(ug/m^3)^{-1}$	A		IRIS	1/28/2012
COBALT	9.00E-03	$(ug/m^3)^{-1}$	B2		PPTRV	8/25/2008
IRON	NA	$(ug/m^3)^{-1}$	NA		PPRTV	9/11/2006
MANGANESE	NA	$(ug/m^3)^{-1}$	D		IRIS	1/28/2012
MERCURY	NA	$(ug/m^3)^{-1}$	D		IRIS	1/28/2012
VANADIUM	NA	$(ug/m^3)^{-1}$	NA		IRIS	1/28/2012
PAHs						
BENZ(A)ANTHRACENE	1.10E-04	$(ug/m^3)^{-1}$	B2	M	CalEPA	5/1/2009
BENZO(B)FLUORANTHENE	1.10E-04	$(ug/m^3)^{-1}$	B2	M	CalEPA	5/1/2009
BENZO(A)PYRENE	1.10E-03	$(ug/m^3)^{-1}$	B2	M	CalEPA	5/1/2009
DIBENZ(A,H)ANTHRACENE	1.10E-03	$(ug/m^3)^{-1}$	B2	M	CalEPA	5/1/2009
INDENO(1,2,3-C,D)PYRENE	1.10E-04	$(ug/m^3)^{-1}$	B2	M	CalEPA	5/1/2009
Semivolatiles						
BIS(2-ETHYLHEXYL)PHTHALATE	2.40E-06	$(ug/m^3)^{-1}$	B2		CalEPA	5/1/2009
Volatiles						
BENZENE	7.80E-06	$(ug/m^3)^{-1}$	A		IRIS	1/28/2012
CHLOROFORM	2.30E-05	$(ug/m^3)^{-1}$	B2		IRIS	1/28/2012
1,4-DICHLOROBENZENE	1.10E-05	$(ug/m^3)^{-1}$	NA		CalEPA	5/1/2009
TRICHLOROETHENE	4.10E-06	$(ug/m^3)^{-1}$	A		IRIS	1/28/2012

NA = Not Applicable

(1) IRIS - Integrated Risk Information System. For IRIS values, the date IRIS was searched is provided.
CalEPA - California EPA Office of Environmental Health Hazard Assessment
PPRTV - Provisional Peer-Reviewed Toxicity Value, the date of the issue paper is provided.

Weight of Evidence:
A - Human carcinogen
B1 - Probable human carcinogen - indicate that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

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TABLE D.7.1.1
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 1

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Site 1, 7, 8	Ingestion	**Inorganics**												
				ALUMINUM	2.52E+04	(mg/kg)	8.24E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.92E-03	(mg/kg-day)	1.00E+00	(mg/kg-day)	1.9E-03
				ARSENIC	4.38E+01	(mg/kg)	1.43E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.1E-06	3.34E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.1E-02
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	3.34E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	1.7E-06	7.78E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	2.6E-03
				COBALT	6.60E+00	(mg/kg)	2.16E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	5.04E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.7E-03
				MANGANESE	5.78E+02	(mg/kg)	1.89E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	4.41E-05	(mg/kg-day)	4.70E-02	(mg/kg-day)	9.4E-04
				VANADIUM	1.63E+02	(mg/kg)	5.33E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	1.24E-05	(mg/kg-day)	5.00E-03	(mg/kg-day)	2.5E-03
				PAHs												
				BENZ(A)ANTHRACENE	2.09E-01	(mg/kg)	6.84E-09	(mg/kg-day)	7.30E-01	per (mg/kg-day)	5.0E-09	1.60E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(B)FLUORANTHENE	4.30E-01	(mg/kg)	1.41E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.0E-08	3.28E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	1.38E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	1.0E-07	3.21E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	9.30E-02	(mg/kg)	3.04E-09	(mg/kg-day)	7.30E+00	per (mg/kg-day)	2.2E-08	7.10E-09	(mg/kg-day)	NA	(mg/kg-day)	--
				INDENO(1,2,3-C,D)PYRENE	2.58E-01	(mg/kg)	8.44E-09	(mg/kg-day)	7.30E-01	per (mg/kg-day)	6.2E-09	1.97E-08	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**4.0E-06**					**2.5E-02**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.52E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	4.38E+01	(mg/kg)	3.43E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	5.1E-07	8.00E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.7E-03
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	6.60E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				MANGANESE	5.78E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	1.63E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				PAHs												
				BENZ(A)ANTHRACENE	2.09E-01	(mg/kg)	7.09E-09	(mg/kg-day)	7.30E-01	per (mg/kg-day)	5.2E-09	1.65E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(B)FLUORANTHENE	4.30E-01	(mg/kg)	1.46E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.1E-08	3.40E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	1.43E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	1.0E-07	3.33E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	9.30E-02	(mg/kg)	3.16E-09	(mg/kg-day)	7.30E+00	per (mg/kg-day)	2.3E-08	7.36E-09	(mg/kg-day)	NA	(mg/kg-day)	--
				INDENO(1,2,3-C,D)PYRENE	2.58E-01	(mg/kg)	8.75E-09	(mg/kg-day)	7.30E-01	per (mg/kg-day)	6.4E-09	2.04E-08	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**6.6E-07**					**2.7E-03**
		Exposure Point Total									**4.6E-06**					**2.8E-02**
	Exposure Medium Total										**4.6E-06**					**2.8E-02**
	Air	Site 1, 7, 8	Inhalation	**Inorganics**												
				ALUMINUM	1.85E-05	(mg/m^3)	3.54E-05	(ug/m^3)	NA	per (ug/m^3)	--	2.75E-09	(mg/m^3)	5.00E-03	(mg/m^3)	5.5E-07
				ARSENIC	3.22E-08	(mg/m^3)	6.14E-08	(ug/m^3)	4.30E-03	per (ug/m^3)	2.6E-10	4.78E-12	(mg/m^3)	1.50E-05	(mg/m^3)	3.2E-07
				CHROMIUM, TOTAL	7.50E-08	(mg/m^3)	1.43E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	1.2E-08	1.11E-11	(mg/m^3)	1.00E-04	(mg/m^3)	1.1E-07
				COBALT	4.85E-09	(mg/m^3)	9.26E-09	(ug/m^3)	9.00E-03	per (ug/m^3)	8.3E-11	7.20E-13	(mg/m^3)	6.00E-06	(mg/m^3)	1.2E-07
				IRON	3.13E-05	(mg/m^3)	5.98E-05	(ug/m^3)	NA	per (ug/m^3)	--	4.65E-09	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.25E-07	(mg/m^3)	8.11E-07	(ug/m^3)	NA	per (ug/m^3)	--	6.31E-11	(mg/m^3)	5.00E-05	(mg/m^3)	1.3E-06
				VANADIUM	1.20E-07	(mg/m^3)	2.29E-07	(ug/m^3)	NA	per (ug/m^3)	--	1.78E-11	(mg/m^3)	NA	(mg/m^3)	--
				PAHs												
				BENZ(A)ANTHRACENE	1.54E-10	(mg/m^3)	2.93E-10	(ug/m^3)	1.10E-04	per (ug/m^3)	3.2E-14	2.28E-14	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(B)FLUORANTHENE	3.16E-10	(mg/m^3)	6.03E-10	(ug/m^3)	1.10E-04	per (ug/m^3)	6.6E-14	4.69E-14	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(A)PYRENE	3.10E-10	(mg/m^3)	5.91E-10	(ug/m^3)	1.10E-03	per (ug/m^3)	6.5E-13	4.59E-14	(mg/m^3)	NA	(mg/m^3)	--
				DIBENZ(A,H)ANTHRACENE	6.84E-11	(mg/m^3)	1.30E-10	(ug/m^3)	1.10E-03	per (ug/m^3)	1.4E-13	1.01E-14	(mg/m^3)	NA	(mg/m^3)	--
				INDENO(1,2,3-C,D)PYRENE	1.90E-10	(mg/m^3)	3.62E-10	(ug/m^3)	1.10E-04	per (ug/m^3)	4.0E-14	2.82E-14	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**1.2E-08**					**2.4E-06**
		Exposure Point Total									**1.2E-08**					**2.4E-06**
	Exposure Medium Total										**1.2E-08**					**2.4E-06**
Soil Total											**4.6E-06**					**2.8E-02**
										Total of Receptor Risks Across All Media	**4.6E-06**				Total of Receptor Hazards Across All Media	**2.8E-02**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.1.2
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 1

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Site 1, 7, 8	Ingestion	**Inorganics**												
				ALUMINUM	2.52E+04	(mg/kg)	6.84E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	2.24E-02	(mg/kg-day)	1.00E+00	(mg/kg-day)	2.2E-02
				ARSENIC	4.38E+01	(mg/kg)	1.19E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.8E-06	3.90E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.3E-01
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	2.77E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	1.4E-06	9.08E-05	(mg/kg-day)	3.00E-03	(mg/kg-day)	3.0E-02
				COBALT	6.60E+00	(mg/kg)	1.79E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	5.88E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.0E-02
				IRON	4.26E+04	(mg/kg)	1.16E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	3.79E-02	(mg/kg-day)	7.00E-01	(mg/kg-day)	5.4E-02
				MANGANESE	5.78E+02	(mg/kg)	1.57E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	5.15E-04	(mg/kg-day)	4.70E-02	(mg/kg-day)	1.1E-02
				VANADIUM	1.63E+02	(mg/kg)	4.42E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	1.45E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	2.9E-02
				PAHs												
				BENZ(A)ANTHRACENE	2.09E-01	(mg/kg)	1.70E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.2E-08	1.86E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(B)FLUORANTHENE	4.30E-01	(mg/kg)	3.50E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	2.6E-08	3.83E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	3.43E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	2.5E-07	3.75E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	9.30E-02	(mg/kg)	7.57E-09	(mg/kg-day)	7.30E+00	per (mg/kg-day)	5.5E-08	8.28E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				INDENO(1,2,3-C,D)PYRENE	2.58E-01	(mg/kg)	2.10E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.5E-08	2.30E-07	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**3.5E-06**					**3.0E-01**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.52E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	4.38E+01	(mg/kg)	1.78E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.7E-07	1.55E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.2E-03
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	6.60E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	4.26E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	5.78E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	1.63E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				PAHs												
				BENZ(A)ANTHRACENE	2.09E-01	(mg/kg)	1.10E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	8.0E-09	3.21E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(B)FLUORANTHENE	4.30E-01	(mg/kg)	2.27E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.7E-08	6.61E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	2.22E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	1.6E-07	6.48E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	9.30E-02	(mg/kg)	4.90E-09	(mg/kg-day)	7.30E+00	per (mg/kg-day)	3.6E-08	1.43E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				INDENO(1,2,3-C,D)PYRENE	2.58E-01	(mg/kg)	1.36E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	9.9E-09	3.97E-08	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**5.0E-07**					**5.2E-03**
		Exposure Point Total									**4.0E-06**					**3.0E-01**
	Exposure Medium Total										**4.0E-06**					**3.0E-01**
	Air	Site 1, 7, 8	Inhalation	**Inorganics**												
				ALUMINUM	1.85E-05	(mg/m^3)	9.43E-06	(ug/m^3)	NA	per (ug/m^3)	--	1.03E-08	(mg/m^3)	5.00E-03	(mg/m^3)	2.1E-06
				ARSENIC	3.22E-08	(mg/m^3)	1.64E-08	(ug/m^3)	4.30E-03	per (ug/m^3)	7.0E-11	1.79E-11	(mg/m^3)	1.50E-05	(mg/m^3)	1.2E-06
				CHROMIUM, TOTAL	7.50E-08	(mg/m^3)	3.82E-08	(ug/m^3)	8.40E-02	per (ug/m^3)	3.2E-09	4.17E-11	(mg/m^3)	1.00E-04	(mg/m^3)	4.2E-07
				COBALT	4.85E-09	(mg/m^3)	2.47E-09	(ug/m^3)	9.00E-03	per (ug/m^3)	2.2E-11	2.70E-12	(mg/m^3)	6.00E-06	(mg/m^3)	4.5E-07
				IRON	3.13E-05	(mg/m^3)	1.59E-05	(ug/m^3)	NA	per (ug/m^3)	--	1.74E-08	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.25E-07	(mg/m^3)	2.16E-07	(ug/m^3)	NA	per (ug/m^3)	--	2.37E-10	(mg/m^3)	5.00E-05	(mg/m^3)	4.7E-06
				VANADIUM	1.20E-07	(mg/m^3)	6.10E-08	(ug/m^3)	NA	per (ug/m^3)	--	6.67E-11	(mg/m^3)	NA	(mg/m^3)	--
				PAHs												
				BENZ(A)ANTHRACENE	1.54E-10	(mg/m^3)	2.35E-10	(ug/m^3)	1.10E-04	per (ug/m^3)	2.6E-14	8.55E-14	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(B)FLUORANTHENE	3.16E-10	(mg/m^3)	4.83E-10	(ug/m^3)	1.10E-04	per (ug/m^3)	5.3E-14	1.76E-13	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(A)PYRENE	3.10E-10	(mg/m^3)	4.73E-10	(ug/m^3)	1.10E-03	per (ug/m^3)	5.2E-13	1.72E-13	(mg/m^3)	NA	(mg/m^3)	--
				DIBENZ(A,H)ANTHRACENE	6.84E-11	(mg/m^3)	1.04E-10	(ug/m^3)	1.10E-03	per (ug/m^3)	1.1E-13	3.81E-14	(mg/m^3)	NA	(mg/m^3)	--
				INDENO(1,2,3-C,D)PYRENE	1.90E-10	(mg/m^3)	2.90E-10	(ug/m^3)	1.10E-04	per (ug/m^3)	3.2E-14	1.06E-13	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**3.3E-09**					**8.9E-06**
		Exposure Point Total									**3.3E-09**					**8.9E-06**
	Exposure Medium Total										**3.3E-09**					**8.9E-06**
Soil Total											**4.0E-06**					**3.0E-01**
										Total of Receptor Risks Across All Media	**4.0E-06**				Total of Receptor Hazards Across All Media	**3.0E-01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.1.3
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 1

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Site 1, 7, 8	Ingestion	**Inorganics**												
				ARSENIC	4.38E+01	(mg/kg)	7.65E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.1E-05	2.14E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	7.1E-02
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	1.78E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	8.9E-06	4.99E-05	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.7E-02
				VANADIUM	1.63E+02	(mg/kg)	2.85E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	7.97E-05	(mg/kg-day)	5.00E-03	(mg/kg-day)	1.6E-02
				PAHs												
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	7.36E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	5.4E-07	2.06E-07	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**2.1E-05**					**1.0E-01**
			Dermal[1]	**Inorganics**												
				ARSENIC	4.38E+01	(mg/kg)	1.06E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.6E-06	2.97E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	9.9E-03
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				VANADIUM	1.63E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				PAHs												
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	4.42E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	3.2E-07	1.24E-07	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**1.9E-06**					**9.9E-03**
		Exposure Point Total									**2.3E-05**					**1.1E-01**
	Exposure Medium Total										**2.3E-05**					**1.1E-01**
	Air	Site 1, 7, 8	Inhalation	**Inorganics**												
				ARSENIC	3.22E-08	(mg/m^3)	2.63E-06	(ug/m^3)	4.30E-03	per (ug/m^3)	1.1E-08	2.94E-10	(mg/m^3)	1.50E-05	(mg/m^3)	2.0E-05
				CHROMIUM, TOTAL	7.50E-08	(mg/m^3)	6.12E-06	(ug/m^3)	8.40E-02	per (ug/m^3)	5.1E-07	6.85E-10	(mg/m^3)	1.00E-04	(mg/m^3)	6.8E-06
				VANADIUM	1.20E-07	(mg/m^3)	9.77E-06	(ug/m^3)	NA	per (ug/m^3)	--	1.09E-09	(mg/m^3)	NA	(mg/m^3)	--
				PAHs												
				BENZO(A)PYRENE	3.10E-10	(mg/m^3)	2.52E-08	(ug/m^3)	1.10E-03	per (ug/m^3)	2.8E-11	2.83E-12	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**5.3E-07**					**2.6E-05**
		Exposure Point Total									**5.3E-07**					**2.6E-05**
	Exposure Medium Total										**5.3E-07**					**2.6E-05**
Soil Total											**2.3E-05**					**1.1E-01**
										Total of Receptor Risks Across All Media	**2.3E-05**				Total of Receptor Hazards Across All Media	**1.1E-01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.1.4
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 1

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Site 1, 7, 8	Ingestion	**Inorganics**												
				ARSENIC	2.68E+01	(mg/kg)	1.80E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.7E-06	1.26E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.2E-01
				CHROMIUM, TOTAL	6.63E+01	(mg/kg)	4.45E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.2E-06	3.11E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.0E-01
				COBALT	5.66E+01	(mg/kg)	3.80E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.66E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	8.9E-01
			Exp. Route Total								**4.9E-06**					**1.4E+00**
			Dermal[1]	**Inorganics**												
				ARSENIC	2.68E+01	(mg/kg)	7.41E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.1E-07	5.19E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.7E-02
				CHROMIUM, TOTAL	6.63E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	5.66E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
			Exp. Route Total								**1.1E-07**					**1.7E-02**
		Exposure Point Total									**5.0E-06**					**1.4E+00**
	Exposure Medium Total										**5.0E-06**					**1.4E+00**
	Air	Site 1, 7, 8	Inhalation	**Inorganics**												
				ARSENIC	1.97E-08	(mg/m^3)	1.54E-12	(ug/m^3)	4.30E-03	per (ug/m^3)	6.6E-15	1.08E-10	(mg/m^3)	1.50E-05	(mg/m^3)	7.2E-06
				CHROMIUM, TOTAL	4.88E-08	(mg/m^3)	3.82E-12	(ug/m^3)	8.40E-02	per (ug/m^3)	3.2E-13	2.67E-10	(mg/m^3)	1.00E-04	(mg/m^3)	2.7E-06
				COBALT	4.16E-08	(mg/m^3)	3.26E-12	(ug/m^3)	9.00E-03	per (ug/m^3)	2.9E-14	2.28E-10	(mg/m^3)	6.00E-06	(mg/m^3)	3.8E-05
			Exp. Route Total								**3.6E-13**					**4.8E-05**
		Exposure Point Total									**3.6E-13**					**4.8E-05**
	Exposure Medium Total										**3.6E-13**					**4.8E-05**
Soil Total											**5.0E-06**					**1.4E+00**
										Total of Receptor Risks Across All Media	**5.0E-06**				Total of Receptor Hazards Across All Media	**1.4E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.1.5
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 1

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Site 1, 7, 8	Ingestion	**Inorganics**												
				ALUMINUM	2.52E+04	(mg/kg)	1.18E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.45E-02	(mg/kg-day)	1.00E+00	(mg/kg-day)	3.5E-02
				ARSENIC	4.38E+01	(mg/kg)	2.06E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.1E-05	6.00E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.0E-01
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	4.79E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.4E-05	1.40E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	4.7E-02
				COBALT	6.60E+00	(mg/kg)	3.10E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	9.04E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.0E-02
				IRON	4.26E+04	(mg/kg)	2.00E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	5.84E-02	(mg/kg-day)	7.00E-01	(mg/kg-day)	8.3E-02
				MANGANESE	5.78E+02	(mg/kg)	2.71E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	7.92E-04	(mg/kg-day)	4.70E-02	(mg/kg-day)	1.7E-02
				VANADIUM	1.63E+02	(mg/kg)	7.66E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	2.23E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	4.5E-02
				PAHs												
				BENZ(A)ANTHRACENE	2.09E-01	(mg/kg)	1.77E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.3E-07	2.86E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(B)FLUORANTHENE	4.30E-01	(mg/kg)	3.64E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	2.7E-07	5.89E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	3.56E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	2.6E-06	5.77E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	9.30E-02	(mg/kg)	7.86E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	5.7E-07	1.27E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				INDENO(1,2,3-C,D)PYRENE	2.58E-01	(mg/kg)	2.18E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.6E-07	3.53E-07	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**5.9E-05**					**4.6E-01**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.52E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	4.38E+01	(mg/kg)	2.46E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.7E-06	7.18E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.4E-02
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	6.60E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	4.26E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	5.78E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	1.63E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				PAHs												
				BENZ(A)ANTHRACENE	2.09E-01	(mg/kg)	9.16E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	6.7E-08	1.49E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(B)FLUORANTHENE	4.30E-01	(mg/kg)	1.89E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.4E-07	3.06E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	1.85E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	1.3E-06	2.99E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	9.30E-02	(mg/kg)	4.08E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	3.0E-07	6.61E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				INDENO(1,2,3-C,D)PYRENE	2.58E-01	(mg/kg)	1.13E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	8.3E-08	1.83E-07	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**5.6E-06**					**2.4E-02**
		Exposure Point Total									**6.4E-05**					**4.8E-01**
	Exposure Medium Total										**6.4E-05**					**4.8E-01**
	Air	Site 1, 7, 8	Inhalation	**Inorganics**												
				ALUMINUM	1.85E-05	(mg/m^3)	6.09E-03	(ug/m^3)	NA	per (ug/m^3)	--	1.78E-05	(mg/m^3)	5.00E-03	(mg/m^3)	3.6E-03
				ARSENIC	3.22E-08	(mg/m^3)	1.06E-05	(ug/m^3)	4.30E-03	per (ug/m^3)	4.6E-08	3.09E-08	(mg/m^3)	1.50E-05	(mg/m^3)	2.1E-03
				CHROMIUM, TOTAL	7.50E-08	(mg/m^3)	2.47E-05	(ug/m^3)	8.40E-02	per (ug/m^3)	2.1E-06	7.19E-08	(mg/m^3)	1.00E-04	(mg/m^3)	7.2E-04
				COBALT	4.85E-09	(mg/m^3)	1.60E-06	(ug/m^3)	9.00E-03	per (ug/m^3)	1.4E-08	4.65E-09	(mg/m^3)	6.00E-06	(mg/m^3)	7.8E-04
				IRON	3.13E-05	(mg/m^3)	1.03E-02	(ug/m^3)	NA	per (ug/m^3)	--	3.00E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.25E-07	(mg/m^3)	1.40E-04	(ug/m^3)	NA	per (ug/m^3)	--	4.08E-07	(mg/m^3)	5.00E-05	(mg/m^3)	8.2E-03
				VANADIUM	1.20E-07	(mg/m^3)	3.94E-05	(ug/m^3)	NA	per (ug/m^3)	--	1.15E-07	(mg/m^3)	NA	(mg/m^3)	--
				PAHs												
				BENZ(A)ANTHRACENE	1.54E-10	(mg/m^3)	9.09E-08	(ug/m^3)	1.10E-04	per (ug/m^3)	1.0E-11	1.47E-10	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(B)FLUORANTHENE	3.16E-10	(mg/m^3)	1.87E-07	(ug/m^3)	1.10E-04	per (ug/m^3)	2.1E-11	3.03E-10	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(A)PYRENE	3.10E-10	(mg/m^3)	1.83E-07	(ug/m^3)	1.10E-03	per (ug/m^3)	2.0E-10	2.97E-10	(mg/m^3)	NA	(mg/m^3)	--
				DIBENZ(A,H)ANTHRACENE	6.84E-11	(mg/m^3)	4.05E-08	(ug/m^3)	1.10E-03	per (ug/m^3)	4.5E-11	6.56E-11	(mg/m^3)	NA	(mg/m^3)	--
				INDENO(1,2,3-C,D)PYRENE	1.90E-10	(mg/m^3)	1.12E-07	(ug/m^3)	1.10E-04	per (ug/m^3)	1.2E-11	1.82E-10	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**2.1E-06**					**1.5E-02**
		Exposure Point Total									**2.1E-06**					**1.5E-02**
	Exposure Medium Total										**2.1E-06**					**1.5E-02**
Soil Total											**6.6E-05**					**5.0E-01**
										Total of Receptor Risks Across All Media	**6.6E-05**				Total of Receptor Hazards Across All Media	**5.0E-01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.1.6
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 1

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Site 1, 7, 8	Ingestion	**Inorganics**												
				ALUMINUM	3.14E+04	(mg/kg)	1.48E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	4.31E-02	(mg/kg-day)	1.00E+00	(mg/kg-day)	4.3E-02
				ARSENIC	2.68E+01	(mg/kg)	1.26E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.9E-05	3.67E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.2E-01
				CHROMIUM, TOTAL	6.63E+01	(mg/kg)	3.11E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	1.6E-05	9.08E-05	(mg/kg-day)	3.00E-03	(mg/kg-day)	3.0E-02
				COBALT	5.66E+01	(mg/kg)	2.66E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	7.75E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.6E-01
				IRON	4.37E+04	(mg/kg)	2.05E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	5.98E-02	(mg/kg-day)	7.00E-01	(mg/kg-day)	8.5E-02
				MANGANESE	2.05E+03	(mg/kg)	9.63E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	2.81E-03	(mg/kg-day)	4.70E-02	(mg/kg-day)	6.0E-02
				MERCURY	3.01E+00	(mg/kg)	1.41E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	4.12E-06	(mg/kg-day)	1.00E-04	(mg/kg-day)	4.1E-02
				VANADIUM	1.21E+02	(mg/kg)	5.68E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.66E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	3.3E-02
				PAHs												
				BENZO(A)PYRENE	7.34E-02	(mg/kg)	6.21E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	4.5E-07	1.01E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	1.83E-02	(mg/kg)	1.55E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	1.1E-07	2.51E-08	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**3.5E-05**					**6.7E-01**
			Dermal[1]	**Inorganics**												
				ALUMINUM	3.14E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	2.68E+01	(mg/kg)	1.51E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.3E-06	4.39E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.5E-02
				CHROMIUM, TOTAL	6.63E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	5.66E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	4.37E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	2.05E+03	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				MERCURY	3.01E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E-04	(mg/kg-day)	--
				VANADIUM	1.21E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				PAHs												
				BENZO(A)PYRENE	7.34E-02	(mg/kg)	3.22E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	2.3E-07	5.22E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	1.83E-02	(mg/kg)	8.02E-09	(mg/kg-day)	7.30E+00	per (mg/kg-day)	5.9E-08	1.30E-08	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**2.6E-06**					**1.5E-02**
		Exposure Point Total									**3.8E-05**					**6.9E-01**
	Exposure Medium Total										**3.8E-05**					**6.9E-01**
	Air	Site 1, 7, 8	Inhalation	**Inorganics**												
				ALUMINUM	2.31E-05	(mg/m^3)	7.60E-03	(ug/m^3)	NA	per (ug/m^3)	--	2.22E-05	(mg/m^3)	5.00E-03	(mg/m^3)	4.4E-03
				ARSENIC	1.97E-08	(mg/m^3)	6.48E-06	(ug/m^3)	4.30E-03	per (ug/m^3)	2.8E-08	1.89E-08	(mg/m^3)	1.50E-05	(mg/m^3)	1.3E-03
				CHROMIUM, TOTAL	4.88E-08	(mg/m^3)	1.60E-05	(ug/m^3)	8.40E-02	per (ug/m^3)	1.3E-06	4.67E-08	(mg/m^3)	1.00E-04	(mg/m^3)	4.7E-04
				COBALT	4.16E-08	(mg/m^3)	1.37E-05	(ug/m^3)	9.00E-03	per (ug/m^3)	1.2E-07	3.99E-08	(mg/m^3)	6.00E-06	(mg/m^3)	6.7E-03
				IRON	3.21E-05	(mg/m^3)	1.06E-02	(ug/m^3)	NA	per (ug/m^3)	--	3.08E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	1.51E-06	(mg/m^3)	4.96E-04	(ug/m^3)	NA	per (ug/m^3)	--	1.45E-06	(mg/m^3)	5.00E-05	(mg/m^3)	2.9E-02
				MERCURY	2.21E-09	(mg/m^3)	7.27E-07	(ug/m^3)	NA	per (ug/m^3)	--	2.12E-09	(mg/m^3)	3.00E-04	(mg/m^3)	7.1E-06
				VANADIUM	8.90E-08	(mg/m^3)	2.93E-05	(ug/m^3)	NA	per (ug/m^3)	--	8.53E-08	(mg/m^3)	NA	(mg/m^3)	--
				PAHs												
				BENZO(A)PYRENE	5.40E-11	(mg/m^3)	3.19E-08	(ug/m^3)	1.10E-03	per (ug/m^3)	3.5E-11	5.18E-11	(mg/m^3)	NA	(mg/m^3)	--
				DIBENZ(A,H)ANTHRACENE	1.35E-11	(mg/m^3)	7.96E-09	(ug/m^3)	1.10E-03	per (ug/m^3)	8.8E-12	1.29E-11	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**1.5E-06**					**4.2E-02**
		Exposure Point Total									**1.5E-06**					**4.2E-02**
	Exposure Medium Total										**1.5E-06**					**4.2E-02**
Soil Total											**3.9E-05**					**7.3E-01**
										Total of Receptor Risks Across All Media	**3.9E-05**				Total of Receptor Hazards Across All Media	**7.3E-01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.1.7
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 1

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Site 1, 7, 8	Ingestion	**Inorganics**												
				ALUMINUM	2.52E+04	(mg/kg)	2.76E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.22E-01	(mg/kg-day)	1.00E+00	(mg/kg-day)	3.2E-01
				ARSENIC	4.38E+01	(mg/kg)	4.80E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	7.2E-05	5.60E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.9E+00
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	1.12E-04	(mg/kg-day)	5.00E-01	per (mg/kg-day)	5.6E-05	1.30E-03	(mg/kg-day)	3.00E-03	(mg/kg-day)	4.3E-01
				COBALT	6.60E+00	(mg/kg)	7.23E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	8.44E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.8E-01
				IRON	4.26E+04	(mg/kg)	4.67E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	5.45E-01	(mg/kg-day)	7.00E-01	(mg/kg-day)	7.8E-01
				MANGANESE	5.78E+02	(mg/kg)	6.33E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	7.39E-03	(mg/kg-day)	4.70E-02	(mg/kg-day)	1.6E-01
				VANADIUM	1.63E+02	(mg/kg)	1.79E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	2.08E-03	(mg/kg-day)	5.00E-03	(mg/kg-day)	4.2E-01
				PAHs												
				BENZ(A)ANTHRACENE	2.09E-01	(mg/kg)	1.21E-06	(mg/kg-day)	7.30E-01	per (mg/kg-day)	8.9E-07	2.67E-06	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(B)FLUORANTHENE	4.30E-01	(mg/kg)	2.50E-06	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.8E-06	5.50E-06	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	2.45E-06	(mg/kg-day)	7.30E+00	per (mg/kg-day)	1.8E-05	5.38E-06	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	9.30E-02	(mg/kg)	5.40E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	3.9E-06	1.19E-06	(mg/kg-day)	NA	(mg/kg-day)	--
				INDENO(1,2,3-C,D)PYRENE	2.58E-01	(mg/kg)	1.50E-06	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.1E-06	3.30E-06	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**1.5E-04**					**4.3E+00**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.52E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	4.38E+01	(mg/kg)	4.03E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	6.0E-06	4.70E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.6E-01
				CHROMIUM, TOTAL	1.02E+02	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	6.60E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	4.26E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	5.78E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	1.63E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				PAHs												
				BENZ(A)ANTHRACENE	2.09E-01	(mg/kg)	4.42E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	3.2E-07	9.73E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(B)FLUORANTHENE	4.30E-01	(mg/kg)	9.09E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	6.6E-07	2.00E-06	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	4.21E-01	(mg/kg)	8.90E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	6.5E-06	1.96E-06	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	9.30E-02	(mg/kg)	1.97E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	1.4E-06	4.33E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				INDENO(1,2,3-C,D)PYRENE	2.58E-01	(mg/kg)	5.45E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	4.0E-07	1.20E-06	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**1.5E-05**					**1.6E-01**
		Exposure Point Total									**1.7E-04**					**4.4E+00**
	Exposure Medium Total										**1.7E-04**					**4.4E+00**
	Air	Site 1, 7, 8	Inhalation	**Inorganics**												
				ALUMINUM	1.85E-05	(mg/m^3)	3.66E-08	(ug/m^3)	NA	per (ug/m^3)	--	4.26E-07	(mg/m^3)	5.00E-03	(mg/m^3)	8.5E-05
				ARSENIC	3.22E-08	(mg/m^3)	6.35E-11	(ug/m^3)	4.30E-03	per (ug/m^3)	2.7E-13	7.41E-10	(mg/m^3)	1.50E-05	(mg/m^3)	4.9E-05
				CHROMIUM, TOTAL	7.50E-08	(mg/m^3)	1.48E-10	(ug/m^3)	8.40E-02	per (ug/m^3)	1.2E-11	1.73E-09	(mg/m^3)	1.00E-04	(mg/m^3)	1.7E-05
				COBALT	4.85E-09	(mg/m^3)	9.57E-12	(ug/m^3)	9.00E-03	per (ug/m^3)	8.6E-14	1.12E-10	(mg/m^3)	6.00E-06	(mg/m^3)	1.9E-05
				IRON	3.13E-05	(mg/m^3)	6.18E-08	(ug/m^3)	NA	per (ug/m^3)	--	7.21E-07	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	4.25E-07	(mg/m^3)	8.38E-10	(ug/m^3)	NA	per (ug/m^3)	--	9.78E-09	(mg/m^3)	5.00E-05	(mg/m^3)	2.0E-04
				VANADIUM	1.20E-07	(mg/m^3)	2.36E-10	(ug/m^3)	NA	per (ug/m^3)	--	2.76E-09	(mg/m^3)	NA	(mg/m^3)	--
				PAHs												
				BENZ(A)ANTHRACENE	1.54E-10	(mg/m^3)	1.61E-12	(ug/m^3)	1.10E-04	per (ug/m^3)	1.8E-16	3.54E-12	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(B)FLUORANTHENE	3.16E-10	(mg/m^3)	3.31E-12	(ug/m^3)	1.10E-04	per (ug/m^3)	3.6E-16	7.28E-12	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(A)PYRENE	3.10E-10	(mg/m^3)	3.24E-12	(ug/m^3)	1.10E-03	per (ug/m^3)	3.6E-15	7.12E-12	(mg/m^3)	NA	(mg/m^3)	--
				DIBENZ(A,H)ANTHRACENE	6.84E-11	(mg/m^3)	7.15E-13	(ug/m^3)	1.10E-03	per (ug/m^3)	7.9E-16	1.57E-12	(mg/m^3)	NA	(mg/m^3)	--
				INDENO(1,2,3-C,D)PYRENE	1.90E-10	(mg/m^3)	1.98E-12	(ug/m^3)	1.10E-04	per (ug/m^3)	2.2E-16	4.37E-12	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**1.3E-11**					**3.7E-04**
		Exposure Point Total									**1.3E-11**					**3.7E-04**
	Exposure Medium Total										**1.3E-11**					**3.7E-04**
Soil Total											**1.7E-04**					**4.4E+00**
										Total of Receptor Risks Across All Media	**1.7E-04**				Total of Receptor Hazards Across All Media	**4.4E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.1.8
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 1

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Site 1, 7, 8	Ingestion	**Inorganics**												
				ALUMINUM	3.14E+04	(mg/kg)	3.44E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	4.02E-01	(mg/kg-day)	1.00E+00	(mg/kg-day)	4.0E-01
				ARSENIC	2.68E+01	(mg/kg)	2.94E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	4.4E-05	3.43E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.1E+00
				CHROMIUM, TOTAL	6.63E+01	(mg/kg)	7.27E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	3.6E-05	8.48E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	2.8E-01
				COBALT	5.66E+01	(mg/kg)	6.20E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	7.24E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.4E+00
				IRON	4.37E+04	(mg/kg)	4.79E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	5.58E-01	(mg/kg-day)	7.00E-01	(mg/kg-day)	8.0E-01
				MANGANESE	2.05E+03	(mg/kg)	2.25E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	2.62E-02	(mg/kg-day)	4.70E-02	(mg/kg-day)	5.6E-01
				MERCURY	3.01E+00	(mg/kg)	3.30E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	3.85E-05	(mg/kg-day)	1.00E-04	(mg/kg-day)	3.8E-01
				VANADIUM	1.21E+02	(mg/kg)	1.33E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.55E-03	(mg/kg-day)	5.00E-03	(mg/kg-day)	3.1E-01
				PAHs												
				BENZO(A)PYRENE	7.34E-02	(mg/kg)	4.26E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	3.1E-06	9.38E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	1.83E-02	(mg/kg)	1.06E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	7.8E-07	2.34E-07	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**8.4E-05**					**6.3E+00**
			Dermal[1]	**Inorganics**												
				ALUMINUM	3.14E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	2.68E+01	(mg/kg)	2.47E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.7E-06	2.88E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	9.6E-02
				CHROMIUM, TOTAL	6.63E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	5.66E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	4.37E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	2.05E+03	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				MERCURY	3.01E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E-04	(mg/kg-day)	--
				VANADIUM	1.21E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				PAHs												
				BENZO(A)PYRENE	7.34E-02	(mg/kg)	1.55E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	1.1E-06	3.42E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				DIBENZ(A,H)ANTHRACENE	1.83E-02	(mg/kg)	3.87E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	2.8E-07	8.52E-08	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**5.1E-06**					**9.6E-02**
		Exposure Point Total									**8.9E-05**					**6.4E+00**
	Exposure Medium Total										**8.9E-05**					**6.4E+00**
	Air	Site 1, 7, 8	Inhalation	**Inorganics**												
				ALUMINUM	2.31E-05	(mg/m^3)	4.56E-08	(ug/m^3)	NA	per (ug/m^3)	--	5.32E-07	(mg/m^3)	5.00E-03	(mg/m^3)	1.1E-04
				ARSENIC	1.97E-08	(mg/m^3)	3.89E-11	(ug/m^3)	4.30E-03	per (ug/m^3)	1.7E-13	4.53E-10	(mg/m^3)	1.50E-05	(mg/m^3)	3.0E-05
				CHROMIUM, TOTAL	4.88E-08	(mg/m^3)	9.62E-11	(ug/m^3)	8.40E-02	per (ug/m^3)	8.1E-12	1.12E-09	(mg/m^3)	1.00E-04	(mg/m^3)	1.1E-05
				COBALT	4.16E-08	(mg/m^3)	8.21E-11	(ug/m^3)	9.00E-03	per (ug/m^3)	7.4E-13	9.58E-10	(mg/m^3)	6.00E-06	(mg/m^3)	1.6E-04
				IRON	3.21E-05	(mg/m^3)	6.34E-08	(ug/m^3)	NA	per (ug/m^3)	--	7.39E-07	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	1.51E-06	(mg/m^3)	2.97E-09	(ug/m^3)	NA	per (ug/m^3)	--	3.47E-08	(mg/m^3)	5.00E-05	(mg/m^3)	6.9E-04
				MERCURY	2.21E-09	(mg/m^3)	4.36E-12	(ug/m^3)	NA	per (ug/m^3)	--	5.09E-11	(mg/m^3)	3.00E-04	(mg/m^3)	1.7E-07
				VANADIUM	8.90E-08	(mg/m^3)	1.76E-10	(ug/m^3)	NA	per (ug/m^3)	--	2.05E-09	(mg/m^3)	NA	(mg/m^3)	--
				PAHs												
				BENZO(A)PYRENE	5.40E-11	(mg/m^3)	5.64E-13	(ug/m^3)	1.10E-03	per (ug/m^3)	6.2E-16	1.24E-12	(mg/m^3)	NA	(mg/m^3)	--
				DIBENZ(A,H)ANTHRACENE	1.35E-11	(mg/m^3)	1.41E-13	(ug/m^3)	1.10E-03	per (ug/m^3)	1.5E-16	3.10E-13	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**9.0E-12**					**1.0E-03**
		Exposure Point Total									**9.0E-12**					**1.0E-03**
	Exposure Medium Total										**9.0E-12**					**1.0E-03**
Soil Total											**8.9E-05**					**6.4E+00**
										Total of Receptor Risks Across All Media	**8.9E-05**				Total of Receptor Hazards Across All Media	**6.4E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidanc
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.1.9

CALCULATIONS OF AIR CONCENTRATIONS DUE TO DUST ENTRAINMENT FROM SOIL

FORT BUCHANAN - GROUPING 1

Model Equations:

Particulate Emmision Factor	PEF = Q/C x [(3,600 s/h)/(.36 x (1- V) x (Um/Ut)^3 x F(x))] =	1.36E+09
Air Concentration	Cair = Csoil/PEF	m^3/kg

Model Constants:				
	Q/C	9.38E+01	g/m^2-s per kg/m^3	Inverse Mean Concentration at Center of 0.05 square, USEPA 2011b
	V	5.00E-01	unitless	Default, USEPA 2011b
	Um	4.69E+00	m/s	Mean annual wind speed, USEPA 2011b
	Ut	1.13E+01	m/s	Equivalent threshold value of windspeed at 7 m, USEPA 2011b
	F(x)	1.94E-01	unitless	Default, USEPA 2011b

Reference for the model: USEPA Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response. U.S. EPA, 1996.

Chemical	Csoil, Surface Soil	Csoil, Subsurface Soil	Cair, Surface Soil Particulate	Cair, Subsurface Soil Particulate
	RME EPC	RME EPC	RME EPC	RME EPC
	mg/kg	mg/kg	mg/m^3	mg/m^3
Inorganics				
ALUMINUM	2.52E+04	3.14E+04	1.85E-05	2.31E-05
ARSENIC	4.38E+01	2.68E+01	3.22E-08	1.97E-08
CHROMIUM, TOTAL	1.02E+02	6.63E+01	7.50E-08	4.88E-08
COBALT	6.60E+00	5.66E+01	4.85E-09	4.16E-08
IRON	4.26E+04	4.37E+04	3.13E-05	3.21E-05
MANGANESE	5.78E+02	2.05E+03	4.25E-07	1.51E-06
MERCURY	NA	3.01E+00	NA	2.21E-09
VANADIUM	1.63E+02	1.21E+02	1.20E-07	8.90E-08
PAHs				
BENZ(A)ANTHRACENE	2.09E-01	NA	1.54E-10	NA
BENZO(B)FLUORANTHENE	4.30E-01	NA	3.16E-10	NA
BENZO(A)PYRENE	4.21E-01	7.34E-02	3.10E-10	5.40E-11
DIBENZ(A,H)ANTHRACENE	9.30E-02	1.83E-02	6.84E-11	1.35E-11
INDENO(1,2,3-C,D)PYRENE	2.58E-01	NA	1.90E-10	NA

NA = Not applicable because the chemical is not a COPC in this media.

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TABLE D.7.2.1
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 2

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Sites 2, 3, 11	Ingestion	**Inorganics**												
				ARSENIC	6.62E+01	(mg/kg)	4.44E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	7E-06	3.11E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	1E+00
				CHROMIUM, TOTAL	9.77E+01	(mg/kg)	6.56E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	3E-06	4.59E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	2E-01
				COBALT	1.81E+01	(mg/kg)	1.21E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	8.49E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	3E-01
				MANGANESE	1.28E+04	(mg/kg)	8.59E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	6.01E-02	(mg/kg-day)	4.70E-02	(mg/kg-day)	1E+00
				VANADIUM	1.77E+02	(mg/kg)	1.19E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	8.33E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	2E-01
			Exp. Route Total								**1E-05**					**3E+00**
			Dermal[1]	**Inorganics**												
				ARSENIC	6.62E+01	(mg/kg)	1.83E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3E-07	1.28E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	4E-02
				CHROMIUM, TOTAL	9.77E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.81E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				MANGANESE	1.28E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	1.77E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**3E-07**					**4E-02**
		Exposure Point Total									**1E-05**					**3E+00**
	Exposure Medium Total										**1E-05**					**3E+00**
	Air	Sites 2, 3, 11	Inhalation	**Inorganics**												
				ARSENIC	4.86E-08	(mg/m^3)	1.59E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	7E-10	1.11E-08	(mg/m^3)	1.50E-05	(mg/m^3)	7E-04
				CHROMIUM, TOTAL	7.18E-08	(mg/m^3)	2.34E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	2E-08	1.64E-08	(mg/m^3)	1.00E-04	(mg/m^3)	2E-04
				COBALT	1.33E-08	(mg/m^3)	4.33E-08	(ug/m^3)	9.00E-03	per (ug/m^3)	4E-10	3.03E-09	(mg/m^3)	6.00E-06	(mg/m^3)	5E-04
				MANGANESE	9.41E-06	(mg/m^3)	3.07E-05	(ug/m^3)	NA	per (ug/m^3)	--	2.15E-06	(mg/m^3)	5.00E-05	(mg/m^3)	4E-02
				VANADIUM	1.30E-07	(mg/m^3)	4.25E-07	(ug/m^3)	NA	per (ug/m^3)	--	2.98E-08	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**2E-08**					**4E-02**
		Exposure Point Total									**2E-08**					**4E-02**
	Exposure Medium Total										**2E-08**					**4E-02**
Soil Total											**1E-05**					**3E+00**
										Total of Receptor Risks Across All Media	**1E-05**				Total of Receptor Hazards Across All Media	**3E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.2.2
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 2

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Sites 2, 3, 11	Ingestion	**Inorganics**												
				ALUMINUM	2.75E+04	(mg/kg)	1.29E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.77E-02	(mg/kg-day)	1.00E+00	(mg/kg-day)	4E-02
				ARSENIC	6.62E+01	(mg/kg)	3.11E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	5E-05	9.06E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	3E-01
				CHROMIUM, TOTAL	9.77E+01	(mg/kg)	4.59E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2E-05	1.34E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	4E-02
				COBALT	1.81E+01	(mg/kg)	8.49E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.48E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	8E-02
				IRON	7.16E+04	(mg/kg)	3.36E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	9.81E-02	(mg/kg-day)	7.00E-01	(mg/kg-day)	1E-01
				MANGANESE	1.28E+04	(mg/kg)	6.01E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	1.75E-02	(mg/kg-day)	4.70E-02	(mg/kg-day)	4E-01
				VANADIUM	1.77E+02	(mg/kg)	8.33E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	2.43E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	5E-02
				Volatiles												
				ETHYLBENZENE	1.86E+01	(mg/kg)	8.74E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.55E-05	(mg/kg-day)	1.00E-01	(mg/kg-day)	3E-04
			Exp. Route Total								**7E-05**					**1E+00**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.75E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	6.62E+01	(mg/kg)	3.72E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	6E-06	1.08E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	4E-02
				CHROMIUM, TOTAL	9.77E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.81E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	7.16E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	2.00E-03	(mg/kg-day)	--
				MANGANESE	1.28E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	1.77E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				Volatiles												
				ETHYLBENZENE	1.86E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E-01	(mg/kg-day)	--
			Exp. Route Total								**6E-06**					**4E-02**
		Exposure Point Total									**8E-05**					**1E+00**
	Exposure Medium Total										**8E-05**					**1E+00**
	Air	Sites 2, 3, 11	Inhalation	**Inorganics**												
				ALUMINUM	2.02E-05	(mg/m^3)	2.77E-04	(ug/m^3)	NA	per (ug/m^3)	--	8.08E-07	(mg/m^3)	5.00E-03	(mg/m^3)	2E-04
				ARSENIC	4.86E-08	(mg/m^3)	6.66E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	3E-09	1.94E-09	(mg/m^3)	1.50E-05	(mg/m^3)	1E-04
				CHROMIUM, TOTAL	7.18E-08	(mg/m^3)	9.84E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	8E-08	2.87E-09	(mg/m^3)	1.00E-04	(mg/m^3)	3E-05
				COBALT	1.33E-08	(mg/m^3)	1.82E-07	(ug/m^3)	9.00E-03	per (ug/m^3)	2E-09	5.31E-10	(mg/m^3)	6.00E-06	(mg/m^3)	9E-05
				IRON	5.27E-05	(mg/m^3)	5.94E-03	(ug/m^3)	NA	per (ug/m^3)	--	7.21E-04	(mg/m3)	NA	(mg/m3)	--
				MANGANESE	9.41E-06	(mg/m^3)	1.29E-04	(ug/m^3)	NA	per (ug/m^3)	--	3.76E-07	(mg/m^3)	5.00E-05	(mg/m^3)	8E-03
				VANADIUM	1.30E-07	(mg/m^3)	1.79E-06	(ug/m^3)	NA	per (ug/m^3)	--	5.21E-09	(mg/m^3)	NA	(mg/m^3)	--
				Volatiles												
				ETHYLBENZENE	1.37E-08	(mg/m^3)	1.87E-07	(ug/m^3)	2.50E-06	per (ug/m^3)	5E-13	5.46E-10	(mg/m^3)	1.00E+00	(mg/m^3)	5E-10
			Exp. Route Total								**9E-08**					**8E-03**
		Exposure Point Total									**9E-08**					**8E-03**
	Exposure Medium Total										**9E-08**					**8E-03**
Soil Total											**8E-05**					**1E+00**
										Total of Receptor Risks Across All Media	**8E-05**				Total of Receptor Hazards Across All Media	**1E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.2.3
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 2

Scenario Timeframe: Future
Receptor Population: Residen
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentratior		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Sites 2, 3, 11	Ingestion	**Inorganics**												
				ALUMINUM	2.75E+04	(mg/kg)	3.01E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.52E-01	(mg/kg-day)	1.00E+00	(mg/kg-day)	4E-01
				ARSENIC	6.62E+01	(mg/kg)	7.25E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1E-04	8.46E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	3E+00
				CHROMIUM, TOTAL	9.77E+01	(mg/kg)	1.07E-04	(mg/kg-day)	5.00E-01	per (mg/kg-day)	5E-05	1.25E-03	(mg/kg-day)	3.00E-03	(mg/kg-day)	4E-01
				COBALT	1.81E+01	(mg/kg)	1.98E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	2.31E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	8E-01
				IRON	7.16E+04	(mg/kg)	7.85E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	9.16E-01	(mg/kg-day)	7.00E-01	(mg/kg-day)	1E+00
				MANGANESE	1.28E+04	(mg/kg)	1.40E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	1.64E-01	(mg/kg-day)	4.70E-02	(mg/kg-day)	3E+00
				VANADIUM	1.77E+02	(mg/kg)	1.94E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	2.27E-03	(mg/kg-day)	5.00E-03	(mg/kg-day)	5E-01
				Volatiles												
				ETHYLBENZENE	1.86E+01	(mg/kg)	2.04E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	2.38E-04	(mg/kg-day)	1.00E-01	(mg/kg-day)	2E-03
			Exp. Route Total								**2E-04**					**1E+01**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.75E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	6.62E+01	(mg/kg)	6.09E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	9E-06	7.11E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	2E-01
				CHROMIUM, TOTAL	9.77E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.81E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	7.16E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	2.00E-03	(mg/kg-day)	--
				MANGANESE	1.28E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	1.77E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				Volatiles												
				ETHYLBENZENE	1.86E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E-01	(mg/kg-day)	--
			Exp. Route Total								**9E-06**					**2E-01**
		Exposure Point Total									**2E-04**					**1E+01**
	Exposure Medium Total										**2E-04**					**1E+01**
	Air	Sites 2, 3, 11	Inhalation	**Inorganics**												
				ALUMINUM	2.02E-05	(mg/m^3)	6.93E-05	(ug/m^3)	NA	per (ug/m^3)	--	8.08E-07	(mg/m^3)	5.00E-03	(mg/m^3)	2E-04
				ARSENIC	4.86E-08	(mg/m^3)	1.67E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	7E-10	1.94E-09	(mg/m^3)	1.50E-05	(mg/m^3)	1E-04
				CHROMIUM, TOTAL	7.18E-08	(mg/m^3)	2.46E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	2E-08	2.87E-09	(mg/m^3)	1.00E-04	(mg/m^3)	3E-05
				COBALT	1.33E-08	(mg/m^3)	4.55E-08	(ug/m^3)	9.00E-03	per (ug/m^3)	4E-10	5.31E-10	(mg/m^3)	6.00E-06	(mg/m^3)	9E-05
				IRON	5.27E-05	(mg/m^3)	6.92E-03	(ug/m^3)	NA	per (ug/m^3)	--	3.37E-03	(mg/m3)	NA	(mg/m3)	--
				MANGANESE	9.41E-06	(mg/m^3)	3.22E-05	(ug/m^3)	NA	per (ug/m^3)	--	3.76E-07	(mg/m^3)	5.00E-05	(mg/m^3)	8E-03
				VANADIUM	1.30E-07	(mg/m^3)	4.47E-07	(ug/m^3)	NA	per (ug/m^3)	--	5.21E-09	(mg/m^3)	NA	(mg/m^3)	--
				Volatiles												
				ETHYLBENZENE	1.37E-08	(mg/m^3)	4.68E-08	(ug/m^3)	2.50E-06	per (ug/m^3)	1E-13	5.46E-10	(mg/m^3)	1.00E+00	(mg/m^3)	5E-10
			Exp. Route Total								**2E-08**					**8E-03**
		Exposure Point Total									**2E-08**					**8E-03**
	Exposure Medium Total										**2E-08**					**8E-03**
Soil Total											**2E-04**					**1E+01**
										Total of Receptor Risks Across All Media	**2E-04**			Total of Receptor Hazards Across All Media		**1E+01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidanc
EPC = Exposure Point Concentratior
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentratior

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TABLE D.7.2.4

CALCULATIONS OF AIR CONCENTRATIONS DUE TO DUST ENTRAINMENT FROM SOIL

FORT BUCHANAN - GROUPING 2

Model Equations:

Particulate Emmision Factor	PEF = Q/C x [(3,600 s/h)/(.36 x (1- V) x (Um/Ut)^3 x F(x))] =	1.36E+09
Air Concentration	Cair = Csoil/PEF	m^3/kg

Model Constants:				
	Q/C	9.38E+01	g/m^2-s per kg/m^3	Inverse Mean Concentration at Center of 0.05 square, USEPA 2011b
	V	5.00E-01	unitless	Default, USEPA 2011b
	Um	4.69E+00	m/s	Mean annual wind speed, USEPA 2011b
	Ut	1.13E+01	m/s	Equivalent threshold value of windspeed at 7 m, USEPA 2011b
	F(x)	1.94E-01	unitless	Default, USEPA 2011b

Reference for the model: USEPA Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response. U.S. EPA, 1996.

Chemical	Csoil, Surface Soil	Csoil, Subsurface Soil	Cair, Surface Soil Particulate	Cair, Subsurface Soil Particulate
	RME EPC	RME EPC	RME EPC	RME EPC
	mg/kg	mg/kg	mg/m^3	mg/m^3
Inorganics				
ALUMINUM	NA	2.75E+04	NA	2.02E-05
ARSENIC	NA	6.62E+01	NA	4.86E-08
CHROMIUM, TOTAL	NA	9.77E+01	NA	7.18E-08
COBALT	NA	1.81E+01	NA	1.33E-08
IRON	NA	7.16E+04	NA	5.27E-05
MANGANESE	NA	1.28E+04	NA	9.41E-06
VANADIUM	NA	1.77E+02	NA	1.30E-07
Volatiles				
ETHYLBENZENE	NA	1.86E+01	NA	1.37E-08

NA = Not applicable because the chemical is not a COPC in this media.

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TABLE D.7.3.1
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 3

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Sites 13 and 15	Ingestion	**Inorganics**												
				ALUMINUM	2.16E+04	(mg/kg)	7.07E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	5.50E-05	(mg/kg-day)	1.00E+00	(mg/kg-day)	5.5E-05
				ARSENIC	1.28E+01	(mg/kg)	4.20E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	6.3E-07	3.27E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.1E-04
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	1.10E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	5.5E-07	8.52E-08	(mg/kg-day)	3.00E-03	(mg/kg-day)	2.8E-05
				COBALT	1.50E+01	(mg/kg)	4.90E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	3.81E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.3E-04
				IRON	2.86E+04	(mg/kg)	9.35E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	7.27E-05	(mg/kg-day)	7.00E-01	(mg/kg-day)	1.04E-04
				MANGANESE	9.17E+02	(mg/kg)	3.00E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	2.33E-06	(mg/kg-day)	4.70E-02	(mg/kg-day)	5.0E-05
				VANADIUM	9.68E+01	(mg/kg)	3.17E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.46E-07	(mg/kg-day)	5.00E-03	(mg/kg-day)	4.9E-05
			Exp. Route Total								**1.2E-06**					**5.2E-04**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.16E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	1.28E+01	(mg/kg)	1.01E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.5E-07	7.82E-09	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.6E-05
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.50E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	2.86E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	9.17E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	9.68E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**1.5E-07**					**2.6E-05**
		Exposure Point Total									**1.3E-06**					**5.5E-04**
	Exposure Medium Total										**1.3E-06**					**5.5E-04**
	Air	Sites 13 and 15	Inhalation	**Inorganics**												
				ALUMINUM	1.59E-05	(mg/m^3)	3.03E-05	(ug/m^3)	NA	per (ug/m^3)	--	7.07E-08	(mg/m^3)	5.00E-03	(mg/m^3)	1.4E-05
				ARSENIC	9.44E-09	(mg/m^3)	1.80E-08	(ug/m^3)	4.30E-03	per (ug/m^3)	7.7E-11	4.20E-11	(mg/m^3)	1.50E-05	(mg/m^3)	2.8E-06
				CHROMIUM, TOTAL	2.46E-08	(mg/m^3)	4.70E-08	(ug/m^3)	8.40E-02	per (ug/m^3)	3.9E-09	1.10E-10	(mg/m^3)	1.00E-04	(mg/m^3)	1.1E-06
				COBALT	1.10E-08	(mg/m^3)	2.10E-08	(ug/m^3)	9.00E-03	per (ug/m^3)	1.9E-10	4.90E-11	(mg/m^3)	6.00E-06	(mg/m^3)	8.2E-06
				IRON	2.10E-05	(mg/m^3)	4.01E-05	(ug/m^3)	NA	per (ug/m^3)	--	9.36E-08	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	6.74E-07	(mg/m^3)	1.29E-06	(ug/m^3)	NA	per (ug/m^3)	--	3.00E-09	(mg/m^3)	5.00E-05	(mg/m^3)	6.0E-05
				VANADIUM	7.12E-08	(mg/m^3)	1.36E-07	(ug/m^3)	NA	per (ug/m^3)	--	3.17E-10	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**4.2E-09**					**8.6E-05**
		Exposure Point Total									**4.2E-09**					**8.6E-05**
	Exposure Medium Total										**4.2E-09**					**8.6E-05**
Soil Total											**1.3E-06**					**6.3E-04**
										Total of Receptor Risks Across All Media	**1.3E-06**				Total of Receptor Hazards Across All Media	**6.3E-04**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.3.2
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 3

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Sites 13 and 15	Ingestion	**Inorganics**												
				ALUMINUM	2.16E+04	(mg/kg)	5.86E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	6.41E-04	(mg/kg-day)	1.00E+00	(mg/kg-day)	6.4E-04
				ARSENIC	1.28E+01	(mg/kg)	3.48E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	5.2E-07	3.81E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.3E-03
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	9.09E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	4.5E-07	9.94E-07	(mg/kg-day)	3.00E-03	(mg/kg-day)	3.3E-04
				COBALT	1.50E+01	(mg/kg)	4.07E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	4.45E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.5E-03
				IRON	2.86E+04	(mg/kg)	7.76E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	8.49E-04	(mg/kg-day)	7.00E-01	(mg/kg-day)	1.21E-03
				MANGANESE	9.17E+02	(mg/kg)	2.49E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	2.72E-05	(mg/kg-day)	4.70E-02	(mg/kg-day)	5.8E-04
				VANADIUM	9.68E+01	(mg/kg)	2.63E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.87E-06	(mg/kg-day)	5.00E-03	(mg/kg-day)	5.7E-04
			Exp. Route Total								**9.8E-07**					**6.1E-03**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.16E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	1.28E+01	(mg/kg)	5.21E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	7.8E-08	5.70E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.9E-04
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.50E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	2.86E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	9.17E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	9.68E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**7.8E-08**					**1.9E-04**
		Exposure Point Total									**1.1E-06**					**6.3E-03**
	Exposure Medium Total										**1.1E-06**					**6.3E-03**
	Air	Sites 13 and 15	Inhalation	**Inorganics**												
				ALUMINUM	1.59E-05	(mg/m^3)	8.08E-06	(ug/m^3)	NA	per (ug/m^3)	--	7.07E-08	(mg/m^3)	5.00E-03	(mg/m^3)	1.4E-05
				ARSENIC	9.44E-09	(mg/m^3)	4.80E-09	(ug/m^3)	4.30E-03	per (ug/m^3)	2.1E-11	4.20E-11	(mg/m^3)	1.50E-05	(mg/m^3)	2.8E-06
				CHROMIUM, TOTAL	2.46E-08	(mg/m^3)	1.25E-08	(ug/m^3)	8.40E-02	per (ug/m^3)	1.1E-09	1.10E-10	(mg/m^3)	1.00E-04	(mg/m^3)	1.1E-06
				COBALT	1.10E-08	(mg/m^3)	5.60E-09	(ug/m^3)	9.00E-03	per (ug/m^3)	5.0E-11	4.90E-11	(mg/m^3)	6.00E-06	(mg/m^3)	8.2E-06
				IRON	2.10E-05	(mg/m^3)	1.07E-05	(ug/m3)	NA	per (ug/m3)	--	9.36E-08	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	6.74E-07	(mg/m^3)	3.43E-07	(ug/m^3)	NA	per (ug/m^3)	--	3.00E-09	(mg/m^3)	5.00E-05	(mg/m^3)	6.0E-05
				VANADIUM	7.12E-08	(mg/m^3)	3.62E-08	(ug/m^3)	NA	per (ug/m^3)	--	3.17E-10	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**1.1E-09**					**8.6E-05**
		Exposure Point Total									**1.1E-09**					**8.6E-05**
	Exposure Medium Total										**1.1E-09**					**8.6E-05**
Soil Total											**1.1E-06**					**6.4E-03**
										Total of Receptor Risks Across All Media	**1.1E-06**				Total of Receptor Hazards Across All Media	**6.4E-03**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.3.3
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 3

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Sites 13 and 15	Ingestion	**Inorganics**												
				ARSENIC	1.28E+01	(mg/kg)	2.24E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.4E-06	2.51E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	8.4E-04
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	5.85E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.9E-06	6.55E-07	(mg/kg-day)	3.00E-03	(mg/kg-day)	2.2E-04
			Exp. Route Total								**6.3E-06**					**1.1E-03**
			Dermal[1]	**Inorganics**												
				ARSENIC	1.28E+01	(mg/kg)	3.11E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	4.7E-07	3.48E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.2E-04
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
			Exp. Route Total								**4.7E-07**					**1.2E-04**
		Exposure Point Total									**6.8E-06**					**1.2E-03**
	Exposure Medium Total										**6.8E-06**					**1.2E-03**
	Air	Sites 13 and 15	Inhalation	**Inorganics**												
				ARSENIC	9.44E-09	(mg/m^3)	7.70E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	3.3E-09	2.16E-09	(mg/m^3)	1.50E-05	(mg/m^3)	1.4E-04
				CHROMIUM, TOTAL	2.46E-08	(mg/m^3)	2.01E-06	(ug/m^3)	8.40E-02	per (ug/m^3)	1.7E-07	5.62E-09	(mg/m^3)	1.00E-04	(mg/m^3)	5.6E-05
			Exp. Route Total								**1.7E-07**					**2.0E-04**
		Exposure Point Total									**1.7E-07**					**2.0E-04**
	Exposure Medium Total										**1.7E-07**					**2.0E-04**
Soil Total											**6.9E-06**					**1.4E-03**
										Total of Receptor Risks Across All Media	**6.9E-06**				Total of Receptor Hazards Across All Media	**1.4E-03**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.3.4
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 3

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Sites 13 and 15	Ingestion	**Inorganics**												
				ARSENIC	4.52E+01	(mg/kg)	3.03E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	4.55E-06	2.12E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	7.08E-01
				CHROMIUM, TOTAL	8.93E+01	(mg/kg)	5.99E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	3.00E-06	4.19E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.40E-01
			Exp. Route Total								**7.54E-06**					**8.47E-01**
			Dermal[1]	**Inorganics**												
				ARSENIC	4.52E+01	(mg/kg)	1.25E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.88E-07	8.76E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.92E-02
				CHROMIUM, TOTAL	8.93E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
			Exp. Route Total								**1.88E-07**					**2.92E-02**
		Exposure Point Total									**7.73E-06**					**8.77E-01**
	Exposure Medium Total										**7.73E-06**					**8.77E-01**
	Air	Sites 13 and 15	Inhalation	**Inorganics**												
				ARSENIC	3.32E-08	(mg/m^3)	1.08E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	4.66E-10	7.59E-09	(mg/m^3)	1.50E-05	(mg/m^3)	5.06E-04
				CHROMIUM, TOTAL	6.57E-08	(mg/m^3)	2.14E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	1.80E-08	1.50E-08	(mg/m^3)	1.00E-04	(mg/m^3)	1.50E-04
			Exp. Route Total								**1.85E-08**					**6.56E-04**
		Exposure Point Total									**1.85E-08**					**6.56E-04**
	Exposure Medium Total										**1.85E-08**					**6.56E-04**
Soil Total											**7.75E-06**					**8.77E-01**
										Total of Receptor Risks Across All Media	**7.75E-06**				Total of Receptor Hazards Across All Media	**8.77E-01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.3.5
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 3

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Sites 13 and 15	Ingestion	**Inorganics**												
				ALUMINUM	2.16E+04	(mg/kg)	1.01E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	2.96E-02	(mg/kg-day)	1.00E+00	(mg/kg-day)	3.0E-02
				ARSENIC	1.28E+01	(mg/kg)	6.03E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	9.0E-06	1.76E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.9E-02
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	1.57E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	7.9E-06	4.59E-05	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.5E-02
				COBALT	1.50E+01	(mg/kg)	7.04E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.05E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	6.8E-02
				IRON	2.86E+04	(mg/kg)	1.34E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.92E-02	(mg/kg-day)	7.00E-01	(mg/kg-day)	5.60E-02
				MANGANESE	9.17E+02	(mg/kg)	4.31E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.26E-03	(mg/kg-day)	4.70E-02	(mg/kg-day)	2.7E-02
				VANADIUM	9.68E+01	(mg/kg)	4.55E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.33E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	2.7E-02
			Exp. Route Total								**1.7E-05**					**2.8E-01**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.16E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	1.28E+01	(mg/kg)	7.22E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.1E-06	2.11E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	7.0E-03
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.50E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	2.86E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	9.17E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	9.68E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**1.1E-06**					**7.0E-03**
		Exposure Point Total									**1.8E-05**					**2.9E-01**
	Exposure Medium Total										**1.8E-05**					**2.9E-01**
	Air	Sites 13 and 15	Inhalation	**Inorganics**												
				ALUMINUM	1.59E-05	(mg/m^3)	2.18E-04	(ug/m^3)	NA	per (ug/m^3)	--	6.35E-07	(mg/m^3)	5.00E-03	(mg/m^3)	1.3E-04
				ARSENIC	9.44E-09	(mg/m^3)	1.29E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	5.6E-10	3.77E-10	(mg/m^3)	1.50E-05	(mg/m^3)	2.5E-05
				CHROMIUM, TOTAL	2.46E-08	(mg/m^3)	3.37E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	2.8E-08	9.84E-10	(mg/m^3)	1.00E-04	(mg/m^3)	9.8E-06
				COBALT	1.10E-08	(mg/m^3)	1.51E-07	(ug/m^3)	9.00E-03	per (ug/m^3)	1.4E-09	4.40E-10	(mg/m^3)	6.00E-06	(mg/m^3)	7.3E-05
				IRON	2.10E-05	(mg/m^3)	2.88E-04	(ug/m^3)	NA	per (ug/m^3)	--	8.40E-07	(mg/m3)	NA	(mg/m^3)	--
				MANGANESE	6.74E-07	(mg/m^3)	9.24E-06	(ug/m^3)	NA	per (ug/m^3)	--	2.69E-08	(mg/m^3)	5.00E-05	(mg/m^3)	5.4E-04
				VANADIUM	7.12E-08	(mg/m^3)	9.75E-07	(ug/m^3)	NA	per (ug/m^3)	--	2.84E-09	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**3.0E-08**					**7.7E-04**
		Exposure Point Total									**3.0E-08**					**7.7E-04**
	Exposure Medium Total										**3.0E-08**					**7.7E-04**
Soil Total											**1.8E-05**					**2.9E-01**
										Total of Receptor Risks Across All Media	**1.8E-05**				Total of Receptor Hazards Across All Media	**2.9E-01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.3.6
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 3

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Sites 13 and 15	Ingestion	**Inorganics**												
				ALUMINUM	2.75E+04	(mg/kg)	1.29E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.77E-02	(mg/kg-day)	1.00E+00	(mg/kg-day)	3.8E-02
				ARSENIC	4.52E+01	(mg/kg)	2.12E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.2E-05	6.19E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.1E-01
				CHROMIUM, TOTAL	8.93E+01	(mg/kg)	4.19E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.1E-05	1.22E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	4.1E-02
				COBALT	1.34E+01	(mg/kg)	6.27E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	1.83E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	6.1E-02
				IRON	4.58E+04	(mg/kg)	2.15E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	6.27E-02	(mg/kg-day)	7.00E-01	(mg/kg-day)	8.96E-02
				MANGANESE	9.17E+02	(mg/kg)	4.31E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.26E-03	(mg/kg-day)	4.70E-02	(mg/kg-day)	2.7E-02
				VANADIUM	1.39E+02	(mg/kg)	6.53E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.90E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	3.8E-02
				PAHs												
				BENZO(B)FLUORANTHENE	8.78E-02	(mg/kg)	7.42E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	5.4E-08	1.20E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	1.74E-01	(mg/kg)	1.47E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	1.1E-06	2.38E-07	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**5.4E-05**					**5.0E-01**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.75E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	4.52E+01	(mg/kg)	2.54E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.8E-06	7.41E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.5E-02
				CHROMIUM, TOTAL	8.93E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.34E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	4.58E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	9.17E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	1.39E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				PAHs												
				BENZO(B)FLUORANTHENE	8.78E-02	(mg/kg)	3.85E-08	(mg/kg-day)	7.30E-01	per (mg/kg-day)	2.8E-08	6.24E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	1.74E-01	(mg/kg)	7.63E-08	(mg/kg-day)	7.30E+00	per (mg/kg-day)	5.6E-07	1.24E-07	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**4.4E-06**					**2.5E-02**
		Exposure Point Total									**5.8E-05**					**5.2E-01**
	Exposure Medium Total										**5.8E-05**					**5.2E-01**
	Air	Sites 13 and 15	Inhalation	**Inorganics**												
				ALUMINUM	2.02E-05	(mg/m^3)	2.77E-04	(ug/m^3)	NA	per (ug/m^3)	--	8.08E-07	(mg/m^3)	5.00E-03	(mg/m^3)	1.6E-04
				ARSENIC	3.32E-08	(mg/m^3)	4.55E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	2.0E-09	1.33E-09	(mg/m^3)	1.50E-05	(mg/m^3)	8.9E-05
				CHROMIUM, TOTAL	6.57E-08	(mg/m^3)	8.99E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	7.6E-08	2.62E-09	(mg/m^3)	1.00E-04	(mg/m^3)	2.6E-05
				COBALT	9.82E-09	(mg/m^3)	1.34E-07	(ug/m^3)	9.00E-03	per (ug/m^3)	1.2E-09	3.92E-10	(mg/m^3)	6.00E-06	(mg/m^3)	6.5E-05
				IRON	3.37E-05	(mg/m^3)	4.61E-04	(ug/m^3)	NA	per (ug/m^3)	--	1.35E-06	(mg/m3)	NA	(mg/m3)	--
				MANGANESE	6.74E-07	(mg/m^3)	9.24E-06	(ug/m^3)	NA	per (ug/m^3)	--	2.69E-08	(mg/m^3)	5.00E-05	(mg/m^3)	5.4E-04
				VANADIUM	1.02E-07	(mg/m^3)	1.40E-06	(ug/m^3)	NA	per (ug/m^3)	--	4.08E-09	(mg/m^3)	NA	(mg/m^3)	--
				PAHs												
				BENZO(B)FLUORANTHENE	6.46E-11	(mg/m^3)	1.59E-09	(ug/m^3)	1.10E-04	per (ug/m^3)	1.8E-13	2.58E-12	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(A)PYRENE	1.28E-10	(mg/m^3)	3.15E-09	(ug/m^3)	1.10E-03	per (ug/m^3)	3.5E-12	5.11E-12	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**7.9E-08**					**8.8E-04**
		Exposure Point Total									**7.9E-08**					**8.8E-04**
	Exposure Medium Total										**7.9E-08**					**8.8E-04**
Soil Total											**5.8E-05**					**5.3E-01**
										Total of Receptor Risks Across All Media	**5.8E-05**				Total of Receptor Hazards Across All Media	**5.3E-01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.3.7
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 3

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Sites 13 and 15	Ingestion	**Inorganics**												
				ALUMINUM	2.16E+04	(mg/kg)	2.37E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	2.76E-01	(mg/kg-day)	1.00E+00	(mg/kg-day)	2.8E-01
				ARSENIC	1.28E+01	(mg/kg)	1.41E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.1E-05	1.64E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.5E-01
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	3.67E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	1.8E-05	4.28E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.4E-01
				COBALT	1.50E+01	(mg/kg)	1.64E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.92E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	6.4E-01
				IRON	2.86E+04	(mg/kg)	3.13E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.66E-01	(mg/kg-day)	7.00E-01	(mg/kg-day)	5.22E-01
				MANGANESE	9.17E+02	(mg/kg)	1.00E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	1.17E-02	(mg/kg-day)	4.70E-02	(mg/kg-day)	2.5E-01
				VANADIUM	9.68E+01	(mg/kg)	1.06E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.24E-03	(mg/kg-day)	5.00E-03	(mg/kg-day)	2.5E-01
			Exp. Route Total								**3.9E-05**					**2.6E+00**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.16E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	1.28E+01	(mg/kg)	1.18E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.8E-06	1.38E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.6E-02
				CHROMIUM, TOTAL	3.35E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.50E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	2.86E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	9.17E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	9.68E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**1.8E-06**					**4.6E-02**
		Exposure Point Total									**4.1E-05**					**2.7E+00**
	Exposure Medium Total										**4.1E-05**					**2.7E+00**
	Air	Sites 13 and 15	Inhalation	**Inorganics**												
				ALUMINUM	1.59E-05	(mg/m^3)	5.44E-05	(ug/m^3)	NA	per (ug/m^3)	--	6.35E-07	(mg/m^3)	5.00E-03	(mg/m^3)	1.3E-04
				ARSENIC	9.44E-09	(mg/m^3)	3.23E-08	(ug/m^3)	4.30E-03	per (ug/m^3)	1.4E-10	3.77E-10	(mg/m^3)	1.50E-05	(mg/m^3)	2.5E-05
				CHROMIUM, TOTAL	2.46E-08	(mg/m^3)	8.43E-08	(ug/m^3)	8.40E-02	per (ug/m^3)	7.1E-09	9.84E-10	(mg/m^3)	1.00E-04	(mg/m^3)	9.8E-06
				COBALT	1.10E-08	(mg/m^3)	3.77E-08	(ug/m^3)	9.00E-03	per (ug/m^3)	3.4E-10	4.40E-10	(mg/m^3)	6.00E-06	(mg/m^3)	7.3E-05
				IRON	2.10E-05	(mg/m^3)	7.20E-05	(ug/m^3)	NA	per (ug/m^3)	--	8.40E-07	(mg/m3)	NA	(mg/m3)	--
				MANGANESE	6.74E-07	(mg/m^3)	2.31E-06	(ug/m^3)	NA	per (ug/m^3)	--	2.69E-08	(mg/m^3)	5.00E-05	(mg/m^3)	5.4E-04
				VANADIUM	7.12E-08	(mg/m^3)	2.44E-07	(ug/m^3)	NA	per (ug/m^3)	--	2.84E-09	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**7.6E-09**					**7.7E-04**
		Exposure Point Total									**7.6E-09**					**7.7E-04**
	Exposure Medium Total										**7.6E-09**					**7.7E-04**
Soil Total											**4.1E-05**					**2.7E+00**
										Total of Receptor Risks Across All Media	**4.1E-05**				Total of Receptor Hazards Across All Media	**2.7E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.3.8
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 3

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Sites 13 and 15	Ingestion	**Inorganics**												
				ALUMINUM	2.75E+04	(mg/kg)	3.01E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.52E-01	(mg/kg-day)	1.00E+00	(mg/kg-day)	3.5E-01
				ARSENIC	4.52E+01	(mg/kg)	4.95E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	7.4E-05	5.78E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.9E+00
				CHROMIUM, TOTAL	8.93E+01	(mg/kg)	9.79E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	4.9E-05	1.14E-03	(mg/kg-day)	3.00E-03	(mg/kg-day)	3.8E-01
				COBALT	1.34E+01	(mg/kg)	1.46E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.71E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.7E-01
				IRON	4.58E+04	(mg/kg)	5.02E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	5.86E-01	(mg/kg-day)	7.00E-01	(mg/kg-day)	8.37E-01
				MANGANESE	9.17E+02	(mg/kg)	1.00E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	1.17E-02	(mg/kg-day)	4.70E-02	(mg/kg-day)	2.5E-01
				VANADIUM	1.39E+02	(mg/kg)	1.52E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.78E-03	(mg/kg-day)	5.00E-03	(mg/kg-day)	3.6E-01
				PAHs												
				BENZO(B)FLUORANTHENE	8.78E-02	(mg/kg)	5.10E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	3.7E-07	1.12E-06	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	1.74E-01	(mg/kg)	1.01E-06	(mg/kg-day)	7.30E+00	per (mg/kg-day)	7.4E-06	2.22E-06	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**1.3E-04**					**4.7E+00**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.75E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	4.52E+01	(mg/kg)	4.16E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	6.2E-06	4.85E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.6E-01
				CHROMIUM, TOTAL	8.93E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.34E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	4.58E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	7.00E-01	(mg/kg-day)	--
				MANGANESE	9.17E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	1.39E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
				PAHs												
				BENZO(B)FLUORANTHENE	8.78E-02	(mg/kg)	1.86E-07	(mg/kg-day)	7.30E-01	per (mg/kg-day)	1.4E-07	4.09E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				BENZO(A)PYRENE	1.74E-01	(mg/kg)	3.68E-07	(mg/kg-day)	7.30E+00	per (mg/kg-day)	2.7E-06	8.10E-07	(mg/kg-day)	NA	(mg/kg-day)	--
			Exp. Route Total								**9.1E-06**					**1.6E-01**
		Exposure Point Total									**1.4E-04**					**4.8E+00**
	Exposure Medium Total										**1.4E-04**					**4.8E+00**
	Air	Sites 13 and 15	Inhalation	**Inorganics**												
				ALUMINUM	2.02E-05	(mg/m^3)	6.92E-05	(ug/m^3)	NA	per (ug/m^3)	--	8.08E-07	(mg/m^3)	5.00E-03	(mg/m^3)	1.6E-04
				ARSENIC	3.32E-08	(mg/m^3)	1.14E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	4.9E-10	1.33E-09	(mg/m^3)	1.50E-05	(mg/m^3)	8.9E-05
				CHROMIUM, TOTAL	6.57E-08	(mg/m^3)	2.25E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	1.9E-08	2.62E-09	(mg/m^3)	1.00E-04	(mg/m^3)	2.6E-05
				COBALT	9.82E-09	(mg/m^3)	3.36E-08	(ug/m^3)	9.00E-03	per (ug/m^3)	3.0E-10	3.92E-10	(mg/m^3)	6.00E-06	(mg/m^3)	6.5E-05
				IRON	3.37E-05	(mg/m^3)	1.15E-04	(ug/m^3)	NA	per (ug/m^3)	--	1.35E-06	(mg/m3)	NA	(mg/m3)	--
				MANGANESE	6.74E-07	(mg/m^3)	2.31E-06	(ug/m^3)	NA	per (ug/m^3)	--	2.69E-08	(mg/m^3)	5.00E-05	(mg/m^3)	5.4E-04
				VANADIUM	1.02E-07	(mg/m^3)	3.50E-07	(ug/m^3)	NA	per (ug/m^3)	--	4.08E-09	(mg/m^3)	NA	(mg/m^3)	--
				PAHs												
				BENZO(B)FLUORANTHENE	6.46E-11	(mg/m^3)	1.18E-09	(ug/m^3)	1.10E-04	per (ug/m^3)	1.3E-13	1.37E-11	(mg/m^3)	NA	(mg/m^3)	--
				BENZO(A)PYRENE	1.28E-10	(mg/m^3)	2.34E-09	(ug/m^3)	1.10E-03	per (ug/m^3)	2.6E-12	2.71E-11	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**2.0E-08**					**8.8E-04**
		Exposure Point Total									**2.0E-08**					**8.8E-04**
	Exposure Medium Total										**2.0E-08**					**8.8E-04**
Soil Total											**1.4E-04**					**4.8E+00**
										Total of Receptor Risks Across All Media	**1.4E-04**				Total of Receptor Hazards Across All Media	**4.8E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.3.9
CALCULATIONS OF AIR CONCENTRATIONS DUE TO DUST ENTRAINMENT FROM SOIL
FORT BUCHANAN - GROUPING 3

Model Equations:

Particulate Emmision Factor	PEF = Q/C x [(3,600 s/h)/(.36 x (1- V) x (Um/Ut)^3 x F(x))] =	1.36E+09
Air Concentration	Cair = Csoil/PEF	m^3/kg

Model Constants:				
	Q/C	9.38E+01	g/m^2-s per kg/m^3	Inverse Mean Concentration at Center of 0.05 square, USEPA 2011b
	V	5.00E-01	unitless	Default, USEPA 2011b
	Um	4.69E+00	m/s	Mean annual wind speed, USEPA 2011b
	Ut	1.13E+01	m/s	Equivalent threshold value of windspeed at 7 m, USEPA 2011b
	F(x)	1.94E-01	unitless	Default, USEPA 2011b

Reference for the model: USEPA Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response. USEPA, 1996.

Chemical	Csoil, Surface Soil	Csoil, Subsurface Soil	Cair, Surface Soil Particulate	Cair, Subsurface Soil Particulate
	RME EPC	RME EPC	RME EPC	RME EPC
	mg/kg	mg/kg	mg/m^3	mg/m^3
Inorganics				
ALUMINUM	2.16E+04	2.75E+04	1.59E-05	2.02E-05
ARSENIC	1.28E+01	4.52E+01	9.44E-09	3.32E-08
CHROMIUM, TOTAL	3.35E+01	8.93E+01	2.46E-08	6.57E-08
COBALT	1.50E+01	1.34E+01	1.10E-08	9.82E-09
IRON	2.86E+04	4.58E+04	2.10E-05	3.37E-05
MANGANESE	9.17E+02	9.17E+02	6.74E-07	6.74E-07
VANADIUM	9.68E+01	1.39E+02	7.12E-08	1.02E-07
PAHs				
BENZO(B)FLUORANTHENE	NA	8.78E-02	NA	6.46E-11
BENZO(A)PYRENE	NA	1.74E-01	NA	1.28E-10

NA = Not applicable because the chemical is not a COPC in this media.

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TABLE D.7.4.1
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - SITE 9

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Site 9	Ingestion	**Inorganics**												
				ARSENIC	1.52E+02	(mg/kg)	1.02E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.5E-05	7.13E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.4E+00
				CHROMIUM, TOTAL	1.35E+02	(mg/kg)	9.07E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	4.5E-06	6.35E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	2.1E-01
				COBALT	1.04E+02	(mg/kg)	6.98E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	4.88E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.6E+00
				IRON	1.01E+05	(mg/kg)	6.78E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	4.75E-01	(mg/kg-day)	7.00E-01	(mg/kg-day)	6.8E-01
				MANGANESE	7.15E+03	(mg/kg)	4.80E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	3.36E-02	(mg/kg-day)	4.70E-02	(mg/kg-day)	7.1E-01
			Exp. Route Total								**2.0E-05**					**5.6E+00**
			Dermal[1]	**Inorganics**												
				ARSENIC	1.52E+02	(mg/kg)	4.20E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	6.3E-07	2.94E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	9.8E-02
				CHROMIUM, TOTAL	1.35E+02	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.04E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	1.01E+05	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	2.00E-03	(mg/kg-day)	--
				MANGANESE	7.15E+03	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
			Exp. Route Total								**6.3E-07**					**9.8E-02**
		Exposure Point Total									**2.0E-05**					**5.7E+00**
	Exposure Medium Total										**2.0E-05**					**5.7E+00**
	Air	Site 9	Inhalation	**Inorganics**												
				ARSENIC	1.12E-07	(mg/m^3)	3.64E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	1.6E-09	2.55E-08	(mg/m^3)	1.50E-05	(mg/m^3)	1.7E-03
				CHROMIUM, TOTAL	9.94E-08	(mg/m^3)	3.24E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	2.7E-08	2.27E-08	(mg/m^3)	1.00E-04	(mg/m^3)	2.3E-04
				COBALT	7.65E-08	(mg/m^3)	2.49E-07	(ug/m^3)	9.00E-03	per (ug/m^3)	2.2E-09	1.75E-08	(mg/m^3)	6.00E-06	(mg/m^3)	2.9E-03
				IRON	7.43E-05	(mg/m^3)	2.42E-04	(ug/m^3)	NA	per (ug/m^3)	--	1.70E-05	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	5.26E-06	(mg/m^3)	1.71E-05	(ug/m^3)	NA	per (ug/m^3)	--	1.20E-06	(mg/m^3)	5.00E-05	(mg/m^3)	2.4E-02
			Exp. Route Total								**3.1E-08**					**2.9E-02**
		Exposure Point Total									**3.1E-08**					**2.9E-02**
	Exposure Medium Total										**3.1E-08**					**2.9E-02**
Soil Total											**2.0E-05**					**5.7E+00**
										Total of Receptor Risks Across All Media	**2.0E-05**				Total of Receptor Hazards Across All Media	**5.7E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.4.2
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - SITE 9

Scenario Timeframe: Future
Receptor Population: Residen
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentratior		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentratior		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Site 9	Ingestion	**Inorganics**												
				ALUMINUM	2.25E+04	(mg/kg)	1.05E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.08E-02	(mg/kg-day)	1.00E+00	(mg/kg-day)	3.1E-02
				ARSENIC	1.52E+02	(mg/kg)	7.13E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.1E-04	2.08E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	6.9E-01
				CHROMIUM, TOTAL	1.35E+02	(mg/kg)	6.35E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	3.2E-05	1.85E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	6.2E-02
				COBALT	1.04E+02	(mg/kg)	4.88E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.42E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.7E-01
				IRON	1.01E+05	(mg/kg)	4.75E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	1.38E-01	(mg/kg-day)	7.00E-01	(mg/kg-day)	1.98E-01
				MANGANESE	7.15E+03	(mg/kg)	3.36E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	9.79E-03	(mg/kg-day)	4.70E-02	(mg/kg-day)	2.1E-01
				VANADIUM	2.08E+02	(mg/kg)	9.77E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	2.85E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	5.7E-02
			Exp. Route Total								**1.4E-04**					**1.7E+00**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.25E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	1.52E+02	(mg/kg)	8.54E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.3E-05	2.49E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	8.3E-02
				CHROMIUM, TOTAL	1.35E+02	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.04E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	1.01E+05	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	2.00E-03	(mg/kg-day)	--
				MANGANESE	7.15E+03	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	2.08E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**1.3E-05**					**8.3E-02**
		Exposure Point Total									**1.5E-04**					**1.8E+00**
	Exposure Medium Total										**1.5E-04**					**1.8E+00**
	Air	Site 9	Inhalation	**Inorganics**												
				ALUMINUM	1.65E-05	(mg/m^3)	2.26E-04	(ug/m^3)	NA	per (ug/m^3)	--	6.60E-07	(mg/m^3)	5.00E-03	(mg/m^3)	1.3E-04
				ARSENIC	1.12E-07	(mg/m^3)	1.53E-06	(ug/m^3)	4.30E-03	per (ug/m^3)	6.6E-09	4.46E-09	(mg/m^3)	1.50E-05	(mg/m^3)	3.0E-04
				CHROMIUM, TOTAL	9.94E-08	(mg/m^3)	1.36E-06	(ug/m^3)	8.40E-02	per (ug/m^3)	1.1E-07	3.97E-09	(mg/m^3)	1.00E-04	(mg/m^3)	4.0E-05
				COBALT	7.65E-08	(mg/m^3)	1.05E-06	(ug/m^3)	9.00E-03	per (ug/m^3)	9.4E-09	3.06E-09	(mg/m^3)	6.00E-06	(mg/m^3)	5.1E-04
				IRON	7.43E-05	(mg/m^3)	1.02E-03	(ug/m^3)	NA	per (ug/m^3)	--	2.97E-06	(mg/m3)	NA	(mg/m3)	--
				MANGANESE	5.26E-06	(mg/m^3)	7.20E-05	(ug/m^3)	NA	per (ug/m^3)	--	2.10E-07	(mg/m^3)	5.00E-05	(mg/m^3)	4.2E-03
				VANADIUM	1.53E-07	(mg/m^3)	2.10E-06	(ug/m^3)	NA	per (ug/m^3)	--	6.11E-09	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**1.3E-07**					**5.2E-03**
		Exposure Point Total									**1.3E-07**					**5.2E-03**
	Exposure Medium Total										**1.3E-07**					**5.2E-03**
Soil Total											**1.5E-04**					**1.8E+00**
										Total of Receptor Risks Across All Media	**1.5E-04**				Total of Receptor Hazards Across All Media	**1.8E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see U.S. EPA 2004 guidanc
EPC = Exposure Point Concentratior
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentratior

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TABLE D.7.4.3
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - SITE 9

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Subsurface Soil	Site 9	Ingestion	**Inorganics**												
				ALUMINUM	2.25E+04	(mg/kg)	2.46E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	2.87E-01	(mg/kg-day)	1.00E+00	(mg/kg-day)	2.9E-01
				ARSENIC	1.52E+02	(mg/kg)	1.66E-04	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.5E-04	1.94E-03	(mg/kg-day)	3.00E-04	(mg/kg-day)	6.5E+00
				CHROMIUM, TOTAL	1.35E+02	(mg/kg)	1.48E-04	(mg/kg-day)	5.00E-01	per (mg/kg-day)	7.4E-05	1.73E-03	(mg/kg-day)	3.00E-03	(mg/kg-day)	5.8E-01
				COBALT	1.04E+02	(mg/kg)	1.14E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.33E-03	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.4E+00
				IRON	1.01E+05	(mg/kg)	1.11E-01	(mg/kg-day)	NA	per (mg/kg-day)	--	1.29E+00	(mg/kg-day)	7.00E-01	(mg/kg-day)	1.85E+00
				MANGANESE	7.15E+03	(mg/kg)	7.84E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	9.14E-02	(mg/kg-day)	4.70E-02	(mg/kg-day)	1.9E+00
				VANADIUM	2.08E+02	(mg/kg)	2.28E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	2.66E-03	(mg/kg-day)	5.00E-03	(mg/kg-day)	5.3E-01
			Exp. Route Total								**3.2E-04**					**1.6E+01**
			Dermal[1]	**Inorganics**												
				ALUMINUM	2.25E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	1.52E+02	(mg/kg)	1.40E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.1E-05	1.63E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.4E-01
				CHROMIUM, TOTAL	1.35E+02	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	1.04E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	1.01E+05	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	2.00E-03	(mg/kg-day)	--
				MANGANESE	7.15E+03	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	2.08E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**2.1E-05**					**5.4E-01**
		Exposure Point Total									**3.4E-04**					**1.7E+01**
	Exposure Medium Total										**3.4E-04**					**1.7E+01**
	Air	Site 9	Inhalation	**Inorganics**												
				ALUMINUM	1.65E-05	(mg/m^3)	5.65E-05	(ug/m^3)	NA	per (ug/m^3)	--	6.60E-07	(mg/m^3)	5.00E-03	(mg/m^3)	1.3E-04
				ARSENIC	1.12E-07	(mg/m^3)	3.83E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	1.6E-09	4.46E-09	(mg/m^3)	1.50E-05	(mg/m^3)	3.0E-04
				CHROMIUM, TOTAL	9.94E-08	(mg/m^3)	3.40E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	2.9E-08	3.97E-09	(mg/m^3)	1.00E-04	(mg/m^3)	4.0E-05
				COBALT	7.65E-08	(mg/m^3)	2.62E-07	(ug/m^3)	9.00E-03	per (ug/m^3)	2.4E-09	3.06E-09	(mg/m^3)	6.00E-06	(mg/m^3)	5.1E-04
				IRON	7.43E-05	(mg/m^3)	2.55E-04	(ug/m^3)	NA	per (ug/m^3)	--	2.97E-06	(mg/m3)	NA	(mg/m3)	--
				MANGANESE	5.26E-06	(mg/m^3)	1.80E-05	(ug/m^3)	NA	per (ug/m^3)	--	2.10E-07	(mg/m^3)	5.00E-05	(mg/m^3)	4.2E-03
				VANADIUM	1.53E-07	(mg/m^3)	5.24E-07	(ug/m^3)	NA	per (ug/m^3)	--	6.11E-09	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**3.3E-08**					**5.2E-03**
		Exposure Point Total									**3.3E-08**					**5.2E-03**
	Exposure Medium Total										**3.3E-08**					**5.2E-03**
Soil Total											**3.4E-04**					**1.7E+01**
										Total of Receptor Risks Across All Media	**3.4E-04**				Total of Receptor Hazards Across All Media	**1.7E+01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see U.S. EPA 2004 guidance
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.4.4
CALCULATIONS OF AIR CONCENTRATIONS DUE TO DUST ENTRAINMENT FROM SOIL
FORT BUCHANAN - SITE 9

Model Equations:

Particulate Emmision Factor	PEF = Q/C x [(3,600 s/h)/(.36 x (1- V) x (Um/Ut)^3 x F(x))] =		1.36E+09
Air Concentration	Cair = Csoil/PEF		m^3/kg

Model Constants:				
	Q/C	9.38E+01	g/m^2-s per kg/m^3	Inverse Mean Concentration at Center of 0.05 square, USEPA 2011b
	V	5.00E-01	unitless	Default, USEPA 2011b
	Um	4.69E+00	m/s	Mean annual wind speed, USEPA 2011b
	Ut	1.13E+01	m/s	Equivalent threshold value of windspeed at 7 m, USEPA 2011b
	F(x)	1.94E-01	unitless	Default, USEPA 2011b

Reference for the model: USEPA Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response. U.S. EPA, 1996.

Chemical	**Csoil, Surface Soil**	**Csoil, Subsurface Soil**	**Cair, Surface Soil Particulate**	**Cair, Subsurface Soil Particulate**
	RME EPC	RME EPC	RME EPC	RME EPC
	mg/kg	mg/kg	mg/m^3	mg/m^3
Inorganics				
ALUMINUM	NA	2.25E+04	NA	1.65E-05
ARSENIC	NA	1.52E+02	NA	1.12E-07
CHROMIUM, TOTAL	NA	1.35E+02	NA	9.94E-08
COBALT	NA	1.04E+02	NA	7.65E-08
IRON	NA	1.01E+05	NA	7.43E-05
MANGANESE	NA	7.15E+03	NA	5.26E-06
VANADIUM	NA	2.08E+02	NA	1.53E-07

NA = Not applicable because the chemical is not a COPC in this media.

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TABLE D.7.5.1
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - SITE 12

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Site 12	Ingestion	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	6.40E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	9.6E-07	1.49E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.0E-03
				CHROMIUM, TOTAL	2.24E+01	(mg/kg)	4.88E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.4E-07	1.14E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	3.8E-04
				VANADIUM	4.96E+01	(mg/kg)	1.08E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.52E-06	(mg/kg-day)	5.00E-03	(mg/kg-day)	5.0E-04
			Exp. Route Total								**1.2E-06**					**5.9E-03**
			Dermal[1]	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	1.53E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.3E-07	3.57E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.2E-03
				CHROMIUM, TOTAL	2.24E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				VANADIUM	4.96E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**2.3E-07**					**1.2E-03**
		Exposure Point Total									**1.4E-06**					**7.0E-03**
	Exposure Medium Total										**1.4E-06**					**7.0E-03**
Sediment Total											**1.4E-06**					**7.0E-03**
Surface Water	Surface Water	Site 12	Ingestion	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	7.76E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.2E-05	1.81E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	6.0E-02
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	6.85E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	3.4E-07	1.60E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	5.3E-04
				COBALT	7.93E-03	(mg/L)	6.92E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	1.61E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.4E-03
				Semivolatiles												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	1.48E-07	(mg/kg-day)	1.40E-02	per (mg/kg-day)	2.1E-09	3.46E-07	(mg/kg-day)	2.00E-02	(mg/kg-day)	1.7E-05
			Exp. Route Total								**1.2E-05**					**6.6E-02**
			Dermal	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	4.42E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	6.6E-07	1.03E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.4E-03
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	7.80E-08	(mg/kg-day)	2.00E+01	per (mg/kg-day)	1.6E-06	1.82E-07	(mg/kg-day)	7.50E-05	(mg/kg-day)	2.4E-03
				COBALT	7.93E-03	(mg/L)	1.58E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	3.68E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.2E-04
				Semivolatiles												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	6.01E-05	(mg/kg-day)	1.40E-02	per (mg/kg-day)	8.4E-07	1.40E-04	(mg/kg-day)	2.00E-02	(mg/kg-day)	7.0E-03
			Exp. Route Total								**3.1E-06**					**1.3E-02**
		Exposure Point Total									**1.5E-05**					**7.9E-02**
	Exposure Medium Total										**1.5E-05**					**7.9E-02**
Surface Water Total											**1.5E-05**					**7.9E-02**
Soil	Surface Soil	Site 12	Ingestion	**Inorganics**												
				ALUMINUM	1.91E+04	(mg/kg)	6.25E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.46E-03	(mg/kg-day)	1.00E+00	(mg/kg-day)	1.5E-03
				ARSENIC	7.90E+00	(mg/kg)	2.58E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.9E-07	6.03E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.0E-03
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	8.90E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	4.4E-07	2.08E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	6.9E-04
				COBALT	9.40E+00	(mg/kg)	3.07E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	7.17E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.4E-03
				IRON	2.34E+04	(mg/kg)	7.65E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.79E-03	(mg/kg-day)	7.00E-01	(mg/kg-day)	2.6E-03
				MANGANESE	4.06E+02	(mg/kg)	1.33E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	3.10E-05	(mg/kg-day)	4.70E-02	(mg/kg-day)	6.6E-04
				VANADIUM	7.76E+01	(mg/kg)	2.54E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	5.92E-06	(mg/kg-day)	5.00E-03	(mg/kg-day)	1.2E-03
			Exp. Route Total								**8.3E-07**					**1.1E-02**
			Dermal[1]	**Inorganics**												
				ALUMINUM	1.91E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	7.90E+00	(mg/kg)	6.19E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	9.3E-08	1.44E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.8E-04
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	9.40E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	2.34E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	2.00E-03	(mg/kg-day)	--
				MANGANESE	4.06E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	7.76E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**9.3E-08**					**4.8E-04**
		Exposure Point Total									**9.3E-07**					**1.1E-02**
	Exposure Medium Total										**9.3E-07**					**1.1E-02**
	Air	Site 12	Inhalation	**Inorganics**												
				ALUMINUM	1.40E-05	(mg/m^3)	2.68E-05	(ug/m^3)	NA	per (ug/m^3)	--	6.25E-08	(mg/m^3)	5.00E-03	(mg/m^3)	1.3E-05
				ARSENIC	5.81E-09	(mg/m^3)	1.11E-08	(ug/m^3)	4.30E-03	per (ug/m^3)	4.8E-11	2.59E-11	(mg/m^3)	1.50E-05	(mg/m^3)	1.7E-06
				CHROMIUM, TOTAL	2.00E-08	(mg/m^3)	3.82E-08	(ug/m^3)	8.40E-02	per (ug/m^3)	3.2E-09	8.90E-11	(mg/m^3)	1.00E-04	(mg/m^3)	8.9E-07
				COBALT	6.91E-09	(mg/m^3)	1.32E-08	(ug/m^3)	9.00E-03	per (ug/m^3)	1.2E-10	3.08E-11	(mg/m^3)	6.00E-06	(mg/m^3)	5.1E-06
				IRON	1.72E-05	(mg/m^3)	3.28E-05	(ug/m^3)	NA	per (ug/m^3)	--	7.66E-08	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	2.99E-07	(mg/m^3)	5.70E-07	(ug/m^3)	NA	per (ug/m^3)	--	1.33E-09	(mg/m^3)	5.00E-05	(mg/m^3)	2.7E-05
				VANADIUM	5.71E-08	(mg/m^3)	1.09E-07	(ug/m^3)	NA	per (ug/m^3)	--	2.54E-10	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**3.4E-09**					**4.7E-05**
		Exposure Point Total									**3.4E-09**					**4.7E-05**
	Exposure Medium Total										**3.4E-09**					**4.7E-05**
Soil Total											**9.3E-07**					**1.1E-02**
										Total of Receptor Risks Across All Media	**1.7E-05**				Total of Receptor Hazards Across All Media	**9.8E-02**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.5.2
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - SITE 12

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Site 12	Ingestion	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	5.31E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	8.0E-07	4.64E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.5E-02
				CHROMIUM, TOTAL	2.24E+01	(mg/kg)	4.05E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.0E-07	3.54E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.2E-03
				VANADIUM	4.96E+01	(mg/kg)	8.96E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	7.84E-06	(mg/kg-day)	5.00E-03	(mg/kg-day)	1.6E-03
			Exp. Route Total								**1.0E-06**					**1.8E-02**
			Dermal[1]	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	1.44E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.2E-07	1.26E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.2E-03
				CHROMIUM, TOTAL	2.24E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				VANADIUM	4.96E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**2.2E-07**					**4.2E-03**
		Exposure Point Total									**1.2E-06**					**2.2E-02**
	Exposure Medium Total										**1.2E-06**					**2.2E-02**
Sediment Total											**1.2E-06**					**2.2E-02**
Surface Water	Surface Water	Site 12	Ingestion	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	3.22E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	4.8E-06	2.82E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	9.4E-02
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	2.84E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	1.4E-07	2.48E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	8.3E-04
				COBALT	7.93E-03	(mg/L)	2.87E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	2.51E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	8.4E-03
				Semivolatiles												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	6.15E-08	(mg/kg-day)	1.40E-02	per (mg/kg-day)	8.6E-10	5.38E-07	(mg/kg-day)	2.00E-02	(mg/kg-day)	2.7E-05
			Exp. Route Total								**5.0E-06**					**1.0E-01**
			Dermal	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	1.46E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.2E-07	1.28E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.3E-03
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	2.57E-08	(mg/kg-day)	2.00E+01	per (mg/kg-day)	5.1E-07	2.25E-07	(mg/kg-day)	7.50E-05	(mg/kg-day)	3.0E-03
				COBALT	7.93E-03	(mg/L)	5.20E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	4.55E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.5E-04
				Semivolatiles												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	1.98E-05	(mg/kg-day)	1.40E-02	per (mg/kg-day)	2.8E-07	1.73E-04	(mg/kg-day)	2.00E-02	(mg/kg-day)	8.7E-03
			Exp. Route Total								**1.0E-06**					**1.6E-02**
		Exposure Point Total									**6.0E-06**					**1.2E-01**
	Exposure Medium Total										**6.0E-06**					**1.2E-01**
Surface Water Total											**6.0E-06**					**1.2E-01**
Soil	Surface Soil	Site 12	Ingestion	**Inorganics**												
				ALUMINUM	1.91E+04	(mg/kg)	2.59E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	2.27E-03	(mg/kg-day)	1.00E+00	(mg/kg-day)	2.3E-03
				ARSENIC	7.90E+00	(mg/kg)	1.07E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.6E-07	9.38E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.1E-03
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	3.69E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	1.8E-07	3.23E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.1E-03
				COBALT	9.40E+00	(mg/kg)	1.28E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	1.12E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.7E-03
				IRON	2.34E+04	(mg/kg)	3.17E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	2.78E-03	(mg/kg-day)	7.00E-01	(mg/kg-day)	4.0E-03
				MANGANESE	4.06E+02	(mg/kg)	5.51E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	4.82E-05	(mg/kg-day)	4.70E-02	(mg/kg-day)	1.0E-03
				VANADIUM	7.76E+01	(mg/kg)	1.05E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	9.21E-06	(mg/kg-day)	5.00E-03	(mg/kg-day)	1.8E-03
			Exp. Route Total								**3.5E-07**					**1.7E-02**
			Dermal[1]	**Inorganics**												
				ALUMINUM	1.91E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	7.90E+00	(mg/kg)	3.20E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	4.8E-08	2.80E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	9.3E-04
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	9.40E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	2.34E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	2.00E-03	(mg/kg-day)	--
				MANGANESE	4.06E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	7.76E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**4.8E-08**					**9.3E-04**
		Exposure Point Total									**3.9E-07**					**1.8E-02**
	Exposure Medium Total										**3.9E-07**					**1.8E-02**
	Air	Site 12	Inhalation	**Inorganics**												
				ALUMINUM	1.40E-05	(mg/m^3)	7.15E-06	(ug/m^3)	NA	per (ug/m^3)	--	6.25E-08	(mg/m^3)	5.00E-03	(mg/m^3)	1.3E-05
				ARSENIC	5.81E-09	(mg/m^3)	2.96E-09	(ug/m^3)	4.30E-03	per (ug/m^3)	1.3E-11	2.59E-11	(mg/m^3)	1.50E-05	(mg/m^3)	1.7E-06
				CHROMIUM, TOTAL	2.00E-08	(mg/m^3)	1.02E-08	(ug/m^3)	8.40E-02	per (ug/m^3)	8.5E-10	8.90E-11	(mg/m^3)	1.00E-04	(mg/m^3)	8.9E-07
				COBALT	6.91E-09	(mg/m^3)	3.52E-09	(ug/m^3)	9.00E-03	per (ug/m^3)	3.2E-11	3.08E-11	(mg/m^3)	6.00E-06	(mg/m^3)	5.1E-06
				IRON	1.72E-05	(mg/m^3)	8.75E-06	(ug/m3)	NA	per (ug/m3)	--	7.66E-08	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	2.99E-07	(mg/m^3)	1.52E-07	(ug/m^3)	NA	per (ug/m^3)	--	1.33E-09	(mg/m^3)	5.00E-05	(mg/m^3)	2.7E-05
				VANADIUM	5.71E-08	(mg/m^3)	2.90E-08	(ug/m^3)	NA	per (ug/m^3)	--	2.54E-10	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**9.0E-10**					**4.7E-05**
		Exposure Point Total									**9.0E-10**					**4.7E-05**
	Exposure Medium Total										**9.0E-10**					**4.7E-05**
Soil Total											**3.9E-07**					**1.8E-02**
										Total of Receptor Risks Across All Media	**7.6E-06**				Total of Receptor Hazards Across All Media	**1.6E-01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.5.3
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - SITE 12

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Site 12	Ingestion	**Inorganics**												
				ARSENIC	7.90E+00	(mg/kg)	1.38E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.1E-06	3.86E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.3E-02
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	4.75E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.4E-06	1.33E-05	(mg/kg-day)	3.00E-03	(mg/kg-day)	4.4E-03
			Exp. Route Total								**4.4E-06**					**1.7E-02**
			Dermal[1]	**Inorganics**												
				ARSENIC	7.90E+00	(mg/kg)	1.91E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.9E-07	5.36E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.8E-03
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
			Exp. Route Total								**2.9E-07**					**1.8E-03**
		Exposure Point Total									**4.7E-06**					**1.9E-02**
	Exposure Medium Total										**4.7E-06**					**1.9E-02**
	Air	Site 12	Inhalation	**Inorganics**												
				ARSENIC	5.81E-09	(mg/m^3)	4.74E-07	(ug/m^3)	4.30E-03	per (ug/m^3)	2.0E-09	1.33E-09	(mg/m^3)	1.50E-05	(mg/m^3)	8.8E-05
				CHROMIUM, TOTAL	2.00E-08	(mg/m^3)	1.63E-06	(ug/m^3)	8.40E-02	per (ug/m^3)	1.4E-07	4.57E-09	(mg/m^3)	1.00E-04	(mg/m^3)	4.6E-05
			Exp. Route Total								**1.4E-07**					**1.3E-04**
		Exposure Point Total									**1.4E-07**					**1.3E-04**
	Exposure Medium Total										**1.4E-07**					**1.3E-04**
Soil Total											**4.9E-06**					**1.9E-02**
										Total of Receptor Risks Across All Media	**4.9E-06**				Total of Receptor Hazards Across All Media	**1.9E-02**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.5.4
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - SITE 12

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Site 12	Ingestion	**Inorganics**												
				ARSENIC	4.87E-02	(mg/L)	6.81E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.0E-07	4.77E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.6E-02
				BARIUM	4.50E-01	(mg/L)	6.29E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	4.40E-05	(mg/kg-day)	2.00E-01	(mg/kg-day)	2.2E-04
				CADMIUM	1.50E-03	(mg/L)	2.10E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	1.47E-07	(mg/kg-day)	5.00E-04	(mg/kg-day)	2.9E-04
				CHROMIUM, TOTAL	1.26E-01	(mg/L)	1.76E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	8.8E-08	1.23E-05	(mg/kg-day)	3.00E-03	(mg/kg-day)	4.1E-03
				COBALT	1.71E-02	(mg/L)	2.39E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	1.67E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.6E-03
				COPPER	4.58E-02	(mg/L)	6.40E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	4.48E-06	(mg/kg-day)	4.00E-02	(mg/kg-day)	1.1E-04
				IRON	2.05E+01	(mg/L)	2.87E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	2.01E-03	(mg/kg-day)	7.00E-01	(mg/kg-day)	2.9E-03
				MANGANESE	4.55E+00	(mg/L)	6.36E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	4.45E-04	(mg/kg-day)	4.70E-02	(mg/kg-day)	9.5E-03
				NICKEL	5.71E-02	(mg/L)	7.98E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	5.59E-06	(mg/kg-day)	2.00E-02	(mg/kg-day)	2.8E-04
				VANADIUM	1.18E-01	(mg/L)	1.65E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	1.15E-05	(mg/kg-day)	5.00E-03	(mg/kg-day)	2.3E-03
				ZINC	6.51E-01	(mg/L)	9.10E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	6.37E-05	(mg/kg-day)	3.00E-01	(mg/kg-day)	2.1E-04
				Semivolatiles												
				BIS(2-ETHYLHEXYL)PHTHALATE	7.50E-03	(mg/L)	1.05E-08	(mg/kg-day)	1.40E-02	per (mg/kg-day)	1.5E-10	7.34E-07	(mg/kg-day)	2.00E-02	(mg/kg-day)	3.7E-05
				Volatiles												
				CHLOROFORM	5.30E-03	(mg/L)	7.41E-09	(mg/kg-day)	3.10E-02	per (mg/kg-day)	2.3E-10	5.19E-07	(mg/kg-day)	1.00E-02	(mg/kg-day)	5.2E-05
			Exp. Route Total								**1.9E-07**					**4.1E-02**
			Dermal	**Inorganics**												
				ARSENIC	4.87E-02	(mg/L)	3.10E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	4.7E-08	2.17E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	7.2E-03
				BARIUM	4.50E-01	(mg/L)	2.87E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	2.01E-05	(mg/kg-day)	1.40E-02	(mg/kg-day)	1.4E-03
				CADMIUM	1.50E-03	(mg/L)	9.56E-10	(mg/kg-day)	NA	per (mg/kg-day)	--	6.69E-08	(mg/kg-day)	2.50E-05	(mg/kg-day)	2.7E-03
				CHROMIUM, TOTAL	1.26E-01	(mg/L)	1.61E-07	(mg/kg-day)	2.00E+01	per (mg/kg-day)	3.2E-06	1.12E-05	(mg/kg-day)	7.50E-05	(mg/kg-day)	1.5E-01
				COBALT	1.71E-02	(mg/L)	4.36E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	3.05E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.0E-03
				COPPER	4.58E-02	(mg/L)	2.92E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	2.04E-06	(mg/kg-day)	4.00E-02	(mg/kg-day)	5.1E-05
				IRON	2.05E+01	(mg/L)	1.31E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	9.15E-04	(mg/kg-day)	2.00E-03	(mg/kg-day)	4.6E-01
				MANGANESE	4.55E+00	(mg/L)	2.90E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.03E-04	(mg/kg-day)	1.88E-03	(mg/kg-day)	1.1E-01
				NICKEL	5.71E-02	(mg/L)	3.64E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	2.55E-06	(mg/kg-day)	8.00E-04	(mg/kg-day)	3.2E-03
				VANADIUM	1.18E-01	(mg/L)	7.52E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	5.26E-06	(mg/kg-day)	5.00E-03	(mg/kg-day)	1.1E-03
				ZINC	6.51E-01	(mg/L)	2.49E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	1.74E-05	(mg/kg-day)	3.00E-01	(mg/kg-day)	5.8E-05
				Semivolatiles												
				BIS(2-ETHYLHEXYL)PHTHALATE	7.50E-03	(mg/L)	2.40E-05	(mg/kg-day)	1.40E-02	per (mg/kg-day)	3.4E-07	1.68E-03	(mg/kg-day)	2.00E-02	(mg/kg-day)	8.4E-02
				Volatiles												
				CHLOROFORM	5.30E-03	(mg/L)	2.82E-08	(mg/kg-day)	3.10E-02	per (mg/kg-day)	8.8E-10	1.98E-06	(mg/kg-day)	1.00E-02	(mg/kg-day)	2.0E-04
			Exp. Route Total								**3.6E-06**					**8.2E-01**
		Exposure Point Total									**3.8E-06**					**8.6E-01**
	Exposure Medium Total										**3.8E-06**					**8.6E-01**
Groundwater Total											**3.8E-06**					**8.6E-01**
Sediment	Sediment	Site 12	Ingestion	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	4.26E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	6.4E-08	2.98E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	9.9E-03
			Exp. Route Total								**6.4E-08**					**9.9E-03**
			Dermal[1]	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	1.69E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.5E-08	1.18E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.9E-03
			Exp. Route Total								**2.5E-08**					**3.9E-03**
		Exposure Point Total									**8.9E-08**					**1.4E-02**
	Exposure Medium Total										**8.9E-08**					**1.4E-02**
Sediment Total											**8.9E-08**					**1.4E-02**
Surface water	Surface water	Site 12	Ingestion	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	5.69E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	8.5E-08	3.98E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.3E-02
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	5.02E-09	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.5E-09	3.51E-07	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.2E-04
				COBALT	7.93E-03	(mg/L)	5.07E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	3.55E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.2E-03
				Semivolatiles												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	1.09E-09	(mg/kg-day)	1.40E-02	per (mg/kg-day)	1.5E-11	7.61E-08	(mg/kg-day)	2.00E-02	(mg/kg-day)	3.8E-06
			Exp. Route Total								**8.8E-08**					**1.5E-02**
			Dermal	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	1.71E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.6E-08	1.20E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.0E-03
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	3.01E-09	(mg/kg-day)	2.00E+01	per (mg/kg-day)	6.0E-08	2.11E-07	(mg/kg-day)	7.50E-05	(mg/kg-day)	2.8E-03
				COBALT	7.93E-03	(mg/L)	6.09E-10	(mg/kg-day)	NA	per (mg/kg-day)	--	4.26E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.4E-04
			Dermal	**Semivolatiles**												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	6.46E-05	(mg/kg-day)	1.40E-02	per (mg/kg-day)	9.0E-07	4.52E-03	(mg/kg-day)	2.00E-02	(mg/kg-day)	2.3E-01
			Exp. Route Total								**9.9E-07**					**2.3E-01**
		Exposure Point Total									**1.1E-06**					**2.5E-01**
	Exposure Medium Total										**1.1E-06**					**2.5E-01**

Surfacewater Total											**1.1E-06**				**2.5E-01**
Soil	Surface Soil	Site 12	Ingestion	**Inorganics**											
				ARSENIC	7.90E+00	(mg/kg)	5.30E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	8.0E-07	3.71E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.2E-01
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	1.82E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	9.1E-07	1.28E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	4.3E-02
			Exp. Route Total								**1.7E-06**				**1.7E-01**
			Dermal[1]	**Inorganics**											
				ARSENIC	7.90E+00	(mg/kg)	2.19E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.3E-08	1.53E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.1E-03
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
			Exp. Route Total								**3.3E-08**				**5.1E-03**
		Exposure Point Total									**1.7E-06**				**1.7E-01**
	Exposure Medium Total										**1.7E-06**				**1.7E-01**
	Air	Site 12	Inhalation	**Inorganics**											
				ARSENIC	5.81E-09	(mg/m^3)	1.89E-08	(ug/m^3)	4.30E-03	per (ug/m^3)	8.1E-11	1.33E-09	(mg/m^3)	1.50E-05	(mg/m^3)	8.8E-05
				CHROMIUM, TOTAL	2.00E-08	(mg/m^3)	6.52E-08	(ug/m^3)	8.40E-02	per (ug/m^3)	5.5E-09	4.57E-09	(mg/m^3)	1.00E-04	(mg/m^3)	4.6E-05
			Exp. Route Total								**5.6E-09**				**1.3E-04**
		Exposure Point Total									**5.6E-09**				**1.3E-04**
	Exposure Medium Total										**5.6E-09**				**1.3E-04**
Soil Total											**1.7E-06**				**1.7E-01**
										Total of Receptor Risks Across All Media	**6.7E-06**			Total of Receptor Hazards Across All Media	**1.3E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

TABLE D.7.5.5
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - SITE 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Site 12	Ingestion	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	5.12E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	7.7E-07	1.49E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.0E-03
				CHROMIUM, TOTAL	2.24E+01	(mg/kg)	3.90E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.0E-07	1.14E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	3.8E-04
				VANADIUM	4.96E+01	(mg/kg)	8.64E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	2.52E-06	(mg/kg-day)	5.00E-03	(mg/kg-day)	5.0E-04
			Exp. Route Total								**9.6E-07**					**5.9E-03**
			Dermal[1]	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	1.22E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.8E-07	3.57E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.2E-03
				CHROMIUM, TOTAL	2.24E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				VANADIUM	4.96E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**1.8E-07**					**1.2E-03**
		Exposure Point Total									**1.1E-06**					**7.0E-03**
	Exposure Medium Total										**1.1E-06**					**7.0E-03**
Sediment Total											**1.1E-06**					**7.0E-03**
Surface Water	Surface Water	Site 12	Ingestion	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	6.21E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	9.3E-06	1.81E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	6.0E-02
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	5.48E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	2.7E-07	1.60E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	5.3E-04
				COBALT	7.93E-03	(mg/L)	5.53E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	1.61E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.4E-03
Surface Water				**Semivolatiles**												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	1.19E-07	(mg/kg-day)	1.40E-02	per (mg/kg-day)	1.7E-09	3.46E-07	(mg/kg-day)	2.00E-02	(mg/kg-day)	1.7E-05
			Exp. Route Total								**9.6E-06**					**6.6E-02**
			Dermal	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	3.54E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	5.3E-07	1.03E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.4E-03
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	6.24E-08	(mg/kg-day)	2.00E+01	per (mg/kg-day)	1.2E-06	1.82E-07	(mg/kg-day)	7.50E-05	(mg/kg-day)	2.4E-03
				COBALT	7.93E-03	(mg/L)	1.26E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	3.68E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.2E-04
			Dermal	**Semivolatiles**												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	4.81E-05	(mg/kg-day)	1.40E-02	per (mg/kg-day)	6.7E-07	1.40E-04	(mg/kg-day)	2.00E-02	(mg/kg-day)	7.0E-03
			Exp. Route Total								**2.5E-06**					**1.3E-02**
		Exposure Point Total									**1.2E-05**					**7.9E-02**
	Exposure Medium Total										**1.2E-05**					**7.9E-02**
Surface Water Total											**1.2E-05**					**7.9E-02**
Soil	Surface Soil	Site 12	Ingestion	**Inorganics**												
				ALUMINUM	1.91E+04	(mg/kg)	8.97E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	2.62E-02	(mg/kg-day)	1.00E+00	(mg/kg-day)	2.6E-02
				ARSENIC	7.90E+00	(mg/kg)	3.71E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	5.6E-06	1.08E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.6E-02
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	1.28E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	6.4E-06	3.73E-05	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.2E-02
				COBALT	9.40E+00	(mg/kg)	4.41E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	1.29E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.3E-02
				IRON	2.34E+04	(mg/kg)	1.10E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	3.21E-02	(mg/kg-day)	7.00E-01	(mg/kg-day)	4.6E-02
				MANGANESE	4.06E+02	(mg/kg)	1.91E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	5.56E-04	(mg/kg-day)	4.70E-02	(mg/kg-day)	1.2E-02
				VANADIUM	7.76E+01	(mg/kg)	3.64E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.06E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	2.1E-02
			Exp. Route Total								**1.2E-05**					**2.0E-01**
			Dermal[1]	**Inorganics**												
				ALUMINUM	1.91E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	7.90E+00	(mg/kg)	4.44E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	6.7E-07	1.30E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.3E-03
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	9.40E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	2.34E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	2.00E-03	(mg/kg-day)	--
				MANGANESE	4.06E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	7.76E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**6.7E-07**					**4.3E-03**
		Exposure Point Total									**1.3E-05**					**2.0E-01**
	Exposure Medium Total										**1.3E-05**					**2.0E-01**
	Air	Site 12	Inhalation	**Inorganics**												
				ALUMINUM	1.40E-05	(mg/m^3)	1.92E-04	(ug/m^3)	NA	per (ug/m^3)	--	5.61E-07	(mg/m^3)	5.00E-03	(mg/m^3)	1.1E-04
				ARSENIC	5.81E-09	(mg/m^3)	7.96E-08	(ug/m^3)	4.30E-03	per (ug/m^3)	3.4E-10	2.32E-10	(mg/m^3)	1.50E-05	(mg/m^3)	1.5E-05
				CHROMIUM, TOTAL	2.00E-08	(mg/m^3)	2.74E-07	(ug/m^3)	8.40E-02	per (ug/m^3)	2.3E-08	7.99E-10	(mg/m^3)	1.00E-04	(mg/m^3)	8.0E-06
				COBALT	6.91E-09	(mg/m^3)	9.47E-08	(ug/m^3)	9.00E-03	per (ug/m^3)	8.5E-10	2.76E-10	(mg/m^3)	6.00E-06	(mg/m^3)	4.6E-05
				IRON	1.72E-05	(mg/m^3)	2.36E-04	(ug/m^3)	NA	per (ug/m^3)	--	6.87E-07	(mg/m3)	NA	(mg/m^3)	--
				MANGANESE	2.99E-07	(mg/m^3)	4.09E-06	(ug/m^3)	NA	per (ug/m^3)	--	1.19E-08	(mg/m^3)	5.00E-05	(mg/m^3)	2.4E-04
				VANADIUM	5.71E-08	(mg/m^3)	7.82E-07	(ug/m^3)	NA	per (ug/m^3)	--	2.28E-09	(mg/m^3)	NA	(mg/m^3)	--
			Exp. Route Total								**2.4E-08**					**4.2E-04**
		Exposure Point Total									**2.4E-08**					**4.2E-04**
	Exposure Medium Total										**2.4E-08**					**4.2E-04**
Soil Total											**1.3E-05**					**2.0E-01**
										Total of Receptor Risks Across All Media	**2.6E-05**				Total of Receptor Hazards Across All Media	**2.9E-01**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose

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TABLE D.7.5.6
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - SITE 12

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Site 12	Ingestion	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	2.39E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.6E-06	2.79E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	9.3E-02
				CHROMIUM, TOTAL	2.24E+01	(mg/kg)	1.82E-06	(mg/kg-day)	5.00E-01	per (mg/kg-day)	9.1E-07	2.13E-05	(mg/kg-day)	3.00E-03	(mg/kg-day)	7.1E-03
				VANADIUM	4.96E+01	(mg/kg)	4.03E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	4.71E-05	(mg/kg-day)	5.00E-03	(mg/kg-day)	9.4E-03
			Exp. Route Total								**4.5E-06**					**1.1E-01**
			Dermal[1]	**Inorganics**												
				ARSENIC	2.93E+01	(mg/kg)	2.01E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.0E-07	2.34E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	7.8E-03
				CHROMIUM, TOTAL	2.24E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				VANADIUM	4.96E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**3.0E-07**					**7.8E-03**
		Exposure Point Total									**4.8E-06**					**1.2E-01**
	Exposure Medium Total										**4.8E-06**					**1.2E-01**
Sediment Total											**4.8E-06**					**1.2E-01**
Surface Water	Surface Water	Site 12	Ingestion	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	7.25E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.1E-05	8.45E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.8E-01
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	6.39E-07	(mg/kg-day)	5.00E-01	per (mg/kg-day)	3.2E-07	7.45E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	2.5E-03
				COBALT	7.93E-03	(mg/L)	6.46E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	7.53E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.5E-02
				Semivolatiles												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	1.38E-07	(mg/kg-day)	1.40E-02	per (mg/kg-day)	1.9E-09	1.61E-06	(mg/kg-day)	2.00E-02	(mg/kg-day)	8.1E-05
			Exp. Route Total								**1.1E-05**					**3.1E-01**
			Dermal	**Inorganics**												
				ARSENIC	8.90E-02	(mg/L)	2.03E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.0E-07	2.37E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	7.9E-03
				CHROMIUM, TOTAL	7.85E-03	(mg/L)	3.58E-08	(mg/kg-day)	2.00E+01	per (mg/kg-day)	7.2E-07	4.17E-07	(mg/kg-day)	7.50E-05	(mg/kg-day)	5.6E-03
				COBALT	7.93E-03	(mg/L)	7.23E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	8.44E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.8E-04
				Semivolatiles												
				BIS(2-ETHYLHEXYL)PHTHALATE	1.70E-03	(mg/L)	2.75E-05	(mg/kg-day)	1.40E-02	per (mg/kg-day)	3.9E-07	3.21E-04	(mg/kg-day)	2.00E-02	(mg/kg-day)	1.6E-02
			Exp. Route Total								**1.4E-06**					**3.0E-02**
		Exposure Point Total									**1.3E-05**					**3.4E-01**
	Exposure Medium Total										**1.3E-05**					**3.4E-01**
Surface Water Total											**1.3E-05**					**3.4E-01**
Soil	Surface Soil	Site 12	Ingestion	**Inorganics**												
				ALUMINUM	1.91E+04	(mg/kg)	2.09E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	2.44E-01	(mg/kg-day)	1.00E+00	(mg/kg-day)	2.4E-01
				ARSENIC	7.90E+00	(mg/kg)	8.66E-06	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.3E-05	1.01E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.4E-01
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	2.98E-05	(mg/kg-day)	5.00E-01	per (mg/kg-day)	1.5E-05	3.48E-04	(mg/kg-day)	3.00E-03	(mg/kg-day)	1.2E-01
				COBALT	9.40E+00	(mg/kg)	1.03E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.20E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	4.0E-01
				IRON	2.34E+04	(mg/kg)	2.56E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	2.99E-01	(mg/kg-day)	7.00E-01	(mg/kg-day)	4.3E-01
				MANGANESE	4.06E+02	(mg/kg)	4.45E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	5.19E-03	(mg/kg-day)	4.70E-02	(mg/kg-day)	1.1E-01
				VANADIUM	7.76E+01	(mg/kg)	8.50E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	9.92E-04	(mg/kg-day)	5.00E-03	(mg/kg-day)	2.0E-01
			Exp. Route Total								**2.8E-05**					**1.8E+00**
			Dermal[1]	**Inorganics**												
				ALUMINUM	1.91E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.00E+00	(mg/kg-day)	--
				ARSENIC	7.90E+00	(mg/kg)	7.27E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.1E-06	8.48E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.8E-02
				CHROMIUM, TOTAL	2.72E+01	(mg/kg)	NA	(mg/kg-day)	2.00E+01	per (mg/kg-day)	--	NA	(mg/kg-day)	7.50E-05	(mg/kg-day)	--
				COBALT	9.40E+00	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	3.00E-04	(mg/kg-day)	--
				IRON	2.34E+04	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	2.00E-03	(mg/kg-day)	--
				MANGANESE	4.06E+02	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	1.88E-03	(mg/kg-day)	--
				VANADIUM	7.76E+01	(mg/kg)	NA	(mg/kg-day)	NA	per (mg/kg-day)	--	NA	(mg/kg-day)	5.00E-03	(mg/kg-day)	--
			Exp. Route Total								**1.1E-06**					**2.8E-02**
		Exposure Point Total									**2.9E-05**					**1.9E+00**
	Exposure Medium Total										**2.9E-05**					**1.9E+00**
	Air	Site 12	Inhalation	**Inorganics**												
				ALUMINUM	1.40E-05	(mg/m^3)	4.81E-05	(ug/m^3)	NA	per (ug/m^3)	--	5.61E-07	(mg/m^3)	5.00E-03	(mg/m^3)	1.1E-04
				ARSENIC	5.81E-09	(mg/m^3)	1.99E-08	(ug/m^3)	4.30E-03	per (ug/m^3)	8.6E-11	2.32E-10	(mg/m^3)	1.50E-05	(mg/m^3)	1.5E-05
				CHROMIUM, TOTAL	2.00E-08	(mg/m^3)	6.85E-08	(ug/m^3)	8.40E-02	per (ug/m^3)	5.8E-09	7.99E-10	(mg/m^3)	1.00E-04	(mg/m^3)	8.0E-06
				COBALT	6.91E-09	(mg/m^3)	2.37E-08	(ug/m^3)	9.00E-03	per (ug/m^3)	2.1E-10	2.76E-10	(mg/m^3)	6.00E-06	(mg/m^3)	4.6E-05
				IRON	1.72E-05	(mg/m^3)	5.89E-05	(ug/m^3)	NA	per (ug/m^3)	--	6.87E-07	(mg/m^3)	NA	(mg/m^3)	--
				MANGANESE	2.99E-07	(mg/m^3)	1.02E-06	(ug/m^3)	NA	per (ug/m^3)	--	1.19E-08	(mg/m^3)	5.00E-05	(mg/m^3)	2.4E-04
				VANADIUM	5.71E-08	(mg/m^3)	1.95E-07	(ug/m^3)	NA	per (ug/m^3)	--	2.28E-09	(mg/m^2)	NA	(mg/m^3)	--
			Exp. Route Total								**6.1E-09**					**4.2E-04**
		Exposure Point Total									**6.1E-09**					**4.2E-04**
	Exposure Medium Total										**6.1E-09**					**4.2E-04**
Soil Total											**2.9E-05**					**1.9E+00**
										Total of Receptor Risks Across All Media	**4.6E-05**				Total of Receptor Hazards Across All Media	**2.3E+00**

1) Dermal intake is "NA" due to no published dermal absorption factor. Please see Table D.5.3 and U.S. EPA 2004 guidance.
EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

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TABLE D.7.5.7

CALCULATIONS OF AIR CONCENTRATIONS DUE TO DUST ENTRAINMENT FROM SOIL

FORT BUCHANAN - SITE 12

Model Equations:

Particulate Emmision Factor	PEF = Q/C x [(3,600 s/h)/(.36 x (1- V) x (Um/Ut)^3 x F(x))] =	1.36E+09
Air Concentration	Cair = Csoil/PEF	m^3/kg

Model Constants:				
	Q/C	9.08E+01	g/m^2-s per kg/m^3	Inverse Mean Concentration at Center of 0.05 square, USEPA 2011b
	V	5.00E-01	unitless	Default, USEPA 2011b
	Um	4.69E+00	m/s	Mean annual wind speed, USEPA 2011b
	Ut	1.13E+01	m/s	Equivalent threshold value of windspeed at 7 m, USEPA 2011b
	F(x)	1.94E-01	unitless	Default, USEPA 2011b

Reference for the model: USEPA Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response. USEPA 1996.

Chemical	**Csoil, Surface Soil**	**Csoil, Subsurface Soil**	**Cair, Surface Soil Particulate**	**Cair, Subsurface Soil Particulate**
	RME EPC	RME EPC	RME EPC	RME EPC
	mg/kg	mg/kg	mg/m^3	mg/m^3
Inorganics				
ALUMINUM	1.91E+04	NA	1.40E-05	NA
ARSENIC	7.90E+00	NA	5.81E-09	NA
CHROMIUM, TOTAL	2.72E+01	NA	2.00E-08	NA
COBALT	9.40E+00	NA	6.91E-09	NA
IRON	2.34E+04	NA	1.72E-05	NA
MANGANESE	4.06E+02	NA	2.99E-07	NA
VANADIUM	7.76E+01	NA	5.71E-08	NA

NA = Not applicable because the chemical is not a COPC in this media.

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TABLE D.7.6.1

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA
FORT BUCHANAN

Scenario Timeframe: Future
Receptor Population: Off-Site Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Tap Water	Tap Water Off-site	Ingestion	**Inorganics**												
				ARSENIC	4.57E-03	(mg/L)	5.26E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	7.9E-05	1.53E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	5.1E-01
				BARIUM	1.88E-01	(mg/L)	2.16E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	6.31E-03	(mg/kg-day)	2.00E-01	(mg/kg-day)	3.2E-02
				COBALT	1.56E-03	(mg/L)	1.80E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	5.24E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.7E-01
				IRON	1.71E+01	(mg/L)	1.97E-01	(mg/kg-day)	NA	per (mg/kg-day)	--	5.74E-01	(mg/kg-day)	7.00E-01	(mg/kg-day)	8.2E-01
				MANGANESE	1.26E+00	(mg/L)	1.45E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	4.23E-02	(mg/kg-day)	4.60E-02	(mg/kg-day)	9.2E-01
				MERCURY	7.86E-05	(mg/L)	9.04E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	2.64E-06	(mg/kg-day)	1.00E-04	(mg/kg-day)	2.6E-02
				PAHs												
				NAPHTHALENE	1.51E-03	(mg/L)	1.74E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	5.07E-05	(mg/kg-day)	2.00E-02	(mg/kg-day)	2.5E-03
				Volatiles												
				CHLOROFORM	7.44E-04	(mg/L)	8.56E-06	(mg/kg-day)	3.10E-02	per (mg/kg-day)	2.7E-07	2.50E-05	(mg/kg-day)	1.00E-02	(mg/kg-day)	2.5E-03
				1,2-DICHLOROETHANE	4.09E-04	(mg/L)	4.71E-06	(mg/kg-day)	9.10E-02	per (mg/kg-day)	4.3E-07	1.37E-05	(mg/kg-day)	NA	(mg/kg-day)	--
				CIS-1,2-DICHLOROETHENE	5.62E-02	(mg/L)	6.47E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	1.89E-03	(mg/kg-day)	2.00E-03	(mg/kg-day)	9.4E-01
				TRANS-1,2-DICHLOROETHENE	2.72E-03	(mg/L)	3.13E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	9.13E-05	(mg/kg-day)	2.00E-02	(mg/kg-day)	4.6E-03
				TETRACHLOROETHENE	3.09E-03	(mg/L)	3.56E-05	(mg/kg-day)	2.10E-03	per (mg/kg-day)	7.5E-08	1.04E-04	(mg/kg-day)	6.00E-03	(mg/kg-day)	1.7E-02
				1,1,2-TRICHLOROETHANE	1.69E-03	(mg/L)	1.94E-05	(mg/kg-day)	5.70E-02	per (mg/kg-day)	1.1E-06	5.67E-05	(mg/kg-day)	4.00E-03	(mg/kg-day)	1.4E-02
				TRICHLOROETHENE	4.02E-01	(mg/L)	4.63E-03	(mg/kg-day)	4.60E-02	per (mg/kg-day)	2.1E-04	1.35E-02	(mg/kg-day)	5.00E-04	(mg/kg-day)	2.7E+01
				VINYL CHLORIDE	1.75E-06	(mg/L)	2.01E-08	(mg/kg-day)	7.20E-01	per (mg/kg-day)	1.4E-08	5.87E-08	(mg/kg-day)	3.00E-03	(mg/kg-day)	2.0E-05
			Exp. Route Total								**2.9E-04**					**3.0E+01**
			Dermal	**Inorganics**												
				ARSENIC	4.57E-03	(mg/L)	2.24E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.4E-07	6.54E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	2.2E-03
				BARIUM	1.88E-01	(mg/L)	9.22E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.69E-05	(mg/kg-day)	1.40E-02	(mg/kg-day)	1.9E-03
				COBALT	1.56E-03	(mg/L)	3.06E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	8.92E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.0E-04
				IRON	1.71E+01	(mg/L)	8.38E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	2.45E-03	(mg/kg-day)	7.00E-01	(mg/kg-day)	3.5E-03
				MANGANESE	1.26E+00	(mg/L)	6.18E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.80E-04	(mg/kg-day)	1.84E-03	(mg/kg-day)	9.8E-02
				MERCURY	7.86E-05	(mg/L)	3.85E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	1.12E-08	(mg/kg-day)	1.00E-04	(mg/kg-day)	1.1E-04
				PAHs												
				NAPHTHALENE	1.51E-03	(mg/L)	9.36E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.73E-05	(mg/kg-day)	2.00E-02	(mg/kg-day)	1.4E-03
				Volatiles												
				CHLOROFORM	7.44E-04	(mg/L)	2.48E-07	(mg/kg-day)	3.10E-02	per (mg/kg-day)	7.7E-09	7.24E-07	(mg/kg-day)	1.00E-02	(mg/kg-day)	7.2E-05
				1,2-DICHLOROETHANE	4.09E-04	(mg/L)	1.88E-07	(mg/kg-day)	9.10E-02	per (mg/kg-day)	1.7E-08	5.47E-07	(mg/kg-day)	NA	(mg/kg-day)	--
				CIS-1,2-DICHLOROETHENE	5.62E-02	(mg/L)	4.67E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.36E-04	(mg/kg-day)	2.00E-03	(mg/kg-day)	6.8E-02
				TRANS-1,2-DICHLOROETHENE	2.72E-03	(mg/L)	2.09E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	6.09E-06	(mg/kg-day)	2.00E-02	(mg/kg-day)	3.0E-04
				TETRACHLOROETHENE	3.09E-03	(mg/L)	1.71E-06	(mg/kg-day)	2.10E-03	per (mg/kg-day)	3.6E-09	5.00E-06	(mg/kg-day)	6.00E-03	(mg/kg-day)	8.3E-04
				1,1,2-TRICHLOROETHANE	1.69E-03	(mg/L)	1.48E-06	(mg/kg-day)	5.70E-02	per (mg/kg-day)	8.4E-08	4.30E-06	(mg/kg-day)	4.00E-03	(mg/kg-day)	1.1E-03
				TRICHLOROETHENE	4.02E-01	(mg/L)	6.49E-04	(mg/kg-day)	4.60E-02	per (mg/kg-day)	3.0E-05	1.89E-03	(mg/kg-day)	5.00E-04	(mg/kg-day)	3.8E+00
				VINYL CHLORIDE	1.75E-06	(mg/L)	8.69E-07	(mg/kg-day)	7.20E-01	per (mg/kg-day)	6.3E-07	2.54E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	8.5E-04
			Exp. Route Total								**3.1E-05**					**4.0E+00**
		Exposure Point Total									**3.2E-04**					**3.4E+01**
	Exposure Medium Total										**3.2E-04**					**3.4E+01**
	Air	Shower Head	Inhalation	**PAHs**												
				NAPHTHALENE	7.55E-04	(mg/m^3)	6.00E-03	(ug/m^3)	3.40E-05	per (ug/m^3)	2.0E-07	1.75E-05	(mg/m^3)	3.00E-03	(mg/m^3)	5.8E-03
				Volatiles												
				CHLOROFORM	3.72E-04	(mg/m^3)	2.96E-03	(ug/m^3)	2.30E-05	per (ug/m^3)	6.8E-08	8.62E-06	(mg/m^3)	9.80E-02	(mg/m^3)	8.8E-05
				1,2-DICHLOROETHANE	2.05E-04	(mg/m^3)	1.62E-03	(ug/m^3)	2.60E-05	per (ug/m^3)	4.2E-08	4.74E-06	(mg/m^3)	7.00E-03	(mg/m^3)	6.8E-04
				CIS-1,2-DICHLOROETHENE	2.81E-02	(mg/m^3)	2.23E-01	(ug/m^3)	NA	per (ug/m^3)	--	6.51E-04	(mg/m^3)	NA	(mg/m^3)	--
				TRANS-1,2-DICHLOROETHENE	1.36E-03	(mg/m^3)	1.08E-02	(ug/m^3)	NA	per (ug/m^3)	--	3.15E-05	(mg/m^3)	6.00E-02	(mg/m^3)	5.3E-04
				TETRACHLOROETHENE	1.55E-03	(mg/m^3)	1.23E-02	(ug/m^3)	2.60E-07	per (ug/m^3)	3.2E-09	3.58E-05	(mg/m^3)	4.00E-02	(mg/m^3)	9.0E-04
				1,1,2-TRICHLOROETHANE	8.45E-04	(mg/m^3)	6.71E-03	(ug/m^3)	1.60E-05	per (ug/m^3)	1.1E-07	1.96E-05	(mg/m^3)	NA	(mg/m^3)	--
				TRICHLOROETHENE	2.01E-01	(mg/m^3)	1.60E+00	(ug/m^3)	4.10E-06	per (ug/m^3)	6.5E-06	4.66E-03	(mg/m^3)	2.00E-03	(mg/m^3)	2.3E+00
				VINYL CHLORIDE	8.75E-04	(mg/m^3)	6.95E-03	(ug/m^3)	4.40E-06	per (ug/m^3)	3.1E-08	2.03E-05	(mg/m^3)	1.00E-01	(mg/m^3)	2.0E-04
			Exp. Route Total								**6.8E-06**					**2.3E+00**
		Exposure Point Total									**6.8E-06**					**2.3E+00**
	Exposure Medium Total										**6.8E-06**					**2.3E+00**
Groundwater Total											**3.3E-04**					**3.7E+01**
										Total of Receptor Risks Across All Media	**3.3E-04**				Total of Receptor Hazards Across All Media	**3.7E+01**

EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

TABLE D.7.6.2

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA
FORT BUCHANAN

Scenario Timeframe: Future
Receptor Population: Off-Site Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Tap Water	Off-site	Ingestion	**Inorganics**												
				ARSENIC	4.57E-03	(mg/L)	2.50E-05	(mg/kg-day)	1.50E+00	per (mg/kg-day)	3.8E-05	2.92E-04	(mg/kg-day)	3.00E-04	(mg/kg-day)	9.7E-01
				BARIUM	1.88E-01	(mg/L)	1.03E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	1.20E-02	(mg/kg-day)	2.00E-01	(mg/kg-day)	6.0E-02
				COBALT	1.56E-03	(mg/L)	8.55E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	9.97E-05	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.3E-01
				IRON	1.71E+01	(mg/L)	9.37E-02	(mg/kg-day)	NA	per (mg/kg-day)	--	1.09E+00	(mg/kg-day)	7.00E-01	(mg/kg-day)	1.6E+00
				MANGANESE	1.26E+00	(mg/L)	6.90E-03	(mg/kg-day)	NA	per (mg/kg-day)	--	8.05E-02	(mg/kg-day)	4.60E-02	(mg/kg-day)	1.8E+00
				MERCURY	7.86E-05	(mg/L)	4.31E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	5.02E-06	(mg/kg-day)	1.00E-04	(mg/kg-day)	5.0E-02
				PAHs												
				NAPHTHALENE	1.51E-03	(mg/L)	8.27E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	9.65E-05	(mg/kg-day)	2.00E-02	(mg/kg-day)	4.8E-03
				Volatiles												
				CHLOROFORM	7.44E-04	(mg/L)	4.08E-06	(mg/kg-day)	3.10E-02	per (mg/kg-day)	1.3E-07	4.76E-05	(mg/kg-day)	1.00E-02	(mg/kg-day)	4.8E-03
				1,2-DICHLOROETHANE	4.09E-04	(mg/L)	2.24E-06	(mg/kg-day)	9.10E-02	per (mg/kg-day)	2.0E-07	2.61E-05	(mg/kg-day)	NA	(mg/kg-day)	--
				CIS-1,2-DICHLOROETHENE	5.62E-02	(mg/L)	3.08E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	3.59E-03	(mg/kg-day)	2.00E-03	(mg/kg-day)	1.8E+00
				TRANS-1,2-DICHLOROETHENE	2.72E-03	(mg/L)	1.49E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.74E-04	(mg/kg-day)	2.00E-02	(mg/kg-day)	8.7E-03
				TETRACHLOROETHENE	3.09E-03	(mg/L)	1.69E-05	(mg/kg-day)	2.10E-03	per (mg/kg-day)	3.6E-08	1.98E-04	(mg/kg-day)	6.00E-03	(mg/kg-day)	3.3E-02
				1,1,2-TRICHLOROETHANE	1.69E-03	(mg/L)	9.26E-06	(mg/kg-day)	5.70E-02	per (mg/kg-day)	5.3E-07	1.08E-04	(mg/kg-day)	4.00E-03	(mg/kg-day)	2.7E-02
				TRICHLOROETHENE	4.02E-01	(mg/L)	2.20E-03	(mg/kg-day)	4.60E-02	per (mg/kg-day)	1.0E-04	2.57E-02	(mg/kg-day)	5.00E-04	(mg/kg-day)	5.1E+01
				VINYL CHLORIDE	1.75E-06	(mg/L)	9.59E-09	(mg/kg-day)	7.20E-01	per (mg/kg-day)	6.9E-09	1.12E-07	(mg/kg-day)	3.00E-03	(mg/kg-day)	3.7E-05
			Exp. Route Total								**1.4E-04**					**5.8E+01**
			Dermal	**Inorganics**												
				ARSENIC	4.57E-03	(mg/L)	1.65E-07	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.5E-07	1.93E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	6.4E-03
				BARIUM	1.88E-01	(mg/L)	6.80E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	7.93E-05	(mg/kg-day)	1.40E-02	(mg/kg-day)	5.7E-03
				COBALT	1.56E-03	(mg/L)	2.26E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	2.63E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	8.8E-04
				IRON	1.71E+01	(mg/L)	6.18E-04	(mg/kg-day)	NA	per (mg/kg-day)	--	7.21E-03	(mg/kg-day)	7.00E-01	(mg/kg-day)	1.0E-02
				MANGANESE	1.26E+00	(mg/L)	4.56E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	5.32E-04	(mg/kg-day)	1.84E-03	(mg/kg-day)	2.9E-01
				MERCURY	7.86E-05	(mg/L)	2.84E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	3.32E-08	(mg/kg-day)	1.00E-04	(mg/kg-day)	3.3E-04
				PAHs												
				NAPHTHALENE	1.51E-03	(mg/L)	5.26E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	6.13E-05	(mg/kg-day)	2.00E-02	(mg/kg-day)	3.1E-03
				Volatiles												
				CHLOROFORM	7.44E-04	(mg/L)	1.83E-07	(mg/kg-day)	3.10E-02	per (mg/kg-day)	5.7E-09	2.13E-06	(mg/kg-day)	1.00E-02	(mg/kg-day)	2.1E-04
				1,2-DICHLOROETHANE	4.09E-04	(mg/L)	1.09E-07	(mg/kg-day)	9.10E-02	per (mg/kg-day)	9.9E-09	1.27E-06	(mg/kg-day)	NA	(mg/kg-day)	--
				CIS-1,2-DICHLOROETHENE	5.62E-02	(mg/L)	2.70E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	3.15E-04	(mg/kg-day)	2.00E-03	(mg/kg-day)	1.6E-01
				TRANS-1,2-DICHLOROETHENE	2.72E-03	(mg/L)	1.23E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	1.43E-05	(mg/kg-day)	2.00E-02	(mg/kg-day)	7.2E-04
				TETRACHLOROETHENE	3.09E-03	(mg/L)	9.63E-07	(mg/kg-day)	2.10E-03	per (mg/kg-day)	2.0E-09	1.12E-05	(mg/kg-day)	6.00E-03	(mg/kg-day)	1.9E-03
				1,1,2-TRICHLOROETHANE	1.69E-03	(mg/L)	8.29E-07	(mg/kg-day)	5.70E-02	per (mg/kg-day)	4.7E-08	9.67E-06	(mg/kg-day)	4.00E-03	(mg/kg-day)	2.4E-03
				TRICHLOROETHENE	4.02E-01	(mg/L)	3.65E-04	(mg/kg-day)	4.60E-02	per (mg/kg-day)	1.7E-05	4.26E-03	(mg/kg-day)	5.00E-04	(mg/kg-day)	8.5E+00
				VINYL CHLORIDE	1.75E-06	(mg/L)	5.18E-07	(mg/kg-day)	7.20E-01	per (mg/kg-day)	3.7E-07	6.05E-06	(mg/kg-day)	3.00E-03	(mg/kg-day)	2.0E-03
			Exp. Route Total								**1.7E-05**					**9.0E+00**
		Exposure Point Total									**1.6E-04**					**6.7E+01**
	Exposure Medium Total										**1.6E-04**					**6.7E+01**
Groundwater Total											**1.6E-04**					**6.7E+01**
										Total of Receptor Risks Across All Media	**1.6E-04**				Total of Receptor Hazards Across All Media	**6.7E+01**

EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

TABLE D.7.6.3

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA
FORT BUCHANAN

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater/Irrigation	Northwest Boundary Area	Ingestion	**Inorganics**												
				ALUMINUM	8.31E+00	(mg/L)	5.69E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	3.98E-04	(mg/kg-day)	1.00E+00	(mg/kg-day)	4.0E-04
				ARSENIC	2.14E-02	(mg/L)	1.47E-08	(mg/kg-day)	1.50E+00	per (mg/kg-day)	2.2E-08	1.03E-06	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.4E-03
				BARIUM	3.65E-01	(mg/L)	2.50E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	1.75E-05	(mg/kg-day)	2.00E-01	(mg/kg-day)	8.8E-05
				CADMIUM	2.01E-03	(mg/L)	1.38E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	9.64E-08	(mg/kg-day)	5.00E-04	(mg/kg-day)	1.9E-04
				COBALT	2.37E-03	(mg/L)	1.62E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	1.14E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	3.8E-04
				COPPER	3.50E-02	(mg/L)	2.40E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	1.68E-06	(mg/kg-day)	4.00E-02	(mg/kg-day)	4.2E-05
				IRON	2.12E+01	(mg/L)	1.45E-05	(mg/kg-day)	NA	per (mg/kg-day)	--	1.02E-03	(mg/kg-day)	7.00E-01	(mg/kg-day)	1.5E-03
				MANGANESE	1.12E+00	(mg/L)	7.67E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	5.37E-05	(mg/kg-day)	4.60E-02	(mg/kg-day)	1.2E-03
				MERCURY	4.49E-04	(mg/L)	3.08E-10	(mg/kg-day)	NA	per (mg/kg-day)	--	2.15E-08	(mg/kg-day)	1.00E-04	(mg/kg-day)	2.2E-04
				NICKEL	1.09E-02	(mg/L)	7.47E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	5.23E-07	(mg/kg-day)	2.00E-02	(mg/kg-day)	2.6E-05
				PAHs												
				NAPHTHALENE	1.51E-03	(mg/L)	1.03E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	7.24E-08	(mg/kg-day)	2.00E-02	(mg/kg-day)	3.6E-06
				Volatiles												
				CHLOROFORM	7.44E-04	(mg/L)	5.10E-10	(mg/kg-day)	3.10E-02	per (mg/kg-day)	1.6E-11	3.57E-08	(mg/kg-day)	1.00E-02	(mg/kg-day)	3.6E-06
				1,2-DICHLOROETHANE	4.09E-04	(mg/L)	2.80E-10	(mg/kg-day)	9.10E-02	per (mg/kg-day)	2.5E-11	1.96E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				CIS-1,2-DICHLOROETHENE	5.62E-02	(mg/L)	3.85E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	2.69E-06	(mg/kg-day)	2.00E-03	(mg/kg-day)	1.3E-03
				TRANS-1,2-DICHLOROETHENE	2.72E-03	(mg/L)	1.86E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	1.30E-07	(mg/kg-day)	2.00E-02	(mg/kg-day)	6.5E-06
				TETRACHLOROETHENE	3.09E-03	(mg/L)	2.12E-09	(mg/kg-day)	2.10E-03	per (mg/kg-day)	4.4E-12	1.48E-07	(mg/kg-day)	6.00E-03	(mg/kg-day)	2.5E-05
				1,1,2-TRICHLOROETHANE	1.69E-03	(mg/L)	1.16E-09	(mg/kg-day)	5.70E-02	per (mg/kg-day)	6.6E-11	8.10E-08	(mg/kg-day)	4.00E-03	(mg/kg-day)	2.0E-05
				TRICHLOROETHENE	4.02E-01	(mg/L)	2.75E-07	(mg/kg-day)	4.60E-02	per (mg/kg-day)	1.3E-08	1.93E-05	(mg/kg-day)	5.00E-04	(mg/kg-day)	3.9E-02
				VINYL CHLORIDE	1.75E-03	(mg/L)	1.20E-09	(mg/kg-day)	7.20E-01	per (mg/kg-day)	8.6E-10	8.39E-08	(mg/kg-day)	3.00E-03	(mg/kg-day)	2.8E-05
			Exp. Route Total								**3.6E-08**					**4.7E-02**
			Dermal	**Inorganics**												
				ALUMINUM	8.31E+00	(mg/L)	3.07E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	2.15E-04	(mg/kg-day)	1.00E+00	(mg/kg-day)	2.1E-04
				ARSENIC	2.14E-02	(mg/L)	7.90E-09	(mg/kg-day)	1.50E+00	per (mg/kg-day)	1.2E-08	5.53E-07	(mg/kg-day)	3.00E-04	(mg/kg-day)	1.8E-03
				BARIUM	3.65E-01	(mg/L)	1.35E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	9.43E-06	(mg/kg-day)	1.40E-02	(mg/kg-day)	6.7E-04
				CADMIUM	2.01E-03	(mg/L)	7.42E-10	(mg/kg-day)	NA	per (mg/kg-day)	--	5.19E-08	(mg/kg-day)	2.50E-05	(mg/kg-day)	2.1E-03
				COBALT	2.37E-03	(mg/L)	3.50E-10	(mg/kg-day)	NA	per (mg/kg-day)	--	2.45E-08	(mg/kg-day)	3.00E-04	(mg/kg-day)	8.2E-05
				COPPER	3.50E-02	(mg/L)	1.29E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	9.04E-07	(mg/kg-day)	4.00E-02	(mg/kg-day)	2.3E-05
				IRON	2.12E+01	(mg/L)	7.82E-06	(mg/kg-day)	NA	per (mg/kg-day)	--	5.48E-04	(mg/kg-day)	7.00E-01	(mg/kg-day)	7.8E-04
				MANGANESE	1.12E+00	(mg/L)	4.13E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	2.89E-05	(mg/kg-day)	1.84E-03	(mg/kg-day)	1.6E-02
				MERCURY	4.49E-04	(mg/L)	1.66E-10	(mg/kg-day)	NA	per (mg/kg-day)	--	1.16E-08	(mg/kg-day)	1.00E-04	(mg/kg-day)	1.2E-04
				NICKEL	1.09E-02	(mg/L)	8.04E-10	(mg/kg-day)	NA	per (mg/kg-day)	--	5.63E-08	(mg/kg-day)	8.00E-04	(mg/kg-day)	7.0E-05
				PAHs												
				NAPHTHALENE	1.51E-03	(mg/L)	3.04E-08	(mg/kg-day)	NA	per (mg/kg-day)	--	2.13E-06	(mg/kg-day)	2.00E-02	(mg/kg-day)	1.1E-04
				Volatiles												
				CHLOROFORM	7.44E-04	(mg/L)	2.29E-09	(mg/kg-day)	3.10E-02	per (mg/kg-day)	7.1E-11	1.60E-07	(mg/kg-day)	1.00E-02	(mg/kg-day)	1.6E-05
				1,2-DICHLOROETHANE	4.09E-04	(mg/L)	7.45E-10	(mg/kg-day)	9.10E-02	per (mg/kg-day)	6.8E-11	5.22E-08	(mg/kg-day)	NA	(mg/kg-day)	--
				CIS-1,2-DICHLOROETHENE	5.62E-02	(mg/L)	1.85E-07	(mg/kg-day)	NA	per (mg/kg-day)	--	1.30E-05	(mg/kg-day)	2.00E-03	(mg/kg-day)	6.5E-03
				TRANS-1,2-DICHLOROETHENE	2.72E-03	(mg/L)	8.77E-09	(mg/kg-day)	NA	per (mg/kg-day)	--	6.14E-07	(mg/kg-day)	2.00E-02	(mg/kg-day)	3.1E-05
				TETRACHLOROETHENE	3.09E-03	(mg/L)	5.41E-09	(mg/kg-day)	2.10E-03	per (mg/kg-day)	1.1E-11	3.79E-07	(mg/kg-day)	6.00E-03	(mg/kg-day)	6.3E-05
				1,1,2-TRICHLOROETHANE	1.69E-03	(mg/L)	5.09E-09	(mg/kg-day)	5.70E-02	per (mg/kg-day)	2.9E-10	3.56E-07	(mg/kg-day)	4.00E-03	(mg/kg-day)	8.9E-05
				TRICHLOROETHENE	4.02E-01	(mg/L)	2.23E-06	(mg/kg-day)	4.60E-02	per (mg/kg-day)	1.0E-07	1.56E-04	(mg/kg-day)	5.00E-04	(mg/kg-day)	3.1E-01
				VINYL CHLORIDE	1.75E-03	(mg/L)	3.99E-09	(mg/kg-day)	7.20E-01	per (mg/kg-day)	2.9E-09	2.79E-07	(mg/kg-day)	3.00E-03	(mg/kg-day)	9.3E-05
			Exp. Route Total								**1.2E-07**					**3.4E-01**
		Exposure Point Total									**1.5E-07**					**3.9E-01**
	Exposure Medium Total										**1.5E-07**					**3.9E-01**
Sediment Total											**1.5E-07**					**3.9E-01**
										Total of Receptor Risks Across All Media	**1.5E-07**				Total of Receptor Hazards Across All Media	**3.9E-01**

EPC = Exposure Point Concentration
CSF = Cancer Slope Factor
RfD = Reference Dose
RfC = Reference Concentration

TABLE D.7.6.4
CALCULATION OF DERMAL ABSORBED DOSE FROM GROUNDWATER
RESIDENT (ADULT AND CHILD) - REASONABLE MAXIMUM EXPOSURE
NORTHWEST BOUNDARY AREA

Contaminant of Potential Concern	EPC (ug/L)	K_p (cm/hr)	Log K_p	MW (g/mole)	Log K_{ow}	B (unitless)	D_{sc} (cm^2/hr)	τ_{event} (hr)	b	c	t* (hr)	DA_{adult} (mg/cm^2-event)	DA_{child} (mg/cm^2-event)
NAPHTHALENE	1.51E+00	4.70E-02	-1.34E+00	128.18	3.30	2.05E-01	3.04E-07	5.49E-01	4.43E-01	4.81E-01	1.32E+00	1.1E-07	1.5E-07
CHLOROFORM	7.44E-01	6.80E-03	-2.17E+00	119.38	1.97	2.86E-02	3.40E-07	4.90E-01	3.21E-01	3.53E-01	1.18E+00	2.9E-09	5.1E-09
1,2-DICHLOROETHANE	4.09E-01	4.20E-03	-2.38E+00	98.96	1.48	1.61E-02	4.42E-07	3.77E-01	3.13E-01	3.44E-01	9.04E-01	2.2E-09	3.0E-09
CIS-1,2-DICHLOROETHENE	5.62E+01	7.70E-03	-1.96E+00	96.94	2.09	2.92E-02	4.54E-07	3.67E-01	3.21E-01	3.53E-01	8.81E-01	5.5E-07	7.5E-07
TRANS-1,2-DICHLOROETHENE	2.72E+00	7.70E-03	-2.45E+00	84.90	1.25	2.73E-02	5.30E-07	3.14E-01	3.20E-01	3.52E-01	7.54E-01	2.5E-08	3.4E-08
TETRACHLOROETHENE	3.09E+00	3.30E-03	-1.48E+00	165.83	3.40	1.63E-02	1.87E-07	8.92E-01	3.13E-01	3.44E-01	2.14E+00	2.0E-08	2.7E-08
1,1,2-TRICHLOROETHANE	1.69E+00	6.40E-03	-2.30E+00	133.41	1.89	2.84E-02	2.84E-07	5.87E-01	3.21E-01	3.53E-01	1.41E+00	1.7E-08	2.3E-08
TRICHLOROETHENE	4.02E+02	1.20E-02	-1.94E+00	131.39	2.42	5.29E-02	2.91E-07	5.72E-01	3.36E-01	3.69E-01	1.37E+00	7.7E-06	1.0E-05
VINYL CHLORIDE	1.75E+00	5.60E-03	-2.08E+00	62.50	1.62	1.70E-02	7.08E-07	2.35E-01	3.14E-01	3.45E-01	5.65E-01	1.0E-08	1.4E-08

Notes:

-- = Not applicable
B = Ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis
cm/hr = Centimeter per hour
cm^2/hr = Square centimeter per hour
DA = Dose absorbed per event per area of skin exposed for the adult and child resident scenario
D_{sc} = Effective diffusivity for chemical transfer through the skin
USEPA = U.S. Environmental Protection Agency
EPC = Exposure point concentration (see Table D.3.6.1)
g/mol = Gram per mole
hr = Hour
K_p = Dermal permeability coefficient of compound in water; calculated per USEPA 2004 for organics
Log K_{ow} = Log octanol/water partition coefficient (Primary source: USEPA 2004)
Log K_p = Log of the dermal permeability coefficient
ug/L = Microgram per liter
mg/cm^2-event = Milligram per square centimeter per event
MW = Molecular weight
τ_{event} = Lag time per event
t* = Time it takes to reach steady-state

TABLE D.7.6.5
CALCULATION OF DERMAL ABSORBED DOSE FROM GROUNDWATER
CONSTRUCTION WORKER - REASONABLE MAXIMUM EXPOSURE
NORTHWEST BOUNDARY AREA

Contaminant of Potential Concern	EPC (ug/L)	K_p (cm/hr)	Log K_p	MW (g/mole)	Log K_{ow}	B (unitless)	D_{sc} (cm^2/hr)	τ_{event} (hr)	b	c	t* (hr)	DA_{CW} (mg/cm^2-event)
NAPHTHALENE	1.51E+00	4.70E-02	-1.34E+00	128.18	3.30	2.05E-01	3.04E-07	5.49E-01	4.43E-01	4.81E-01	1.32E+00	3.3E-07
CHLOROFORM	7.44E-01	6.80E-03	-2.17E+00	119.38	1.97	2.86E-02	3.40E-07	4.90E-01	3.21E-01	3.53E-01	1.18E+00	2.5E-08
1,2-DICHLOROETHANE	4.09E-01	4.20E-03	-2.38E+00	98.96	1.48	1.61E-02	4.42E-07	3.77E-01	3.13E-01	3.44E-01	9.04E-01	8.1E-09
CIS-1,2-DICHLOROETHENE	5.62E+01	7.70E-03	-1.96E+00	96.94	2.09	2.92E-02	4.54E-07	3.67E-01	3.21E-01	3.53E-01	8.81E-01	2.0E-06
TRANS-1,2-DICHLOROETHENE	2.72E+00	7.70E-03	-2.45E+00	84.90	1.25	2.73E-02	5.30E-07	3.14E-01	3.20E-01	3.52E-01	7.54E-01	9.5E-08
TETRACHLOROETHENE	3.09E+00	3.30E-03	-1.48E+00	165.83	3.40	1.63E-02	1.87E-07	8.92E-01	3.13E-01	3.44E-01	2.14E+00	5.9E-08
1,1,2-TRICHLOROETHANE	1.69E+00	6.40E-03	-2.30E+00	133.41	1.89	2.84E-02	2.84E-07	5.87E-01	3.21E-01	3.53E-01	1.41E+00	5.5E-08
TRICHLOROETHENE	4.02E+02	1.20E-02	-1.94E+00	131.39	2.42	5.29E-02	2.91E-07	5.72E-01	3.36E-01	3.69E-01	1.37E+00	2.4E-05
VINYL CHLORIDE	1.75E+00	5.60E-03	-2.08E+00	62.50	1.62	1.70E-02	7.08E-07	2.35E-01	3.14E-01	3.45E-01	5.65E-01	4.3E-08

Notes:
-- = Not applicable
B = Ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis
cm/hr = Centimeter per hour
cm^2/hr = Square centimeter per hour
DA_{CW} = Dose absorbed per event per area of skin exposed for the construction worker scenario
D_{sc} = Effective diffusivity for chemical transfer through the skin
USEPA = U.S. Environmental Protection Agency
EPC = Exposure point concentration (see Table D.3.6.1)
g/mol = Gram per mole
hr = Hour
IW = Industrial worker
K_p = Dermal permeability coefficient of compound in water; calculated per USEPA 2004 for organics
Log K_{ow} = Log octanol/water partition coefficient (Primary source: USEPA 2004)
Log K_p = Log of the dermal permeability coefficient
ug/L = Microgram per liter
mg/cm^2-event = Milligram per square centimeter per event
MW = Molecular weight
τ_{event} = Lag time per event
t* = Time it takes to reach steady-state
Log K_p = Log of the dermal permeability coefficient

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TABLE D.9.1.1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	1.9E-03	--	5.5E-07	1.9E-03
			ARSENIC	2.1E-06	5.1E-07	2.6E-10	2.7E-06	ARSENIC	Skin	1.1E-02	2.7E-03	3.2E-07	1.4E-02
			CHROMIUM, TOTAL	1.7E-06	--	1.2E-08	1.7E-06	CHROMIUM, TOTAL	None	2.6E-03	--	1.1E-07	2.6E-03
			COBALT	--	--	8.3E-11	8.3E-11	COBALT	Thyroid	1.7E-03	--	1.2E-07	1.7E-03
			IRON	--	--	--	NA	IRON	Gastrointestinal System	4.6E-03	--	--	4.6E-03
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	9.4E-04	--	1.3E-06	9.4E-04
			VANADIUM	--	--	--	NA	VANADIUM	Hair	2.5E-03	--	--	2.5E-03
			PAHs					**PAHs**					
			BENZ(A)ANTHRACENE	5.0E-09	5.2E-09	3.2E-14	1.0E-08	BENZ(A)ANTHRACENE	NA	--	--	--	NA
			BENZO(B)FLUORANTHENE	1.0E-08	1.1E-08	6.6E-14	2.1E-08	BENZO(B)FLUORANTHENE	NA	--	--	--	NA
			BENZO(A)PYRENE	1.0E-07	1.0E-07	6.5E-13	2.0E-07	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	2.2E-08	2.3E-08	1.4E-13	4.5E-08	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			INDENO(1,2,3-C,D)PYRENE	6.2E-09	6.4E-09	4.0E-14	1.3E-08	INDENO(1,2,3-C,D)PYRENE	NA	--	--	--	NA
			(Total)	4.0E-06	6.6E-07	1.2E-08	4.6E-06		(Total)	2.5E-02	2.7E-03	2.4E-06	2.8E-02
					Total Risk Across Surface Soil		**4.6E-06**				**Total Hazard Index Across Surface Soil**		**2.8E-02**
						Total Risk Across All Media and All Exposure Routes	**5E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0.03**

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TABLE D.9.1.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	2.2E-02	--	2.1E-06	2.2E-02
			ARSENIC	1.8E-06	2.7E-07	7.0E-11	2.0E-06	ARSENIC	Skin	1.3E-01	5.2E-03	1.2E-06	1.4E-01
			CHROMIUM, TOTAL	1.4E-06	--	3.2E-09	1.4E-06	CHROMIUM, TOTAL	None	3.0E-02	--	4.2E-07	3.0E-02
			COBALT	--	--	2.2E-11	2.2E-11	COBALT	Thyroid	2.0E-02	--	4.5E-07	2.0E-02
			IRON	--	--	--	NA	IRON	Gastrointestinal System	5.4E-02	--	--	5.4E-02
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.1E-02	--	4.7E-06	1.1E-02
			VANADIUM	--	--	--	NA	VANADIUM	Hair	2.9E-02	--	--	2.9E-02
			PAHs					**PAHs**					
			BENZ(A)ANTHRACENE	1.2E-08	8.0E-09	2.6E-14	2.0E-08	BENZ(A)ANTHRACENE	NA	--	--	--	NA
			BENZO(B)FLUORANTHENE	2.6E-08	1.7E-08	5.3E-14	4.2E-08	BENZO(B)FLUORANTHENE	NA	--	--	--	NA
			BENZO(A)PYRENE	2.5E-07	1.6E-07	5.2E-13	4.1E-07	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	5.5E-08	3.6E-08	1.1E-13	9.1E-08	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			INDENO(1,2,3-C,D)PYRENE	1.5E-08	9.9E-09	3.2E-14	2.5E-08	INDENO(1,2,3-C,D)PYRENE	NA	--	--	--	NA
			(Total)	3.5E-06	5.0E-07	3.3E-09	4.0E-06		(Total)	3.0E-01	5.2E-03	8.9E-06	3.0E-01
					Total Risk Across Surface Soil		**4.0E-06**				**Total Hazard Index Across Surface Soil**		**3.0E-01**
						Total Risk Across All Media and All Exposure Routes	**4E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0.3**

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TABLE D.9.1.3

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ARSENIC	1.1E-05	1.6E-06	1.1E-08	1.3E-05	ARSENIC	Skin	7.1E-02	9.9E-03	2.0E-05	8.1E-02
			CHROMIUM, TOTAL	8.9E-06	--	5.1E-07	9.4E-06	CHROMIUM, TOTAL	None	1.7E-02	--	6.8E-06	1.7E-02
			VANADIUM	--	--	--	NA	VANADIUM	Hair	1.6E-02	--	--	1.6E-02
			PAHs					**PAHs**					
			BENZO(A)PYRENE	5.4E-07	3.2E-07	2.8E-11	8.6E-07	BENZO(A)PYRENE	NA	--	--	--	NA
			(Total)	2.1E-05	1.9E-06	5.3E-07	2.3E-05		(Total)	1.0E-01	9.9E-03	2.6E-05	1.1E-01
				Total Risk Across Surface Soil			**2.3E-05**		**Total Hazard Index Across Surface Soil**				**1.1E-01**
			Total Risk Across All Media and All Exposure Routes				**2E-05**		**Total Hazard Index Across All Media and All Exposure Routes**				**0.1**

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TABLE D.9.1.4

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ARSENIC	2.7E-06	1.1E-07	6.6E-15	2.8E-06	ARSENIC	Skin	4.2E-01	1.7E-02	7.2E-06	4.4E-01
			CHROMIUM, TOTAL	2.2E-06	--	3.2E-13	2.2E-06	CHROMIUM, TOTAL	None	1.0E-01	--	2.7E-06	1.0E-01
			COBALT	--	--	2.9E-14	2.9E-14	COBALT	Thyroid	8.9E-01	--	3.8E-05	8.9E-01
			(Total)	4.9E-06	1.1E-07	3.6E-13	5.0E-06		(Total)	1.4E+00	1.7E-02	4.8E-05	1.4E+00
Subsurface Risk Across Subsurface Soil							**5.0E-06**	**Total Hazard Index Across Subsurface Soil**					**1.4E+00**
Total Risk Across All Media and All Exposure Routes							**5E-06**	**Total Hazard Index Across All Media and All Exposure Routes**					**1**

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TABLE D.9.1.5

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.2E-01	--	3.6E-03	3.3E-01
			ARSENIC	7.2E-05	6.0E-06	1.1E-08	7.8E-05	ARSENIC	Skin	1.9E+00	1.6E-01	2.1E-03	2.0E+00
			CHROMIUM, TOTAL	5.6E-05	--	5.2E-07	5.6E-05	CHROMIUM, TOTAL	None	4.3E-01	--	7.2E-04	4.4E-01
			COBALT	--	--	3.6E-09	3.6E-09	COBALT	Thyroid	2.8E-01	--	7.8E-04	2.8E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	7.8E-01	--	--	7.8E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.6E-01	--	8.2E-03	1.7E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	4.2E-01	--	--	4.2E-01
			PAHs					**PAHs**					
			BENZ(A)ANTHRACENE	8.9E-07	3.2E-07	7.4E-12	1.2E-06	BENZ(A)ANTHRACENE	NA	--	--	--	NA
			BENZO(B)FLUORANTHENE	1.8E-06	6.6E-07	1.5E-11	2.5E-06	BENZO(B)FLUORANTHENE	NA	--	--	--	NA
			BENZO(A)PYRENE	1.8E-05	6.5E-06	1.5E-10	2.4E-05	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	3.9E-06	1.4E-06	3.3E-11	5.4E-06	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			INDENO(1,2,3-C,D)PYRENE	1.1E-06	4.0E-07	9.1E-12	1.5E-06	INDENO(1,2,3-C,D)PYRENE	NA	--	--	--	NA
			(Total for Child)	1.5E-04	1.5E-05	5.3E-07	1.7E-04		(Total for Child)	4.3E+00	1.6E-01	1.5E-02	4.4E+00
	Surface Soil	Site 1, 7, 8 (Adult)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.5E-02	--	3.6E-03	3.8E-02
			ARSENIC	3.1E-05	3.7E-06	4.6E-08	3.5E-05	ARSENIC	Skin	2.0E-01	2.4E-02	2.1E-03	2.3E-01
			CHROMIUM, TOTAL	2.4E-05	--	2.1E-06	2.6E-05	CHROMIUM, TOTAL	None	4.7E-02	--	7.2E-04	4.7E-02
			COBALT	--	--	1.4E-08	1.4E-08	COBALT	Thyroid	3.0E-02	--	7.8E-04	3.1E-02
			IRON	--	--	--	NA	IRON	Gastrointestinal System	8.3E-02	--	--	8.3E-02
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.7E-02	--	8.2E-03	2.5E-02
			VANADIUM	--	--	--	NA	VANADIUM	Hair	4.5E-02	--	--	4.5E-02
			PAHs					**PAHs**					
			BENZ(A)ANTHRACENE	1.3E-07	6.7E-08	1.0E-11	2.0E-07	BENZ(A)ANTHRACENE	NA	--	--	--	NA
			BENZO(B)FLUORANTHENE	2.7E-07	1.4E-07	2.1E-11	4.0E-07	BENZO(B)FLUORANTHENE	NA	--	--	--	NA
			BENZO(A)PYRENE	2.6E-06	1.3E-06	2.0E-10	3.9E-06	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	5.7E-07	3.0E-07	4.5E-11	8.7E-07	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			INDENO(1,2,3-C,D)PYRENE	1.6E-07	8.3E-08	1.2E-11	2.4E-07	INDENO(1,2,3-C,D)PYRENE	NA	--	--	--	NA
			(Total for Adult)	5.9E-05	5.6E-06	2.1E-06	6.6E-05		(Total for Adult)	4.6E-01	2.4E-02	1.5E-02	5.0E-01
	Surface Soil	Site 1, 7, 8 (Adult + Child)	**Inorganics**										
			ARSENIC	1.0E-04	9.7E-06	5.7E-08	1.1E-04						
			CHROMIUM, TOTAL	8.0E-05	NA	2.6E-06	8.2E-05						
			COBALT	NA	NA	1.8E-08	1.8E-08						
			PAHs										
			BENZ(A)ANTHRACENE	1.0E-06	3.9E-07	1.7E-11	1.4E-06						
			BENZO(B)FLUORANTHENE	2.1E-06	8.0E-07	3.6E-11	2.9E-06						
			BENZO(A)PYRENE	2.0E-05	7.8E-06	3.5E-10	2.8E-05						
			DIBENZ(A,H)ANTHRACENE	4.5E-06	1.7E-06	7.7E-11	6.3E-06						
			INDENO(1,2,3-C,D)PYRENE	1.3E-06	4.8E-07	2.1E-11	1.7E-06						
			(Total for Child + Adult)	2.1E-04	2.1E-05	2.7E-06	2.4E-04						
				Total Risk Across Surface Soil			**2.4E-04**					**Total Hazard Index Across Surface Soil (Child)**	**4.4E+00**
												Total Hazard Index Across Surface Soil (Adult)	**5.0E-01**
			Total Risk Across All Media and All Exposure Routes				**2E-04**					**Total Hazard Index Across All Media and All Exposure Routes (Child)**	**4**
												Total Hazard Index Across All Media and All Exposure Routes (Adult)	**0.5**

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TABLE D.9.1.6

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 1, 7, 8 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	4.0E-01	--	4.4E-03	4.1E-01
			ARSENIC	4.4E-05	3.7E-06	7.0E-09	4.8E-05	ARSENIC	Skin	1.1E+00	9.6E-02	1.3E-03	1.2E+00
			CHROMIUM, TOTAL	3.6E-05	--	3.4E-07	3.7E-05	CHROMIUM, TOTAL	None	2.8E-01	--	4.7E-04	2.8E-01
			COBALT	--	--	3.1E-08	3.1E-08	COBALT	Thyroid	2.4E+00	--	6.7E-03	2.4E+00
			IRON	--	--	--	NA	IRON	Gastrointestinal System	8.0E-01	--	--	8.0E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	5.6E-01	--	2.9E-02	5.9E-01
			MERCURY	--	--	--	NA	MERCURY	Central Nervous System	3.8E-01	--	7.1E-06	3.8E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	3.1E-01	--	--	3.1E-01
			PAHs					**PAHs**					
			BENZO(A)PYRENE	3.1E-06	1.1E-06	2.6E-11	4.2E-06	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	7.8E-07	2.8E-07	6.4E-12	1.1E-06	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Child)	8.4E-05	5.1E-06	3.7E-07	9.0E-05		(Total for Child)	6.3E+00	9.6E-02	4.2E-02	6.4E+00
	Subsurface Soil	Site 1, 7, 8 (Adult)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	4.3E-02	--	4.4E-03	4.7E-02
			ARSENIC	1.9E-05	2.3E-06	2.8E-08	2.1E-05	ARSENIC	Skin	1.2E-01	1.5E-02	1.3E-03	1.4E-01
			CHROMIUM, TOTAL	1.6E-05	--	1.3E-06	1.7E-05	CHROMIUM, TOTAL	None	3.0E-02	--	4.7E-04	3.1E-02
			COBALT	--	--	1.2E-07	1.2E-07	COBALT	Thyroid	2.6E-01	--	6.7E-03	2.7E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	8.5E-02	--	--	8.5E-02
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	6.0E-02	--	2.9E-02	8.9E-02
			MERCURY	--	--	--	NA	MERCURY	Central Nervous System	4.1E-02	--	7.1E-06	4.1E-02
			VANADIUM	--	--	--	NA	VANADIUM	Hair	3.3E-02	--	--	3.3E-02
			PAHs					**PAHs**					
			BENZO(A)PYRENE	4.5E-07	2.3E-07	3.5E-11	6.9E-07	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	1.1E-07	5.9E-08	8.8E-12	1.7E-07	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Adult)	3.5E-05	2.6E-06	1.5E-06	3.9E-05		(Total for Adult)	6.7E-01	1.5E-02	4.2E-02	7.3E-01
	Subsurface Soil	Site 1, 7, 8 (Adult + Child)	**Inorganics**										
			ARSENIC	6.3E-05	6.0E-06	3.5E-08	6.9E-05						
			CHROMIUM, TOTAL	5.2E-05	NA	1.7E-06	5.4E-05						
			COBALT	NA	NA	1.5E-07	1.5E-07						
			PAHs										
			BENZO(A)PYRENE	3.6E-06	1.4E-06	6.1E-11	4.9E-06						
			DIBENZ(A,H)ANTHRACENE	8.9E-07	3.4E-07	1.5E-11	1.2E-06						
			(Total for Child + Adult)	1.2E-04	7.7E-06	1.9E-06	1.3E-04	**Total Hazard Index Across Subsurface Soil (Child)**					**6.4E+00**

TABLE D.9.1.6

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
				Total Risk Across Surface Soil			**1.3E-04**		**Total Hazard Index Across Subsurface Soil (Adult)**				**7.3E-01**
			Total Risk Across All Media and All Exposure Routes				**1E-04**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**6**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**0.7**

TABLE D.9.2.1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 2

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 2, 3, and 11	**Inorganics**					**Inorganics**					
			ARSENIC	6.7E-06	2.7E-07	6.8E-10	6.9E-06	ARSENIC	Skin	1.0E+00	4.3E-02	7.4E-04	1.1E+00
			CHROMIUM, TOTAL	3.3E-06	--	2.0E-08	3.3E-06	CHROMIUM, TOTAL	None	1.5E-01	--	1.6E-04	1.5E-01
			COBALT	--	--	3.9E-10	3.9E-10	COBALT	Thyroid	2.8E-01	--	5.1E-04	2.8E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.3E+00	--	4.3E-02	1.3E+00
			VANADIUM	--	--	--	NA	VANADIUM	Hair	1.7E-01	--	--	1.7E-01
			(Total)	9.9E-06	2.7E-07	2.1E-08	1.0E-05		(Total)	2.9E+00	4.3E-02	4.4E-02	3.0E+00
							Subsurface Risk Across Subsurface Soil	**1E-05**					**Total Hazard Index Across Subsurface Soil**	**3E+00**
							Total Risk Across All Media and All Exposure Routes	**1E-05**					**Total Hazard Index Across All Media and All Exposure Routes**	**3**

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TABLE D.9.2.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 2

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 2, 3, and 11 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.5E-01	--	1.6E-04	3.5E-01
			ARSENIC	1.1E-04	9.1E-06	7.2E-10	1.2E-04	ARSENIC	Skin	2.8E+00	2.4E-01	1.3E-04	3.1E+00
			CHROMIUM, TOTAL	5.4E-05	--	2.1E-08	5.4E-05	CHROMIUM, TOTAL	None	4.2E-01	--	2.9E-05	4.2E-01
			COBALT	--	--	4.1E-10	4.1E-10	COBALT	Thyroid	7.7E-01	--	8.8E-05	7.7E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.3E+00	--	--	1.3E+00
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	3.5E+00	--	7.5E-03	3.5E+00
			VANADIUM	--	--	--	NA	VANADIUM	Hair	4.5E-01	--	--	4.5E-01
			Volatiles					**Volatiles**					
			ETHYLBENZENE	--	--	1.2E-13	1.2E-13	ETHYLBENZENE	Liver and Kidney	2.4E-03	--	5.5E-10	2.4E-03
			(Total for Child)	1.6E-04	9.1E-06	2.2E-08	1.7E-04		(Total for Child)	9.6E+00	2.4E-01	7.9E-03	9.8E+00
	Subsurface Soil	Sites 2, 3, and 11 (Adult)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.8E-02	--	1.6E-04	3.8E-02
			ARSENIC	4.7E-05	5.6E-06	2.9E-09	5.2E-05	ARSENIC	Skin	3.0E-01	3.6E-02	1.3E-04	3.4E-01
			CHROMIUM, TOTAL	2.3E-05	--	8.3E-08	2.3E-05	CHROMIUM, TOTAL	None	4.5E-02	--	2.9E-05	4.5E-02
			COBALT	--	--	1.6E-09	1.6E-09	COBALT	Thyroid	8.3E-02	--	8.8E-05	8.3E-02
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.4E-01	--	--	1.4E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	3.7E-01	--	7.5E-03	3.8E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	4.9E-02	--	--	4.9E-02
			Volatiles					**Volatiles**					
			ETHYLBENZENE	--	--	4.7E-13	4.7E-13	ETHYLBENZENE	Liver and Kidney	2.5E-04	--	5.5E-10	2.5E-04
			(Total for Adult)	7.0E-05	5.6E-06	8.7E-08	7.5E-05		(Total for Adult)	1.0E+00	3.6E-02	7.9E-03	1.1E+00
	Subsurface Soil	Sites 2, 3, and 11 (Adult + Child)	**Inorganics**										
			ARSENIC	1.6E-04	1.5E-05	3.6E-09	1.7E-04						
			CHROMIUM, TOTAL	7.6E-05	NA	1.0E-07	7.7E-05						
			COBALT	NA	NA	2.0E-09	2.0E-09						
			Volatiles										
			ETHYLBENZENE	NA	NA	5.9E-13	5.9E-13						
			(Total for Child + Adult)	2.3E-04	1.5E-05	1.1E-07	2.5E-04	**Total Hazard Index Across Subsurface Soil (Child)**					**9.8E+00**
				Total Risk Across Subsurface Soil			**2E-04**	**Total Hazard Index Across Subsurface Soil (Adult)**					**1.1E+00**
			Total Risk Across All Media and All Exposure Routes				**2E-04**	**Total Hazard Index Across All Media and All Exposure Routes (Child)**					**10**
								Total Hazard Index Across All Media and All Exposure Routes (Adult)					**1**

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TABLE D.9.3.1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Sites 13 and 15	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	5.5E-05	--	1.4E-05	6.9E-05
			ARSENIC	6.3E-07	1.5E-07	7.7E-11	7.8E-07	ARSENIC	Skin	1.1E-04	2.6E-05	2.8E-06	1.4E-04
			CHROMIUM, TOTAL	5.5E-07	--	3.9E-09	5.5E-07	CHROMIUM, TOTAL	None	2.8E-05	--	1.1E-06	2.9E-05
			COBALT	--	--	1.9E-10	1.9E-10	COBALT	Thyroid	1.3E-04	--	8.2E-06	1.4E-04
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.0E-04	--	--	1.0E-04
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	5.0E-05	--	6.0E-05	1.1E-04
			VANADIUM	--	--	--	NA	VANADIUM	Hair	4.9E-05	--	--	4.9E-05
			(Total)	1.2E-06	1.5E-07	4.2E-09	1.3E-06		(Total)	5.2E-04	2.6E-05	8.6E-05	6.3E-04
					Total Risk Across Surface Soil		**1E-06**				**Total Hazard Index Across Surface Soil**		**6E-04**
						Total Risk Across All Media and All Exposure Routes	**1E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0.0006**

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TABLE D.9.3.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Sites 13 and 15	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	6.4E-04	--	1.4E-05	6.6E-04
			ARSENIC	5.2E-07	7.8E-08	2.1E-11	6.0E-07	ARSENIC	Skin	1.3E-03	1.9E-04	2.8E-06	1.5E-03
			CHROMIUM, TOTAL	4.5E-07	--	1.1E-09	4.6E-07	CHROMIUM, TOTAL	None	3.3E-04	--	1.1E-06	3.3E-04
			COBALT	--	--	5.0E-11	5.0E-11	COBALT	Thyroid	1.5E-03	--	8.2E-06	1.5E-03
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.2E-03	--	--	1.2E-03
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	5.8E-04	--	6.0E-05	6.4E-04
			VANADIUM	--	--	--	NA	VANADIUM	Hair	5.7E-04	--	--	5.7E-04
			(Total)	9.8E-07	7.8E-08	1.1E-09	1.1E-06		(Total)	6.1E-03	1.9E-04	8.6E-05	6.4E-03
					Total Risk Across Surface Soil		**1.1E-06**				**Total Hazard Index Across Surface Soil**		**6E-03**
						Total Risk Across All Media and All Exposure Routes	**1E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0.006**

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TABLE D.9.3.3

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Sites 13 and 15	**Inorganics**					**Inorganics**					
			ARSENIC	3.4E-06	4.7E-07	3.3E-09	3.8E-06	ARSENIC	Skin	8.4E-04	1.2E-04	1.4E-04	1.1E-03
			CHROMIUM, TOTAL	2.9E-06	--	1.7E-07	3.1E-06	CHROMIUM, TOTAL	None	2.2E-04	--	5.6E-05	2.7E-04
			(Total)	6.3E-06	4.7E-07	1.7E-07	6.9E-06		(Total)	1.1E-03	1.2E-04	2.0E-04	1.4E-03
				Total Risk Across Surface Soil			**6.9E-06**		**Total Hazard Index Across Surface Soil**				**1.4E-03**
			Total Risk Across All Media and All Exposure Routes				**7E-06**		**Total Hazard Index Across All Media and All Exposure Routes**				**0.001**

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TABLE D.9.3.4

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 13 and 15	**Inorganics**					**Inorganics**					
			ARSENIC	4.5E-06	1.9E-07	4.7E-10	4.7E-06	ARSENIC	Skin	7.1E-01	2.9E-02	5.1E-04	7.4E-01
			CHROMIUM, TOTAL	3.0E-06	--	1.8E-08	3.0E-06	CHROMIUM, TOTAL	None	1.4E-01	--	1.5E-04	1.4E-01
			(Total)	7.5E-06	1.9E-07	1.8E-08	7.8E-06		(Total)	8.5E-01	2.9E-02	6.6E-04	8.8E-01
Subsurface Risk Across Subsurface Soi							**7.8E-06**	**Total Hazard Index Across Subsurface Soi**					**9E-01**
Total Risk Across All Media and All Exposure Route							**8E-06**	**Total Hazard Index Across All Media and All Exposure Route**					**0.9**

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TABLE D.9.3.5

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Sites 13 and 15 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	2.8E-01	--	1.3E-04	2.8E-01
			ARSENIC	2.1E-05	1.8E-06	1.4E-10	2.3E-05	ARSENIC	Skin	5.5E-01	4.6E-02	2.5E-05	5.9E-01
			CHROMIUM, TOTAL	1.8E-05	--	7.1E-09	1.8E-05	CHROMIUM, TOTAL	None	1.4E-01	--	9.8E-06	1.4E-01
			COBALT	--	--	3.4E-10	3.4E-10	COBALT	Thyroid	6.4E-01	--	7.3E-05	6.4E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	5.2E-01	--	--	5.2E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	2.5E-01	--	5.4E-04	2.5E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	2.5E-01	--	--	2.5E-01
			(Total for Child)	3.9E-05	1.8E-06	7.6E-09	4.1E-05		(Total for Child)	2.6E+00	4.6E-02	7.7E-04	2.7E+00
	Surface Soil	Sites 13 and 15 (Adult)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.0E-02	--	1.3E-04	3.0E-02
			ARSENIC	9.0E-06	1.1E-06	5.6E-10	1.0E-05	ARSENIC	Skin	5.9E-02	7.0E-03	2.5E-05	6.6E-02
			CHROMIUM, TOTAL	7.9E-06	--	2.8E-08	7.9E-06	CHROMIUM, TOTAL	None	1.5E-02	--	9.8E-06	1.5E-02
			COBALT	--	--	1.4E-09	1.4E-09	COBALT	Thyroid	6.8E-02	--	7.3E-05	6.8E-02
			IRON	--	--	--	NA	IRON	Gastrointestinal System	5.6E-02	--	--	5.6E-02
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	2.7E-02	--	5.4E-04	2.7E-02
			VANADIUM	--	--	--	NA	VANADIUM	Hair	2.7E-02	--	--	2.7E-02
			(Total for Adult)	1.7E-05	1.1E-06	3.0E-08	1.8E-05		(Total for Adult)	2.8E-01	7.0E-03	7.7E-04	2.9E-01
	Surface Soil	Sites 13 and 15 (Adult + Child)	**Inorganics**										
			ARSENIC	3.0E-05	2.9E-06	7.0E-10	3.3E-05						
			CHROMIUM, TOTAL	2.6E-05	NA	3.5E-08	2.6E-05						
			COBALT	NA	NA	1.7E-09	1.7E-09						
			(Total for Child + Adult)	5.6E-05	2.9E-06	3.8E-08	5.9E-05					**Total Hazard Index Across Surface Soil (Child)**	**2.7E+00**
						Total Risk Across Surface Soil	**5.9E-05**					**Total Hazard Index Across Surface Soil (Adult)**	**2.9E-01**
						Total Risk Across All Media and All Exposure Routes	**6E-05**					**Total Hazard Index Across All Media and All Exposure Routes (Child)**	**3**
												Total Hazard Index Across All Media and All Exposure Routes (Adult)	**0.3**

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TABLE D.9.3.6

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 13 and 15 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.5E-01	--	1.6E-04	3.5E-01
			ARSENIC	7.4E-05	6.2E-06	4.9E-10	8.1E-05	ARSENIC	Skin	1.9E+00	1.6E-01	8.9E-05	2.1E+00
			CHROMIUM, TOTAL	4.9E-05	--	1.9E-08	4.9E-05	CHROMIUM, TOTAL	None	3.8E-01	--	2.6E-05	3.8E-01
			COBALT	--	--	3.0E-10	3.0E-10	COBALT	Thyroid	5.7E-01	--	6.5E-05	5.7E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	8.4E-01	--	--	8.4E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	2.5E-01	--	5.4E-04	2.5E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	3.6E-01	--	--	3.6E-01
			PAHs					**PAHs**					
			BENZO(B)FLUORANTHENE	3.7E-07	1.4E-07	1.3E-13	5.1E-07	BENZO(B)FLUORANTHENE	NA	--	--	--	NA
			BENZO(A)PYRENE	7.4E-06	2.7E-06	2.6E-12	1.0E-05	BENZO(A)PYRENE	NA	--	--	--	NA
			(Total for Child)	1.3E-04	9.1E-06	2.0E-08	1.4E-04		(Total for Child)	4.7E+00	1.6E-01	8.8E-04	4.8E+00
	Subsurface Soil	Sites 13 and 15 (Adult)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.8E-02	--	1.6E-04	3.8E-02
			ARSENIC	3.2E-05	3.8E-06	2.0E-09	3.6E-05	ARSENIC	Skin	2.1E-01	2.5E-02	8.9E-05	2.3E-01
			CHROMIUM, TOTAL	2.1E-05	--	7.6E-08	2.1E-05	CHROMIUM, TOTAL	None	4.1E-02	--	2.6E-05	4.1E-02
			COBALT	--	--	1.2E-09	1.2E-09	COBALT	Thyroid	6.1E-02	--	6.5E-05	6.1E-02
			IRON	--	--	--	NA	IRON	Gastrointestinal System	9.0E-02	--	--	9.0E-02
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	2.7E-02	--	5.4E-04	2.7E-02
			VANADIUM	--	--	--	NA	VANADIUM	Hair	3.8E-02	--	--	3.8E-02
			PAHs					**PAHs**					
			BENZO(B)FLUORANTHENE	5.4E-08	2.8E-08	1.8E-13	8.2E-08	BENZO(B)FLUORANTHENE	NA	--	--	--	NA
			BENZO(A)PYRENE	1.1E-06	5.6E-07	3.5E-12	1.6E-06	BENZO(A)PYRENE	NA	--	--	--	NA
			(Total for Adult)	5.4E-05	4.4E-06	7.9E-08	5.8E-05		(Total for Adult)	5.0E-01	2.5E-02	8.8E-04	5.3E-01
	Subsurface Soil	Sites 13 and 15 (Adult + Child)	**Inorganics**										
			ARSENIC	1.1E-04	1.0E-05	2.4E-09	1.2E-04						
			CHROMIUM, TOTAL	7.0E-05	NA	9.4E-08	7.0E-05						
			COBALT	NA	NA	1.5E-09	1.5E-09						
			PAHs										
			BENZO(B)FLUORANTHENE	4.3E-07	1.6E-07	3.0E-13	5.9E-07						
			BENZO(A)PYRENE	8.5E-06	3.2E-06	6.0E-12	1.2E-05						
			(Total for Child + Adult)	1.8E-04	1.3E-05	9.8E-08	2.0E-04		**Total Hazard Index Across Subsurface Soil (Child)**				**5E+00**
				Total Risk Across Subsurface Soil			**2E-04**		**Total Hazard Index Across Subsurface Soil (Adult)**				**5E-01**
			Total Risk Across All Media and All Exposure Routes				**2E-04**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**5**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**0.5**

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TABLE D.9.4.1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 9

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 9	**Inorganics**					**Inorganics**					
			ARSENIC	1.5E-05	6.3E-07	1.6E-09	1.6E-05	ARSENIC	Skin	2.4E+00	9.8E-02	1.7E-03	2.5E+00
			CHROMIUM, TOTAL	4.5E-06	--	2.7E-08	4.6E-06	CHROMIUM, TOTAL	None	2.1E-01	--	2.3E-04	2.1E-01
			COBALT	--	--	2.2E-09	2.2E-09	COBALT	Thyroid	1.6E+00	--	2.9E-03	1.6E+00
			IRON	--	--	--	NA	IRON	Gastrointestinal System	6.8E-01	--	--	6.8E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	7.1E-01	--	2.4E-02	7.4E-01
			(Total)	2.0E-05	6.3E-07	3.1E-08	2.0E-05		(Total)	5.6E+00	9.8E-02	2.9E-02	5.7E+00
							Subsurface Risk Across Subsurface Soil	**2.0E-05**					**Total Hazard Index Across Subsurface Soil**	**6**
							Total Risk Across All Media and All Exposure Routes	**2E-05**					**Total Hazard Index Across All Media and All Exposure Routes**	**6**

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TABLE D.9.4.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 9

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Residen
Receptor Age: Child and Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 9 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	2.9E-01	--	1.3E-04	2.9E-01
			ARSENIC	2.5E-04	2.1E-05	1.6E-09	2.7E-04	ARSENIC	Skin	6.5E+00	5.4E-01	3.0E-04	7.0E+00
			CHROMIUM, TOTAL	7.4E-05	--	2.9E-08	7.4E-05	CHROMIUM, TOTAL	None	5.8E-01	--	4.0E-05	5.8E-01
			COBALT	--	--	2.4E-09	2.4E-09	COBALT	Thyroid	4.4E+00	--	5.1E-04	4.4E+00
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.8E+00	--	--	1.8E+00
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.9E+00	--	4.2E-03	1.9E+00
			VANADIUM	--	--	--	NA	VANADIUM	Hair	5.3E-01	--	--	5.3E-01
			(Total for Child)	3.2E-04	2.1E-05	3.3E-08	3.4E-04		(Total for Child)	1.6E+01	5.4E-01	5.2E-03	1.7E+01
	Subsurface Soil	Site 9 (Adult)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.1E-02	--	1.3E-04	3.1E-02
			ARSENIC	1.1E-04	1.3E-05	6.6E-09	1.2E-04	ARSENIC	Skin	6.9E-01	8.3E-02	3.0E-04	7.8E-01
			CHROMIUM, TOTAL	3.2E-05	--	1.1E-07	3.2E-05	CHROMIUM, TOTAL	None	6.2E-02	--	4.0E-05	6.2E-02
			COBALT	--	--	9.4E-09	9.4E-09	COBALT	Thyroid	4.7E-01	--	5.1E-04	4.8E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	2.0E-01	--	--	2.0E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	2.1E-01	--	4.2E-03	2.1E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	5.7E-02	--	--	5.7E-02
			(Total for Adult)	1.4E-04	1.3E-05	1.3E-07	1.5E-04		(Total for Adult)	1.7E+00	8.3E-02	5.2E-03	1.8E+00
	Subsurface Soil	Site 9 (Adult + Child)	**Inorganics**										
			ARSENIC	3.6E-04	3.4E-05	8.2E-09	3.9E-04						
			CHROMIUM, TOTAL	1.1E-04	NA	1.4E-07	1.1E-04						
			COBALT	NA	NA	1.2E-08	1.2E-08						
			(Total for Child + Adult)	4.6E-04	3.4E-05	1.6E-07	5.0E-04		**Total Hazard Index Across Subsurface Soil (Child)**				**17**
				Total Risk Across Subsurface Soil			**5.0E-04**		**Total Hazard Index Across Subsurface Soil (Adult)**				**2**
			Total Risk Across All Media and All Exposure Routes				**5E-04**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**17**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**2**

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TABLE D.9.5.1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site12	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	1.5E-03	--	1.3E-05	1.5E-03
			ARSENIC	3.9E-07	9.3E-08	4.8E-11	4.8E-07	ARSENIC	Skin	2.0E-03	4.8E-04	1.7E-06	2.5E-03
			CHROMIUM, TOTAL	4.4E-07	--	3.2E-09	4.5E-07	CHROMIUM, TOTAL	None	6.9E-04	--	8.9E-07	6.9E-04
			COBALT	--	--	1.2E-10	1.2E-10	COBALT	Thyroid	2.4E-03	--	5.1E-06	2.4E-03
			IRON	--	--	--	NA	IRON	Gastrointestinal System	2.6E-03	--	--	2.6E-03
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	6.6E-04	--	2.7E-05	6.9E-04
			VANADIUM	--	--	--	NA	VANADIUM	Hair	1.2E-03	--	--	1.2E-03
			(Total)	8.3E-07	9.3E-08	3.4E-09	9.3E-07		(Total)	1.1E-02	4.8E-04	4.7E-05	1.1E-02
					Total Risk Across Surface Soil		**9.3E-07**			**Total Hazard Index Across Surface Soil**			**1.1E-02**
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	1.2E-05	6.6E-07	--	1.2E-05	ARSENIC	Skin	6.0E-02	3.4E-03	--	6.4E-02
			CHROMIUM, TOTAL	3.4E-07	1.6E-06	--	1.9E-06	CHROMIUM, TOTAL	None	5.3E-04	2.4E-03	--	3.0E-03
			COBALT	--	--	--	NA	COBALT	Thyroid	5.4E-03	1.2E-04	--	5.5E-03
			Semivolatiles					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	2.1E-09	8.4E-07	--	8.4E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	1.7E-05	7.0E-03	--	7.0E-03
			(Total)	1.2E-05	3.1E-06	---	1.5E-05		(Total)	6.6E-02	1.3E-02	---	7.9E-02
						Total Risk Across Surface Water	**1.5E-05**			**Total Hazard Index Across Surface Water**			**7.9E-02**
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	9.6E-07	2.3E-07	--	1.2E-06	ARSENIC	Skin	5.0E-03	1.2E-03	--	6.2E-03
			CHROMIUM, TOTAL	2.4E-07	--	--	2.4E-07	CHROMIUM, TOTAL	None	3.8E-04	--	--	3.8E-04
			VANADIUM	--	--	--	NA	VANADIUM	Hair	5.0E-04	--	--	5.0E-04
			(Total)	1.2E-06	2.3E-07	---	1.4E-06		(Total)	5.9E-03	1.2E-03	---	7.0E-03
						Total Risk Across Sediment	**1.4E-06**			**Total Hazard Index Across Sediment**			**7.0E-03**
						Total Risk Across All Media and All Exposure Routes	**2E-05**			**Total Hazard Index Across All Media and All Exposure Routes**			**0.1**

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TABLE D.9.5.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site12	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	2.3E-03	--	1.3E-05	2.3E-03
			ARSENIC	1.6E-07	4.8E-08	1.3E-11	2.1E-07	ARSENIC	Skin	3.1E-03	9.3E-04	1.7E-06	4.1E-03
			CHROMIUM, TOTAL	1.8E-07	--	8.5E-10	1.9E-07	CHROMIUM, TOTAL	None	1.1E-03	--	8.9E-07	1.1E-03
			COBALT	--	--	3.2E-11	3.2E-11	COBALT	Thyroid	3.7E-03	--	5.1E-06	3.7E-03
			IRON	--	--	--	NA	IRON	Gastrointestinal System	4.0E-03	--	--	4.0E-03
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.0E-03	--	2.7E-05	1.1E-03
			VANADIUM	--	--	--	NA	VANADIUM	Hair	1.8E-03	--	--	1.8E-03
			(Total)	3.5E-07	4.8E-08	9.0E-10	3.9E-07		(Total)	1.7E-02	9.3E-04	4.7E-05	1.8E-02
					Total Risk Across Surface Soil		**3.9E-07**			**Total Hazard Index Across Surface Soil**			**1.8E-02**
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	4.8E-06	2.2E-07	--	5.0E-06	ARSENIC	Skin	9.4E-02	4.3E-03	--	9.8E-02
			CHROMIUM, TOTAL	1.4E-07	5.1E-07	--	6.6E-07	CHROMIUM, TOTAL	None	8.3E-04	3.0E-03	--	3.8E-03
			COBALT	--	--	--	NA	COBALT	Thyroid	8.4E-03	1.5E-04	--	8.5E-03
			Semivolatiles					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	8.6E-10	2.8E-07	--	2.8E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	2.7E-05	8.7E-03	--	8.7E-03
			(Total)	5.0E-06	1.0E-06	---	6.0E-06		(Total)	1.0E-01	1.6E-02	---	1.2E-01
						Total Risk Across Surface Water	**6.0E-06**			**Total Hazard Index Across Surface Water**			**1.2E-01**
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	8.0E-07	2.2E-07	--	1.0E-06	ARSENIC	Skin	1.5E-02	4.2E-03	--	2.0E-02
			CHROMIUM, TOTAL	2.0E-07	--	--	2.0E-07	CHROMIUM, TOTAL	None	1.2E-03	--	--	1.2E-03
			VANADIUM	--	--	--	NA	VANADIUM	Hair	1.6E-03	--	--	1.6E-03
			(Total)	1.0E-06	2.2E-07	---	1.2E-06		(Total)	1.8E-02	4.2E-03	---	2.2E-02
						Total Risk Across Sediment	**1.2E-06**			**Total Hazard Index Across Sediment**			**2.2E-02**
						Total Risk Across All Media and All Exposure Routes	**8E-06**			**Total Hazard Index Across All Media and All Exposure Routes**			**0.2**

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TABLE D.9.5.3

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	2.1E-06	2.9E-07	2.0E-09	2.4E-06	ARSENIC	Skin	1.3E-02	1.8E-03	8.8E-05	1.5E-02
			CHROMIUM, TOTAL	2.4E-06	--	1.4E-07	2.5E-06	CHROMIUM, TOTAL	None	4.4E-03	--	4.6E-05	4.5E-03
			(Total)	4.4E-06	2.9E-07	1.4E-07	4.9E-06		(Total)	1.7E-02	1.8E-03	1.3E-04	1.9E-02
				Total Risk Across Surface Soil			**4.9E-06**			**Total Hazard Index Across Suface Soil**			**1.9E-02**
			Total Risk Across All Media and All Exposure Routes				**5E-06**		**Total Hazard Index Across All Media and All Exposure Routes**				**0.02**

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TABLE D.9.5.4

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	8.0E-07	3.3E-08	8.1E-11	8.3E-07	ARSENIC	Skin	1.2E-01	5.1E-03	8.8E-05	1.3E-01
			CHROMIUM, TOTAL	9.1E-07	--	5.5E-09	9.2E-07	CHROMIUM, TOTAL	None	4.3E-02	--	4.6E-05	4.3E-02
			(Total)	1.7E-06	3.3E-08	5.6E-09	1.7E-06		(Total)	1.7E-01	5.1E-03	1.3E-04	1.7E-01
				Subsurface Risk Across Surface Soil			**1.7E-06**			**Total Hazard Index Across Surface Soil**			**1.7E-01**
Groundwater	Groundwater	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	1.0E-07	4.7E-08	--	1.5E-07	ARSENIC	Skin	1.6E-02	7.2E-03	--	2.3E-02
			BARIUM	--	--	--	NA	BARIUM	Kidneys	2.2E-04	1.4E-03	--	1.7E-03
			CADMIUM	--	--	--	NA	CADMIUM	Kidneys	2.9E-04	2.7E-03	--	3.0E-03
			CHROMIUM, TOTAL	8.8E-08	3.2E-06	--	3.3E-06	CHROMIUM, TOTAL	None	4.1E-03	1.5E-01	--	1.5E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	5.6E-03	1.0E-03	--	6.6E-03
			COPPER	--	--	--	NA	COPPER	Gastrointestinal System	1.1E-04	5.1E-05	--	1.6E-04
			IRON	--	--	--	NA	IRON	Gastrointestinal System	2.9E-03	4.6E-01	--	4.6E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	9.5E-03	1.1E-01	--	1.2E-01
			NICKEL	--	--	--	NA	NICKEL	None	2.8E-04	3.2E-03	--	3.5E-03
			VANADIUM	--	--	--	NA	VANADIUM	Hair	2.3E-03	1.1E-03	--	3.4E-03
			ZINC	--	--	--	NA	ZINC	Blood	2.1E-04	5.8E-05	--	2.7E-04
			Semivolatiles					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	1.5E-10	3.4E-07	--	3.4E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	3.7E-05	8.4E-02	--	8.4E-02
			Volatiles	--				**Volatiles**					
			CHLOROFORM	2.3E-10	8.8E-10	--	1.1E-09	CHLOROFORM	Liver	5.2E-05	2.0E-04	--	2.5E-04
			(Total)	1.9E-07	3.6E-06	---	3.8E-06		(Total)	4.1E-02	8.2E-01	---	8.6E-01
				Total Risk Across Groundwater			**3.8E-06**			**Total Hazard Index Across Groundwater**			**8.6E-01**
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	8.5E-08	2.6E-08	--	1.1E-07	ARSENIC	Skin	1.3E-02	4.0E-03	--	1.7E-02
			CHROMIUM, TOTAL	2.5E-09	6.0E-08	--	6.3E-08	CHROMIUM, TOTAL	None	1.2E-04	2.8E-03	--	2.9E-03
			COBALT	--	--	--	NA	COBALT	Thyroid	1.2E-03	1.4E-04	--	1.3E-03
			Semivolatiles					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	1.5E-11	9.0E-07	--	9.0E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	3.8E-06	2.3E-01	--	2.3E-01
			(Total)	8.8E-08	9.9E-07	---	1.1E-06		(Total)	1.5E-02	2.3E-01	---	2.5E-01
				Total Risk Across Surface water			**1.1E-06**			**Total Hazard Index Across Surface Water**			**2.5E-01**
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	6.4E-08	2.5E-08	--	8.9E-08	ARSENIC	Skin	9.9E-03	3.9E-03	--	1.4E-02
			(Total)	6.4E-08	2.5E-08	---	8.9E-08		(Total)	9.9E-03	3.9E-03	---	1.4E-02
				Total Risk Across Sediment			**8.9E-08**			**Total Hazard Index Across Sediment**			**1.4E-02**
				Total Risk Across All Media and All Exposure Routes			**7E-06**			**Total Hazard Index Across All Media and All Exposure Routes**			**1**

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TABLE D.9.5.5

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site12	**Inorganics**					**Inorganics**					
		(Child)	ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	2.4E-01	--	1.1E-04	2.4E-01
			ARSENIC	1.3E-05	1.1E-06	8.6E-11	1.4E-05	ARSENIC	Skin	3.4E-01	2.8E-02	1.5E-05	3.6E-01
			CHROMIUM, TOTAL	1.5E-05	--	5.8E-09	1.5E-05	CHROMIUM, TOTAL	None	1.2E-01	--	8.0E-06	1.2E-01
			COBALT	--	--	2.1E-10	2.1E-10	COBALT	Thyroid	4.0E-01	--	4.6E-05	4.0E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	4.3E-01	--	--	4.3E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.1E-01	--	2.4E-04	1.1E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	2.0E-01	--	--	2.0E-01
			(Total for Child)	2.8E-05	1.1E-06	6.1E-09	2.9E-05		(Total for Child)	1.8E+00	2.8E-02	4.2E-04	1.9E+00
	Surface Soil	Site12	**Inorganics**					**Inorganics**					
		(Adult)	ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	2.6E-02	--	1.1E-04	2.6E-02
			ARSENIC	5.6E-06	6.66E-07	3.42E-10	6.2E-06	ARSENIC	Skin	3.6E-02	4.3E-03	1.5E-05	4.0E-02
			CHROMIUM, TOTAL	6.4E-06	--	2.30E-08	6.4E-06	CHROMIUM, TOTAL	None	1.2E-02	--	8.0E-06	1.2E-02
			COBALT	--	--	8.52E-10	8.5E-10	COBALT	Thyroid	4.3E-02	--	4.6E-05	4.3E-02
			IRON	--	--	--	NA	IRON	Gastrointestinal System	4.6E-02	--	--	4.6E-02
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.2E-02	--	2.4E-04	1.2E-02
			VANADIUM	--	--	--	NA	VANADIUM	Hair	2.1E-02	--	--	2.1E-02
			(Total for Adult)	1.2E-05	6.7E-07	2.4E-08	1.3E-05		(Total for Adult)	2.0E-01	4.3E-03	4.2E-04	2.0E-01
	Surface Soil	Site12	**Inorganics**										
		(Adult + Child)	ARSENIC	1.9E-05	1.8E-06	4.3E-10	2.0E-05						
			CHROMIUM, TOTAL	2.1E-05	NA	2.9E-08	2.1E-05						
			COBALT	NA	NA	1.1E-09	1.1E-09						
			(Total for Child + Adult)	4.0E-05	1.8E-06	3.0E-08	4.2E-05					**Total Hazard Index Across Surface Soil (Child)**	**1.9E+00**
				Total Risk Across Surface Soil			**4.2E-05**					**Total Hazard Index Across Surface Soil (Adult)**	**2.0E-01**
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
		(Child)	ARSENIC	1.1E-05	3.0E-07	--	1.1E-05	ARSENIC	Skin	2.8E-01	7.9E-03	--	2.9E-01
			CHROMIUM, TOTAL	3.2E-07	7.2E-07	--	1.0E-06	CHROMIUM, TOTAL	None	2.5E-03	5.6E-03	--	8.1E-03
			COBALT	--	--	--	NA	COBALT	Thyroid	2.5E-02	2.8E-04	--	2.5E-02
			Semivolatiles					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	1.9E-09	3.9E-07	--	3.9E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	8.1E-05	1.6E-02	--	1.6E-02
			(Total for Child)	1.1E-05	1.4E-06	---	1.3E-05		(Total for Child)	3.1E-01	3.0E-02	---	3.4E-01

TABLE D.9.5.5

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
	Surface Water	Site12	**Inorganics**					**Inorganics**					
		(Adult)	ARSENIC	9.3E-06	5.3E-07	--	9.8E-06	ARSENIC	Skin	6.0E-02	3.4E-03	--	6.4E-02
			CHROMIUM, TOTAL	2.7E-07	1.2E-06	--	1.5E-06	CHROMIUM, TOTAL	None	5.3E-04	2.4E-03	--	3.0E-03
			COBALT	--	--	--	NA	COBALT	Thyroid	5.4E-03	1.2E-04	--	5.5E-03
			Semivolatiles					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	1.7E-09	6.7E-07	--	6.7E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	1.7E-05	7.0E-03	--	7.0E-03
			(Total for Adult)	9.6E-06	2.5E-06	---	1.2E-05		(Total for Adult)	6.6E-02	1.3E-02	---	7.9E-02
	Surface Water	Site12	**Inorganics**										
		(Adult + Child)	ARSENIC	2.0E-05	8.4E-07	NA	2.1E-05						
			CHROMIUM, TOTAL	5.9E-07	2.0E-06	NA	2.6E-06						
			Semivolatiles										
			BIS(2-ETHYLHEXYL)PHTHALATE	3.6E-09	1.1E-06	NA	1.1E-06						
			(Total for Child + Adult)	2.1E-05	3.9E-06	---	2.5E-05		**Total Hazard Index Across Surface Water (Child)**				**3.4E-01**
	Total Risk Across Surface Water (Adult + Child)						**2.5E-05**		**Total Hazard Index Across Surface Water (Adult)**				**7.9E-02**
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
		(Child)	ARSENIC	3.6E-06	3.0E-07	--	3.9E-06	ARSENIC	Skin	9.3E-02	7.8E-03	--	1.0E-01
			CHROMIUM, TOTAL	9.1E-07	--	--	9.1E-07	CHROMIUM, TOTAL	None	7.1E-03	--	--	7.1E-03
			VANADIUM	--	--	--	NA	VANADIUM	Hair	9.4E-03	--	--	9.4E-03
			(Total for Child)	4.5E-06	3.0E-07	---	4.8E-06		(Total for Child)	1.1E-01	7.8E-03	---	1.2E-01
	Sediment	Site12	**Inorganics**					**Inorganics**					
		(Adult)	ARSENIC	7.7E-07	1.84E-07	--	9.5E-07	ARSENIC	Skin	5.0E-03	1.19E-03	--	6.2E-03
			CHROMIUM, TOTAL	2.0E-07	--	--	2.0E-07	CHROMIUM, TOTAL	None	3.8E-04	--	--	3.8E-04
			VANADIUM	--	--	--	NA	VANADIUM	Hair	5.0E-04	--	--	5.0E-04
			(Total for Adult)	9.6E-07	1.8E-07	---	1.1E-06		(Total for Adult)	5.9E-03	1.2E-03	---	7.0E-03
	Sediment	Site12	**Inorganics**										
		(Adult + Child)	ARSENIC	4.3E-06	4.8E-07	NA	4.8E-06						
			CHROMIUM, TOTAL	1.1E-06	NA	NA	1.1E-06						
			(Total for Child + Adult)	5.5E-06	4.8E-07	---	5.9E-06		**Total Hazard Index Across Sediment (Child)**				**1.2E-01**
	Total Risk Across Sediment (Adult + Child)						**5.9E-06**		**Total Hazard Index Across Sediment (Adult)**				**7.0E-03**
	Total Risk Across All Media and All Exposure Routes						**7E-05**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**2**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**0.3**

TABLE D.9.6.1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA

FORT BUCHANAN

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Off-site Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**Inorganics**					**Inorganics**					
	Child	Off-Site	ARSENIC	3.8E-05	2.5E-07	--	3.8E-05	ARSENIC	Skin	9.7E-01	6.4E-03	--	9.8E-01
			BARIUM	--	--	--	NA	BARIUM	Kidneys	6.0E-02	5.7E-03	--	6.6E-02
			COBALT	--	--	--	NA	COBALT	Thyroid	3.3E-01	8.8E-04	--	3.3E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.6E+00	1.0E-02	--	1.6E+00
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.8E+00	2.9E-01	--	2.0E+00
			MERCURY	--	--	--	NA	MERCURY	Central Nervous System	5.0E-02	3.3E-04	--	5.1E-02
			PAHs					**PAHs**					
			NAPHTHALENE	--	--	--	NA	NAPHTHALENE	None	4.8E-03	3.1E-03	--	7.9E-03
			Volatiles			--		**Volatiles**					
			CHLOROFORM	1.3E-07	5.7E-09	--	1.3E-07	CHLOROFORM	Liver	4.8E-03	2.1E-04	--	5.0E-03
			1,2-DICHLOROETHANE	2.0E-07	9.9E-09	--	2.1E-07	1,2-DICHLOROETHANE	NA	--	--	--	NA
			CIS-1,2-DICHLOROETHENE	--	--	--	NA	CIS-1,2-DICHLOROETHENE	Kidneys	1.8E+00	1.6E-01	--	2.0E+00
			TRANS-1,2-DICHLOROETHENE	--	--	--	NA	TRANS-1,2-DICHLOROETHENE	Blood	8.7E-03	7.2E-04	--	9.4E-03
			TETRACHLOROETHENE	3.6E-08	2.0E-09	--	3.8E-08	TETRACHLOROETHENE	Liver	3.3E-02	1.9E-03	--	3.5E-02
			1,1,2-TRICHLOROETHANE	5.3E-07	4.7E-08	--	5.8E-07	1,1,2-TRICHLOROETHANE	Liver	2.7E-02	2.4E-03	--	2.9E-02
			TRICHLOROETHENE	1.0E-04	1.7E-05	--	1.2E-04	TRICHLOROETHENE	Immune System	5.1E+01	8.5E+00	--	6.0E+01
			VINYL CHLORIDE	6.9E-09	3.7E-07	--	3.8E-07	VINYL CHLORIDE	Liver	3.7E-05	2.0E-03	--	2.1E-03
			(Total for Child)	1.4E-04	1.7E-05	---	1.6E-04		(Total for Child)	5.8E+01	9.0E+00	---	6.7E+01
	Groundwater	Tap Water	**Inorganics**					**Inorganics**					
	Adult	Off-Site	ARSENIC	7.9E-05	3.4E-07	--	7.9E-05	ARSENIC	Skin	5.1E-01	2.18E-03	--	5.1E-01
			BARIUM	--	--	--	NA	BARIUM	Kidneys	3.2E-02	1.92E-03	--	3.3E-02
			COBALT	--	--	--	NA	COBALT	Thyroid	1.7E-01	2.97E-04	--	1.7E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	8.2E-01	3.49E-03	--	8.2E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	9.2E-01	9.79E-02	--	1.0E+00
			MERCURY	--	--	--	NA	MERCURY	Central Nervous System	2.6E-02	1.12E-04	--	2.6E-02
			PAHs					**PAHs**					
			NAPHTHALENE	--	--	--	NA	NAPHTHALENE	None	2.5E-03	1.36E-03	--	3.9E-03
			Volatiles					**Volatiles**					
			CHLOROFORM	2.7E-07	7.7E-09	6.8E-08	3.4E-07	CHLOROFORM	Liver	2.5E-03	7.24E-05	8.8E-05	2.7E-03
			1,2-DICHLOROETHANE	4.3E-07	1.7E-08	4.2E-08	4.9E-07	1,2-DICHLOROETHANE	NA	--	--	6.8E-04	6.8E-04
			CIS-1,2-DICHLOROETHENE	--	--	--	NA	CIS-1,2-DICHLOROETHENE	Kidneys	9.4E-01	6.80E-02	6.5E-04	1.0E+00
			TRANS-1,2-DICHLOROETHENE	--	--	--	NA	TRANS-1,2-DICHLOROETHENE	Blood	4.6E-03	3.05E-04	5.3E-04	5.4E-03
			TETRACHLOROETHENE	7.5E-08	3.6E-09	5.3E-08	1.3E-07	TETRACHLOROETHENE	Liver	1.7E-02	8.33E-04	9.7E-04	1.9E-02
			1,1,2-TRICHLOROETHANE	1.1E-06	8.4E-08	1.6E-07	1.4E-06	1,1,2-TRICHLOROETHANE	Liver	1.4E-02	1.08E-03	--	1.5E-02
			TRICHLOROETHENE	2.1E-04	3.0E-05	8.8E-06	2.5E-04	TRICHLOROETHENE	Immune System	2.7E+01	3.79E+00	3.0E+00	3.4E+01
			VINYL CHLORIDE	1.4E-08	6.3E-07	3.1E-08	6.7E-07	VINYL CHLORIDE	Liver	2.0E-05	8.45E-04	2.0E-04	1.1E-03
			(Total for Adult)	2.9E-04	3.1E-05	9.2E-06	3.3E-04		(Total for Adult)	3.0E+01	4.0E+00	3.0E+00	3.7E+01

TABLE D.9.6.1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA

FORT BUCHANAN

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Off-site Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**Inorganics**										
	Child + Adult	Off-Site	ARSENIC	1.2E-04	5.8E-07	NA	1.2E-04						
			BARIUM	NA	NA	NA	NA						
			COBALT	NA	NA	NA	NA						
			IRON	NA	NA	NA	NA						
			MANGANESE	NA	NA	NA	NA						
			MERCURY	NA	NA	NA	NA						
			PAHs										
			NAPHTHALENE	NA	NA	NA	NA						
			Volatiles										
			CHLOROFORM	3.9E-07	1.3E-08	6.8E-08	4.7E-07						
			1,2-DICHLOROETHANE	6.3E-07	2.7E-08	4.2E-08	7.0E-07						
			CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA						
			TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA						
			TETRACHLOROETHENE	1.1E-07	5.6E-09	5.3E-08	1.7E-07						
			1,1,2-TRICHLOROETHANE	1.6E-06	1.3E-07	1.6E-07	1.9E-06						
			TRICHLOROETHENE	3.1E-04	4.7E-05	8.8E-06	3.7E-04						
			VINYL CHLORIDE	2.1E-08	1.0E-06	3.1E-08	1.1E-06						
			(Total for Child + Adult)	4.3E-04	4.8E-05	9.2E-06	4.9E-04		**Total Hazard Index Across Groundwater (Child)**				**6.7E+01**
	Total Risk Across Groundwater (Adult + Child)						**4.9E-04**		**Total Hazard Index Across Groundwater (Adult)**				**3.7E+01**
			Total Risk Across All Media and All Exposure Routes				**5E-04**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**67**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**37**

TABLE D.9.6.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA

FORT BUCHANAN

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Irrigation Water	**Inorganics**					**Inorganics**					
		Northwest Boundary	ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	4.0E-04	2.1E-04	--	6.1E-04
		Area	ARSENIC	2.2E-08	1.2E-08	--	3.4E-08	ARSENIC	Skin	3.4E-03	1.8E-03	--	5.3E-03
			BARIUM	--	--	--	NA	BARIUM	Kidneys	8.8E-05	6.7E-04	--	7.6E-04
			CADMIUM	--	--	--	NA	CADMIUM	Kidneys	1.9E-04	2.1E-03	--	2.3E-03
			COBALT	--	--	--	NA	COBALT	Thyroid	3.8E-04	8.2E-05	--	4.6E-04
			COPPER	--	--	--	NA	COPPER	Gastrointestinal System	4.2E-05	2.3E-05	--	6.5E-05
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.5E-03	7.8E-04	--	2.2E-03
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.2E-03	1.6E-02	--	1.7E-02
			MERCURY	--	--	--	NA	MERCURY	Central Nervous System	2.2E-04	1.2E-04	--	3.3E-04
			NICKEL	--	--	--	NA	NICKEL	None	2.6E-05	7.0E-05	--	9.7E-05
			PAHs					**PAHs**					
			NAPHTHALENE	--	--	--	NA	NAPHTHALENE	None	3.6E-06	1.1E-04	--	1.1E-04
			Volatiles					**Volatiles**					
			CHLOROFORM	1.6E-11	7.1E-11	--	8.7E-11	CHLOROFORM	Liver	3.6E-06	1.6E-05	--	2.0E-05
			1,2-DICHLOROETHANE	2.5E-11	6.8E-11	--	9.3E-11	1,2-DICHLOROETHANE	NA	--	--	--	NA
			CIS-1,2-DICHLOROETHENE	--	--	--	NA	CIS-1,2-DICHLOROETHENE	Kidneys	1.3E-03	6.5E-03	--	7.8E-03
			TRANS-1,2-DICHLOROETHENE	--	--	--	NA	TRANS-1,2-DICHLOROETHENE	Blood	6.5E-06	3.1E-05	--	3.7E-05
			TETRACHLOROETHENE	4.4E-12	1.1E-11	--	1.6E-11	TETRACHLOROETHENE	Liver	2.5E-05	6.3E-05	--	8.8E-05
			1,1,2-TRICHLOROETHANE	6.6E-11	2.9E-10	--	3.6E-10	1,1,2-TRICHLOROETHANE	Liver	2.0E-05	8.9E-05	--	1.1E-04
			TRICHLOROETHENE	1.3E-08	1.0E-07	--	1.2E-07	TRICHLOROETHENE	Immune System	3.9E-02	3.1E-01	--	3.5E-01
			VINYL CHLORIDE	8.6E-10	2.9E-09	--	3.7E-09	VINYL CHLORIDE	Liver	2.8E-05	9.3E-05	--	1.2E-04
			(Total)	3.6E-08	1.2E-07	---	1.5E-07		(Total)	4.7E-02	3.4E-01	---	3.9E-01
							Total Risk Across Groundwater	**1.5E-07**					**Total Hazard Index Across Groundwater**	**3.9E-01**
							Total Risk Across All Media and All Exposure Routes	**2E-07**					**Total Hazard Index Across All Media and All Exposure Routes**	**0.4**

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TABLE D.9.6.3

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA

FORT BUCHANAN

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Indoor Air	Northwest Boundary Area	**Volatiles**					**Volatiles**					
			CIS-1,2-DICHLOROETHENE	--	--	--	NA	CIS-1,2-DICHLOROETHENE	NA	--	--	6.3E-04	6.3E-04
			TETRACHLOROETHENE	--	--	2.0E-07	2.0E-07	TETRACHLOROETHENE	Central Nervous System	--	--	5.7E-04	5.7E-04
			1,1,2-TRICHLOROETHANE	--	--	3.3E-08	3.3E-08	1,1,2-TRICHLOROETHANE	NA	--	--	--	NA
			TRICHLOROETHENE	--	--	8.1E-06	8.1E-06	TRICHLOROETHENE	Immune System	--	--	2.7E+00	2.7E+00
			VINYL CHLORIDE	--	--	9.0E-08	9.0E-08	VINYL CHLORIDE	Liver	--	--	5.7E-04	5.7E-04
			(Total)	---	---	8.4E-06	8.4E-06		(Total)	---	---	2.7E+00	2.7E+00
						Total Risk Across Groundwater	**8.4E-06**					**Total Hazard Index Across Groundwater**	**2.7E+00**
						Total Risk Across All Media and All Exposure Routes	**8.4E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**2.7E+00**

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TABLE D.10.1.1

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ARSENIC	2.1E-06	5.1E-07	2.6E-10	2.7E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	1.7E-06	--	1.2E-08	1.7E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	3.8E-06	5.1E-07	1.2E-08	4.3E-06		(Total)	---	---	---	---
					Total Risk Across Surface Soil		**4.3E-06**				**Total Hazard Index Across Surface Soil**		**---**
						Total Risk Across All Media and All Exposure Routes	**4E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0**

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TABLE D.10.1.2

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ARSENIC	1.8E-06	2.7E-07	7.0E-11	2.0E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	1.4E-06	--	3.2E-09	1.4E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	3.2E-06	2.7E-07	3.3E-09	3.4E-06		(Total)	---	---	---	---
					Total Risk Across Surface Soil		**3.4E-06**				**Total Hazard Index Across Surface Soil**		**---**
						Total Risk Across All Media and All Exposure Routes	**3E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0**

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TABLE D.10.1.3

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ARSENIC	1.1E-05	1.6E-06	1.1E-08	1.3E-05	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	8.9E-06	--	5.1E-07	9.4E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	2.0E-05	1.6E-06	5.2E-07	2.3E-05		(Total)	---	---	---	---
				Total Risk Across Surface Soil			**2.3E-05**		**Total Hazard Index Across Surface Soil**				**---**
			Total Risk Across All Media and All Exposure Routes				**2E-05**		**Total Hazard Index Across All Media and All Exposure Routes**				**0**

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TABLE D.10.1.4

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ARSENIC	2.7E-06	1.1E-07	6.6E-15	2.8E-06	ARSENIC	Skin	4.2E-01	1.7E-02	7.2E-06	4.4E-01
			CHROMIUM, TOTAL	2.2E-06	--	3.2E-13	2.2E-06	CHROMIUM, TOTAL	None	1.0E-01	--	2.7E-06	1.0E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	8.9E-01	--	3.8E-05	8.9E-01
			(Total)	4.9E-06	1.1E-07	3.3E-13	5.0E-06		(Total)	1.4E+00	1.7E-02	4.8E-05	1.4E+00
							Subsurface Risk Across Subsurface Soil						**Total Hazard Index Across Subsurface Soil**
							5.0E-06						**1.4E+00**
							Total Risk Across All Media and All Exposure Routes						**Total Hazard Index Across All Media and All Exposure Routes**
							5E-06						**1**

Total Hazard Index Skin	**0.4**
Total Hazard Index Chromium	**0.1**
Total Hazard Index Blood	**0.9**
Total Hazard Index Hair	**NA**

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TABLE D.10.1.5
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan
Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.2E-01	--	3.6E-03	3.3E-01
			ARSENIC	7.2E-05	6.0E-06	1.1E-08	7.8E-05	ARSENIC	Skin	1.9E+00	1.6E-01	2.1E-03	2.0E+00
			CHROMIUM, TOTAL	5.6E-05	--	5.2E-07	5.6E-05	CHROMIUM, TOTAL	None	4.3E-01	--	7.2E-04	4.4E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	2.8E-01	--	7.8E-04	2.8E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	7.8E-01	--	--	7.8E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.6E-01	--	8.2E-03	1.7E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	4.2E-01	--	--	4.2E-01
			PAHs					**PAHs**					
			BENZO(A)PYRENE	1.8E-05	6.5E-06	1.5E-10	2.4E-05	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	3.9E-06	1.4E-06	3.3E-11	5.4E-06	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Child)	1.5E-04	1.4E-05	5.3E-07	1.6E-04		(Total for Child)	4.3E+00	1.6E-01	1.5E-02	4.4E+00
	Surface Soil	Site 1, 7, 8 (Adult)	**Inorganics**					**Inorganics**					
			ARSENIC	3.1E-05	3.7E-06	4.6E-08	3.5E-05	ARSENIC	Skin	2.0E-01	2.4E-02	2.1E-03	2.3E-01
			CHROMIUM, TOTAL	2.4E-05	--	2.1E-06	2.6E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			PAHs					**PAHs**					
			BENZO(A)PYRENE	2.6E-06	1.3E-06	2.0E-10	3.9E-06	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	5.7E-07	3.0E-07	4.5E-11	8.7E-07	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Adult)	5.8E-05	5.3E-06	2.1E-06	6.5E-05		(Total for Adult)	2.0E-01	2.4E-02	2.1E-03	2.3E-01
	Surface Soil	Site 1, 7, 8 (Adult + Child)	**Inorganics**										
			ARSENIC	1.0E-04	9.7E-06	5.7E-08	1.1E-04						
			CHROMIUM, TOTAL	8.0E-05	NA	2.6E-06	8.2E-05						
			PAHs										
			BENZO(A)PYRENE	2.0E-05	7.8E-06	3.5E-10	2.8E-05						
			DIBENZ(A,H)ANTHRACENE	4.5E-06	1.7E-06	7.7E-11	6.3E-06						
			(Total for Child + Adult)	2.1E-04	1.9E-05	2.6E-06	2.3E-04		**Total Hazard Index Across Surface Soil (Child)**				**4.4E+00**
				Total Risk Across Surface Soil			**2.3E-04**		**Total Hazard Index Across Surface Soil (Adult)**				**2.3E-01**
			Total Risk Across All Media and All Exposure Routes				**2E-04**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**4**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**0.2**

Total Hazard Index Skin (Child)	**2**
Total Hazard Index Chromium (Child)	**0.4**
Total Hazard Index Gastrointestinal System (Child)	**0.8**
Total Hazard Index Thyroid (Child)	**0.3**
Total Hazard Index Hair (Child)	**0.4**
Total Hazard Index Central Nervous System (Child)	**0.5**

Total Hazard Index Skin (Adult)	**0.2**

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TABLE D.10.1.6

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 1, 7, 8 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	4.0E-01	--	4.4E-03	4.1E-01
			ARSENIC	4.4E-05	3.7E-06	7.0E-09	4.8E-05	ARSENIC	Skin	1.1E+00	9.6E-02	1.3E-03	1.2E+00
			CHROMIUM, TOTAL	3.6E-05	--	3.4E-07	3.7E-05	CHROMIUM, TOTAL	None	2.8E-01	--	4.7E-04	2.8E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	2.4E+00	--	6.7E-03	2.4E+00
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	5.6E-01	--	2.9E-02	5.9E-01
			MERCURY	--	--	--	NA	MERCURY	Central Nervous System	3.8E-01	--	7.1E-06	3.8E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	3.1E-01	--	--	3.1E-01
			PAHs					**PAHs**					
			BENZO(A)PYRENE	3.1E-06	1.1E-06	2.6E-11	4.2E-06	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	7.8E-07	2.8E-07	6.4E-12	1.1E-06	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Child)	8.4E-05	5.1E-06	3.4E-07	9.0E-05		(Total for Child)	6.3E+00	9.6E-02	4.2E-02	6.4E+00
	Subsurface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ARSENIC	1.9E-05	2.3E-06	2.8E-08	2.1E-05	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	1.6E-05	--	1.3E-06	1.7E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			COBALT	--	--	1.2E-07	NA	COBALT	Thyroid	2.6E-01	--	6.7E-03	2.7E-01
			PAHs					**PAHs**					
			BENZO(A)PYRENE	4.5E-07	2.3E-07	3.5E-11	6.9E-07	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	1.1E-07	5.9E-08	8.8E-12	1.7E-07	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Adult)	3.5E-05	2.6E-06	1.5E-06	3.9E-05		(Total for Adult)	3.4E-01	---	6.7E-03	3.5E-01
	Subsurface Soil	Site 1, 7, 8 (Adult + Child)	**Inorganics**										
			ARSENIC	6.3E-05	6.0E-06	3.5E-08	6.9E-05						
			CHROMIUM, TOTAL	5.2E-05	NA	1.7E-06	5.4E-05						
			COBALT	NA	NA	1.2E-07	NA						
			PAHs										
			BENZO(A)PYRENE	3.6E-06	1.4E-06	6.1E-11	4.9E-06						
			DIBENZ(A,H)ANTHRACENE	8.9E-07	3.4E-07	1.5E-11	1.2E-06						
			(Total for Child + Adult)	1.2E-04	7.7E-06	1.8E-06	1.3E-04						
				Total Risk Across Subsurface Soil			**1.3E-04**						

Total Risk Across All Media and All Exposure Routes	**1E-04**
Total Hazard Index Across Subsurface Soil (Child)	**6.4E+00**
Total Hazard Index Across Subsurface Soil (Adult)	**3.5E-01**
Total Hazard Index Across All Media and All Exposure Routes (Child)	**6**
Total Hazard Index Across All Media and All Exposure Routes (Adult)	**0.4**
Total Hazard Index Skin (Child)	**1**
Total Hazard Index Chromium (Child)	**0.3**
Total Hazard Index Thyroid (Child)	**2**
Total Hazard Index Hair (Child)	**0.3**
Total Hazard Index Central Nervous System (Child)	**1**
Total Hazard Index Blood (Adult)	**0.3**

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TABLE D.10.2.1

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 2

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 2, 3, and 11	**Inorganics**					**Inorganics**					
			ARSENIC	6.7E-06	2.7E-07	6.8E-10	6.9E-06	ARSENIC	Skin	1.0E+00	4.3E-02	7.4E-04	1.1E+00
			CHROMIUM, TOTAL	3.3E-06	--	2.0E-08	3.3E-06	CHROMIUM, TOTAL	None	1.5E-01	--	1.6E-04	1.5E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	2.8E-01	--	5.1E-04	2.8E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.3E+00	--	4.3E-02	1.3E+00
			VANADIUM	--	--	--	NA	VANADIUM	Hair	1.7E-01	--	--	1.7E-01
			(Total)	9.9E-06	2.7E-07	2.0E-08	1.0E-05		(Total)	2.9E+00	4.3E-02	4.4E-02	3.0E+00
							Subsurface Risk Across Subsurface Soil	**1E-05**					**Total Hazard Index Across Subsurface Soil**	**3E+00**
							Total Risk Across All Media and All Exposure Routes	**1E-05**					**Total Hazard Index Across All Media and All Exposure Routes**	**3**

Total Hazard Index Skin	**1**
Total Hazard Index Chromium	**0.2**
Total Hazard Index Thyroid	**0.3**
Total Hazard Index Hair	**0.2**
Total Hazard Index Central Nervous System	**1**

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TABLE D.10.2.2

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 2

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 2, 3, and 11 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.5E-01	--	1.6E-04	3.5E-01
			ARSENIC	1.1E-04	9.1E-06	7.2E-10	1.2E-04	ARSENIC	Skin	2.8E+00	2.4E-01	1.3E-04	3.1E+00
			CHROMIUM, TOTAL	5.4E-05	--	2.1E-08	5.4E-05	CHROMIUM, TOTAL	None	4.2E-01	--	2.9E-05	4.2E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	7.7E-01	--	8.8E-05	7.7E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.3E+00	--	--	1.3E+00
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	3.5E+00	--	7.5E-03	3.5E+00
			VANADIUM	--	--	--	NA	VANADIUM	Hair	4.5E-01	--	--	4.5E-01
			(Total for Child)	1.6E-04	9.1E-06	2.1E-08	1.7E-04		(Total for Child)	9.6E+00	2.4E-01	7.9E-03	9.8E+00
	Subsurface Soil	Sites 2, 3, and 11 (Adult)	**Inorganics**					**Inorganics**					
			ARSENIC	4.7E-05	5.6E-06	2.9E-09	5.2E-05	ARSENIC	Skin	3.0E-01	3.6E-02	1.3E-04	3.4E-01
			CHROMIUM, TOTAL	2.3E-05	--	8.3E-08	2.3E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	3.7E-01	--	7.5E-03	3.8E-01
			(Total for Adult)	7.0E-05	5.6E-06	8.6E-08	7.5E-05		(Total for Adult)	6.8E-01	3.6E-02	7.7E-03	7.2E-01
	Subsurface Soil	Sites 2, 3, and 11 (Adult + Child)	**Inorganics**										
			ARSENIC	1.6E-04	1.5E-05	3.6E-09	1.7E-04						
			CHROMIUM, TOTAL	7.6E-05	NA	1.0E-07	7.7E-05						
			(Total for Child + Adult)	2.3E-04	1.5E-05	1.1E-07	2.5E-04	**Total Hazard Index Across Subsurface Soil (Child)**					**9.8E+00**
				Total Risk Across Subsurface Soil			**2E-04**	**Total Hazard Index Across Subsurface Soil (Adult)**					**7.2E-01**
			Total Risk Across All Media and All Exposure Routes				**2E-04**	**Total Hazard Index Across All Media and All Exposure Routes (Child)**					**10**
								Total Hazard Index Across All Media and All Exposure Routes (Adult)					**0.7**

Total Hazard Index Skin (Child)	**3**
Total Hazard Index Chromium (Child)	**0.4**
Total Hazard Index Gastrointestinal System (Child)	**1**
Total Hazard Index Thyroid (Child)	**0.8**
Total Hazard Index Hair (Child)	**0.5**
Total Hazard Index Central Nervous System (Child)	**4**
Total Hazard Index Skin (Adult)	**0.3**
Total Hazard Index Central Nervous System (Adult)	**0.4**

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TABLE D.10.3.1

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
					Total Risk Across Surface Soil		---			**Total Hazard Index Across Surface Soil**			---
					Total Risk Across All Media and All Exposure Routes		**0.0E+00**			**Total Hazard Index Across All Media and All Exposure Routes**			**0**

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TABLE D.10.3.2

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescen

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
					Total Risk Across Surface Soil		---			**Total Hazard Index Across Surface Soil**			---
				Total Risk Across All Media and All Exposure Routes			**0.0E+00**		**Total Hazard Index Across All Media and All Exposure Routes**				**0**

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TABLE D.10.3.3

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Sites 13 and 15	**Inorganics**					**Inorganics**					
			ARSENIC	3.4E-06	4.7E-07	3.3E-09	3.8E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.9E-06	--	1.7E-07	3.1E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	6.3E-06	4.7E-07	1.7E-07	6.9E-06		(Total)	---	---	---	---
				Total Risk Across Surface Soil			**6.9E-06**					**Total Hazard Index Across Surface Soil**	---
						Total Risk Across All Media and All Exposure Routes	**7E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0**

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TABLE D.10.3.4

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 13 and 15	**Inorganics**					**Inorganics**					
			ARSENIC	4.5E-06	1.9E-07	4.7E-10	4.7E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	3.0E-06	--	1.8E-08	3.0E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	7.5E-06	1.9E-07	1.8E-08	7.8E-06		(Total)	---	---	---	---
							Subsurface Risk Across Subsurface Soil	**7.8E-06**					**Total Hazard Index Across Subsurface Soil**	**---**
							Total Risk Across All Media and All Exposure Routes	**8E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0**

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TABLE D.10.3.5

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Sites 13 and 15 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	2.8E-01	--	1.3E-04	2.8E-01
			ARSENIC	2.1E-05	1.8E-06	1.4E-10	2.3E-05	ARSENIC	Skin	5.5E-01	4.6E-02	2.5E-05	5.9E-01
			CHROMIUM, TOTAL	1.8E-05	--	7.1E-09	1.8E-05	CHROMIUM, TOTAL	None	1.4E-01	--	9.8E-06	1.4E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	6.4E-01	--	7.3E-05	6.4E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	5.2E-01	--	--	5.2E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	2.5E-01	--	5.4E-04	2.5E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	2.5E-01	--	--	2.5E-01
			(Total for Child)	3.9E-05	1.8E-06	7.2E-09	4.1E-05		(Total for Child)	2.6E+00	4.6E-02	7.7E-04	2.7E+00
	Surface Soil	Sites 13 and 15 (Adult)	**Inorganics**					**Inorganics**					
			ARSENIC	9.0E-06	1.08E-06	5.56E-10	1.0E-05	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	7.9E-06	--	2.83E-08	7.9E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total for Adult)	1.7E-05	1.1E-06	2.9E-08	1.8E-05		(Total for Adult)	---	---	---	---
	Surface Soil	Sites 13 and 15 (Adult + Child)	**Inorganics**										
			ARSENIC	3.0E-05	2.9E-06	7.0E-10	3.3E-05						
			CHROMIUM, TOTAL	2.6E-05	NA	3.5E-08	2.6E-05						
			(Total for Child + Adult)	5.6E-05	2.9E-06	3.6E-08	5.9E-05		**Total Hazard Index Across Surface Soil (Child)**				**3E+00**
				Total Risk Across Surface Soil			**5.9E-05**		**Total Hazard Index Across Surface Soil (Adult)**				**---**
			Total Risk Across All Media and All Exposure Routes				**6E-05**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**3**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**0**

Total Hazard Index Skin (Child)	**0.6**
Total Hazard Index Chromium (Child)	**0.1**
Total Hazard Index Gastrointestinal System (Child)	**0.5**
Total Hazard Index Thyroid (Child)	**0.6**
Total Hazard Index Hair (Child)	**0.2**
Total Hazard Index Central Nervous System (Child)	**0.5**

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TABLE D.10.3.6

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 13 and 15 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	3.5E-01	--	1.6E-04	3.5E-01
			ARSENIC	7.4E-05	6.2E-06	4.9E-10	8.1E-05	ARSENIC	Skin	1.9E+00	1.6E-01	8.9E-05	2.1E+00
			CHROMIUM, TOTAL	4.9E-05	--	1.9E-08	4.9E-05	CHROMIUM, TOTAL	None	3.8E-01	--	2.6E-05	3.8E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	5.7E-01	--	6.5E-05	5.7E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	8.4E-01	--	--	8.4E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	2.5E-01	--	5.4E-04	2.5E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	3.6E-01	--	--	3.6E-01
			PAHs					**PAHs**					
			BENZO(A)PYRENE	7.4E-06	2.7E-06	2.6E-12	1.0E-05	BENZO(A)PYRENE	NA	--	--	--	NA
			(Total for Child)	1.3E-04	8.9E-06	1.9E-08	1.4E-04		(Total for Child)	4.7E+00	1.6E-01	8.8E-04	4.8E+00
	Subsurface Soil	Sites 13 and 15 (Adult)	**Inorganics**					**Inorganics**					
			ARSENIC	3.2E-05	3.81E-06	1.96E-09	3.6E-05	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.1E-05	--	7.56E-08	2.1E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			PAHs					**PAHs**					
			BENZO(A)PYRENE	1.1E-06	5.57E-07	3.47E-12	1.6E-06	BENZO(A)PYRENE	NA	--	--	--	NA
			(Total for Adult)	5.4E-05	4.4E-06	7.8E-08	5.8E-05		(Total for Adult)	---	---	---	---
	Subsurface Soil	Sites 13 and 15 (Adult + Child)	**Inorganics**										
			ARSENIC	1.1E-04	1.0E-05	2.4E-09	1.2E-04						
			CHROMIUM, TOTAL	7.0E-05	NA	9.4E-08	7.0E-05						
			PAHs										
			BENZO(A)PYRENE	8.5E-06	3.2E-06	6.0E-12	1.2E-05						
			(Total for Child + Adult)	1.8E-04	1.3E-05	9.7E-08	2.0E-04		**Total Hazard Index Across Subsurface Soil (Child)**				**5E+00**
				Total Risk Across Subsurface Soil			**2E-04**		**Total Hazard Index Across Subsurface Soil (Adult)**				**---**
			Total Risk Across All Media and All Exposure Routes				**2E-04**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**5**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**0**

Total Hazard Index Skin (Child)	**2**
Total Hazard Index Chromium (Child)	**0.4**
Total Hazard Index Gastrointestinal System (Child)	**0.8**
Total Hazard Index Thyroid (Child)	**0.6**
Total Hazard Index Hair (Child)	**0.4**
Total Hazard Index Central Nervous System (Child)	**0.6**

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TABLE D.10.4.1

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 9

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 9	**Inorganics**					**Inorganics**					
			ARSENIC	1.5E-05	6.3E-07	1.6E-09	1.6E-05	ARSENIC	Skin	2.4E+00	9.8E-02	1.7E-03	2.5E+00
			CHROMIUM, TOTAL	4.5E-06	--	2.7E-08	4.6E-06	CHROMIUM, TOTAL	None	2.1E-01	--	2.3E-04	2.1E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	1.6E+00	--	2.9E-03	1.6E+00
			IRON	--	--	--	NA	IRON	Gastrointestinal System	6.8E-01	--	--	6.8E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	7.1E-01	--	2.4E-02	7.4E-01
			(Total)	2.0E-05	6.3E-07	2.9E-08	2.0E-05		(Total)	5.6E+00	9.8E-02	2.9E-02	5.7E+00
							Subsurface Risk Across Subsurface Soil						**Total Hazard Index Across Subsurface Soil**
							2.0E-05						**6**
							Total Risk Across All Media and All Exposure Routes						**Total Hazard Index Across All Media and All Exposure Routes**
							2E-05						**6**

Total Hazard Index Skin	**2**
Total Hazard Index Chromium	**0.2**
Total Hazard Index Thyroid	**2**
Total Hazard Index Gastrointestinal System	**0.7**
Total Hazard Index Central Nervous System	**0.7**

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TABLE D.10.4.2

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 9

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Residen
Receptor Age: Child and Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 9 (Child)	**Inorganics**					**Inorganics**					
			ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	2.9E-01	--	1.3E-04	2.9E-01
			ARSENIC	2.5E-04	2.1E-05	1.6E-09	2.7E-04	ARSENIC	Skin	6.5E+00	5.4E-01	3.0E-04	7.0E+00
			CHROMIUM, TOTAL	7.4E-05	--	2.9E-08	7.4E-05	CHROMIUM, TOTAL	None	5.8E-01	--	4.0E-05	5.8E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	4.4E+00	--	5.1E-04	4.4E+00
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.8E+00	--	--	1.8E+00
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.9E+00	--	4.2E-03	1.9E+00
			VANADIUM	--	--	--	NA	VANADIUM	Hair	5.3E-01	--	--	5.3E-01
			(Total for Child)	3.2E-04	2.1E-05	3.0E-08	3.4E-04		(Total for Child)	1.6E+01	5.4E-01	5.2E-03	1.7E+01
	Subsurface Soil	Site 9 (Adult)	**Inorganics**					**Inorganics**					
			ARSENIC	1.1E-04	1.3E-05	6.6E-09	1.2E-04	ARSENIC	Skin	6.9E-01	8.3E-02	3.0E-04	7.8E-01
			CHROMIUM, TOTAL	3.2E-05	--	1.1E-07	3.2E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			COBALT	--	--	--	NA	COBALT	Thyroid	4.7E-01	--	5.1E-04	4.8E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	2.1E-01	--	4.2E-03	2.1E-01
			(Total for Adult)	1.4E-04	1.3E-05	1.2E-07	1.5E-04		(Total for Adult)	1.4E+00	8.3E-02	5.0E-03	1.5E+00
	Subsurface Soil	Site 9 (Adult + Child)	**Inorganics**										
			ARSENIC	3.6E-04	3.4E-05	8.2E-09	3.9E-04						
			CHROMIUM, TOTAL	1.1E-04	NA	1.4E-07	1.1E-04						
			(Total for Child + Adult)	4.6E-04	3.4E-05	1.5E-07	5.0E-04						
				Total Risk Across Subsurface Soil			**5E-04**						
									Total Hazard Index Across Subsurface Soil (Child)				**2E+01**
									Total Hazard Index Across Subsurface Soil (Adult)				**1E+00**
			Total Risk Across All Media and All Exposure Routes				**5E-04**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**17**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**1.5**

Total Hazard Index Skin (Child)	**7**
Total Hazard Index Chromium (Child)	**0.6**
Total Hazard Index Gastrointestinal System (Child)	**2**
Total Hazard Index Thyroid (Child)	**4**
Total Hazard Index Hair (Child)	**0.5**
Total Hazard Index Central Nervous System (Child)	**2**

Total Hazard Index Skin (Adult)	**0.8**
Total Hazard Index Blood (Adult)	**0.5**
Total Hazard Index Central Nervous System (Adult)	**0.2**

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TABLE D.10.5.1

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
					Total Risk Across Surface Soil		---			**Total Hazard Index Across Surface Soil**			---
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	1.2E-05	6.6E-07	--	1.2E-05	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	3.4E-07	1.6E-06	--	1.9E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	1.2E-05	2.2E-06	---	1.4E-05		(Total)	---	---	---	---
						Total Risk Across Surface Water	**1.4E-05**			**Total Hazard Index Across Surface Water**			---
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	9.6E-07	2.3E-07	--	1.2E-06	ARSENIC	Skin	--	--	--	NA
			(Total)	9.6E-07	2.3E-07	---	1.2E-06		(Total)	---	---	---	---
						Total Risk Across Sediment	**1.2E-06**			**Total Hazard Index Across Sediment**			---
						Total Risk Across All Media and All Exposure Routes	**2E-05**			**Total Hazard Index Across All Media and All Exposure Routes**			**0**

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TABLE D.10.5.2

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescen

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
			(Total)	---	---	---	---		(Total)	---	---	---	---
					Total Risk Across Surface Soil		---				**Total Hazard Index Across Surface Soil**		---
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	4.8E-06	2.2E-07	--	5.0E-06	ARSENIC	Skin	--	--	--	NA
			(Total)	4.8E-06	2.2E-07	---	5.0E-06		(Total)	---	---	---	---
						Total Risk Across Surface Water	**5.0E-06**				**Total Hazard Index Across Surface Water**		---
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	8.0E-07	2.2E-07	--	1.0E-06	ARSENIC	Skin	--	--	--	NA
			(Total)	8.0E-07	2.2E-07	---	1.0E-06		(Total)	---	---	---	---
						Total Risk Across Sediment	**1.0E-06**				**Total Hazard Index Across Sediment**		---
						Total Risk Across All Media and All Exposure Routes	**6E-06**				**Total Hazard Index Across All Media and All Exposure Routes**		**0**

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TABLE D.10.5.3

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	2.1E-06	2.9E-07	2.0E-09	2.4E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.4E-06	--	1.4E-07	2.5E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	4.4E-06	2.9E-07	1.4E-07	4.9E-06		(Total)	---	---	---	---
				Total Risk Across Surface Soil			**4.9E-06**		**Total Hazard Index Across Surface Soil**				**---**
			Total Risk Across All Media and All Exposure Routes				**5E-06**		**Total Hazard Index Across All Media and All Exposure Routes**				**0**

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TABLE D.10.5.4

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	--	--	--	NA	ARSENIC	Skin	1.2E-01	5.1E-03	8.8E-05	1.3E-01
			(Total)	---	---	---	---		(Total)	1.2E-01	5.1E-03	8.8E-05	1.3E-01
				Subsurface Risk Across Surface Soil			---			**Total Hazard Index Across Surface Soil**			**1.3E-01**
Groundwater	Groundwater	Site12	**Inorganics**					**Inorganics**					
			CHROMIUM, TOTAL	8.8E-08	3.2E-06	--	3.3E-06	CHROMIUM, TOTAL	None	4.1E-03	1.5E-01	--	1.5E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	2.9E-03	4.6E-01	--	4.6E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	9.5E-03	1.1E-01	--	1.2E-01
			(Total)	8.8E-08	3.2E-06	---	3.3E-06		(Total)	1.6E-02	7.2E-01	---	7.3E-01
				Total Risk Across Groundwater			**3.3E-06**			**Total Hazard Index Across Groundwater**			**7.3E-01**
Surface Water	Surface Water	Site12	**Semivolatiles**					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	--	--	--	NA	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	3.8E-06	2.3E-01	--	2.3E-01
			(Total)	---	---	---	---		(Total)	3.8E-06	2.3E-01	---	2.3E-01
				Total Risk Across Surface water			---			**Total Hazard Index Across Surface Water**			**2.3E-01**
				Total Risk Across Sediment			---			**Total Hazard Index Across Sediment**			---
				Total Risk Across All Media and All Exposure Routes			**3E-06**			**Total Hazard Index Across All Media and All Exposure Routes**			**1**

Total Hazard Index Skin	**0.1**
Total Hazard Index Chromium	**0.2**
Total Hazard Index Gastrointestinal System	**0.5**
Total Hazard Index Central Nervous System	**0.1**
Total Hazard Index Liver	**0.2**

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TABLE D.10.5.5

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site12	**Inorganics**					**Inorganics**					
		(Child)	ALUMINUM	--	--	--	NA	ALUMINUM	Central Nervous System	2.4E-01	--	1.1E-04	2.4E-01
			ARSENIC	1.3E-05	1.1E-06	8.6E-11	1.4E-05	ARSENIC	Skin	3.4E-01	2.8E-02	1.5E-05	3.6E-01
			CHROMIUM, TOTAL	1.5E-05	--	5.8E-09	1.5E-05	CHROMIUM, TOTAL	None	1.2E-01	--	8.0E-06	1.2E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	4.0E-01	--	4.6E-05	4.0E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	4.3E-01	--	--	4.3E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.1E-01	--	2.4E-04	1.1E-01
			VANADIUM	--	--	--	NA	VANADIUM	Hair	2.0E-01	--	--	2.0E-01
			(Total for Child)	2.8E-05	1.1E-06	5.8E-09	2.9E-05		(Total for Child)	1.8E+00	2.8E-02	4.2E-04	1.9E+00
	Surface Soil	Site12	**Inorganics**					**Inorganics**					
		(Adult)	ARSENIC	5.6E-06	6.66E-07	3.42E-10	6.2E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	6.4E-06	--	2.30E-08	6.4E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total for Adult)	1.2E-05	6.7E-07	2.3E-08	1.3E-05		(Total for Adult)	---	---	---	---
	Surface Soil	Site12	**Inorganics**										
		(Adult + Child)	ARSENIC	1.9E-05	1.8E-06	4.3E-10	2.0E-05						
			CHROMIUM, TOTAL	2.1E-05	NA	2.9E-08	2.1E-05						
			(Total for Child + Adult)	4.0E-05	1.8E-06	2.9E-08	4.2E-05	**Total Hazard Index Across Surface Soil (Child)**					**1.9E+00**
				Total Risk Across Surface Soil			**4.2E-05**	**Total Hazard Index Across Surface Soil (Adult)**					---
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
		(Child)	ARSENIC	1.1E-05	3.0E-07	--	1.1E-05	ARSENIC	Skin	2.8E-01	7.9E-03	--	2.9E-01
			CHROMIUM, TOTAL	3.2E-07	7.2E-07	--	1.0E-06	CHROMIUM, TOTAL	None	--	--	--	NA
	Surface Water	Site12	**Semivolatiles**					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	1.9E-09	3.9E-07	--	3.9E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	--	--	--	NA
			(Total for Child)	1.1E-05	1.4E-06	---	1.3E-05		(Total for Child)	2.8E-01	7.9E-03	---	2.9E-01
	Surface Water	Site12	**Inorganics**					**Inorganics**					
		(Adult)	ARSENIC	9.3E-06	5.3E-07	--	9.8E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.7E-07	1.2E-06	--	1.5E-06	CHROMIUM, TOTAL	None	--	--	--	NA
	Surface Water	Site12	**Semivolatiles**					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	1.7E-09	6.7E-07	--	6.7E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	--	--	--	NA
			(Total for Adult)	9.6E-06	2.5E-06	---	1.2E-05		(Total for Adult)	---	---	---	---

TABLE D.10.5.5

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Surface Water	Surface Water	Site12	**Inorganics**										
		(Adult + Child)	ARSENIC	2.0E-05	8.4E-07	NA	2.1E-05						
			CHROMIUM, TOTAL	5.9E-07	2.0E-06	NA	2.6E-06						
	Surface Water	Site12	**Semivolatiles**										
			BIS(2-ETHYLHEXYL)PHTHALATE	3.6E-09	1.1E-06	NA	1.1E-06						
			(Total for Child + Adult)	2.1E-05	3.9E-06	---	2.5E-05		**Total Hazard Index Across Surface Water (Child)**				**2.9E-01**
	Total Risk Across Surface Water (Adult + Child)						**2.5E-05**		**Total Hazard Index Across Surface Water (Adult)**				**---**
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
		(Child)	ARSENIC	3.6E-06	3.0E-07	--	3.9E-06	ARSENIC	Skin	9.3E-02	7.8E-03	--	1.0E-01
			CHROMIUM, TOTAL	9.1E-07	--	--	9.1E-07	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total for Child)	4.5E-06	3.0E-07	---	4.8E-06		(Total for Child)	9.3E-02	7.8E-03	---	1.0E-01
	Sediment	Site12	**Inorganics**					**Inorganics**					
		(Adult)	ARSENIC	7.7E-07	1.84E-07	--	9.5E-07	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.0E-07	--	--	2.0E-07	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total for Adult)	9.6E-07	1.8E-07	---	1.1E-06		(Total for Adult)	---	---	---	---
	Sediment	Site12	**Inorganics**										
		(Adult + Child)	ARSENIC	4.3E-06	4.8E-07	NA	4.8E-06						
			CHROMIUM, TOTAL	1.1E-06	NA	NA	1.1E-06						
			(Total for Child + Adult)	5.5E-06	4.8E-07	---	5.9E-06		**Total Hazard Index Across Sediment (Child)**				**1E-01**
	Total Risk Across Sediment (Adult + Child)						**6E-06**		**Total Hazard Index Across Sediment (Adult)**				**---**
	Total Risk Across All Media and All Exposure Routes						**7E-05**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**2**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**0**

Total Hazard Index Skin (Child)	**0.8**
Total Hazard Index Chromium (Child)	**0.1**
Total Hazard Index Thyroid (Child)	**0.4**
Total Hazard Index Hair (Child)	**0.2**
Total Hazard Index Central Nervous System (Child)	**0.4**
Total Hazard Index Gastrointestinal System (Child)	**0.4**

TABLE D.10.6.1

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA

FORT BUCHANAN

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Off-site Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Tap Water	**Inorganics**					**Inorganics**					
	Child		ARSENIC	3.8E-05	2.5E-07	--	3.8E-05	ARSENIC	Skin	9.7E-01	6.4E-03	--	9.8E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	3.3E-01	8.8E-04	--	3.3E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.6E+00	1.0E-02	--	1.6E+00
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.8E+00	2.9E-01	--	2.0E+00
			Volatiles			--		**Volatiles**					
			CIS-1,2-DICHLOROETHENE	--	--	--	NA	CIS-1,2-DICHLOROETHENE	Kidneys	1.8E+00	1.6E-01	--	2.0E+00
			1,1,2-TRICHLOROETHANE	5.3E-07	4.7E-08	--	5.8E-07	1,1,2-TRICHLOROETHANE	Liver	--	--	--	NA
			TRICHLOROETHENE	1.0E-04	1.7E-05	--	1.2E-04	TRICHLOROETHENE	Immune System	5.1E+01	8.5E+00	--	6.0E+01
			VINYL CHLORIDE	6.9E-09	3.7E-07	--	3.8E-07	VINYL CHLORIDE	Liver	--	--	--	NA
			(Total for Child)	1.4E-04	1.7E-05	---	1.6E-04		(Total for Child)	5.8E+01	9.0E+00	---	6.7E+01
	Groundwater	Tap Water	**Inorganics**					**Inorganics**					
	Adult		ARSENIC	7.9E-05	3.4E-07	--	7.9E-05	ARSENIC	Skin	5.1E-01	2.18E-03	--	5.1E-01
			COBALT	--	--	--	NA	COBALT	Thyroid	1.7E-01	2.97E-04	--	1.7E-01
			IRON	--	--	--	NA	IRON	Gastrointestinal System	8.2E-01	3.49E-03	--	8.2E-01
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	9.2E-01	9.79E-02	--	1.0E+00
			Volatiles					**Volatiles**					
			CIS-1,2-DICHLOROETHENE	--	--	--	NA	CIS-1,2-DICHLOROETHENE	Kidneys	9.4E-01	6.80E-02	6.5E-04	1.0E+00
			1,1,2-TRICHLOROETHANE	1.1E-06	8.4E-08	1.6E-07	1.4E-06	1,1,2-TRICHLOROETHANE	Liver	--	--	--	NA
			TRICHLOROETHENE	2.1E-04	3.0E-05	8.8E-06	2.5E-04	TRICHLOROETHENE	Immune System	2.7E+01	3.79E+00	3.0E+00	3.4E+01
			VINYL CHLORIDE	1.4E-08	6.3E-07	3.1E-08	6.7E-07	VINYL CHLORIDE	Liver	--	--	--	NA
			(Total for Adult)	2.9E-04	3.1E-05	9.0E-06	3.3E-04		(Total for Adult)	3.0E+01	4.0E+00	3.0E+00	3.7E+01

TABLE D.10.6.1

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA

FORT BUCHANAN

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Off-site Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater Child + Adult	Tap Water	**Inorganics**										
			ARSENIC	1.2E-04	5.8E-07	NA	1.2E-04						
			Volatiles										
			1,1,2-TRICHLOROETHANE	1.6E-06	1.3E-07	1.6E-07	1.9E-06						
			TRICHLOROETHENE	3.1E-04	4.7E-05	8.8E-06	3.7E-04						
			VINYL CHLORIDE	2.1E-08	1.0E-06	3.1E-08	1.1E-06						
			(Total for Child + Adult)	4.3E-04	4.8E-05	9.0E-06	4.9E-04		**Total Hazard Index Across Groundwater (Child)**				**6.7E+01**
	Total Risk Across Groundwater (Adult + Child)						**4.9E-04**		**Total Hazard Index Across Groundwater (Adult)**				**3.7E+01**
	Total Risk Across All Media and All Exposure Routes						**5E-04**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**67**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**37**

Total Hazard Index Skin (Child)	**1**
Total Hazard Index Thyroid (Child)	**0.3**
Total Hazard Index Gastrointestinal System (Child)	**2**
Total Hazard Index Central Nervous System (Child)	**2**
Total Hazard Index Kidneys (Child)	**2**
Total Hazard Index Immune System (Child)	**60**

Total Hazard Index Skin (Adult)	**0.5**
Total Hazard Index Thyroid (Adult)	**0.2**
Total Hazard Index Gastrointestinal System (Adult)	**0.8**
Total Hazard Index Kidneys (Adult)	**1**
Total Hazard Index Central Nervous System (Adult)	**1**
Total Hazard Index Immune System (Adult)	**34**

TABLE D.10.6.2

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA

FORT BUCHANAN

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Total Risk Across Groundwater							**NA**	**Total Hazard Index Across Groundwater**					**NA**
Total Risk Across All Media and All Exposure Routes							**0.0E+00**	**Total Hazard Index Across All Media and All Exposure Routes**					**0.0E+00**

TABLE D.10.6.3

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

NORTHWEST BOUNDARY AREA

FORT BUCHANAN

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Indoor Air	Northwest Boundary Area	**Volatiles**					**Volatiles**					
			TRICHLOROETHENE	--	--	8.1E-06	8.1E-06	TRICHLOROETHENE	Immune System	--	--	2.7E+00	2.7E+00
			(Total)	---	---	8.1E-06	8.1E-06		(Total)	---	---	2.7E+00	2.7E+00
						Total Risk Across Groundwater	**8.1E-06**					**Total Hazard Index Across Groundwater**	**2.7E+00**
						Total Risk Across All Media and All Exposure Routes	**8.1E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**2.7E+00**

TABLE D.11.1.1

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			CHROMIUM, TOTAL	1.7E-06	--	1.2E-08	1.7E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	1.7E-06	---	1.2E-08	1.7E-06		(Total)	4.6E-03	---	---	4.6E-03
					Total Risk Across Surface Soil		**1.7E-06**				**Total Hazard Index Across Surface Soil**		**4.6E-03**
					Total Risk Across All Media and All Exposure Routes		**2E-06**				**Total Hazard Index Across All Media and All Exposure Routes**		**4.6E-03**

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TABLE D.11.1.2

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			CHROMIUM, TOTAL	1.4E-06	--	3.2E-09	1.4E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	1.4E-06	---	3.2E-09	1.4E-06		(Total)	5.4E-02	---	---	5.4E-02
					Total Risk Across Surface Soil		**1.4E-06**			**Total Hazard Index Across Surface Soil**			**5.4E-02**
				Total Risk Across All Media and All Exposure Routes			**1.4E-06**		**Total Hazard Index Across All Media and All Exposure Routes**				**5.4E-02**

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TABLE D.11.1.3

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			CHROMIUM, TOTAL	8.9E-06	--	5.1E-07	9.4E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	8.9E-06	---	5.1E-07	9.4E-06		(Total)	---	---	---	---
						Total Risk Across Surface Soil	**9.4E-06**					**Total Hazard Index Across Surface Soil**	**---**
						Total Risk Across All Media and All Exposure Routes	**9E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0.0E+00**

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TABLE D.11.1.4

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worke
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Site 1, 7, 8	**Inorganics**					**Inorganics**					
			ARSENIC	2.7E-06	1.1E-07	6.6E-15	2.8E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.2E-06	--	3.2E-13	2.2E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	4.9E-06	1.1E-07	3.3E-13	5.0E-06		(Total)	---	---	---	---
							Subsurface Risk Across Subsurface Soil	**5.0E-06**					**Total Hazard Index Across Subsurface Soil**	---
							Total Risk Across All Media and All Exposure Routes	**5E-06**					**Total Hazard Index Across All Media and All Exposure Routes**	**0**

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TABLE D.11.1.5

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Site 1, 7, 8 (Child)	**Inorganics**					**Inorganics**					
			CHROMIUM, TOTAL	5.6E-05	--	5.2E-07	5.6E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			PAHs					**PAHs**					
			BENZO(A)PYRENE	1.8E-05	6.5E-06	1.5E-10	2.4E-05	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	3.9E-06	1.4E-06	3.3E-11	5.4E-06	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Child)	7.8E-05	7.9E-06	5.2E-07	8.6E-05		(Total for Child)	---	---	---	---
	Surface Soil	Site 1, 7, 8 (Adult)	**Inorganics**					**Inorganics**					
			CHROMIUM, TOTAL	2.4E-05	--	2.1E-06	2.6E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			PAHs					**PAHs**					
			BENZO(A)PYRENE	2.6E-06	1.3E-06	2.0E-10	3.9E-06	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	5.7E-07	2.98E-07	4.45E-11	8.7E-07	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Adult)	2.7E-05	1.6E-06	2.1E-06	3.1E-05		(Total for Adult)	---	---	---	---
	Surface Soil	Site 1, 7, 8 (Adult + Child)	**Inorganics**										
			CHROMIUM, TOTAL	8.0E-05	NA	2.6E-06	8.2E-05						
			PAHs										
			BENZO(A)PYRENE	2.0E-05	7.8E-06	3.5E-10	2.8E-05						
			DIBENZ(A,H)ANTHRACENE	4.5E-06	1.7E-06	7.7E-11	6.3E-06						
			(Total for Child + Adult)	1.0E-04	9.6E-06	2.6E-06	1.2E-04	**Total Hazard Index Across Surface Soil (Child)**					---
				Total Risk Across Surface Soil			**1.2E-04**	**Total Hazard Index Across Surface Soil (Adult)**					---
			Total Risk Across All Media and All Exposure Routes				**1E-04**	**Total Hazard Index Across All Media and All Exposure Routes (Child)**					**0**
								Total Hazard Index Across All Media and All Exposure Routes (Adult)					**0**

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TABLE D.11.1.6

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 1

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 1, 7, 8 (Child)	**Inorganics**					**Inorganics**					
			COBALT	--	--	--	NA	COBALT	Thyroid	2.4E+00	--	6.7E-03	2.4E+00
			PAHs					**PAHs**					
			BENZO(A)PYRENE	3.1E-06	1.1E-06	2.6E-11	4.2E-06	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	7.8E-07	2.8E-07	6.4E-12	1.1E-06	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Child)	3.9E-06	1.4E-06	3.2E-11	5.3E-06		(Total for Child)	2.4E+00	---	6.7E-03	2.4E+00
	Subsurface Soil	Site 1, 7, 8 (Adult)	**Inorganics**					**Inorganics**					
			PAHs					**PAHs**					
			BENZO(A)PYRENE	4.5E-07	2.3E-07	3.5E-11	6.9E-07	BENZO(A)PYRENE	NA	--	--	--	NA
			DIBENZ(A,H)ANTHRACENE	1.1E-07	5.9E-08	8.8E-12	1.7E-07	DIBENZ(A,H)ANTHRACENE	NA	--	--	--	NA
			(Total for Adult)	5.7E-07	2.9E-07	4.4E-11	8.6E-07		(Total for Adult)	---	---	---	---
	Subsurface Soil	Site 1, 7, 8 (Adult + Child)	**Inorganics**										
			ARSENIC	NA	NA	NA	NA						
			CHROMIUM, TOTAL	NA	NA	NA	NA						
			COBALT	NA	NA	NA	NA						
			PAHs										
			BENZO(A)PYRENE	3.6E-06	1.4E-06	6.1E-11	4.9E-06						
			DIBENZ(A,H)ANTHRACENE	8.9E-07	3.4E-07	1.5E-11	1.2E-06						
			(Total for Child + Adult)	4.5E-06	1.7E-06	7.6E-11	6.2E-06		**Total Hazard Index Across Subsurface Soil (Child)**				**2.4E+00**
				Total Risk Across Surface Soil			**6.2E-06**		**Total Hazard Index Across Subsurface Soil (Adult)**				**---**
			Total Risk Across All Media and All Exposure Routes				**6E-06**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**2**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**0**

Total Hazard Index Thyroid (Child) **2**

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TABLE D.11.2.1

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 2

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 2, 3, and 11	**Inorganics**					**Inorganics**					
			ARSENIC	6.7E-06	2.7E-07	6.8E-10	6.9E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	3.3E-06	--	2.0E-08	3.3E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	9.9E-06	2.7E-07	2.0E-08	1.0E-05		(Total)	---	---	---	NA
							Subsurface Risk Across Subsurface Soil	**1.0E-05**					**Total Hazard Index Across Subsurface Soil**	**NA**
							Total Risk Across All Media and All Exposure Routes	**1E-05**					**Total Hazard Index Across All Media and All Exposure Routes**	**0**

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TABLE D.11.2.2

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 2

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Sites 2, 3, and 11 (Child)	**Inorganics**					**Inorganics**					
			ARSENIC	1.1E-04	9.1E-06	7.2E-10	1.2E-04	ARSENIC	Skin	2.8E+00	2.4E-01	1.3E-04	3.1E+00
			CHROMIUM, TOTAL	5.4E-05	--	2.1E-08	5.4E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	3.5E+00	--	7.5E-03	3.5E+00
			(Total for Child)	1.6E-04	9.1E-06	2.1E-08	1.7E-04		(Total for Child)	6.3E+00	2.4E-01	7.7E-03	6.5E+00
	Subsurface Soil	Sites 2, 3, and 11 (Adult)	**Inorganics**					**Inorganics**					
			ARSENIC	4.7E-05	5.6E-06	2.9E-09	5.2E-05	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.3E-05	--	8.3E-08	2.3E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total for Adult)	7.0E-05	5.6E-06	8.6E-08	7.5E-05		(Total for Adult)	---	---	--	NA
	Subsurface Soil	Sites 2, 3, and 11 (Adult + Child)	**Inorganics**										
			ARSENIC	1.6E-04	1.5E-05	3.6E-09	1.7E-04						
			CHROMIUM, TOTAL	7.6E-05	NA	1.0E-07	7.7E-05						
			(Total for Child + Adult)	2.3E-04	1.5E-05	1.1E-07	2.5E-04	**Total Hazard Index Across Subsurface Soil (Child)**					**6.5E+00**
				Total Risk Across Subsurface Soil			**2.5E-04**	**Total Hazard Index Across Subsurface Soil (Adult)**					**NA**
			Total Risk Across All Media and All Exposure Routes				**2E-04**	**Total Hazard Index Across All Media and All Exposure Routes (Child)**					**7**
								Total Hazard Index Across All Media and All Exposure Routes (Adult)					**0**

Total Hazard Index Skin (Child)	**3**
Total Hazard Index Central Nervous System (Child)	**3**

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TABLE D.11.3.1

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
			(Total)	---	---	---	---		(Total)	---	---	---	---
					Total Risk Across Surface Soil		---				**Total Hazard Index Across Surface Soil**		---
						Total Risk Across All Media and All Exposure Routes	**0.0E+00**					**Total Hazard Index Across All Media and All Exposure Routes**	**0**

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TABLE D.11.3.2

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
					Total Risk Across Surface Soil		---			**Total Hazard Index Across Surface Soil**			--
						Total Risk Across All Media and All Exposure Routes	**0.0E+00**					**Total Hazard Index Across All Media and All Exposure Routes**	**0**

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TABLE D.11.3.3

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
			(Total)	---	---	---	---		(Total)	---	---	---	---
				Total Risk Across Surface Soil			---		**Total Hazard Index Across Surface Soil**				---
			Total Risk Across All Media and All Exposure Routes				**0E+00**		**Total Hazard Index Across All Media and All Exposure Routes**				**0**

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TABLE D.11.3.4

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 13 and 15	**Inorganics**					**Inorganics**					
			ARSENIC	4.5E-06	1.9E-07	4.7E-10	4.7E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	3.0E-06	--	1.8E-08	3.0E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	7.5E-06	1.9E-07	1.8E-08	7.8E-06		(Total)	---	---	---	---
							Subsurface Risk Across Subsurface Soil						**Total Hazard Index Across Subsurface Soil**
							7.8E-06						---
							Total Risk Across All Media and All Exposure Routes						**Total Hazard Index Across All Media and All Exposure Routes**
							8E-06						**0**

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TABLE D.11.3.5

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Residen
Receptor Age: Child and Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
				Total Risk Across Surface Soil			---						
			Total Risk Across All Media and All Exposure Routes				**0E+00**		**Total Hazard Index Across All Media and All Exposure Routes (Child)**				**0**
									Total Hazard Index Across All Media and All Exposure Routes (Adult)				**0**

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TABLE D.11.3.6

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - GROUPING 3

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 13 and 15 (Child)	**Inorganics**					**Inorganics**					
			ARSENIC	7.4E-05	6.2E-06	4.9E-10	8.1E-05	ARSENIC	Skin	1.9E+00	1.6E-01	8.9E-05	2.1E+00
			CHROMIUM, TOTAL	4.9E-05	--	1.9E-08	4.9E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			PAHs					**PAHs**					
			BENZO(A)PYRENE	7.4E-06	2.7E-06	2.6E-12	1.0E-05	BENZO(A)PYRENE	NA	--	--	--	NA
			(Total for Child)	1.3E-04	8.9E-06	1.9E-08	1.4E-04		(Total for Child)	1.9E+00	1.6E-01	8.9E-05	2.1E+00
	Subsurface Soil	Site 13 and 15 (Adult)	**Inorganics**					**Inorganics**					
			ARSENIC	3.2E-05	3.81E-06	1.96E-09	3.6E-05	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.1E-05	--	7.56E-08	2.1E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			PAHs					**PAHs**					
			BENZO(A)PYRENE	1.1E-06	5.57E-07	3.47E-12	1.6E-06	BENZO(A)PYRENE	NA	--	--	--	NA
			(Total for Adult)	5.4E-05	4.4E-06	7.8E-08	5.8E-05		(Total for Adult)	---	---	---	---
	Subsurface Soil	Site 13 and 15 (Adult + Child)	**Inorganics**										
			ARSENIC	1.1E-04	1.0E-05	2.4E-09	1.2E-04						
			CHROMIUM, TOTAL	7.0E-05	NA	9.4E-08	7.0E-05						
			PAHs										
			BENZO(A)PYRENE	8.5E-06	3.2E-06	6.0E-12	1.2E-05						
			(Total for Child + Adult)	1.8E-04	1.3E-05	9.7E-08	2.0E-04	**Total Hazard Index Across Subsurface Soil (Child)**					**2.1E+00**
				Total Risk Across Subsurface Soil			**2.0E-04**	**Total Hazard Index Across Subsurface Soil (Adult)**					---
			Total Risk Across All Media and All Exposure Routes				**2E-04**	**Total Hazard Index Across All Media and All Exposure Routes (Child)**					**2**
								Total Hazard Index Across All Media and All Exposure Routes (Adult)					**0**

Total Hazard Index Skin (Child) **2**

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TABLE D.11.4.1

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 9

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 9	**Inorganics**					**Inorganics**					
			ARSENIC	1.5E-05	6.3E-07	1.6E-09	1.6E-05	ARSENIC	Skin	2.4E+00	9.8E-02	1.7E-03	2.5E+00
			CHROMIUM, TOTAL	4.5E-06	--	2.7E-08	4.6E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			COBALT	--	--	--	NA	COBALT	Thyroid	1.6E+00	--	2.9E-03	1.6E+00
			(Total)	2.0E-05	6.3E-07	2.9E-08	2.0E-05		(Total)	4.7E+00	9.8E-02	4.6E-03	4.8E+00
							Subsurface Risk Across Subsurface Soil						**Total Hazard Index Across Subsurface Soil**
							2.0E-05						**4.8E+00**
							Total Risk Across All Media and All Exposure Routes						**Total Hazard Index Across All Media and All Exposure Routes**
							2E-05						**5**

Total Hazard Index Skin	**2**
Total Hazard Index Thyroid	**2**

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TABLE D.11.4.2

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 9

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Residen
Receptor Age: Child and Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Subsurface Soil	Site 9 (Child)	**Inorganics**					**Inorganics**					
			ARSENIC	2.5E-04	2.1E-05	1.6E-09	2.7E-04	ARSENIC	Skin	6.5E+00	5.4E-01	3.0E-04	7.0E+00
			CHROMIUM, TOTAL	7.4E-05	--	2.9E-08	7.4E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			COBALT	--	--	--	NA	COBALT	Thyroid	4.4E+00	--	5.1E-04	4.4E+00
			IRON	--	--	--	NA	IRON	Gastrointestinal System	1.8E+00	--	--	1.8E+00
			MANGANESE	--	--	--	NA	MANGANESE	Central Nervous System	1.9E+00	--	4.2E-03	1.9E+00
			(Total for Child)	3.2E-04	2.1E-05	3.0E-08	3.4E-04		(Total for Child)	1.5E+01	5.4E-01	5.0E-03	1.5E+01
	Subsurface Soil	Site 9 (Adult)	**Inorganics**					**Inorganics**					
			ARSENIC	1.1E-04	1.28E-05	6.58E-09	1.2E-04	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	3.2E-05	--	1.14E-07	3.2E-05	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total for Adult)	1.4E-04	1.3E-05	1.2E-07	1.5E-04		(Total for Adult)	---	---	---	---
	Subsurface Soil	Site 9 (Adult + Child)	**Inorganics**										
			ARSENIC	3.6E-04	3.4E-05	8.2E-09	3.9E-04						
			CHROMIUM, TOTAL	1.1E-04	NA	1.4E-07	1.1E-04						
			(Total for Child + Adult)	4.6E-04	3.4E-05	1.5E-07	5.0E-04					**Total Hazard Index Across Subsurface Soil (Child)**	**1.5E+01**
				Total Risk Across Subsurface Soil			**5.0E-04**					**Total Hazard Index Across Subsurface Soil (Adult)**	---
							Total Risk Across All Media and All Exposure Routes					**Total Hazard Index Across All Media and All Exposure Routes (Child)**	**1.5E+01**
							5.0E-04					**Total Hazard Index Across All Media and All Exposure Routes (Adult)**	**0.0E+00**

Total Hazard Index Skin (Child)	**7.0E+00**
Total Hazard Index Thyroid (Child)	**4.4E+00**
Total Hazard Index Central Nervous System (Child)	**1.9E+00**

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TABLE D.11.5.1

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
					Total Risk Across Surface Soil		---			**Total Hazard Index Across Surface Soil**			---
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	1.2E-05	6.6E-07	--	1.2E-05	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	3.4E-07	1.6E-06	--	1.9E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	1.2E-05	2.2E-06	---	1.4E-05		(Total)	---	---	---	---
						Total Risk Across Surface Water	**1.4E-05**			**Total Hazard Index Across Surface Water**			---
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	9.6E-07	2.3E-07	--	1.2E-06	ARSENIC	Skin	--	--	--	NA
			(Total)	9.6E-07	2.3E-07	---	1.2E-06		(Total)	---	---	---	---
						Total Risk Across Sediment	**1.2E-06**			**Total Hazard Index Across Sediment**			---
						Total Risk Across All Media and All Exposure Routes	**2E-05**			**Total Hazard Index Across All Media and All Exposure Routes**			**0**

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TABLE D.11.5.2

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
					Total Risk Across Surface Soil		---			**Total Hazard Index Across Surface Soil**			---
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	4.8E-06	2.2E-07	--	5.0E-06	ARSENIC	Skin	--	--	--	NA
			(Total)	4.8E-06	5.0E-07	---	5.3E-06		(Total)	---	---	---	---
						Total Risk Across Surface Water	**5.3E-06**			**Total Hazard Index Across Surface Water**			---
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
			ARSENIC	8.0E-07	2.2E-07	--	1.0E-06	ARSENIC	Skin	--	--	--	NA
			(Total)	8.0E-07	2.2E-07	---	1.0E-06		(Total)	---	---	---	---
						Total Risk Across Sediment	**1.0E-06**			**Total Hazard Index Across Sediment**			---
						Total Risk Across All Media and All Exposure Routes	**6E-06**			**Total Hazard Index Across All Media and All Exposure Routes**			**0**

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TABLE D.11.5.3

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
				Total Risk Across Surface Soil			---			**Total Hazard Index Across Suface Soil**			---
				Total Risk Across All Media and All Exposure Routes			**0.0E+00**			**Total Hazard Index Across All Media and All Exposure Routes**			**0**

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TABLE D.11.5.4

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Construction Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
				Subsurface Risk Across Surface Soil			---			**Total Hazard Index Across Surface Soil**			---
Groundwater	Groundwater	Site12	**Inorganics**					**Inorganics**					
			CHROMIUM, TOTAL	8.8E-08	3.2E-06	--	3.3E-06	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total)	8.8E-08	3.5E-06	---	3.6E-06		(Total)	---	---	---	---
				Total Risk Across Groundwater			**3.6E-06**			**Total Hazard Index Across Groundwater**			---
				Total Risk Across Surface water			---			**Total Hazard Index Across Surface Water**			---
				Total Risk Across Sediment			---			**Total Hazard Index Across Sediment**			---
				Total Risk Across All Media and All Exposure Routes			**4E-06**			**Total Hazard Index Across All Media and All Exposure Routes**			**0.0**

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TABLE D.11.5.5

RISK ASSESSMENT CONCLUSIONS - CONSIDERATION OF BACKGROUND

REASONABLE MAXIMUM EXPOSURE

FORT BUCHANAN - SITE 12

Location: Fort Buchanan

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Dermal	Inhalation	Exposure Routes Total		Primary Target Organ	Ingestion	Dermal	Inhalation	Exposure Routes Total
			(Total for Child + Adult)	---	---	---	---						**Total Hazard Index Across Surface Soil (Child)**	---
				Total Risk Across Surface Soil			---						**Total Hazard Index Across Surface Soil (Adult)**	---
Surface Water	Surface Water	Site12	**Inorganics**					**Inorganics**					
		(Child)	ARSENIC	1.1E-05	3.0E-07	--	1.1E-05	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	3.2E-07	7.2E-07	--	1.0E-06	CHROMIUM, TOTAL	None	--	--	--	NA
Surface Water	Surface Water		**Semivolatiles**					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	1.9E-09	3.9E-07	--	3.9E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	--	--	--	NA
			(Total for Child)	1.1E-05	1.4E-06	---	1.3E-05		(Total for Child)	---	---	---	---
	Surface Water	Site12	**Inorganics**					**Inorganics**					
		(Adult)	ARSENIC	9.3E-06	5.3E-07	--	9.8E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.7E-07	1.2E-06	--	1.5E-06	CHROMIUM, TOTAL	None	--	--	--	NA
	Surface Water		**Semivolatiles**					**Semivolatiles**					
			BIS(2-ETHYLHEXYL)PHTHALATE	1.7E-09	6.7E-07	--	6.7E-07	BIS(2-ETHYLHEXYL)PHTHALATE	Liver	--	--	--	NA
			(Total for Adult)	9.6E-06	2.5E-06	---	1.2E-05		(Total for Adult)	---	---	---	---
	Surface Water	Site12	**Inorganics**										
		(Adult + Child)	ARSENIC	2.0E-05	8.4E-07	NA	2.1E-05						
			CHROMIUM, TOTAL	5.9E-07	2.0E-06	NA	2.6E-06						
	Surface Water	Site12	**Semivolatiles**										
			BIS(2-ETHYLHEXYL)PHTHALATE	3.6E-09	1.1E-06	NA	1.1E-06						
			(Total for Child + Adult)	2.1E-05	3.9E-06	---	2.5E-05						**Total Hazard Index Across Surface Water (Child)**	---
							Total Risk Across Surface Water (Adult + Child)	**2.5E-05**					**Total Hazard Index Across Surface Water (Adult)**	---
Sediment	Sediment	Site12	**Inorganics**					**Inorganics**					
		(Child)	ARSENIC	3.6E-06	3.0E-07	--	3.9E-06	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	9.1E-07	--	--	9.1E-07	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total for Child)	4.5E-06	3.0E-07	---	4.8E-06		(Total for Child)	---	---	---	---
	Sediment	Site12	**Inorganics**					**Inorganics**					
		(Adult)	ARSENIC	7.7E-07	1.84E-07	--	9.5E-07	ARSENIC	Skin	--	--	--	NA
			CHROMIUM, TOTAL	2.0E-07	--	--	2.0E-07	CHROMIUM, TOTAL	None	--	--	--	NA
			(Total for Adult)	9.6E-07	1.8E-07	---	1.1E-06		(Total for Adult)	---	---	---	---
	Sediment	Site12	**Inorganics**										
		(Adult + Child)	ARSENIC	4.3E-06	4.8E-07	NA	4.8E-06						
			CHROMIUM, TOTAL	1.1E-06	NA	NA	1.1E-06						
			(Total for Child + Adult)	5.5E-06	4.8E-07	---	5.9E-06						**Total Hazard Index Across Sediment (Child)**	---
							Total Risk Across Sediment (Adult + Child)	**5.9E-06**					**Total Hazard Index Across Sediment (Adult)**	---
							Total Risk Across All Media and All Exposure Routes	**3E-05**					**Total Hazard Index Across All Media and All Exposure Routes (Child)**	**0**
													Total Hazard Index Across All Media and All Exposure Routes (Adult)	**0**

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TABLE D.12.1: SUMMARY OF RISK AT GROUPING 1 - SITES 1, 7, AND 8

Receptor	Risk[1]		Exposure Medium Contributing to Risk	Chemicals Contributing to Risk (Bold Indicates Drivers)[2]	Exposure Route Contributing to Risk (Bold Indicates Drivers)[2]
Adult Trespasser	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adolescent Trespasser	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adult Commercial Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adult Construction Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Child Resident - Surface Soil	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adult Resident - Surface Soil	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Child Resident - Subsurface Soil	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	2	Subsurface Soil	**Cobalt**	**Ingestion**
Adult Resident - Subsurface Soil	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A

Notes:
N/A - Not applicable
NR - No risk identified above threshold values (Based on cancer risk < 1 x 10^{-4}, non-cancer Hazard Index < 1 for human health).

1 Risk results take into account comparison to background concentrations in soil and do not consider COPCs considered consistent with background levels.

2 A contributor is defined as a pathway or COPC with 10^{-6} or greater for carcinogenic risk or 1 or greater for non-carcinogenic risk.
Drivers = pathways or COPC contributing >10^{-4} carcinogenic risk or greater than 1 non-carcinogenic risk.

TABLE D.12.2: SUMMARY OF RISK AT GROUPING 2 - SITES 2, 3, AND 11

Receptor	Risk[1]		Exposure Medium Contributing to Risk	Chemicals Contributing to Risk (Bold Indicates Drivers)[2]	Exposure Route Contributing to Risk (Bold Indicates Drivers)[2]
Adult Construction Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Child Resident	Cancer Risk[3]	$2x10^{-4}$	Subsurface Soil	**Arsenic**, Chromium (+6)	**Ingestion**, Dermal Contact
	Non-Cancer Hazard Index	7	Subsurface Soil	**Arsenic, Manganese**	**Ingestion**, Dermal Contact
Adult Resident	Cancer Risk[3]	$2x10^{-4}$	Subsurface Soil	**Arsenic**, Chromium (+6)	**Ingestion**, Dermal Contact
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A

Notes:
N/A - Not applicable
NR - No risk identified above threshold values (Based on cancer risk < 1 x 10^{-4}, non-cancer Hazard Index < 1 for human health).

[1] Risk results take into account comparison to background concentrations in soil and do not consider COPCs considered consistent with background levels.

[2] A contributor is defined as a pathway or COPC with 10^{-6} or greater for carcinogenic risk or 1 or greater for non-carcinogenic risk.
Drivers = pathways or COPC contributing >10^{-4} carcinogenic risk or greater than 1 non-carcinogenic risk.

[3] Cancer risks for the resident adult and child are combined to represent a lifetime incremental risk.

TABLE D.12.3: SUMMARY OF RISK AT GROUPING 3 - SITES 13 AND 15

Receptor	Risk[1]		Exposure Medium Contributing to Risk	Chemicals Contributing to Risk (Bold Indicates Drivers)[2]	Exposure Route Contributing to Risk (Bold Indicates Drivers)[2]
Adult Trespasser	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adolescent Trespasser	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adult Commercial Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adult Construction Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Child Resident	Cancer Risk[3]	$2x10^{-4}$	Subsurface Soil	**Arsenic**, Chromium (+6), Benzo(a)pyrene	**Ingestion**, Dermal Contact
	Non-Cancer Hazard Index	2	Subsurface Soil	**Arsenic**	**Ingestion**, Dermal Contact
Adult Resident	Cancer Risk[3]	$2x10^{-4}$	Subsurface Soil	**Arsenic**, Chromium (+6), Benzo(a)pyrene	**Ingestion**, Dermal Contact
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A

Notes:
N/A - Not applicable
NR - No risk identified above threshold values (Based on cancer risk < 1×10^{-4}, non-cancer Hazard Index < 1 for human health).

[1] Risk results take into account comparison to background concentrations in soil and do not consider COPCs considered consistent with background levels.

[2] A contributor is defined as a pathway or COPC with 10^{-6} or greater for carcinogenic risk or 1 or greater for non-carcinogenic risk.
Drivers = pathways or COPC contributing $>10^{-4}$ carcinogenic risk or greater than 1 non-carcinogenic risk.

[3] Cancer risks for the resident adult and child are combined to represent a lifetime incremental risk.

TABLE D.12.4: SUMMARY OF RISK AT SITE 9

Receptor	Risk[1]		Exposure Medium Contributing to Risk	Chemicals Contributing to Risk (Bold Indicates Drivers)[2]	Exposure Route Contributing to Risk (Bold Indicates Drivers)[2]
Adult Construction Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	5	Subsurface Soil	**Arsenic, Cobalt**	**Ingestion**
Child Resident	Cancer Risk[3]	$4x10^{-4}$	Subsurface Soil	**Arsenic**, Chromium (+6)	**Ingestion**, Dermal Contact
	Non-Cancer Hazard Index	15	Subsurface Soil	**Arsenic, Cobalt,** Iron, Manganese	**Ingestion**, Dermal Contact
Adult Resident	Cancer Risk[3]	$4x10^{-4}$	Subsurface Soil	**Arsenic**, Chromium (+6)	**Ingestion**, Dermal Contact
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A

Notes:
N/A - Not applicable
NR - No risk identified above threshold values (Based on cancer risk < 1 x 10^{-4}, non-cancer Hazard Index < 1 for human health).

[1] Risk results take into account comparison to background concentrations in soil and do not consider COPCs considered consistent with background levels.

[2] A contributor is defined as a pathway or COPC with 10^{-6} or greater for carcinogenic risk or 1 or greater for non-carcinogenic risk.
Drivers = pathways or COPC contributing >10^{-4} carcinogenic risk or greater than 1 non-carcinogenic risk.

[3] Cancer risks for the resident adult and child are combined to represent a lifetime incremental risk.

TABLE D.12.5: SUMMARY OF RISK AT SITE 12

Receptor	Risk[1]		Exposure Medium Contributing to Risk	Chemicals Contributing to Risk (Bold Indicates Drivers)[2]	Exposure Route Contributing to Risk (Bold Indicates Drivers)[2]
Adult Trespasser	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adolescent Trespasser	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adult Commercial Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adult Construction Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Child Resident	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Adult Resident	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A

Notes:
N/A - Not applicable
NR - No risk identified above threshold values (Based on cancer risk < 1 x 10^{-4}, non-cancer Hazard Index < 1 for human health).

1 Risk results take into account comparison to background concentrations in soil and do not consider COPCs considered consistent with background levels.

2 A contributor is defined as a pathway or COPC with 10^{-6} or greater for carcinogenic risk or 1 or greater for non-carcinogenic risk.
Drivers = pathways or COPC contributing >10^{-4} carcinogenic risk or greater than 1 non-carcinogenic risk.

TABLE D.12.6: SUMMARY OF RISK FOR NORTHWEST BOUNDARY AREA GROUNDWATER

Receptor	Risk[1]		Exposure Medium Contributing to Risk	Chemicals Contributing to Risk (Bold Indicates Drivers)[2]	Exposure Route Contributing to Risk (Bold Indicates Drivers)[2]
Adult Commercial Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	2.7	Groundwater (Indoor Air)	**Trichloroethene**	**Inhalation**
Adult Construction Worker	Cancer Risk	NR	N/A	N/A	N/A
	Non-Cancer Hazard Index	NR	N/A	N/A	N/A
Child Resident	Cancer Risk[3]	$5x10^{-4}$	Groundwater	**Arsenic**, **Trichloroethene**, 1,1,2-Trichloroethane	**Ingestion**, Dermal Contact, Inhalation
	Non-Cancer Hazard Index	67	Groundwater	Iron, Manganese, cis-1,2-Dichloroethene, **Trichloroethene**	**Ingestion**, Dermal Contact
Adult Resident	Cancer Risk[3]	$5x10^{-4}$	Groundwater	**Arsenic**, **Trichloroethene**, 1,1,2-Trichloroethane	**Ingestion**, Dermal Contact, Inhalation
	Non-Cancer Hazard Index	37	Groundwater	**Trichloroethene**	**Ingestion**, Dermal Contact, Inhalation

Notes:
N/A - Not applicable
NR - No risk identified above threshold values (Based on cancer risk < 1 x 10^{-4}, non-cancer Hazard Index < 1 for human health).

[1] Risk results take into account comparison to background concentrations in soil and do not consider COPCs considered consistent with background levels.

[2] A contributor is defined as a pathway or COPC with 10^{-6} or greater for carcinogenic risk or 1 or greater for non-carcinogenic risk.
Drivers = pathways or COPC contributing >10^{-4} carcinogenic risk or greater than 1 non-carcinogenic risk.

[3] Cancer risks for the resident adult and child are combined to represent a lifetime incremental risk.

ATTACHMENT A

SAMPLES USED IN THE HUMAN HEALTH RISK ASSESSMENT

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ATTACHEMNT A
SAMPLES USED IN THE HUMAN HEALTH RISK ASSESSMENT

Site	Media	Sample ID	Parent Sample ID	Depth
Site 1	SB	S-01-08-01-2-4		4
Site 1	SB	S-01-08-02-2-4		4
Site 1	SB	S-01-08-03-2-4		4
Site 1	SB	S-01-08-04-2-4		4
Site 1	SS	S-01-08-01-0-2		2
Site 1	SS	S-01-08-02-0-2		2
Site 1	SS	S-01-08-03-0-2		2
Site 1	SS	S-01-08-04-0-2		2
Site 1	WG	G-03-07-MW-11A		
Site 1	WG	G-03-08-MW-11B		
Site 1	WG	G-03-09-MW-11A		
Site 1	WG	G-03-09-MW-11B		
Site 1	WG	G-03-08-MW-11A		
Site 1	WG	G-03-07-MW-11B		
Site 2	SB	SB-03-06-03-(4-8)		8
Site 2	SB	SB-03-06-04-(37-36)		36
Site 2	SB	SB-03-06-03-(20-22)		22
Site 2	SB	SB-03-06-02-(4-8)		8
Site 2	SB	SB-03-06-02-(26-28)		28
Site 2	SB	SB-03-06-01-(4-8)		8
Site 2	SB	SB-03-06-01-(20-24)		24
Site 2	SB	SB-03-06-04-(4-8)		8
Site 2	WG	G-03-07-MW-03A		
Site 2	WG	07-JN-13-DP-3	G-03-07-MW-02	
Site 2	WG	G-03-07-MW-02		
Site 2	WG	G-03-07-MW-03B		
Site 2	WG	G-03-07-MW-01		
Site 2	WG	G-03-07-MW-04B		
Site 2	WG	G-03-07-MW-04A		
Site 3	SB	S-03-08-03-1-2		2
Site 3	SB	08-OC-22-DP1	S-03-08-04-1-2	2
Site 3	SB	S-03-08-01-1-2		2
Site 3	SB	S-03-08-01-2-4		4
Site 3	SB	S-03-08-02-2-4		4
Site 3	SB	S-03-08-04-1-2		2
Site 3	SB	S-03-08-04-2-4		4
Site 3	SB	S-03-08-03-2-4		4
Site 3	SB	S-03-08-02-1-2		2
Site 3	WG	G-03-09-MW-5A		
Site 3	WG	G-03-07-MW-05B		
Site 3	WG	07-JA-09-DP	G-03-07-MW-05B	
Site 3	WG	G-03-07-MW-05A		

ATTACHEMNT A
SAMPLES USED IN THE HUMAN HEALTH RISK ASSESSMENT

Site	Media	Sample ID	Parent Sample ID	Depth
Site 4	SS	S-04-08-04-0-2		2
Site 4	SS	S-04-08-05-0-2		2
Site 4	SS	S-04-08-03-0-2		2
Site 4	SS	S-04-08-02-0-2		2
Site 4	SS	S-04-08-01-0-2		2
Site 4	SS	S-04-08-06-0-2		2
Site 4	WG	G-03-08-MW-10A		
Site 4	WG	G-03-08-MW-10B		
Site 4	WG	G-03-09-MW-10B		
Site 4	WG	G-03-09-MW-10A		
Site 4	WG	G-03-07-MW-10A		
Site 4	WG	G-03-07-MW-10B		
Site 5	SB	S-05-08-02-2-4		4
Site 5	SB	S-05-08-01-2-4		4
Site 5	SS	S-05-08-02-1-2		2
Site 5	SS	S-05-08-01-1-2		2
Site 6	SB	S-6-09-1-2-4		4
Site 6	SB	S-06-08-01-2-4		4
Site 6	SB	S-6-09-3-2-4		4
Site 6	SB	S-06-08-02-2-4		4
Site 6	SB	S-06-08-03-2-4		4
Site 6	SB	S-6-09-2-2-4		4
Site 6	SD	SD-6-09-2		
Site 6	SD	SD-6-09-3		
Site 6	SD	SED-06-08-01		
Site 6	SD	SED-06-08-02		
Site 6	SD	SED-06-08-03		
Site 6	SD	SD-6-09-1		
Site 6	SS	S-6-09-3-0-2		2
Site 6	SS	08-12-02-DP1	S-06-08-03-0-2	2
Site 6	SS	S-6-09-2-0-2		2
Site 6	SS	S-6-09-1-0-2		2
Site 6	SS	S-06-08-03-0-2		2
Site 6	SS	S-06-08-02-0-2		2
Site 6	SS	S-06-08-01-0-2		2
Site 7	SB	S-07-08-01-2-4		4
Site 7	SB	08-OC-23-DP1	S-07-08-01-2-4	4
Site 7	SS	S-07-08-01-0-2		2
Site 7	WG	G-07-09-01		
Site 7	WG	G-03-08-MW-19A		
Site 8	SB	S-08-08-02-1-2		2
Site 8	SB	S-08-08-01-4-6		6
Site 8	SB	S-08-09-02-4-6		6
Site 8	SB	S-08-08-01-2-4		4
Site 8	WG	G-03-08-MW-23		
Site 8	WG	G-03-09-MW-23		

ATTACHEMNT A
SAMPLES USED IN THE HUMAN HEALTH RISK ASSESSMENT

Site	Media	Sample ID	Parent Sample ID	Depth
Site 9	SB	S-09-08-02-2-4		4
Site 9	SB	08-OC-21-DP1	S-09-08-03-2-4	4
Site 9	SB	S-09-08-01-4-6		6
Site 9	SB	S-09-08-02-4-6		6
Site 9	SB	S-09-08-03-2-4		4
Site 9	SB	S-09-08-03-4-6		6
Site 9	SB	S-09-08-01-2-4		4
Site 10	SB	S-10-08-03-2-4		4
Site 10	SB	S-10-08-01-2-4		4
Site 10	SB	S-10-08-02-2-4		4
Site 10	SS	S-10-08-02-0-2		2
Site 10	SS	S-10-08-01-0-2		2
Site 10	SS	S-10-08-03-0-2		2
Site 10	WG	G-03-08-MW-20		
Site 10	WG	G-03-09-MW-20		
Site 11	SB	S-11-08-02-2-4		4
Site 11	SB	S-11-08-01-2-4		4
Site 11	SB	S-11-08-03-2-4		4
Site 11	SB	08-OC-21-DP2	S-11-08-04-2-4	4
Site 11	SB	S-11-08-04-2-4		4
Site 12	SD	SD-12-07-05		
Site 12	SD	07-JN-12-DP4	SD-12-07-04	
Site 12	SD	SD-12-07-01		
Site 12	SD	SD-12-07-02		
Site 12	SD	SD12-09-6		
Site 12	SD	SD-12-07-06		
Site 12	SD	SD12-09-1		
Site 12	SD	SD12-09-2		
Site 12	SD	SD12-09-3		
Site 12	SD	SD12-09-4		
Site 12	SD	SD12-09-5		
Site 12	SD	SD-12-07-04		
Site 12	SD	SD-12-07-03		
Site 12	SD	09-FE-04-DP2	SD12-09-6	
Site 12	SS	S-12-08-04		
Site 12	SS	S-12-08-03		
Site 12	SS	S-12-08-02		
Site 12	SS	SS-12-07-02-0.5		0.5
Site 12	SS	SS-12-07-03-0.5		0.5
Site 12	SS	SS-12-07-04-0.5		0.5
Site 12	SS	SS-12-07-01-0.5		0.5
Site 12	SS	S-12-08-01		
Site 12	SS	07-AP-24-DP	SS-12-07-03-0.5	

ATTACHEMNT A
SAMPLES USED IN THE HUMAN HEALTH RISK ASSESSMENT

Site	Media	Sample ID	Parent Sample ID	Depth
Site 12	WG	S12-PW-11-DP	S12-PW-11-3	
Site 12	WG	G-12-07-MW-02		
Site 12	WG	G-12-07-MW-01		
Site 12	WG	S12-PW-11-2		
Site 12	WG	S12-PW-11-3		
Site 12	WG	S12-PW-11-1		
Site 12	WG	G-12-07-MW-03		
Site 12	WS	07-JN-12-DP3	SW-12-07-04	
Site 12	WS	SW-12-07-04		
Site 12	WS	SW-12-07-01		
Site 12	WS	SW-12-09-3		
Site 12	WS	SW-12-09-1		
Site 12	WS	SW-12-09-2		
Site 12	WS	SW-12-07-03		
Site 12	WS	SW-12-09-4		
Site 12	WS	SW-12-09-5		
Site 12	WS	SW-12-07-06		
Site 12	WS	SW-12-09-6		
Site 12	WS	SW-12-07-05		
Site 12	WS	SW-12-07-02		
Site 13	SB	08-12-02-DP2	S-13-08-07-2-4	4
Site 13	SB	S-13-08-07-2-4		4
Site 13	SB	S-13-09-7-2-4		4
Site 13	SS	S-13-09-4-0-2		2
Site 13	SS	S-13-09-5-0-2		2
Site 13	SS	S-13-09-6-0-2		2
Site 13	SS	S-13-09-7-0-2		2
Site 13	SS	S-13-09-3-0-2		2
Site 13	SS	S-13-08-01-0-2		2
Site 13	SS	S-13-08-02-0-2		2
Site 13	SS	S-13-08-03-0-2		2
Site 13	SS	S-13-08-04-0-2		2
Site 13	SS	S-13-08-05-0-2		2
Site 13	SS	S-13-08-06-0-2		2
Site 13	SS	S-13-08-07-0-2		2
Site 13	SS	S-13-09-1-0-2		2
Site 13	SS	S-13-09-2-0-2		2
Site 13	WG	G-13-09-07		
Site 15	SB	S-15-08-02-2-4		4
Site 15	SB	S-15-08-01-2-4		4
Site 15	SS	S-15-08-01-0-1		1
Site 15	SS	S-15-08-02-0-1		1

ATTACHEMNT A
SAMPLES USED IN THE HUMAN HEALTH RISK ASSESSMENT

Site	Media	Sample ID	Parent Sample ID	Depth
Site 2	SB	SB-03-06-03-(4-8)		8
Site 2	SB	SB-03-06-04-(37-36)		36
Site 2	SB	SB-03-06-03-(20-22)		22
Site 2	SB	SB-03-06-02-(4-8)		8
Site 2	SB	SB-03-06-02-(26-28)		28
Site 2	SB	SB-03-06-01-(4-8)		8
Site 2	SB	SB-03-06-01-(20-24)		24
Site 2	SB	SB-03-06-04-(4-8)		8
Site 2	WG	G-03-07-MW-03A		
Site 2	WG	07-JN-13-DP-3	G-03-07-MW-02	
Site 2	WG	G-03-07-MW-02		
Site 2	WG	G-03-07-MW-03B		
Site 2	WG	G-03-07-MW-01		
Site 2	WG	G-03-07-MW-04B		
Site 2	WG	G-03-07-MW-04A		
Site 3	SB	S-03-08-03-1-2		2
Site 3	SB	08-OC-22-DP1	S-03-08-04-1-2	2
Site 3	SB	S-03-08-01-1-2		2
Site 3	SB	S-03-08-01-2-4		4
Site 3	SB	S-03-08-02-2-4		4
Site 3	SB	S-03-08-04-1-2		2
Site 3	SB	S-03-08-04-2-4		4
Site 3	SB	S-03-08-03-2-4		4
Site 3	SB	S-03-08-02-1-2		2
Site 3	WG	G-03-09-MW-5A		
Site 3	WG	G-03-07-MW-05B		
Site 3	WG	07-JA-09-DP	G-03-07-MW-05B	
Site 3	WG	G-03-07-MW-05A		
Site 4	SS	S-04-08-04-0-2		2
Site 4	SS	S-04-08-05-0-2		2
Site 4	SS	S-04-08-03-0-2		2
Site 4	SS	S-04-08-02-0-2		2
Site 4	SS	S-04-08-01-0-2		2
Site 4	SS	S-04-08-06-0-2		2
Site 4	WG	G-03-08-MW-10A		
Site 4	WG	G-03-08-MW-10B		
Site 4	WG	G-03-09-MW-10B		
Site 4	WG	G-03-09-MW-10A		
Site 4	WG	G-03-07-MW-10A		
Site 4	WG	G-03-07-MW-10B		
Site 5	SB	S-05-08-02-2-4		4
Site 5	SB	S-05-08-01-2-4		4
Site 5	SS	S-05-08-02-1-2		2
Site 5	SS	S-05-08-01-1-2		2

ATTACHEMNT A
SAMPLES USED IN THE HUMAN HEALTH RISK ASSESSMENT

Site	Media	Sample ID	Parent Sample ID	Depth
Site 6	SB	S-6-09-1-2-4		4
Site 6	SB	S-06-08-01-2-4		4
Site 6	SB	S-6-09-3-2-4		4
Site 6	SB	S-06-08-02-2-4		4
Site 6	SB	S-06-08-03-2-4		4
Site 6	SB	S-6-09-2-2-4		4
Site 6	SD	SD-6-09-2		
Site 6	SD	SD-6-09-3		
Site 6	SD	SED-06-08-01		
Site 6	SD	SED-06-08-02		
Site 6	SD	SED-06-08-03		
Site 6	SD	SD-6-09-1		
Site 6	SS	S-6-09-3-0-2		2
Site 6	SS	08-12-02-DP1	S-06-08-03-0-2	2
Site 6	SS	S-6-09-2-0-2		2
Site 6	SS	S-6-09-1-0-2		2
Site 6	SS	S-06-08-03-0-2		2
Site 6	SS	S-06-08-02-0-2		2
Site 6	SS	S-06-08-01-0-2		2
Site 7	SB	S-07-08-01-2-4		4
Site 7	SB	08-OC-23-DP1	S-07-08-01-2-4	4
Site 7	SS	S-07-08-01-0-2		2
Site 7	WG	G-07-09-01		
Site 7	WG	G-03-08-MW-19A		
Site 8	SB	S-08-08-02-1-2		2
Site 8	SB	S-08-08-01-4-6		6
Site 8	SB	S-08-09-02-4-6		6
Site 8	SB	S-08-08-01-2-4		4
Site 8	WG	G-03-08-MW-23		
Site 8	WG	G-03-09-MW-23		
Site 9	SB	S-09-08-02-2-4		4
Site 9	SB	08-OC-21-DP1	S-09-08-03-2-4	4
Site 9	SB	S-09-08-01-4-6		6
Site 9	SB	S-09-08-02-4-6		6
Site 9	SB	S-09-08-03-2-4		4
Site 9	SB	S-09-08-03-4-6		6
Site 9	SB	S-09-08-01-2-4		4

SS = Surface Soil
SB = Subsurface Soil
WG = Groundwater
WS = Surface Water
SD = Sediment

ATTACHMENT B

RIKS-BASED SCREENING FOR INDIVIDUAL SITES

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TABLE 7.2.1.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 1, SWMU 1: OLD HAZARDOUS WASTE CONTAINERS - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 1

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	1.49E-02		5.26E-02		mg/kg	S-01-08-01-0-2	3/4	1.50E-03 - 7.90E-03	5.26E-02	NA	2.00E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	9.70E-03		9.70E-01		mg/kg	S-01-08-01-0-2	4/4	1.60E-03 - 2.90E-02	9.70E-01	NA	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	6.20E-03		5.17E-01		mg/kg	S-01-08-04-0-2	4/4	1.60E-03 - 2.90E-02	5.17E-01	NA	1.70E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.50E-03		1.21E-02		mg/kg	S-01-08-04-0-2	3/4	1.50E-03 - 7.90E-03	1.21E-02	NA	1.60E+00	C	NA	NA	No	BSL
11096-82-5	AROCLOR 1260	6.55E-02		9.11E-02		mg/kg	S-01-08-02-0-2	2/4	3.70E-02 - 4.10E-02	9.11E-02	NA	2.20E-01	C	NA	NA	No	BSL
60-57-1	DIELDRIN	3.30E-03		3.30E-03		mg/kg	S-01-08-01-0-2	1/4	1.50E-03 - 7.90E-03	3.30E-03	NA	3.00E-02	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
208-96-8	ACENAPHTHYLENE	8.41E-03		8.41E-03		mg/kg	S-01-08-04-0-2	1/4	7.30E-03 - 8.20E-03	8.41E-03	NA	3.60E+00	C	NA	NA	No	BSL
120-12-7	ANTHRACENE	2.50E-02	J	2.50E-02	J	mg/kg	S-01-08-04-0-2	1/4	3.60E-02 - 4.10E-02	2.50E-02	NA	1.70E+03	N	NA	NA	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	**9.53E-03**		**2.77E-01**		**mg/kg**	**S-01-08-04-0-2**	**4/4**	**7.30E-03 - 4.10E-02**	**2.77E-01**	**NA**	**1.50E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	**5.36E-02**		**4.21E-01**		**mg/kg**	**S-01-08-04-0-2**	**3/4**	**7.30E-03 - 4.10E-02**	**4.21E-01**	**NA**	**1.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	**9.57E-02**		**4.30E-01**		**mg/kg**	**S-01-08-04-0-2**	**3/4**	**7.30E-03 - 4.10E-02**	**4.30E-01**	**NA**	**1.50E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	2.34E-02		2.85E-01		mg/kg	S-01-08-04-0-2	3/4	7.30E-03 - 4.10E-02	2.85E-01	NA	1.70E+02	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	5.82E-02		3.81E-01		mg/kg	S-01-08-04-0-2	3/4	7.30E-03 - 4.10E-02	3.81E-01	NA	1.50E+00	C	NA	NA	No	BSL
218-01-9	CHRYSENE	4.78E-02		3.66E-01		mg/kg	S-01-08-04-0-2	3/4	7.30E-03 - 4.10E-02	3.66E-01	NA	1.50E+01	C	NA	NA	No	BSL
53-70-3	**DIBENZ(A,H)ANTHRACENE**	**1.66E-02**		**9.30E-02**		**mg/kg**	**S-01-08-04-0-2**	**2/4**	**7.30E-03 - 8.20E-03**	**9.30E-02**	**NA**	**1.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
206-44-0	FLUORANTHENE	3.72E-02		2.69E-01		mg/kg	S-01-08-04-0-2	3/4	3.60E-02 - 4.10E-02	2.69E-01	NA	2.30E+02	N	NA	NA	No	BSL
193-39-5	**INDENO(1,2,3-C,D)PYRENE**	**1.98E-02**		**2.58E-01**		**mg/kg**	**S-01-08-04-0-2**	**3/4**	**7.30E-03 - 4.10E-02**	**2.58E-01**	**NA**	**1.50E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
85-01-8	PHENANTHRENE	1.28E-02		5.49E-02		mg/kg	S-01-08-03-0-2	3/4	7.30E-03 - 8.20E-03	5.49E-02	NA	1.70E+03	N	NA	NA	No	BSL
129-00-0	PYRENE	3.85E-02		3.04E-01		mg/kg	S-01-08-04-0-2	3/4	3.60E-02 - 4.10E-02	3.04E-01	NA	1.70E+02	N	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	5.10E-03	J	1.43E-02		mg/kg	S-01-08-03-0-2	3/4	6.60E-03 - 1.00E-02	1.43E-02	NA	6.10E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, Naphthalene for Acenaphthylene, and Pyrene for Benzo[g,h,i]perylene.

TABLE 7.2.1.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 1, SWMU 1: OLD HAZARDOUS WASTE CONTAINERS - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 1

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	1.49E-02		5.26E-02		mg/kg	S-01-08-01-0-2	3/4	1.50E-03 - 7.90E-03	5.26E-02	NA	7.20E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	9.70E-03		9.70E-01		mg/kg	S-01-08-01-0-2	4/4	1.60E-03 - 2.90E-02	9.70E-01	NA	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	6.20E-03		5.17E-01		mg/kg	S-01-08-04-0-2	4/4	1.60E-03 - 2.90E-02	5.17E-01	NA	7.00E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.50E-03		1.21E-02		mg/kg	S-01-08-04-0-2	3/4	1.50E-03 - 7.90E-03	1.21E-02	NA	6.50E+00	C	NA	NA	No	BSL
11096-82-5	AROCLOR 1260	6.55E-02		9.11E-02		mg/kg	S-01-08-02-0-2	2/4	3.70E-02 - 4.10E-02	9.11E-02	NA	7.40E-01	C	NA	NA	No	BSL
60-57-1	DIELDRIN	3.30E-03		3.30E-03		mg/kg	S-01-08-01-0-2	1/4	1.50E-03 - 7.90E-03	3.30E-03	NA	1.10E-01	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
208-96-8	ACENAPHTHYLENE	8.41E-03		8.41E-03		mg/kg	S-01-08-04-0-2	1/4	7.30E-03 - 8.20E-03	8.41E-03	NA	1.80E+01	C	NA	NA	No	BSL
120-12-7	ANTHRACENE	2.50E-02	J	2.50E-02	J	mg/kg	S-01-08-04-0-2	1/4	3.60E-02 - 4.10E-02	2.50E-02	NA	1.70E+04	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	9.53E-03		2.77E-01		mg/kg	S-01-08-04-0-2	4/4	7.30E-03 - 4.10E-02	2.77E-01	NA	2.10E+00	C	NA	NA	No	BSL
50-32-8	**BENZO(A)PYRENE**	**5.36E-02**		**4.21E-01**		**mg/kg**	**S-01-08-04-0-2**	**3/4**	**7.30E-03 - 4.10E-02**	**4.21E-01**	**NA**	**2.10E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	BENZO(B)FLUORANTHENE	9.57E-02		4.30E-01		mg/kg	S-01-08-04-0-2	3/4	7.30E-03 - 4.10E-02	4.30E-01	NA	2.10E+00	C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	2.34E-02		2.85E-01		mg/kg	S-01-08-04-0-2	3/4	7.30E-03 - 4.10E-02	2.85E-01	NA	1.70E+03	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	5.82E-02		3.81E-01		mg/kg	S-01-08-04-0-2	3/4	7.30E-03 - 4.10E-02	3.81E-01	NA	2.10E+01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	4.78E-02		3.66E-01		mg/kg	S-01-08-04-0-2	3/4	7.30E-03 - 4.10E-02	3.66E-01	NA	2.10E+02	C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	1.66E-02		9.30E-02		mg/kg	S-01-08-04-0-2	2/4	7.30E-03 - 8.20E-03	9.30E-02	NA	2.10E-01	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	3.72E-02		2.69E-01		mg/kg	S-01-08-04-0-2	3/4	3.60E-02 - 4.10E-02	2.69E-01	NA	2.20E+03	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	1.98E-02		2.58E-01		mg/kg	S-01-08-04-0-2	3/4	7.30E-03 - 4.10E-02	2.58E-01	NA	2.10E+00	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	1.28E-02		5.49E-02		mg/kg	S-01-08-03-0-2	3/4	7.30E-03 - 8.20E-03	5.49E-02	NA	1.70E+04	N	NA	NA	No	BSL
129-00-0	PYRENE	3.85E-02		3.04E-01		mg/kg	S-01-08-04-0-2	3/4	3.60E-02 - 4.10E-02	3.04E-01	NA	1.70E+03	N	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	5.10E-03	J	1.43E-02		mg/kg	S-01-08-03-0-2	3/4	6.60E-03 - 1.00E-02	1.43E-02	NA	6.30E+04	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, Naphthalene for Acenaphthylene, and Pyrene for Benzo[g,h,i]perylene.

TABLE 7.2.1.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 1, SWMU 1: OLD HAZARDOUS WASTE CONTAINERS - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 1

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES									
87-86-5	PENTACHLOROPHENOL	3.70E-03		3.70E-03		mg/kg	S-01-08-02-2-4	1/4	2.10E-03 - 2.20E-03	3.70E-03	NA	3.00E+00 C	NA	NA	No	BSL
							PESTICIDES/PCBS									
72-54-8	4,4-DDD	1.80E-03		4.30E-03		mg/kg	S-01-08-03-2-4	2/4	1.60E-03 - 1.70E-03	4.30E-03	NA	2.00E+00 C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.80E-03		2.73E-02	J	mg/kg	S-01-08-01-2-4	2/4	1.60E-03 - 1.70E-03	2.73E-02	NA	1.40E+00 C	NA	NA	No	BSL
50-29-3	4,4-DDT	8.70E-03		9.10E-03	J	mg/kg	S-01-08-01-2-4	2/4	1.60E-03 - 1.70E-03	9.10E-03	NA	1.70E+00 C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.50E-03		2.50E-03		mg/kg	S-01-08-03-2-4	1/4	1.60E-03 - 1.70E-03	2.50E-03	NA	1.60E+00 C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS									
56-55-3	BENZO(A)ANTHRACENE	6.82E-02		6.82E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	6.82E-02	NA	1.50E-01 C	NA	NA	No	BSL
50-32-8	**BENZO(A)PYRENE**	**7.34E-02**		**7.34E-02**		**mg/kg**	**S-01-08-03-2-4**	**1/4**	**8.20E-03 - 8.60E-03**	**7.34E-02**	**NA**	**1.50E-02 C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	BENZO(B)FLUORANTHENE	9.65E-02		9.65E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	9.65E-02	NA	1.50E-01 C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	5.32E-02		5.32E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	5.32E-02	NA	1.70E+02 N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	8.83E-02		8.83E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	8.83E-02	NA	1.50E+00 C	NA	NA	No	BSL
218-01-9	CHRYSENE	6.41E-02		6.41E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	6.41E-02	NA	1.50E+01 C	NA	NA	No	BSL
53-70-3	**DIBENZ(A,H)ANTHRACENE**	**1.83E-02**		**1.83E-02**		**mg/kg**	**S-01-08-03-2-4**	**1/4**	**8.20E-03 - 8.60E-03**	**1.83E-02**	**NA**	**1.50E-02 C**	**NA**	**NA**	**Yes**	**ASL**
206-44-0	FLUORANTHENE	9.31E-02		9.31E-02		mg/kg	S-01-08-03-2-4	1/4	4.10E-02 - 4.30E-02	9.31E-02	NA	2.30E+02 N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	4.84E-02		4.84E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	4.84E-02	NA	1.50E-01 C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	3.13E-02		3.13E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	3.13E-02	NA	1.70E+03 N	NA	NA	No	BSL
129-00-0	PYRENE	8.95E-02		8.95E-02		mg/kg	S-01-08-03-2-4	1/4	4.10E-02 - 4.30E-02	8.95E-02	NA	1.70E+02 N	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS									
75-35-4	1,1-DICHLOROETHENE	6.10E-04	J	6.10E-04	J	mg/kg	S-01-08-01-2-4	1/4	4.20E-03 - 5.30E-03	6.10E-04	NA	2.40E+01 N	NA	NA	No	BSL
67-64-1	ACETONE	2.85E-02		1.34E-01		mg/kg	S-01-08-03-2-4	2/4	8.40E-03 - 1.10E-02	1.34E-01	NA	6.10E+03 N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	1.10E-03	J	1.10E-03	J	mg/kg	S-01-08-01-2-4	1/4	4.20E-03 - 5.30E-03	1.10E-03	NA	8.20E+01 N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, and Pyrene for and Benzo[g,h,i]perylene.

TABLE 7.2.1.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 1, SWMU 1: OLD HAZARDOUS WASTE CONTAINERS - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 1

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES									
87-86-5	PENTACHLOROPHENOL	3.70E-03		3.70E-03		mg/kg	S-01-08-02-2-4	1/4	2.10E-03 - 2.20E-03	3.70E-03	NA	9.00E+00 C	NA	NA	No	BSL
							PESTICIDES/PCBS									
72-54-8	4,4-DDD	1.80E-03		4.30E-03		mg/kg	S-01-08-03-2-4	2/4	1.60E-03 - 1.70E-03	4.30E-03	NA	7.20E+00 C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.80E-03		2.73E-02	J	mg/kg	S-01-08-01-2-4	2/4	1.60E-03 - 1.70E-03	2.73E-02	NA	5.10E+00 C	NA	NA	No	BSL
50-29-3	4,4-DDT	8.70E-03		9.10E-03	J	mg/kg	S-01-08-01-2-4	2/4	1.60E-03 - 1.70E-03	9.10E-03	NA	7.00E+00 C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.50E-03		2.50E-03		mg/kg	S-01-08-03-2-4	1/4	1.60E-03 - 1.70E-03	2.50E-03	NA	6.50E+00 C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS									
56-55-3	BENZO(A)ANTHRACENE	6.82E-02		6.82E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	6.82E-02	NA	2.10E+00 C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	7.34E-02		7.34E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	7.34E-02	NA	2.10E-01 C	NA	NA	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	9.65E-02		9.65E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	9.65E-02	NA	2.10E+00 C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	5.32E-02		5.32E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	5.32E-02	NA	1.70E+03 N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	8.83E-02		8.83E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	8.83E-02	NA	2.10E+01 C	NA	NA	No	BSL
218-01-9	CHRYSENE	6.41E-02		6.41E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	6.41E-02	NA	2.10E+02 C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	1.83E-02		1.83E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	1.83E-02	NA	2.10E-01 C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	9.31E-02		9.31E-02		mg/kg	S-01-08-03-2-4	1/4	4.10E-02 - 4.30E-02	9.31E-02	NA	2.20E+03 N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	4.84E-02		4.84E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	4.84E-02	NA	2.10E+00 C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	3.13E-02		3.13E-02		mg/kg	S-01-08-03-2-4	1/4	8.20E-03 - 8.60E-03	3.13E-02	NA	1.70E+04 N	NA	NA	No	BSL
129-00-0	PYRENE	8.95E-02		8.95E-02		mg/kg	S-01-08-03-2-4	1/4	4.10E-02 - 4.30E-02	8.95E-02	NA	1.70E+03 N	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS									
75-35-4	1,1-DICHLOROETHENE	6.10E-04	J	6.10E-04	J	mg/kg	S-01-08-01-2-4	1/4	4.20E-03 - 5.30E-03	6.10E-04	NA	1.10E+02 N	NA	NA	No	BSL
67-64-1	ACETONE	2.85E-02		1.34E-01		mg/kg	S-01-08-03-2-4	2/4	8.40E-03 - 1.10E-02	1.34E-01	NA	6.30E+04 N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	1.10E-03	J	1.10E-03	J	mg/kg	S-01-08-01-2-4	1/4	4.20E-03 - 5.30E-03	1.10E-03	NA	3.70E+02 N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Anthracene for Phenanthrene, and Pyrene for and Benzo[g,h,i]perylene.

TABLE 7.2.2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 2, SWMU 3: PESTICIDES AND CHEMICALS BURIAL TRENCH - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 2

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7440-38-2	**ARSENIC**	**4.70E+00**	**J**	**6.18E+01**		**mg/kg**	**SB-03-06-03-(4-8)**	**5/8**	**2.30E+00 - 4.50E+01**	**6.18E+01**	**NA**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	8.34E+01	J	8.34E+01	J	mg/kg	SB-03-06-04-(4-8)	1/8	2.30E+01 - 4.50E+02	8.34E+01	NA	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	8.20E-01		8.20E-01		mg/kg	SB-03-06-04-(4-8)	1/8	5.60E-01 - 1.10E+01	8.20E-01	NA	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	1.30E+00		1.80E+00		mg/kg	SB-03-06-01-(4-8)	2/8	5.60E-01 - 1.10E+01	1.80E+00	NA	7.00E+00	N	NA	NA	No	BSL
7440-47-3	**CHROMIUM**	**1.25E+01**	**J**	**1.09E+02**		**mg/kg**	**SB-03-06-03-(4-8)**	**8/8**	**1.10E+00 - 2.30E+01**	**1.09E+02**	**NA**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**9.00E+00**	**J**	**3.77E+01**		**mg/kg**	**SB-03-06-03-(4-8)**	**3/8**	**5.60E+00 - 1.10E+02**	**3.77E+01**	**NA**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.10E+01	J	5.44E+01		mg/kg	SB-03-06-03-(4-8)	7/8	2.80E+00 - 5.70E+01	5.44E+01	NA	3.10E+02	N	NA	NA	No	BSL
7439-92-1	LEAD	4.50E+00	J	9.30E+00		mg/kg	SB-03-06-03-(4-8)	4/8	2.30E+00 - 4.50E+01	9.30E+00	NA	4.00E+02	N	NA	NA	No	BSL
7439-97-6	MERCURY	4.60E-02		3.80E-01	J	mg/kg	SB-03-06-01-(4-8)	6/8	3.60E-02 - 4.20E-02	3.80E-01	NA	5.60E-01	N	NA	NA	No	BSL
7440-02-0	NICKEL	5.30E+00	J	3.98E+01		mg/kg	SB-03-06-03-(4-8)	5/8	4.50E+00 - 9.10E+01	3.98E+01	NA	1.50E+02	N	NA	NA	No	BSL
7782-49-2	SELENIUM	4.40E+00		4.40E+00		mg/kg	SB-03-06-01-(4-8)	1/8	2.30E+00 - 4.50E+01	4.40E+00	NA	3.90E+01	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**2.34E+01**	**J**	**2.02E+02**	**J**	**mg/kg**	**SB-03-06-02-(4-8)**	**7/8**	**5.60E+00 - 1.10E+02**	**2.02E+02**	**NA**	**5.50E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.64E+01		8.87E+01		mg/kg	SB-03-06-03-(20-22)	8/8	2.30E+00 - 4.50E+01	8.87E+01	NA	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-55-9	4,4-DDE	2.80E-03		2.80E-03		mg/kg	SB-03-06-04-(4-8)	1/8	1.50E-03 - 1.70E-03	2.80E-03	NA	1.40E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
91-57-6	2-METHYLNAPHTHALENE	1.63E+00		1.63E+00		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-02	1.63E+00	NA	3.10E+01	N	NA	NA	No	BSL
83-32-9	ACENAPHTHENE	5.34E-02	J	5.34E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	5.34E-02	NA	3.40E+02	N	NA	NA	No	BSL
120-12-7	ANTHRACENE	3.92E-02	J	3.92E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	3.92E-02	NA	1.70E+03	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	2.91E-02		2.91E-02		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-03	2.91E-02	NA	1.50E-01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.91E-02	J	1.91E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-03	1.91E-02	NA	1.50E+01	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	9.09E-02		9.09E-02		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	9.09E-02	NA	2.30E+02	N	NA	NA	No	BSL
86-73-7	FLUORENE	1.45E-01		1.45E-01		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	1.45E-01	NA	2.30E+02	N	NA	NA	No	BSL
91-20-3	NAPHTHALENE	1.51E+00		1.51E+00		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-02	1.51E+00	NA	3.60E+00	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	8.33E-02	J	8.33E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-03	8.33E-02	NA	1.70E+03	N	NA	NA	No	BSL
129-00-0	PYRENE	7.36E-02	J	7.36E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	7.36E-02	NA	1.70E+02	N	NA	NA	No	BSL
							SEMI-VOLATILE ORGANIC COMPOUNDS										
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	7.09E-02	J	7.23E-02	J	mg/kg	SB-03-06-03-(4-8)	3/8	7.70E-02 - 8.90E-02	7.23E-02	NA	3.50E+01	C	NA	NA	No	BSL
132-64-9	DIBENZOFURAN	3.04E-02	J	3.04E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	3.04E-02	NA	7.80E+00	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.65E+01		1.36E+02		mg/kg	SB-03-06-04-(4-8)	2/8	7.70E+00 - 8.70E+00	1.36E+02	NA	NA		NA	NA	No	NSL
TPH-GRO	TPH-GRO (C6-C10)	5.15E+02		5.15E+02		mg/kg	SB-03-06-04-(4-8)	1/8	1.30E+01 - 1.70E+01	5.15E+02	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	1.25E-02		1.25E-02		mg/kg	SB-03-06-02-(4-8)	1/5	6.60E-03 - 1.10E-02	1.25E-02	NA	6.10E+03	N	NA	NA	No	BSL
71-43-2	BENZENE	1.04E+00		1.04E+00		mg/kg	SB-03-06-04-(4-8)	1/8	6.60E-04 - 1.00E-01	1.04E+00	NA	1.10E+00	C	NA	NA	No	BSL
100-41-4	**ETHYLBENZENE**	**1.86E+01**		**1.86E+01**		**mg/kg**	**SB-03-06-04-(4-8)**	**1/8**	**6.60E-04 - 1.00E-01**	**1.86E+01**	**NA**	**5.40E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
78-83-1	ISOBUTYL ALCOHOL	6.51E+01		6.51E+01		mg/kg	SB-03-06-04-(4-8)	1/1	5.20E+00 - 5.20E+00	6.51E+01	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Anthracene for Phenanthrene.

TABLE 7.2.2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 2, SWMU 3: PESTICIDES AND CHEMICALS BURIAL TRENCH - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 2

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7440-38-2	**ARSENIC**	**4.70E+00**	**J**	**6.18E+01**		**mg/kg**	**SB-03-06-03-(4-8)**	**5/8**	**2.30E+00 - 4.50E+01**	**6.18E+01**	**NA**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	8.34E+01	J	8.34E+01	J	mg/kg	SB-03-06-04-(4-8)	1/8	2.30E+01 - 4.50E+02	8.34E+01	NA	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	8.20E-01		8.20E-01		mg/kg	SB-03-06-04-(4-8)	1/8	5.60E-01 - 1.10E+01	8.20E-01	NA	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	1.30E+00		1.80E+00		mg/kg	SB-03-06-01-(4-8)	2/8	5.60E-01 - 1.10E+01	1.80E+00	NA	8.00E+01	N	NA	NA	No	BSL
7440-47-3	**CHROMIUM**	**1.25E+01**	**J**	**1.09E+02**		**mg/kg**	**SB-03-06-03-(4-8)**	**8/8**	**1.10E+00 - 2.30E+01**	**1.09E+02**	**NA**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**9.00E+00**	**J**	**3.77E+01**		**mg/kg**	**SB-03-06-03-(4-8)**	**3/8**	**5.60E+00 - 1.10E+02**	**3.77E+01**	**NA**	**3.00E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.10E+01	J	5.44E+01		mg/kg	SB-03-06-03-(4-8)	7/8	2.80E+00 - 5.70E+01	5.44E+01	NA	4.10E+03	N	NA	NA	No	BSL
7439-92-1	LEAD	4.50E+00	J	9.30E+00		mg/kg	SB-03-06-03-(4-8)	4/8	2.30E+00 - 4.50E+01	9.30E+00	NA	8.00E+02	N	NA	NA	No	BSL
7439-97-6	MERCURY	4.60E-02		3.80E-01	J	mg/kg	SB-03-06-01-(4-8)	6/8	3.60E-02 - 4.20E-02	3.80E-01	NA	3.40E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	5.30E+00	J	3.98E+01		mg/kg	SB-03-06-03-(4-8)	5/8	4.50E+00 - 9.10E+01	3.98E+01	NA	2.00E+03	N	NA	NA	No	BSL
7782-49-2	SELENIUM	4.40E+00		4.40E+00		mg/kg	SB-03-06-01-(4-8)	1/8	2.30E+00 - 4.50E+01	4.40E+00	NA	5.10E+02	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**2.34E+01**	**J**	**2.02E+02**	**J**	**mg/kg**	**SB-03-06-02-(4-8)**	**7/8**	**5.60E+00 - 1.10E+02**	**2.02E+02**	**NA**	**7.20E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.64E+01		8.87E+01		mg/kg	SB-03-06-03-(20-22)	8/8	2.30E+00 - 4.50E+01	8.87E+01	NA	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-55-9	4,4-DDE	2.80E-03		2.80E-03		mg/kg	SB-03-06-04-(4-8)	1/8	1.50E-03 - 1.70E-03	2.80E-03	NA	5.10E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
91-57-6	2-METHYLNAPHTHALENE	1.63E+00		1.63E+00		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-02	1.63E+00	NA	4.10E+02	N	NA	NA	No	BSL
83-32-9	ACENAPHTHENE	5.34E-02	J	5.34E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	5.34E-02	NA	3.30E+03	N	NA	NA	No	BSL
120-12-7	ANTHRACENE	3.92E-02	J	3.92E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	3.92E-02	NA	1.70E+04	N	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	2.91E-02		2.91E-02		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-03	2.91E-02	NA	2.10E+00	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.91E-02	J	1.91E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-03	1.91E-02	NA	2.10E+02	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	9.09E-02		9.09E-02		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	9.09E-02	NA	2.20E+03	N	NA	NA	No	BSL
86-73-7	FLUORENE	1.45E-01		1.45E-01		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	1.45E-01	NA	2.20E+03	N	NA	NA	No	BSL
91-20-3	NAPHTHALENE	1.51E+00		1.51E+00		mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-02	1.51E+00	NA	1.80E+01	C	NA	NA	No	BSL
85-01-8	PHENANTHRENE	8.33E-02	J	8.33E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-03 - 8.90E-03	8.33E-02	NA	1.70E+04	N	NA	NA	No	BSL
129-00-0	PYRENE	7.36E-02	J	7.36E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	7.36E-02	NA	1.70E+03	N	NA	NA	No	BSL
							SEMI-VOLATILE ORGANIC COMPOUNDS										
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	7.09E-02	J	7.23E-02	J	mg/kg	SB-03-06-03-(4-8)	3/8	7.70E-02 - 8.90E-02	7.23E-02	NA	1.20E+02	C	NA	NA	No	BSL
132-64-9	DIBENZOFURAN	3.04E-02	J	3.04E-02	J	mg/kg	SB-03-06-04-(4-8)	1/8	7.70E-02 - 8.90E-02	3.04E-02	NA	1.00E+02	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.65E+01		1.36E+02		mg/kg	SB-03-06-04-(4-8)	2/8	7.70E+00 - 8.70E+00	1.36E+02	NA	NA		NA	NA	No	NSL
TPH-GRO	TPH-GRO (C6-C10)	5.15E+02		5.15E+02		mg/kg	SB-03-06-04-(4-8)	1/8	1.30E+01 - 1.70E+01	5.15E+02	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	1.25E-02		1.25E-02		mg/kg	SB-03-06-02-(4-8)	1/5	6.60E-03 - 1.10E-02	1.25E-02	NA	6.30E+04	N	NA	NA	No	BSL
71-43-2	BENZENE	1.04E+00		1.04E+00		mg/kg	SB-03-06-04-(4-8)	1/8	6.60E-04 - 1.00E-01	1.04E+00	NA	5.40E+00	C	NA	NA	No	BSL
100-41-4	ETHYLBENZENE	1.86E+01		1.86E+01		mg/kg	SB-03-06-04-(4-8)	1/8	6.60E-04 - 1.00E-01	1.86E+01	NA	2.70E+01	C	NA	NA	No	BSL
78-83-1	ISOBUTYL ALCOHOL	6.51E+01		6.51E+01		mg/kg	SB-03-06-04-(4-8)	1/1	5.20E+00 - 5.20E+00	6.51E+01	NA	3.10E+04	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Anthracene for Phenanthrene.

TABLE 7.2.2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 2, SWMU 3: PESTICIDES AND CHEMICALS BURIAL TRENCH - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 2

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-DISSOLVED										
7440-39-3	BARIUM	3.24E+02		4.50E+02		ug/L	G-03-07-MW-04B	2/6	2.00E+02 - 2.00E+02	4.50E+02	NA	7.30E+02	N	NA	NA	No	BSL
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	2.35E+02		3.40E+03		ug/L	G-03-07-MW-04A	2/4	2.00E+02 - 2.00E+02	3.40E+03	NA	3.70E+03	N	NA	NA	No	BSL
7440-39-3	BARIUM	3.13E+02		4.42E+02		ug/L	G-03-07-MW-04B	2/6	2.00E+02 - 2.00E+02	4.42E+02	NA	7.30E+02	N	NA	NA	No	BSL
7440-70-2	CALCIUM	1.04E+05		1.71E+05		ug/L	G-03-07-MW-03A	4/4	5.00E+03 - 5.00E+03	1.71E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.98E+01**		**1.98E+01**		**ug/L**	**G-03-07-MW-03A**	**1/6**	**1.00E+01 - 1.00E+01**	**1.98E+01**	**NA**	**4.30E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7439-89-6	IRON	3.26E+02		3.45E+03		ug/L	G-03-07-MW-04A	4/4	1.00E+02 - 1.00E+02	3.45E+03	NA	2.60E+03	N	NA	NA	No	NUT
7439-95-4	MAGNESIUM	1.00E+04		2.52E+04		ug/L	G-03-07-MW-04B	4/4	5.00E+03 - 5.00E+03	2.52E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**2.86E+01**		**1.35E+02**		**ug/L**	**G-03-07-MW-04B**	**4/4**	**1.50E+01 - 1.50E+01**	**1.35E+02**	**NA**	**8.80E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	**MERCURY**	**3.30E-01**		**1.40E+00**		**ug/L**	**G-03-07-MW-01**	**3/6**	**2.00E-01 - 2.00E-01**	**1.40E+00**	**NA**	**5.70E-02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-23-5	SODIUM	2.54E+04		2.79E+04		ug/L	G-03-07-MW-04B / G-03-	4/4	1.00E+04 - 1.00E+04	2.79E+04	NA	NA		NA	NA	No	NUT
							POLYCYCLIC AROMATIC HYDROCARBONS										
91-20-3	**NAPHTHALENE**	**1.51E+00**		**1.51E+00**		**ug/L**	**G-03-07-MW-04B**	**1/6**	**2.00E-01 - 2.10E-01**	**1.51E+00**	**NA**	**1.40E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
							SEMI-VOLATILE ORGANIC COMPOUNDS										
95-50-1	1,2-DICHLOROBENZENE	8.10E-01	J	8.10E-01	J	ug/L	G-03-07-MW-04A	1/4	2.00E+00 - 2.10E+00	8.10E-01	NA	3.70E+01	N	NA	NA	No	BSL
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	2.90E+00		2.90E+00		ug/L	G-03-07-MW-02	1/6	2.00E+00 - 2.10E+00	2.90E+00	NA	4.80E+00	C	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS										
71-43-2	**BENZENE**	**4.90E-01**	**J**	**7.30E-01**	**J / J**	**ug/L**	**G-03-07-MW-04A**	**2/6**	**1.00E+00 - 1.00E+00**	**7.30E-01**	**NA**	**4.10E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
100-41-4	**ETHYLBENZENE**	**4.40E-01**	**J**	**2.15E+00**	**J /**	**ug/L**	**G-03-07-MW-04B**	**2/6**	**1.00E+00 - 1.00E+00**	**2.15E+00**	**NA**	**1.50E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.

(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE 7.2.3.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 3, SWMU 4: SPENT SOLVENTS STORAGE AREA - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES										
120-36-5	DICHLORPROP	1.17E-01		1.17E-01		mg/kg	S-03-08-03-1-2	1/8	1.80E-02 - 2.20E-02	1.17E-01	NA	NA		NA	NA	No	NSL
87-86-5	PENTACHLOROPHENOL	2.45E-02		5.78E-02		mg/kg	S-03-08-01-2-4	2/8	1.80E-03 - 1.00E-02	5.78E-02	NA	3.00E+00	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	**ALUMINUM**	**1.80E+04**	**J**	**3.22E+04**	**J**	**mg/kg**	**S-03-08-01-2-4**	**8/8**	**2.10E+01 - 2.70E+01**	**3.22E+04**	**NA**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	4.70E-01	J	1.20E+00	J	mg/kg	S-03-08-02-2-4	5/8	2.10E+00 - 7.60E+00	1.20E+00	NA	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.60E+00**		**1.22E+02**		**mg/kg**	**S-03-08-03-2-4**	**8/8**	**3.20E-01 - 3.50E+00**	**1.22E+02**	**NA**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	5.30E+00	J	1.42E+02		mg/kg	S-03-08-01-2-4	8/8	2.10E+01 - 2.70E+01	1.42E+02	NA	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	9.70E-02	J	4.10E-01	J	mg/kg	S-03-08-04-2-4	6/8	5.30E-01 - 5.80E+00	4.10E-01	NA	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	8.50E-02	J	8.00E-01	J	mg/kg	S-03-08-01-2-4	8/8	5.30E-01 - 1.90E+00	8.00E-01	NA	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	9.91E+02		1.34E+04		mg/kg	S-03-08-03-1-2	8/8	5.30E+02 - 6.80E+02	1.34E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**4.07E+01**		**1.67E+02**		**mg/kg**	**S-03-08-02-2-4**	**8/8**	**1.10E+00 - 1.20E+01**	**1.67E+02**	**NA**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**1.30E+00**	**J**	**4.53E+01**		**mg/kg**	**S-03-08-01-2-4**	**8/8**	**5.30E+00 - 6.80E+00**	**4.53E+01**	**NA**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	4.50E+01	J / J	7.33E+01	J	mg/kg	S-03-08-01-2-4	8/8	2.60E+00 - 9.50E+00	7.33E+01	NA	3.10E+02	N	NA	NA	No	BSL
7439-89-6	IRON	3.24E+04		9.53E+04		mg/kg	S-03-08-02-2-4	8/8	1.10E+01 - 3.80E+01	9.53E+04	NA	5.50E+03	N	NA	NA	No	NUT
7439-92-1	LEAD	4.90E+00		1.99E+01		mg/kg	S-03-08-01-2-4	8/8	2.10E+00 - 2.30E+01	1.99E+01	NA	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.60E+02	J	1.01E+04		mg/kg	S-03-08-02-1-2	8/8	5.30E+02 - 6.80E+02	1.01E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.61E+02**	**J**	**1.28E+04**	**J**	**mg/kg**	**S-03-08-01-1-2**	**8/8**	**1.60E+00 - 1.80E+01**	**1.28E+04**	**NA**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	1.40E-02	J	2.00E-01		mg/kg	S-03-08-02-2-4	7/8	3.30E-02 - 4.10E-02	2.00E-01	NA	5.60E-01	N	NA	NA	No	BSL
7440-02-0	NICKEL	9.60E+00		3.62E+01		mg/kg	S-03-08-02-1-2	8/8	4.20E+00 - 1.50E+01	3.62E+01	NA	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.63E+02	J	7.75E+02	J	mg/kg	S-03-08-03-1-2	8/8	1.10E+03 - 1.40E+03	7.75E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	7.80E-01		3.70E+00		mg/kg	S-03-08-02-2-4	7/8	5.30E-01 - 5.80E+00	3.70E+00	NA	3.90E+01	N	NA	NA	No	BSL
7440-22-4	SILVER	1.10E+00		3.00E+00		mg/kg	S-03-08-02-2-4	7/8	1.10E+00 - 3.80E+00	3.00E+00	NA	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	7.16E+01	J	6.15E+02	J	mg/kg	S-03-08-03-1-2	8/8	1.10E+03 - 1.40E+03	6.15E+02	NA	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	5.75E-01	J / J	4.00E+00	J	mg/kg	S-03-08-01-1-2	7/8	1.10E+00 - 1.20E+01	4.00E+00	NA	NA		NA	NA	No	NSL
7440-31-5	TIN	2.50E+00	J	4.50E+00	J	mg/kg	S-03-08-02-1-2	8/8	5.30E+00 - 6.80E+00	4.50E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**8.24E+01**		**2.91E+02**		**mg/kg**	**S-03-08-02-2-4**	**8/8**	**1.10E+00 - 3.80E+00**	**2.91E+02**	**NA**	**5.50E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	3.18E+01		7.22E+01		mg/kg	S-03-08-01-1-2	8/8	2.10E+00 - 7.60E+00	7.22E+01	NA	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	9.27E-02		9.27E-02		mg/kg	S-03-08-02-1-2	1/8	1.50E-03 - 5.20E-03	9.27E-02	NA	2.00E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	1.61E-02		1.61E-02		mg/kg	S-03-08-02-1-2	1/8	1.50E-03 - 5.20E-03	1.61E-02	NA	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	3.70E-03		2.41E-02		mg/kg	S-03-08-02-1-2	3/8	1.50E-03 - 5.20E-03	2.41E-02	NA	1.70E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.40E-03		2.21E-01		mg/kg	S-03-08-03-1-2	3/8	1.50E-03 - 1.50E-02	2.21E-01	NA	1.60E+00	C	NA	NA	No	BSL
60-57-1	DIELDRIN	9.00E-03		9.00E-03		mg/kg	S-03-08-03-1-2	1/8	1.50E-03 - 5.20E-03	9.00E-03	NA	3.00E-02	C	NA	NA	No	BSL
959-98-8	ENDOSULFAN I	2.60E-03		2.60E-03		mg/kg	S-03-08-02-1-2	1/8	1.50E-03 - 5.20E-03	2.60E-03	NA	3.70E+01	N	NA	NA	No	BSL
76-44-8	HEPTACHLOR	6.29E-02		6.29E-02		mg/kg	S-03-08-03-1-2	1/8	1.50E-03 - 5.20E-03	6.29E-02	NA	1.10E-01	C	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.87E+01		1.87E+01		mg/kg	S-03-08-02-1-2	1/8	7.20E+00 - 8.50E+00	1.87E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	5.40E-03	J	2.39E-02		mg/kg	S-03-08-02-1-2	2/8	5.40E-03 - 1.30E-02	2.39E-02	NA	6.10E+03	N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	4.30E-04	J	4.30E-04	J	mg/kg	S-03-08-02-1-2	1/8	2.70E-03 - 6.60E-03	4.30E-04	NA	8.20E+01	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, and Endosulfan for Endosulfan I.

TABLE 7.2.3.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 3, SWMU 4: SPENT SOLVENTS STORAGE AREA - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES										
120-36-5	DICHLORPROP	1.17E-01		1.17E-01		mg/kg	S-03-08-03-1-2	1/8	1.80E-02 - 2.20E-02	1.17E-01	NA	NA		NA	NA	No	NSL
87-86-5	PENTACHLOROPHENOL	2.45E-02		5.78E-02		mg/kg	S-03-08-01-2-4	2/8	1.80E-03 - 1.00E-02	5.78E-02	NA	9.00E+00	C	NA	NA	No	BSL
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	1.80E+04	J	3.22E+04	J	mg/kg	S-03-08-01-2-4	8/8	2.10E+01 - 2.70E+01	3.22E+04	NA	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	4.70E-01	J	1.20E+00	J	mg/kg	S-03-08-02-2-4	5/8	2.10E+00 - 7.60E+00	1.20E+00	NA	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.60E+00**		**1.22E+02**		**mg/kg**	**S-03-08-03-2-4**	**8/8**	**3.20E-01 - 3.50E+00**	**1.22E+02**	**NA**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	5.30E+00	J	1.42E+02		mg/kg	S-03-08-01-2-4	8/8	2.10E+01 - 2.70E+01	1.42E+02	NA	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	9.70E-02	J	4.10E-01	J	mg/kg	S-03-08-04-2-4	6/8	5.30E-01 - 5.80E+00	4.10E-01	NA	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	8.50E-02	J	8.00E-01	J	mg/kg	S-03-08-01-2-4	8/8	5.30E-01 - 1.90E+00	8.00E-01	NA	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	9.91E+02		1.34E+04		mg/kg	S-03-08-03-1-2	8/8	5.30E+02 - 6.80E+02	1.34E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**4.07E+01**		**1.67E+02**		**mg/kg**	**S-03-08-02-2-4**	**8/8**	**1.10E+00 - 1.20E+01**	**1.67E+02**	**NA**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**1.30E+00**	**J**	**4.53E+01**		**mg/kg**	**S-03-08-01-2-4**	**8/8**	**5.30E+00 - 6.80E+00**	**4.53E+01**	**NA**	**3.00E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	4.50E+01	J / J	7.33E+01	J	mg/kg	S-03-08-01-2-4	8/8	2.60E+00 - 9.50E+00	7.33E+01	NA	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	3.24E+04		9.53E+04		mg/kg	S-03-08-02-2-4	8/8	1.10E+01 - 3.80E+01	9.53E+04	NA	7.20E+04	N	NA	NA	No	NUT
7439-92-1	LEAD	4.90E+00		1.99E+01		mg/kg	S-03-08-01-2-4	8/8	2.10E+00 - 2.30E+01	1.99E+01	NA	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.60E+02	J	1.01E+04		mg/kg	S-03-08-02-1-2	8/8	5.30E+02 - 6.80E+02	1.01E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.61E+02**	**J**	**1.28E+04**	**J**	**mg/kg**	**S-03-08-01-1-2**	**8/8**	**1.60E+00 - 1.80E+01**	**1.28E+04**	**NA**	**2.30E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	1.40E-02	J	2.00E-01		mg/kg	S-03-08-02-2-4	7/8	3.30E-02 - 4.10E-02	2.00E-01	NA	3.40E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	9.60E+00		3.62E+01		mg/kg	S-03-08-02-1-2	8/8	4.20E+00 - 1.50E+01	3.62E+01	NA	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.63E+02	J	7.75E+02	J	mg/kg	S-03-08-03-1-2	8/8	1.10E+03 - 1.40E+03	7.75E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	7.80E-01		3.70E+00		mg/kg	S-03-08-02-2-4	7/8	5.30E-01 - 5.80E+00	3.70E+00	NA	5.10E+02	N	NA	NA	No	BSL
7440-22-4	SILVER	1.10E+00		3.00E+00		mg/kg	S-03-08-02-2-4	7/8	1.10E+00 - 3.80E+00	3.00E+00	NA	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	7.16E+01	J	6.15E+02	J	mg/kg	S-03-08-03-1-2	8/8	1.10E+03 - 1.40E+03	6.15E+02	NA	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	5.75E-01	J / J	4.00E+00	J	mg/kg	S-03-08-01-1-2	7/8	1.10E+00 - 1.20E+01	4.00E+00	NA	NA		NA	NA	No	NSL
7440-31-5	TIN	2.50E+00	J	4.50E+00	J	mg/kg	S-03-08-02-1-2	8/8	5.30E+00 - 6.80E+00	4.50E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**8.24E+01**		**2.91E+02**		**mg/kg**	**S-03-08-02-2-4**	**8/8**	**1.10E+00 - 3.80E+00**	**2.91E+02**	**NA**	**7.20E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	3.18E+01		7.22E+01		mg/kg	S-03-08-01-1-2	8/8	2.10E+00 - 7.60E+00	7.22E+01	NA	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	9.27E-02		9.27E-02		mg/kg	S-03-08-02-1-2	1/8	1.50E-03 - 5.20E-03	9.27E-02	NA	7.20E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	1.61E-02		1.61E-02		mg/kg	S-03-08-02-1-2	1/8	1.50E-03 - 5.20E-03	1.61E-02	NA	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	3.70E-03		2.41E-02		mg/kg	S-03-08-02-1-2	3/8	1.50E-03 - 5.20E-03	2.41E-02	NA	7.00E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	2.40E-03		2.21E-01		mg/kg	S-03-08-03-1-2	3/8	1.50E-03 - 1.50E-02	2.21E-01	NA	6.50E+00	C	NA	NA	No	BSL
60-57-1	DIELDRIN	9.00E-03		9.00E-03		mg/kg	S-03-08-03-1-2	1/8	1.50E-03 - 5.20E-03	9.00E-03	NA	1.10E-01	C	NA	NA	No	BSL
959-98-8	ENDOSULFAN I	2.60E-03		2.60E-03		mg/kg	S-03-08-02-1-2	1/8	1.50E-03 - 5.20E-03	2.60E-03	NA	3.70E+02	N	NA	NA	No	BSL
76-44-8	HEPTACHLOR	6.29E-02		6.29E-02		mg/kg	S-03-08-03-1-2	1/8	1.50E-03 - 5.20E-03	6.29E-02	NA	3.80E-01	C	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.87E+01		1.87E+01		mg/kg	S-03-08-02-1-2	1/8	7.20E+00 - 8.50E+00	1.87E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	5.40E-03	J	2.39E-02		mg/kg	S-03-08-02-1-2	2/8	5.40E-03 - 1.30E-02	2.39E-02	NA	6.30E+04	N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	4.30E-04	J	4.30E-04	J	mg/kg	S-03-08-02-1-2	1/8	2.70E-03 - 6.60E-03	4.30E-04	NA	3.70E+02	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, and Endosulfan for Endosulfan I.

TABLE 7.2.3.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 3, SWMU 4: SPENT SOLVENTS STORAGE AREA - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7440-70-2	CALCIUM	1.18E+05		1.35E+05		ug/L	G-03-07-MW-05A	2/2	5.00E+03 - 5.00E+03	1.35E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.05E+01**		**1.05E+01**		**ug/L**	**G-03-07-MW-05B**	**1/2**	**1.00E+01 - 1.00E+01**	**1.05E+01**	**NA**	**4.30E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7439-89-6	IRON	2.24E+02		2.24E+02		ug/L	G-03-07-MW-05A	1/1	1.00E+02 - 1.00E+02	2.24E+02	NA	2.60E+03	N	NA	NA	No	NUT
7439-95-4	MAGNESIUM	5.89E+03		2.82E+04		ug/L	G-03-07-MW-05B	2/2	5.00E+03 - 5.00E+03	2.82E+04	NA	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	1.92E+01		7.99E+01		ug/L	G-03-07-MW-05B	2/2	1.50E+01 - 1.50E+01	7.99E+01	NA	8.80E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	1.72E+04		3.90E+04		ug/L	G-03-07-MW-05B	2/2	1.00E+04 - 1.00E+04	3.90E+04	NA	NA		NA	NA	No	NUT
							POLYCYCLIC AROMATIC HYDROCARBONS										
91-20-3	**NAPHTHALENE**	**7.96E-01**		**7.96E-01**		**ug/L**	**G-03-07-MW-05B**	**1/2**	**2.00E-01 - 2.00E-01**	**7.96E-01**	**NA**	**1.40E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
							SEMI-VOLATILE ORGANIC COMPOUNDS										
95-50-1	1,2-DICHLOROBENZENE	4.40E+00		4.40E+00		ug/L	G-03-07-MW-05B	1/2	2.00E+00 - 2.00E+00	4.40E+00	NA	3.70E+01	N	NA	NA	No	BSL
106-46-7	**1,4-DICHLOROBENZENE**	**1.50E+00**	**J**	**1.50E+00**	**J**	**ug/L**	**G-03-07-MW-05B**	**1/2**	**2.00E+00 - 2.00E+00**	**1.50E+00**	**NA**	**4.30E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
							VOLATILE ORGANIC COMPOUNDS										
67-66-3	**CHLOROFORM**	**3.10E-01**	**J**	**3.10E-01**	**J**	**ug/L**	**G-03-09-MW-5A**	**1/3**	**1.00E+00 - 1.00E+00**	**3.10E-01**	**NA**	**1.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
79-01-6	**TRICHLOROETHENE**	**3.80E+00**		**5.50E+00**		**ug/L**	**G-03-09-MW-5A**	**2/3**	**1.00E+00 - 1.00E+00**	**5.50E+00**	**NA**	**2.00E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.

(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE 7.2.6.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 6: PESTICIDE STORAGE AREA - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 6

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES									
87-86-5	PENTACHLOROPHENOL	2.00E-03		5.15E-03		mg/kg	S-06-08-03-0-2	3/3	1.90E-03 - 1.95E-03	5.15E-03	NA	3.00E+00 C	NA	NA	No	BSL
							PESTICIDES/PCBS									
72-54-8	4,4-DDD	1.70E-03		1.70E-03		mg/kg	S-06-08-01-0-2	1/3	1.50E-03 - 1.60E-03	1.70E-03	NA	2.00E+00 C	NA	NA	No	BSL
72-55-9	4,4-DDE	9.80E-03		9.80E-03		mg/kg	S-06-08-01-0-2	1/3	1.50E-03 - 1.60E-03	9.80E-03	NA	1.40E+00 C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	6.70E-03		6.70E-03		mg/kg	S-06-08-03-0-2	1/3	1.50E-03 - 1.60E-03	6.70E-03	NA	1.60E+00 C	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Surrogates used: Chlordane for Alpha-Chlordane.

TABLE 7.2.6.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 6: PESTICIDE STORAGE AREA - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 6

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES									
87-86-5	PENTACHLOROPHENOL	2.00E-03		5.15E-03		mg/kg	S-06-08-03-0-2	3/3	1.90E-03 - 1.95E-03	5.15E-03	NA	9.00E+00 C	NA	NA	No	BSL
							PESTICIDES/PCBS									
72-54-8	4,4-DDD	1.70E-03		1.70E-03		mg/kg	S-06-08-01-0-2	1/3	1.50E-03 - 1.60E-03	1.70E-03	NA	7.20E+00 C	NA	NA	No	BSL
72-55-9	4,4-DDE	9.80E-03		9.80E-03		mg/kg	S-06-08-01-0-2	1/3	1.50E-03 - 1.60E-03	9.80E-03	NA	5.10E+00 C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	6.70E-03		6.70E-03		mg/kg	S-06-08-03-0-2	1/3	1.50E-03 - 1.60E-03	6.70E-03	NA	6.50E+00 C	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Surrogates used: Chlordane for Alpha-Chlordane.

TABLE 7.2.6.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 6: PESTICIDE STORAGE AREA - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 6

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES									
87-86-5	PENTACHLOROPHENOL	8.50E-03		1.40E-02		mg/kg	S-06-08-01-2-4	2/3	2.00E-03 - 2.20E-03	1.40E-02	NA	3.00E+00 C	NA	NA	No	BSL
							PESTICIDES/PCBS									
5103-71-9	ALPHA-CHLORDANE	1.68E-02		1.68E-02		mg/kg	S-06-08-03-2-4	1/3	1.60E-03 - 1.70E-03	1.68E-02	NA	1.60E+00 C	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Surrogates used: Chlordane for Alpha-Chlordane.

TABLE 7.2.6.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 6: PESTICIDE STORAGE AREA - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 6

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
HERBICIDES																
87-86-5	PENTACHLOROPHENOL	8.50E-03		1.40E-02		mg/kg	S-06-08-01-2-4	2/3	2.00E-03 - 2.20E-03	1.40E-02	NA	9.00E+00 C	NA	NA	No	BSL
PESTICIDES/PCBS																
5103-71-9	ALPHA-CHLORDANE	1.68E-02		1.68E-02		mg/kg	S-06-08-03-2-4	1/3	1.60E-03 - 1.70E-03	1.68E-02	NA	6.50E+00 C	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Surrogates used: Chlordane for Alpha-Chlordane.

TABLE 7.2.6.5
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 6: PESTICIDE STORAGE AREA - SEDIMENT - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Site 6

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							PESTICIDES/PCBS									
72-55-9	4,4-DDE	6.90E-03		6.90E-03		mg/kg	SED-06-08-03	1/3	1.90E-03 - 3.50E-03	6.90E-03	NA	1.40E+01 C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	1.65E-02		6.90E-02		mg/kg	SED-06-08-03	2/3	1.90E-03 - 3.50E-03	6.90E-02	NA	1.60E+01 C	NA	NA	No	BSL
1024-57-3	HEPTACHLOR EPOXIDE	4.10E-03		4.10E-03		mg/kg	SED-06-08-03	1/3	1.90E-03 - 3.50E-03	4.10E-03	NA	5.30E-01 C	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value. The resulting values have been increased by a factor of ten to account for reduced sediment exposures.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Surrogates used: Chlordane for Alpha-Chlordane.

TABLE 7.2.6.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 6: PESTICIDE STORAGE AREA - SEDIMENT - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Site 6

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
PESTICIDES/PCBS																	
72-55-9	4,4-DDE	6.90E-03		6.90E-03		mg/kg	SED-06-08-03	1/3	1.90E-03 - 3.50E-03	6.90E-03	NA	5.10E+01	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	1.65E-02		6.90E-02		mg/kg	SED-06-08-03	2/3	1.90E-03 - 3.50E-03	6.90E-02	NA	6.50E+01	C	NA	NA	No	BSL
1024-57-3	HEPTACHLOR EPOXIDE	4.10E-03		4.10E-03		mg/kg	SED-06-08-03	1/3	1.90E-03 - 3.50E-03	4.10E-03	NA	1.90E+00	C	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value. The resulting values have been increased by a factor of ten to account for reduced sediment exposures.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Surrogates used: Chlordane for Alpha-Chlordane.

TABLE 7.2.7.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 7: BUILDING 541 - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 7

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	**ALUMINUM**	**2.52E+04**		**2.52E+04**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**2.60E+01 - 2.60E+01**	**2.52E+04**	**3.40E+04**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	1.10E+00	J	1.10E+00	J	mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	1.10E+00	2.20E+00	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.38E+01**		**4.38E+01**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**3.90E-01 - 3.90E-01**	**4.38E+01**	**4.71E+01**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.34E+01	J	2.34E+01	J	mg/kg	S-07-08-01-0-2	1/1	2.60E+01 - 2.60E+01	2.34E+01	1.18E+02	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	3.20E-01	J	3.20E-01	J	mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	3.20E-01	7.70E-01	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	7.70E-01		7.70E-01		mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	7.70E-01	3.05E+00	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	3.79E+04		3.79E+04		mg/kg	S-07-08-01-0-2	1/1	6.50E+02 - 6.50E+02	3.79E+04	1.17E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.02E+02**		**1.02E+02**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.30E+00 - 1.30E+00**	**1.02E+02**	**8.97E+01**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**6.60E+00**		**6.60E+00**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**6.50E+00 - 6.50E+00**	**6.60E+00**	**2.80E+01**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	4.59E+01		4.59E+01		mg/kg	S-07-08-01-0-2	1/1	3.20E+00 - 3.20E+00	4.59E+01	1.11E+02	3.10E+02	N	NA	NA	No	BSL
7439-89-6	IRON	4.26E+04		4.26E+04		mg/kg	S-07-08-01-0-2	1/1	1.30E+01 - 1.30E+01	4.26E+04	5.43E+04	5.50E+03	N	NA	NA	No	NUT
7439-92-1	LEAD	3.93E+01		3.93E+01		mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	3.93E+01	1.52E+02	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.25E+03		1.25E+03		mg/kg	S-07-08-01-0-2	1/1	6.50E+02 - 6.50E+02	1.25E+03	8.92E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**5.78E+02**		**5.78E+02**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.90E+00 - 1.90E+00**	**5.78E+02**	**1.28E+03**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	1.20E-01		1.20E-01		mg/kg	S-07-08-01-0-2	1/1	4.00E-02 - 4.00E-02	1.20E-01	1.10E+00	5.60E-01	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.72E+01		1.72E+01		mg/kg	S-07-08-01-0-2	1/1	5.20E+00 - 5.20E+00	1.72E+01	4.23E+01	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.91E+02	J	5.91E+02	J	mg/kg	S-07-08-01-0-2	1/1	1.30E+03 - 1.30E+03	5.91E+02	1.71E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.70E+00		1.70E+00		mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	1.70E+00	1.00E+00	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	8.70E+01	J	8.70E+01	J	mg/kg	S-07-08-01-0-2	1/1	1.30E+03 - 1.30E+03	8.70E+01	2.71E+02	NA		NA	NA	No	NUT
7440-31-5	TIN	3.60E+00	J	3.60E+00	J	mg/kg	S-07-08-01-0-2	1/1	6.50E+00 - 6.50E+00	3.60E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**1.63E+02**	**J**	**1.63E+02**	**J**	**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.30E+00 - 1.30E+00**	**1.63E+02**	**1.76E+02**	**5.50E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	7.36E+01		7.36E+01		mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	7.36E+01	6.03E+02	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	2.42E-02		2.42E-02		mg/kg	S-07-08-01-0-2	1/1	1.70E-03 - 1.70E-03	2.42E-02	NA	2.00E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.41E-02		3.41E-02		mg/kg	S-07-08-01-0-2	1/1	1.70E-03 - 1.70E-03	3.41E-02	NA	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	4.08E-02		4.08E-02		mg/kg	S-07-08-01-0-2	1/1	1.70E-03 - 1.70E-03	4.08E-02	NA	1.70E+00	C	NA	NA	No	BSL
60-57-1	DIELDRIN	4.40E-03		4.40E-03		mg/kg	S-07-08-01-0-2	1/1	1.70E-03 - 1.70E-03	4.40E-03	NA	3.00E-02	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
56-55-3	BENZO(A)ANTHRACENE	1.32E-02		1.32E-02		mg/kg	S-07-08-01-0-2	1/1	8.70E-03 - 8.70E-03	1.32E-02	NA	1.50E-01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	7.61E-03	J	7.61E-03	J	mg/kg	S-07-08-01-0-2	1/1	8.70E-03 - 8.70E-03	7.61E-03	NA	1.50E+01	C	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.37E+01		1.37E+01		mg/kg	S-07-08-01-0-2	1/1	8.60E+00 - 8.60E+00	1.37E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	2.03E-02		2.03E-02		mg/kg	S-07-08-01-0-2	1/1	8.90E-03 - 8.90E-03	2.03E-02	NA	6.10E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.7.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 7: BUILDING 541 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 7

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	ALUMINUM	2.52E+04		2.52E+04		mg/kg	S-07-08-01-0-2	1/1	2.60E+01 - 2.60E+01	2.52E+04	3.40E+04	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	1.10E+00	J	1.10E+00	J	mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	1.10E+00	2.20E+00	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.38E+01**		**4.38E+01**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**3.90E-01 - 3.90E-01**	**4.38E+01**	**4.71E+01**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.34E+01	J	2.34E+01	J	mg/kg	S-07-08-01-0-2	1/1	2.60E+01 - 2.60E+01	2.34E+01	1.18E+02	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	3.20E-01	J	3.20E-01	J	mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	3.20E-01	7.70E-01	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	7.70E-01		7.70E-01		mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	7.70E-01	3.05E+00	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	3.79E+04		3.79E+04		mg/kg	S-07-08-01-0-2	1/1	6.50E+02 - 6.50E+02	3.79E+04	1.17E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.02E+02**		**1.02E+02**		**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.30E+00 - 1.30E+00**	**1.02E+02**	**8.97E+01**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	6.60E+00		6.60E+00		mg/kg	S-07-08-01-0-2	1/1	6.50E+00 - 6.50E+00	6.60E+00	2.80E+01	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	4.59E+01		4.59E+01		mg/kg	S-07-08-01-0-2	1/1	3.20E+00 - 3.20E+00	4.59E+01	1.11E+02	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	4.26E+04		4.26E+04		mg/kg	S-07-08-01-0-2	1/1	1.30E+01 - 1.30E+01	4.26E+04	5.43E+04	7.20E+04	N	NA	NA	No	NUT
7439-92-1	LEAD	3.93E+01		3.93E+01		mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	3.93E+01	1.52E+02	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.25E+03		1.25E+03		mg/kg	S-07-08-01-0-2	1/1	6.50E+02 - 6.50E+02	1.25E+03	8.92E+03	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	5.78E+02		5.78E+02		mg/kg	S-07-08-01-0-2	1/1	1.90E+00 - 1.90E+00	5.78E+02	1.28E+03	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	1.20E-01		1.20E-01		mg/kg	S-07-08-01-0-2	1/1	4.00E-02 - 4.00E-02	1.20E-01	1.10E+00	3.40E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.72E+01		1.72E+01		mg/kg	S-07-08-01-0-2	1/1	5.20E+00 - 5.20E+00	1.72E+01	4.23E+01	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.91E+02	J	5.91E+02	J	mg/kg	S-07-08-01-0-2	1/1	1.30E+03 - 1.30E+03	5.91E+02	1.71E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.70E+00		1.70E+00		mg/kg	S-07-08-01-0-2	1/1	6.50E-01 - 6.50E-01	1.70E+00	1.00E+00	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	8.70E+01	J	8.70E+01	J	mg/kg	S-07-08-01-0-2	1/1	1.30E+03 - 1.30E+03	8.70E+01	2.71E+02	NA		NA	NA	No	NUT
7440-31-5	TIN	3.60E+00	J	3.60E+00	J	mg/kg	S-07-08-01-0-2	1/1	6.50E+00 - 6.50E+00	3.60E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**1.63E+02**	**J**	**1.63E+02**	**J**	**mg/kg**	**S-07-08-01-0-2**	**1/1**	**1.30E+00 - 1.30E+00**	**1.63E+02**	**1.76E+02**	**7.20E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	7.36E+01		7.36E+01		mg/kg	S-07-08-01-0-2	1/1	2.60E+00 - 2.60E+00	7.36E+01	6.03E+02	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	2.42E-02		2.42E-02		mg/kg	S-07-08-01-0-2	1/1	1.70E-03 - 1.70E-03	2.42E-02	NA	7.20E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.41E-02		3.41E-02		mg/kg	S-07-08-01-0-2	1/1	1.70E-03 - 1.70E-03	3.41E-02	NA	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	4.08E-02		4.08E-02		mg/kg	S-07-08-01-0-2	1/1	1.70E-03 - 1.70E-03	4.08E-02	NA	7.00E+00	C	NA	NA	No	BSL
60-57-1	DIELDRIN	4.40E-03		4.40E-03		mg/kg	S-07-08-01-0-2	1/1	1.70E-03 - 1.70E-03	4.40E-03	NA	1.10E-01	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
56-55-3	BENZO(A)ANTHRACENE	1.32E-02		1.32E-02		mg/kg	S-07-08-01-0-2	1/1	8.70E-03 - 8.70E-03	1.32E-02	NA	2.10E+00	C	NA	NA	No	BSL
218-01-9	CHRYSENE	7.61E-03	J	7.61E-03	J	mg/kg	S-07-08-01-0-2	1/1	8.70E-03 - 8.70E-03	7.61E-03	NA	2.10E+02	C	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.37E+01		1.37E+01		mg/kg	S-07-08-01-0-2	1/1	8.60E+00 - 8.60E+00	1.37E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	2.03E-02		2.03E-02		mg/kg	S-07-08-01-0-2	1/1	8.90E-03 - 8.90E-03	2.03E-02	NA	6.30E+04	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.7.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 7: BUILDING 541 - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 7

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	**ALUMINUM**	**1.02E+04**		**1.02E+04**		**mg/kg**	**S-07-08-01-2-4**	**1/1**	**2.35E+01 - 2.35E+01**	**1.02E+04**	**NA**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-38-2	**ARSENIC**	**7.55E+00**		**7.55E+00**		**mg/kg**	**S-07-08-01-2-4**	**1/1**	**3.50E-01 - 3.50E-01**	**7.55E+00**	**NA**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	1.48E+01	J / J	1.48E+01	J / J	mg/kg	S-07-08-01-2-4	1/1	2.35E+01 - 2.35E+01	1.48E+01	NA	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.75E-01	J / J	1.75E-01	J / J	mg/kg	S-07-08-01-2-4	1/1	5.90E-01 - 5.90E-01	1.75E-01	NA	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	3.40E-01	J	3.40E-01	J	mg/kg	S-07-08-01-2-4	1/1	5.70E+00 - 5.70E+00	3.40E-01	NA	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	2.19E+05		2.19E+05		mg/kg	S-07-08-01-2-4	1/1	5.90E+03 - 5.90E+03	2.19E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.47E+01**		**1.47E+01**		**mg/kg**	**S-07-08-01-2-4**	**1/1**	**1.15E+00 - 1.15E+00**	**1.47E+01**	**NA**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**6.05E+00**	**/ J**	**6.05E+00**	**/ J**	**mg/kg**	**S-07-08-01-2-4**	**1/1**	**5.90E+00 - 5.90E+00**	**6.05E+00**	**NA**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.59E+01		1.59E+01		mg/kg	S-07-08-01-2-4	1/1	2.90E+00 - 2.90E+00	1.59E+01	NA	3.10E+02	N	NA	NA	No	BSL
7439-89-6	IRON	1.44E+04		1.44E+04		mg/kg	S-07-08-01-2-4	1/1	1.15E+01 - 1.15E+01	1.44E+04	NA	5.50E+03	N	NA	NA	No	NUT
7439-92-1	LEAD	1.35E+00	J / J	1.35E+00	J / J	mg/kg	S-07-08-01-2-4	1/1	2.35E+00 - 2.35E+00	1.35E+00	NA	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.70E+03		2.70E+03		mg/kg	S-07-08-01-2-4	1/1	5.90E+02 - 5.90E+02	2.70E+03	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**3.61E+02**		**3.61E+02**		**mg/kg**	**S-07-08-01-2-4**	**1/1**	**1.75E+00 - 1.75E+00**	**3.61E+02**	**NA**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	**MERCURY**	**3.01E+00**	**/ J**	**3.01E+00**	**/ J**	**mg/kg**	**S-07-08-01-2-4**	**1/1**	**1.99E-01 - 1.99E-01**	**3.01E+00**	**NA**	**5.60E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-02-0	NICKEL	6.95E+00		6.95E+00		mg/kg	S-07-08-01-2-4	1/1	4.70E+00 - 4.70E+00	6.95E+00	NA	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.15E+03	/ J	1.15E+03	/ J	mg/kg	S-07-08-01-2-4	1/1	1.15E+03 - 1.15E+03	1.15E+03	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	5.70E+00	J	5.70E+00	J	mg/kg	S-07-08-01-2-4	1/1	6.10E+00 - 6.10E+00	5.70E+00	NA	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	6.98E+01	J / J	6.98E+01	J / J	mg/kg	S-07-08-01-2-4	1/1	1.15E+03 - 1.15E+03	6.98E+01	NA	NA		NA	NA	No	NUT
7440-31-5	TIN	2.05E+00	J / J	2.05E+00	J / J	mg/kg	S-07-08-01-2-4	1/1	5.90E+00 - 5.90E+00	2.05E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**3.86E+01**	**J / J**	**3.86E+01**	**J / J**	**mg/kg**	**S-07-08-01-2-4**	**1/1**	**1.15E+00 - 1.15E+00**	**3.86E+01**	**NA**	**5.50E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.92E+01		1.92E+01		mg/kg	S-07-08-01-2-4	1/1	2.35E+00 - 2.35E+00	1.92E+01	NA	2.30E+03	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.04E+01	J	1.04E+01	J	mg/kg	S-07-08-01-2-4	1/1	7.90E+00 - 7.90E+00	1.04E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
75-35-4	1,1-DICHLOROETHENE	1.10E-03	J / J	1.10E-03	J / J	mg/kg	S-07-08-01-2-4	1/1	4.50E-03 - 4.50E-03	1.10E-03	NA	2.40E+01	N	NA	NA	No	BSL
67-64-1	ACETONE	3.70E-03	J	3.70E-03	J	mg/kg	S-07-08-01-2-4	1/1	9.50E-03 - 9.50E-03	3.70E-03	NA	6.10E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.7.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 7: BUILDING 541 - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 7

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	ALUMINUM	1.02E+04		1.02E+04		mg/kg	S-07-08-01-2-4	1/1	2.35E+01 - 2.35E+01	1.02E+04	NA	9.90E+04	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**7.55E+00**		**7.55E+00**		**mg/kg**	**S-07-08-01-2-4**	**1/1**	**3.50E-01 - 3.50E-01**	**7.55E+00**	**NA**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	1.48E+01	J / J	1.48E+01	J / J	mg/kg	S-07-08-01-2-4	1/1	2.35E+01 - 2.35E+01	1.48E+01	NA	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.75E-01	J / J	1.75E-01	J / J	mg/kg	S-07-08-01-2-4	1/1	5.90E-01 - 5.90E-01	1.75E-01	NA	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	3.40E-01	J	3.40E-01	J	mg/kg	S-07-08-01-2-4	1/1	5.70E+00 - 5.70E+00	3.40E-01	NA	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	2.19E+05		2.19E+05		mg/kg	S-07-08-01-2-4	1/1	5.90E+03 - 5.90E+03	2.19E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.47E+01**		**1.47E+01**		**mg/kg**	**S-07-08-01-2-4**	**1/1**	**1.15E+00 - 1.15E+00**	**1.47E+01**	**NA**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	6.05E+00	/ J	6.05E+00	/ J	mg/kg	S-07-08-01-2-4	1/1	5.90E+00 - 5.90E+00	6.05E+00	NA	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	1.59E+01		1.59E+01		mg/kg	S-07-08-01-2-4	1/1	2.90E+00 - 2.90E+00	1.59E+01	NA	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	1.44E+04		1.44E+04		mg/kg	S-07-08-01-2-4	1/1	1.15E+01 - 1.15E+01	1.44E+04	NA	7.20E+04	N	NA	NA	No	NUT
7439-92-1	LEAD	1.35E+00	J / J	1.35E+00	J / J	mg/kg	S-07-08-01-2-4	1/1	2.35E+00 - 2.35E+00	1.35E+00	NA	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.70E+03		2.70E+03		mg/kg	S-07-08-01-2-4	1/1	5.90E+02 - 5.90E+02	2.70E+03	NA	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	3.61E+02		3.61E+02		mg/kg	S-07-08-01-2-4	1/1	1.75E+00 - 1.75E+00	3.61E+02	NA	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	3.01E+00	/ J	3.01E+00	/ J	mg/kg	S-07-08-01-2-4	1/1	1.99E-01 - 1.99E-01	3.01E+00	NA	3.40E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	6.95E+00		6.95E+00		mg/kg	S-07-08-01-2-4	1/1	4.70E+00 - 4.70E+00	6.95E+00	NA	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.15E+03	/ J	1.15E+03	/ J	mg/kg	S-07-08-01-2-4	1/1	1.15E+03 - 1.15E+03	1.15E+03	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	5.70E+00	J	5.70E+00	J	mg/kg	S-07-08-01-2-4	1/1	6.10E+00 - 6.10E+00	5.70E+00	NA	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	6.98E+01	J / J	6.98E+01	J / J	mg/kg	S-07-08-01-2-4	1/1	1.15E+03 - 1.15E+03	6.98E+01	NA	NA		NA	NA	No	NUT
7440-31-5	TIN	2.05E+00	J / J	2.05E+00	J / J	mg/kg	S-07-08-01-2-4	1/1	5.90E+00 - 5.90E+00	2.05E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**3.86E+01**	**J / J**	**3.86E+01**	**J / J**	**mg/kg**	**S-07-08-01-2-4**	**1/1**	**1.15E+00 - 1.15E+00**	**3.86E+01**	**NA**	**7.20E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.92E+01		1.92E+01		mg/kg	S-07-08-01-2-4	1/1	2.35E+00 - 2.35E+00	1.92E+01	NA	3.10E+04	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.04E+01	J	1.04E+01	J	mg/kg	S-07-08-01-2-4	1/1	7.90E+00 - 7.90E+00	1.04E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
75-35-4	1,1-DICHLOROETHENE	1.10E-03	J / J	1.10E-03	J / J	mg/kg	S-07-08-01-2-4	1/1	4.50E-03 - 4.50E-03	1.10E-03	NA	1.10E+02	N	NA	NA	No	BSL
67-64-1	ACETONE	3.70E-03	J	3.70E-03	J	mg/kg	S-07-08-01-2-4	1/1	9.50E-03 - 9.50E-03	3.70E-03	NA	6.30E+04	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.7.5
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 7: BUILDING 541 - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 7

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
INORGANICS-DISSOLVED																	
7440-39-3	BARIUM	1.20E+02	J	1.20E+02	J	ug/L	G-03-08-MW-19A	1/1	2.00E+02 - 2.00E+02	1.20E+02	NA	7.30E+02	N	NA	NA	No	BSL
7440-48-4	**COBALT**	**2.30E+00**	**J**	**2.30E+00**	**J**	**ug/L**	**G-03-08-MW-19A**	**1/1**	**5.00E+01 - 5.00E+01**	**2.30E+00**	**NA**	**1.10E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
INORGANICS-TOTAL																	
7440-39-3	BARIUM	1.45E+02	J	1.45E+02	J	ug/L	G-03-08-MW-19A	1/1	2.00E+02 - 2.00E+02	1.45E+02	NA	7.30E+02	N	NA	NA	No	BSL
7440-48-4	**COBALT**	**5.40E+00**	**J**	**5.40E+00**	**J**	**ug/L**	**G-03-08-MW-19A**	**1/1**	**5.00E+01 - 5.00E+01**	**5.40E+00**	**NA**	**1.10E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	4.50E+00	J	4.50E+00	J	ug/L	G-03-08-MW-19A	1/1	2.50E+01 - 2.50E+01	4.50E+00	NA	1.50E+02	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**9.80E+00**	**J**	**9.80E+00**	**J**	**ug/L**	**G-03-08-MW-19A**	**1/1**	**5.00E+01 - 5.00E+01**	**9.80E+00**	**NA**	**2.60E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	5.70E+00	J	5.70E+00	J	ug/L	G-03-08-MW-19A	1/1	2.00E+01 - 2.00E+01	5.70E+00	NA	1.10E+03	N	NA	NA	No	BSL
VOLATILE ORGANIC COMPOUNDS																	
67-64-1	ACETONE	1.60E+01		1.60E+01		ug/L	G-07-09-01	1/2	1.00E+01 - 1.00E+01	1.60E+01	NA	2.20E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.

(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE 7.2.8.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 8: BUILDING S-563 - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 8

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-TOTAL										
7429-90-5	**ALUMINUM**	**1.67E+04**	**J**	**3.18E+04**	**J**	**mg/kg**	**S-08-08-01-4-6**	**4/4**	**2.60E+01 - 3.10E+01**	**3.18E+04**	**NA**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-38-2	**ARSENIC**	**1.19E+01**		**3.37E+01**		**mg/kg**	**S-08-08-01-4-6**	**4/4**	**4.00E-01 - 4.70E-01**	**3.37E+01**	**NA**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	5.79E+01		1.56E+02		mg/kg	S-08-09-02-4-6	4/4	2.60E+01 - 3.10E+01	1.56E+02	NA	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	2.20E-01	J	5.80E-01	J / J	mg/kg	S-08-08-01-4-6 / S-08-09-	4/4	6.60E-01 - 7.80E-01	5.80E-01	NA	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.80E-01	J	4.20E-01	J	mg/kg	S-08-09-02-4-6	4/4	6.60E-01 - 7.80E-01	4.20E-01	NA	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.68E+03		1.38E+05		mg/kg	S-08-08-02-1-2	4/4	6.70E+02 - 2.00E+03	1.38E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**4.23E+01**		**6.63E+01**		**mg/kg**	**S-08-08-01-4-6**	**4/4**	**1.30E+00 - 1.60E+00**	**6.63E+01**	**NA**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**8.80E+00**		**5.66E+01**		**mg/kg**	**S-08-08-01-4-6**	**4/4**	**6.60E+00 - 7.80E+00**	**5.66E+01**	**NA**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	3.23E+01	J	6.11E+01	J	mg/kg	S-08-08-01-4-6	4/4	3.30E+00 - 3.90E+00	6.11E+01	NA	3.10E+02	N	NA	NA	No	BSL
7439-89-6	IRON	1.96E+04		4.94E+04		mg/kg	S-08-08-01-4-6	4/4	1.30E+01 - 3.10E+01	4.94E+04	NA	5.50E+03	N	NA	NA	No	NUT
7439-92-1	LEAD	4.60E+00		2.77E+01		mg/kg	S-08-08-02-1-2	4/4	2.70E+00 - 7.90E+00	2.77E+01	NA	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.57E+03		3.85E+03		mg/kg	S-08-08-02-1-2	4/4	6.60E+02 - 7.80E+02	3.85E+03	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.91E+02**	**J**	**2.05E+03**	**J**	**mg/kg**	**S-08-08-01-4-6**	**4/4**	**2.00E+00 - 2.30E+00**	**2.05E+03**	**NA**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	4.50E-02		1.50E-01		mg/kg	S-08-09-02-4-6	4/4	3.90E-02 - 5.20E-02	1.50E-01	NA	5.60E-01	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.15E+01		2.05E+01		mg/kg	S-08-08-01-4-6	4/4	5.30E+00 - 6.30E+00	2.05E+01	NA	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	6.72E+02	J	9.64E+02	J	mg/kg	S-08-09-02-4-6	4/4	1.30E+03 - 1.60E+03	9.64E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.10E+00		2.50E+00		mg/kg	S-08-09-02-4-6	2/4	6.60E-01 - 7.80E-01	2.50E+00	NA	3.90E+01	N	NA	NA	No	BSL
7440-22-4	SILVER	4.10E-01	J	1.50E+00		mg/kg	S-08-08-01-4-6	3/4	1.30E+00 - 1.60E+00	1.50E+00	NA	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	1.29E+02	J	2.17E+02	J	mg/kg	S-08-08-02-1-2	4/4	1.30E+03 - 1.60E+03	2.17E+02	NA	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	2.30E-01	J / J	6.50E-01	J	mg/kg	S-08-08-01-4-6	3/4	1.30E+00 - 1.60E+00	6.50E-01	NA	NA		NA	NA	No	NSL
7440-31-5	TIN	2.50E+00	J	2.90E+00	J	mg/kg	S-08-08-01-4-6	3/3	6.60E+00 - 6.90E+00	2.90E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**7.02E+01**		**1.39E+02**		**mg/kg**	**S-08-09-02-4-6**	**4/4**	**1.30E+00 - 1.60E+00**	**1.39E+02**	**NA**	**5.50E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	4.00E+01		9.06E+01	J	mg/kg	S-08-09-02-4-6	4/4	2.60E+00 - 3.10E+00	9.06E+01	NA	2.30E+03	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	8.74E+01		1.29E+02		mg/kg	S-08-08-02-1-2	2/4	8.80E+00 - 2.40E+01	1.29E+02	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
78-93-3	2-BUTANONE	6.30E-03	J	1.51E-02		mg/kg	S-08-08-01-4-6	2/4	8.00E-03 - 1.60E+00	1.51E-02	NA	2.80E+03	N	NA	NA	No	BSL
67-64-1	ACETONE	2.57E-02		1.84E-01		mg/kg	S-08-08-01-4-6	3/4	8.00E-03 - 1.60E+00	1.84E-01	NA	6.10E+03	N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	1.50E-03	J	3.00E-03	J	mg/kg	S-08-08-01-2-4	3/4	4.00E-03 - 8.10E-01	3.00E-03	NA	8.20E+01	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.8.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 8: BUILDING S-563 - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 8

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	1.67E+04	J	3.18E+04	J	mg/kg	S-08-08-01-4-6	4/4	2.60E+01 - 3.10E+01	3.18E+04	NA	9.90E+04	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**1.19E+01**		**3.37E+01**		**mg/kg**	**S-08-08-01-4-6**	**4/4**	**4.00E-01 - 4.70E-01**	**3.37E+01**	**NA**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	5.79E+01		1.56E+02		mg/kg	S-08-09-02-4-6	4/4	2.60E+01 - 3.10E+01	1.56E+02	NA	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	2.20E-01	J	5.80E-01	J / J	mg/kg	S-08-08-01-4-6 / S-08-09-	4/4	6.60E-01 - 7.80E-01	5.80E-01	NA	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.80E-01	J	4.20E-01	J	mg/kg	S-08-09-02-4-6	4/4	6.60E-01 - 7.80E-01	4.20E-01	NA	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.68E+03		1.38E+05		mg/kg	S-08-08-02-1-2	4/4	6.70E+02 - 2.00E+03	1.38E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**4.23E+01**		**6.63E+01**		**mg/kg**	**S-08-08-01-4-6**	**4/4**	**1.30E+00 - 1.60E+00**	**6.63E+01**	**NA**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**8.80E+00**		**5.66E+01**		**mg/kg**	**S-08-08-01-4-6**	**4/4**	**6.60E+00 - 7.80E+00**	**5.66E+01**	**NA**	**3.00E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	3.23E+01	J	6.11E+01	J	mg/kg	S-08-08-01-4-6	4/4	3.30E+00 - 3.90E+00	6.11E+01	NA	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	1.96E+04		4.94E+04		mg/kg	S-08-08-01-4-6	4/4	1.30E+01 - 3.10E+01	4.94E+04	NA	7.20E+04	N	NA	NA	No	NUT
7439-92-1	LEAD	4.60E+00		2.77E+01		mg/kg	S-08-08-02-1-2	4/4	2.70E+00 - 7.90E+00	2.77E+01	NA	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	1.57E+03		3.85E+03		mg/kg	S-08-08-02-1-2	4/4	6.60E+02 - 7.80E+02	3.85E+03	NA	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	1.91E+02	J	2.05E+03	J	mg/kg	S-08-08-01-4-6	4/4	2.00E+00 - 2.30E+00	2.05E+03	NA	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	4.50E-02		1.50E-01		mg/kg	S-08-09-02-4-6	4/4	3.90E-02 - 5.20E-02	1.50E-01	NA	3.40E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.15E+01		2.05E+01		mg/kg	S-08-08-01-4-6	4/4	5.30E+00 - 6.30E+00	2.05E+01	NA	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	6.72E+02	J	9.64E+02	J	mg/kg	S-08-09-02-4-6	4/4	1.30E+03 - 1.60E+03	9.64E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.10E+00		2.50E+00		mg/kg	S-08-09-02-4-6	2/4	6.60E-01 - 7.80E-01	2.50E+00	NA	5.10E+02	N	NA	NA	No	BSL
7440-22-4	SILVER	4.10E-01	J	1.50E+00		mg/kg	S-08-08-01-4-6	3/4	1.30E+00 - 1.60E+00	1.50E+00	NA	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	1.29E+02	J	2.17E+02	J	mg/kg	S-08-08-02-1-2	4/4	1.30E+03 - 1.60E+03	2.17E+02	NA	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	2.30E-01	J / J	6.50E-01	J	mg/kg	S-08-08-01-4-6	3/4	1.30E+00 - 1.60E+00	6.50E-01	NA	NA		NA	NA	No	NSL
7440-31-5	TIN	2.50E+00	J	2.90E+00	J	mg/kg	S-08-08-01-4-6	3/3	6.60E+00 - 6.90E+00	2.90E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**7.02E+01**		**1.39E+02**		**mg/kg**	**S-08-09-02-4-6**	**4/4**	**1.30E+00 - 1.60E+00**	**1.39E+02**	**NA**	**7.20E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	4.00E+01		9.06E+01	J	mg/kg	S-08-09-02-4-6	4/4	2.60E+00 - 3.10E+00	9.06E+01	NA	3.10E+04	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	8.74E+01		1.29E+02		mg/kg	S-08-08-02-1-2	2/4	8.80E+00 - 2.40E+01	1.29E+02	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
78-93-3	2-BUTANONE	6.30E-03	J	1.51E-02		mg/kg	S-08-08-01-4-6	2/4	8.00E-03 - 1.60E+00	1.51E-02	NA	2.00E+04	N	NA	NA	No	BSL
67-64-1	ACETONE	2.57E-02		1.84E-01		mg/kg	S-08-08-01-4-6	3/4	8.00E-03 - 1.60E+00	1.84E-01	NA	6.30E+04	N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	1.50E-03	J	3.00E-03	J	mg/kg	S-08-08-01-2-4	3/4	4.00E-03 - 8.10E-01	3.00E-03	NA	3.70E+02	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.8.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 8: BUILDING S-563 - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 8

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-DISSOLVED										
7440-39-3	BARIUM	1.20E+02	J	1.20E+02	J	ug/L	G-03-08-MW-23	1/1	2.00E+02 - 2.00E+02	1.20E+02	NA	7.30E+02	N	NA	NA	No	BSL
7440-70-2	CALCIUM	1.32E+05		1.32E+05		ug/L	G-03-08-MW-23	1/1	5.00E+03 - 5.00E+03	1.32E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**1.10E+00**	**J**	**1.10E+00**	**J**	**ug/L**	**G-03-08-MW-23**	**1/1**	**1.00E+01 - 1.00E+01**	**1.10E+00**	**NA**	**4.30E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**2.80E+00**	**J**	**2.80E+00**	**J**	**ug/L**	**G-03-08-MW-23**	**1/1**	**5.00E+01 - 5.00E+01**	**2.80E+00**	**NA**	**1.10E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-89-6	IRON	1.84E+01	J	1.84E+01	J	ug/L	G-03-08-MW-23	1/1	1.00E+02 - 1.00E+02	1.84E+01	NA	2.60E+03	N	NA	NA	No	NUT
7439-95-4	MAGNESIUM	1.68E+04		1.68E+04		ug/L	G-03-08-MW-23	1/1	5.00E+03 - 5.00E+03	1.68E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**3.21E+02**		**3.21E+02**		**ug/L**	**G-03-08-MW-23**	**1/1**	**1.50E+01 - 1.50E+01**	**3.21E+02**	**NA**	**8.80E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-02-0	NICKEL	4.00E+00	J	4.00E+00	J	ug/L	G-03-08-MW-23	1/1	4.00E+01 - 4.00E+01	4.00E+00	NA	7.30E+01	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	2.02E+03	J	2.02E+03	J	ug/L	G-03-08-MW-23	1/1	1.00E+04 - 1.00E+04	2.02E+03	NA	NA		NA	NA	No	NUT
7440-23-5	SODIUM	3.53E+04		3.53E+04		ug/L	G-03-08-MW-23	1/1	1.00E+04 - 1.00E+04	3.53E+04	NA	NA		NA	NA	No	NUT
7440-62-2	**VANADIUM**	**1.60E+00**	**J**	**1.60E+00**	**J**	**ug/L**	**G-03-08-MW-23**	**1/1**	**5.00E+01 - 5.00E+01**	**1.60E+00**	**NA**	**2.60E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	9.90E+00	J	9.90E+00	J	ug/L	G-03-08-MW-23	1/1	2.00E+01 - 2.00E+01	9.90E+00	NA	1.10E+03	N	NA	NA	No	BSL
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	7.73E+01	J	7.73E+01	J	ug/L	G-03-08-MW-23	1/1	2.00E+02 - 2.00E+02	7.73E+01	NA	3.70E+03	N	NA	NA	No	BSL
7440-39-3	BARIUM	1.21E+02	J	1.21E+02	J	ug/L	G-03-08-MW-23	1/1	2.00E+02 - 2.00E+02	1.21E+02	NA	7.30E+02	N	NA	NA	No	BSL
7440-70-2	CALCIUM	1.31E+05		1.31E+05		ug/L	G-03-08-MW-23	1/1	5.00E+03 - 5.00E+03	1.31E+05	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**9.00E-01**	**J**	**9.00E-01**	**J**	**ug/L**	**G-03-08-MW-23**	**1/1**	**1.00E+01 - 1.00E+01**	**9.00E-01**	**NA**	**4.30E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**3.00E+00**	**J**	**3.00E+00**	**J**	**ug/L**	**G-03-08-MW-23**	**1/1**	**5.00E+01 - 5.00E+01**	**3.00E+00**	**NA**	**1.10E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-89-6	IRON	1.02E+02		1.02E+02		ug/L	G-03-08-MW-23	1/1	1.00E+02 - 1.00E+02	1.02E+02	NA	2.60E+03	N	NA	NA	No	NUT
7439-95-4	MAGNESIUM	1.67E+04		1.67E+04		ug/L	G-03-08-MW-23	1/1	5.00E+03 - 5.00E+03	1.67E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**3.47E+02**		**3.47E+02**		**ug/L**	**G-03-08-MW-23**	**1/1**	**1.50E+01 - 1.50E+01**	**3.47E+02**	**NA**	**8.80E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-02-0	NICKEL	4.80E+00	J	4.80E+00	J	ug/L	G-03-08-MW-23	1/1	4.00E+01 - 4.00E+01	4.80E+00	NA	7.30E+01	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	1.99E+03	J	1.99E+03	J	ug/L	G-03-08-MW-23	1/1	1.00E+04 - 1.00E+04	1.99E+03	NA	NA		NA	NA	No	NUT
7440-23-5	SODIUM	3.52E+04		3.52E+04		ug/L	G-03-08-MW-23	1/1	1.00E+04 - 1.00E+04	3.52E+04	NA	NA		NA	NA	No	NUT
7440-62-2	**VANADIUM**	**2.00E+00**	**J**	**2.00E+00**	**J**	**ug/L**	**G-03-08-MW-23**	**1/1**	**5.00E+01 - 5.00E+01**	**2.00E+00**	**NA**	**2.60E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.

(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE 7.2.10.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 10: 65TH ARMY RESERVE COMMAND REFUELING AREA - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 10

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
TOTAL PETROLEUM HYDROCARBONS																
TPH-DRO	TPH-DRO (C10-C28)	1.01E+01		3.48E+01		mg/kg	S-10-08-01-0-2	3/3	7.50E+00 - 7.80E+00	3.48E+01	NA	NA	NA	NA	No	BSL
VOLATILE ORGANIC COMPOUNDS																
67-64-1	ACETONE	1.47E-02		4.11E-02		mg/kg	S-10-08-01-0-2	2/3	7.80E-03 - 9.70E-03	4.11E-02	NA	6.10E+03 N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

TABLE 7.2.10.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 10: 65TH ARMY RESERVE COMMAND REFUELING AREA - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 10

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
TOTAL PETROLEUM HYDROCARBONS																
TPH-DRO	TPH-DRO (C10-C28)	1.01E+01		3.48E+01		mg/kg	S-10-08-01-0-2	3/3	7.50E+00 - 7.80E+00	3.48E+01	NA	NA	NA	NA	No	BSL
VOLATILE ORGANIC COMPOUNDS																
67-64-1	ACETONE	1.47E-02		4.11E-02		mg/kg	S-10-08-01-0-2	2/3	7.80E-03 - 9.70E-03	4.11E-02	NA	6.30E+04 N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

TABLE 7.2.10.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 10: 65TH ARMY RESERVE COMMAND REFUELING AREA - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 10

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
VOLATILE ORGANIC COMPOUNDS																	
67-64-1	ACETONE	1.81E-02		6.97E-02	J	mg/kg	S-10-08-03-2-4	3/3	7.70E-03 - 9.50E-03	6.97E-02	NA	6.10E+03	N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	9.00E-04	J	1.30E-03	J	mg/kg	S-10-08-01-2-4	2/3	3.90E-03 - 4.80E-03	1.30E-03	NA	8.20E+01	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.10.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 10: 65TH ARMY RESERVE COMMAND REFUELING AREA - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 10

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
VOLATILE ORGANIC COMPOUNDS																	
67-64-1	ACETONE	1.81E-02		6.97E-02	J	mg/kg	S-10-08-03-2-4	3/3	7.70E-03 - 9.50E-03	6.97E-02	NA	6.30E+04	N	NA	NA	No	BSL
75-15-0	CARBON DISULFIDE	9.00E-04	J	1.30E-03	J	mg/kg	S-10-08-01-2-4	2/3	3.90E-03 - 4.80E-03	1.30E-03	NA	3.70E+02	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.10.5
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 10: 65TH ARMY RESERVE COMMAND REFUELING AREA - GROUNDWATER

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site 10

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-DISSOLVED										
7440-38-2	**ARSENIC**	**2.00E+00**	**J**	**2.00E+00**	**J**	**ug/L**	**G-03-08-MW-20**	**1/1**	**3.00E+00 - 3.00E+00**	**2.00E+00**	**NA**	**4.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	8.31E+01	J	8.31E+01	J	ug/L	G-03-08-MW-20	1/1	2.00E+02 - 2.00E+02	8.31E+01	NA	7.30E+02	N	NA	NA	No	BSL
7440-70-2	CALCIUM	9.53E+04		9.53E+04		ug/L	G-03-08-MW-20	1/1	5.00E+03 - 5.00E+03	9.53E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**6.00E-01**	**J**	**6.00E-01**	**J**	**ug/L**	**G-03-08-MW-20**	**1/1**	**1.00E+01 - 1.00E+01**	**6.00E-01**	**NA**	**4.30E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7439-89-6	IRON	4.33E+01	J	4.33E+01	J	ug/L	G-03-08-MW-20	1/1	1.00E+02 - 1.00E+02	4.33E+01	NA	2.60E+03	N	NA	NA	No	NUT
7439-95-4	MAGNESIUM	2.64E+04		2.64E+04		ug/L	G-03-08-MW-20	1/1	5.00E+03 - 5.00E+03	2.64E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**2.08E+02**		**2.08E+02**		**ug/L**	**G-03-08-MW-20**	**1/1**	**1.50E+01 - 1.50E+01**	**2.08E+02**	**NA**	**8.80E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-09-7	POTASSIUM	2.76E+03	J	2.76E+03	J	ug/L	G-03-08-MW-20	1/1	1.00E+04 - 1.00E+04	2.76E+03	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	2.10E+00	J	2.10E+00	J	ug/L	G-03-08-MW-20	1/1	1.00E+01 - 1.00E+01	2.10E+00	NA	1.80E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	5.65E+04		5.65E+04		ug/L	G-03-08-MW-20	1/1	1.00E+04 - 1.00E+04	5.65E+04	NA	NA		NA	NA	No	NUT
7440-62-2	**VANADIUM**	**8.00E-01**	**J**	**8.00E-01**	**J**	**ug/L**	**G-03-08-MW-20**	**1/1**	**5.00E+01 - 5.00E+01**	**8.00E-01**	**NA**	**2.60E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	5.69E+02		5.69E+02		ug/L	G-03-08-MW-20	1/1	2.00E+02 - 2.00E+02	5.69E+02	NA	3.70E+03	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**2.20E+00**	**J**	**2.20E+00**	**J**	**ug/L**	**G-03-08-MW-20**	**1/1**	**3.00E+00 - 3.00E+00**	**2.20E+00**	**NA**	**4.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	8.61E+01	J	8.61E+01	J	ug/L	G-03-08-MW-20	1/1	2.00E+02 - 2.00E+02	8.61E+01	NA	7.30E+02	N	NA	NA	No	BSL
7440-70-2	CALCIUM	9.94E+04		9.94E+04		ug/L	G-03-08-MW-20	1/1	5.00E+03 - 5.00E+03	9.94E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**2.10E+00**	**J**	**2.10E+00**	**J**	**ug/L**	**G-03-08-MW-20**	**1/1**	**1.00E+01 - 1.00E+01**	**2.10E+00**	**NA**	**4.30E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	6.00E-01	J	6.00E-01	J	ug/L	G-03-08-MW-20	1/1	5.00E+01 - 5.00E+01	6.00E-01	NA	1.10E+00	N	NA	NA	No	BSL
7440-50-8	COPPER	3.20E+00	J	3.20E+00	J	ug/L	G-03-08-MW-20	1/1	2.50E+01 - 2.50E+01	3.20E+00	NA	1.50E+02	N	NA	NA	No	BSL
7439-89-6	IRON	7.91E+02		7.91E+02		ug/L	G-03-08-MW-20	1/1	1.00E+02 - 1.00E+02	7.91E+02	NA	2.60E+03	N	NA	NA	No	NUT
7439-95-4	MAGNESIUM	2.68E+04		2.68E+04		ug/L	G-03-08-MW-20	1/1	5.00E+03 - 5.00E+03	2.68E+04	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**2.19E+02**		**2.19E+02**		**ug/L**	**G-03-08-MW-20**	**1/1**	**1.50E+01 - 1.50E+01**	**2.19E+02**	**NA**	**8.80E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-02-0	NICKEL	1.80E+00	J	1.80E+00	J	ug/L	G-03-08-MW-20	1/1	4.00E+01 - 4.00E+01	1.80E+00	NA	7.30E+01	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	2.80E+03	J	2.80E+03	J	ug/L	G-03-08-MW-20	1/1	1.00E+04 - 1.00E+04	2.80E+03	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	4.10E+00	J	4.10E+00	J	ug/L	G-03-08-MW-20	1/1	1.00E+01 - 1.00E+01	4.10E+00	NA	1.80E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	5.69E+04		5.69E+04		ug/L	G-03-08-MW-20	1/1	1.00E+04 - 1.00E+04	5.69E+04	NA	NA		NA	NA	No	NUT
7440-62-2	**VANADIUM**	**3.00E+00**	**J**	**3.00E+00**	**J**	**ug/L**	**G-03-08-MW-20**	**1/1**	**5.00E+01 - 5.00E+01**	**3.00E+00**	**NA**	**2.60E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	4.20E+00	J	4.20E+00	J	ug/L	G-03-08-MW-20	1/1	2.00E+01 - 2.00E+01	4.20E+00	NA	1.10E+03	N	NA	NA	No	BSL
							VOLATILE ORGANIC COMPOUNDS										
79-01-6	TRICHLOROETHENE	6.20E-01	J	1.20E+00		ug/L	G-03-08-MW-20	2/2	1.00E+00 - 1.00E+00	1.20E+00	NA	2.00E+00	C	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.

(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the tap water value. For carcinogens the value shown is equal to the tap water value.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
ug/L = micrograms per liter

Data Qualifiers: J = Value is estimated.

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TABLE 7.2.11.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 11: HEAVY EQUIPMENT STORAGE AREA - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 11

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	**ALUMINUM**	**2.06E+04**		**2.39E+04**		**mg/kg**	**S-11-08-04-2-4**	**4/4**	**2.50E+01 - 2.70E+01**	**2.39E+04**	**NA**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	3.90E-01	J	9.60E-01	J	mg/kg	S-11-08-03-2-4	2/4	2.50E+00 - 2.70E+00	9.60E-01	NA	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.47E+01**		**1.19E+02**		**mg/kg**	**S-11-08-03-2-4**	**4/4**	**3.80E-01 - 8.00E-01**	**1.19E+02**	**NA**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	5.00E+00	J	4.93E+01		mg/kg	S-11-08-01-2-4	4/4	2.50E+01 - 2.70E+01	4.93E+01	NA	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	4.30E-01	J	5.60E-01	J	mg/kg	S-11-08-03-2-4	4/4	6.30E-01 - 6.80E-01	5.60E-01	NA	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	5.10E-01	J	8.90E-01		mg/kg	S-11-08-01-2-4	4/4	6.30E-01 - 1.30E+00	8.90E-01	NA	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	1.57E+03		1.39E+04	J / J	mg/kg	S-11-08-04-2-4	4/4	6.30E+02 - 6.80E+02	1.39E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**6.22E+01**		**1.40E+02**		**mg/kg**	**S-11-08-03-2-4**	**4/4**	**1.30E+00 - 1.40E+00**	**1.40E+02**	**NA**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**4.45E+00**	**J / J**	**2.37E+01**		**mg/kg**	**S-11-08-01-2-4**	**4/4**	**6.30E+00 - 6.80E+00**	**2.37E+01**	**NA**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	5.40E+01		5.81E+01		mg/kg	S-11-08-01-2-4	4/4	3.20E+00 - 6.70E+00	5.81E+01	NA	3.10E+02	N	NA	NA	No	BSL
7439-89-6	IRON	4.99E+04		7.00E+04		mg/kg	S-11-08-03-2-4	4/4	1.30E+01 - 2.70E+01	7.00E+04	NA	5.50E+03	N	NA	NA	No	NUT
7439-92-1	LEAD	5.80E+00		1.52E+01		mg/kg	S-11-08-01-2-4	4/4	2.50E+00 - 5.40E+00	1.52E+01	NA	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.61E+02	J	1.43E+03		mg/kg	S-11-08-04-2-4	4/4	6.30E+02 - 6.80E+02	1.43E+03	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.88E+02**		**3.04E+03**		**mg/kg**	**S-11-08-01-2-4**	**4/4**	**1.90E+00 - 2.00E+00**	**3.04E+03**	**NA**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	7.00E-02		2.65E-01		mg/kg	S-11-08-04-2-4	4/4	3.80E-02 - 4.15E-02	2.65E-01	NA	5.60E-01	N	NA	NA	No	BSL
7440-02-0	NICKEL	9.05E+00		1.50E+01		mg/kg	S-11-08-01-2-4	4/4	5.10E+00 - 1.10E+01	1.50E+01	NA	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	3.88E+02	J	5.18E+02	J / J	mg/kg	S-11-08-04-2-4	4/4	1.30E+03 - 1.40E+03	5.18E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.60E+00		4.30E+00		mg/kg	S-11-08-03-2-4	4/4	6.30E-01 - 1.30E+00	4.30E+00	NA	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	3.42E+01	J	9.78E+01	J / J	mg/kg	S-11-08-04-2-4	4/4	1.30E+03 - 1.40E+03	9.78E+01	NA	NA		NA	NA	No	NUT
7440-31-5	TIN	2.20E+00	J	2.50E+00	J	mg/kg	S-11-08-02-2-4	4/4	6.30E+00 - 6.80E+00	2.50E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**1.42E+02**		**2.41E+02**		**mg/kg**	**S-11-08-03-2-4**	**4/4**	**1.30E+00 - 1.40E+00**	**2.41E+02**	**NA**	**5.50E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	3.86E+01		5.78E+01		mg/kg	S-11-08-01-2-4	4/4	2.50E+00 - 2.70E+00	5.78E+01	NA	2.30E+03	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	3.81E+01		8.79E+01		mg/kg	S-11-08-03-2-4	3/4	8.40E+00 - 8.90E+00	8.79E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	3.56E-02		5.23E-02		mg/kg	S-11-08-01-2-4	3/4	8.90E-03 - 1.20E-02	5.23E-02	NA	6.10E+03	N	NA	NA	No	BSL
108-88-3	TOLUENE	6.60E-04	J	6.60E-04	J	mg/kg	S-11-08-01-2-4	1/4	8.90E-04 - 1.20E-03	6.60E-04	NA	5.00E+02	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.11.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 11: HEAVY EQUIPMENT STORAGE AREA - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 11

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS										
7429-90-5	ALUMINUM	2.06E+04		2.39E+04		mg/kg	S-11-08-04-2-4	4/4	2.50E+01 - 2.70E+01	2.39E+04	NA	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	3.90E-01	J	9.60E-01	J	mg/kg	S-11-08-03-2-4	2/4	2.50E+00 - 2.70E+00	9.60E-01	NA	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**4.47E+01**		**1.19E+02**		**mg/kg**	**S-11-08-03-2-4**	**4/4**	**3.80E-01 - 8.00E-01**	**1.19E+02**	**NA**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	5.00E+00	J	4.93E+01		mg/kg	S-11-08-01-2-4	4/4	2.50E+01 - 2.70E+01	4.93E+01	NA	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	4.30E-01	J	5.60E-01	J	mg/kg	S-11-08-03-2-4	4/4	6.30E-01 - 6.80E-01	5.60E-01	NA	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	5.10E-01	J	8.90E-01		mg/kg	S-11-08-01-2-4	4/4	6.30E-01 - 1.30E+00	8.90E-01	NA	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	1.57E+03		1.39E+04	J / J	mg/kg	S-11-08-04-2-4	4/4	6.30E+02 - 6.80E+02	1.39E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**6.22E+01**		**1.40E+02**		**mg/kg**	**S-11-08-03-2-4**	**4/4**	**1.30E+00 - 1.40E+00**	**1.40E+02**	**NA**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	4.45E+00	J / J	2.37E+01		mg/kg	S-11-08-01-2-4	4/4	6.30E+00 - 6.80E+00	2.37E+01	NA	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	5.40E+01		5.81E+01		mg/kg	S-11-08-01-2-4	4/4	3.20E+00 - 6.70E+00	5.81E+01	NA	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	4.99E+04		7.00E+04		mg/kg	S-11-08-03-2-4	4/4	1.30E+01 - 2.70E+01	7.00E+04	NA	7.20E+04	N	NA	NA	No	NUT
7439-92-1	LEAD	5.80E+00		1.52E+01		mg/kg	S-11-08-01-2-4	4/4	2.50E+00 - 5.40E+00	1.52E+01	NA	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.61E+02	J	1.43E+03		mg/kg	S-11-08-04-2-4	4/4	6.30E+02 - 6.80E+02	1.43E+03	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.88E+02**		**3.04E+03**		**mg/kg**	**S-11-08-01-2-4**	**4/4**	**1.90E+00 - 2.00E+00**	**3.04E+03**	**NA**	**2.30E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	7.00E-02		2.65E-01		mg/kg	S-11-08-04-2-4	4/4	3.80E-02 - 4.15E-02	2.65E-01	NA	3.40E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	9.05E+00		1.50E+01		mg/kg	S-11-08-01-2-4	4/4	5.10E+00 - 1.10E+01	1.50E+01	NA	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	3.88E+02	J	5.18E+02	J / J	mg/kg	S-11-08-04-2-4	4/4	1.30E+03 - 1.40E+03	5.18E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.60E+00		4.30E+00		mg/kg	S-11-08-03-2-4	4/4	6.30E-01 - 1.30E+00	4.30E+00	NA	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	3.42E+01	J	9.78E+01	J / J	mg/kg	S-11-08-04-2-4	4/4	1.30E+03 - 1.40E+03	9.78E+01	NA	NA		NA	NA	No	NUT
7440-31-5	TIN	2.20E+00	J	2.50E+00	J	mg/kg	S-11-08-02-2-4	4/4	6.30E+00 - 6.80E+00	2.50E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**1.42E+02**		**2.41E+02**		**mg/kg**	**S-11-08-03-2-4**	**4/4**	**1.30E+00 - 1.40E+00**	**2.41E+02**	**NA**	**7.20E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	3.86E+01		5.78E+01		mg/kg	S-11-08-01-2-4	4/4	2.50E+00 - 2.70E+00	5.78E+01	NA	3.10E+04	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	3.81E+01		8.79E+01		mg/kg	S-11-08-03-2-4	3/4	8.40E+00 - 8.90E+00	8.79E+01	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
67-64-1	ACETONE	3.56E-02		5.23E-02		mg/kg	S-11-08-01-2-4	3/4	8.90E-03 - 1.20E-02	5.23E-02	NA	6.30E+04	N	NA	NA	No	BSL
108-88-3	TOLUENE	6.60E-04	J	6.60E-04	J	mg/kg	S-11-08-01-2-4	1/4	8.90E-04 - 1.20E-03	6.60E-04	NA	4.50E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.13.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 13: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 13

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES										
87-86-5	PENTACHLOROPHENOL	5.70E-03		5.70E-03		mg/kg	S-13-08-07-2-4	1/1	2.10E-03 - 2.10E-03	5.70E-03	NA	3.00E+00	C	NA	NA	No	BSL
							INORGANICS										
7429-90-5	**ALUMINUM**	**1.82E+04**	**J / J**	**1.82E+04**	**J / J**	**mg/kg**	**S-13-08-07-2-4**	**1/1**	**2.45E+01 - 2.45E+01**	**1.82E+04**	**NA**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	6.45E-01	J / J	6.45E-01	J / J	mg/kg	S-13-08-07-2-4	1/1	2.45E+00 - 2.45E+00	6.45E-01	NA	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**1.66E+01**		**1.66E+01**		**mg/kg**	**S-13-08-07-2-4**	**1/1**	**3.65E-01 - 3.65E-01**	**1.66E+01**	**NA**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	6.01E+01	J / J	6.01E+01	J / J	mg/kg	S-13-08-07-2-4	1/1	2.45E+01 - 2.45E+01	6.01E+01	NA	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	2.35E-01	J / J	2.35E-01	J / J	mg/kg	S-13-08-07-2-4	1/1	6.10E-01 - 6.10E-01	2.35E-01	NA	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	4.05E-01	J / J	4.05E-01	J / J	mg/kg	S-13-08-07-2-4	1/1	6.10E-01 - 6.10E-01	4.05E-01	NA	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.64E+04	J / J	4.64E+04	J / J	mg/kg	S-13-08-07-2-4	1/1	9.10E+02 - 9.10E+02	4.64E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**2.95E+01**		**2.95E+01**		**mg/kg**	**S-13-08-07-2-4**	**1/1**	**1.20E+00 - 1.20E+00**	**2.95E+01**	**NA**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**1.34E+01**		**1.34E+01**		**mg/kg**	**S-13-08-07-2-4**	**1/1**	**6.10E+00 - 6.10E+00**	**1.34E+01**	**NA**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	4.19E+01	J / J	4.19E+01	J / J	mg/kg	S-13-08-07-2-4	1/1	3.05E+00 - 3.05E+00	4.19E+01	NA	3.10E+02	N	NA	NA	No	BSL
7439-89-6	IRON	2.55E+04		2.55E+04		mg/kg	S-13-08-07-2-4	1/1	1.20E+01 - 1.20E+01	2.55E+04	NA	5.50E+03	N	NA	NA	No	NUT
7439-92-1	LEAD	1.28E+02	J / J	1.28E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	3.65E+00 - 3.65E+00	1.28E+02	NA	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.91E+03	J / J	2.91E+03	J / J	mg/kg	S-13-08-07-2-4	1/1	6.10E+02 - 6.10E+02	2.91E+03	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**7.53E+02**		**7.53E+02**		**mg/kg**	**S-13-08-07-2-4**	**1/1**	**1.85E+00 - 1.85E+00**	**7.53E+02**	**NA**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	3.25E-01		3.25E-01		mg/kg	S-13-08-07-2-4	1/1	3.80E-02 - 3.80E-02	3.25E-01	NA	5.60E-01	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.16E+01		1.16E+01		mg/kg	S-13-08-07-2-4	1/1	4.90E+00 - 4.90E+00	1.16E+01	NA	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	7.12E+02	J / J	7.12E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	1.20E+03 - 1.20E+03	7.12E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.90E+00		1.90E+00		mg/kg	S-13-08-07-2-4	1/1	6.10E-01 - 6.10E-01	1.90E+00	NA	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	1.26E+02	J / J	1.26E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	1.20E+03 - 1.20E+03	1.26E+02	NA	NA		NA	NA	No	NUT
7440-31-5	TIN	3.65E+00	J / J	3.65E+00	J / J	mg/kg	S-13-08-07-2-4	1/1	6.10E+00 - 6.10E+00	3.65E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**7.17E+01**	**J / J**	**7.17E+01**	**J / J**	**mg/kg**	**S-13-08-07-2-4**	**1/1**	**1.20E+00 - 1.20E+00**	**7.17E+01**	**NA**	**5.50E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.14E+02	J / J	1.14E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	2.45E+00 - 2.45E+00	1.14E+02	NA	2.30E+03	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	2.26E-02	J	2.26E-02	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-03 - 1.70E-03	2.26E-02	NA	2.00E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.65E-01	J	3.65E-01	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-02 - 1.70E-02	3.65E-01	NA	1.40E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	1.36E-01	J	1.36E-01	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-02 - 1.70E-02	1.36E-01	NA	1.70E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	7.10E-03	J	7.10E-03	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-03 - 1.70E-03	7.10E-03	NA	1.60E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
208-96-8	ACENAPHTHYLENE	1.37E-02	J	1.37E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.37E-02	NA	3.60E+00	C	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	8.03E-02	J	8.03E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	8.03E-02	NA	1.50E-01	C	NA	NA	No	BSL
50-32-8	**BENZO(A)PYRENE**	**8.78E-02**	**J**	**8.78E-02**	**J**	**mg/kg**	**S-13-08-07-2-4**	**1/1**	**8.20E-03 - 8.20E-03**	**8.78E-02**	**NA**	**1.50E-02**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	**1.74E-01**	**J**	**1.74E-01**	**J**	**mg/kg**	**S-13-08-07-2-4**	**1/1**	**8.20E-03 - 8.20E-03**	**1.74E-01**	**NA**	**1.50E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	2.47E-02	J	2.47E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	2.47E-02	NA	1.70E+02	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	1.18E-01	J	1.18E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.18E-01	NA	1.50E+00	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.06E-01	J	1.06E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.06E-01	NA	1.50E+01	C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	1.25E-02	J	1.25E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.25E-02	NA	1.50E-02	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	1.12E-01		1.12E-01		mg/kg	S-13-08-07-2-4	1/1	4.10E-02 - 4.10E-02	1.12E-01	NA	2.30E+02	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	2.91E-02	J	2.91E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	2.91E-02	NA	1.50E-01	C	NA	NA	No	BSL
129-00-0	PYRENE	1.09E-01		1.09E-01		mg/kg	S-13-08-07-2-4	1/1	4.10E-02 - 4.10E-02	1.09E-01	NA	1.70E+02	N	NA	NA	No	BSL
							SEMI-VOLATILE ORGANIC COMPOUNDS										
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	6.25E-02	J	6.25E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.60E-02 - 8.60E-02	6.25E-02	NA	3.50E+01	C	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.17E+02	J / J	1.17E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	8.30E+00 - 8.30E+00	1.17E+02	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
75-35-4	1,1-DICHLOROETHENE	1.20E-03	J	1.20E-03	J	mg/kg	S-13-08-07-2-4	1/1	6.60E-03 - 6.60E-03	1.20E-03	NA	2.40E+01	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Naphthalene for Acenaphthylene, and Pyrene for Benzo[g,h,i]perylene.

TABLE 7.2.13.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 13: POTENTIAL HAZARDOUS MATERIAL BURIAL SITE - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 13

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							HERBICIDES										
87-86-5	PENTACHLOROPHENOL	5.70E-03		5.70E-03		mg/kg	S-13-08-07-2-4	1/1	2.10E-03 - 2.10E-03	5.70E-03	NA	9.00E+00	C	NA	NA	No	BSL
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	1.82E+04	J / J	1.82E+04	J / J	mg/kg	S-13-08-07-2-4	1/1	2.45E+01 - 2.45E+01	1.82E+04	NA	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	6.45E-01	J / J	6.45E-01	J / J	mg/kg	S-13-08-07-2-4	1/1	2.45E+00 - 2.45E+00	6.45E-01	NA	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**1.66E+01**		**1.66E+01**		**mg/kg**	**S-13-08-07-2-4**	**1/1**	**3.65E-01 - 3.65E-01**	**1.66E+01**	**NA**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	6.01E+01	J / J	6.01E+01	J / J	mg/kg	S-13-08-07-2-4	1/1	2.45E+01 - 2.45E+01	6.01E+01	NA	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	2.35E-01	J / J	2.35E-01	J / J	mg/kg	S-13-08-07-2-4	1/1	6.10E-01 - 6.10E-01	2.35E-01	NA	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	4.05E-01	J / J	4.05E-01	J / J	mg/kg	S-13-08-07-2-4	1/1	6.10E-01 - 6.10E-01	4.05E-01	NA	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.64E+04	J / J	4.64E+04	J / J	mg/kg	S-13-08-07-2-4	1/1	9.10E+02 - 9.10E+02	4.64E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**2.95E+01**		**2.95E+01**		**mg/kg**	**S-13-08-07-2-4**	**1/1**	**1.20E+00 - 1.20E+00**	**2.95E+01**	**NA**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	1.34E+01		1.34E+01		mg/kg	S-13-08-07-2-4	1/1	6.10E+00 - 6.10E+00	1.34E+01	NA	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	4.19E+01	J / J	4.19E+01	J / J	mg/kg	S-13-08-07-2-4	1/1	3.05E+00 - 3.05E+00	4.19E+01	NA	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	2.55E+04		2.55E+04		mg/kg	S-13-08-07-2-4	1/1	1.20E+01 - 1.20E+01	2.55E+04	NA	7.20E+04	N	NA	NA	No	NUT
7439-92-1	LEAD	1.28E+02	J / J	1.28E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	3.65E+00 - 3.65E+00	1.28E+02	NA	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.91E+03	J / J	2.91E+03	J / J	mg/kg	S-13-08-07-2-4	1/1	6.10E+02 - 6.10E+02	2.91E+03	NA	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	7.53E+02		7.53E+02		mg/kg	S-13-08-07-2-4	1/1	1.85E+00 - 1.85E+00	7.53E+02	NA	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	3.25E-01		3.25E-01		mg/kg	S-13-08-07-2-4	1/1	3.80E-02 - 3.80E-02	3.25E-01	NA	3.40E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.16E+01		1.16E+01		mg/kg	S-13-08-07-2-4	1/1	4.90E+00 - 4.90E+00	1.16E+01	NA	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	7.12E+02	J / J	7.12E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	1.20E+03 - 1.20E+03	7.12E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.90E+00		1.90E+00		mg/kg	S-13-08-07-2-4	1/1	6.10E-01 - 6.10E-01	1.90E+00	NA	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	1.26E+02	J / J	1.26E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	1.20E+03 - 1.20E+03	1.26E+02	NA	NA		NA	NA	No	NUT
7440-31-5	TIN	3.65E+00	J / J	3.65E+00	J / J	mg/kg	S-13-08-07-2-4	1/1	6.10E+00 - 6.10E+00	3.65E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**7.17E+01**	**J / J**	**7.17E+01**	**J / J**	**mg/kg**	**S-13-08-07-2-4**	**1/1**	**1.20E+00 - 1.20E+00**	**7.17E+01**	**NA**	**7.20E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.14E+02	J / J	1.14E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	2.45E+00 - 2.45E+00	1.14E+02	NA	3.10E+04	N	NA	NA	No	BSL
							PESTICIDES/PCBS										
72-54-8	4,4-DDD	2.26E-02	J	2.26E-02	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-03 - 1.70E-03	2.26E-02	NA	7.20E+00	C	NA	NA	No	BSL
72-55-9	4,4-DDE	3.65E-01	J	3.65E-01	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-02 - 1.70E-02	3.65E-01	NA	5.10E+00	C	NA	NA	No	BSL
50-29-3	4,4-DDT	1.36E-01	J	1.36E-01	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-02 - 1.70E-02	1.36E-01	NA	7.00E+00	C	NA	NA	No	BSL
5103-71-9	ALPHA-CHLORDANE	7.10E-03	J	7.10E-03	J	mg/kg	S-13-08-07-2-4	1/1	1.70E-03 - 1.70E-03	7.10E-03	NA	6.50E+00	C	NA	NA	No	BSL
							POLYCYCLIC AROMATIC HYDROCARBONS										
208-96-8	ACENAPHTHYLENE	1.37E-02	J	1.37E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.37E-02	NA	1.80E+01	C	NA	NA	No	BSL
56-55-3	BENZO(A)ANTHRACENE	8.03E-02	J	8.03E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	8.03E-02	NA	2.10E+00	C	NA	NA	No	BSL
50-32-8	BENZO(A)PYRENE	8.78E-02	J	8.78E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	8.78E-02	NA	2.10E-01	C	NA	NA	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	1.74E-01	J	1.74E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.74E-01	NA	2.10E+00	C	NA	NA	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	2.47E-02	J	2.47E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	2.47E-02	NA	1.70E+03	N	NA	NA	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	1.18E-01	J	1.18E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.18E-01	NA	2.10E+01	C	NA	NA	No	BSL
218-01-9	CHRYSENE	1.06E-01	J	1.06E-01	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.06E-01	NA	2.10E+02	C	NA	NA	No	BSL
53-70-3	DIBENZ(A,H)ANTHRACENE	1.25E-02	J	1.25E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	1.25E-02	NA	2.10E-01	C	NA	NA	No	BSL
206-44-0	FLUORANTHENE	1.12E-01		1.12E-01		mg/kg	S-13-08-07-2-4	1/1	4.10E-02 - 4.10E-02	1.12E-01	NA	2.20E+03	N	NA	NA	No	BSL
193-39-5	INDENO(1,2,3-C,D)PYRENE	2.91E-02	J	2.91E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.20E-03 - 8.20E-03	2.91E-02	NA	2.10E+00	C	NA	NA	No	BSL
129-00-0	PYRENE	1.09E-01		1.09E-01		mg/kg	S-13-08-07-2-4	1/1	4.10E-02 - 4.10E-02	1.09E-01	NA	1.70E+03	N	NA	NA	No	BSL
							SEMI-VOLATILE ORGANIC COMPOUNDS										
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	6.25E-02	J	6.25E-02	J	mg/kg	S-13-08-07-2-4	1/1	8.60E-02 - 8.60E-02	6.25E-02	NA	1.20E+02	C	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.17E+02	J / J	1.17E+02	J / J	mg/kg	S-13-08-07-2-4	1/1	8.30E+00 - 8.30E+00	1.17E+02	NA	NA		NA	NA	No	NSL
							VOLATILE ORGANIC COMPOUNDS										
75-35-4	1,1-DICHLOROETHENE	1.20E-03	J	1.20E-03	J	mg/kg	S-13-08-07-2-4	1/1	6.60E-03 - 6.60E-03	1.20E-03	NA	1.10E+02	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Biphenyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

Surrogates used: Chlordane for Alpha-Chlordane, Naphthalene for Acenaphthylene, and Pyrene for Benzo[g,h,i]perylene.

TABLE 7.2.15.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 15: BUILDING S-159 - SURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 15

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-TOTAL										
7429-90-5	**ALUMINUM**	**2.46E+04**		**2.57E+04**		**mg/kg**	**S-15-08-01-0-1**	**2/2**	**2.30E+01 - 2.30E+01**	**2.57E+04**	**3.40E+04**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	1.60E+00	J	2.70E+00	J	mg/kg	S-15-08-01-0-1	2/2	2.30E+00 - 2.30E+00	2.70E+00	2.20E+00	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**6.00E+00**		**2.05E+01**		**mg/kg**	**S-15-08-02-0-1**	**2/2**	**3.50E-01 - 3.50E-01**	**2.05E+01**	**4.71E+01**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.97E+01		5.26E+01		mg/kg	S-15-08-01-0-1	2/2	2.30E+01 - 2.30E+01	5.26E+01	1.18E+02	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	2.80E-01	J	1.40E+00		mg/kg	S-15-08-01-0-1	2/2	5.80E-01 - 5.90E-01	1.40E+00	7.70E-01	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	4.80E-01	J	1.40E+00		mg/kg	S-15-08-01-0-1	2/2	5.80E-01 - 5.90E-01	1.40E+00	3.05E+00	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.04E+04		4.29E+04		mg/kg	S-15-08-01-0-1	2/2	5.80E+02 - 5.90E+02	4.29E+04	1.17E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**4.41E+01**	**J**	**4.83E+01**	**J**	**mg/kg**	**S-15-08-01-0-1**	**2/2**	**1.20E+00 - 1.20E+00**	**4.83E+01**	**8.97E+01**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**6.30E+00**		**1.74E+01**		**mg/kg**	**S-15-08-01-0-1**	**2/2**	**5.80E+00 - 5.90E+00**	**1.74E+01**	**2.80E+01**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	3.09E+01		1.11E+02		mg/kg	S-15-08-01-0-1	2/2	2.90E+00 - 2.90E+00	1.11E+02	1.11E+02	3.10E+02	N	NA	NA	No	BSL
7439-89-6	IRON	3.11E+04		4.13E+04		mg/kg	S-15-08-01-0-1	2/2	1.20E+01 - 1.20E+01	4.13E+04	5.43E+04	5.50E+03	N	NA	NA	No	NUT
7439-92-1	LEAD	1.40E+01		3.21E+01		mg/kg	S-15-08-01-0-1	2/2	2.30E+00 - 2.30E+00	3.21E+01	1.52E+02	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.75E+03		1.32E+04		mg/kg	S-15-08-01-0-1	2/2	5.80E+02 - 5.90E+02	1.32E+04	8.92E+03	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**4.80E+02**		**9.17E+02**		**mg/kg**	**S-15-08-01-0-1**	**2/2**	**1.70E+00 - 1.80E+00**	**9.17E+02**	**1.28E+03**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	3.20E-02	J	1.00E-01		mg/kg	S-15-08-02-0-1	2/2	3.50E-02 - 3.80E-02	1.00E-01	1.10E+00	5.60E-01	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.00E+01		3.52E+01		mg/kg	S-15-08-01-0-1	2/2	4.60E+00 - 4.70E+00	3.52E+01	4.23E+01	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.29E+02	J	6.09E+02	J	mg/kg	S-15-08-02-0-1	2/2	1.20E+03 - 1.20E+03	6.09E+02	1.71E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	6.40E-01		9.30E-01		mg/kg	S-15-08-02-0-1	2/2	5.80E-01 - 5.90E-01	9.30E-01	1.00E+00	3.90E+01	N	NA	NA	No	BSL
7440-22-4	SILVER	1.40E-01	J	1.40E-01	J	mg/kg	S-15-08-01-0-1	1/2	1.20E+00 - 1.20E+00	1.40E-01	2.00E+00	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	1.43E+02	J	4.05E+02	J	mg/kg	S-15-08-01-0-1	2/2	1.20E+03 - 1.20E+03	4.05E+02	2.71E+02	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	3.50E-01	J	1.10E+00	J	mg/kg	S-15-08-01-0-1	2/2	1.20E+00 - 1.20E+00	1.10E+00	1.10E+00	NA		NA	NA	No	NSL
7440-31-5	TIN	3.70E+00	J	1.36E+01		mg/kg	S-15-08-01-0-1	2/2	5.80E+00 - 5.90E+00	1.36E+01	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**8.96E+01**		**1.62E+02**		**mg/kg**	**S-15-08-01-0-1**	**2/2**	**1.20E+00 - 1.20E+00**	**1.62E+02**	**1.76E+02**	**5.50E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	6.28E+01	J	2.60E+02	J	mg/kg	S-15-08-01-0-1	2/2	2.30E+00 - 2.30E+00	2.60E+02	6.03E+02	2.30E+03	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.99E+01		2.33E+02		mg/kg	S-15-08-01-0-1	2/2	8.10E+00 - 4.00E+01	2.33E+02	NA	NA		NA	NA	No	NSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.15.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 15: BUILDING S-159 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: Site 15

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	2.46E+04		2.57E+04		mg/kg	S-15-08-01-0-1	2/2	2.30E+01 - 2.30E+01	2.57E+04	3.40E+04	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	1.60E+00	J	2.70E+00	J	mg/kg	S-15-08-01-0-1	2/2	2.30E+00 - 2.30E+00	2.70E+00	2.20E+00	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**6.00E+00**		**2.05E+01**		**mg/kg**	**S-15-08-02-0-1**	**2/2**	**3.50E-01 - 3.50E-01**	**2.05E+01**	**4.71E+01**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.97E+01		5.26E+01		mg/kg	S-15-08-01-0-1	2/2	2.30E+01 - 2.30E+01	5.26E+01	1.18E+02	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	2.80E-01	J	1.40E+00		mg/kg	S-15-08-01-0-1	2/2	5.80E-01 - 5.90E-01	1.40E+00	7.70E-01	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	4.80E-01	J	1.40E+00		mg/kg	S-15-08-01-0-1	2/2	5.80E-01 - 5.90E-01	1.40E+00	3.05E+00	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	4.04E+04		4.29E+04		mg/kg	S-15-08-01-0-1	2/2	5.80E+02 - 5.90E+02	4.29E+04	1.17E+05	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**4.41E+01**	**J**	**4.83E+01**	**J**	**mg/kg**	**S-15-08-01-0-1**	**2/2**	**1.20E+00 - 1.20E+00**	**4.83E+01**	**8.97E+01**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	6.30E+00		1.74E+01		mg/kg	S-15-08-01-0-1	2/2	5.80E+00 - 5.90E+00	1.74E+01	2.80E+01	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	3.09E+01		1.11E+02		mg/kg	S-15-08-01-0-1	2/2	2.90E+00 - 2.90E+00	1.11E+02	1.11E+02	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	3.11E+04		4.13E+04		mg/kg	S-15-08-01-0-1	2/2	1.20E+01 - 1.20E+01	4.13E+04	5.43E+04	7.20E+04	N	NA	NA	No	NUT
7439-92-1	LEAD	1.40E+01		3.21E+01		mg/kg	S-15-08-01-0-1	2/2	2.30E+00 - 2.30E+00	3.21E+01	1.52E+02	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	2.75E+03		1.32E+04		mg/kg	S-15-08-01-0-1	2/2	5.80E+02 - 5.90E+02	1.32E+04	8.92E+03	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	4.80E+02		9.17E+02		mg/kg	S-15-08-01-0-1	2/2	1.70E+00 - 1.80E+00	9.17E+02	1.28E+03	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	3.20E-02	J	1.00E-01		mg/kg	S-15-08-02-0-1	2/2	3.50E-02 - 3.80E-02	1.00E-01	1.10E+00	3.40E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	1.00E+01		3.52E+01		mg/kg	S-15-08-01-0-1	2/2	4.60E+00 - 4.70E+00	3.52E+01	4.23E+01	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	5.29E+02	J	6.09E+02	J	mg/kg	S-15-08-02-0-1	2/2	1.20E+03 - 1.20E+03	6.09E+02	1.71E+03	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	6.40E-01		9.30E-01		mg/kg	S-15-08-02-0-1	2/2	5.80E-01 - 5.90E-01	9.30E-01	1.00E+00	5.10E+02	N	NA	NA	No	BSL
7440-22-4	SILVER	1.40E-01	J	1.40E-01	J	mg/kg	S-15-08-01-0-1	1/2	1.20E+00 - 1.20E+00	1.40E-01	2.00E+00	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	1.43E+02	J	4.05E+02	J	mg/kg	S-15-08-01-0-1	2/2	1.20E+03 - 1.20E+03	4.05E+02	2.71E+02	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	3.50E-01	J	1.10E+00	J	mg/kg	S-15-08-01-0-1	2/2	1.20E+00 - 1.20E+00	1.10E+00	1.10E+00	NA		NA	NA	No	NSL
7440-31-5	TIN	3.70E+00	J	1.36E+01		mg/kg	S-15-08-01-0-1	2/2	5.80E+00 - 5.90E+00	1.36E+01	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**8.96E+01**		**1.62E+02**		**mg/kg**	**S-15-08-01-0-1**	**2/2**	**1.20E+00 - 1.20E+00**	**1.62E+02**	**1.76E+02**	**7.20E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	6.28E+01	J	2.60E+02	J	mg/kg	S-15-08-01-0-1	2/2	2.30E+00 - 2.30E+00	2.60E+02	6.03E+02	3.10E+04	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	1.99E+01		2.33E+02		mg/kg	S-15-08-01-0-1	2/2	8.10E+00 - 4.00E+01	2.33E+02	NA	NA		NA	NA	No	NSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.15.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 15: BUILDING S-159 - SUBSURFACE SOIL - RESIDENTIAL

Scenario Timeframe: Current/Future-Residential
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 15

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-TOTAL										
7429-90-5	**ALUMINUM**	**1.90E+04**		**2.75E+04**		**mg/kg**	**S-15-08-01-2-4**	**2/2**	**2.50E+01 - 2.70E+01**	**2.75E+04**	**NA**	**7.70E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-36-0	ANTIMONY	1.30E+00	J	2.70E+00	J	mg/kg	S-15-08-01-2-4	2/2	2.50E+00 - 2.70E+00	2.70E+00	NA	3.10E+00	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**1.80E+01**		**4.52E+01**		**mg/kg**	**S-15-08-01-2-4**	**2/2**	**3.80E-01 - 4.10E-01**	**4.52E+01**	**NA**	**3.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.88E+01		3.82E+01		mg/kg	S-15-08-01-2-4	2/2	2.50E+01 - 2.70E+01	3.82E+01	NA	1.50E+03	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.30E-01	J	4.40E-01	J	mg/kg	S-15-08-01-2-4	2/2	6.30E-01 - 6.80E-01	4.40E-01	NA	1.60E+01	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.70E-01	J	5.50E-01	J	mg/kg	S-15-08-01-2-4	2/2	6.30E-01 - 6.80E-01	5.50E-01	NA	7.00E+00	N	NA	NA	No	BSL
7440-70-2	CALCIUM	2.54E+03		2.89E+04		mg/kg	S-15-08-01-2-4	2/2	6.30E+02 - 6.80E+02	2.89E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**3.68E+01**	**J**	**8.93E+01**	**J**	**mg/kg**	**S-15-08-01-2-4**	**2/2**	**1.30E+00 - 1.40E+00**	**8.93E+01**	**NA**	**2.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	**COBALT**	**3.80E+00**	**J**	**9.30E+00**		**mg/kg**	**S-15-08-01-2-4**	**2/2**	**6.30E+00 - 6.80E+00**	**9.30E+00**	**NA**	**2.30E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	COPPER	1.56E+01		6.22E+01		mg/kg	S-15-08-01-2-4	2/2	3.20E+00 - 3.40E+00	6.22E+01	NA	3.10E+02	N	NA	NA	No	BSL
7439-89-6	IRON	3.29E+04		4.58E+04		mg/kg	S-15-08-01-2-4	2/2	1.30E+01 - 1.40E+01	4.58E+04	NA	5.50E+03	N	NA	NA	No	NUT
7439-92-1	LEAD	5.50E+00		2.14E+01		mg/kg	S-15-08-01-2-4	2/2	2.50E+00 - 2.70E+00	2.14E+01	NA	4.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	8.80E+02		1.79E+03		mg/kg	S-15-08-01-2-4	2/2	6.30E+02 - 6.80E+02	1.79E+03	NA	NA		NA	NA	No	NUT
7439-96-5	**MANGANESE**	**1.05E+02**		**9.17E+02**		**mg/kg**	**S-15-08-01-2-4**	**2/2**	**1.90E+00 - 2.00E+00**	**9.17E+02**	**NA**	**1.80E+02**	**N**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	MERCURY	4.80E-02		1.00E-01		mg/kg	S-15-08-01-2-4	2/2	4.10E-02 - 4.10E-02	1.00E-01	NA	5.60E-01	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.30E+00	J	1.40E+01		mg/kg	S-15-08-01-2-4	2/2	5.10E+00 - 5.50E+00	1.40E+01	NA	1.50E+02	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	4.46E+02	J	6.18E+02	J	mg/kg	S-15-08-01-2-4	2/2	1.30E+03 - 1.40E+03	6.18E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.60E+00		2.00E+00		mg/kg	S-15-08-01-2-4	2/2	6.30E-01 - 6.80E-01	2.00E+00	NA	3.90E+01	N	NA	NA	No	BSL
7440-23-5	SODIUM	4.35E+01	J	1.25E+02	J	mg/kg	S-15-08-01-2-4	2/2	1.30E+03 - 1.40E+03	1.25E+02	NA	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	2.50E-01	J	8.00E-01	J	mg/kg	S-15-08-01-2-4	2/2	1.30E+00 - 1.40E+00	8.00E-01	NA	NA		NA	NA	No	NSL
7440-31-5	TIN	3.10E+00	J	4.40E+00	J	mg/kg	S-15-08-01-2-4	2/2	6.30E+00 - 6.80E+00	4.40E+00	NA	4.70E+03	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**8.02E+01**		**1.39E+02**		**mg/kg**	**S-15-08-01-2-4**	**2/2**	**1.30E+00 - 1.40E+00**	**1.39E+02**	**NA**	**5.50E-01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.53E+01	J	6.03E+01	J	mg/kg	S-15-08-01-2-4	2/2	2.50E+00 - 2.70E+00	6.03E+01	NA	2.30E+03	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	4.51E+01		4.51E+01		mg/kg	S-15-08-01-2-4	1/2	8.30E+00 - 8.50E+00	4.51E+01	NA	NA		NA	NA	No	NSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the residential soil value. For carcinogens the value shown is equal to the residential soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

TABLE 7.2.15.4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
FORT BUCHANAN
SITE 15: BUILDING S-159 - SUBSURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current/Future-Industrial
Medium: Subsurface soil
Exposure Medium: Subsurface soil
Exposure Point: Site 15

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
							INORGANICS-TOTAL										
7429-90-5	ALUMINUM	1.90E+04		2.75E+04		mg/kg	S-15-08-01-2-4	2/2	2.50E+01 - 2.70E+01	2.75E+04	NA	9.90E+04	N	NA	NA	No	BSL
7440-36-0	ANTIMONY	1.30E+00	J	2.70E+00	J	mg/kg	S-15-08-01-2-4	2/2	2.50E+00 - 2.70E+00	2.70E+00	NA	4.10E+01	N	NA	NA	No	BSL
7440-38-2	**ARSENIC**	**1.80E+01**		**4.52E+01**		**mg/kg**	**S-15-08-01-2-4**	**2/2**	**3.80E-01 - 4.10E-01**	**4.52E+01**	**NA**	**1.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-39-3	BARIUM	2.88E+01		3.82E+01		mg/kg	S-15-08-01-2-4	2/2	2.50E+01 - 2.70E+01	3.82E+01	NA	1.90E+04	N	NA	NA	No	BSL
7440-41-7	BERYLLIUM	1.30E-01	J	4.40E-01	J	mg/kg	S-15-08-01-2-4	2/2	6.30E-01 - 6.80E-01	4.40E-01	NA	2.00E+02	N	NA	NA	No	BSL
7440-43-9	CADMIUM	2.70E-01	J	5.50E-01	J	mg/kg	S-15-08-01-2-4	2/2	6.30E-01 - 6.80E-01	5.50E-01	NA	8.00E+01	N	NA	NA	No	BSL
7440-70-2	CALCIUM	2.54E+03		2.89E+04		mg/kg	S-15-08-01-2-4	2/2	6.30E+02 - 6.80E+02	2.89E+04	NA	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	**3.68E+01**	**J**	**8.93E+01**	**J**	**mg/kg**	**S-15-08-01-2-4**	**2/2**	**1.30E+00 - 1.40E+00**	**8.93E+01**	**NA**	**5.60E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-48-4	COBALT	3.80E+00	J	9.30E+00		mg/kg	S-15-08-01-2-4	2/2	6.30E+00 - 6.80E+00	9.30E+00	NA	3.00E+01	N	NA	NA	No	BSL
7440-50-8	COPPER	1.56E+01		6.22E+01		mg/kg	S-15-08-01-2-4	2/2	3.20E+00 - 3.40E+00	6.22E+01	NA	4.10E+03	N	NA	NA	No	BSL
7439-89-6	IRON	3.29E+04		4.58E+04		mg/kg	S-15-08-01-2-4	2/2	1.30E+01 - 1.40E+01	4.58E+04	NA	7.20E+04	N	NA	NA	No	NUT
7439-92-1	LEAD	5.50E+00		2.14E+01		mg/kg	S-15-08-01-2-4	2/2	2.50E+00 - 2.70E+00	2.14E+01	NA	8.00E+02	N	NA	NA	No	BSL
7439-95-4	MAGNESIUM	8.80E+02		1.79E+03		mg/kg	S-15-08-01-2-4	2/2	6.30E+02 - 6.80E+02	1.79E+03	NA	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	1.05E+02		9.17E+02		mg/kg	S-15-08-01-2-4	2/2	1.90E+00 - 2.00E+00	9.17E+02	NA	2.30E+03	N	NA	NA	No	BSL
7439-97-6	MERCURY	4.80E-02		1.00E-01		mg/kg	S-15-08-01-2-4	2/2	4.10E-02 - 4.10E-02	1.00E-01	NA	3.40E+00	N	NA	NA	No	BSL
7440-02-0	NICKEL	3.30E+00	J	1.40E+01		mg/kg	S-15-08-01-2-4	2/2	5.10E+00 - 5.50E+00	1.40E+01	NA	2.00E+03	N	NA	NA	No	BSL
7440-09-7	POTASSIUM	4.46E+02	J	6.18E+02	J	mg/kg	S-15-08-01-2-4	2/2	1.30E+03 - 1.40E+03	6.18E+02	NA	NA		NA	NA	No	NUT
7782-49-2	SELENIUM	1.60E+00		2.00E+00		mg/kg	S-15-08-01-2-4	2/2	6.30E-01 - 6.80E-01	2.00E+00	NA	5.10E+02	N	NA	NA	No	BSL
7440-23-5	SODIUM	4.35E+01	J	1.25E+02	J	mg/kg	S-15-08-01-2-4	2/2	1.30E+03 - 1.40E+03	1.25E+02	NA	NA		NA	NA	No	NUT
7440-28-0	THALLIUM	2.50E-01	J	8.00E-01	J	mg/kg	S-15-08-01-2-4	2/2	1.30E+00 - 1.40E+00	8.00E-01	NA	NA		NA	NA	No	NSL
7440-31-5	TIN	3.10E+00	J	4.40E+00	J	mg/kg	S-15-08-01-2-4	2/2	6.30E+00 - 6.80E+00	4.40E+00	NA	6.10E+04	N	NA	NA	No	BSL
7440-62-2	**VANADIUM**	**8.02E+01**		**1.39E+02**		**mg/kg**	**S-15-08-01-2-4**	**2/2**	**1.30E+00 - 1.40E+00**	**1.39E+02**	**NA**	**7.20E+00**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	ZINC	1.53E+01	J	6.03E+01	J	mg/kg	S-15-08-01-2-4	2/2	2.50E+00 - 2.70E+00	6.03E+01	NA	3.10E+04	N	NA	NA	No	BSL
							TOTAL PETROLEUM HYDROCARBONS										
TPH-DRO	TPH-DRO (C10-C28)	4.51E+01		4.51E+01		mg/kg	S-15-08-01-2-4	1/2	8.30E+00 - 8.50E+00	4.51E+01	NA	NA		NA	NA	No	NSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels, USEPA, December 2009. For non-carcinogens, value shown is equal to 1/10 the industrial soil value. For carcinogens the value shown is equal to the industrial soil value.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
PCBS = Polychlorinated Bipheyls
mg/kg = milligrams per kilogram

Data Qualifiers: J = Value is estimated.

ATTACHMENT C

PROUCL OUTPUTS

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General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE17 8-SB_T_ALUMINUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_ALUMINUM

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics

Minimum	10175
Maximum	31800
Mean	22775
Median	25900
SD	9075
Coefficient of Variation	0.398
Skewness	-0.658

Log-transformed Statistics

Minimum of Log Data	9.228
Maximum of Log Data	10.37
Mean of log Data	9.953
SD of log Data	0.476

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical Value	0.762

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.882
Shapiro Wilk Critical Value	0.762

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	31427

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	28174
95% Modified-t UCL	31228

Assuming Lognormal Distribution

95% H-UCL	46567
95% Chebyshev (MVUE) UCL	44103
97.5% Chebyshev (MVUE) UCL	53245
99% Chebyshev (MVUE) UCL	71201

Gamma Distribution Test

k star (bias corrected)	2.688
Theta Star	8474
MLE of Mean	22775
MLE of Standard Deviation	13892
nu star	26.88
Approximate Chi Square Value (.05)	16.06
Adjusted Level of Significance	0.0086
Adjusted Chi Square Value	12.55
Anderson-Darling Test Statistic	0.38
Anderson-Darling 5% Critical Value	0.68
Kolmogorov-Smirnov Test Statistic	0.278
Kolmogorov-Smirnov 5% Critical Value	0.358

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	38123
95% Adjusted Gamma UCL	48776

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	29451
95% Jackknife UCL	31427
95% Standard Bootstrap UCL	28718
95% Bootstrap-t UCL	29941
95% Hall's Bootstrap UCL	27197
95% Percentile Bootstrap UCL	28440
95% BCA Bootstrap UCL	27780
95% Chebyshev(Mean, Sd) UCL	40466
97.5% Chebyshev(Mean, Sd) UCL	48121
99% Chebyshev(Mean, Sd) UCL	63158

Potential UCL to Use

Use 95% Student's-t UCL 31427

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE17 8-SB_T_ARSENIC.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_ARSENIC

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics		Log-transformed Statistics	
Minimum	7.55	Minimum of Log Data	2.022
Maximum	33.7	Maximum of Log Data	3.517
Mean	17.19	Mean of log Data	2.718
Median	14.1	SD of log Data	0.555
SD	10.07		
Coefficient of Variation	0.586		
Skewness	1.401		

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.893	Shapiro Wilk Test Statistic	0.988
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	26.79	95% H-UCL	42.11
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	35.38
95% Adjusted-CLT UCL	27.61	97.5% Chebyshev (MVUE) UCL	43.29
95% Modified-t UCL	27.26	99% Chebyshev (MVUE) UCL	58.84

Gamma Distribution Test		Data Distribution
k star (bias corrected)	1.781	Data appear Normal at 5% Significance Level
Theta Star	9.652	
MLE of Mean	17.19	
MLE of Standard Deviation	12.88	
nu star	17.81	
Approximate Chi Square Value (.05)	9.253	**Nonparametric Statistics**
Adjusted Level of Significance	0.0086	95% CLT UCL 24.59
Adjusted Chi Square Value	6.727	95% Jackknife UCL 26.79
		95% Standard Bootstrap UCL 23.76
Anderson-Darling Test Statistic	0.234	95% Bootstrap-t UCL 37.07
Anderson-Darling 5% Critical Value	0.681	95% Hall's Bootstrap UCL 66.84
Kolmogorov-Smirnov Test Statistic	0.188	95% Percentile Bootstrap UCL 24.55
Kolmogorov-Smirnov 5% Critical Value	0.358	95% BCA Bootstrap UCL 25.47
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 36.81
		97.5% Chebyshev(Mean, Sd) UCL 45.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 61.98
95% Approximate Gamma UCL	33.08	
95% Adjusted Gamma UCL	45.51	

Potential UCL to Use	Use 95% Student's-t UCL 26.79

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE17 8-SB_T_CHROMIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_CHROMIUM

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics		**Log-transformed Statistics**	
Minimum	14.7	Minimum of Log Data	2.688
Maximum	66.3	Maximum of Log Data	4.194
Mean	49.68	Mean of log Data	3.78
Median	62.3	SD of log Data	0.636
SD	21.71		
Coefficient of Variation	0.437		
Skewness	-1.398		

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.817	Shapiro Wilk Test Statistic	0.743
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	70.38	95% H-UCL	159.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	113.9
95% Adjusted-CLT UCL	59.16	97.5% Chebyshev (MVUE) UCL	141
95% Modified-t UCL	69.37	99% Chebyshev (MVUE) UCL	194.3

Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	1.786	Data appear Normal at 5% Significance Level
Theta Star	27.81	
MLE of Mean	49.68	
MLE of Standard Deviation	37.17	
nu star	17.86	
Approximate Chi Square Value (.05)	9.291	**Nonparametric Statistics**
Adjusted Level of Significance	0.0086	95% CLT UCL 65.65
Adjusted Chi Square Value	6.759	95% Jackknife UCL 70.38
		95% Standard Bootstrap UCL 63.94
Anderson-Darling Test Statistic	0.686	95% Bootstrap-t UCL 64.75
Anderson-Darling 5% Critical Value	0.681	95% Hall's Bootstrap UCL 59.35
Kolmogorov-Smirnov Test Statistic	0.339	95% Percentile Bootstrap UCL 63.3
Kolmogorov-Smirnov 5% Critical Value	0.358	95% BCA Bootstrap UCL 60
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 92
		97.5% Chebyshev(Mean, Sd) UCL 110.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 146.3
95% Approximate Gamma UCL	95.51	
95% Adjusted Gamma UCL	131.3	

Potential UCL to Use	Use 95% Student's-t UCL 70.38

Recommended UCL exceeds the maximum observation

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE17 8-SB_T_COBALT.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_COBALT

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics		Log-transformed Statistics	
Minimum	6.05	Minimum of Log Data	1.8
Maximum	56.6	Maximum of Log Data	4.036
Mean	20.43	Mean of log Data	2.691
Median	13.3	SD of log Data	0.853
SD	20.68		
Coefficient of Variation	1.012		
Skewness	1.997		

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.744	Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	40.14	95% H-UCL	131.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	50.89
95% Adjusted-CLT UCL	44.47	97.5% Chebyshev (MVUE) UCL	64.48
95% Modified-t UCL	41.52	99% Chebyshev (MVUE) UCL	91.19

Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.806	Data appear Gamma Distributed at 5% Significance Level
Theta Star	25.35	
MLE of Mean	20.43	
MLE of Standard Deviation	22.76	
nu star	8.058	
Approximate Chi Square Value (.05)	2.769	**Nonparametric Statistics**
Adjusted Level of Significance	0.0086	95% CLT UCL 35.64
Adjusted Chi Square Value	1.605	95% Jackknife UCL 40.14
		95% Standard Bootstrap UCL 33.94
Anderson-Darling Test Statistic	0.424	95% Bootstrap-t UCL 88.09
Anderson-Darling 5% Critical Value	0.686	95% Hall's Bootstrap UCL 103.6
Kolmogorov-Smirnov Test Statistic	0.276	95% Percentile Bootstrap UCL 36.93
Kolmogorov-Smirnov 5% Critical Value	0.361	95% BCA Bootstrap UCL 39.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 60.74
		97.5% Chebyshev(Mean, Sd) UCL 78.18
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 112.4
95% Approximate Gamma UCL	59.46	
95% Adjusted Gamma UCL	102.6	

Potential UCL to Use	Use 95% Approximate Gamma UCL 59.46

Recommended UCL exceeds the maximum observation

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE17 8-SB_T_MANGANESE.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_MANGANESE

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics		**Log-transformed Statistics**	
Minimum	191	Minimum of Log Data	5.252
Maximum	2050	Maximum of Log Data	7.626
Mean	665.1	Mean of log Data	6.106
Median	360.5	SD of log Data	0.897
SD	778.4		
Coefficient of Variation	1.17		
Skewness	2.175		

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.653	Shapiro Wilk Test Statistic	0.835
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1407	95% H-UCL	4968
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1640
95% Adjusted-CLT UCL	1599	97.5% Chebyshev (MVUE) UCL	2087
95% Modified-t UCL	1464	99% Chebyshev (MVUE) UCL	2963

Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	0.699	Data appear Lognormal at 5% Significance Level
Theta Star	951.4	
MLE of Mean	665.1	
MLE of Standard Deviation	795.5	
nu star	6.99	
Approximate Chi Square Value (.05)	2.165	**Nonparametric Statistics**
Adjusted Level of Significance	0.0086	95% CLT UCL 1238
Adjusted Chi Square Value	1.184	95% Jackknife UCL 1407
		95% Standard Bootstrap UCL 1173
Anderson-Darling Test Statistic	0.734	95% Bootstrap-t UCL 6592
Anderson-Darling 5% Critical Value	0.687	95% Hall's Bootstrap UCL 6185
Kolmogorov-Smirnov Test Statistic	0.397	95% Percentile Bootstrap UCL 1331
Kolmogorov-Smirnov 5% Critical Value	0.362	95% BCA Bootstrap UCL 1374
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 2182
		97.5% Chebyshev(Mean, Sd) UCL 2839
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 4129
95% Approximate Gamma UCL	2147	
95% Adjusted Gamma UCL	3928	

Potential UCL to Use	Use 95% H-UCL 4968

Recommended UCL exceeds the maximum observation

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE17 8-SB_T_MERCURY.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_MERCURY

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics		Log-transformed Statistics	
Minimum	0.045	Minimum of Log Data	-3.101
Maximum	3.008	Maximum of Log Data	1.101
Mean	0.673	Mean of log Data	-1.79
Median	0.084	SD of log Data	1.672
SD	1.306		
Coefficient of Variation	1.942		
Skewness	2.231		

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.579	Shapiro Wilk Test Statistic	0.782
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.917	95% H-UCL	496.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.687
95% Adjusted-CLT UCL	2.256	97.5% Chebyshev (MVUE) UCL	2.227
95% Modified-t UCL	2.015	99% Chebyshev (MVUE) UCL	3.289

Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.318	Data appear Lognormal at 5% Significance Level
Theta Star	2.115	
MLE of Mean	0.673	
MLE of Standard Deviation	1.193	
nu star	3.18	
Approximate Chi Square Value (.05)	0.428	**Nonparametric Statistics**
Adjusted Level of Significance	0.0086	95% CLT UCL 1.633
Adjusted Chi Square Value	0.161	95% Jackknife UCL 1.917
		95% Standard Bootstrap UCL 1.534
Anderson-Darling Test Statistic	0.905	95% Bootstrap-t UCL 43.02
Anderson-Darling 5% Critical Value	0.716	95% Hall's Bootstrap UCL 23.98
Kolmogorov-Smirnov Test Statistic	0.417	95% Percentile Bootstrap UCL 1.829
Kolmogorov-Smirnov 5% Critical Value	0.373	95% BCA Bootstrap UCL 1.851
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 3.218
		97.5% Chebyshev(Mean, Sd) UCL 4.32
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 6.483
95% Approximate Gamma UCL	5.001	
95% Adjusted Gamma UCL	13.28	

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) UCL 6.483

Recommended UCL exceeds the maximum observation

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE17 8-SB_T_VANADIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_VANADIUM

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics		Log-transformed Statistics	
Minimum	38.55	Minimum of Log Data	3.652
Maximum	139	Maximum of Log Data	4.934
Mean	84.49	Mean of log Data	4.348
Median	70.7	SD of log Data	0.483
SD	38.26		
Coefficient of Variation	0.453		
Skewness	0.498		

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.958	Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	121	95% H-UCL	174.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	164
95% Adjusted-CLT UCL	116.7	97.5% Chebyshev (MVUE) UCL	198.2
95% Modified-t UCL	121.6	99% Chebyshev (MVUE) UCL	265.5

Gamma Distribution Test		Data Distribution
k star (bias corrected)	2.458	Data appear Normal at 5% Significance Level
Theta Star	34.38	
MLE of Mean	84.49	
MLE of Standard Deviation	53.9	
nu star	24.58	
Approximate Chi Square Value (.05)	14.29	**Nonparametric Statistics**
Adjusted Level of Significance	0.0086	95% CLT UCL 112.6
Adjusted Chi Square Value	11.01	95% Jackknife UCL 121
		95% Standard Bootstrap UCL 109.4
Anderson-Darling Test Statistic	0.248	95% Bootstrap-t UCL 142.4
Anderson-Darling 5% Critical Value	0.68	95% Hall's Bootstrap UCL 392.3
Kolmogorov-Smirnov Test Statistic	0.209	95% Percentile Bootstrap UCL 111.3
Kolmogorov-Smirnov 5% Critical Value	0.358	95% BCA Bootstrap UCL 111.6
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 159.1
		97.5% Chebyshev(Mean, Sd) UCL 191.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 254.8
95% Approximate Gamma UCL	145.3	
95% Adjusted Gamma UCL	188.6	

Potential UCL to Use	Use 95% Student's-t UCL 121

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE17 8-SS_N_BENZOAANTHRACEN.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_BENZO(A)ANTHRACENE

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.00953	Minimum of Log Data	-4.653
Maximum	0.277	Maximum of Log Data	-1.284
Mean	0.1	Mean of log Data	-3.025
Median	0.0521	SD of log Data	1.47
SD	0.114		
Coefficient of Variation	1.135		
Skewness	1.17		

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.857	Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.209	95% H-UCL	24.25
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.376
95% Adjusted-CLT UCL	0.212	97.5% Chebyshev (MVUE) UCL	0.493
95% Modified-t UCL	0.213	99% Chebyshev (MVUE) UCL	0.723

Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	0.46	Data appear Normal at 5% Significance Level
Theta Star	0.218	
MLE of Mean	0.1	
MLE of Standard Deviation	0.148	
nu star	4.604	
Approximate Chi Square Value (.05)	0.974	**Nonparametric Statistics**
Adjusted Level of Significance	0.0086	95% CLT UCL 0.184
Adjusted Chi Square Value	0.432	95% Jackknife UCL 0.209
		95% Standard Bootstrap UCL 0.175
Anderson-Darling Test Statistic	0.3	95% Bootstrap-t UCL 0.473
Anderson-Darling 5% Critical Value	0.696	95% Hall's Bootstrap UCL 0.676
Kolmogorov-Smirnov Test Statistic	0.235	95% Percentile Bootstrap UCL 0.179
Kolmogorov-Smirnov 5% Critical Value	0.366	95% BCA Bootstrap UCL 0.187
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 0.322
		97.5% Chebyshev(Mean, Sd) UCL 0.418
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 0.606
95% Approximate Gamma UCL	0.474	
95% Adjusted Gamma UCL	1.067	

Potential UCL to Use	Use 95% Student's-t UCL 0.209

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	\\Edgewoodfp\projects\ARMY\BEST\PROJECTS\6191735 Ft Buchanan\Revised RFI Report\HHRA\ProUCL\inp
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_BENZO(A)PYRENE

General Statistics

Number of Valid Data	5	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	2
		Percent Non-Detects	40.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0536	Minimum Detected	-2.926
Maximum Detected	0.421	Maximum Detected	-0.865
Mean of Detected	0.224	Mean of Detected	-1.807
SD of Detected	0.185	SD of Detected	1.042
Minimum Non-Detect	0.0006	Minimum Non-Detect	-7.419
Maximum Non-Detect	0.00065	Maximum Non-Detect	-7.339

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	2
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	3
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	40.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.983	Shapiro Wilk Test Statistic	0.978
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.134	Mean	-4.313
SD	0.179	SD	3.51
95% DL/2 (t) UCL	0.305	95% H-Stat (DL/2) UCL	1.718E+13
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0664	Mean in Log Scale	-3.058
SD	0.241	SD in Log Scale	1.864
95% MLE (t) UCL	0.296	Mean in Original Scale	0.137
95% MLE (Tiku) UCL	0.325	SD in Original Scale	0.177
		95% Percentile Bootstrap UCL	0.258
		95% BCA Bootstrap UCL	0.293

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data appear Normal at 5% Significance Level
Theta Star	N/A	
nu star	N/A	
A-D Test Statistic	N/A	
5% A-D Critical Value	N/A	
K-S Test Statistic	N/A	
5% K-S Critical Value	N/A	
Data not Gamma Distributed at 5% Significance Level		

Assuming Gamma Distribution		Nonparametric Statistics	
Gamma ROS Statistics using Extrapolated Data		Kaplan-Meier (KM) Method	
Minimum	N/A	Mean	0.156
Maximum	N/A	SD	0.144
Mean	N/A	SE of Mean	0.0787
Median	N/A	95% KM (t) UCL	0.323
SD	N/A	95% KM (z) UCL	0.285
k star	N/A	95% KM (jackknife) UCL	0.325
Theta star	N/A	95% KM (bootstrap t) UCL	0.257
Nu star	N/A	95% KM (BCA) UCL	0.421
AppChi2	N/A	95% KM (Percentile Bootstrap) UCL	N/A
95% Gamma Approximate UCL	N/A	95% KM (Chebyshev) UCL	0.499
95% Adjusted Gamma UCL	N/A	97.5% KM (Chebyshev) UCL	0.647
		99% KM (Chebyshev) UCL	0.939
		Potential UCLs to Use	
		95% KM (t) UCL	0.323
		95% KM (Percentile Bootstrap) UCL	N/A

Note: DL/2 is not a recommended method.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	\\Edgewoodfp\projects\ARMY\BEST\PROJECTS\6191735 Ft Buchanan\Revised RFI Report\HHRA\ProUCL\input
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_BENZO(B)FLUORANTHENE

General Statistics

Number of Valid Data	5	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	2
		Percent Non-Detects	40.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0957	Minimum Detected	-2.347
Maximum Detected	0.43	Maximum Detected	-0.844
Mean of Detected	0.239	Mean of Detected	-1.614
SD of Detected	0.172	SD of Detected	0.752
Minimum Non-Detect	0.0015	Minimum Non-Detect	-6.502
Maximum Non-Detect	0.0016	Maximum Non-Detect	-6.438

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	2
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	3
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	40.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.943	Shapiro Wilk Test Statistic	0.998
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.144	Mean	-3.833
SD	0.179	SD	3.086
95% DL/2 (t) UCL	0.314	95% H-Stat (DL/2) UCL	1.069E+10
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0772	Mean in Log Scale	-2.538
SD	0.241	SD in Log Scale	1.373
95% MLE (t) UCL	0.307	Mean in Original Scale	0.151
95% MLE (Tiku) UCL	0.338	SD in Original Scale	0.171
		95% Percentile Bootstrap UCL	0.268
		95% BCA Bootstrap UCL	0.287

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data appear Normal at 5% Significance Level
Theta Star	N/A	
nu star	N/A	
A-D Test Statistic	N/A	
5% A-D Critical Value	N/A	
K-S Test Statistic	N/A	
5% K-S Critical Value	N/A	
Data not Gamma Distributed at 5% Significance Level		

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.182
SD	0.13
SE of Mean	0.071
95% KM (t) UCL	0.333
95% KM (z) UCL	0.299
95% KM (jackknife) UCL	0.326
95% KM (bootstrap t) UCL	0.42
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	0.43
95% KM (Chebyshev) UCL	0.491
97.5% KM (Chebyshev) UCL	0.625
99% KM (Chebyshev) UCL	0.888
Potential UCLs to Use	
95% KM (t) UCL	0.333
95% KM (Percentile Bootstrap) UCL	0.43

Note: DL/2 is not a recommended method.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	\\Edgewoodfp\projects\ARMY\BEST\PROJECTS\6191735 Ft Buchanan\Revised RFI Report\HHRA\ProUCL\input
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_DIBENZ(A,H)ANTHRACENE

General Statistics

Number of Valid Data	5	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	3
		Percent Non-Detects	60.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0166	Minimum Detected	-4.098
Maximum Detected	0.093	Maximum Detected	-2.375
Mean of Detected	0.0548	Mean of Detected	-3.237
SD of Detected	0.054	SD of Detected	1.218
Minimum Non-Detect	0.00047	Minimum Non-Detect	-7.663
Maximum Non-Detect	0.00057	Maximum Non-Detect	-7.47

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	3
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	2
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	60.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0221	Mean	-6.249
SD	0.0403	SD	2.818
95% DL/2 (t) UCL	0.0605	95% H-Stat (DL/2) UCL	11048589
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)
Theta Star	N/A	
nu star	N/A	
A-D Test Statistic	N/A	**Nonparametric Statistics**
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method
K-S Test Statistic	N/A	Mean 0.0319
5% K-S Critical Value	N/A	SD 0.0306
Data not Gamma Distributed at 5% Significance Level		SE of Mean 0.0193
		95% KM (t) UCL 0.0731
Assuming Gamma Distribution		95% KM (z) UCL 0.0637
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL 0.0965
Minimum	N/A	95% KM (bootstrap t) UCL N/A
Maximum	N/A	95% KM (BCA) UCL 0.093
Mean	N/A	95% KM (Percentile Bootstrap) UCL N/A
Median	N/A	95% KM (Chebyshev) UCL 0.116
SD	N/A	97.5% KM (Chebyshev) UCL 0.153
k star	N/A	99% KM (Chebyshev) UCL 0.224
Theta star	N/A	
Nu star	N/A	Potential UCLs to Use
AppChi2	N/A	95% KM (BCA) UCL 0.093
95% Gamma Approximate UCL	N/A	
95% Adjusted Gamma UCL	N/A	

Note: DL/2 is not a recommended method.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	\\Edgewoodfp\projects\ARMY\BEST\PROJECTS\6191735 Ft Buchanan\Revised RFI Report\HHRA\ProUCL\inp
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_INDENO(1,2,3-C,D)PYRENE

General Statistics

Number of Valid Data	5	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	2
		Percent Non-Detects	40.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0198	Minimum Detected	-3.922
Maximum Detected	0.258	Maximum Detected	-1.355
Mean of Detected	0.135	Mean of Detected	-2.449
SD of Detected	0.119	SD of Detected	1.325
Minimum Non-Detect	0.00063	Minimum Non-Detect	-7.37
Maximum Non-Detect	0.00068	Maximum Non-Detect	-7.293

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	2
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	3
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	40.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.996	Shapiro Wilk Test Statistic	0.939
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0809	Mean	-4.68
SD	0.112	SD	3.194
95% DL/2 (t) UCL	0.188	95% H-Stat (DL/2) UCL	3.113E+10
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0384	Mean in Log Scale	-3.995
SD	0.15	SD in Log Scale	2.315
95% MLE (t) UCL	0.181	Mean in Original Scale	0.0815
95% MLE (Tiku) UCL	0.199	SD in Original Scale	0.111
		95% Percentile Bootstrap UCL	0.159
		95% BCA Bootstrap UCL	0.18

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data appear Normal at 5% Significance Level
Theta Star	N/A	
nu star	N/A	
A-D Test Statistic	N/A	
5% A-D Critical Value	N/A	
K-S Test Statistic	N/A	
5% K-S Critical Value	N/A	
Data not Gamma Distributed at 5% Significance Level		

Assuming Gamma Distribution		Nonparametric Statistics	
Gamma ROS Statistics using Extrapolated Data		Kaplan-Meier (KM) Method	
Minimum	N/A	Mean	0.0887
Maximum	N/A	SD	0.0941
Mean	N/A	SE of Mean	0.0516
Median	N/A	95% KM (t) UCL	0.199
SD	N/A	95% KM (z) UCL	0.173
k star	N/A	95% KM (jackknife) UCL	0.204
Theta star	N/A	95% KM (bootstrap t) UCL	0.201
Nu star	N/A	95% KM (BCA) UCL	0.258
AppChi2	N/A	95% KM (Percentile Bootstrap) UCL	0.258
95% Gamma Approximate UCL	N/A	95% KM (Chebyshev) UCL	0.313
95% Adjusted Gamma UCL	N/A	97.5% KM (Chebyshev) UCL	0.411
		99% KM (Chebyshev) UCL	0.602
		Potential UCLs to Use	
		95% KM (t) UCL	0.199
		95% KM (Percentile Bootstrap) UCL	0.258

Note: DL/2 is not a recommended method.

General UCL Statistics for Full Data Sets

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

Iron

General Statistics

Number of Valid Observations	5	Number of Distinct Observations	5

Raw Statistics		**Log-transformed Statistics**	
Minimum	14350	Minimum of Log Data	9.572
Maximum	49400	Maximum of Log Data	10.81
Mean	29210	Mean of log Data	10.19
Median	25500	SD of log Data	0.493
SD	14128		
Std. Error of Mean	6318		
Coefficient of Variation	0.484		
Skewness	0.668		

Warning: A sample size of 'n' = 5 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 5 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.95	Shapiro Wilk Test Statistic	0.981
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	42680	95% H-UCL	61615
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	57026
95% Adjusted-CLT UCL (Chen-1995)	41619	97.5% Chebyshev (MVUE) UCL	69062
95% Modified-t UCL (Johnson-1978)	42994	99% Chebyshev (MVUE) UCL	92705

Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	2.288	**Data appear Normal at 5% Significance Level**
Theta Star	12765	
MLE of Mean	29210	
MLE of Standard Deviation	19309	
nu star	22.88	
Approximate Chi Square Value (.05)	13	**Nonparametric Statistics**
Adjusted Level of Significance	0.0086	95% CLT UCL 39603
Adjusted Chi Square Value	9.905	95% Jackknife UCL 42680
		95% Standard Bootstrap UCL 38481
Anderson-Darling Test Statistic	0.204	95% Bootstrap-t UCL 54126
Anderson-Darling 5% Critical Value	0.681	95% Hall's Bootstrap UCL 121859
Kolmogorov-Smirnov Test Statistic	0.166	95% Percentile Bootstrap UCL 38660
Kolmogorov-Smirnov 5% Critical Value	0.358	95% BCA Bootstrap UCL 39740
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 56751
		97.5% Chebyshev(Mean, Sd) UCL 68668
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 92076
95% Approximate Gamma UCL	51406	
95% Adjusted Gamma UCL	67483	

Potential UCL to Use	Use 95% Student's-t UCL 42680

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE23451011-SB_T_ALUMINUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_ALUMINUM

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12

Raw Statistics

Minimum	18000
Maximum	32200
Mean	25350
Median	25350
SD	4167
Coefficient of Variation	0.164
Skewness	-0.0831

Log-transformed Statistics

Minimum of Log Data	9.798
Maximum of Log Data	10.38
Mean of log Data	10.13
SD of log Data	0.169

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.985
Shapiro Wilk Critical Value	0.859

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.859

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	27510

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	27298
95% Modified-t UCL	27505

Assuming Lognormal Distribution

95% H-UCL	27858
95% Chebyshev (MVUE) UCL	30772
97.5% Chebyshev (MVUE) UCL	33115
99% Chebyshev (MVUE) UCL	37717

Gamma Distribution Test

k star (bias corrected)	29.38
Theta Star	862.9
MLE of Mean	25350
MLE of Standard Deviation	4677
nu star	705.1
Approximate Chi Square Value (.05)	644.5
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	635.6
Anderson-Darling Test Statistic	0.164
Anderson-Darling 5% Critical Value	0.73
Kolmogorov-Smirnov Test Statistic	0.121
Kolmogorov-Smirnov 5% Critical Value	0.245

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	27734
95% Adjusted Gamma UCL	28120

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	27329
95% Jackknife UCL	27510
95% Standard Bootstrap UCL	27216
95% Bootstrap-t UCL	27493
95% Hall's Bootstrap UCL	27401
95% Percentile Bootstrap UCL	27200
95% BCA Bootstrap UCL	27192
95% Chebyshev(Mean, Sd) UCL	30593
97.5% Chebyshev(Mean, Sd) UCL	32862
99% Chebyshev(Mean, Sd) UCL	37318

Potential UCL to Use

Use 95% Student's-t UCL 27510

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE23451011-SB_T_ARSENIC.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_ARSENIC

General Statistics

Number of Valid Data	20	Number of Detected Data	17
Number of Distinct Detected Data	17	Number of Non-Detect Data	3
		Percent Non-Detects	15.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	4.6	Minimum Detected	1.526
Maximum Detected	122	Maximum Detected	4.804
Mean of Detected	58.98	Mean of Detected	3.763
SD of Detected	37.16	SD of Detected	0.988
Minimum Non-Detect	1.1	Minimum Non-Detect	0.0953
Maximum Non-Detect	18.1	Maximum Non-Detect	2.896

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	5
Number treated as Detected	15
Single DL Non-Detect Percentage	25.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Test Statistic	0.843
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.892
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	50.65	Mean	3.267
SD	39.74	SD	1.59
95% DL/2 (t) UCL	66.02	95% H-Stat (DL/2) UCL	377.5
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	47.66	Mean in Log Scale	3.467
SD	43.82	SD in Log Scale	1.163
95% MLE (t) UCL	64.6	Mean in Original Scale	51.05
95% MLE (Tiku) UCL	65.39	SD in Original Scale	39.22
		95% Percentile Bootstrap UCL	65.49
		95% BCA Bootstrap UCL	66.01

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	1.47	Data appear Normal at 5% Significance Level
Theta Star	40.11	
nu star	49.99	
A-D Test Statistic	0.47	
5% A-D Critical Value	0.753	
K-S Test Statistic	0.753	
5% K-S Critical Value	0.212	
Data appear Gamma Distributed at 5% Significance Level		

Assuming Gamma Distribution		Nonparametric Statistics	
Gamma ROS Statistics using Extrapolated Data		Kaplan-Meier (KM) Method	
Minimum	0.776	Mean	50.82
Maximum	122	SD	38.49
Mean	50.92	SE of Mean	8.872
Median	45.03	95% KM (t) UCL	66.16
SD	39.46	95% KM (z) UCL	65.42
k star	0.825	95% KM (jackknife) UCL	66.09
Theta star	61.69	95% KM (bootstrap t) UCL	67.13
Nu star	33.01	95% KM (BCA) UCL	66.64
AppChi2	20.88	95% KM (Percentile Bootstrap) UCL	65.89
95% Gamma Approximate UCL	80.52	95% KM (Chebyshev) UCL	89.5
95% Adjusted Gamma UCL	83.57	97.5% KM (Chebyshev) UCL	106.2
		99% KM (Chebyshev) UCL	139.1
		Potential UCLs to Use	
		95% KM (t) UCL	66.16
		95% KM (Percentile Bootstrap) UCL	65.89

Note: DL/2 is not a recommended method.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE23451011-SB_T_CHROMIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_CHROMIUM

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	20

Raw Statistics

Minimum	12.5
Maximum	167
Mean	80.43
Median	82.95
SD	44.67
Coefficient of Variation	0.555
Skewness	-0.00786

Log-transformed Statistics

Minimum of Log Data	2.526
Maximum of Log Data	5.118
Mean of log Data	4.155
SD of log Data	0.804

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical Value	0.905

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.854
Shapiro Wilk Critical Value	0.905

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	97.7

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	96.84
95% Modified-t UCL	97.7

Assuming Lognormal Distribution

95% H-UCL	136.3
95% Chebyshev (MVUE) UCL	159.7
97.5% Chebyshev (MVUE) UCL	191.4
99% Chebyshev (MVUE) UCL	253.8

Gamma Distribution Test

k star (bias corrected)	1.995
Theta Star	40.32
MLE of Mean	80.43
MLE of Standard Deviation	56.95
nu star	79.79
Approximate Chi Square Value (.05)	60.21
Adjusted Level of Significance	0.038
Adjusted Chi Square Value	58.87
Anderson-Darling Test Statistic	0.749
Anderson-Darling 5% Critical Value	0.751
Kolmogorov-Smirnov Test Statistic	0.176
Kolmogorov-Smirnov 5% Critical Value	0.196

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	106.6
95% Adjusted Gamma UCL	109

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	96.86
95% Jackknife UCL	97.7
95% Standard Bootstrap UCL	96.52
95% Bootstrap-t UCL	97.52
95% Hall's Bootstrap UCL	97.02
95% Percentile Bootstrap UCL	96.59
95% BCA Bootstrap UCL	96.79
95% Chebyshev(Mean, Sd) UCL	124
97.5% Chebyshev(Mean, Sd) UCL	142.8
99% Chebyshev(Mean, Sd) UCL	179.8

Potential UCL to Use

Use 95% Student's-t UCL 97.7

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE23451011-SB_T_COBALT.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_COBALT

General Statistics

Number of Valid Data	20	Number of Detected Data	15
Number of Distinct Detected Data	15	Number of Non-Detect Data	5
		Percent Non-Detects	25.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.3	Minimum Detected	0.262
Maximum Detected	45.3	Maximum Detected	3.813
Mean of Detected	15.95	Mean of Detected	2.306
SD of Detected	14.67	SD of Detected	1.069
Minimum Non-Detect	1.7	Minimum Non-Detect	0.531
Maximum Non-Detect	6.7	Maximum Non-Detect	1.902

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	10
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	10
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	50.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.847	Shapiro Wilk Test Statistic	0.966
5% Shapiro Wilk Critical Value	0.881	5% Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	12.44	Mean	1.858
SD	14.07	SD	1.241
95% DL/2 (t) UCL	17.88	95% H-Stat (DL/2) UCL	38.26
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	6.002	Mean in Log Scale	1.857
SD	20.84	SD in Log Scale	1.226
95% MLE (t) UCL	14.06	Mean in Original Scale	12.4
95% MLE (Tiku) UCL	15.94	SD in Original Scale	14.09
		95% Percentile Bootstrap UCL	17.71
		95% BCA Bootstrap UCL	18.48

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	1.019	Data appear Gamma Distributed at 5% Significance Level
Theta Star	15.65	
nu star	30.57	
A-D Test Statistic	0.28	
5% A-D Critical Value	0.759	
K-S Test Statistic	0.759	
5% K-S Critical Value	0.227	
Data appear Gamma Distributed at 5% Significance Level		

Assuming Gamma Distribution		Nonparametric Statistics	
Gamma ROS Statistics using Extrapolated Data		Kaplan-Meier (KM) Method	
Minimum	0.141	Mean	12.42
Maximum	45.3	SD	13.73
Mean	12.84	SE of Mean	3.179
Median	7.25	95% KM (t) UCL	17.92
SD	13.86	95% KM (z) UCL	17.65
k star	0.689	95% KM (jackknife) UCL	17.74
Theta star	18.64	95% KM (bootstrap t) UCL	19.75
Nu star	27.54	95% KM (BCA) UCL	18.29
AppChi2	16.57	95% KM (Percentile Bootstrap) UCL	18.07
95% Gamma Approximate UCL	21.33	95% KM (Chebyshev) UCL	26.28
95% Adjusted Gamma UCL	22.23	97.5% KM (Chebyshev) UCL	32.28
		99% KM (Chebyshev) UCL	44.06
		Potential UCLs to Use	
		95% KM (Percentile Bootstrap) UCL	18.07

Note: DL/2 is not a recommended method.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE23451011-SB_T_MANGANESE.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_MANGANESE

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12

Raw Statistics

Minimum	161
Maximum	12800
Mean	2081
Median	317
SD	3869
Coefficient of Variation	1.859
Skewness	2.388

Log-transformed Statistics

Minimum of Log Data	5.081
Maximum of Log Data	9.457
Mean of log Data	6.372
SD of log Data	1.515

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.58
Shapiro Wilk Critical Value	0.859

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.781
Shapiro Wilk Critical Value	0.859

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	4087

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	4741
95% Modified-t UCL	4215

Assuming Lognormal Distribution

95% H-UCL	11093
95% Chebyshev (MVUE) UCL	4816
97.5% Chebyshev (MVUE) UCL	6225
99% Chebyshev (MVUE) UCL	8992

Gamma Distribution Test

k star (bias corrected)	0.431
Theta Star	4830
MLE of Mean	2081
MLE of Standard Deviation	3171
nu star	10.34
Approximate Chi Square Value (.05)	4.157
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	3.578
Anderson-Darling Test Statistic	1.626
Anderson-Darling 5% Critical Value	0.785
Kolmogorov-Smirnov Test Statistic	0.362
Kolmogorov-Smirnov 5% Critical Value	0.259

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	5178
95% Adjusted Gamma UCL	6016

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	3918
95% Jackknife UCL	4087
95% Standard Bootstrap UCL	3838
95% Bootstrap-t UCL	9629
95% Hall's Bootstrap UCL	11464
95% Percentile Bootstrap UCL	3962
95% BCA Bootstrap UCL	4966
95% Chebyshev(Mean, Sd) UCL	6949
97.5% Chebyshev(Mean, Sd) UCL	9056
99% Chebyshev(Mean, Sd) UCL	13194

Potential UCL to Use Use 99% Chebyshev (Mean, Sd) UCL 13194

Recommended UCL exceeds the maximum observation

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE23451011-SB_T_VANADIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_VANADIUM

General Statistics

Number of Valid Data	20	Number of Detected Data	19
Number of Distinct Detected Data	18	Number of Non-Detect Data	1
		Percent Non-Detects	5.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	23.4	Minimum Detected	3.153
Maximum Detected	291	Maximum Detected	5.673
Mean of Detected	153.3	Mean of Detected	4.85
SD of Detected	75.54	SD of Detected	0.715
Minimum Non-Detect	30.7	Minimum Non-Detect	3.424
Maximum Non-Detect	30.7	Maximum Non-Detect	3.424

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.966	Shapiro Wilk Test Statistic	0.844
5% Shapiro Wilk Critical Value	0.901	5% Shapiro Wilk Critical Value	0.901
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	146.4	Mean	4.744
SD	79.73	SD	0.842
95% DL/2 (t) UCL	177.2	95% H-Stat (DL/2) UCL	266.2
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	143.7	Mean in Log Scale	4.784
SD	83.05	SD in Log Scale	0.756
95% MLE (t) UCL	175.8	Mean in Original Scale	147.3
95% MLE (Tiku) UCL	176.3	SD in Original Scale	78.21
		95% Percentile Bootstrap UCL	175.1
		95% BCA Bootstrap UCL	174.9

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	2.477	Data appear Normal at 5% Significance Level
Theta Star	61.88	
nu star	94.13	
A-D Test Statistic	0.817	**Nonparametric Statistics**
5% A-D Critical Value	0.749	Kaplan-Meier (KM) Method
K-S Test Statistic	0.749	Mean 146.8
5% K-S Critical Value	0.2	SD 77.05
Data not Gamma Distributed at 5% Significance Level		SE of Mean 17.7
		95% KM (t) UCL 177.4
Assuming Gamma Distribution		95% KM (z) UCL 175.9
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL 177.2
Minimum	10.63	95% KM (bootstrap t) UCL 176.9
Maximum	291	95% KM (BCA) UCL 176.3
Mean	146.1	95% KM (Percentile Bootstrap) UCL 175.8
Median	159	95% KM (Chebyshev) UCL 223.9
SD	80.15	97.5% KM (Chebyshev) UCL 257.3
k star	1.804	99% KM (Chebyshev) UCL 322.9
Theta star	81.02	
Nu star	72.15	Potential UCLs to Use
AppChi2	53.59	95% KM (t) UCL 177.4
95% Gamma Approximate UCL	196.8	95% KM (Percentile Bootstrap) UCL 175.8
95% Adjusted Gamma UCL	201.5	

Note: DL/2 is not a recommended method.

General UCL Statistics for Full Data Sets

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

Iron

General Statistics

Number of Valid Observations	12	Number of Distinct Observations	12

Raw Statistics		Log-transformed Statistics	
Minimum	32400	Minimum of Log Data	10.39
Maximum	95300	Maximum of Log Data	11.46
Mean	61846	Mean of log Data	10.99
Median	56200	SD of log Data	0.309
SD	18843		
Std. Error of Mean	5440		
Coefficient of Variation	0.305		
Skewness	0.507		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.947	Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical Value	0.859	Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	71615	95% H-UCL	74388
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	86135
95% Adjusted-CLT UCL (Chen-1995)	71645	97.5% Chebyshev (MVUE) UCL	96629
95% Modified-t UCL (Johnson-1978)	71748	99% Chebyshev (MVUE) UCL	117243

Gamma Distribution Test		Data Distribution
k star (bias corrected)	8.919	**Data appear Normal at 5% Significance Level**
Theta Star	6934	
MLE of Mean	61846	
MLE of Standard Deviation	20709	
nu star	214	
Approximate Chi Square Value (.05)	181.2	**Nonparametric Statistics**
Adjusted Level of Significance	0.029	95% CLT UCL 70793
Adjusted Chi Square Value	176.6	95% Jackknife UCL 71615
		95% Standard Bootstrap UCL 70442
Anderson-Darling Test Statistic	0.261	95% Bootstrap-t UCL 72756
Anderson-Darling 5% Critical Value	0.731	95% Hall's Bootstrap UCL 72416
Kolmogorov-Smirnov Test Statistic	0.156	95% Percentile Bootstrap UCL 70533
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL 70983
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 85556
		97.5% Chebyshev(Mean, Sd) UCL 95816
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 115969
95% Approximate Gamma UCL	73061	
95% Adjusted Gamma UCL	74970	

Potential UCL to Use		
	Use 95% Student's-t UCL	71615

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Thallium

General Statistics

Number of Valid Observations	20	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.16	Minimum of Log Data	-1.833
Maximum	18	Maximum of Log Data	2.89
Mean	2.126	Mean of log Data	-0.0787
Median	0.84	SD of log Data	1.244
SD	3.96		
Std. Error of Mean	0.886		
Coefficient of Variation	1.863		
Skewness	3.743		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.492	Shapiro Wilk Test Statistic	0.948
Shapiro Wilk Critical Value	0.905	Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	3.657	95% H-UCL	4.72
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	4.527
95% Adjusted-CLT UCL (Chen-1995)	4.374	97.5% Chebyshev (MVUE) UCL	5.671
95% Modified-t UCL (Johnson-1978)	3.781	99% Chebyshev (MVUE) UCL	7.92

Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	0.647	**Data appear Lognormal at 5% Significance Level**
Theta Star	3.284	
MLE of Mean	2.126	
MLE of Standard Deviation	2.642	
nu star	25.9	
Approximate Chi Square Value (.05)	15.3	**Nonparametric Statistics**
Adjusted Level of Significance	0.038	95% CLT UCL 3.583
Adjusted Chi Square Value	14.66	95% Jackknife UCL 3.657
		95% Standard Bootstrap UCL 3.551
Anderson-Darling Test Statistic	1.005	95% Bootstrap-t UCL 6.904
Anderson-Darling 5% Critical Value	0.782	95% Hall's Bootstrap UCL 8.634
Kolmogorov-Smirnov Test Statistic	0.215	95% Percentile Bootstrap UCL 3.706
Kolmogorov-Smirnov 5% Critical Value	0.202	95% BCA Bootstrap UCL 4.744
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 5.986
		97.5% Chebyshev(Mean, Sd) UCL 7.656
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 10.94
95% Approximate Gamma UCL	3.599	
95% Adjusted Gamma UCL	3.756	

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL 5.986

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

Barium_dissolved

General Statistics

Number of Valid Data	11	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	6
		Percent Non-Detects	54.55%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	8.9	Minimum Detected	2.186
Maximum Detected	450	Maximum Detected	6.109
Mean of Detected	189.1	Mean of Detected	4.574
SD of Detected	188.4	SD of Detected	1.547
Minimum Non-Detect	15.3	Minimum Non-Detect	2.728
Maximum Non-Detect	192	Maximum Non-Detect	5.257

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	9
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	2
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	81.82%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.873	Shapiro Wilk Test Statistic	0.906
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	109.8	Mean	3.996
SD	143	SD	1.282
95% DL/2 (t) UCL	188	95% H-Stat (DL/2) UCL	525.8
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.495
		SD in Log Scale	1.442
		Mean in Original Scale	93.58
		SD in Original Scale	150.2
		95% t UCL	175.7
		95% Percentile Bootstrap UCL	172.5
		95% BCA Bootstrap UCL	195.4
		95% H-UCL	552.3

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.484	**Data appear Normal at 5% Significance Level**	
Theta Star	390.3		
nu star	4.845		
A-D Test Statistic	0.308	**Nonparametric Statistics**	
5% A-D Critical Value	0.695	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.695	Mean	96.21
5% K-S Critical Value	0.366	SD	142.9
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	48.66
		95% KM (t) UCL	184.4
Assuming Gamma Distribution		95% KM (z) UCL	176.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	175.4
Minimum	0.000001	95% KM (bootstrap t) UCL	298.4
Maximum	450	95% KM (BCA) UCL	346.9
Mean	85.95	95% KM (Percentile Bootstrap) UCL	205.1
Median	0.000001	95% KM (Chebyshev) UCL	308.3
SD	154.8	97.5% KM (Chebyshev) UCL	400.1
k star	0.122	99% KM (Chebyshev) UCL	580.4
Theta star	707.4		
Nu star	2.673	**Potential UCLs to Use**	
AppChi2	0.283	95% KM (t) UCL	184.4
95% Gamma Approximate UCL	813.1	95% KM (Percentile Bootstrap) UCL	205.1
95% Adjusted Gamma UCL	1160		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Barium_total

General Statistics

Number of Valid Data	11	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	6
		Percent Non-Detects	54.55%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	9.4	Minimum Detected	2.241
Maximum Detected	442	Maximum Detected	6.091
Mean of Detected	185.4	Mean of Detected	4.575
SD of Detected	183.6	SD of Detected	1.516
Minimum Non-Detect	14.6	Minimum Non-Detect	2.681
Maximum Non-Detect	198.5	Maximum Non-Detect	5.291

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	9
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	2
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	81.82%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.881	Shapiro Wilk Test Statistic	0.914
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	108.9	Mean	4.008
SD	139.2	SD	1.271
95% DL/2 (t) UCL	185	95% H-Stat (DL/2) UCL	512.7
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.514
		SD in Log Scale	1.414
		Mean in Original Scale	92.19
		SD in Original Scale	146.5
		95% t UCL	172.2
		95% Percentile Bootstrap UCL	164.7
		95% BCA Bootstrap UCL	192
		95% H-UCL	510

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.494	**Data appear Normal at 5% Significance Level**	
Theta Star	375.3		
nu star	4.941		
A-D Test Statistic	0.287	**Nonparametric Statistics**	
5% A-D Critical Value	0.694	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.694	Mean	94.73
5% K-S Critical Value	0.365	SD	139.4
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	47.46
		95% KM (t) UCL	180.8
Assuming Gamma Distribution		95% KM (z) UCL	172.8
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	171.8
Minimum	0.000001	95% KM (bootstrap t) UCL	279.1
Maximum	442	95% KM (BCA) UCL	324.7
Mean	84.29	95% KM (Percentile Bootstrap) UCL	203.8
Median	0.000001	95% KM (Chebyshev) UCL	301.6
SD	151.2	97.5% KM (Chebyshev) UCL	391.1
k star	0.122	99% KM (Chebyshev) UCL	567
Theta star	693.1		
Nu star	2.675	**Potential UCLs to Use**	
AppChi2	0.283	95% KM (t) UCL	180.8
95% Gamma Approximate UCL	796.5	95% KM (Percentile Bootstrap) UCL	203.8
95% Adjusted Gamma UCL	1136		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Mercury_total

General Statistics

Number of Valid Data	11	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	6
		Percent Non-Detects	54.55%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.15	Minimum Detected	-1.897
Maximum Detected	1.4	Maximum Detected	0.336
Mean of Detected	0.598	Mean of Detected	-0.796
SD of Detected	0.499	SD of Detected	0.852
Minimum Non-Detect	0.0415	Minimum Non-Detect	-3.182
Maximum Non-Detect	0.15	Maximum Non-Detect	-1.897

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	5
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	54.55%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.873	Shapiro Wilk Test Statistic	0.976
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.291	Mean	-2.258
SD	0.432	SD	1.539
95% DL/2 (t) UCL	0.527	95% H-Stat (DL/2) UCL	2.54
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0386	Mean in Log Scale	-2.254
SD	0.671	SD in Log Scale	1.497
95% MLE (t) UCL	0.405	Mean in Original Scale	0.289
95% MLE (Tiku) UCL	0.518	SD in Original Scale	0.433
		95% t UCL	0.525
		95% Percentile Bootstrap UCL	0.511
		95% BCA Bootstrap UCL	0.578
		95% H UCL	2.162

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**
k star (bias corrected)	0.904	**Data appear Normal at 5% Significance Level**
Theta Star	0.662	
nu star	9.036	
A-D Test Statistic	0.264	**Nonparametric Statistics**
5% A-D Critical Value	0.685	Kaplan-Meier (KM) Method
K-S Test Statistic	0.685	Mean 0.354
5% K-S Critical Value	0.361	SD 0.375
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.126
		95% KM (t) UCL 0.582
Assuming Gamma Distribution		95% KM (z) UCL 0.561
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL 0.557
Minimum	0.000001	95% KM (bootstrap t) UCL 0.892
Maximum	1.4	95% KM (BCA) UCL 0.809
Mean	0.272	95% KM (Percentile Bootstrap) UCL 0.665
Median	0.000001	95% KM (Chebyshev) UCL 0.904
SD	0.444	97.5% KM (Chebyshev) UCL 1.142
k star	0.148	99% KM (Chebyshev) UCL 1.61
Theta star	1.836	
Nu star	3.257	**Potential UCLs to Use**
AppChi2	0.452	95% KM (t) UCL 0.582
95% Gamma Approximate UCL	1.957	95% KM (Percentile Bootstrap) UCL 0.665
95% Adjusted Gamma UCL	2.763	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE23451011-WG_T_MANGANESE.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

WG_MANGANESE

General Statistics

Number of Valid Observations	7	Number of Distinct Observations	7

Raw Statistics		**Log-transformed Statistics**	
Minimum	19.2	Minimum of Log Data	2.955
Maximum	219	Maximum of Log Data	5.389
Mean	89.68	Mean of log Data	4.213
Median	79.85	SD of log Data	0.852
SD	69.35		
Coefficient of Variation	0.773		
Skewness	1.141		

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.911	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	140.6	95% H-UCL	305.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	220.2
95% Adjusted-CLT UCL	144.9	97.5% Chebyshev (MVUE) UCL	276
95% Modified-t UCL	142.5	99% Chebyshev (MVUE) UCL	385.6

Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	1.191	Data appear Normal at 5% Significance Level
Theta Star	75.29	
MLE of Mean	89.68	
MLE of Standard Deviation	82.17	
nu star	16.68	
Approximate Chi Square Value (.05)	8.441	**Nonparametric Statistics**
Adjusted Level of Significance	0.0158	95% CLT UCL 132.8
Adjusted Chi Square Value	6.75	95% Jackknife UCL 140.6
		95% Standard Bootstrap UCL 129.6
Anderson-Darling Test Statistic	0.162	95% Bootstrap-t UCL 170.5
Anderson-Darling 5% Critical Value	0.716	95% Hall's Bootstrap UCL 382.4
Kolmogorov-Smirnov Test Statistic	0.144	95% Percentile Bootstrap UCL 132.7
Kolmogorov-Smirnov 5% Critical Value	0.315	95% BCA Bootstrap UCL 140.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 203.9
		97.5% Chebyshev(Mean, Sd) UCL 253.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 350.5
95% Approximate Gamma UCL	177.2	
95% Adjusted Gamma UCL	221.6	

Potential UCL to Use		Use 95% Student's-t UCL	140.6

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE23451011-WG_N_TRICHLOROETHE.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

WG_TRICHLOROETHENE

General Statistics

Number of Valid Data	11	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	7
		Percent Non-Detects	63.64%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.62	Minimum Detected	-0.478
Maximum Detected	5.5	Maximum Detected	1.705
Mean of Detected	2.78	Mean of Detected	0.686
SD of Detected	2.28	SD of Detected	1.011
Minimum Non-Detect	0.27	Minimum Non-Detect	-1.309
Maximum Non-Detect	0.28	Maximum Non-Detect	-1.273

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	4
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	63.64%

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Test Statistic	0.935
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.098	Mean	-1.013
SD	1.827	SD	1.457
95% DL/2 (t) UCL	2.097	95% H-Stat (DL/2) UCL	6.435
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.648
		SD in Log Scale	2.098
		Mean in Original Scale	1.059
		SD in Original Scale	1.85
		95% Percentile Bootstrap UCL	2.009
		95% BCA Bootstrap UCL	2.308

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.575	Data appear Normal at 5% Significance Level
Theta Star	4.836	
nu star	4.599	
A-D Test Statistic	0.31	
5% A-D Critical Value	0.662	
K-S Test Statistic	0.662	
5% K-S Critical Value	0.399	
Data appear Gamma Distributed at 5% Significance Level		

Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0.62
Maximum	5.607
Mean	3.23
Median	3.321
SD	1.596
k star	2.45
Theta star	1.318
Nu star	53.9
AppChi2	38.03
95% Gamma Approximate UCL	4.577
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	1.405
SD	1.58
SE of Mean	0.55
95% KM (t) UCL	2.403
95% KM (z) UCL	2.311
95% KM (jackknife) UCL	2.244
95% KM (bootstrap t) UCL	2.199
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	4.109
95% KM (Chebyshev) UCL	3.804
97.5% KM (Chebyshev) UCL	4.842
99% KM (Chebyshev) UCL	6.88
Potential UCLs to Use	
95% KM (t) UCL	2.403
95% KM (Percentile Bootstrap) UCL	4.109

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE613 15-SS_T_ALUMINUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_ALUMINUM

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	8

Raw Statistics		Log-transformed Statistics	
Minimum	13800	Minimum of Log Data	9.532
Maximum	25700	Maximum of Log Data	10.15
Mean	18456	Mean of log Data	9.799
Median	16300	SD of log Data	0.228
SD	4436		
Coefficient of Variation	0.24		
Skewness	0.87		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.826	Shapiro Wilk Test Statistic	0.853
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	21205	95% H-UCL	21609
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	24559
95% Adjusted-CLT UCL	21346	97.5% Chebyshev (MVUE) UCL	27207
95% Modified-t UCL	21277	99% Chebyshev (MVUE) UCL	32409

Gamma Distribution Test		Data Distribution
k star (bias corrected)	14.13	Data appear Lognormal at 5% Significance Level
Theta Star	1306	
MLE of Mean	18456	
MLE of Standard Deviation	4910	
nu star	254.3	
Approximate Chi Square Value (.05)	218.4	**Nonparametric Statistics**
Adjusted Level of Significance	0.0231	95% CLT UCL 20888
Adjusted Chi Square Value	211.3	95% Jackknife UCL 21205
		95% Standard Bootstrap UCL 20777
Anderson-Darling Test Statistic	0.773	95% Bootstrap-t UCL 22351
Anderson-Darling 5% Critical Value	0.721	95% Hall's Bootstrap UCL 20677
Kolmogorov-Smirnov Test Statistic	0.294	95% Percentile Bootstrap UCL 20844
Kolmogorov-Smirnov 5% Critical Value	0.279	95% BCA Bootstrap UCL 21056
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 24900
		97.5% Chebyshev(Mean, Sd) UCL 27689
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 33167
95% Approximate Gamma UCL	21492	
95% Adjusted Gamma UCL	22207	

Potential UCL to Use	
Use 95% Student's-t UCL	21205
or 95% Modified-t UCL	21277
or 95% H-UCL	21609

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE613 15-SS_T_ARSENIC.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_ARSENIC

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	8

Raw Statistics		Log-transformed Statistics	
Minimum	2.4	Minimum of Log Data	0.875
Maximum	20.5	Maximum of Log Data	3.02
Mean	9.3	Mean of log Data	2.052
Median	6.7	SD of log Data	0.657
SD	5.712		
Coefficient of Variation	0.614		
Skewness	0.907		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.92	Shapiro Wilk Test Statistic	0.967
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	12.84	95% H-UCL	17.43
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	18.55
95% Adjusted-CLT UCL	13.05	97.5% Chebyshev (MVUE) UCL	22.51
95% Modified-t UCL	12.94	99% Chebyshev (MVUE) UCL	30.3

Gamma Distribution Test		Data Distribution
k star (bias corrected)	2.047	Data appear Normal at 5% Significance Level
Theta Star	4.544	
MLE of Mean	9.3	
MLE of Standard Deviation	6.501	
nu star	36.84	
Approximate Chi Square Value (.05)	23.95	**Nonparametric Statistics**
Adjusted Level of Significance	0.0231	95% CLT UCL 12.43
Adjusted Chi Square Value	21.78	95% Jackknife UCL 12.84
		95% Standard Bootstrap UCL 12.25
Anderson-Darling Test Statistic	0.246	95% Bootstrap-t UCL 14.18
Anderson-Darling 5% Critical Value	0.727	95% Hall's Bootstrap UCL 13.83
Kolmogorov-Smirnov Test Statistic	0.187	95% Percentile Bootstrap UCL 12.36
Kolmogorov-Smirnov 5% Critical Value	0.281	95% BCA Bootstrap UCL 12.84
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 17.6
		97.5% Chebyshev(Mean, Sd) UCL 21.19
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 28.24
95% Approximate Gamma UCL	14.31	
95% Adjusted Gamma UCL	15.73	

Potential UCL to Use	Use 95% Student's-t UCL 12.84

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE613 15-SS_T_CHROMIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_CHROMIUM

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	9	Minimum of Log Data	2.197
Maximum	48.3	Maximum of Log Data	3.877
Mean	24.72	Mean of log Data	3.059
Median	22.1	SD of log Data	0.584
SD	14.15		
Coefficient of Variation	0.572		
Skewness	0.747		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.901	Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	33.49	95% H-UCL	41.48
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	46.14
95% Adjusted-CLT UCL	33.73	97.5% Chebyshev (MVUE) UCL	55.4
95% Modified-t UCL	33.69	99% Chebyshev (MVUE) UCL	73.59

Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	2.424	Data appear Normal at 5% Significance Level
Theta Star	10.2	
MLE of Mean	24.72	
MLE of Standard Deviation	15.88	
nu star	43.63	
Approximate Chi Square Value (.05)	29.48	**Nonparametric Statistics**
Adjusted Level of Significance	0.0231	95% CLT UCL 32.48
Adjusted Chi Square Value	27.05	95% Jackknife UCL 33.49
		95% Standard Bootstrap UCL 31.96
Anderson-Darling Test Statistic	0.261	95% Bootstrap-t UCL 37.09
Anderson-Darling 5% Critical Value	0.726	95% Hall's Bootstrap UCL 35.66
Kolmogorov-Smirnov Test Statistic	0.152	95% Percentile Bootstrap UCL 32.47
Kolmogorov-Smirnov 5% Critical Value	0.281	95% BCA Bootstrap UCL 32.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 45.28
		97.5% Chebyshev(Mean, Sd) UCL 54.17
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 71.64
95% Approximate Gamma UCL	36.59	
95% Adjusted Gamma UCL	39.87	

Potential UCL to Use	Use 95% Student's-t UCL 33.49

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE613 15-SS_T_COBALT.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_COBALT

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics		Log-transformed Statistics	
Minimum	4.6	Minimum of Log Data	1.526
Maximum	18.4	Maximum of Log Data	2.912
Mean	11.34	Mean of log Data	2.293
Median	9.6	SD of log Data	0.569
SD	5.866		
Coefficient of Variation	0.517		
Skewness	0.11		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.831	Shapiro Wilk Test Statistic	0.857
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	14.98	95% H-UCL	18.72
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	21.02
95% Adjusted-CLT UCL	14.64	97.5% Chebyshev (MVUE) UCL	25.17
95% Modified-t UCL	14.99	99% Chebyshev (MVUE) UCL	33.33

Gamma Distribution Test		Data Distribution
k star (bias corrected)	2.636	Data appear Normal at 5% Significance Level
Theta Star	4.304	
MLE of Mean	11.34	
MLE of Standard Deviation	6.988	
nu star	47.44	
Approximate Chi Square Value (.05)	32.63	**Nonparametric Statistics**
Adjusted Level of Significance	0.0231	95% CLT UCL 14.56
Adjusted Chi Square Value	30.06	95% Jackknife UCL 14.98
		95% Standard Bootstrap UCL 14.4
Anderson-Darling Test Statistic	0.667	95% Bootstrap-t UCL 14.97
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL 13.76
Kolmogorov-Smirnov Test Statistic	0.27	95% Percentile Bootstrap UCL 14.38
Kolmogorov-Smirnov 5% Critical Value	0.281	95% BCA Bootstrap UCL 14.47
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 19.87
		97.5% Chebyshev(Mean, Sd) UCL 23.56
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 30.8
95% Approximate Gamma UCL	16.49	
95% Adjusted Gamma UCL	17.9	

Potential UCL to Use	Use 95% Student's-t UCL 14.98

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE613 15-SS_T_LEAD.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_LEAD

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics		Log-transformed Statistics	
Minimum	3.1	Minimum of Log Data	1.131
Maximum	562	Maximum of Log Data	6.332
Mean	91.97	Mean of log Data	3.178
Median	20.7	SD of log Data	1.642
SD	182.7		
Coefficient of Variation	1.987		
Skewness	2.657		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.553	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	205.2	95% H-UCL	1498
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	244.6
95% Adjusted-CLT UCL	249.8	97.5% Chebyshev (MVUE) UCL	319.7
95% Modified-t UCL	214.2	99% Chebyshev (MVUE) UCL	467.3

Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.392	Data appear Lognormal at 5% Significance Level
Theta Star	234.8	
MLE of Mean	91.97	
MLE of Standard Deviation	146.9	
nu star	7.05	
Approximate Chi Square Value (.05)	2.198	**Nonparametric Statistics**
Adjusted Level of Significance	0.0231	95% CLT UCL 192.1
Adjusted Chi Square Value	1.673	95% Jackknife UCL 205.2
		95% Standard Bootstrap UCL 186.5
Anderson-Darling Test Statistic	0.818	95% Bootstrap-t UCL 1467
Anderson-Darling 5% Critical Value	0.775	95% Hall's Bootstrap UCL 829.4
Kolmogorov-Smirnov Test Statistic	0.322	95% Percentile Bootstrap UCL 199.3
Kolmogorov-Smirnov 5% Critical Value	0.295	95% BCA Bootstrap UCL 264.7
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 357.4
		97.5% Chebyshev(Mean, Sd) UCL 472.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 697.9
95% Approximate Gamma UCL	295	
95% Adjusted Gamma UCL	387.7	

Potential UCL to Use	Use 99% Chebyshev (Mean, Sd) UCL 697.9

Recommended UCL exceeds the maximum observation

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE613 15-SS_T_MANGANESE.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_MANGANESE

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics

Minimum	59.6
Maximum	1230
Mean	656.2
Median	480
SD	420.7
Coefficient of Variation	0.641
Skewness	0.0968

Log-transformed Statistics

Minimum of Log Data	4.088
Maximum of Log Data	7.115
Mean of log Data	6.191
SD of log Data	0.962

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.864
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	917

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	891.7
95% Modified-t UCL	917.7

Assuming Lognormal Distribution

95% H-UCL	2268
95% Chebyshev (MVUE) UCL	1775
97.5% Chebyshev (MVUE) UCL	2229
99% Chebyshev (MVUE) UCL	3120

Gamma Distribution Test

k star (bias corrected)	1.303
Theta Star	503.5
MLE of Mean	656.2
MLE of Standard Deviation	574.8
nu star	23.46
Approximate Chi Square Value (.05)	13.44
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	11.87
Anderson-Darling Test Statistic	0.368
Anderson-Darling 5% Critical Value	0.731
Kolmogorov-Smirnov Test Statistic	0.209
Kolmogorov-Smirnov 5% Critical Value	0.283

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1146
95% Adjusted Gamma UCL	1297

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	886.9
95% Jackknife UCL	917
95% Standard Bootstrap UCL	875.6
95% Bootstrap-t UCL	923
95% Hall's Bootstrap UCL	850.4
95% Percentile Bootstrap UCL	876.3
95% BCA Bootstrap UCL	882.8
95% Chebyshev(Mean, Sd) UCL	1267
97.5% Chebyshev(Mean, Sd) UCL	1532
99% Chebyshev(Mean, Sd) UCL	2052

Potential UCL to Use

Use 95% Student's-t UCL 917

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE613 15-SS_T_VANADIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SS_VANADIUM

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9

Raw Statistics		Log-transformed Statistics	
Minimum	24.9	Minimum of Log Data	3.215
Maximum	162	Maximum of Log Data	5.088
Mean	63.79	Mean of log Data	3.988
Median	46.5	SD of log Data	0.59
SD	43.22		
Coefficient of Variation	0.678		
Skewness	1.691		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.812	Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	90.58	95% H-UCL	106.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	117.8
95% Adjusted-CLT UCL	96.16	97.5% Chebyshev (MVUE) UCL	141.5
95% Modified-t UCL	91.93	99% Chebyshev (MVUE) UCL	188.2

Gamma Distribution Test		Data Distribution
k star (bias corrected)	2.169	Data appear Gamma Distributed at 5% Significance Level
Theta Star	29.41	
MLE of Mean	63.79	
MLE of Standard Deviation	43.31	
nu star	39.04	
Approximate Chi Square Value (.05)	25.73	**Nonparametric Statistics**
Adjusted Level of Significance	0.0231	95% CLT UCL 87.48
Adjusted Chi Square Value	23.47	95% Jackknife UCL 90.58
		95% Standard Bootstrap UCL 86.07
Anderson-Darling Test Statistic	0.419	95% Bootstrap-t UCL 110.3
Anderson-Darling 5% Critical Value	0.727	95% Hall's Bootstrap UCL 111.4
Kolmogorov-Smirnov Test Statistic	0.222	95% Percentile Bootstrap UCL 87.93
Kolmogorov-Smirnov 5% Critical Value	0.281	95% BCA Bootstrap UCL 94.39
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 126.6
		97.5% Chebyshev(Mean, Sd) UCL 153.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 207.1
95% Approximate Gamma UCL	96.79	
95% Adjusted Gamma UCL	106.1	

Potential UCL to Use	Use 95% Approximate Gamma UCL 96.79

General UCL Statistics for Full Data Sets

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

Iron

General Statistics

Number of Valid Observations	9	Number of Distinct Observations	9
Raw Statistics		**Log-transformed Statistics**	
Minimum	14600	Minimum of Log Data	9.589
Maximum	41300	Maximum of Log Data	10.63
Mean	23178	Mean of log Data	9.994
Median	21000	SD of log Data	0.349
SD	8739		
Std. Error of Mean	2913		
Coefficient of Variation	0.377		
Skewness	1.203		

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.89	Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Critical Value	0.829	Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	28594	95% H-UCL	30039
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	34914
95% Adjusted-CLT UCL (Chen-1995)	29217	97.5% Chebyshev (MVUE) UCL	40021
95% Modified-t UCL (Johnson-1978)	28789	99% Chebyshev (MVUE) UCL	50053
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.064	**Data appear Normal at 5% Significance Level**	
Theta Star	3822		
MLE of Mean	23178		
MLE of Standard Deviation	9412		
nu star	109.1		
Approximate Chi Square Value (.05)	86.03	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0231	95% CLT UCL	27969
Adjusted Chi Square Value	81.71	95% Jackknife UCL	28594
		95% Standard Bootstrap UCL	27683
Anderson-Darling Test Statistic	0.293	95% Bootstrap-t UCL	31523
Anderson-Darling 5% Critical Value	0.722	95% Hall's Bootstrap UCL	33244
Kolmogorov-Smirnov Test Statistic	0.173	95% Percentile Bootstrap UCL	27944
Kolmogorov-Smirnov 5% Critical Value	0.279	95% BCA Bootstrap UCL	29111
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	35875
		97.5% Chebyshev(Mean, Sd) UCL	41369
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	52161
95% Approximate Gamma UCL	29405		
95% Adjusted Gamma UCL	30959		
Potential UCL to Use		Use 95% Student's-t UCL	28594

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

THALLIUM

General Statistics

Number of Valid Data	9	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	5
		Percent Non-Detects	55.56%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.35	Minimum Detected	-1.05
Maximum Detected	1.1	Maximum Detected	0.0953
Mean of Detected	0.7	Mean of Detected	-0.497
SD of Detected	0.401	SD of Detected	0.624
Minimum Non-Detect	0.15	Minimum Non-Detect	-1.897
Maximum Non-Detect	0.17	Maximum Non-Detect	-1.772

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	4
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	55.56%

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.8	Shapiro Wilk Test Statistic	0.783
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.355	Mean	-1.631
SD	0.409	SD	1.143
95% DL/2 (t) UCL	0.609	95% H-Stat (DL/2) UCL	0.792
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0958	Mean in Log Scale	-1.564
SD	0.664	SD in Log Scale	1.116
95% MLE (t) UCL	0.507	Mean in Original Scale	0.363
95% MLE (Tiku) UCL	0.637	SD in Original Scale	0.403
		95% Percentile Bootstrap UCL	0.583
		95% BCA Bootstrap UCL	0.638

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	1.1	**Data appear Normal at 5% Significance Level**
Theta Star	0.636	
nu star	8.799	
A-D Test Statistic	0.602	**Nonparametric Statistics**
5% A-D Critical Value	0.659	Kaplan-Meier (KM) Method
K-S Test Statistic	0.659	Mean 0.506
5% K-S Critical Value	0.396	SD 0.29
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.111
		95% KM (t) UCL 0.713
Assuming Gamma Distribution		95% KM (z) UCL 0.689
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL 0.693
Minimum	0.35	95% KM (bootstrap t) UCL 0.63
Maximum	1.1	95% KM (BCA) UCL 1.027
Mean	0.7	95% KM (Percentile Bootstrap) UCL 1.014
Median	0.7	95% KM (Chebyshev) UCL 0.991
SD	0.246	97.5% KM (Chebyshev) UCL 1.201
k star	5.51	99% KM (Chebyshev) UCL 1.614
Theta star	0.127	

Nu star	99.17
AppChi2	77.2
95% Gamma Approximate UCL	0.899
95% Adjusted Gamma UCL	N/A

Potential UCLs to Use

95% KM (t) UCL	0.713
95% KM (Percentile Bootstrap) UCL	1.014

Note: DL/2 is not a recommended method.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE9-SB_T_ALUMINUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_ALUMINUM

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	14600	Minimum of Log Data	9.589
Maximum	22750	Maximum of Log Data	10.03
Mean	20075	Mean of log Data	9.897
Median	20500	SD of log Data	0.159
SD	2887		
Coefficient of Variation	0.144		
Skewness	-1.7		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.825	Shapiro Wilk Test Statistic	0.782
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	22450	95% H-UCL	23236
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	25781
95% Adjusted-CLT UCL	21139	97.5% Chebyshev (MVUE) UCL	28244
95% Modified-t UCL	22314	99% Chebyshev (MVUE) UCL	33083

Gamma Distribution Test		Data Distribution
k star (bias corrected)	25.53	Data appear Normal at 5% Significance Level
Theta Star	786.3	
MLE of Mean	20075	
MLE of Standard Deviation	3973	
nu star	306.4	
Approximate Chi Square Value (.05)	266.8	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 22014
Adjusted Chi Square Value	253.4	95% Jackknife UCL 22450
		95% Standard Bootstrap UCL 21857
Anderson-Darling Test Statistic	0.663	95% Bootstrap-t UCL 21759
Anderson-Darling 5% Critical Value	0.697	95% Hall's Bootstrap UCL 21358
Kolmogorov-Smirnov Test Statistic	0.341	95% Percentile Bootstrap UCL 21658
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL 21433
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 25213
		97.5% Chebyshev(Mean, Sd) UCL 27436
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 31803
95% Approximate Gamma UCL	23050	
95% Adjusted Gamma UCL	24272	

Potential UCL to Use		Use 95% Student's-t UCL	22450

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE9-SB_T_ARSENIC.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_ARSENIC

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	35.7	Minimum of Log Data	3.575
Maximum	188.5	Maximum of Log Data	5.239
Mean	100.6	Mean of log Data	4.441
Median	80.2	SD of log Data	0.65
SD	62.46		
Coefficient of Variation	0.621		
Skewness	0.654		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.892
Shapiro Wilk Critical Value	0.788

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.95
Shapiro Wilk Critical Value	0.788

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	151.9

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	149.8
95% Modified-t UCL	153.1

Assuming Lognormal Distribution

95% H-UCL	252.4
95% Chebyshev (MVUE) UCL	216.7
97.5% Chebyshev (MVUE) UCL	266.9
99% Chebyshev (MVUE) UCL	365.5

Gamma Distribution Test

k star (bias corrected)	1.657
Theta Star	60.68
MLE of Mean	100.6
MLE of Standard Deviation	78.12
nu star	19.89
Approximate Chi Square Value (.05)	10.77
Adjusted Level of Significance	0.0122
Adjusted Chi Square Value	8.455
Anderson-Darling Test Statistic	0.289
Anderson-Darling 5% Critical Value	0.701
Kolmogorov-Smirnov Test Statistic	0.204
Kolmogorov-Smirnov 5% Critical Value	0.334

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	185.7
95% Adjusted Gamma UCL	236.6

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	142.5
95% Jackknife UCL	151.9
95% Standard Bootstrap UCL	138.5
95% Bootstrap-t UCL	199.9
95% Hall's Bootstrap UCL	223.7
95% Percentile Bootstrap UCL	139.9
95% BCA Bootstrap UCL	143.4
95% Chebyshev(Mean, Sd) UCL	211.7
97.5% Chebyshev(Mean, Sd) UCL	259.8
99% Chebyshev(Mean, Sd) UCL	354.3

Potential UCL to Use

Use 95% Student's-t UCL 151.9

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE9-SB_T_CHROMIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_CHROMIUM

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	35.4	Minimum of Log Data	3.567
Maximum	163	Maximum of Log Data	5.094
Mean	94.22	Mean of log Data	4.418
Median	79.65	SD of log Data	0.568
SD	49.86		
Coefficient of Variation	0.529		
Skewness	0.496		

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The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.923	Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	135.2	95% H-UCL	199.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	190.2
95% Adjusted-CLT UCL	132.1	97.5% Chebyshev (MVUE) UCL	231.6
95% Modified-t UCL	135.9	99% Chebyshev (MVUE) UCL	312.8

Gamma Distribution Test		Data Distribution
k star (bias corrected)	2.156	Data appear Normal at 5% Significance Level
Theta Star	43.69	
MLE of Mean	94.22	
MLE of Standard Deviation	64.16	
nu star	25.88	
Approximate Chi Square Value (.05)	15.29	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 127.7
Adjusted Chi Square Value	12.44	95% Jackknife UCL 135.2
		95% Standard Bootstrap UCL 124.9
Anderson-Darling Test Statistic	0.256	95% Bootstrap-t UCL 171
Anderson-Darling 5% Critical Value	0.7	95% Hall's Bootstrap UCL 189.7
Kolmogorov-Smirnov Test Statistic	0.197	95% Percentile Bootstrap UCL 125.2
Kolmogorov-Smirnov 5% Critical Value	0.333	95% BCA Bootstrap UCL 128.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 182.9
		97.5% Chebyshev(Mean, Sd) UCL 221.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 296.7
95% Approximate Gamma UCL	159.5	
95% Adjusted Gamma UCL	195.9	

Potential UCL to Use	Use 95% Student's-t UCL 135.2

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE9-SB_T_COBALT.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_COBALT

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	1.9	Minimum of Log Data	0.642
Maximum	104	Maximum of Log Data	4.644
Mean	27.8	Mean of log Data	2.391
Median	12.85	SD of log Data	1.581
SD	39.26		
Coefficient of Variation	1.412		
Skewness	1.967		

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If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.739	Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	60.1	95% H-UCL	2992
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	99.41
95% Adjusted-CLT UCL	67.92	97.5% Chebyshev (MVUE) UCL	130.6
95% Modified-t UCL	62.25	99% Chebyshev (MVUE) UCL	191.7

Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.438	Data appear Gamma Distributed at 5% Significance Level
Theta Star	63.51	
MLE of Mean	27.8	
MLE of Standard Deviation	42.02	
nu star	5.253	
Approximate Chi Square Value (.05)	1.271	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 54.17
Adjusted Chi Square Value	0.697	95% Jackknife UCL 60.1
		95% Standard Bootstrap UCL 51.57
Anderson-Darling Test Statistic	0.338	95% Bootstrap-t UCL 144.5
Anderson-Darling 5% Critical Value	0.727	95% Hall's Bootstrap UCL 158.2
Kolmogorov-Smirnov Test Statistic	0.235	95% Percentile Bootstrap UCL 56.17
Kolmogorov-Smirnov 5% Critical Value	0.345	95% BCA Bootstrap UCL 63.22
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 97.67
		97.5% Chebyshev(Mean, Sd) UCL 127.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 187.3
95% Approximate Gamma UCL	114.9	
95% Adjusted Gamma UCL	209.4	

Potential UCL to Use	Use 95% Approximate Gamma UCL 114.9

Recommended UCL exceeds the maximum observation

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE9-SB_T_MANGANESE.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_MANGANESE

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	42.7	Minimum of Log Data	3.754
Maximum	7150	Maximum of Log Data	8.875
Mean	1729	Mean of log Data	6.115
Median	486.5	SD of log Data	1.959
SD	2769		
Coefficient of Variation	1.601		
Skewness	2.059		

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If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.703	Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	4007	95% H-UCL	2306116
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	7083
95% Adjusted-CLT UCL	4603	97.5% Chebyshev (MVUE) UCL	9395
95% Modified-t UCL	4165	99% Chebyshev (MVUE) UCL	13938

Gamma Distribution Test		Data Distribution
k star (bias corrected)	0.35	Data appear Gamma Distributed at 5% Significance Level
Theta Star	4944	
MLE of Mean	1729	
MLE of Standard Deviation	2924	
nu star	4.197	
Approximate Chi Square Value (.05)	0.801	
Adjusted Level of Significance	0.0122	
Adjusted Chi Square Value	0.399	
Anderson-Darling Test Statistic	0.326	
Anderson-Darling 5% Critical Value	0.739	
Kolmogorov-Smirnov Test Statistic	0.244	
Kolmogorov-Smirnov 5% Critical Value	0.35	
Data appear Gamma Distributed at 5% Significance Level		

Nonparametric Statistics	
95% CLT UCL	3588
95% Jackknife UCL	4007
95% Standard Bootstrap UCL	3449
95% Bootstrap-t UCL	12415
95% Hall's Bootstrap UCL	15520
95% Percentile Bootstrap UCL	3659
95% BCA Bootstrap UCL	4295
95% Chebyshev(Mean, Sd) UCL	6656
97.5% Chebyshev(Mean, Sd) UCL	8788
99% Chebyshev(Mean, Sd) UCL	12975

Assuming Gamma Distribution	
95% Approximate Gamma UCL	9059
95% Adjusted Gamma UCL	18202

Potential UCL to Use	Use 95% Adjusted Gamma UCL 18202

Recommended UCL exceeds the maximum observation

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE9-SB_T_VANADIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SB_VANADIUM

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	140	Minimum of Log Data	4.942
Maximum	222	Maximum of Log Data	5.403
Mean	181.3	Mean of log Data	5.187
Median	170.5	SD of log Data	0.178
SD	32.42		
Coefficient of Variation	0.179		
Skewness	0.385		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.876	Shapiro Wilk Test Statistic	0.894
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	208	95% H-UCL	213.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	238.7
95% Adjusted-CLT UCL	205.3	97.5% Chebyshev (MVUE) UCL	263.5
95% Modified-t UCL	208.4	99% Chebyshev (MVUE) UCL	312.2

Gamma Distribution Test		Data Distribution
k star (bias corrected)	19.12	Data appear Normal at 5% Significance Level
Theta Star	9.483	
MLE of Mean	181.3	
MLE of Standard Deviation	41.47	
nu star	229.5	
Approximate Chi Square Value (.05)	195.4	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 203.1
Adjusted Chi Square Value	184	95% Jackknife UCL 208
		95% Standard Bootstrap UCL 201.2
Anderson-Darling Test Statistic	0.468	95% Bootstrap-t UCL 229.8
Anderson-Darling 5% Critical Value	0.697	95% Hall's Bootstrap UCL 334.3
Kolmogorov-Smirnov Test Statistic	0.273	95% Percentile Bootstrap UCL 202.8
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL 203.3
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 239
		97.5% Chebyshev(Mean, Sd) UCL 264
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 313
95% Approximate Gamma UCL	212.9	
95% Adjusted Gamma UCL	226.2	

Potential UCL to Use		Use 95% Student's-t UCL	208

General UCL Statistics for Full Data Sets

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

Iron

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		**Log-transformed Statistics**	
Minimum	37900	Minimum of Log Data	10.54
Maximum	123000	Maximum of Log Data	11.72
Mean	74817	Mean of log Data	11.14
Median	68950	SD of log Data	0.437
SD	31931		
Std. Error of Mean	13036		
Coefficient of Variation	0.427		
Skewness	0.555		

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Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.96	Shapiro Wilk Test Statistic	0.984
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	101084	95% H-UCL	123927
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	133030
95% Adjusted-CLT UCL (Chen-1995)	99417	97.5% Chebyshev (MVUE) UCL	158196
95% Modified-t UCL (Johnson-1978)	101577	99% Chebyshev (MVUE) UCL	207631

Gamma Distribution Test		**Data Distribution**
k star (bias corrected)	3.4	**Data appear Normal at 5% Significance Level**
Theta Star	22007	
MLE of Mean	74817	
MLE of Standard Deviation	40577	
nu star	40.8	
Approximate Chi Square Value (.05)	27.16	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 96258
Adjusted Chi Square Value	23.22	95% Jackknife UCL 101084
		95% Standard Bootstrap UCL 94470
Anderson-Darling Test Statistic	0.172	95% Bootstrap-t UCL 112682
Anderson-Darling 5% Critical Value	0.698	95% Hall's Bootstrap UCL 115731
Kolmogorov-Smirnov Test Statistic	0.152	95% Percentile Bootstrap UCL 94967
Kolmogorov-Smirnov 5% Critical Value	0.333	95% BCA Bootstrap UCL 95517
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 131638
		97.5% Chebyshev(Mean, Sd) UCL 156224
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 204520
95% Approximate Gamma UCL	112384	
95% Adjusted Gamma UCL	131447	

Potential UCL to Use	Use 95% Student's-t UCL 101084

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE12-SD_T_ARSENIC.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SD_ARSENIC

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	16.4	Minimum of Log Data	2.797
Maximum	35.8	Maximum of Log Data	3.578
Mean	23.78	Mean of log Data	3.138
Median	22.35	SD of log Data	0.267
SD	6.741		
Coefficient of Variation	0.283		
Skewness	1.238		

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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.918	Shapiro Wilk Test Statistic	0.973
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	29.33	95% H-UCL	30.97
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	35.03
95% Adjusted-CLT UCL	29.8	97.5% Chebyshev (MVUE) UCL	39.91
95% Modified-t UCL	29.56	99% Chebyshev (MVUE) UCL	49.5

Gamma Distribution Test		Data Distribution
k star (bias corrected)	8.32	Data appear Normal at 5% Significance Level
Theta Star	2.859	
MLE of Mean	23.78	
MLE of Standard Deviation	8.245	
nu star	99.84	
Approximate Chi Square Value (.05)	77.79	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 28.31
Adjusted Chi Square Value	70.78	95% Jackknife UCL 29.33
		95% Standard Bootstrap UCL 27.89
Anderson-Darling Test Statistic	0.243	95% Bootstrap-t UCL 33.18
Anderson-Darling 5% Critical Value	0.698	95% Hall's Bootstrap UCL 56.58
Kolmogorov-Smirnov Test Statistic	0.188	95% Percentile Bootstrap UCL 28.12
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL 28.97
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 35.78
		97.5% Chebyshev(Mean, Sd) UCL 40.97
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 51.17
95% Approximate Gamma UCL	30.53	
95% Adjusted Gamma UCL	33.55	

Potential UCL to Use	Use 95% Student's-t UCL 29.33

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE12-SD_T_CHROMIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SD_CHROMIUM

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	16	Minimum of Log Data	2.773
Maximum	24.5	Maximum of Log Data	3.199
Mean	19.6	Mean of log Data	2.964
Median	18.2	SD of log Data	0.167
SD	3.383		
Coefficient of Variation	0.173		
Skewness	0.775		

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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.867	Shapiro Wilk Test Statistic	0.887
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	22.38	95% H-UCL	22.85
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	25.43
95% Adjusted-CLT UCL	22.34	97.5% Chebyshev (MVUE) UCL	27.95
95% Modified-t UCL	22.46	99% Chebyshev (MVUE) UCL	32.91

Gamma Distribution Test		Data Distribution
k star (bias corrected)	21.18	Data appear Normal at 5% Significance Level
Theta Star	0.925	
MLE of Mean	19.6	
MLE of Standard Deviation	4.258	
nu star	254.2	
Approximate Chi Square Value (.05)	218.3	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 21.87
Adjusted Chi Square Value	206.2	95% Jackknife UCL 22.38
		95% Standard Bootstrap UCL 21.68
Anderson-Darling Test Statistic	0.497	95% Bootstrap-t UCL 27.25
Anderson-Darling 5% Critical Value	0.697	95% Hall's Bootstrap UCL 48.35
Kolmogorov-Smirnov Test Statistic	0.305	95% Percentile Bootstrap UCL 21.77
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL 21.93
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 25.62
		97.5% Chebyshev(Mean, Sd) UCL 28.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 33.34
95% Approximate Gamma UCL	22.82	
95% Adjusted Gamma UCL	24.16	

Potential UCL to Use		Use 95% Student's-t UCL	22.38

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE12-SD_T_VANADIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

SD_VANADIUM

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	29.9	Minimum of Log Data	3.398
Maximum	56.2	Maximum of Log Data	4.029
Mean	40.25	Mean of log Data	3.664
Median	34.85	SD of log Data	0.266
SD	11.31		
Coefficient of Variation	0.281		
Skewness	0.887		

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If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
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the resulting calculations may not be reliable enough to draw conclusions

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Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.801	Shapiro Wilk Test Statistic	0.829
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	49.55	95% H-UCL	52.37
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	59.25
95% Adjusted-CLT UCL	49.63	97.5% Chebyshev (MVUE) UCL	67.49
95% Modified-t UCL	49.83	99% Chebyshev (MVUE) UCL	83.68

Gamma Distribution Test		Data Distribution
k star (bias corrected)	8.34	Data appear Normal at 5% Significance Level
Theta Star	4.826	
MLE of Mean	40.25	
MLE of Standard Deviation	13.94	
nu star	100.1	
Approximate Chi Square Value (.05)	78	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 47.84
Adjusted Chi Square Value	70.98	95% Jackknife UCL 49.55
		95% Standard Bootstrap UCL 47.13
Anderson-Darling Test Statistic	0.669	95% Bootstrap-t UCL 78.26
Anderson-Darling 5% Critical Value	0.698	95% Hall's Bootstrap UCL 139.7
Kolmogorov-Smirnov Test Statistic	0.348	95% Percentile Bootstrap UCL 47.68
Kolmogorov-Smirnov 5% Critical Value	0.332	95% BCA Bootstrap UCL 48.02
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 60.37
		97.5% Chebyshev(Mean, Sd) UCL 69.08
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 86.19
95% Approximate Gamma UCL	51.64	
95% Adjusted Gamma UCL	56.75	

Potential UCL to Use		Use 95% Student's-t UCL	49.55

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE12-WS_T_CHROMIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

WS_CHROMIUM

General Statistics

Number of Valid Data	6	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	1
		Percent Non-Detects	16.67%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.4	Minimum Detected	0.336
Maximum Detected	8.3	Maximum Detected	2.116
Mean of Detected	3.22	Mean of Detected	0.915
SD of Detected	2.92	SD of Detected	0.74
Minimum Non-Detect	0.8	Minimum Non-Detect	-0.223
Maximum Non-Detect	0.8	Maximum Non-Detect	-0.223

Warning: There are only 5 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.725	Shapiro Wilk Test Statistic	0.842
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.75	Mean	0.61
SD	2.854	SD	0.999
95% DL/2 (t) UCL	5.098	95% H-Stat (DL/2) UCL	19.11
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	2.516	Mean in Log Scale	0.611
SD	2.92	SD in Log Scale	0.997
95% MLE (t) UCL	4.918	Mean in Original Scale	2.75
95% MLE (Tiku) UCL	4.879	SD in Original Scale	2.854
		95% Percentile Bootstrap UCL	4.75
		95% BCA Bootstrap UCL	5.417

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.982	Data appear Gamma Distributed at 5% Significance Level
Theta Star	3.28	
nu star	9.817	
A-D Test Statistic	0.584	
5% A-D Critical Value	0.684	
K-S Test Statistic	0.684	
5% K-S Critical Value	0.36	
Data appear Gamma Distributed at 5% Significance Level		

Assuming Gamma Distribution		Nonparametric Statistics	
Gamma ROS Statistics using Extrapolated Data		Kaplan-Meier (KM) Method	
Minimum	0.00217	Mean	2.917
Maximum	8.3	SD	2.479
Mean	2.684	SE of Mean	1.131
Median	1.65	95% KM (t) UCL	5.197
SD	2.924	95% KM (z) UCL	4.778
k star	0.365	95% KM (jackknife) UCL	5.143
Theta star	7.347	95% KM (bootstrap t) UCL	23.01
Nu star	4.383	95% KM (BCA) UCL	4.95
AppChi2	0.879	95% KM (Percentile Bootstrap) UCL	4.917
95% Gamma Approximate UCL	13.39	95% KM (Chebyshev) UCL	7.848
95% Adjusted Gamma UCL	26.39	97.5% KM (Chebyshev) UCL	9.982
		99% KM (Chebyshev) UCL	14.17
		Potential UCLs to Use	
		95% KM (Chebyshev) UCL	7.848

Note: DL/2 is not a recommended method.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	C:\temp\Fort Buchanan\ProUCL\inp_SITE12-WS_T_VANADIUM.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

WS_VANADIUM

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	3.2	Minimum of Log Data	1.163
Maximum	23.2	Maximum of Log Data	3.144
Mean	8.167	Mean of log Data	1.848
Median	5.55	SD of log Data	0.713
SD	7.551		
Coefficient of Variation	0.925		
Skewness	2.192		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.698	Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	14.38	95% H-UCL	22.77
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	17.64
95% Adjusted-CLT UCL	16.18	97.5% Chebyshev (MVUE) UCL	21.89
95% Modified-t UCL	14.84	99% Chebyshev (MVUE) UCL	30.26

Gamma Distribution Test		Data Distribution
k star (bias corrected)	1.178	Data appear Gamma Distributed at 5% Significance Level
Theta Star	6.93	
MLE of Mean	8.167	
MLE of Standard Deviation	7.523	
nu star	14.14	
Approximate Chi Square Value (.05)	6.668	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 13.24
Adjusted Chi Square Value	4.934	95% Jackknife UCL 14.38
		95% Standard Bootstrap UCL 12.72
Anderson-Darling Test Statistic	0.57	95% Bootstrap-t UCL 31.57
Anderson-Darling 5% Critical Value	0.704	95% Hall's Bootstrap UCL 34.71
Kolmogorov-Smirnov Test Statistic	0.268	95% Percentile Bootstrap UCL 13.77
Kolmogorov-Smirnov 5% Critical Value	0.336	95% BCA Bootstrap UCL 14.82
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 21.6
		97.5% Chebyshev(Mean, Sd) UCL 27.42
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 38.84
95% Approximate Gamma UCL	17.32	
95% Adjusted Gamma UCL	23.41	

Potential UCL to Use	Use 95% Approximate Gamma UCL 17.32

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

Barium

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		Log-transformed Statistics	
Minimum	113	Minimum of Log Data	4.727
Maximum	662	Maximum of Log Data	6.495
Mean	284	Mean of log Data	5.476
Median	199	SD of log Data	0.618
SD	201.5		
Std. Error of Mean	82.25		
Coefficient of Variation	0.709		
Skewness	1.72		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.803	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	449.7	95% H-UCL	652.3
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	585.3
95% Adjusted-CLT UCL (Chen-1995)	481	97.5% Chebyshev (MVUE) UCL	717.8
95% Modified-t UCL (Johnson-1978)	459.4	99% Chebyshev (MVUE) UCL	978.1

Gamma Distribution Test		Data Distribution
k star (bias corrected)	1.632	**Data appear Normal at 5% Significance Level**
Theta Star	174	
MLE of Mean	284	
MLE of Standard Deviation	222.3	
nu star	19.58	
Approximate Chi Square Value (.05)	10.54	**Nonparametric Statistics**
Adjusted Level of Significance	0.0122	95% CLT UCL 419.3
Adjusted Chi Square Value	8.259	95% Jackknife UCL 449.7
		95% Standard Bootstrap UCL 406.2
Anderson-Darling Test Statistic	0.435	95% Bootstrap-t UCL 892.2
Anderson-Darling 5% Critical Value	0.701	95% Hall's Bootstrap UCL 1373
Kolmogorov-Smirnov Test Statistic	0.303	95% Percentile Bootstrap UCL 416.5
Kolmogorov-Smirnov 5% Critical Value	0.335	95% BCA Bootstrap UCL 454.7

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	527.4
95% Adjusted Gamma UCL	673.4

95% Chebyshev(Mean, Sd) UCL	642.5
97.5% Chebyshev(Mean, Sd) UCL	797.7
99% Chebyshev(Mean, Sd) UCL	1102

Potential UCL to Use

Use 95% Student's-t UCL 449.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Copper

General Statistics

Number of Valid Data	6	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	1
		Percent Non-Detects	16.67%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	2.1	Minimum Detected	0.742
Maximum Detected	83.9	Maximum Detected	4.43
Mean of Detected	27.06	Mean of Detected	2.52
SD of Detected	33.5	SD of Detected	1.529
Minimum Non-Detect	0.85	Minimum Non-Detect	-0.163
Maximum Non-Detect	0.85	Maximum Non-Detect	-0.163

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.806	Shapiro Wilk Test Statistic	0.937
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	22.62	Mean	1.958
SD	31.87	SD	1.942
95% DL/2 (t) UCL	48.84	95% H-Stat (DL/2) UCL	31048
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	19.22	Mean in Log Scale	1.866
SD	33.21	SD in Log Scale	2.107
95% MLE (t) UCL	46.54	Mean in Original Scale	22.59
95% MLE (Tiku) UCL	46.01	SD in Original Scale	31.9
		95% t UCL	48.83
		95% Percentile Bootstrap UCL	45.46
		95% BCA Bootstrap UCL	51.09
		95% H UCL	121779

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**
k star (bias corrected)	0.44	**Data appear Normal at 5% Significance Level**
Theta Star	61.47	
nu star	4.402	

A-D Test Statistic	0.28
5% A-D Critical Value	0.698
K-S Test Statistic	0.698
5% K-S Critical Value	0.367

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	83.9
Mean	22.55
Median	11
SD	31.93
k star	0.22
Theta star	102.3
Nu star	2.645
AppChi2	0.276
95% Gamma Approximate UCL	216.4
95% Adjusted Gamma UCL	473.9

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	22.9
SD	28.89
SE of Mean	13.19
95% KM (t) UCL	49.47
95% KM (z) UCL	44.59
95% KM (jackknife) UCL	48.87
95% KM (bootstrap t) UCL	79.72
95% KM (BCA) UCL	47.6
95% KM (Percentile Bootstrap) UCL	45.77
95% KM (Chebyshev) UCL	80.38
97.5% KM (Chebyshev) UCL	105.2
99% KM (Chebyshev) UCL	154.1

Potential UCLs to Use

95% KM (t) UCL	49.47
95% KM (Percentile Bootstrap) UCL	45.77

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Zinc

General Statistics

Number of Valid Observations	6	Number of Distinct Observations	6

Raw Statistics		**Log-transformed Statistics**	
Minimum	2.4	Minimum of Log Data	0.875
Maximum	651	Maximum of Log Data	6.479
Mean	117	Mean of log Data	2.814
Median	12.15	SD of log Data	1.942
SD	261.7		
Std. Error of Mean	106.8		
Coefficient of Variation	2.238		
Skewness	2.446		

Warning: A sample size of 'n' = 6 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!
If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 6 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.518	Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical Value	0.788	Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution | **Assuming Lognormal Distribution**

95% Student's-t UCL	332.2
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	406.7
95% Modified-t UCL (Johnson-1978)	350

95% H-UCL	73114
95% Chebyshev (MVUE) UCL	254.3
97.5% Chebyshev (MVUE) UCL	337.2
99% Chebyshev (MVUE) UCL	500.1

Gamma Distribution Test

k star (bias corrected)	0.284
Theta Star	411.7
MLE of Mean	117
MLE of Standard Deviation	219.4
nu star	3.408
Approximate Chi Square Value (.05)	0.503
Adjusted Level of Significance	0.0122
Adjusted Chi Square Value	0.231
Anderson-Darling Test Statistic	1.002
Anderson-Darling 5% Critical Value	0.76
Kolmogorov-Smirnov Test Statistic	0.431
Kolmogorov-Smirnov 5% Critical Value	0.355

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	792.4
95% Adjusted Gamma UCL	1724

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	292.7
95% Jackknife UCL	332.2
95% Standard Bootstrap UCL	278.2
95% Bootstrap-t UCL	5655
95% Hall's Bootstrap UCL	4385
95% Percentile Bootstrap UCL	329.1
95% BCA Bootstrap UCL	334
95% Chebyshev(Mean, Sd) UCL	582.7
97.5% Chebyshev(Mean, Sd) UCL	784.2
99% Chebyshev(Mean, Sd) UCL	1180

Potential UCL to Use

Use 99% Chebyshev (Mean, Sd) UCL 1180

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

ATTACHMENT D

BLOOD LEAD AND VAPOR INTRUSION MODEL RESULTS

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GROUPING 3 LEAD MODEL OUTPUTS

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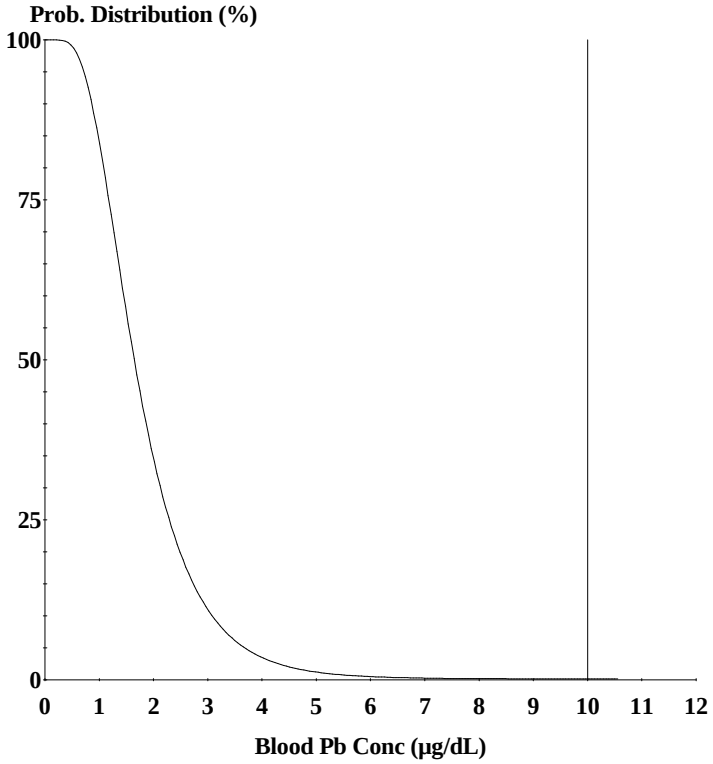

Cutoff = 10.000 µg/dl
Geo Mean = 1.726
GSD = 1.600
% Above = 0.009

Age Range = 0 to 84 months

Run Mode = Research

LEAD MODEL FOR WINDOWS Version 1.1

==========
Model Version: 1.1 Build11
User Name:
Date:
Site Name:
Operable Unit:
Run Mode: Research
==========

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(µg/day)
.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 74.400 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
.5-1	92.000	74.400
1-2	92.000	74.400
2-3	92.000	74.400
3-4	92.000	74.400
4-5	92.000	74.400
5-6	92.000	74.400
6-7	92.000	74.400

****** Alternate Intake ******

Age	Alternate (µg Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 1.000 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
.5-1	0.021	1.086	0.000	0.384
1-2	0.034	0.937	0.000	0.957
2-3	0.062	1.024	0.000	1.000
3-4	0.067	0.987	0.000	1.025
4-5	0.067	0.952	0.000	1.074
5-6	0.093	1.004	0.000	1.136
6-7	0.093	1.089	0.000	1.158

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
.5-1	2.018	3.510	1.9
1-2	3.189	5.118	2.1
2-3	3.207	5.294	2.0
3-4	3.225	5.304	1.9
4-5	2.411	4.503	1.6
5-6	2.177	4.410	1.4
6-7	2.059	4.400	1.3

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NORTHWEST BOUNDARY AREA GROUNDWATER

VAPOR INTRUSION MODEL RESULTS

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COMMERCIAL WORKER

GROUNDWATER TO INDOOR AIR CALCULATIONS

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General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	Sheet2.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	10000

1,1,2-TRICHLOROETHANE

General Statistics

Number of Valid Data	20	Number of Detected Data	11
Number of Distinct Detected Data	11	Number of Non-Detect Data	9
		Percent Non-Detects	45.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.2	Minimum Detected	0.182
Maximum Detected	25.7	Maximum Detected	3.246
Mean of Detected	10.2	Mean of Detected	1.764
SD of Detected	9.917	SD of Detected	1.201
Minimum Non-Detect	0.17	Minimum Non-Detect	-1.772
Maximum Non-Detect	0.49	Maximum Non-Detect	-0.713

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	9
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	11
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	45.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.779	Shapiro Wilk Test Statistic	0.859
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.664	Mean	-0.033
SD	8.845	SD	2.238
95% DL/2 (t) UCL	9.084	95% H-Stat (DL/2) UCL	134.7
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	1.159	Mean in Log Scale	0.351
SD	13.31	SD in Log Scale	1.914
95% MLE (t) UCL	6.306	Mean in Original Scale	5.762
95% MLE (Tiku) UCL	7.196	SD in Original Scale	8.782
		95% t UCL	9.158
		95% Percentile Bootstrap UCL	9.186
		95% BCA Bootstrap UCL	9.729
		95% H UCL	54.76

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.81	**Data appear Gamma Distributed at 5% Significance Level**
Theta Star	12.59	

nu star	17.83
A-D Test Statistic	0.687
5% A-D Critical Value	0.751
K-S Test Statistic	0.751
5% K-S Critical Value	0.262

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	25.7
Mean	5.61
Median	1.3
SD	8.881
k star	0.131
Theta star	42.94
Nu star	5.226
AppChi2	1.258
95% Gamma Approximate UCL	23.31
95% Adjusted Gamma UCL	26.35

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	6.15
SD	8.32
SE of Mean	1.951
95% KM (t) UCL	9.524
95% KM (z) UCL	9.359
95% KM (jackknife) UCL	9.385
95% KM (bootstrap t) UCL	10.65
95% KM (BCA) UCL	9.8
95% KM (Percentile Bootstrap) UCL	9.55
95% KM (Chebyshev) UCL	14.66
97.5% KM (Chebyshev) UCL	18.34
99% KM (Chebyshev) UCL	25.56

Potential UCLs to Use

95% KM (BCA) UCL	9.8

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

CIS-1,2-DICHLOROETHENE

General Statistics

Number of Valid Data	17	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	7
		Percent Non-Detects	41.18%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	43.6	Minimum Detected	3.775
Maximum Detected	275	Maximum Detected	5.617
Mean of Detected	115.2	Mean of Detected	4.44
SD of Detected	100.3	SD of Detected	0.787
Minimum Non-Detect	0.19	Minimum Non-Detect	-1.661
Maximum Non-Detect	0.25	Maximum Non-Detect	-1.386

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	10
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	41.18%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.681	Shapiro Wilk Test Statistic	0.746
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	67.78
SD	95.19
95% DL/2 (t) UCL	108.1
Maximum Likelihood Estimate(MLE) Method	
Mean	25.8
SD	139
95% MLE (t) UCL	84.65
95% MLE (Tiku) UCL	92.64

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	1.691
SD	3.439
95% H-Stat (DL/2) UCL	936068
Log ROS Method	
Mean in Log Scale	3.628
SD in Log Scale	1.198
Mean in Original Scale	73.07
SD in Original Scale	91.4
95% t UCL	111.8
95% Percentile Bootstrap UCL	110.8
95% BCA Bootstrap UCL	118.3
95% H UCL	188.2

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.312
Theta Star	87.78
nu star	26.24
A-D Test Statistic	1.403
5% A-D Critical Value	0.737
K-S Test Statistic	0.737
5% K-S Critical Value	0.27

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	275
Mean	67.74
Median	44.1
SD	95.22
k star	0.13
Theta star	521.8
Nu star	4.413
AppChi2	0.892
95% Gamma Approximate UCL	335.3
95% Adjusted Gamma UCL	403.1

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	85.69
SD	81.01
SE of Mean	20.71
95% KM (t) UCL	121.8
95% KM (z) UCL	119.8
95% KM (jackknife) UCL	120.9
95% KM (bootstrap t) UCL	130.3
95% KM (BCA) UCL	123.1
95% KM (Percentile Bootstrap) UCL	122.2
95% KM (Chebyshev) UCL	176
97.5% KM (Chebyshev) UCL	215
99% KM (Chebyshev) UCL	291.8
Potential UCLs to Use	
95% KM (t) UCL	121.8
95% KM (% Bootstrap) UCL	122.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

TETRACHLOROETHENE

General Statistics

Number of Valid Data	20	Number of Detected Data	11

Number of Distinct Detected Data	11	Number of Non-Detect Data	9
		Percent Non-Detects	45.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	5.4	Minimum Detected	1.686
Maximum Detected	34.1	Maximum Detected	3.529
Mean of Detected	19.12	Mean of Detected	2.722
SD of Detected	11.23	SD of Detected	0.774
Minimum Non-Detect	0.28	Minimum Non-Detect	-1.273
Maximum Non-Detect	0.29	Maximum Non-Detect	-1.238

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	9
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	11
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	45.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.855	Shapiro Wilk Test Statistic	0.783
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85
Data appear Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	10.58	Mean	0.625
SD	12.65	SD	2.445
95% DL/2 (t) UCL	15.47	95% H-Stat (DL/2) UCL	654.5
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4.067	Mean in Log Scale	1.871
SD	19.95	SD in Log Scale	1.17
95% MLE (t) UCL	11.78	Mean in Original Scale	11.67
95% MLE (Tiku) UCL	13.13	SD in Original Scale	11.76
		95% t UCL	16.22
		95% Percentile Bootstrap UCL	16.04
		95% BCA Bootstrap UCL	16.44
		95% H UCL	27.95

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.765	**Data appear Normal at 5% Significance Level**	
Theta Star	10.83		
nu star	38.84		
A-D Test Statistic	1.045	**Nonparametric Statistics**	
5% A-D Critical Value	0.737	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.737	Mean	12.95
5% K-S Critical Value	0.258	SD	10.47
Data not Gamma Distributed at 5% Significance Level		SE of Mean	2.455
		95% KM (t) UCL	17.19
Assuming Gamma Distribution		95% KM (z) UCL	16.98
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	17.01
Minimum	0.000001	95% KM (bootstrap t) UCL	17.68
Maximum	34.1	95% KM (BCA) UCL	17.61

Mean	10.52	95% KM (Percentile Bootstrap) UCL	17.32
Median	5.55	95% KM (Chebyshev) UCL	23.65
SD	12.71	97.5% KM (Chebyshev) UCL	28.28
k star	0.129	99% KM (Chebyshev) UCL	37.37
Theta star	81.25		
Nu star	5.176	**Potential UCLs to Use**	
AppChi2	1.235	95% KM (t) UCL	17.19
95% Gamma Approximate UCL	44.09	95% KM (Percentile Bootstrap) UCL	17.32
95% Adjusted Gamma UCL	49.88		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

TRICHLOROETHENE

General Statistics

Number of Valid Data	20	Number of Detected Data	13
Number of Distinct Detected Data	13	Number of Non-Detect Data	7
		Percent Non-Detects	35.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.62	Minimum Detected	-0.478
Maximum Detected	4040	Maximum Detected	8.304
Mean of Detected	1334	Mean of Detected	5.875
SD of Detected	1391	SD of Detected	2.818
Minimum Non-Detect	0.18	Minimum Non-Detect	-1.715
Maximum Non-Detect	0.26	Maximum Non-Detect	-1.347

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	7
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	13
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	35.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.818	Shapiro Wilk Test Statistic	0.73
5% Shapiro Wilk Critical Value	0.866	5% Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	867.1	Mean	3.013
SD	1284	SD	4.587
95% DL/2 (t) UCL	1363	95% H-Stat (DL/2) UCL	1.268E+10
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	436.2	Mean in Log Scale	3.906
SD	1727	SD in Log Scale	3.624
95% MLE (t) UCL	1104	Mean in Original Scale	867.8
95% MLE (Tiku) UCL	1160	SD in Original Scale	1283

95% t UCL	1364
95% Percentile Bootstrap UCL	1363
95% BCA Bootstrap UCL	1434
95% H UCL	15198650

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.423
Theta Star	3152
nu star	11
A-D Test Statistic	0.749
5% A-D Critical Value	0.793
K-S Test Statistic	0.793
5% K-S Critical Value	0.25

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	4040
Mean	867
Median	343.5
SD	1284
k star	0.122
Theta star	7129
Nu star	4.865
AppChi2	1.09
95% Gamma Approximate UCL	3869
95% Adjusted Gamma UCL	4401

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	867.3
SD	1251
SE of Mean	291.2
95% KM (t) UCL	1371
95% KM (z) UCL	1346
95% KM (jackknife) UCL	1363
95% KM (bootstrap t) UCL	1576
95% KM (BCA) UCL	1430
95% KM (Percentile Bootstrap) UCL	1377
95% KM (Chebyshev) UCL	2136
97.5% KM (Chebyshev) UCL	2686
99% KM (Chebyshev) UCL	3764

Potential UCLs to Use

95% KM (BCA) UCL	1430

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

VINYL CHLORIDE

General Statistics

Number of Valid Data	20	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	15
		Percent Non-Detects	75.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.3	Minimum Detected	0.833
Maximum Detected	7	Maximum Detected	1.946
Mean of Detected	3.52	Mean of Detected	1.165
SD of Detected	1.961	SD of Detected	0.447
Minimum Non-Detect	0.21	Minimum Non-Detect	-1.561
Maximum Non-Detect	4.4	Maximum Non-Detect	1.482

Note: Data have multiple DLs - Use of KM Method is recommended

Number treated as Non-Detect 19

For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	95.00%

Warning: There are only 5 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.674
5% Shapiro Wilk Critical Value	0.762

Data not Normal at 5% Significance Level

Assuming Normal Distribution

DL/2 Substitution Method	
Mean	1.233
SD	1.71
95% DL/2 (t) UCL	1.894
Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	0.751
5% Shapiro Wilk Critical Value	0.762

Data not Lognormal at 5% Significance Level

Assuming Lognormal Distribution

DL/2 Substitution Method	
Mean	-0.783
SD	1.526
95% H-Stat (DL/2) UCL	4.936
Log ROS Method	
Mean in Log Scale	0.0668
SD in Log Scale	0.767
Mean in Original Scale	1.478
SD in Original Scale	1.53
95% t UCL	2.069
95% Percentile Bootstrap UCL	2.074
95% BCA Bootstrap UCL	2.305
95% H-UCL	2.157

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.343
Theta Star	1.502
nu star	23.43
A-D Test Statistic	0.824
5% A-D Critical Value	0.681
K-S Test Statistic	0.681
5% K-S Critical Value	0.358

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	7
Mean	0.88
Median	0.000001
SD	1.804
k star	0.104
Theta star	8.437

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	2.609
SD	1.024
SE of Mean	0.256
95% KM (t) UCL	3.052
95% KM (z) UCL	3.03
95% KM (jackknife) UCL	2.965
95% KM (bootstrap t) UCL	4.238
95% KM (BCA) UCL	3.56
95% KM (Percentile Bootstrap) UCL	3.277
95% KM (Chebyshev) UCL	3.726
97.5% KM (Chebyshev) UCL	4.209
99% KM (Chebyshev) UCL	5.158

Nu star	4.172	**Potential UCLs to Use**	
AppChi2	0.791	95% KM (t) UCL	3.052
95% Gamma Approximate UCL	4.643	95% KM (% Bootstrap) UCL	3.277
95% Adjusted Gamma UCL	5.357		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

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GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79005	9.80E+00	1,1,2-Trichloroethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	20	762	762			A	SICL			1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SICL	1.37	0.482	0.198		1.5	0.43	0.215		1.5	0.43	0.215

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.80E-02	8.80E-06	9.11E-04	25	8,322	386.15	602.00	5.01E+01	4.42E+03	1.6E-05	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	742	0.284	0.215	0.215	#N/A	#N/A	#N/A	1.00E-08	133.93	0.482	0.083	0.399	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.08E+06	3.70E-04	20	9,572	3.87E-04	1.67E-02	1.75E-04	5.09E-03	0.00E+00	0.00E+00	1.91E-04	9.03E-04	742

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
20	1.63E+02	0.10	8.33E+01	5.09E-03	4.00E+02	7.45E+177	5.09E-05	8.31E-03	1.6E-05	NA

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	4.42E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.3E-08	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	1.22E+01	cis-1,2-Dichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	20	762	762			A	SICL			1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SICL	1.37	0.482	0.198		1.5	0.43	0.215		1.5	0.43	0.215

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	742	0.284	0.215	0.215	#N/A	#N/A	#N/A	1.00E-08	133.93	0.482	0.083	0.399	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.08E+06	3.70E-04	20	7,734	2.04E-03	8.77E-02	1.75E-04	4.79E-03	0.00E+00	0.00E+00	1.05E-04	5.30E-04	742

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
20	1.07E+03	0.10	8.33E+01	4.79E-03	4.00E+02	6.18E+188	3.01E-05	3.22E-02	NA	3.5E-02

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.3E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	1.73E+01	Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	20	762	762			A	SICL			1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SICL	1.37	0.482	0.198		1.5	0.43	0.215		1.5	0.43	0.215

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	2.7E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a.cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w.cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	742	0.284	0.215	0.215	#N/A	#N/A	#N/A	1.00E-08	133.93	0.482	0.083	0.399	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.08E+06	3.70E-04	20	9,553	7.81E-03	3.36E-01	1.75E-04	4.69E-03	0.00E+00	0.00E+00	8.24E-05	4.23E-04	742

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
20	5.82E+03	0.10	8.33E+01	4.69E-03	4.00E+02	1.17E+193	2.40E-05	1.40E-01	5.9E-06	2.7E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-07	3.5E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	1.43E+03	Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	20	762	762			A	SICL			1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SICL	1.37	0.482	0.198		1.5	0.43	0.215		1.5	0.43	0.215

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	4.1E-06	2.0E-03

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	742	0.284	0.215	0.215	#N/A	#N/A	#N/A	1.00E-08	133.93	0.482	0.083	0.399	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.08E+06	3.70E-04	20	8,557	4.78E-03	2.06E-01	1.75E-04	5.14E-03	0.00E+00	0.00E+00	9.39E-05	4.80E-04	742

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
20	2.94E+05	0.10	8.33E+01	5.14E-03	4.00E+02	8.89E+175	2.73E-05	8.03E+00	4.1E-06	2.0E-03

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.1E-06	2.7E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75014	3.28E+00	Vinyl chloride (chloroethene)

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	20	762	762			A	SICL			1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SICL	1.37	0.482	0.198		1.5	0.43	0.215		1.5	0.43	0.215

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.06E-01	1.23E-05	2.69E-02	25	5,250	259.25	432.00	1.86E+01	8.80E+03	4.4E-06	1.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	742	0.284	0.215	0.215	#N/A	#N/A	#N/A	1.00E-08	133.93	0.482	0.083	0.399	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.08E+06	3.70E-04	20	5,000	1.72E-02	7.41E-01	1.75E-04	6.90E-03	0.00E+00	0.00E+00	1.17E-04	6.04E-04	742

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
20	2.43E+03	0.10	8.33E+01	6.90E-03	4.00E+02	1.41E+131	3.42E-05	8.32E-02	4.4E-06	1.0E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	8.80E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
9.0E-08	5.7E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

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RESIDENT

GROUNDWATER TO INDOOR AIR CALCULATIONS

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GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79005	9.80E+00	1,1,2-Trichloroethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	762	762			A	SICL			1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SICL	1.37	0.482	0.198		1.5	0.43	0.215		1.5	0.43	0.215

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.80E-02	8.80E-06	9.11E-04	25	8,322	386.15	602.00	5.01E+01	4.42E+03	1.6E-05	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	562	0.284	0.215	0.215	#N/A	#N/A	#N/A	1.00E-08	133.93	0.482	0.083	0.399	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	9,572	3.87E-04	1.67E-02	1.75E-04	5.09E-03	0.00E+00	0.00E+00	1.91E-04	7.15E-04	562

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.63E+02	0.10	8.33E+01	5.09E-03	4.00E+02	7.45E+177	8.77E-05	1.43E-02	1.6E-05	NA

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	4.42E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.6E-08	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	5.30E+00	cis-1,2-Dichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	762	762			A	SICL			1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SICL	1.37	0.482	0.198		1.5	0.43	0.215		1.5	0.43	0.215

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	562	0.284	0.215	0.215	#N/A	#N/A	#N/A	1.00E-08	133.93	0.482	0.083	0.399	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	7,734	2.04E-03	8.77E-02	1.75E-04	4.79E-03	0.00E+00	0.00E+00	1.05E-04	4.13E-04	562

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	4.65E+02	0.10	8.33E+01	4.79E-03	4.00E+02	6.18E+188	5.12E-05	2.38E-02	NA	3.5E-02

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.5E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	1.50E+00	Tetrachloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	762	762			A	SICL			1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SICL	1.37	0.482	0.198		1.5	0.43	0.215		1.5	0.43	0.215

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	2.7E-01

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	562	0.284	0.215	0.215	#N/A	#N/A	#N/A	1.00E-08	133.93	0.482	0.083	0.399	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	9,553	7.81E-03	3.36E-01	1.75E-04	4.69E-03	0.00E+00	0.00E+00	8.24E-05	3.27E-04	562

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	5.04E+02	0.10	8.33E+01	4.69E-03	4.00E+02	1.17E+193	4.07E-05	2.05E-02	5.9E-06	2.7E-01

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.0E-08	7.3E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	1.41E+02	Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	200	762	762			A	SICL			1.00E-08

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SICL	1.37	0.482	0.198		1.5	0.43	0.215		1.5	0.43	0.215

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	4.1E-06	2.0E-03

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	562	0.284	0.215	0.215	#N/A	#N/A	#N/A	1.00E-08	133.93	0.482	0.083	0.399	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.54E+04	1.80E+06	2.22E-04	200	8,557	4.78E-03	2.06E-01	1.75E-04	5.14E-03	0.00E+00	0.00E+00	9.39E-05	3.72E-04	562

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	2.90E+04	0.10	8.33E+01	5.14E-03	4.00E+02	8.89E+175	4.63E-05	1.34E+00	4.1E-06	2.0E-03

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.3E-06	6.4E-01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END