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Miamisburg Closure Project

Parcel 6, 7, and 8 Residual Risk Evaluation

Mound Plant
Miamisburg, OH

Public Review Draft

September 2007

Department of Energy
Ohio Field Office

CH2M Hill Mound Inc

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Acronyms and Abbreviations

AEC	Atomic Energy Commission
AOC	Area of Concern
Bq	Becquerel
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Ci	curie
COPCs	constituents of potential concern
CSF	cancer slope factor
DOE	Department of Energy
E^{-x}	Exponent Form of Scientific Notation Equal to $1X10^{-x}$
EG&G	Edgerton, Germeshausen and Grier, Technical Services
EPA	Environmental Protection Agency
EPC	exposure point concentration
FA	Further Assessment
HAZMAT	Hazardous Materials
HEAST	Health Effects Assessment Summary Tables
HEPA	High Efficiency Particle Arrestor
HI	Hazard Index
HQ	Hazard Quotient
HVAC	Heating, Ventilating and Cooling
IRIS	Integrated Risk Information System
kg	kilogram
LSA	Low Specific Activity
MCP	Miamisburg Closure Project
mg	milligram
MMCIC	Miamisburg Mound Community Improvement Corporation
MWWTP	Mound Wastewater Treatment Plant
NCEA	National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	not detected
NFA	No Further Action
NOAEL	no observed adverse effect level
OEPA	Ohio Environmental Protection Agency
OSC	On-Scene Coordinator Report
OU	Operable Unit

PAH	polycyclic aromatic hydrocarbons
pCi	picocuries
PRS	Potential Release Site
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RA	Removal Action
RAGS	Risk Assessment Guidance for Superfund
RBA	Radiological Buffer Area
RBGV	Risk-Based Guideline Value
RfD	reference dose
RfC	reference concentration
RME	reasonable maximum exposure
RRE	Residual Risk Evaluation
RREM	Residual Risk Evaluation Methodology
RTG	Radioisotopic Thermoelectric Generator
SD	Sanitary Disposal
SM/PP	Special Metallurgical/Plutonium Processing
SQL	Sample Quantitation Limit
SVOC	semi-volatile organic compounds
TIC	Tentatively Identified Compounds
TRL	Target Risk Level
TRU	Transuranic
THI	Target Hazard Index
UB	Unbinned
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOCs	volatile organic compounds

EXECUTIVE SUMMARY

The Miamisburg Closure Project (MCP) Parcel 6, 7, and 8 Residual Risk Evaluation (RRE) addresses the remaining portions [except Operable Unit 1 (OU1) and Potential Release Site 441 (PRS 441)] of the US Department of Energy (DOE) Mound Plant to be transferred to the Miamisburg Mound Community Improvement Corporation (MMCIC). These portions of the Mound Plant have been designated as Parcel 6, 7, and 8. The MCP Parcel 6, 7, and 8 RRE was prepared using the Mound 2000 Residual Risk Evaluation Methodology (RREM) (DOE 1997a) to quantify the potential for cancer and non-cancer health effects from long-term, low-level exposures to site-related contaminants in Parcel 6, 7, and 8. The Parcel 6, 7, and 8 RRE quantifies human health risks associated with residual levels of contamination remaining within this area to ensure that future users of the land are not exposed to contaminant levels that would pose unacceptable risks. In the future, Parcel 6, 7, and 8 is expected to be used for industrial use. Therefore, total risk, background risk, and incremental risk are calculated for current and future exposure scenarios for a construction worker and a site employee working in Parcel 6, 7, or 8 and compared to the National Oil & Hazardous Substances Pollution Contingency Plan (NCP, EPA 1990) the acceptable risk range of 10^{-4} to 10^{-6} (increased cancer risk of 1 human in 10,000 to 1 human in 1 million). The OEPA (Ohio Environmental Protection Agency) has a target risk goal of $1E^{-5}$. Note that although none of the risk values in Table ES.1 exceed the NCP acceptable risk range, several do exceed the OEPA target risk goal, supporting the use and enforcement of the institutional controls (ICs).

When discussing risk, significant risk (known as a risk driver) is defined as greater than $1E^{-6}$ and insignificant is defined as less than $1E^{-6}$ risk. There are four pathways for which a receptor may be exposed: oral (ingestion), dermal contact, inhalation of dust, and/or external exposure to ionizing radiation. Some or all of these pathways may contribute to the risk. In some case the individual pathway for a constituent may be in excess of 10^{-6}. In other cases, a combination of pathways for a constituent (i.e., oral and dermal) may each contribute risk less than 10^{-6} but the total risk for both pathways exceeds 10^{-6}. Risk drivers include individual pathways in excess of 10^{-6} and multiple pathways that total to risk in excess of 10^{-6}.

The Parcel 6, 7, and 8 RRE does not include groundwater as a media of concern because exposure to groundwater at the MCP is an incomplete exposure pathway. The MCP was connected to municipal water service, from the City of Miamisburg, on May 1, 2005. Since this connection was established, drinking water at the MCP has been provided by the City of Miamisburg. Continued use of municipally-supplied water is anticipated at the MCP.

Since the surface water pathway is expected to be complete but insignificant, it is not included as a media of concern for industrial and construction workers in the Parcel 6, 7, and 8 RRE. DOE has prepared an evaluation of VOCs and tritium detected in surface water from several seeps on the plant's Main Hill. The evaluation is presented in Potential Release Site Package, PRSs 91-92 and 94-98, Addendum 1 (DOE 2006).

Parcel 6

Total, background, and incremental non-cancer HIs for the construction worker and a site employee exposed to soil in Parcel 6 were less than one. Therefore, non-cancer risk is below a level of concern in Parcel 6.

For the construction worker exposed to soil in Parcel 6, constituents of potential concern (COPCs) in soil are shown in bold text in Table 2.1. Total, background, and incremental residual risks for the construction worker scenario in Parcel 6 are presented in Tables 5.1, 5.2, and 5.3, respectively. To quantify future residual soil risk, it was assumed that no degradation of the COPCs would occur over time; therefore, current and future residual soil risks are assumed to be equivalent. Carcinogenic risk drivers for the Parcel 6 construction worker are benzo(a)pyrene via oral and dermal pathways, plutonium-238 via the oral pathway, and thorium-230+D via oral and external pathways. Total and incremental cancer risk falls within the NCP acceptable risk range of 10^{-4} to 10^{-6}. These results are summarized in Table ES.1 below.

For the site employee exposed to soil in Parcel 6, COPCs in soil are shown in bold text on Table 2.2. Total, background, and incremental residual risks for the site employee scenario in Parcel 6 are presented in Tables 5.4, 5.5, and 5.6, respectively. To quantify future residual soil risk it was assumed that no further degradation of the COPCs would occur over time; therefore, current and future residual soil risks are assumed to be equivalent. Carcinogenic risk drivers for the Parcel 6 site employee are benzo(a)pyrene via oral and dermal pathways, dibenz(a,h)anthracene via the total of oral and dermal pathways, plutonium-238 via the oral pathway, and thorium-230+D via oral and external pathways. Total and incremental cancer risk falls within the NCP acceptable risk range of 10^{-4} to 10^{-6}. These results are summarized in Table ES.1 below.

Parcel 7

Total, background, and incremental non-cancer HIs for the construction worker and a site employee in Parcel 7 were less than one. Therefore, non-cancer risk is below a level of concern in Parcel 7. As noted in Table 2.3, the non-cancer background risk could not be calculated in Parcel 7 because background soil chemistry data are not available for the chemicals of potential concern. Had background risk been calculated, that would be subtracted from the total non-cancer risk resulting in an incremental non-cancer risk even smaller than that presented in the table.

For the construction worker exposed to soil in Parcel 7, COPCs in soil are shown in bold text in Table 2.3. Total, background, and incremental residual risks for the construction worker scenario in Parcel 7 are presented in Tables 5.7, 5.8, and 5.9, respectively. To quantify future residual soil risk, it was assumed that no degradation of the COPCs would occur over time; therefore, current and future residual soil risks are assumed to be equivalent. Carcinogenic risk drivers for the Parcel 7 construction worker are plutonium-238 via the oral pathway and radium-228 and uranium-233/234 via oral and external pathways. Total and incremental cancer risk falls within the NCP acceptable risk range of 10^{-4} to 10^{-6}. These results are summarized in Table ES.1 below.

For the site employee exposed to soil in Parcel 7 constituents of potential concern COPCs in soil (Table 2.4). Total, background, and incremental residual risks for the site employee scenario in Parcel 6 are presented in Tables 5.10, 5.11, and 5.12, respectively. To quantify future residual soil risk it was assumed that no further degradation of the COPCs would occur over time, therefore, current and future residual soil risks are assumed to be equivalent. Carcinogenic risk drivers for the Parcel 7 site employee are benzo(a)pyrene via the dermal pathway, dibenzo(a,h)anthracene via the total of oral and dermal pathways, plutonium-238 via the oral pathway, and radium-228 and uranium-233/234 via the external pathway. Total and incremental cancer risk falls within the NCP acceptable risk range of 10^{-4} to 10^{-6}. These results are summarized in Table ES.1 below.

Parcel 8

Total, background, and incremental non-cancer HIs for the construction worker and a site employee in Parcel 8 were less than one. Therefore, non-cancer risk is below a level of concern in Parcel 8.

For the construction worker exposed to soil in Parcel 8, constituents of potential concern (COPCs) in soil are shown in bold text in Table 2.5. Total, background, and incremental residual risks for the construction worker scenario in Parcel 6 are presented in Tables 5.13, 5.14, and 5.15, respectively. To quantify future residual soil risk, it was assumed that no degradation of the COPCs would occur over time; therefore, current and future residual soil risks are assumed to be equivalent. Carcinogenic risk drivers for the Parcel 8 construction worker are benzo(a)pyrene, dibenzo(a,h)anthracene, and plutonium-238 via the oral pathway; radium-228 via oral and external pathways, and uranium-233/234 via the total of oral and external pathways. Total and incremental cancer risk falls within the NCP acceptable risk range of 10^{-4} to 10^{-6}. These results are summarized in Table ES.1 below.

For the site employee exposed to soil in Parcel 8 constituents of potential concern COPCs in soil (Table 2.6). Total, background, and incremental residual risks for the site employee scenario in Parcel 6 are presented in Tables 5.16, 5.17, and 5.18,

respectively. To quantify future residual soil risk it was assumed that no further degradation of the COPCs would occur over time, therefore, current and future residual soil risks are assumed to be equivalent. Carcinogenic risk drivers for the Parcel 8 site employee are HpCDD and plutonium-238 via the oral pathway, benzo(a)pyrene via oral and dermal pathways, dibenzo(a,h)anthracene via the dermal pathway, and radium-228 and uranium-233/234 via the external pathway. Total and incremental cancer risk falls within the NCP acceptable risk range of 10^{-4} to 10^{-6}. These results are summarized in Table ES.1 below.

Table ES.1 - Overall Summary of Risks

Scenario and Receptor	Overall Risk Types	Total Non-Carcinogen Risk HI	Total Excess Lifetime Cancer Risk
Parcel 6			
Construction Worker	Total	NC	$3.5x10^{-5}$
	Background	NC	$2.0x10^{-5}$
	Incremental	NC	$1.5x10^{-5}$
Site Employee	Total	NC	$3.5x10^{-5}$
	Background	NC	$2.0x10^{-5}$
	Incremental	NC	$1.5x10^{-5}$
Parcel 7			
Construction Worker	Total	$8.6x10^{-3}$	$2.1x10^{-5}$
	Background	NC	$2.6x10^{-7}$
	Incremental	$8.6x10^{-3}$	$2.1x10^{-5}$
Site Employee	Total	$6.8x10^{-7}$	$1.7x10^{-5}$
	Background	NC	$1.1x10^{-8}$
	Incremental	$6.8x10^{-7}$	$1.7x10^{-5}$
Parcel 8			
Construction Worker	Total	0.17	$2.2x10^{-5}$
	Background	NC	$1.7x10^{-8}$
	Incremental	0.16	$2.2x10^{-5}$
Site Employee	Total	$1.8x10^{-10}$	$2.6x10^{-5}$
	Background	NC	$9.0x10^{-9}$
	Incremental	$1.8x10^{-10}$	$2.6x10^{-5}$
* Release Block D Risk Assessment – Soil Risk (DOE 1996)			
Construction Worker	Total	0.18	$1.2x10^{-5}$
	Background	NA	$2.3x10^{-8}$
	Incremental	0.18	$1.2x10^{-5}$

Site Employee	Total	0.02	8.7×10^{-7}
	Background	NA	1.2×10^{-8}
	Incremental	0.02	8.6×10^{-7}
* Release Block H Risk Assessment – Soil Risk (DOE 1997c)			
Construction Worker	Total	0.17	6.5×10^{-5}
	Background	0.13	4.5×10^{-8}
	Incremental	0.04	2.0×10^{-5}
Site Employee	Total	0.02	3.7×10^{-5}
	Background	0.01	2.5×10^{-5}
	Incremental	0.00	1.3×10^{-5}
* Parcel 4 Risk Assessment – Soil Risk (DOE 2001a)			
Construction Worker	Total	0.19	3.3×10^{-5}
	Background	0.03	6.8×10^{-6}
	Incremental	0.16	3.0×10^{-5}
Site Employee	Total	0.00	1.1×10^{-4}
	Background	0.00	4.5×10^{-5}
	Incremental	0.00	6.5×10^{-5}
* Parcel 3 Risk Assessment (DOE 2001b)			
Construction Worker	Total	NA	6.2×10^{-6}
	Background	NA	2.3×10^{-8}
	Incremental	NA	6.1×10^{-6}
Site Employee	Total	NA	2.6×10^{-6}
	Background	NA	1.2×10^{-7}
	Incremental	NA	2.6×10^{-6}
* Phase 1 Risk Assessment (DOE 2003)			
Construction Worker	Total	0.17	5.1×10^{-5}
	Background	0.03	3.4×10^{-5}
	Incremental	0.14	1.7×10^{-5}
Site Employee	Total	0.01	5.3×10^{-5}
	Background	0.01	3.7×10^{-5}
	Incremental	0.00	1.6×10^{-5}

NA: not applicable
NC: not calculated due to the absence of toxicity data.
* Other site risk assessments are included for comparison only.

1.0 INTRODUCTION

The Mound Plant is located about 10 miles southwest of Dayton, Ohio in Montgomery County, within the City of Miamisburg as shown in Figure 1.1. The plant is located approximately 2,000 feet east of the Great Miami River and partially overlies the Great Miami Buried Valley Aquifer. At one time, the Mound Plant occupied approximately 306 acres and approximately 130 buildings with a total of 1.4 million square feet of floor space. Since 1999, approximately 128 acres have been transferred to Miamisburg Mound Community Improvement Corporation (MMCIC). Parcels 6, 7, and 8 consist of approximately 103 acres of land. The locations of Parcels 6, 7, and 8 are illustrated in Figure 1.2.

Since 1948, Mound has operated as a research, development, and production facility in support of DOE's weapons and energy programs. Mound's past weapons program mission included process development, production, engineering, manufacturing, and surveillance of detonators, explosives, and nuclear components. In 1989, the US Environmental Protection Agency (USEPA) placed Mound on the National Priorities List due to VOCs detected groundwater. Mound's current mission is to support DOE's efforts in environmental management and to transition the site, in cooperation with the City of Miamisburg, from a cold-war production facility to industrial use.

Groundwater is expressed at several seeps located along the northwest border of the site (Parcel 6). The seeps are hydraulically connected to the Main Hill (developed northern end) of the Mound Plant and have been monitored for tritium and volatile organic compounds since 1986. VOCs (tetrachloroethene, dichloroethene, and trichloroethene) and tritium have been detected in water collected at the seeps. Soils that underlay the former B-building and SW-building sites are believed to be the source of contaminants detected in seeps. These soils have been remediated. Concentrations in the seeps rose during remediation because of the large volume of water applied to the sites for dust suppression; however, levels have subsided somewhat. A peak tritium concentration of 1,085 nCi/L was detected in November 2004, and concentrations are expected to continue to decline. Tritium concentrations of 463 nCi/L and 71 nCi/L were recorded in seeps 601 and 607 respectively, in November 2005. Trichloroethene levels approached 100 ppb at seep 605 in July 2005. In November 2005 levels had dropped to 33 ppb. The results of seep sampling, including trend charts, are presented in the Release Site Package, PRSs 91-92 and 94-98, Addendum 1 (DOE 2006).

One of the expected results of this remediation project is that contaminant levels in the seeps will continue to decrease. Continued monitoring of the seeps is expected to be required by the Record of Decision for these parcels; however, construction workers and site employees are expected to have insignificant exposure to the seeps, therefore this was considered to be an complete but insignificant exposure pathway for the

calculation of risk in this document.

During past operations at the Mound facility, the release of hazardous materials occurred. During subsequent facility investigations, over 400 Potential Release Sites (PRSs) were identified. Since contamination at the Mound Plant occurred at discrete PRSs rather than being widespread across the site, a new decision-making process was formulated for the MCP. The new decision-making process is known formally as the "removal site evaluation process" and informally as the "Mound 2000 Process". The Mound 2000 Process is consistent with the Federal Facilities Agreement signed by the Department of Energy (DOE), the USEPA, and the Ohio Environmental Protection Agency (OEPA), in accordance with the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA) as defined in the National Contingency Plan [(NCP) EPA 1990].

This report was developed using the Mound 2000 Residual Risk Evaluation Methodology [RREM (DOE 1997a)] to quantify the potential for cancer and non-cancer health effects from long-term, low-level exposures to site-related contaminants in Parcel 6, 7, and 8. A Residual Risk Evaluation (RRE) assesses human health risks associated with residual levels of contamination remaining within an area to ensure that future users of the land will not be exposed to contaminant levels that would pose unacceptable risks. The RRE results will be used, together with Applicable or Relevant and Appropriate Requirements, to determine the need for additional site remediation or to demonstrate that a parcel is ready for release and economic redevelopment.

1.1 Purpose of Residual Risk Evaluation

The objective of the Parcel 6, 7, and 8 RRE is to assess risks associated with residual levels of contamination remaining after all necessary actions within the parcels have been taken. Although the RRE method was developed specifically for use at Mound, the method is consistent with the CERCLA baseline risk assessment method to ensure that future users of the land will not be exposed to contaminant levels that would pose unacceptable risks.

1.2 Scope of the Parcel 6, 7, and 8 RRE

The Parcel 6, 7, and 8 RRE was completed using the Mound 2000 RREM (DOE 1997a) and includes an evaluation of human health risk for residual contamination in the parcel. Since commercial/industrial use of Parcel 6, 7, and 8 is anticipated, receptor scenarios were selected to represent reasonable maximum exposures (RME) in a commercial/industrial setting. Residual contaminants in Parcel 6, 7, and 8 were evaluated for two potential receptor groups: construction workers, who may be directly exposed to surface and subsurface soil for up to five years, and site employees, such

as office workers, who may be exposed to surface soil (0-2 feet below land surface) for up to 25 years.

The Parcel 6, 7, and 8 RRE does not include groundwater as a media of concern because exposure to groundwater at the MCP is an incomplete exposure pathway. The MCP was connected to municipal water service, from the City of Miamisburg, on May 1, 2005. Since this connection was established, all drinking water has been provided by the City of Miamisburg. Continued use of municipally-supplied water is anticipated at the MCP.

The Parcel 6, 7, and 8 RRE does not include surface water as a media of concern because industrial and construction workers exposure pathway is expected to be a complete but insignificant to surface water.

Exposure assumptions for the construction worker and site employee scenarios are site-specific adaptations of the standard scenarios presented in EPA's Risk Assessment Guidance for Superfund (RAGS), Part A (EPA 1989). These assumptions are documented in Table 1 in the Mound 2000 RREM (DOE 1997a) and are based on reasonable maximum exposure (RME) assumptions. The RME exposure assumptions are conservative estimates for exposure and are therefore, not likely to underestimate residual risk.

Parcel 6, 7, and 8 residual risks for a construction worker and a site employee were calculated as total, background, and incremental risk. Total risk was calculated using the exposure point concentrations (EPCs) calculated for each COPC detected in a given parcel. Consistent with the RREM (DOE 1997a), the EPCs for the Parcel 6, 7, and 8 RRE were defined as the lower of the maximum detected concentration or the 95% upper confidence limit of the mean (95%UCL). Similarly, background risk was calculated based on the lower of the maximum detected concentration or the 95%UCL of the Mound background data set. Incremental risk is the difference between total and background risk levels. Incremental risk can be used to assess the increase in risk above background levels due to Mound Plant operations.

1.3 Organization of Report

The RREM provides a framework for evaluating potential human health risks associated with residual levels of contamination. Although the RREM is similar to a traditional CERCLA baseline risk assessment, it serves a different purpose and, therefore, is not identical.

The RREM consists of five elements, including:

- identification of the contaminants to be evaluated,
- exposure assessment,
- toxicity assessment,
- risk characterization, and
- evaluation of potential cumulative risks.

The following sections describe each of these elements in more detail starting with Section 2.0, Data Compilation and Evaluation, which describes the methods used to compile Parcel 6, 7, and 8 data and identify the COPCs evaluated in the RRE. Section 3.0, Exposure Assessment, summarizes the pathways through which hazardous substances may reach potential receptors and intake assumptions that will be used to quantify exposure. In Section 4.0, Toxicity Assessment, exposure point concentrations (EPCs), intake equations, and toxicological reference values are presented. Information from the exposure assessment is combined with information from the toxicity assessment to characterize human health risks in Section 5.0, Risk Characterization. Section 6.0, Uncertainty in the Risk Assessment, presents some of the sources of uncertainty inherent in risk assessments and in the RRE. Section 7.0, References, contains a list of documents cited in this report.

Figure 1.1 Vicinity Map

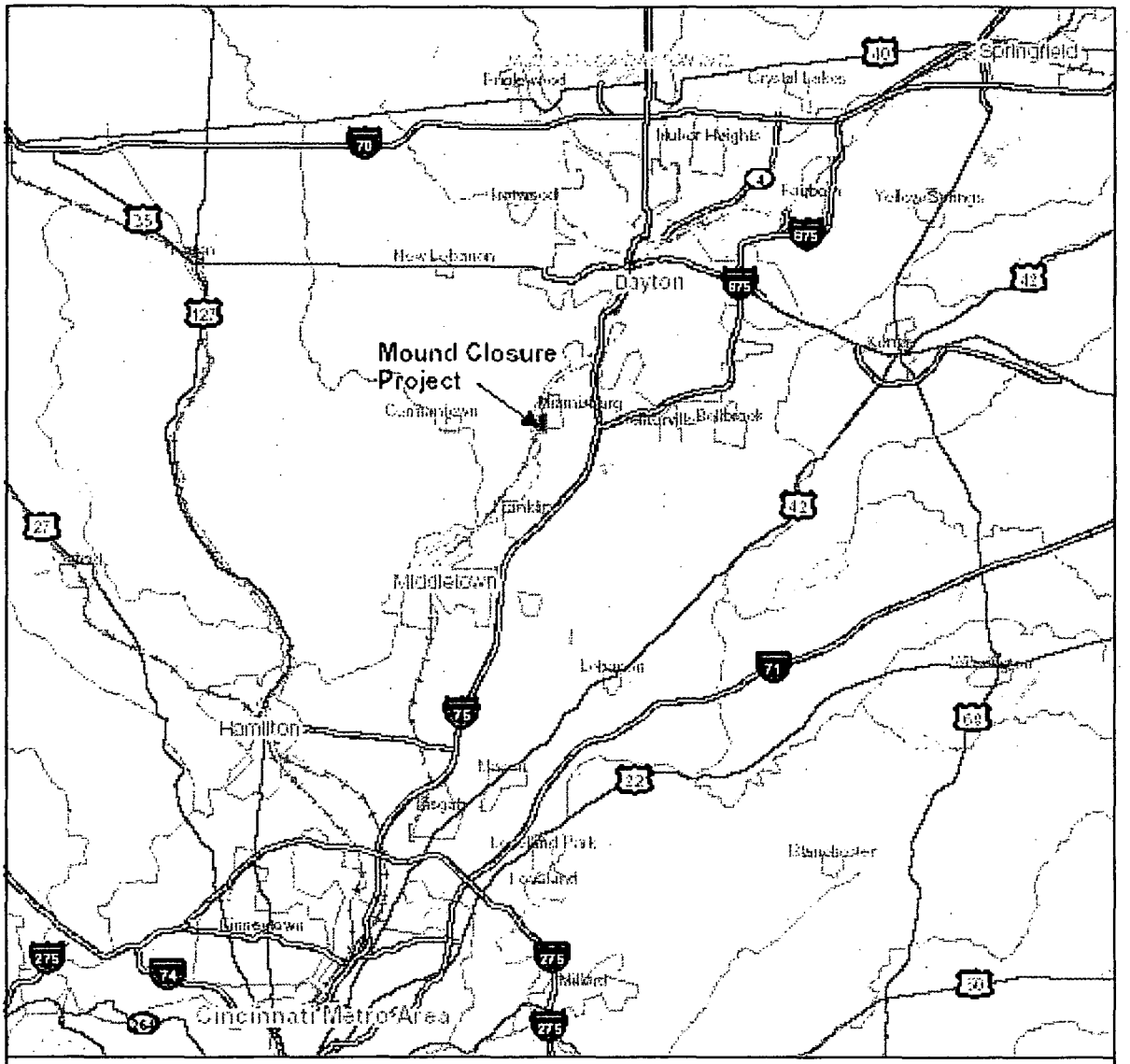
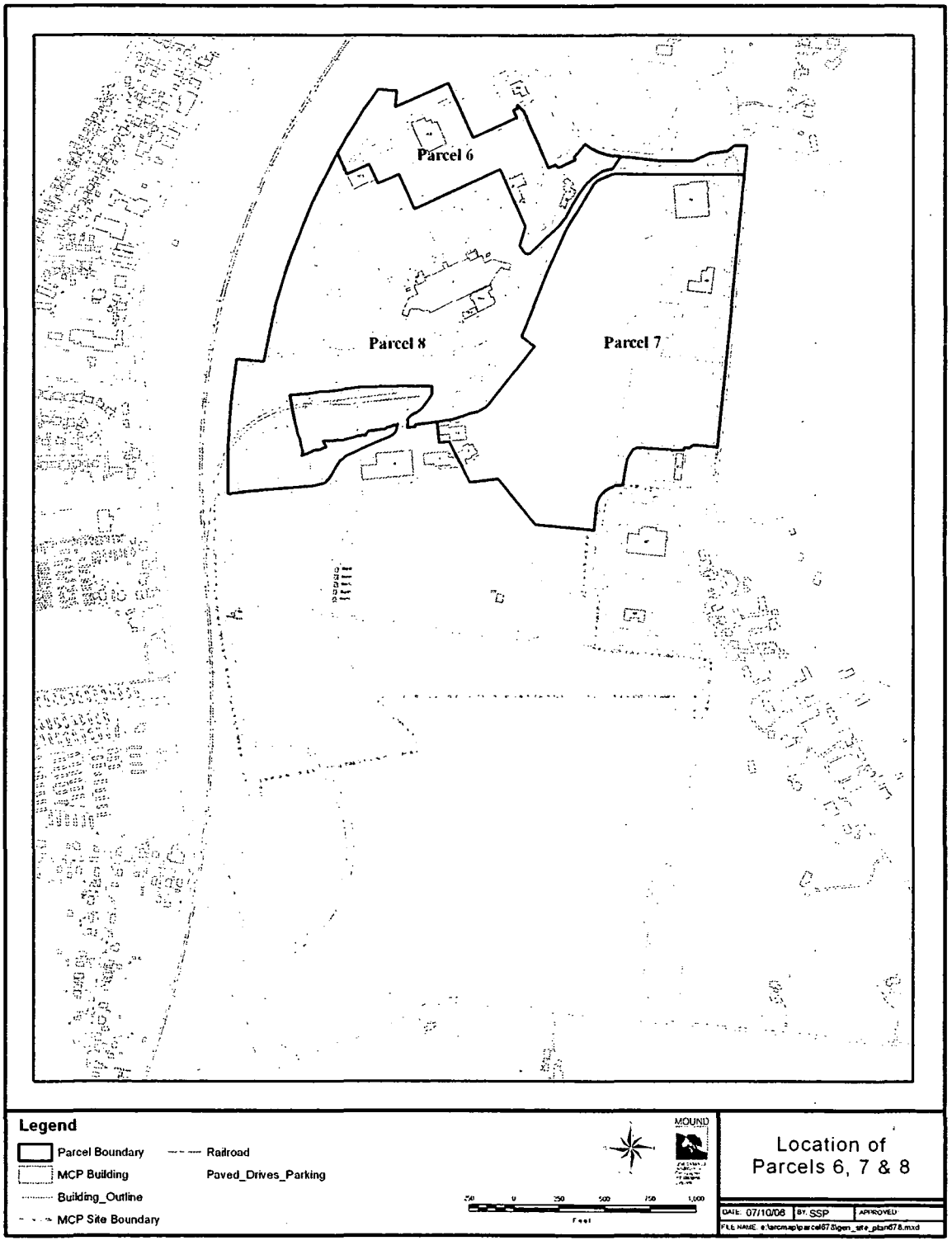


Figure 1.2 Parcel 6, 7, and 8 Site Map



2.0 DATA COMPILATION AND EVALUATION

Identification of contaminants to be carried through the RRE calculations is a multi-step process beginning with the identification of all constituents detected in Parcel 6, 7, and 8 and then eliminating some based upon a set of established screening criteria described in the RREM (DOE 1997a).

All available sampling data were compiled from the Mound Environmental Information Management System for use in the Parcel 6, 7, and 8 RRE. Newer data were used to supplement, rather than supersede older data except when older data described materials that had subsequently been removed from the parcel. In this case, the older data no longer represent site conditions and were, therefore, not used in the RRE. Sampling data obtained from the Mound Soil Screening Facility were used except in the case where a sample was split and analyzed by both the Mound Soil Screening Facility and a commercial analytical laboratory. In such cases, the value from the commercial analytical laboratory was used to take advantage of the greater precision available from the commercial analytical laboratory.

Data used to characterize Parcel 6, 7, and 8 were drawn from the following data sets:

Project Code	Description
	Parcel 6
MND20	Mound - Operable Unit 9
SCRDATA	Mound Plant Screening Data
2680	Operational Area Investigation (OU5)
PRS99-100C	PRS 99-100 Characterization Sampling
PRS107	PRS 107/108/109
RSS	Radiological Site Survey - OU9 Site Scoping Report
SGCSP	Soil Gas Confirmation Sampling
MBLDGDDC	M Building D&D Characterization Sampling
FIREREPAIR	FIRE HYDRANT REPAIRS (2000)
GASLINE	MMCIC / DP&L GAS LINE
H2O_LINE	Water Line by MMIC FY2001
PRS106C	PRS 106 Characterization 2004
A_MED_TANK	A Building Medical Tanks Sampling
HBLDGVSAP	H Building, VSAP 2004
	Parcel 7
PRS277/278	PRS 277/278
MND13A	Area 17 SM Building Annex Verification
AREA14/19	Area 19 and Area 14 Verification
11256	Area D Verification
BLDG31	Building 31 Soil Characterization
WASTEBURI	Characterization of Waste Burial Areas
MND20	Mound - Operable Unit 9
SCRDATA	Mound Plant Screening Data

MND33	Operable Unit 3 LFI
2680	Operational Area Investigation (OU5)
MND17	Other Soils Areas
PRS308	PRS 308
RSS	Radiological Site Survey - OU9 Site Scoping Report
OU6RECON	Reconnaissance Sampling OU6 D&D Areas
04-2768	Regional Soils Investigation
MND36	SM Building Leachfield Area Analytical Results
SMFDT	SM Foundation
SOASPH1	SM South Asphalt Phase I
SOASPH2	SM South Asphalt Phase II
SGCSP	Soil Gas Confirmation Sampling
SWSD	Surface Water and Sediment
WTSVS	WTS Excavation Area Verification Survey
600	SM East Asphalt Area Verification Report
PRS 66_1	PRS 66, Phase 1
PRS 80	PRS 80
PRS422	PRS 422 Verification
FIREREPAIR	FIRE HYDRANT REPAIRS (2000)
SM-96	SM/PP data from 1996 entered in 2001
TF2001	Test Fire Valley (PRS 72, 73 & 87)
PRS 66_2	PRS 66, Phase 2
PRS 66_3	PRS 66, Phase 3
PRS274	PRS 274/275 Characterization
PRS267C	PRS 267 Characterization Initial Sampling
PRS 66_4	PRS 66, Phase 4
PRS274_5V	PRS 274/275 Verification Sampling
PRS266V	PRS 266 Verification Sampling
PRS87_WELL	PRS 87 Wells 2002
PRS277278V	PRS 277/278 Verification Sampling 2002
PRS 87	PRS 87, Building 49 Additional VOA Sampling
SM_ROAD	SM Roadway Sampling 1996
SM_EAST	SM East - Grassy Area
SM_WEST	SM West - Grassy Area
PRS412V	PRS 412 Verification Sampling
PRS 66V	PRS 66 Verification Sampling
WASP2003	SM-West Sampling 2003
SMADDRV	SM Annex D&D Radiological Verification
SMB_2004	SM Borings FY 2004
BLDG128	Building 128, 15 ft Sampling, 2004
B38_AREA	Building 38 Area VSAP
B36_LD_V	Building 36 Loading Dock Verification
PRS66_P8	PRS 66, Phase 8 Characterization
BD50VS2004	Building 50, Verification Sampling 2004
PRS67C	PRS 67 Creek Characterization Sampling 2004
GRP5_CS_04	Group 5, Confirmation Sampling, 2004
GRP5_VS_04	Group 5, Verification Sampling, 2004
B31D_VS_04	Building 31 Dock, Verification Sampling 2004
PRS286V	PRS 286 Verification Sampling - 2004
PRS87VS	PRS 87 Verification Sampling 2005
PRS67V	PRS 67 Verification Sampling

PRS267PV	PRS 267 Pre-Verification Sampling
PRS442V	PRS 442 Verification Sampling
PRS66W_V	PRS 66 West Verification Sampling
ASDP_6_7_8	Assessment of Soil Data in Parcels 6, 7 and 8
SCR902_RE	SCR902 Excavation and Resampling Effort
	Parcel 8
MND11A	Area 14 Fuel Oil Storage Verification
AREA14/19	Area 19 and Area 14 Verification
WD_B41	Confirmatory Soil Data for Area Between Bldg WD/41
MND20	Mound - Operable Unit 9
AREA 3	Mound Operable Unit 5 Area 3 Sampling and Analysis
SCRDATA	Mound Plant Screening Data
OLDSD	Old SD Drying Beds
MND33	Operable Unit 3 Limited Field Investigation (LFI)
2680	Operational Area Investigation (OU5)
MND17	Other Soils Areas
RSS	Radiological Site Survey - OU9 Site Scoping Report
OU6RECON	Reconnaissance Sampling OU6 D&D Areas
04-2768	Regional Soils Investigation
SEWER	Sewer Line Investigation
SGCSP	Soil Gas Confirmation Sampling
SWSD	Surface Water and Sediment
MND-UGLD-3	Underground Line D Sampling & Analysis Report
MND16	Underground Lines Investigation Data Report
USTBMI	Underground Storage Tank Closure
WDSOIL91	WD Building Soil Characterization 1991
WTSVS	WTS Excavation Area Verification Survey
PRS 76	PRS 76
PRS 80	PRS 80
MBLDGDDC	M Building D&D Characterization Sampling
B BLDG C	B Building Characterization
FIREREPAIR	FIRE HYDRANT REPAIRS (2000)
GASLINE	MMCIC / DP&L GAS LINE
E_BLDG	E Building Sampling
H2O_LINE	Water Line by MMIC FY2001
E_BLDGV	E Building Verification Sampling
BDB2002	Biodegradation Barn Petrol Sampling
WDSOIL02	WD External Contract Sampling 2002
I_BLDG01C	I Building Characterization Sampling
I_BLDG02V	I Building Verification Sampling
RSW_C_02	R & SW 2002 Building Characterization
PRS76C	PRS 76 Characterization 2002
PRS154238C	PRS 154 & 238 Characterization Sampling
PRS4164417	PRS 41/64/417 Characterization
HBLDGVSAP	H Building, VSAP 2004
PRS75_2004	PRS 75 Sampling in 2004
UGLY2004	Underground Lines Project 2004
PRS237V	PRS 237 Verification Sampling 2004
PRS411V	PRS 411 Verification Sampling 2004
PRS67C	PRS 67 Creek Characterization Sampling 2004
PRS76V_04	PRS 76 Verification Sampling - 2004

PRS67V	PRS 67 Verification Sampling
HH_V	HH Verification Sampling
PRS17V	PRS 17 Verification Sampling
PRS159V	PRS 159 SD Drying Bed Verification
PRS153V	PRS 153 Verification
CMPD	Subcontractor's Compound Verification Sampling
PRS41V	PRS 41 Verification Sampling
PRS41P	PRS 41 Area Sampling (Potholes)
AGL/OHL_V	Above Ground/Overhead Lines Verification Sampling
R/SW_V	R / SW Building Verification Sampling
T-STACKS	T Building Stack Sampling
BLDG34_V	Building 34 Verification Sampling
PRS124V	PRS 124 Verification Sampling
PRS66W_V	PRS 66 West Verification Sampling
PRS153V	PRS 153 Verification Sampling
PRS159V	PRS 159 Verification Sampling
PRS70V	PRS 70 Verification Sampling
ASDP_6_7_8	Assessment of Soil Data in Parcels 6, 7 and 8

2.1 Data Quality Assessment

Samples collected after 1993 were analyzed according to the methods outlined in the Operable Unit (OU) 9 Quality Assurance Project Plan (QAPP) (DOE 1993a). All data used in the risk assessment have undergone quality assurance/quality control (QA/QC) evaluations in accordance with the requirements described in the OU9 QAPP (DOE 1993b) or the OU5 QAPP (DOE 1993b). Since some of the data used to characterize residual contaminant concentrations in Parcel 6, 7, and 8 were collected prior to 1993, not all data used in the risk assessment have undergone Quality Assurance/Quality Control (QA/QC) evaluation and data validation in accordance with the requirements described in the OU9 QAPP (DOE 1993a).

2.2 Environmental Media Considered and Data Availability

Data used to characterize Parcel 6, 7, and 8 are listed above. Samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), inorganic compounds, common anions, polychlorinated biphenyls, pesticides, and radionuclides. Environmental media that were evaluated include surface soil (0-2 ft below land surface) and subsurface soil (>2 feet below land surface).

2.3 Data Analysis

For each analyte detected in Parcel 6, 7, and 8 soils, the 95%UCL was calculated to estimate the concentration to which receptors may be exposed. This is known as the Exposure Point Concentration or EPC. Calculations were performed in accordance with the RREM guidance, Gilbert's *Statistical Methods for Environmental Pollution*

Monitoring (Gilbert 1987), and the *Supplemental Guidance to RAGS: Calculating the Concentration Term* (EPA, 1992a). Before calculating the 95%UCL, the distribution of the data set was determined. If the data were found to be normally distributed, the EPC was calculated as the 95%UCL of the arithmetic mean of the data using the Student's t-statistic. If the data were found to be log normally distributed, the EPC was calculated as the 95%UCL using the H-statistic. Since environmental data sets are typically log normally distributed, a log normal distribution was assumed for any data set found to be neither normally nor log normally distributed. For these data sets the 95%UCL was calculated using the H-statistic.

The 95%UCL on the arithmetic mean for normal data sets was calculated as follows:

$$95\%UCL = Mean + t(s/n^{1/2})$$

Where:

UCL= upper confidence limit,
t = t statistic (Table A2, Gilbert 1987),
s = standard deviation, and
n = number of observations in the data set

The 95%UCL equation of the arithmetic mean for log normal data sets was calculated as follows:

$$95\%\ UCL = e^{mean + sH/\sqrt{n-1}}$$

Where:

UCL = upper confidence limit,
H = H statistic (Table A12, Gilbert 1987),
s = standard deviation, and
n = number of observations in the data set
e = constant

If the 95%UCL exceeded the maximum value observed in the data set, the maximum value was used as the EPC for that constituent (whether the data were normally or log normally distributed).

For chemical analyses, EPA's RAGS Part A (EPA 1989) recommends that half the sample quantitation limit (SQL) be used as a proxy value for "not detected" (ND) results. For radiochemical analyses, RREM recommends that half the detection limit be used as a proxy value (EPA 1989) for ND results. This guidance was applied for ND results for chemical and radiological constituents. Half the SQL was selected as the proxy value for chemical COPCs and half the reported value was selected as a proxy value for radiological COPCs. Proxy values were included in calculations for the 95%UCL

values.

Blind field duplicates were collected to assess variability in the sampling process. Duplicate samples were used in the data quality assessment but were not included in the calculation of the EPCs. Since twenty observations is more than enough to reliably determine the distribution of a data set, the maximum detected concentration was used as the EPC for data sets with less than twenty observations (n<20).

The reported value was used for estimated concentrations (J-flagged data) reported above the detection limit or reported without the detection limit. Samples reported as ND or zero with no detection limit were not utilized in calculating a 95%UCL. Rejected data flagged with an "R" were also not used in calculating the EPC.

2.4 Data Screening Process

All constituents detected one or more times were listed in constituent summary tables and sorted by media. Soil data were also sorted by depth. The constituent screening methods described below were then used to generate a final list of COPCs for each media and receptor. The constituent summary tables also provide minimum detected concentrations, maximum detected concentrations, frequency of detection, and the decision and rationale to include or exclude a constituent from further consideration in the RRE. The following section describes how COPCs were selected.

The COPCs for each receptor and parcel were identified by comparing the maximum concentration detected in a given media to RREM background values and the updated Risk-Based Guideline Value (RBGV) for the given receptor. The EPC for each constituent was also compared to RREM background values. The RREM background values were augmented for decay products assumed to be present in background at concentrations in secular equilibrium with their parent. For instance, the background level of U-235/236 was used for Ac-227. Similarly the background concentration of U-238 was used for Pb-214, Pb-210, and Bi-214. Tables 2.1, 2.3 and 2.5 identify the final COPCs in surface and subsurface soil for the construction worker scenario in Parcel 6, 7, and 8, respectively. Tables 2.2, 2.4 and 2.6 identify the final COPCs in surface soil for the site employee in Parcel 6, 7, and 8, respectively.

Constituents lacking both site-specific background levels and RBGVs were brought forward as COPCs. These constituents include dypsprosium, erbium, europium, gadolinium, lanthanum, lithium, lutetium, neodymium, praseodymium, samarium, tantalum, terbium, methyl cyclohexane, 2,4,6-tribromophenol, 2-fluorobiphenyl, benzo(g,h,i)perylene, nitrobenzene, phenanthrene and 2-methylnaphthalene.

2.4.1 Screening Constituents Based on Background

One of the screening criteria used to identify COPCs was site-specific, regulator-approved background levels for soil. Site-specific background concentrations, described as the 95% Upper Tolerance Limit of the background data set for Mound Plant soil, are presented in Appendix A of the *Mound 2000 RREM* guidance (DOE 1997a). Background values, including those in Appendix A of the RREM, are based on the Operable Unit 9 Background Soils Investigation Chemistry Report (DOE 1994) or, in the case of nuclides with short half lives (Ac-227, Pb-210, and Pa-231) are based on the parent nuclide background and assumption of equilibrium with the parent nuclide. Constituents with a maximum detected concentration or an EPC exceeding their level in background were identified as COPCs and carried to the next step of the RRE. Constituents with maximum concentrations or EPCs less than their background concentrations were not carried though the RRE. If no background value was available for a particular constituent (e.g., many organic compounds, including polycyclic aromatic hydrocarbons (PAHs), the constituent was carried forward.

2.4.2 Screening Constituents Based on Guideline Values

Constituents detected in Parcel 6, 7, and 8 media with maximum detected concentrations or EPCs greater than Mound background concentrations were compared to RBGVs for the Mound Facility (DOE 1997b) updated in Appendix B. The RBGVs are media-specific concentrations of constituents that correspond to specific human health risk levels for specified exposure scenarios. Construction worker and site employee RBGVs were used to screen detected constituents as COPCs.

The RBGVs correspond to the $1x10^{-6}$ risk level for carcinogens and radionuclides or a Hazard Quotient of one. A $1x10^{-6}$ risk level represents the probability of an incremental increase of one person in one million people developing cancer as the result of exposure to a constituent at the RBGV concentration. A Hazard Quotient (HQ) of one indicates that from an exposure at or below the given concentration, no adverse effects to humans are expected. Since the acceptable risk level for carcinogenic constituents specified in the NCP is a range of $1x10^{-4}$ to $1x10^{-6}$ (1 in 10,000 to 1 in a million), screening COPCs against the whole RBGV is protective. The acceptable threshold for non-carcinogenic constituents is a Hazard Index (HI) of less than or equal to one. The RBGVs were calculated for an HI of one. To account for the possibility of more than one non-carcinogenic constituent, COPCs were screened using 1/10 the RBGV. Carcinogenic or radioactive constituents that exceed their RBGVs and non-carcinogenic constituents that exceed one-tenth of their RBGV were carried to the next step of the RRE. The OEPA (Ohio Environmental Protection Agency) has a target risk goal of $1E^{-5}$.

Since toxicological reference values and computational guidance relevant to the

calculation of RBGVs have been updated since release of the Mound Plant *RBGV Guidance* in 1997, the Mound Plant RBGVs were updated for the Parcel 6, 7, and 8 RRE. Updated RBGVs for the construction worker and site employee were incorporated into the COPC screening tables. If an RBGV could not be calculated the constituent was brought forward as a COPC. Details on the methods used to calculate updated RBGVs and the updated RBGVs themselves are presented in Appendix B.

Some of the radionuclide RBGVs are designated as +D to indicate that cancer risk estimates and RBGVs include contributions from the radionuclide's short-lived decay products, or daughters. Other radionuclide RBGVs are designated as +L to indicate that cancer risk estimates and RBGVs include contributions from the radionuclide's long-lived decay products. These calculations assumed equal activity concentrations (i.e. secular equilibrium) with the principal or parent nuclide in the environment. For Parcel 6, 7, and 8, actinium-227+L, cesium-137+D, lead-210+D, radium-226+D, radium-228+L, strontium-90+D, thorium-228+L, thorium-230+D, thorium-232+D, uranium-235+D, and uranium-238+L RBGVs were used for screening purposes.

2.4.3 Screening Constituents Based on Frequency of Detection

Constituents detected at concentrations above Mound background levels and above applicable RBGVs were evaluated for their frequency of detection. The *Risk Assessment Guidance for Superfund, Volume 1:Human Health Evaluation Manual, Part A* (hereafter referred to RAGS Part A) (EPA 1989) states that infrequently detected compounds may be artifacts in the data due to sampling, analytical, or other problems, and therefore may not be site-related. Compounds that were detected infrequently in all media, and not detected at high concentrations in any medium were eliminated from further consideration by the RRE. Infrequent detection was defined as five percent or less, which is equivalent to one detect in 20 samples. If there were an insufficient number of samples (e.g. less than 20), to determine whether the frequency of detection was five percent or less, the constituent was not eliminated based on frequency of detection. Constituents screened out due to frequency of detection are noted in tables 2.1 through 2.6.

2.4.4 Screening Constituents Based on Essential Human Nutrients

According to RAGS Part A (EPA 1989): "Chemicals that are (1) essential human nutrients, (2) present at low concentrations (i.e., only slightly elevated above naturally occurring levels), and (3) toxic only at very high doses (i.e., much higher than those that could be associated with contact at the site) need not be considered further in the quantitative risk assessment." Calcium, chloride, iron, magnesium, potassium, and sodium are considered essential human nutrients. These compounds were detected in the Parcel 6, 7, and 8 area at levels below or slightly elevated above background levels

and are toxic only at very high doses. Concentrations of these compounds in on-site media would not be expected to result in intakes associated with a toxic response. Therefore, these compounds were eliminated as COPCs for Parcel 6, 7, and 8.

2.4.5 Additional Screening Procedures

In accordance with the RREM, additional screening procedures were used to evaluate Parcel 6, 7, and 8 constituents. For example, in accordance with USEPA's Functional Guideline for Organics (EPA 1999a), if a blank contains measurable levels of a common laboratory contaminant, then the associated sample results were considered as positive results only if concentration in the samples exceeded ten times the concentration in the blank. If the concentration of a common laboratory contaminant was less than ten times the blank concentration, the constituent was considered to be an artifact of laboratory handling and was not included in the RRE. Common laboratory contaminants include acetone, 2-butanone, methylene chloride, toluene, and phthalate esters.

Given the high degree of uncertainty in both the identity and reported concentrations of tentatively identified compounds (TICs), TICs were not carried through the RRE. Relatively few TICs were reported in the Parcel 6, 7, and 8 data sets and historical information does not suggest that any particular TIC should be present.

2.4.6 Exceptions to the Screening Criteria

During the review of this document it was noted that sixty-six data points with elevated Pu-238, U-238, and Th-232 readings were present in both the Parcel 7 and Parcel 8 final data (see Appendix F). Each of these points was investigated to determine if the elevated levels still exist and to determine if the data for these points should be included in the final dataset. In the case of two points, additional field measurements were taken to verify that the area was remediated and that elevated levels no longer exist. In most instances, the data was inappropriately included in the final data because the area was either excavated and verified or just verified to be below clean-up criteria. In some cases, the data was appropriately included in the final data because slightly elevated levels still exist or the original elevated reading could not be reproduced. In all cases, the inclusion of these data points in the final data presents to the stakeholders a more conservative evaluation of the risk.

Table 2.1: Identification of Constituents of Potential Concern for the Construction Worker Exposed to Surface and Subsurface Soil in Parcel 6

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Inorganics (mg/kg)									
Aluminum	7429-90-5	2.69E+03	1.47E+04	4/ 4	6.45E+05	1.47E+04	1.90E+04	1.69E+05	NO:2
Arsenic	7440-38-2	2.10E+00	5.30E+00	4/ 4	1.15E+01	5.30E+00	8.60E+00	2.26E+00	NO:2
Barium	7440-39-3	1.57E+01	4.54E+01	4/ 4	4.10E+02	4.54E+01	1.80E+02	1.25E+04	NO:2
Beryllium	7440-41-7	1.40E-01	8.60E-01	4/ 4	3.99E+01	8.60E-01	1.30E+00	3.70E+02	NO:2
Bismuth	7440-69-9	1.50E+00	1.50E+00	1/ 3	2.22E+01	1.50E+00	3.84E+01	- - -	NO:2
Cadmium	7440-43-9	3.00E-01	4.20E-01	3/ 5	1.02E+01	4.20E-01	2.10E+00	- - -	NO:2
Calcium	7440-70-2	5.80E+04	2.17E+05	4/ 4	4.19E+06	2.17E+05	3.10E+05	- - -	NO:2
Chromium	**7440-47-3**	**5.40E+00**	**2.08E+01**	**5/ 5**	**2.61E+01**	**2.08E+01**	**2.00E+01**	- - -	**YES**
Cobalt	7440-48-4	3.00E+00	1.94E+01	4/ 4	2.39E+03	1.94E+01	1.90E+01	1.93E+03	NO:3
Copper	7440-50-8	1.06E+01	2.91E+01	4/ 4	1.11E+02	2.91E+01	2.60E+01	8.18E+03	NO:3
Iron	7439-89-6	6.51E+03	3.04E+04	4/ 4	5.92E+05	3.04E+04	3.50E+04	- - -	NO:2
Lead	7439-92-1	2.60E+00	2.67E+01	6/ 6	5.83E+01	2.67E+01	4.80E+01	- - -	NO:2
Lithium	**7439-93-2**	**1.03E+01**	**3.86E+01**	**4/ 4**	**2.56E+02**	**3.86E+01**	- - -	- - -	**YES**
Magnesium	7439-95-4	1.05E+04	1.02E+05	4/ 4	8.61E+08	1.02E+05	4.00E+04	- - -	NO:5
Manganese	7439-96-5	2.64E+02	1.08E+03	4/ 4	8.39E+03	1.08E+03	1.40E+03	- - -	NO:2
Mercury	7439-97-6	1.30E-01	1.30E-01	1/ 4	1.17E+03	1.30E-01	1.50E-01	5.78E+04	NO:2
Molybdenum	7439-98-7	5.10E-01	2.10E+00	2/ 3	7.96E+05	2.10E+00	2.72E+01	1.02E+03	NO:2
Nickel	7440-02-0	6.40E+00	3.46E+01	5/ 5	5.71E+01	3.46E+01	3.20E+01	4.09E+03	NO:3
Potassium	7440-09-7	5.55E+02	3.28E+03	4/ 4	1.52E+05	3.28E+03	1.90E+03	- - -	NO:5
Silver	7440-22-4	2.10E-01	2.10E-01	2/ 4	8.33E-01	2.10E-01	1.70E+00	1.02E+03	NO:2
Sodium	7440-23-5	2.16E+02	7.07E+02	4/ 4	5.65E+03	7.07E+02	2.40E+02	- - -	NO:5
Tin	7440-31-5	8.90E-01	1.20E+00	2/ 3	1.63E+01	1.20E+00	2.09E+01	1.23E+05	NO:2
Vanadium	7440-62-2	6.70E+00	1.97E+01	4/ 4	1.45E+02	1.97E+01	2.50E+01	2.04E+02	NO:2
Zinc	7440-66-6	2.71E+01	2.54E+02	4/ 4	1.23E+05	2.54E+02	1.40E+02	6.13E+04	NO:3
Semi-Volatile Organic Compounds (ug/kg)									
Acenaphthene	83-32-9	4.17E+01	3.37E+02	3/ 8	9.97E+02	3.37E+02	- - -	3.09E+06	NO:3
Anthracene	120-12-7	2.60E+01	9.28E+02	5/ 8	1.44E+03	9.28E+02	- - -	1.55E+07	NO:3
Benzo(a)anthracene	56-55-3	1.80E+01	1.64E+03	7/ 8	6.07E+03	1.64E+03	- - -	1.98E+03	NO:3
Benzo(a)pyrene	**50-32-8**	**2.30E+01**	**1.22E+03**	**6/ 8**	**1.96E+03**	**1.22E+03**	- - -	**1.98E+02**	**YES**
Benzo(b)fluoranthene	205-99-2	2.30E+01	1.89E+03	6/ 8	3.56E+03	1.89E+03	- - -	1.98E+03	NO:3
Benzo(g,h,i)perylene	**191-24-2**	**6.38E+01**	**8.55E+02**	**5/ 8**	**5.70E+02**	**5.70E+02**	- - -	- - -	**YES**
Benzo(k)fluoranthene	207-08-9	2.30E+01	7.45E+02	6/ 8	8.79E+02	7.45E+02	- - -	1.98E+04	NO:3
Bis(2-ethylhexyl)phthalate	117-81-7	4.30E+01	5.80E+01	2/ 4	3.37E+04	5.80E+01	- - -	1.25E+05	NO:3
Chrysene	218-01-9	2.90E+01	3.01E+02	6/ 8	4.93E+02	3.01E+02	- - -	1.98E+05	NO:3
Dibenz(a,h)anthracene	**53-70-3**	**2.90E+01**	**2.18E+02**	**2/ 8**	**1.96E+03**	**2.18E+02**	- - -	**1.98E+02**	**YES**
Di-n-octyl Phthalate	117-84-0	1.70E+02	1.70E+02	1/ 4	2.17E+02	1.70E+02	- - -	8.18E+06	NO:3
Fluoranthene	206-44-0	4.50E+01	3.67E+03	7/ 8	1.27E+04	3.67E+03	- - -	2.06E+06	NO:3
Fluorene	86-73-7	4.60E+01	4.74E+02	3/ 8	1.15E+03	4.74E+02	- - -	2.06E+06	NO:3
Indeno(1,2,3-cd)pyrene	193-39-5	7.90E+01	9.77E+02	5/ 8	6.63E+02	6.63E+02	- - -	1.98E+03	NO:3
Phenanthrene	**85-01-8**	**2.50E+01**	**3.89E+03**	**7/ 8**	**3.21E+04**	**3.89E+03**	- - -	- - -	**YES**
Pyrene	129-00-0	5.00E+01	4.56E+03	7/ 8	1.53E+04	4.56E+03	- - -	1.55E+06	NO:3
Volatile Organic Compounds (ug/kg)									
4-Methyl-2-pentanone	108-10-1	7.97E-01	7.97E-01	1/ 8	4.87E+03	7.97E-01	- - -	1.64E+07	NO:3
Acetone	67-64-1	1.10E+01	1.80E+01	3/ 8	4.50E+01	1.80E+01	- - -	1.84E+08	NO:3
Dichloromethane (Methylene Chloride)	75-09-2	6.00E+00	1.60E+01	4/ 8	2.37E+04	1.60E+01	- - -	7.63E+05	NO:3
Naphthalene	91-20-3	3.43E+01	3.43E+01	1/ 8	1.09E+03	3.43E+01	- - -	1.24E+06	NO:3
Tetrachloroethene	127-18-4	1.31E+00	1.30E+01	2/ 8	7.23E+02	1.30E+01	- - -	1.06E+04	NO:3
Toluene	108-88-3	5.41E-01	1.15E+00	4/ 9	9.56E+01	1.15E+00	- - -	2.00E+02	NO:3
Radionuclides (pCi/g)									
Actinium-227	14952-40-0(+D)	7.00E-02	1.10E-01	4/ 136	1.14E-01	1.10E-01	1.10E-01	5.02E-01	NO:1
Cesium-137	10045-97-3(+D)	2.00E-02	5.00E-01	79/ 148	5.82E-02	5.82E-02	4.20E-01	3.56E-01	NO:4
Cobalt-60	10198-40-0	3.00E-02	3.00E-02	1/ 146	2.18E-02	2.18E-02	- - -	7.35E-02	NO:1
Lead-210	14255-04-0(+D)	1.50E-01	2.05E+00	102/ 145	6.23E-01	6.23E-01	1.20E+00	1.19E+00	NO:4
Plutonium-238	**13981-16-3**	**1.24E-02**	**4.10E+01**	**70/ 428**	**2.90E+01**	**2.90E+01**	**1.30E-01**	**1.13E+01**	**YES**
Plutonium-239/240	PU-239/240	3.70E-02	3.70E-02	1/ 9	7.16E-01	3.70E-02	1.80E-01	6.01E+00	NO:2
Potassium-40	13966-00-2	1.80E+01	2.31E+01	3/ 3	2.78E+01	2.31E+01	3.70E+01	1.12E+00	NO:2
Radium-226	13982-63-3(+D)	1.30E-01	3.53E+00	140/ 149	1.31E+00	1.31E+00	2.00E+00	1.05E-01	NO:4
Thorium-227	15623-47-9	1.80E-01	1.80E-01	1/ 2	0.00E+00	1.80E-01	- - -	2.17E+00	NO:3
Thorium-228	14274-82-9(+D)	2.81E-01	9.00E-01	10/ 12	5.82E+01	9.00E-01	1.50E+00	1.14E-01	NO:2
Thorium-230 +D	**14269-63-7(+D)**	**3.28E-01**	**2.32E+00**	**12/ 150**	**2.76E+00**	**2.32E+00**	**1.90E+00**	**9.26E-02**	**YES**
Thorium-232	7440-29-1(+D)	4.00E-02	2.30E+00	157/ 452	1.12E+00	1.12E+00	1.40E+00	6.90E-02	NO:4
Tritium	10028-17-8p	1.87E-01	3.91E+00	4/ 4	3.33E+09	3.91E+00	1.60E+00	1.45E+04	NO:3
Uranium-233/234	U-233/234	1.80E-01	6.70E-01	2/ 2	0.00E+00	6.70E-01	1.10E+00	5.52E-01	NO:2
Uranium-234	13966-29-5	2.31E-01	7.23E-01	5/ 5	1.37E+00	7.23E-01	1.10E+00	1.97E+01	NO:2
Uranium-235	15117-96-1(+D)	2.40E-02	4.75E-02	2/ 9	4.99E+01	4.75E-02	1.10E-01	1.55E+00	NO:2
Uranium-238	7440-61-1(+D)	2.32E-01	8.85E-01	8/ 11	3.51E+01	8.85E-01	1.20E+00	5.22E+00	NO:2

CAS - Chemical Abstract Service
COPC - Constituents of Potential Concern
EPC - exposure point concentration (lower of maximum concentration and 95%UCL).
mg/kg - milligram per kilogram
ug/kg - microgram per kilogram
pCi/g - picocurie per gram
RBGV - Risk Based Guideline Value
UCL - Upper Confidence Limit

NO:1 - <5% Detects
NO:2 - Max<Background
NO:3 - Max< Risk Based Guideline Value
NO:4 - EPC< Background
NO:5 - Essential Human Nutrient

Bold text indicates COPCs selected

Lithium note: The RREM background value for lithium is 26 mg/kg and not 0.00 mg/kg as presented in this table; however, since the analyte would still become a COPC, the value in the table was not modified.

Background values are based on the Operable Unit 9 Background Soils Investigation Chemistry Report (DOE 1994) or, in the case of nuclides with short half lives (Ac-227, Pb-210, and Pa-231) are based on the parent nuclide background and assumption of equilibrium with the parent nuclide.

- - -: not applicable, not available, or not calculated due to insufficient toxicity data

Table 2.2: *Identification of Constituents of Potential Concern for a Site Employee Exposed to Surface Soil in Parcel 6*

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Inorganics (mg/kg)									
Aluminum	7429-90-5	2.69E+03	1.47E+04	4/ 4	6.45E+05	1.47E+04	1.90E+04	1.69E+05	NO:2
Arsenic	7440-38-2	2.10E+00	5.30E+00	4/ 4	1.15E+01	5.30E+00	8.60E+00	2.26E+00	NO:2
Barium	7440-39-3	1.57E+01	4.54E+01	4/ 4	4.10E+02	4.54E+01	1.80E+02	1.25E+04	NO:2
Beryllium	7440-41-7	1.40E-01	8.60E-01	4/ 4	3.99E+01	8.60E-01	1.30E+00	3.70E+02	NO:2
Bismuth	7440-69-9	1.50E+00	1.50E+00	1/ 3	2.22E+01	1.50E+00	3.84E+01	---	NO:2
Cadmium	7440-43-9	3.00E-01	4.20E-01	3/ 5	1.02E+01	4.20E-01	2.10E+00	---	NO:2
Calcium	7440-70-2	5.80E+04	2.17E+05	4/ 4	4.19E+06	2.17E+05	3.10E+05	---	NO:2
Chromium	**7440-47-3**	**5.40E+00**	**2.08E+01**	**5/ 5**	**2.61E+01**	**2.08E+01**	**2.00E+01**	---	**YES**
Cobalt	7440-48-4	3.00E+00	1.94E+01	4/ 4	2.39E+03	1.94E+01	1.90E+01	1.93E+03	NO:3
Copper	7440-50-8	1.06E+01	2.91E+01	4/ 4	1.11E+02	2.91E+01	2.60E+01	8.18E+03	NO:3
Iron	7439-89-6	6.51E+03	3.04E+04	4/ 4	5.92E+05	3.04E+04	3.50E+04	---	NO:2
Lead	7439-92-1	2.60E+00	2.67E+01	6/ 6	5.83E+01	2.67E+01	4.80E+01	---	NO:2
Lithium	**7439-93-2**	**1.03E+01**	**3.86E+01**	**4/ 4**	**2.56E+02**	**3.86E+01**	---	---	**YES**
Magnesium	7439-95-4	1.05E+04	1.02E+05	4/ 4	8.61E+08	1.02E+05	4.00E+04	---	NO:5
Manganese	7439-96-5	2.64E+02	1.08E+03	4/ 4	8.39E+03	1.08E+03	1.40E+03	---	NO:2
Mercury	7439-97-6	1.30E-01	1.30E-01	1/ 4	1.17E+03	1.30E-01	1.50E-01	5.78E+04	NO:2
Molybdenum	7439-98-7	5.10E-01	2.10E+00	2/ 3	7.96E+05	2.10E+00	2.72E+01	1.02E+03	NO:2
Nickel	7440-02-0	6.40E+00	3.46E+01	5/ 5	5.71E+01	3.46E+01	3.20E+01	4.09E+03	NO:3
Potassium	7440-09-7	5.55E+02	3.28E+03	4/ 4	1.52E+05	3.28E+03	1.90E+03	---	NO:5
Silver	7440-22-4	2.10E-01	2.10E-01	2/ 4	8.33E-01	2.10E-01	1.70E+00	1.02E+03	NO:2
Sodium	7440-23-5	2.16E+02	7.07E+02	4/ 4	5.65E+03	7.07E+02	2.40E+02	---	NO:5
Tin	7440-31-5	8.90E-01	1.20E+00	2/ 3	1.63E+01	1.20E+00	2.09E+01	1.23E+05	NO:2
Vanadium	7440-62-2	6.70E+00	1.97E+01	4/ 4	1.45E+02	1.97E+01	2.50E+01	2.04E+02	NO:2
Zinc	7440-66-6	27.1	254.0	4/ 4	123,000.0	254.0	140.0	61,320.0	NO:3
Semi-Volatile Organic Compounds (ug/kg)									
Acenaphthene	83-32-9	4.17E+01	3.37E+02	3/ 8	9.97E+02	3.37E+02	---	3.09E+06	NO:3
Anthracene	120-12-7	2.60E+01	9.28E+02	5/ 8	1.44E+03	9.28E+02	---	1.55E+07	NO:3
Benzo(a)anthracene	56-55-3	1.80E+01	1.64E+03	7/ 8	6.07E+03	1.64E+03	---	1.98E+03	NO:3
Benzo(a)pyrene	**50-32-8**	**2.30E+01**	**1.22E+03**	**6/ 8**	**1.96E+03**	**1.22E+03**	---	**1.98E+02**	**YES**
Benzo(b)fluoranthene	205-99-2	2.30E+01	1.89E+03	6/ 8	3.56E+03	1.89E+03	---	1.98E+03	NO:3
Benzo(g,h,i)perylene	**191-24-2**	**6.38E+01**	**8.55E+02**	**5/ 8**	**5.70E+02**	**5.70E+02**	---	---	**YES**
Benzo(k)fluoranthene	207-08-9	2.30E+01	7.45E+02	6/ 8	8.79E+02	7.45E+02	---	1.98E+04	NO:3
Bis(2-ethylhexyl)phthalate	117-81-7	4.30E+01	5.80E+01	2/ 4	3.37E+04	5.80E+01	---	1.25E+05	NO:3
Chrysene	218-01-9	2.90E+01	3.01E+02	6/ 8	4.93E+02	3.01E+02	---	1.98E+05	NO:3
Dibenz(a,h)anthracene	**53-70-3**	**2.90E+01**	**2.18E+02**	**2/ 8**	**1.96E+03**	**2.18E+02**	---	**1.98E+02**	**YES**
Di-n-octyl Phthalate	117-84-0	1.70E+02	1.70E+02	1/ 4	2.17E+02	1.70E+02	---	8.18E+06	NO:3
Fluoranthene	206-44-0	4.50E+01	3.67E+03	7/ 8	1.27E+04	3.67E+03	---	2.06E+06	NO:3
Fluorene	86-73-7	4.60E+01	4.74E+02	3/ 8	1.15E+03	4.74E+02	---	2.06E+06	NO:3
Indeno(1,2,3-cd)pyrene	193-39-5	7.90E+01	9.77E+02	5/ 8	6.63E+02	6.63E+02	---	1.98E+03	NO:3
Phenanthrene	**85-01-8**	**2.50E+01**	**3.89E+03**	**7/ 8**	**3.21E+04**	**3.89E+03**	---	---	**YES**
Pyrene	129-00-0	5.00E+01	4.56E+03	7/ 8	1.53E+04	4.56E+03	---	1.55E+06	NO:3
Volatile Organic Compounds (ug/kg)									
4-Methyl-2-pentanone	108-10-1	7.97E-01	7.97E-01	1/ 8	4.87E+03	7.97E-01	---	1.64E+07	NO:3
Acetone	67-64-1	1.10E+01	1.80E+01	3/ 8	4.50E+01	1.80E+01	---	1.84E+08	NO:3
Dichloromethane (Methylene C	75-09-2	6.00E+00	1.60E+01	4/ 8	2.37E+04	1.60E+01	---	7.63E+05	NO:3
Naphthalene	91-20-3	3.43E+01	3.43E+01	1/ 8	1.09E+03	3.43E+01	---	1.24E+06	NO:3
Tetrachloroethene	127-18-4	1.31E+00	1.30E+01	2/ 8	7.23E+02	1.30E+01	---	1.06E+04	NO:3
Toluene	108-88-3	5.41E-01	1.15E+00	4/ 9	9.56E+01	1.15E+00	---	4.09E+07	NO:3
Radionuclides (pCi/g)									
Actinium-227	14952-40-0(+D)	7.00E-02	1.10E-01	4/ 136	1.14E-01	1.10E-01	1.10E-01	5.02E-01	NO:1
Cesium-137	10045-97-3(+D)	2.00E-02	5.00E-01	79/ 148	5.82E-02	5.82E-02	4.20E-01	3.56E-01	NO:4
Cobalt-60	10198-40-0	3.00E-02	3.00E-02	1/ 146	2.18E-02	2.18E-02	---	7.35E-02	NO:1
Lead-210	14255-04-0(+D)	1.50E-01	2.05E+00	102/ 145	6.23E-01	6.23E-01	1.20E+00	1.19E+00	NO:4
Plutonium-238	**13981-16-3**	**1.24E-02**	**4.10E+01**	**70/ 428**	**2.90E+01**	**2.90E+01**	**1.30E-01**	**1.13E+01**	**YES**
Plutonium-239/240	PU-239/240	3.70E-02	3.70E-02	1/ 9	7.16E-01	3.70E-02	1.80E-01	---	NO:2
Potassium-40	13966-00-2	1.80E+01	2.31E+01	3/ 3	2.78E+01	2.31E+01	3.70E+01	1.12E+00	NO:2
Radium-226	13982-63-3(+D)	1.30E-01	3.53E+00	140/ 149	1.31E+00	1.31E+00	2.00E+00	1.05E-01	NO:4
Thorium-227	15623-47-9	1.80E-01	1.80E-01	1/ 2	---	1.80E-01	---	2.17E+00	NO:3
Thorium-228	14274-82-9(+D)	2.81E-01	9.00E-01	10/ 12	5.82E+01	9.00E-01	1.50E+00	1.14E-01	NO:2
Thorium-230 +D	**14269-63-7(+D)**	**3.28E-01**	**2.32E+00**	**12/ 150**	**2.76E+00**	**2.32E+00**	**1.90E+00**	**5.86E-01**	**YES**
Thorium-232	7440-29-1(+D)	4.00E-02	2.30E+00	157/ 452	1.12E+00	1.12E+00	1.40E+00	---	NO:4
Tritium	10028-17-8p	1.87E-01	3.91E+00	4/ 4	3.33E+09	3.91E+00	1.60E+00	1.45E+04	NO:3
Uranium-233/234	U-233/234	1.80E-01	6.70E-01	2/ 2	---	6.70E-01	1.10E+00	5.52E-01	NO:2
Uranium-234	13966-29-5	2.31E-01	7.23E-01	5/ 5	1.37E+00	7.23E-01	1.10E+00	1.97E+01	NO:2
Uranium-235	15117-96-1(+D)	2.40E-02	4.75E-02	2/ 9	4.99E+01	4.75E-02	1.10E-01	1.55E+00	NO:2
Uranium-238	7440-61-1(+D)	2.32E-01	8.85E-01	8/ 11	3.51E+01	8.85E-01	1.20E+00	5.22E+00	NO:2

CAS - Chemical Abstract Service
COPC - Constituents of Potential Concern
EPC - exposure point concentration (lower of maximum concentration and 95%UCL).
mg/kg - milligram per kilogram
ug/kg - microgram per kilogram
pCi/g - picocurie per gram
RBGV - Risk Based Guideline Value
UCL - Upper Confidence Limit
- - -: not applicable, not available, or not calculated due to insufficient toxicity data

NO:1 - <5% Detects
NO:2 - Max<Background
NO:3 - Max< Risk Based Guideline Value
NO:4 - EPC< Background
NO:5 - Essential Human Nutrient

Bold text indicates COPCs selected

Background values are based on the Operable Unit 9 Background Soils Investigation Chemistry Report (DOE 1994) or, in the case of nuclides with short half lives (Ac-227, Pb-210, and Pa-231) are based on the parent nuclide background and assumption of equilibrium with the parent nuclide.

Table 2.3: Identification of Constituents of Potential Concern for the Construction Worker Exposed to Surface and Subsurface Soil in MCP Parcel 7

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Inorganics (mg/kg)									
Aluminum	7429-90-5	7.45E+01	3.03E+05	491/ 492	1.30E+04	1.30E+04	1.90E+04	2.08E+04	NO:4
Antimony	**7440-36-0**	**1.90E-01**	**3.37E+01**	**122/ 476**	**7.23E-01**	**7.23E-01**	---	**8.52E+00**	**YES**
Arsenic	7440-38-2	1.00E+00	1.46E+01	493/ 529	5.59E+00	5.59E+00	8.60E+00	1.85E+00	NO:4
Barium	7440-39-3	1.90E-01	5.64E+02	497/ 527	6.36E+01	6.36E+01	1.80E+02	1.47E+03	NO:3
Beryllium	7440-41-7	9.00E-02	1.80E+00	463/ 493	6.46E-01	6.46E-01	1.30E+00	4.21E+01	NO:3
Bismuth	7440-69-9	4.60E-01	1.41E+02	37/ 134	1.76E+01	1.76E+01	3.84E+01	---	NO:4
Cadmium	7440-43-9	4.00E-02	7.30E+00	341/ 507	4.49E-01	4.49E-01	2.10E+00	---	NO:4
Calcium	7440-70-2	1.19E+03	3.09E+05	499/ 522	1.98E+05	1.98E+05	3.10E+05	---	NO:2
Cerium	7440-45-1	1.27E+01	7.41E+01	21/ 38	3.31E+01	3.31E+01	---	3.85E+04	NO:3
Chromium	7440-47-3	1.00E-01	7.57E+01	492/ 520	1.61E+01	1.61E+01	2.00E+01	---	NO:4
Cobalt	7440-48-4	6.00E-02	2.89E+01	480/ 516	8.66E+00	8.66E+00	1.90E+01	3.83E+02	NO:3
Copper	7440-50-8	1.00E-01	4.30E+02	494/ 516	1.73E+01	1.73E+01	2.60E+01	8.52E+02	NO:3
Cyanide	57-12-5	1.10E-01	3.14E+01	14/ 184	5.90E-01	5.90E-01	---	4.26E+02	NO:3
Dysprosium	**7429-91-6**	**2.40E+00**	**5.90E+00**	**10/ 25**	**3.05E+00**	**3.05E+00**	---	---	**YES**
Erbium	**7440-52-0**	**6.60E+00**	**7.90E+00**	**6/ 38**	**4.78E+00**	**4.78E+00**	---	---	**YES**
Europium	**7440-53-1**	**8.80E-01**	**2.00E+00**	**16/ 24**	**1.31E+00**	**1.31E+00**	---	---	**YES**
Gadolinium	**7440-54-2**	**7.10E+00**	**8.83E+01**	**9/ 38**	**1.95E+01**	**1.95E+01**	---	---	**YES**
Holmium	**7440-60-0**	**2.20E+00**	**2.40E+00**	**2/ 38**	**1.47E+00**	**1.47E+00**	---	---	**YES**
Iron	7439-89-6	1.42E+02	1.28E+05	501/ 523	5.19E+04	5.19E+04	3.50E+04	---	NO:5
Lanthanum	**7439-91-0**	**5.50E+00**	**1.57E+01**	**10/ 38**	**9.59E+00**	**9.59E+00**	---	---	**YES**
Lead	7439-92-1	1.30E+00	8.83E+01	502/ 532	1.19E+01	1.19E+01	4.80E+01	---	NO:4
Lithium	**7439-93-2**	**1.40E-01**	**4.96E+01**	**410/ 446**	**2.25E+01**	**2.25E+01**	---	---	**YES**
Lutetium	**7439-94-3**	**5.00E-01**	**9.20E-01**	**4/ 24**	**3.87E-01**	**3.87E-01**	---	---	**YES**
Magnesium	7439-95-4	4.22E+01	1.46E+05	501/ 523	4.08E+04	4.08E+04	4.00E+04	---	NO:5
Manganese	7439-96-5	9.50E+00	1.79E+03	488/ 510	8.95E+02	8.95E+02	1.40E+03	---	NO:4
Mercury	7439-97-6	1.00E-02	2.60E+00	157/ 515	5.56E-02	5.56E-02	1.50E-01	5.78E+04	NO:3
Molybdenum	7439-98-7	1.90E-01	1.08E+01	57/ 117	2.47E+00	2.47E+00	2.72E+01	1.06E+02	NO:2
Neodymium	**7440-00-8**	**1.32E+01**	**4.61E+01**	**31/ 38**	**2.44E+01**	**2.44E+01**	---	---	**YES**
Nickel	7440-02-0	1.10E-01	5.67E+01	485/ 517	1.84E+01	1.84E+01	3.20E+01	4.26E+02	NO:3
Potassium	7440-09-7	2.26E+01	6.49E+03	483/ 500	2.89E+03	2.89E+03	1.90E+03	---	NO:5
Praseodymium	**7440-10-0**	**7.30E+00**	**1.21E+02**	**7/ 38**	**2.34E+01**	**2.34E+01**	---	---	**YES**
Samarium	**7440-19-9**	**1.81E+01**	**2.04E+01**	**3/ 38**	**1.19E+01**	**1.19E+01**	---	---	**YES**
Selenium	7782-49-2	2.40E-01	1.20E+00	60/ 494	3.17E-01	3.17E-01	5.90E-01	1.06E+02	NO:3
Silver	7440-22-4	7.00E-02	1.85E+01	93/ 507	5.45E-01	5.45E-01	1.70E+00	1.06E+02	NO:3
Sodium	7440-23-5	2.40E+00	4.08E+03	483/ 523	4.36E+02	4.36E+02	2.40E+02	---	NO:5
Tantalum	**7440-25-7**	**2.01E+02**	**4.59E+02**	**7/ 31**	**1.41E+03**	**4.59E+02**	---	---	**YES**
Terbium	**7440-27-9**	**1.37E+01**	**1.49E+01**	**2/ 38**	**8.54E+00**	**8.54E+00**	---	---	**YES**
Thallium	7440-28-0	1.70E-01	1.30E+00	54/ 517	3.36E-01	3.36E-01	4.60E-01	1.41E+00	NO:3
Tin	7440-31-5	6.40E-01	6.30E+00	38/ 141	3.40E+00	3.40E+00	2.09E+01	1.28E+04	NO:2
Vanadium	7440-62-2	9.00E-02	5.57E+01	491/ 516	1.99E+01	1.99E+01	2.50E+01	2.13E+01	NO:4
Ytterbium	**7440-64-4**	**3.30E+00**	**3.90E+00**	**4/ 38**	**2.48E+00**	**2.48E+00**	---	---	**YES**
Zinc	7440-66-6	4.70E-01	3.49E+03	498/ 520	6.79E+01	6.79E+01	1.40E+02	6.39E+03	NO:3
Explosives (ug/kg)									
2,6-Dinitrotoluene	606-20-2	5.00E+02	5.00E+02	1/ 516	2.20E+02	2.20E+02	---	3.54E+03	NO:1
HMX	2691-41-0	2.40E+02	2.40E+02	2/ 84	1.36E+03	2.40E+02	---	1.06E+06	NO:1
RDX	121-82-4	1.90E+02	1.90E+02	1/ 83	1.00E+03	1.90E+02	---	2.71E+04	NO:1
Pesticides and/or PCBs (ug/kg)									
4,4'-DDD	72-54-8	1.40E-01	1.40E-01	1/ 389	3.90E+00	1.40E-01	---	1.24E+04	NO:1
4,4'-DDE	72-55-9	7.90E-02	5.60E+00	6/ 389	3.64E+00	3.64E+00	---	8.77E+03	NO:1
4,4'-DDT	50-29-3	2.90E-01	7.90E+00	5/ 389	3.88E+00	3.88E+00	---	8.12E+03	NO:1
Aldrin	309-00-2	1.70E-01	2.20E-01	3/ 389	1.83E+00	2.20E-01	---	1.42E+02	NO:1
Alpha Chlordane	5103-71-9	1.00E-01	4.20E+01	9/ 367	7.83E+00	7.83E+00	---	7.61E+03	NO:1
Alpha-BHC	319-84-6	8.80E-01	3.00E+00	2/ 389	1.84E+00	1.84E+00	---	4.73E+02	NO:1
Aroclor-1248	12672-29-6	4.10E+01	1.70E+03	7/ 390	3.14E+01	3.14E+01	---	---	NO:1
Aroclor-1254	11097-69-1	1.40E+01	2.00E+02	10/ 390	4.05E+01	4.05E+01	---	3.20E+02	NO:1
Aroclor-1260	11096-82-5	4.00E+01	9.60E+01	3/ 390	3.94E+01	3.94E+01	---	---	NO:1
Beta-BHC	319-85-7	1.20E+01	1.20E+01	1/ 374	1.63E+00	1.63E+00	---	1.66E+03	NO:1
Chlordane	57-74-9	1.80E+01	4.00E+01	2/ 17	1.03E+01	4.00E+01	---	7.61E+03	NO:3
Delta-BHC	319-86-8	1.90E-01	1.50E+00	2/ 388	2.01E+00	1.50E+00	---	---	NO:1
Dieldrin	60-57-1	1.70E-01	7.90E-01	3/ 388	3.67E+00	7.90E-01	---	1.86E+02	NO:1
Endosulfan I	959-98-8	1.40E+00	1.70E+01	3/ 389	2.18E+00	2.18E+00	---	---	NO:1
Endosulfan II	33213-65-9	1.50E-01	2.50E+00	2/ 389	3.56E+00	2.50E+00	---	---	NO:1
Endosulfan Sulfate	1031-07-8	7.30E-01	7.30E-01	1/ 388	4.68E+00	7.30E-01	---	---	NO:1
Endrin	72-20-8	1.60E-01	1.30E+00	5/ 389	3.62E+00	1.30E+00	---	6.39E+03	NO:1
Endrin Aldehyde	7421-93-4	5.20E-01	8.40E-01	3/ 342	2.49E+00	8.40E-01	---	---	NO:1
Endrin Ketone	53494-70-5	1.00E-01	2.00E+01	4/ 388	4.71E+00	4.71E+00	---	---	NO:1
Gamma Chlordane	5103-74-2	6.60E-02	5.00E+01	14/ 372	7.84E+00	7.84E+00	---	7.61E+03	NO:1
Heptachlor	76-44-8	9.30E-02	2.90E+00	4/ 389	1.83E+00	1.83E+00	---	6.62E+02	NO:1
Heptachlor Epoxide	1024-57-3	5.60E-01	5.60E-01	1/ 389	2.80E+00	5.60E-01	---	2.77E+02	NO:1
Methoxychlor	72-43-5	7.80E-01	1.12E+01	4/ 388	2.15E+01	1.12E+01	---	1.06E+05	NO:1
Semi-Volatile Organic Compounds (ug/kg)									
1,2-Dichlorobenzene	95-50-1	1.30E+01	1.30E+01	1/ 520	2.31E+02	1.30E+01	---	1.55E+06	NO:1
2,4,6-Tribromophenol	**118-79-6**	**1.70E+03**	**1.70E+03**	**1/ 1**	---	**1.70E+03**	---	---	**YES**
2-Fluorobiphenyl	**321-60-8**	**1.40E+03**	**1.40E+03**	**1/ 1**	---	**1.40E+03**	---	---	**YES**
2-Fluorophenol	**367-12-4**	**1.90E+03**	**1.90E+03**	**1/ 1**	---	**1.90E+03**	---	---	**YES**
2-Methylnaphthalene	91-57-6	2.00E+01	2.70E+03	28/ 517	2.28E+02	2.28E+02	---	8.52E+04	NO:3
4-Nitroaniline	100-01-6	9.20E+02	9.20E+02	1/ 515	6.63E+02	6.63E+02	---	5.16E+04	NO:1
Acenaphthene	83-32-9	1.90E+01	2.80E+03	59/ 517	2.32E+02	2.32E+02	---	9.76E+05	NO:3
Acenaphthylene	208-96-8	2.40E+01	6.10E+02	14/ 517	2.24E+02	2.24E+02	---	---	NO:1
Anthracene	120-12-7	1.80E+01	4.90E+03	88/ 517	2.39E+02	2.39E+02	---	4.88E+06	NO:3
Benzo(a)anthracene	**56-55-3**	**1.70E+01**	**5.70E+03**	**143/ 517**	**2.57E+02**	**2.57E+02**	---	**3.12E+03**	**YES**

Table 2.3: Identification of Constituents of Potential Concern for the Construction Worker Exposed to Surface and Subsurface Soil in MCP Parcel 7

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Benzo(a)pyrene	50-32-8	**2.20E+01**	**5.10E+03**	**135/ 518**	**2.53E+02**	**2.53E+02**	---	**3.12E+02**	**YES**
Benzo(b)fluoranthene	**205-99-2**	**1.70E+01**	**5.00E+03**	**140/ 517**	**2.50E+02**	**2.50E+02**	---	**3.12E+03**	**YES**
Benzo(g,h,i)perylene	**191-24-2**	**1.30E+01**	**3.50E+03**	**113/ 517**	**2.38E+02**	**2.38E+02**	---	---	**YES**
Benzo(k)fluoranthene	207-08-9	2.00E+01	4.80E+03	132/ 517	2.58E+02	2.58E+02	---	3.12E+04	NO:3
Benzoic Acid	65-85-0	4.60E+01	1.80E+02	13/ 138	1.63E+03	1.80E+02	---	6.88E+07	NO:3
Bis(2-ethylhexyl)phthalate	117-81-7	1.90E+01	1.20E+04	188/ 515	2.50E+02	2.50E+02	---	1.72E+05	NO:3
Butyl Benzyl Phthalate	85-68-7	5.80E+01	1.00E+03	13/ 515	2.29E+02	2.29E+02	---	3.44E+06	NO:1
Carbazole	86-74-8	1.90E+01	1.50E+03	52/ 467	2.07E+02	2.07E+02	---	1.20E+05	NO:3
Chrysene	218-01-9	1.90E+01	6.30E+03	148/ 517	2.62E+02	2.62E+02	---	3.12E+05	NO:3
Di-n-butyl Phthalate	84-74-2	1.90E+01	5.30E+03	115/ 515	2.41E+02	2.41E+02	---	1.72E+06	NO:3
Di-n-octyl Phthalate	117-84-0	2.20E+01	8.20E+01	12/ 515	2.23E+02	8.20E+01	---	8.52E+05	NO:1
Dibenz(a,h)anthracene	**53-70-3**	**2.00E+01**	**9.30E+02**	**46/ 517**	**2.24E+02**	**2.24E+02**	---	**3.12E+02**	**YES**
Dibenzofuran	132-64-9	1.80E+01	9.90E+02	39/ 517	2.25E+02	2.25E+02	---	3.44E+04	NO:3
Diethyl Phthalate	84-66-2	1.20E+01	1.60E+03	23/ 515	2.25E+02	2.25E+02	---	1.38E+07	NO:1
Dimethyl Phthalate	131-11-3	3.90E+02	3.90E+02	1/ 515	2.24E+02	2.24E+02	---	2.13E+08	NO:1
Fluoranthene	206-44-0	2.00E+01	1.50E+04	184/ 516	3.23E+02	3.23E+02	---	6.51E+05	NO:3
Fluorene	86-73-7	1.90E+01	4.50E+03	51/ 517	2.32E+02	2.32E+02	---	6.51E+05	NO:3
Hexachlorobenzene	118-74-1	7.40E+02	7.40E+02	1/ 519	2.24E+02	2.24E+02	---	1.51E+03	NO:1
Hexachlorobutadiene	87-68-3	7.40E+02	7.40E+02	1/ 519	2.24E+02	2.24E+02	---	5.16E+03	NO:1
Hexachlorocyclopentadiene	77-47-4	7.40E+02	7.40E+02	1/ 515	2.24E+02	2.24E+02	---	1.03E+05	NO:1
Hexachloroethane	67-72-1	7.40E+02	7.40E+02	1/ 519	2.24E+02	2.24E+02	---	1.72E+04	NO:1
Indeno(1,2,3-cd)pyrene	193-39-5	1.70E+01	3.10E+03	103/ 515	2.36E+02	2.36E+02	---	3.12E+03	NO:3
Isophorone	78-59-1	1.30E+01	4.80E+01	4/ 515	2.25E+02	4.80E+01	---	2.54E+06	NO:1
N-Nitrosodiphenylamine	86-30-6	2.80E+02	2.80E+02	1/ 515	2.22E+02	2.22E+02	---	3.44E+05	NO:1
Nitrobenzene-d5	**4165-60-0**	**1.30E+03**	**1.30E+03**	**1/ 1**	---	**1.30E+03**	---	---	**YES**
P-Terphenyl-d14	**1718-51-0**	**1.40E+03**	**1.40E+03**	**1/ 1**	---	**1.40E+03**	---	---	**YES**
Pentachlorophenol	87-86-5	9.40E+01	9.40E+01	1/ 518	6.62E+02	9.40E+01	---	1.56E+04	NO:1
Phenanthrene	**85-01-8**	**1.80E+01**	**1.20E+04**	**176/ 517**	**2.99E+02**	**2.99E+02**	---	---	**YES**
Phenol	108-95-2	2.00E+01	1.50E+02	7/ 514	2.25E+02	1.50E+02	---	5.16E+06	NO:1
Phenol-d5	**4165-62-2**	**1.90E+03**	**1.90E+03**	**1/ 1**	---	**1.90E+03**	---	---	**YES**
Pyrene	129-00-0	1.80E+01	2.10E+04	187/ 516	3.18E+02	3.18E+02	---	4.88E+05	NO:3
Volatile Organic Compounds (ug/kg)									
1,1,1-Trichloroethane	71-55-6	1.00E+00	8.00E+00	8/ 969	3.65E+00	3.65E+00	---	6.84E+05	NO:1
1,1,2,2-Tetrachloroethane	79-34-5	6.00E-01	3.00E+00	4/ 968	3.64E+00	3.00E+00	---	3.50E+03	NO:1
1,1,2-Trichloroethane	79-00-5	1.00E+00	1.00E+00	2/ 968	3.64E+00	1.00E+00	---	8.19E+03	NO:1
1,1-Dichloroethane	75-34-3	6.00E+00	6.00E+00	1/ 969	3.65E+00	3.65E+00	---	1.93E+05	NO:1
1,1-Dichloroethene	75-35-4	3.00E+00	5.30E+01	4/ 973	3.69E+00	3.69E+00	---	4.20E+04	NO:1
1,2-Dichloroethane	107-06-2	2.00E+00	2.00E+00	1/ 973	3.65E+00	2.00E+00	---	3.45E+03	NO:1
1,2-Dichloroethene	540-59-0	9.00E-02	1.10E+04	50/ 962	5.36E+00	5.36E+00	---	1.92E+05	NO:3
1,2-Dichloropropane	78-87-5	1.00E+00	2.00E+00	2/ 969	3.64E+00	2.00E+00	---	2.08E+03	NO:1
1,2-Diethylbenzene	135-01-3	1.30E+01	1.30E+01	1/ 398	5.42E+00	5.42E+00	---	---	NO:1
1,2-cis-Dichloroethene (DCE)	156-59-2	2.00E+01	3.20E+03	15/ 28	1.59E+04	3.20E+03	---	2.13E+05	NO:3
1,3-Dichlorobenzene	541-73-1	1.00E+00	1.60E+01	2/ 520	2.34E+02	1.60E+01	---	5.16E+05	NO:1
1,3-cis-Dichloropropene	10061-01-5	8.00E-01	8.00E-01	1/ 762	3.76E+00	8.00E-01	---	---	NO:1
1,3-trans-Dichloropropene	10061-02-6	9.00E-01	9.00E-01	1/ 969	3.64E+00	9.00E-01	---	---	NO:1
1,4-Dichlorobenzene	106-46-7	1.30E+01	7.90E+01	3/ 524	2.28E+02	7.90E+01	---	1.00E+05	NO:1
2-Butanone	78-93-3	1.00E+00	2.50E+02	214/ 972	7.71E+00	7.71E+00	---	6.65E+06	NO:3
2-Hexanone	591-78-6	2.00E+00	1.30E+01	8/ 970	6.48E+00	6.48E+00	---	---	NO:1
4-Methyl-2-pentanone	108-10-1	8.00E-01	2.00E+01	20/ 970	6.51E+00	6.51E+00	---	1.47E+06	NO:1
Acetone	67-64-1	2.00E+00	3.40E+04	532/ 968	2.17E+01	2.17E+01	---	1.92E+07	NO:3
Acetonitrile	75-05-8	3.20E+01	1.20E+02	3/ 387	6.63E+01	6.63E+01	---	2.00E+05	NO:1
Acrylonitrile	107-13-1	4.00E+00	1.30E+01	3/ 399	6.73E+01	1.30E+01	---	1.82E+03	NO:1
Benzene	71-43-2	6.00E-01	9.00E+00	12/ 974	3.62E+00	3.62E+00	---	6.46E+03	NO:1
Bromodichloromethane	75-27-4	6.00E-01	6.00E-01	1/ 969	3.64E+00	6.00E-01	---	4.81E+04	NO:1
Bromoform	75-25-2	8.00E-01	1.00E+00	2/ 969	3.64E+00	1.00E+00	---	3.77E+05	NO:1
Carbon Disulfide	75-15-0	1.00E+00	3.70E+01	88/ 969	3.66E+00	3.66E+00	---	1.16E+05	NO:3
Carbon Tetrachloride	56-23-5	1.00E+00	2.00E+00	4/ 973	3.64E+00	2.00E+00	---	2.44E+03	NO:1
Chlorobenzene	108-90-7	5.00E-01	5.30E+03	15/ 974	3.83E+00	3.83E+00	---	4.85E+04	NO:1
Chloromethane	74-87-3	4.00E-01	1.10E+01	2/ 763	6.56E+00	6.56E+00	---	1.59E+04	NO:1
Dibromochloromethane	124-48-1	7.00E-01	7.00E-01	1/ 969	3.64E+00	7.00E-01	---	3.55E+04	NO:1
Dichloromethane (Methylene Chloride)	75-09-2	1.00E+00	3.00E+04	756/ 970	2.31E+01	2.31E+01	---	8.25E+04	NO:3
Ethylbenzene	100-41-4	1.00E+00	2.80E+02	18/ 971	3.62E+00	3.62E+00	---	7.80E+04	NO:1
FREON-113	76-13-1	3.00E+00	2.10E+01	4/ 572	3.73E+00	3.73E+00	---	6.93E+06	NO:1
Hexane	110-54-3	1.00E+00	4.20E+01	71/ 566	5.42E+00	5.42E+00	---	4.08E+04	NO:3
Isopropyl Benzene	98-82-8	2.00E+00	2.00E+00	1/ 5	7.08E+01	2.00E+00	---	5.28E+04	NO:3
Methyl Cyclohexane	**108-87-2**	**5.00E+00**	**6.00E+00**	**2/ 5**	**6.19E+00**	**6.00E+00**	---	---	**YES**
Naphthalene	91-20-3	2.40E+01	1.90E+03	26/ 517	2.25E+02	2.25E+02	---	3.44E+05	NO:3
Styrene	100-42-5	1.00E-01	2.80E+01	16/ 969	3.62E+00	3.62E+00	---	1.46E+06	NO:1
Tetrachloroethene (PCE)	127-18-4	5.00E-01	8.00E+00	24/ 973	3.62E+00	3.62E+00	---	3.66E+03	NO:1
Toluene	108-88-3	3.00E-01	3.20E+01	144/ 971	3.51E+00	3.51E+00	---	2.00E+05	NO:3
Trichloroethylene (TCE)	**79-01-6**	**8.00E-01**	**2.30E+04**	**81/ 996**	**5.54E+00**	**5.54E+00**	---	**4.38E+02**	**YES**
Trichloromethane (Cholorform)	67-66-3	4.00E-01	6.70E+01	15/ 972	3.69E+00	3.69E+00	---	2.56E+03	NO:1
Vinyl Chloride	75-01-4	1.00E+00	4.40E+02	22/ 996	7.71E+00	7.71E+00	---	1.07E+03	NO:1
Xylenes, Total	1330-20-7	5.00E-01	2.70E+02	35/ 971	3.72E+00	3.72E+00	---	6.42E+04	NO:1
Radionuclides (pCi/g)									
Actinium-227	**14952-40-0(+D)**	**6.00E-02**	**3.10E+00**	**177/1914**	**2.12E-01**	**2.12E-01**	**1.10E-01**	**4.56E-01**	**YES**
Actinium-228	14331-83-0	3.00E-01	1.83E+00	87/ 87	1.02E+00	1.02E+00	---	2.17E-01	NO:6
Americium-241	14596-10-2	2.00E-02	2.60E+00	103/2540	7.14E-02	7.14E-02	---	6.32E+00	NO:1
Bismuth-207	13982-38-2	1.00E-02	2.00E-01	14/ 623	3.24E-02	3.24E-02	---	1.39E-01	NO:1
Bismuth-210	14331-79-4	1.00E-02	1.00E-01	7/ 148	5.11E-02	5.11E-02	---	5.52E+01	NO:1
Bismuth-210M	BI-210M	4.70E-02	4.70E-02	1/ 581	4.20E-02	4.20E-02	---	---	NO:1
Bismuth-212	14913-49-6	6.60E-01	1.74E+00	18/ 18	1.09E+00	1.74E+00	---	1.11E+00	NO:6
Bismuth-214	14733-03-0	2.20E-01	1.40E+00	89/ 89	6.92E-01	6.92E-01	1.20E+00	1.31E-01	NO:6
Cerium-141	13967-74-3	1.61E+00	1.61E+00	1/ 1	---	1.61E+00	---	4.18E+00	NO:3

Table 2.3: Identification of Constituents of Potential Concern for the Construction Worker Exposed to Surface and Subsurface Soil in MCP Parcel 7

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Cerium-144	14762-78-8	5.12E-01	5.12E-01	1/ 1	- - -	5.12E-01	- - -	8.91E+00	NO:3
Cerium-144/Praseodymium	14762-78-8(+D)	1.02E+00	1.02E+00	1/ 1	- - -	1.02E+00	- - -	3.23E+00	NO:3
Cesium-137	10045-97-3(+D)	1.00E-02	3.10E+01	545/2614	5.21E-02	5.21E-02	4.20E-01	3.82E-01	NO:4
Cobalt-60	10198-40-0	1.00E-02	9.19E-02	80/2514	3.22E-02	3.22E-02	- - -	7.91E-02	NO:1
Lead-210	14255-04-0	1.40E-01	3.97E+00	770/1932	6.48E-01	6.48E-01	1.20E+00	9.05E-01	NO:6
Lead-212	15092-94-1	8.50E-02	2.42E+00	204/ 204	8.46E-01	8.46E-01	- - -	1.79E+00	NO:6
Lead-214	15067-28-4	1.33E-01	1.66E+00	191/ 191	8.06E-01	8.06E-01	1.20E+00	1.00E+00	NO:6
Plutonium-238	**13981-16-3**	**3.10E-03**	**4.94E+02**	**2083/5827**	**5.94E+01**	**5.94E+01**	**1.30E-01**	**6.12E+00**	**YES**
Plutonium-239	15117-48-3	2.20E-02	3.20E-02	3/ 5	1.42E-01	3.20E-02	- - -	6.03E+00	NO:3
Plutonium-239/240	PU-239/240	1.60E-03	7.26E+00	422/1303	3.59E-02	3.59E-02	1.80E-01	- - -	NO:4
Plutonium-242	13982-10-0	4.26E-03	8.48E-03	2/ 6	1.03E-02	8.48E-03	- - -	6.33E+00	NO:3
Potassium-40	13966-00-2	1.15E+00	4.26E+01	720/ 749	2.28E+01	2.28E+01	3.70E+01	1.18E+00	NO:4
Protactinium-231	14331-85-2	6.30E-01	1.87E+00	2/ 441	9.09E-01	9.09E-01	- - -	2.73E+00	NO:1
Radium-224	13233-32-4	3.30E-01	1.94E+00	61/ 61	1.10E+00	1.10E+00	- - -	3.24E+00	NO:3
Radium-226	13982-63-3(+D)	1.50E-01	4.06E+00	2195/2527	1.18E+00	1.18E+00	2.00E+00	1.10E-01	NO:4
Radium-228 +D	**15262-20-1(+D)**	**2.12E-01**	**1.32E+01**	**502/ 515**	**1.06E+00**	**1.06E+00**	- - -	**1.67E-01**	**YES**
Strontium-90	10098-97-2(+D)	1.06E-01	1.58E+00	18/ 127	2.98E-01	2.98E-01	7.20E-01	9.40E+00	NO:3
Thallium-208	14913-50-9	4.00E-02	8.00E-01	149/ 150	3.34E-01	3.34E-01	- - -	5.59E-02	NO:6
Thorium-227	15623-47-9	2.30E-02	4.21E-01	36/ 37	1.82E-01	1.82E-01	- - -	2.14E+00	NO:3
Thorium-228	14274-82-9(+D)	7.30E-03	4.10E+01	1232/1508	1.84E+00	1.84E+00	1.50E+00	1.19E-01	NO:6
Thorium-230	14269-63-7(+D)	2.06E-02	1.32E+01	1204/2931	2.72E+00	2.72E+00	1.90E+00	9.26E-02	NO:6
Thorium-232	7440-29-1(+D)	6.80E-03	2.92E+01	3374/5057	8.10E-01	8.10E-01	1.40E+00	6.90E-02	NO:4
Thorium-234	15065-10-8	6.40E-01	2.20E+00	10/ 10	1.73E+00	2.20E+00	- - -	1.76E+01	NO:3
Tritium	10028-17-8p	1.00E-02	5.85E+01	221/ 318	2.44E+00	2.44E+00	1.60E+00	7.58E+03	NO:3
Uranium-233/234	**U-233/234**	**7.34E-01**	**1.39E+00**	**4/ 4**	**2.24E+00**	**1.39E+00**	- - -	**4.82E-01**	**YES**
Uranium-234	13966-29-5	7.05E-02	1.70E+00	505/ 545	5.70E-01	5.70E-01	1.10E+00	1.05E+01	NO:3
Uranium-235	15117-96-1(+D)	4.00E-03	2.50E-01	206/ 742	1.29E-01	1.29E-01	1.10E-01	1.54E+00	NO:3
Uranium-235/236	U-235/236	2.02E-02	5.38E-02	10/ 37	3.88E-02	3.88E-02	- - -	3.10E-01	NO:3
Uranium-238	7440-61-1(+D)	5.62E-02	2.20E+00	569/1031	2.04E+00	2.04E+00	1.20E+00	4.13E+00	NO:3

CAS - Chemical Abstract Service
COPC - Constituents of Potential Concern
EPC - exposure point concentration (lower of maximum concentration and 95%UCL).
mg/kg - milligram per kilogram
ug/kg - microgram per kilogram

- - - : not applicable, not available, or not calculated due to insufficient toxicity data

NO:1 - <5% Detects
NO:2 - Max<Background
NO:3 - Max< Risk Based Guideline Value
NO:4 - EPC< Background
NO:5 - Essential Human Nutrient
NO:6 - Part of a chain which has members above that are COPCs
Bold text indicates COPCs selected

Lithium note: The RREM background value for lithium is 26 mg/kg and not - - - as presented in this table; however, since the analyte would still become a COPC, the value in the table was not modified.

Background values are based on the Operable Unit 9 Background Soils Investigation Chemistry Report (DOE 1994) or, in the case of nuclides with short half lives (Ac-227, Pb-210, and Pa-231) are based on the parent nuclide background and assumption of equilibrium with the parent nuclide.

Ra-228 note: A background value has not been calculated for Ra-228 and why none is provided in the table above. However, if Ra-228's parent nuclide background is considered (Th-232 at 1.4 pCi/g), Ra-228 would not be brought forward as a COPC. To be consistent with previous RREs, Ra-228 was presented with no background value and was brought forward as a COPC.

Table 2.4: Identification of Constituents of Potential Concern for the Site Employee Exposed to Surface Soil in Parcel 7

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Inorganics (mg/kg)									
Aluminum	7429-90-5	6.59E+02	1.57E+05	84/ 84	1.21E+04	1.21E+04	1.90E+04	1.69E+05	NO:3
Antimony	7440-36-0	2.30E-01	2.60E+00	21/ 74	2.37E+00	2.37E+00	---	8.18E+01	NO:3
Arsenic	7440-38-2	1.20E+00	1.46E+01	83/ 89	5.58E+00	5.58E+00	8.60E+00	2.26E+00	NO:4
Barium	7440-39-3	6.10E+00	4.24E+02	80/ 89	7.06E+01	7.06E+01	1.80E+02	1.25E+04	NO:3
Beryllium	7440-41-7	9.00E-02	1.10E+00	63/ 85	8.67E-01	8.67E-01	1.30E+00	3.70E+02	NO:2
Bismuth	7440-69-9	4.60E-01	1.41E+02	12/ 60	7.32E+00	7.32E+00	3.84E+01	---	NO:4
Cadmium	7440-43-9	1.00E-01	6.80E+00	36/ 83	1.57E+00	1.57E+00	2.10E+00	---	NO:4
Calcium	7440-70-2	4.93E+03	3.09E+05	84/ 85	1.94E+05	1.94E+05	3.10E+05	---	NO:2
Cerium	7440-45-1	1.27E+01	4.47E+01	6/ 9	4.63E+01	4.47E+01	---	3.85E+04	NO:3
Chromium	7440-47-3	1.30E+00	5.78E+01	82/ 86	1.42E+01	1.42E+01	2.00E+01	---	NO:4
Cobalt	7440-48-4	8.50E-01	2.04E+01	71/ 83	8.55E+00	8.55E+00	1.90E+01	1.93E+03	NO:3
Copper	7440-50-8	1.30E+00	4.80E+01	82/ 83	1.66E+01	1.66E+01	2.60E+01	8.18E+03	NO:3
Cyanide	57-12-5	2.40E-01	2.70E-01	2/ 73	5.17E-01	2.70E-01	---	4.09E+03	NO:1
Dysprosium	**7429-91-6**	**4.50E+00**	**4.50E+00**	**1/ 6**	**4.58E+00**	**4.50E+00**	---	---	**YES**
Erbium	**7440-52-0**	**7.20E+00**	**7.20E+00**	**1/ 9**	**5.78E+00**	**7.20E+00**	---	---	**YES**
Europium	**7440-53-1**	**1.40E+00**	**1.60E+00**	**2/ 6**	**2.13E+00**	**1.60E+00**	---	---	**YES**
Gadolinium	**7440-54-2**	**2.89E+01**	**6.59E+01**	**3/ 9**	**2.02E+02**	**6.59E+01**	---	---	**YES**
Iron	7439-89-6	2.33E+03	3.88E+04	85/ 86	2.64E+04	2.64E+04	3.50E+04	---	NO:4
Lanthanum	**7439-91-0**	**7.20E+00**	**1.57E+01**	**3/ 9**	**1.49E+01**	**1.57E+01**	---	---	**YES**
Lead	7439-92-1	3.60E+00	8.83E+01	89/ 91	1.61E+01	1.61E+01	4.80E+01	---	NO:4
Lithium	**7439-93-2**	**1.90E+00**	**4.31E+01**	**62/ 65**	**2.02E+01**	**2.02E+01**	---	---	**YES**
Magnesium	7439-95-4	2.51E+03	1.46E+05	85/ 86	4.78E+04	4.78E+04	4.00E+04	---	NO:5
Manganese	7439-96-5	1.63E+02	9.76E+02	82/ 83	6.30E+02	6.30E+02	1.40E+03	—	NO:2
Mercury	7439-97-6	2.00E-02	6.60E-01	24/ 86	7.26E-02	7.26E-02	1.50E-01	5.78E+04	NO:3
Molybdenum	7439-98-7	1.90E-01	1.08E+01	44/ 55	2.68E+00	2.68E+00	2.72E+01	1.02E+03	NO:2
Neodymium	**7440-00-8**	**1.32E+01**	**2.99E+01**	**8/ 9**	**3.16E+01**	**2.99E+01**	---	---	**YES**
Nickel	7440-02-0	1.40E+00	3.22E+01	75/ 83	1.73E+01	1.73E+01	3.20E+01	4.09E+03	NO:3
Potassium	7440-09-7	2.50E+02	6.09E+03	76/ 85	1.81E+03	1.81E+03	1.90E+03	---	NO:4
Praseodymium	**7440-10-0**	**1.21E+02**	**1.21E+02**	**1/ 9**	**9.52E+01**	**1.21E+02**	---	---	**YES**
Selenium	7782-49-2	3.10E-01	7.60E-01	6/ 82	7.02E-01	7.02E-01	5.90E-01	1.02E+03	NO:3
Silver	7440-22-4	1.00E-01	6.60E+00	12/ 83	6.14E-01	6.14E-01	1.70E+00	1.02E+03	NO:3
Sodium	7440-23-5	9.48E+01	2.15E+03	71/ 86	5.13E+02	5.13E+02	2.40E+02	---	NO:5
Tantalum	**7440-25-7**	**2.74E+02**	**4.59E+02**	**3/ 5**	**1.69E+03**	**4.59E+02**	---	---	**YES**
Thallium	7440-28-0	8.00E-01	8.00E-01	1/ 82	8.47E-01	8.00E-01	4.60E-01	1.35E+01	NO:1
Tin	7440-31-5	6.40E-01	6.30E+00	30/ 56	2.42E+00	2.42E+00	2.09E+01	1.23E+05	NO:2
Vanadium	7440-62-2	3.40E+00	4.00E+01	79/ 83	1.92E+01	1.92E+01	2.50E+01	2.04E+02	NO:3
Zinc	7440-66-6	4.90E+00	3.28E+02	84/ 85	7.01E+01	7.01E+01	1.40E+02	6.13E+04	NO:3
Pesticides and/or PCBs (ug/kg)									
4,4'-DDE	72-55-9	2.20E-01	3.90E-01	2/ 79	4.56E+00	3.90E-01	---	1.68E+04	NO:1
4,4'-DDT	50-29-3	2.90E-01	4.90E+00	2/ 79	4.67E+00	4.67E+00	---	9.56E+03	NO:1
Alpha Chlordane	5103-71-9	1.50E+00	1.60E+01	6/ 73	1.83E+01	1.60E+01	---	7.64E+03	NO:3
Aroclor-1248	12672-29-6	9.80E+01	9.80E+01	1/ 79	3.14E+01	3.14E+01	---	---	NO:1
Aroclor-1254	11097-69-1	3.80E+01	1.30E+02	6/ 79	4.78E+01	4.78E+01	---	6.83E+02	NO:3
Delta-BHC	319-86-8	1.90E-01	1.90E-01	1/ 78	2.41E+00	1.90E-01	---	---	NO:1
Dieldrin	60-57-1	2.40E-01	7.90E-01	2/ 78	5.23E+00	7.90E-01	---	3.58E+02	NO:1
Endosulfan I	959-98-8	2.40E+00	2.40E+00	1/ 79	2.33E+00	2.33E+00	---	---	NO:1
Endrin	72-20-8	3.30E-01	1.30E+00	3/ 79	4.31E+00	1.30E+00	---	6.13E+04	NO:1
Endrin Aldehyde	7421-93-4	5.70E-01	5.70E-01	1/ 69	2.84E+00	5.70E-01	---	---	NO:1
Endrin Ketone	53494-70-5	2.10E-01	2.10E-01	1/ 79	5.78E+00	2.10E-01	---	---	NO:1
Gamma Chlordane	5103-74-2	4.80E-01	1.60E+01	8/ 76	1.76E+01	1.60E+01	---	7.64E+03	NO:3
Heptachlor	76-44-8	1.40E-01	2.90E+00	3/ 79	2.16E+00	2.16E+00	---	1.27E+03	NO:1
Heptachlor Epoxide	1024-57-3	5.60E-01	5.60E-01	1/ 79	3.30E+00	5.60E-01	---	6.29E+02	NO:1
Methoxychlor	72-43-5	7.80E-01	7.80E-01	1/ 78	2.50E+01	7.80E-01	---	1.02E+06	NO:1
Semi-Volatile Organic Compounds (ug/kg)									
1,2-Dichlorobenzene	95-50-1	1.30E+01	1.30E+01	1/ 90	3.04E+02	1.30E+01	---	2.92E+00	NO:1
2,4,6-Tribromophenol	**118-79-6**	**1.70E+03**	**1.70E+03**	**1/ 1**	**0.00E+00**	**1.70E+03**	---	---	**YES**
2-Fluorobiphenyl	**321-60-8**	**1.40E+03**	**1.40E+03**	**1/ 1**	**0.00E+00**	**1.40E+03**	---	---	**YES**
2-Fluorophenol	**367-12-4**	**1.90E+03**	**1.90E+03**	**1/ 1**	**0.00E+00**	**1.90E+03**	---	---	**YES**
2-Methylnaphthalene	91-57-6	3.30E+01	2.70E+03	7/ 87	2.64E+02	2.64E+02	---	8.18E+05	NO:3
Acenaphthene	83-32-9	2.20E+01	2.80E+03	20/ 87	2.90E+02	2.90E+02	---	3.09E+06	NO:3
Acenaphthylene	208-96-8	3.10E+01	6.10E+02	4/ 87	2.45E+02	2.45E+02	---	---	NO:1
Anthracene	120-12-7	2.50E+01	4.90E+03	30/ 87	3.31E+02	3.31E+02	---	1.55E+07	NO:3
Benzo(a)anthracene	**56-55-3**	**2.10E+01**	**5.70E+03**	**46/ 87**	**4.51E+02**	**4.51E+02**	---	**1.98E+03**	**YES**
Benzo(a)pyrene	**50-32-8**	**2.40E+01**	**5.10E+03**	**44/ 88**	**4.41E+02**	**4.41E+02**	---	**1.98E+02**	**YES**
Benzo(b)fluoranthene	**205-99-2**	**1.70E+01**	**5.00E+03**	**46/ 87**	**4.67E+02**	**4.67E+02**	---	**1.98E+03**	**YES**
Benzo(g,h,i)perylene	**191-24-2**	**1.30E+01**	**3.50E+03**	**43/ 87**	**3.53E+02**	**3.53E+02**	---	---	**YES**
Benzo(k)fluoranthene	207-08-9	2.00E+01	4.80E+03	46/ 87	5.01E+02	5.01E+02	---	1.98E+04	NO:3
Benzoic Acid	65-85-0	4.80E+01	1.80E+02	8/ 35	1.93E+03	1.80E+02	---	2.49E+08	NO:3
Bis(2-ethylhexyl)phthalate	117-81-7	2.00E+01	6.50E+03	44/ 85	3.14E+02	3.14E+02	---	1.25E+05	NO:3
Butyl Benzyl Phthalate	85-68-7	5.80E+01	5.20E+02	2/ 85	2.38E+02	2.38E+02	---	1.25E+07	NO:1
Carbazole	86-74-8	1.90E+01	1.50E+03	23/ 72	2.53E+02	2.53E+02	---	8.72E+04	NO:3

Table 2.4: Identification of Constituents of Potential Concern for the Site Employee Exposed to Surface Soil in Parcel 7

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Chrysene	218-01-9	2.30E+01	6.30E+03	48/ 87	5.23E+02	5.23E+02	---	1.98E+05	NO:3
Di-n-butyl Phthalate	84-74-2	3.40E+01	2.80E+02	9/ 85	2.38E+02	2.38E+02	---	6.23E+06	NO:3
Dibenz(a,h)anthracene	**53-70-3**	**2.00E+01**	**9.30E+02**	**22/ 87**	**2.50E+02**	**2.50E+02**	---	**1.98E+02**	**YES**
Dibenzofuran	132-64-9	1.80E+01	9.90E+02	14/ 87	2.50E+02	2.50E+02	---	1.25E+05	NO:3
Diethyl Phthalate	84-66-2	2.30E+01	7.90E+01	6/ 85	2.28E+02	7.90E+01	---	4.99E+07	NO:3
Fluoranthene	206-44-0	2.20E+01	1.50E+04	51/ 87	8.71E+02	8.71E+02	---	2.06E+06	NO:3
Fluorene	86-73-7	1.90E+01	4.50E+03	18/ 87	2.93E+02	2.93E+02	---	2.06E+06	NO:3
Hexachlorobenzene	118-74-1	7.40E+02	7.40E+02	1/ 88	2.36E+02	2.36E+02	---	1.09E+03	NO:1
Hexachlorobutadiene	87-68-3	7.40E+02	7.40E+02	1/ 88	2.36E+02	2.36E+02	---	1.87E+04	NO:1
Hexachlorocyclopentadiene	77-47-4	7.40E+02	7.40E+02	1/ 85	2.38E+02	2.38E+02	---	3.70E+05	NO:1
Hexachloroethane	67-72-1	7.40E+02	7.40E+02	1/ 88	2.36E+02	2.36E+02	---	6.23E+04	NO:1
Indeno(1,2,3-cd)pyrene	**193-39-5**	**1.70E+01**	**3.10E+03**	**42/ 87**	**3.34E+02**	**3.34E+02**	---	**1.98E+03**	**YES**
N-Nitrosodiphenylamine	86-30-6	2.80E+02	2.80E+02	1/ 85	2.26E+02	2.26E+02	---	3.56E+05	NO:1
Nitrobenzene-d5	**4165-60-0**	**1.30E+03**	**1.30E+03**	**1/ 1**	**0.00E+00**	**1.30E+03**	---	---	**YES**
P-Terphenyl-d14	**1718-51-0**	**1.40E+03**	**1.40E+03**	**1/ 1**	**0.00E+00**	**1.40E+03**	---	---	**YES**
Phenanthrene	**85-01-8**	**2.10E+01**	**1.20E+04**	**50/ 87**	**7.16E+02**	**7.16E+02**	---	---	**YES**
Phenol	108-95-2	4.00E+01	1.50E+02	2/ 84	2.35E+02	1.50E+02	---	1.87E+07	NO:1
Phenol-d5	**4165-62-2**	**1.90E+03**	**1.90E+03**	**1/ 1**	**0.00E+00**	**1.90E+03**	---	---	**YES**
Pyrene	129-00-0	1.80E+01	2.10E+04	53/ 86	9.97E+02	9.97E+02	---	1.55E+06	NO:3
Volatile Organic Compounds (ug/kg)									
1,1,2,2-Tetrachloroethane	79-34-5	3.00E+00	3.00E+00	1/ 264	4.15E+00	3.00E+00	---	2.86E+04	NO:1
1,1,2-Trichloroethane	79-00-5	1.00E+00	1.00E+00	1/ 264	4.15E+00	1.00E+00	---	1.00E+05	NO:1
1,2-Dichloroethane	107-06-2	2.00E+00	2.00E+00	1/ 267	4.14E+00	2.00E+00	---	6.29E+04	NO:1
1,2-Dichloroethene	540-59-0	1.00E+00	1.40E+02	13/ 259	4.92E+00	4.92E+00	---	1.84E+06	NO:3
1,2-Dichloropropane	78-87-5	2.00E+00	2.00E+00	1/ 264	4.13E+00	2.00E+00	---	8.42E+04	NO:1
1,2-cis-Dichloroethene (DCE)	156-59-2	2.00E+01	3.20E+03	15/ 28	1.59E+04	3.20E+03	---	2.04E+06	NO:3
1,3-Dichlorobenzene	541-73-1	1.00E+00	1.60E+01	2/ 90	3.32E+02	1.60E+01	---	1.87E+06	NO:1
1,4-Dichlorobenzene	106-46-7	1.30E+01	4.40E+01	2/ 93	2.83E+02	4.40E+01	---	7.27E+04	NO:1
2-Butanone	78-93-3	2.00E+00	5.50E+01	27/ 267	7.83E+00	7.83E+00	---	1.23E+08	NO:3
2-Hexanone	591-78-6	5.00E+00	1.30E+01	2/ 265	6.96E+00	6.96E+00	---	---	NO:1
4-Methyl-2-pentanone	108-10-1	7.00E+00	2.00E+01	4/ 265	7.01E+00	7.01E+00	---	1.64E+07	NO:1
Acetone	67-64-1	2.00E+00	6.00E+03	97/ 264	1.41E+01	1.41E+01	---	1.84E+08	NO:3
Acrylonitrile	107-13-1	4.00E+00	5.00E+00	2/ 141	6.43E+01	5.00E+00	---	1.06E+04	NO:1
Bromoform	75-25-2	1.00E+00	1.00E+00	1/ 264	4.15E+00	1.00E+00	---	7.24E+05	NO:1
Carbon Disulfide	75-15-0	1.00E+00	2.00E+00	2/ 264	4.14E+00	2.00E+00	---	2.04E+07	NO:1
Chlorobenzene	108-90-7	3.00E+00	1.00E+02	5/ 268	4.34E+00	4.34E+00	---	4.09E+06	NO:1
Dichloromethane (Methylene Chloride)	75-09-2	3.00E+00	1.20E+04	203/ 265	2.16E+01	2.16E+01	---	7.63E+05	NO:3
Ethylbenzene	100-41-4	1.00E+00	4.00E+00	4/ 266	4.10E+00	4.00E+00	---	2.04E+07	NO:1
FREON-113	76-13-1	3.00E+00	3.00E+00	3/ 167	3.57E+00	3.00E+00	---	6.13E+09	NO:1
Hexane	110-54-3	2.00E+00	8.00E+00	13/ 162	5.77E+00	5.77E+00	---	2.25E+09	NO:3
Isopropyl Benzene	98-82-8	2.00E+00	2.00E+00	1/ 5	7.08E+01	2.00E+00	---	2.04E+07	NO:3
Methyl Cyclohexane	**108-87-2**	**5.00E+00**	**6.00E+00**	**2/ 5**	**6.19E+00**	**6.00E+00**	---	---	**YES**
Naphthalene	91-20-3	2.70E+01	1.90E+03	11/ 87	2.62E+02	2.62E+02	---	1.24E+06	NO:3
Styrene	100-42-5	4.00E-01	2.00E+00	3/ 265	4.12E+00	2.00E+00	---	4.09E+07	NO:1
Tetrachloroethene (PCE)	127-18-4	1.00E+00	5.00E+00	5/ 268	4.13E+00	4.13E+00	---	1.06E+04	NO:1
Toluene	108-88-3	1.00E+00	3.00E+00	33/ 266	4.00E+00	3.00E+00	---	4.09E+07	NO:3
Trichloroethylene (TCE)	79-01-6	1.00E+00	5.40E+03	52/ 290	1.36E+01	1.36E+01	---	1.43E+04	NO:3
Trichloromethane (Chloroform)	67-66-3	4.00E-01	6.70E+01	4/ 267	4.39E+00	4.39E+00	---	2.04E+06	NO:1
Vinyl Chloride	75-01-4	9.00E+00	4.40E+02	10/ 290	9.98E+00	9.98E+00	---	3.82E+03	NO:1
Xylenes, Total	1330-20-7	1.00E+00	1.80E+01	9/ 266	4.16E+00	4.16E+00	---	4.09E+07	NO:1
Radionuclides (pCi/g)									
Actinium-227 +D	**14952-40-0(+D)**	**2.30E-01**	**3.10E+00**	**62/ 805**	**2.08E-01**	**2.08E-01**	**1.10E-01**	**5.02E-01**	**YES**
Actinium-228	14331-83-0	3.00E-01	1.78E+00	81/ 81	1.00E+00	1.00E+00	---	2.01E-01	NO:6
Americium-241	14596-10-2	4.00E-02	2.60E+00	50/1145	7.30E-02	7.30E-02	---	9.93E+00	NO:1
Bismuth-207	13982-38-2	1.50E-02	3.40E-02	4/ 205	3.47E-02	3.40E-02	---	1.29E-01	NO:1
Bismuth-210	14331-79-4	1.00E-02	1.00E-02	2/ 61	6.96E-02	1.00E-02	---	9.07E+01	NO:1
Bismuth-210M	BI-210M	4.70E-02	4.70E-02	1/ 251	3.62E-02	3.62E-02	---	---	NO:1
Bismuth-212	14913-49-6	6.60E-01	1.74E+00	18/ 18	1.09E+00	1.74E+00	---	1.03E+00	NO:6
Bismuth-214	14733-03-0	2.20E-01	1.28E+00	83/ 83	6.64E-01	6.64E-01	1.20E+00	1.22E-01	NO:4
Cesium-137	10045-97-3(+D)	1.00E-02	2.90E+01	328/1229	7.20E-02	7.20E-02	4.20E-01	3.56E-01	NO:4
Cobalt-60	10198-40-0	2.00E-02	9.19E-02	24/1134	3.51E-02	3.51E-02	---	7.35E-02	NO:1
Lead-210	14255-04-0(+D)	1.40E-01	3.97E+00	338/ 802	7.12E-01	7.12E-01	1.20E+00	1.19E+00	NO:4
Lead-212	15092-94-1	8.50E-02	2.42E+00	147/ 147	7.62E-01	7.62E-01	---	1.73E+00	NO:6
Lead-214	15067-28-4	1.33E-01	1.23E+00	134/ 134	7.16E-01	7.16E-01	1.20E+00	9.29E-01	NO:4
Plutonium-238	**13981-16-3**	**3.10E-03**	**4.94E+02**	**1435/3726**	**4.39E+01**	**4.39E+01**	**1.30E-01**	**1.13E+01**	**YES**
Plutonium-239	15117-48-3	2.20E-02	3.20E-02	3/ 4	6.88E-02	3.20E-02	---	1.12E+01	NO:3
Plutonium-239/240	PU-239/240	1.60E-03	7.26E+00	363/ 837	4.97E-02	4.97E-02	1.80E-01	---	NO:4
Plutonium-242	13982-10-0	4.26E-03	8.48E-03	2/ 6	1.03E-02	8.48E-03	---	1.17E+01	NO:3
Potassium-40	13966-00-2	1.15E+00	3.92E+01	339/ 342	1.94E+01	1.94E+01	3.70E+01	1.12E+00	NO:4
Radium-224	13233-32-4	8.09E-01	1.11E+00	3/ 3	1.38E+00	1.11E+00	---	5.47E+00	NO:3
Radium-226	13982-63-3(+D)	1.68E-01	4.06E+00	965/1142	1.20E+00	1.20E+00	2.00E+00	1.05E-01	NO:4
Radium-228 +D	**15262-20-1(+D)**	**2.88E-01**	**3.97E+00**	**179/ 181**	**1.05E+00**	**1.05E+00**	---	**1.76E-01**	**YES**
Strontium-90	10098-97-2(+D)	1.06E-01	1.58E+00	18/ 62	3.48E-01	3.48E-01	7.20E-01	1.50E+01	NO:3
Thallium-208	14913-50-9	4.00E-02	8.00E-01	115/ 116	3.27E-01	3.27E-01	---	5.18E-02	NO:6
Thorium-227	15623-47-9	4.00E-02	4.21E-01	23/ 24	2.32E-01	2.32E-01	---	2.17E+00	NO:3

Table 2.4: Identification of Constituents of Potential Concern for the Site Employee Exposed to Surface Soil in Parcel 7

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Thorium-228	14274-82-9(+D)	7.30E-03	4.34E+00	799/1032	2.57E+00	2.57E+00	1.50E+00	1.14E-01	NO:6
Thorium-230	14269-63-7(+D)	2.06E-02	7.62E+00	772/1526	2.47E+00	2.47E+00	1.90E+00	---	NO:6
Thorium-232	7440-29-1(+D)	6.80E-03	2.92E+01	1794/2929	8.01E-01	8.01E-01	1.40E+00	---	NO:4
Thorium-234	15065-10-8	6.40E-01	2.20E+00	8/ 8	2.08E+00	2.20E+00	---	2.58E+01	NO:3
Tritium	10028-17-8p	3.91E-02	9.50E+00	12/ 28	3.57E+01	9.50E+00	1.60E+00	1.45E+04	NO:3
Uranium-233/234	**U-233/234**	**7.34E-01**	**1.39E+00**	**4/ 4**	**2.24E+00**	**1.39E+00**	---	**5.52E-01**	**YES**
Uranium-234	13966-29-5	9.60E-02	1.46E+00	242/ 246	6.57E-01	6.57E-01	1.10E+00	1.97E+01	NO:3
Uranium-235	15117-96-1(+D)	4.00E-03	2.30E-01	131/ 479	2.12E-01	2.12E-01	1.10E-01	1.55E+00	NO:3
Uranium-235/236	U-235/236	5.07E-02	5.07E-02	1/ 2	0.00E+00	5.07E-02	---	3.32E-01	NO:3
Uranium-238	7440-61-1(+D)	9.00E-02	2.20E+00	265/ 568	2.43E+00	2.20E+00	1.20E+00	5.22E+00	NO:3

CAS - Chemical Abstract Service
COPC - Constituents of Potential Concern
EPC - exposure point concentration (lower of maximum concentration and 95%UCL).
mg/kg - milligram per kilogram
ug/kg - microgram per kilogram
pCi/g - picocurie per gram
RBGV - Risk Based Guideline Value
UCL - Upper Confidence Limit

NO:1 - <5% Detects
NO:2 - Max<Background
NO:3 - Max< Risk Based Guideline Value
NO:4 - EPC< Background
NO:5 - Essential Human Nutrients
NO:6 - Part of a chain which has members above that are COPCs

Bold text indicates COPCs selected

--- : not applicable, not available, or not calculated due to insufficient toxicity data

Background values are based on the Operable Unit 9 Background Soils Investigation Chemistry Report (DOE 1994) or, in the case of nuclides with short half lives (Ac-227, Pb-210, and Pa-231) are based on the parent nuclide background and assumption of equilibrium with the parent nuclide.

Ra-228 note: A background value has not been calculated for Ra-228 and why none is provided in the table above. However, if Ra-228's parent nuclide background is considered (Th-232 at 1.4 pCi/g), Ra-228 would not be brought forward as a COPC. To be consistent with previous RREs, Ra-228 was presented with no background value and was brought forward as a COPC.

Table 2.5: Identification of Constituents of Potential Concern for a Construction Worker Exposed to Surface and Subsurface Soil in the MCP Parcel 8

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Inorganics (mg/kg)									
Aluminum	7429-90-5	1.59E+00	2.14E+04	308/ 309	1.10E+04	1.10E+04	1.90E+04	2.08E+04	NO:4
Antimony	**7440-36-0**	**2.30E-01**	**6.90E+01**	**55/ 290**	**9.91E+00**	**9.91E+00**	---	**8.52E+00**	**YES**
Arsenic	7440-38-2	2.30E-03	3.22E+01	313/ 325	5.36E+00	5.36E+00	8.60E+00	1.85E+00	NO:4
Barium	7440-39-3	1.20E-02	6.23E+02	294/ 321	5.89E+01	5.89E+01	1.80E+02	1.47E+03	NO:3
Beryllium	7440-41-7	1.50E-04	1.30E+00	291/ 462	5.49E-01	5.49E-01	1.30E+00	4.21E+01	NO:3
Bismuth	7440-69-9	4.30E-01	1.01E+02	35/ 126	1.34E+01	1.34E+01	3.84E+01	---	NO:4
Cadmium	7440-43-9s	6.00E-02	2.42E+01	112/ 321	1.37E+00	1.37E+00	2.10E+00	5.46E+00	NO:4
Calcium	7440-70-2	1.33E+02	2.68E+05	309/ 311	1.42E+05	1.42E+05	3.10E+05	---	NO:2
Cerium	7440-45-1	2.46E+01	2.84E+01	2/ 25	2.38E+01	2.38E+01	---	3.85E+04	NO:3
Chromium	7440-47-3	3.60E-03	9.21E+01	303/ 308	1.73E+01	1.73E+01	2.00E+01	---	NO:4
Cobalt	7440-48-4	1.70E-03	2.80E+01	278/ 311	9.63E+00	9.63E+00	1.90E+01	3.83E+02	NO:3
Copper	7440-50-8	6.50E-03	3.82E+02	301/ 305	2.09E+01	2.09E+01	2.60E+01	8.52E+02	NO:3
Cyanide	57-12-5	1.10E-01	1.01E+01	45/ 254	5.58E-01	5.58E-01	---	4.26E+02	NO:3
Erbium	**7440-52-0**	**4.00E+01**	**1.62E+02**	**19/ 25**	**1.90E+02**	**1.62E+02**	---	---	**YES**
Iron	7439-89-6	4.33E+00	1.09E+05	312/ 314	2.28E+04	2.28E+04	3.50E+04	---	NO:4
Lead	7439-92-1	2.40E-03	3.10E+03	300/ 307	1.24E+01	1.24E+01	4.80E+01	---	NO:4
Lithium	**7439-93-2**	**1.10E+00**	**4.29E+01**	**195/ 208**	**1.97E+01**	**1.97E+01**	---	---	**YES**
Magnesium	7439-95-4	4.31E+01	1.08E+05	307/ 311	3.52E+04	3.52E+04	4.00E+04	---	NO:4
Manganese	7439-96-5s	1.75E-01	1.49E+03	304/ 306	5.49E+02	5.49E+02	1.40E+03	4.85E+02	NO:4
Mercury	7439-97-6	2.00E-02	9.10E-01	54/ 318	7.09E-02	7.09E-02	1.50E-01	5.78E+04	NO:3
Molybdenum	7439-98-7	5.30E-01	1.64E+01	58/ 122	2.65E+00	2.65E+00	2.72E+01	1.06E+02	NO:2
Neodymium	**7440-00-8**	**1.98E+01**	**2.22E+01**	**2/ 25**	**2.32E+01**	**2.22E+01**	---	---	**YES**
Nickel	7440-02-0	4.20E-03	1.07E+02	286/ 302	2.13E+01	2.13E+01	3.20E+01	4.26E+02	NO:3
Potassium	7440-09-7	5.16E-01	7.46E+03	286/ 313	2.22E+03	2.22E+03	1.90E+03	---	NO:5
Selenium	7782-49-2	1.20E-01	2.90E+00	34/ 303	5.41E-01	5.41E-01	5.90E-01	1.06E+02	NO:3
Silver	7440-22-4	1.90E-01	2.06E+01	92/ 319	3.74E+00	3.74E+00	1.70E+00	1.06E+02	NO:3
Sodium	7440-23-5	3.23E-01	2.62E+03	269/ 314	4.17E+02	4.17E+02	2.40E+02	---	NO:5
Tantalum	**7440-25-7**	**1.68E+02**	**5.53E+02**	**23/ 49**	**2.69E+02**	**2.69E+02**	---	---	**YES**
Thallium	**7440-28-0**	**6.20E-04**	**5.50E+00**	**58/ 312**	**7.05E-01**	**7.05E-01**	**4.60E-01**	**1.41E+00**	**YES**
Tin	7440-31-5	9.80E-01	8.00E+00	18/ 116	2.28E+00	2.28E+00	2.09E+01	1.28E+04	NO:2
Vanadium	7440-62-2	6.10E-03	4.88E+01	308/ 311	1.97E+01	1.97E+01	2.50E+01	2.13E+01	NO:4
Zinc	7440-66-6	1.20E-02	1.18E+03	305/ 307	6.55E+01	6.55E+01	1.40E+02	6.39E+03	NO:3
Dioxins/Dibenzofurans (µg/kg)									
1,2,3,4,6,7,8-HpCDD	**35822-46-9**	**2.10E-01**	**2.30E+00**	**3/ 27**	**4.34E-01**	**4.34E-01**	---	---	**YES**
1,2,3,6,7,8-HxCDF	55684-94-1	3.60E-01	3.60E-01	1/ 27	2.92E-01	2.92E-01	---	1.99E-01	NO:1
HpCDD	**37871-00-4**	**5.00E-01**	**4.10E+00**	**3/ 27**	**7.56E-01**	**7.56E-01**	---	**1.99E+00**	**YES**
HpCDF	38998-75-3	7.30E-01	7.30E-01	1/ 27	4.94E-01	4.94E-01	---	1.99E+00	NO:1
HxCDD	34465-46-8	1.70E-01	1.70E-01	1/ 27	2.02E-01	1.70E-01	---	1.99E-01	NO:1
OCDD	3268-87-9	3.10E-01	1.66E+01	3/ 27	1.71E+00	1.71E+00	---	1.99E+01	NO:3
OCDF	39001-02-0	5.40E-01	5.40E-01	1/ 27	6.28E-01	5.40E-01	---	1.99E+01	NO:1
Explosives (µg/kg)									
1,3,5-Trinitrobenzene	99-35-4	3.70E+02	3.70E+02	1/ 73	7.24E+02	3.70E+02	---	6.39E+05	NO:1
2,4-Dinitrotoluene	121-14-2	8.50E+02	8.50E+02	1/ 46	2.01E+02	2.01E+02	---	3.54E+03	NO:1
2,6-Dinitrotoluene	606-20-2	8.50E+01	9.50E+01	2/ 270	3.18E+02	9.50E+01	---	3.54E+03	NO:1
HMX	2691-41-0	3.80E+02	1.40E+03	4/ 73	1.40E+03	1.40E+03	---	1.06E+06	NO:3
RDX	121-82-4	2.90E+02	2.40E+03	6/ 73	1.11E+03	1.11E+03	---	2.71E+04	NO:3
Pesticides/PCBs (µg/kg)									
4,4'-DDD	72-54-8	2.40E-01	1.10E+01	5/ 220	6.19E+00	6.19E+00	---	1.24E+04	NO:1
4,4'-DDE	72-55-9	2.20E-01	3.10E+00	6/ 220	4.86E+00	3.10E+00	---	8.77E+03	NO:1
4,4'-DDT	50-29-3	1.40E-01	2.70E+01	23/ 219	6.49E+00	6.49E+00	---	8.12E+03	NO:3
Aldrin	309-00-2	5.70E-02	4.00E+00	10/ 220	2.85E+00	2.85E+00	---	1.42E+02	NO:1
Alpha Chlordane**	5103-71-9	2.70E-02	1.50E+00	10/ 216	2.02E+01	1.50E+00	---	7.61E+03	NO:1
Alpha-BHC	319-84-6	4.30E-02	3.20E+00	24/ 220	2.91E+00	2.91E+00	---	4.73E+02	NO:3
Aroclor-1248	12672-29-6	1.80E+01	1.80E+01	1/ 239	4.39E+01	1.80E+01	---	---	NO:1
Aroclor-1254	11097-69-1	1.50E+01	7.60E+01	10/ 239	8.24E+01	7.60E+01	---	3.20E+02	NO:1
Aroclor-1260	11096-82-5	1.50E+01	4.40E+01	2/ 238	8.03E+01	4.40E+01	---	---	NO:1
Beta-BHC	319-85-7	4.20E-01	1.30E+01	5/ 220	3.06E+00	3.06E+00	---	1.66E+03	NO:1
Delta-BHC	319-86-8	1.00E-02	4.10E-01	6/ 220	3.94E+00	4.10E-01	---	---	NO:1
Dieldrin	60-57-1	7.80E-02	5.00E+01	14/ 220	4.47E+00	4.47E+00	---	1.86E+02	NO:3
Endosulfan I	959-98-8	4.80E-01	4.80E-01	1/ 220	4.34E+00	4.80E-01	---	---	NO:1
Endosulfan II	33213-65-9	1.50E-01	4.40E+00	8/ 220	4.67E+00	4.40E+00	---	---	NO:1
Endosulfan Sulfate	1031-07-8	2.20E-01	1.30E+00	6/ 220	9.56E+00	1.30E+00	---	---	NO:1
Endrin	72-20-8	2.20E-01	4.10E+00	10/ 219	5.08E+00	4.10E+00	---	6.39E+03	NO:1
Endrin Aldehyde	7421-93-4	1.30E-01	1.40E+01	7/ 203	6.61E+00	6.61E+00	---	---	NO:1
Endrin Ketone	53494-70-5	1.60E-01	5.40E+00	7/ 220	9.20E+00	5.40E+00	---	---	NO:1
Gamma Chlordane	5103-74-2	6.80E-01	5.10E+00	6/ 216	1.96E+01	5.10E+00	---	7.61E+03	NO:1
Gamma-BHC (Lindane)	58-89-9	4.30E-01	4.30E-01	1/ 220	2.70E+00	4.30E-01	---	2.29E+03	NO:1
Heptachlor	76-44-8	2.00E-01	7.20E-01	3/ 220	2.49E+00	7.20E-01	---	6.62E+02	NO:1
Heptachlor Epoxide	1024-57-3	1.40E-01	7.00E+00	11/ 220	5.80E+00	5.80E+00	---	2.77E+02	NO:3
Methoxychlor	72-43-5	1.30E+00	1.00E+02	6/ 220	4.51E+01	4.51E+01	---	1.06E+05	NO:1
Semi-Volatile Organic Compounds (µg/kg)									
1,2,4-Trichlorobenzene	120-82-1	1.20E+03	1.20E+03	1/ 254	2.96E+02	2.96E+02	---	1.72E+05	NO:1
1,2-Dichlorobenzene	95-50-1	6.40E-01	6.40E-01	1/ 257	3.27E+02	6.40E-01	---	1.55E+06	NO:1
2,4-Dimethylphenol	105-67-9	3.10E+04	3.10E+04	1/ 254	3.09E+02	3.09E+02	---	3.44E+05	NO:1
2,4-Dinitrotoluene	121-14-2	8.50E+02	8.50E+02	1/ 46	2.01E+02	2.01E+02	---	3.54E+03	NO:1
2-Benzyl-4-Chlorophenol	120-32-1	1.20E+02	1.20E+02	1/ 40	1.95E+02	1.20E+02	---	---	NO:1
2-Chlorophenol	95-57-8	9.40E+01	1.80E+03	2/ 254	2.96E+02	2.96E+02	---	8.60E+04	NO:1
2-Methylnaphthalene	91-57-6	1.40E+01	2.30E+04	11/ 269	4.38E+02	4.38E+02	---	8.52E+04	NO:1
2-Methylphenol	95-48-7	9.00E+01	1.30E+04	2/ 261	2.96E+02	2.96E+02	---	1.06E+06	NO:1
3,3'-Dichlorobenzidine	91-94-1	4.80E+01	1.10E+02	2/ 254	4.49E+02	1.10E+02	---	5.35E+03	NO:1
4-Chloro-3-methylphenol	59-50-7	8.50E+01	2.20E+03	3/ 254	2.96E+02	2.96E+02	---	---	NO:1
4-Methylphenol	106-44-5	4.60E+01	2.50E+04	3/ 261	3.09E+02	3.09E+02	---	1.06E+05	NO:1
4-Nitrophenol	100-02-7	2.40E+03	2.40E+03	1/ 254	1.11E+03	1.11E+03	---	---	NO:1

Table 2.5: Identification of Constituents of Potential Concern for a Construction Worker Exposed to Surface and Subsurface Soil in the MCP Parcel 8

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Acenaphthene	83-32-9	1.90E+01	5.10E+03	29/ 269	4.38E+02	4.38E+02	---	9.76E+05	NO:3
Acenaphthylene	208-96-8	1.20E+01	7.30E+02	7/ 269	4.19E+02	4.19E+02	---	---	NO:1
Anthracene	120-12-7	1.80E+01	3.80E+04	45/ 269	4.90E+02	4.90E+02	---	4.88E+06	NO:3
Benzo(a)anthracene	**56-55-3**	**2.00E+01**	**9.60E+04**	**70/ 269**	**5.14E+02**	**5.14E+02**	**---**	**3.12E+03**	**YES**
Benzo(a)pyrene	**50-32-8**	**2.00E+01**	**1.10E+05**	**69/ 269**	**4.93E+02**	**4.93E+02**	**---**	**3.12E+02**	**YES**
Benzo(b)fluoranthene	**205-99-2**	**2.20E+01**	**1.20E+05**	**75/ 269**	**5.19E+02**	**5.19E+02**	**---**	**3.12E+03**	**YES**
Benzo(g,h,i)perylene	**191-24-2**	**2.00E+01**	**1.65E+05**	**59/ 269**	**5.23E+02**	**5.23E+02**	**---**	**---**	**YES**
Benzo(k)fluoranthene	**207-08-9**	**1.90E+01**	**1.10E+05**	**67/ 269**	**5.09E+02**	**5.09E+02**	**---**	**3.12E+04**	**YES**
Benzoic Acid	65-85-0	4.00E+01	5.80E+03	9/ 126	2.03E+03	2.03E+03	---	6.88E+07	NO:3
Benzyl Alcohol	100-51-6	1.70E+04	1.70E+04	1/ 132	3.27E+02	3.27E+02	---	5.16E+06	NO:1
Bis(2-ethylhexyl)phthalate	117-81-7	2.20E+01	3.40E+03	138/ 255	3.46E+02	3.46E+02	---	1.72E+05	NO:3
Butyl Benzyl Phthalate	85-68-7	3.20E+01	1.30E+03	33/ 254	3.10E+02	3.10E+02	---	3.44E+06	NO:3
Carbazole	86-74-8	1.90E+01	1.70E+03	25/ 169	2.85E+02	2.85E+02	---	1.20E+05	NO:3
Chrysene	218-01-9	2.60E+01	1.20E+05	73/ 256	4.75E+02	4.75E+02	---	3.12E+05	NO:3
Dibenz(a,h)anthracene	**53-70-3**	**2.00E+01**	**7.50E+02**	**28/ 267**	**4.27E+02**	**4.27E+02**	**---**	**3.12E+02**	**YES**
Dibenzofuran	132-64-9	2.80E+01	1.10E+03	15/ 254	3.05E+02	3.05E+02	---	3.44E+04	NO:3
Diethyl Phthalate	84-66-2	2.00E+01	1.00E+02	6/ 254	2.93E+02	1.00E+02	---	1.38E+07	NO:1
Dimethyl Phthalate	131-11-3	3.40E+01	1.30E+02	3/ 254	2.93E+02	1.30E+02	---	2.13E+08	NO:1
Di-n-butyl Phthalate	84-74-2	1.90E+01	7.80E+04	68/ 256	3.61E+02	3.61E+02	---	1.72E+06	NO:3
Di-n-octyl Phthalate	117-84-0	2.10E+01	3.50E+05	34/ 254	3.05E+02	3.05E+02	---	8.52E+05	NO:3
Fluoranthene	206-44-0	1.50E+01	1.80E+05	101/ 270	6.29E+02	6.29E+02	---	6.51E+05	NO:3
Fluorene	86-73-7	2.30E+01	2.10E+04	26/ 269	4.57E+02	4.57E+02	---	6.51E+05	NO:3
Hexachlorobenzene	118-74-1	4.90E+01	4.90E+01	1/ 261	2.89E+02	4.90E+01	---	1.51E+03	NO:1
Indeno(1,2,3-cd)pyrene	**193-39-5**	**1.60E+01**	**1.20E+05**	**57/ 267**	**4.56E+02**	**4.56E+02**	**---**	**3.12E+03**	**YES**
Isophorone	78-59-1	4.10E+02	7.80E+02	2/ 254	2.84E+02	2.84E+02	---	2.54E+06	NO:1
N-Nitroso-di-n-propylamine	621-64-7	4.10E+01	1.10E+03	6/ 254	2.94E+02	2.94E+02	---	3.44E+02	NO:1
N-Nitrosodiphenylamine	86-30-6	1.50E+02	1.50E+02	1/ 254	2.91E+02	1.50E+02	---	3.44E+05	NO:1
Pentachlorophenol	87-86-5	1.20E+02	1.80E+03	5/ 261	1.08E+03	1.08E+03	---	1.56E+04	NO:1
Phenanthrene	**85-01-8**	**1.80E+01**	**1.00E+05**	**82/ 269**	**6.23E+02**	**6.23E+02**	**---**	**---**	**YES**
Phenol	108-95-2	1.10E+02	2.20E+04	5/ 257	3.06E+02	3.06E+02	---	5.16E+06	NO:1
Pyrene	129-00-0	1.90E+01	1.60E+05	93/ 270	6.00E+02	6.00E+02	---	4.88E+05	NO:2
Volatile Organic Compounds (µg/kg)									
1,1,1-Trichloroethane	71-55-6	1.00E+00	3.04E+01	8/ 354	4.52E+00	4.52E+00	---	6.84E+05	NO:1
1,1-Dichloroethane	75-34-3	4.00E-01	4.00E-01	1/ 354	4.47E+00	4.00E-01	---	1.93E+05	NO:1
1,2-cis-Dichloroethene (DCE)	156-59-2	2.37E-01	1.12E+03	22/ 41	9.19E+01	9.19E+01	---	2.13E+05	NO:3
1,2-Dichloroethane	107-06-2	1.00E+00	1.00E+00	1/ 361	4.48E+00	1.00E+00	---	3.45E+03	NO:1
1,2-Dichloroethene	540-59-0	4.33E-01	1.16E+03	30/ 364	5.99E+00	5.99E+00	---	1.92E+05	NO:3
1,2-Dichloropropane	78-87-5	2.87E+00	2.87E+00	1/ 354	4.46E+00	2.87E+00	---	2.08E+03	NO:1
1,2-trans-Dichloroethene	156-60-5	2.00E+00	4.38E+02	3/ 44	4.35E+01	4.35E+01	---	4.26E+05	NO:3
1,4-Dichlorobenzene	106-46-7	1.10E+02	1.10E+03	2/ 264	3.16E+02	3.16E+02	---	1.00E+05	NO:1
2-Butanone	78-93-3	6.00E-01	4.60E+01	65/ 357	8.08E+00	8.08E+00	---	6.65E+06	NO:3
2-Hexanone	591-78-6	3.00E+00	6.10E+01	11/ 354	7.30E+00	7.30E+00	---	---	NO:1
4-Methyl-2-pentanone	108-10-1	6.00E-01	2.00E+01	23/ 354	7.17E+00	7.17E+00	---	1.47E+06	NO:3
Acetone	67-64-1	2.00E+00	2.50E+02	170/ 344	2.12E+01	2.12E+01	---	1.92E+07	NO:3
Acetonitrile	75-05-8	6.70E+01	6.70E+01	1/ 91	8.18E+01	6.70E+01	---	2.00E+05	NO:1
Acrylonitrile	107-13-1	8.00E+00	8.00E+00	1/ 94	9.65E+01	8.00E+00	---	1.82E+03	NO:1
Benzene	71-43-2	5.00E-01	8.00E+00	16/ 384	4.37E+00	4.37E+00	---	6.46E+03	NO:1
Carbon Disulfide	75-15-0	8.00E-01	1.33E+01	42/ 354	4.47E+00	4.47E+00	---	1.16E+05	NO:3
Carbon Tetrachloride	56-23-5	2.00E+00	2.00E+00	1/ 361	4.56E+00	2.00E+00	---	2.44E+03	NO:1
Chlorobenzene	108-90-7	2.00E+00	1.10E+01	2/ 361	4.49E+00	4.49E+00	---	4.85E+04	NO:1
Chloromethane	74-87-3	1.00E+00	6.00E+00	3/ 354	6.45E+00	6.00E+00	---	1.59E+04	NO:1
Dichloromethane (Methylene Chloride)	75-09-2	1.00E+00	1.40E+03	219/ 354	1.97E+01	1.97E+01	---	8.25E+04	NO:3
Ethylbenzene	100-41-4	7.00E-01	1.80E+01	33/ 377	4.32E+00	4.32E+00	---	7.80E+04	NO:3
FREON-113	76-13-1	2.00E+00	4.00E+01	4/ 128	6.39E+00	6.39E+00	---	6.93E+06	NO:1
Hexane	110-54-3	2.00E+00	3.00E+00	2/ 91	8.13E+00	3.00E+00	---	4.08E+04	NO:1
Naphthalene	91-20-3	1.60E+01	4.50E+03	11/ 269	4.31E+02	4.31E+02	---	3.44E+05	NO:1
Styrene	100-42-5	3.00E-01	3.00E+00	25/ 354	4.47E+00	3.00E+00	---	1.46E+06	NO:3
Tetrachloroethene (PCE)	**127-18-4**	**2.00E-01**	**5.94E+03**	**59/ 374**	**8.15E+00**	**8.15E+00**	**---**	**3.66E+03**	**YES**
Toluene	108-88-3	5.70E-01	7.00E+01	82/ 377	4.25E+00	4.25E+00	---	2.00E+05	NO:3
Trichloroethylene (TCE)	**79-01-6**	**2.81E-01**	**9.52E+03**	**63/ 374**	**9.27E+00**	**9.27E+00**	**---**	**4.38E+02**	**YES**
Trichloromethane (Cholorform)	67-66-3	3.00E-01	2.00E+00	25/ 361	4.46E+00	2.00E+00	---	2.56E+03	NO:3
Vinyl Chloride	75-01-4	3.86E-01	6.82E+01	6/ 374	7.35E+00	7.35E+00	---	1.07E+03	NO:1
Xylenes, Total	1330-20-7	3.00E-01	1.50E+02	45/ 377	4.75E+00	4.75E+00	---	6.42E+04	NO:3
Radionuclides (pCi/g)									
Actinium-227 +L ***	**14952-40-0L**	**3.80E-02**	**2.65E+00**	**330/2319**	**2.57E-01**	**2.57E-01**	**1.10E-01**	**4.56E-01**	**YES**
Actinium-228	14331-83-0	3.80E-05	2.48E+00	998/1309	6.69E-01	6.69E-01	---	2.17E-01	NO:6
Americium-241	**14596-10-2**	**3.00E-02**	**3.36E+01**	**226/2650**	**1.08E-01**	**1.08E-01**	**---**	**6.32E+00**	**YES**
Bismuth-207	13982-38-2	1.00E-02	1.53E-01	10/1708	3.50E-02	3.50E-02	---	1.39E-01	NO:1
Bismuth-210M	BI-210M	5.00E-02	2.41E+00	32/1617	4.96E-02	4.96E-02	---	---	NO:1
Bismuth-212	14913-49-6	5.30E-01	2.40E+00	36/ 37	1.48E+00	1.48E+00	---	1.11E+00	NO:6
Bismuth-214 ****	14733-03-0	2.81E-05	1.97E+00	1366/1381	6.18E-01	6.18E-01	1.20E+00	1.31E-01	NO:4
Cesium-137	10045-97-3(+D)	1.00E-02	2.50E+00	273/2643	5.94E-02	5.94E-02	4.20E-01	3.82E-01	NO:4
Cobalt-60	10198-40-0	1.00E-02	1.10E+00	40/2595	5.60E-02	5.60E-02	---	7.91E-02	NO:1
Lead-210 ****	14255-04-0(+D)	4.00E-02	1.17E+01	424/2255	1.10E+00	1.10E+00	1.20E+00	6.25E-01	NO:4
Lead-212	15092-94-1	3.44E-05	2.67E+00	1401/1407	6.51E-01	6.51E-01	---	1.79E+00	NO:6
Lead-214 ****	15067-28-4	2.10E-01	1.32E+00	481/ 483	5.99E-01	5.99E-01	1.20E+00	1.00E+00	NO:4
Neptunium-237	13994-20-2(+D)	5.00E-04	2.40E-01	13/ 14	6.91E-01	2.40E-01	---	1.10E+00	NO:3
Plutonium-238	**13981-16-3**	**3.38E-03**	**8.44E+03**	**2758/5349**	**3.23E+01**	**3.23E+01**	**1.30E-01**	**6.12E+00**	**YES**
Plutonium-239	15117-48-3	9.00E-03	1.24E-01	2/ 4	4.77E+03	1.24E-01	---	6.03E+00	NO:3
Plutonium-239/240	PU-239/240	3.30E-03	2.01E+01	821/2560	5.83E-02	5.83E-02	1.80E-01	---	NO:4
Plutonium-241	14119-32-5	1.50E+00	2.95E+00	4/ 6	1.03E+01	2.95E+00	---	5.06E+02	NO:3
Plutonium-242	13982-10-0	3.72E-03	5.50E-01	15/ 26	6.59E-01	5.50E-01	---	6.33E+00	NO:3
Potassium-40	13966-00-2	1.32E-03	4.64E+01	1526/1533	1.89E+01	1.89E+01	3.70E+01	1.18E+00	NO:4
Protactinium-231	14331-85-2(+D)	1.43E+00	3.00E+00	5/1666	9.62E-01	9.62E-01	---	---	NO:1
Radium-224	13233-32-4	2.36E-01	2.50E+00	20/ 20	9.35E-01	9.35E-01	---	3.24E+00	NO:3
Radium-226	13982-63-3(+D)	2.81E-05	3.91E+00	2435/2603	8.23E-01	8.23E-01	2.00E+00	1.10E-01	NO:4
Radium-228 +L	**15262-20-1L**	**2.40E-01**	**2.48E+00**	**341/ 498**	**7.00E-01**	**7.00E-01**	**---**	**6.96E-02**	**YES**

Table 2.5: Identification of Constituents of Potential Concern for a Construction Worker Exposed to Surface and Subsurface Soil in the MCP Parcel 8

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Strontium-90	10098-97-2(+D)	2.00E-01	1.62E+00	25/ 168	5.09E-01	5.09E-01	7.20E-01	9.40E+00	NO:3
Thallium-208	14913-50-9	4.70E-02	5.70E-01	428/ 430	2.61E-01	2.61E-01	- - -	5.59E-02	NO:6
Thorium-227	15623-47-9	2.00E-02	6.00E-01	48/ 53	3.07E-01	3.07E-01	- - -	2.14E+00	NO:6
Thorium-228 +L	14274-82-9L	3.85E-02	2.50E+01	2471/2528	8.26E-01	8.26E-01	1.50E+00	1.19E-01	NO:4
Thorium-229	15594-54-4	4.90E-01	8.45E-01	2/1201	4.78E-01	4.78E-01	- - -	1.90E+00	NO:1
Thorium-230	14269-63-7(+D)	5.00E-02	1.34E+01	2485/2953	1.25E+00	1.25E+00	1.90E+00	9.26E-02	NO:4
Thorium-232	7440-29-1(+D)	5.60E-02	3.77E+01	2979/5392	8.16E-01	8.16E-01	1.40E+00	6.90E-02	NO:4
Thorium-232 Daughters	TH-232DA	4.10E-01	4.90E-01	2/ 2	- - -	4.90E-01	1.40E+00	- - -	NO:2
Thorium-234	15065-10-8	5.48E-01	5.41E+00	21/ 21	1.53E+00	1.53E+00	- - -	1.76E+01	NO:3
Tritium	10028-17-8p	6.80E-02	8.95E+02	341/ 549	4.21E+01	4.21E+01	1.60E+00	7.58E+03	NO:3
Uranium-233/234	**U-233/234**	**4.47E-01**	**1.02E+00**	**37/ 37**	**7.34E-01**	**7.34E-01**	- - -	**4.82E-01**	**YES**
Uranium-234	13966-29-5	2.01E-01	1.26E+01	420/ 425	9.01E-01	9.01E-01	1.10E+00	1.05E+01	NO:4
Uranium-235	15117-96-1(+D)	3.00E-03	1.02E+00	269/1465	3.67E-01	3.67E-01	1.10E-01	1.54E+00	NO:3
Uranium-235/236	U-235/236	1.94E-02	6.78E-02	13/ 27	4.69E-02	4.69E-02	- - -	3.10E-01	NO:3
Uranium-238 +L	7440-61-1L	1.10E-01	1.10E+02	528/1651	9.17E-01	9.17E-01	1.20E+00	8.98E-02	NO:4

CAS - Chemical Abstract Service
COPC - Constituents of Potential Concern
EPC - exposure point concentration (lower of maximum concentration and 95%UCL).
mg/kg - milligram per kilogram
ug/kg - microgram per kilogram
pCi/g - picocurie per gram
RBGV - Risk Based Guideline Value
UCL - Upper Confidence Limit
+D - Plus daughters up to the next long-lived daughter
+L - Includes long-lived daughters.

NO:1 - <5% Detects
NO:2 - Max<Background
NO:3 - Max< Risk Based Guideline Value
NO:4 - EPC< Background
NO:5 - Essential Human Nutrients
NO:6 - Part of a chain which has members above that are COPCs
*** Ac-227 background level assumes secular equilibrium with U235/236.
**** Pb-210, Pb-214 and Bi-214 background levels assume secular equilibrium with U-238.

Background values are based on the Operable Unit 9 Background Soils Investigation Chemistry Report (DOE 1994) or, in the case of nuclides with short half lives (Ac-227, Pb-210, and Pa-231) are based on the parent nuclide background and assumption of equilibrium with the parent nuclide.

- - - : not applicable, not available, or not calculated due to insufficient toxicity data

Ra-228 note: A background value has not been calculated for Ra-228 and why none is provided in the table above. However, if Ra-228's parent nuclide background is considered (Th-232 at 1.4 pCi/g), Ra-228 would not be brought forward as a COPC. To be consistent with previous RREs, Ra-228 was presented with no background value and was brought forward as a COPC.

Table 2.6: Identification of Constituents of Potential Concern for the Site Employee Exposed to Surface Soil in Parcel 8

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Inorganics (mg/kg)									
Aluminum	7429-90-5	1.59E+00	1.93E+04	147/ 148	1.20E+04	1.20E+04	1.90E+04	1.69E+05	NO:3
Antimony	7440-36-0	2.30E-01	6.90E+01	24/ 133	1.06E+01	1.06E+01	---	8.18E+01	NO:3
Arsenic	7440-38-2	2.30E-03	1.33E+01	148/ 156	5.87E+00	5.87E+00	8.60E+00	2.26E+00	NO:4
Barium	7440-39-3	1.20E-02	6.23E+02	129/ 154	8.76E+01	8.76E+01	1.80E+02	1.25E+04	NO:3
Beryllium	7440-41-7	1.50E-04	1.30E+00	134/ 296	4.78E-01	4.78E-01	1.30E+00	3.70E+02	NO:3
Bismuth	7440-69-9	4.30E-01	1.01E+02	13/ 49	8.71E+00	8.71E+00	3.84E+01	---	NO:4
Cadmium	7440-43-9s	6.00E-02	2.42E+01	67/ 154	1.47E+00	1.47E+00	2.10E+00	1.01E+01	NO:4
Calcium	7440-70-2	1.33E+02	2.64E+05	147/ 148	1.63E+05	1.63E+05	3.10E+05	---	NO:2
Chromium	7440-47-3	3.60E-03	9.21E+01	150/ 154	1.70E+01	1.70E+01	2.00E+01	---	NO:4
Cobalt	7440-48-4	1.70E-03	2.80E+01	124/ 148	1.06E+01	1.06E+01	1.90E+01	1.93E+03	NO:3
Copper	7440-50-8	6.50E-03	3.82E+02	144/ 147	2.79E+01	2.79E+01	2.60E+01	8.18E+03	NO:3
Cyanide	57-12-5	1.20E-01	1.01E+01	22/ 119	8.64E-01	8.64E-01	---	4.09E+03	NO:3
Erbium	**7440-52-0**	**4.00E+01**	**6.87E+01**	**3/ 4**	**4.92E+08**	**6.87E+01**	---	---	**YES**
Iron	7439-89-6	4.33E+00	1.00E+05	150/ 151	2.41E+04	2.41E+04	3.50E+04	---	NO:4
Lead	7439-92-1	2.40E-03	3.10E+03	135/ 138	1.96E+01	1.96E+01	4.80E+01	---	NO:4
Lithium	**7439-93-2**	**1.10E+00**	**3.93E+01**	**68/ 73**	**1.57E+01**	**1.57E+01**	---	---	**YES**
Magnesium	7439-95-4	4.31E+01	1.08E+05	147/ 148	4.53E+04	4.53E+04	4.00E+04	---	NO:5
Manganese	7439-96-5s	1.75E-01	8.31E+02	142/ 143	5.71E+02	5.71E+02	1.40E+03	3.25E+03	NO:2
Mercury	7439-97-6	2.00E-02	9.10E-01	38/ 150	9.08E-02	9.08E-02	1.50E-01	5.78E+04	NO:3
Molybdenum	7439-98-7	5.30E-01	1.64E+01	37/ 56	2.79E+00	2.79E+00	2.72E+01	1.02E+03	NO:2
Nickel	7440-02-0	4.20E-03	1.07E+02	136/ 148	2.28E+01	2.28E+01	3.20E+01	4.09E+03	NO:3
Potassium	7440-09-7	5.16E-01	5.15E+03	127/ 148	1.90E+03	1.90E+03	1.90E+03	---	NO:5
Selenium	7782-49-2	1.20E-01	2.30E+00	12/ 138	6.04E-01	6.04E-01	5.90E-01	1.02E+03	NO:3
Silver	7440-22-4	1.90E-01	1.89E+01	46/ 152	2.91E+00	2.91E+00	1.70E+00	1.02E+03	NO:3
Sodium	7440-23-5	3.23E-01	2.62E+03	119/ 151	6.71E+02	6.71E+02	2.40E+02	---	NO:5
Tantalum	**7440-25-7**	**1.68E+02**	**4.44E+02**	**3/ 10**	**2.91E+02**	**4.44E+02**	---	---	**YES**
Thallium	7440-28-0	6.20E-04	5.50E+00	26/ 148	8.27E-01	8.27E-01	4.60E-01	1.35E+01	NO:3
Tin	7440-31-5	9.80E-01	8.00E+00	16/ 48	4.12E+00	4.12E+00	2.09E+01	1.23E+05	NO:2
Vanadium	7440-62-2	6.10E-03	4.88E+01	147/ 148	2.07E+01	2.07E+01	2.50E+01	2.04E+02	NO:3
Zinc	7440-66-6	1.20E-02	1.18E+03	143/ 144	1.00E+02	1.00E+02	1.40E+02	6.13E+04	NO:3
Dioxins & Dibenzofurans (µg/kg)									
1,2,3,4,6,7,8-HpCDD	**35822-46-9**	**2.30E+00**	**2.30E+00**	**1/ 6**	**4.51E+02**	**2.30E+00**	---	---	**YES**
HpCDD	**37871-00-4**	**4.10E+00**	**4.10E+00**	**1/ 6**	**7.64E+02**	**4.10E+00**	---	**3.81E+00**	**YES**
OCDD	3268-87-9	3.10E-01	1.66E+01	2/ 6	1.77E+05	1.66E+01	---	3.81E+01	NO:3
Pesticides/PCBs (µg/kg)									
4,4'-DDD	72-54-8	2.40E-01	2.40E-01	1/ 109	1.20E+01	2.40E-01	---	2.38E+04	NO:1
4,4'-DDE	72-55-9	2.20E-01	3.10E+00	6/ 109	1.14E+01	3.10E+00	---	1.68E+04	NO:3
4,4'-DDT	50-29-3	9.00E-01	2.70E+01	9/ 108	1.22E+01	1.22E+01	---	9.56E+03	NO:3
Aldrin	309-00-2	5.70E-02	1.40E+00	8/ 109	6.30E+00	1.40E+00	---	1.03E+02	NO:3
Alpha Chlordane**	5103-71-9	2.70E-02	1.50E+00	9/ 108	1.19E+02	1.50E+00	---	7.64E+03	NO:3
Alpha-BHC	319-84-6	4.30E-02	2.50E+00	7/ 109	6.47E+00	2.50E+00	---	9.08E+02	NO:3
Aroclor-1248	12672-29-6	1.80E+01	1.80E+01	1/ 116	6.84E+01	1.80E+01	---	---	NO:1
Aroclor-1254	11097-69-1	1.50E+01	6.30E+01	9/ 116	1.45E+02	6.30E+01	---	6.83E+02	NO:3
Aroclor-1260	11096-82-5	1.50E+01	4.40E+01	2/ 115	1.42E+02	4.40E+01	---	---	NO:1
Beta-BHC	319-85-7	6.60E-01	1.30E+01	2/ 109	6.02E+00	6.02E+00	---	3.18E+03	NO:1
Delta-BHC	319-86-8	1.20E-01	4.10E-01	5/ 109	7.44E+00	4.10E-01	---	---	NO:1
Dieldrin	60-57-1	7.80E-02	5.00E+01	10/ 109	1.21E+01	1.21E+01	---	3.58E+02	NO:3
Endosulfan I	959-98-8	4.80E-01	4.80E-01	1/ 109	8.03E+00	4.80E-01	---	---	NO:1
Endosulfan II	**33213-65-9**	**1.50E-01**	**4.40E+00**	**8/ 109**	**1.06E+01**	**4.40E+00**	---	---	**YES**
Endosulfan Sulfate	**1031-07-8**	**2.20E-01**	**1.30E+00**	**6/ 109**	**1.91E+01**	**1.30E+00**	---	---	**YES**
Endrin	72-20-8	1.80E+00	4.10E+00	4/ 109	1.04E+01	4.10E+00	---	6.13E+04	NO:1
Endrin Aldehyde	**7421-93-4**	**1.30E-01**	**1.40E+01**	**7/ 93**	**1.20E+01**	**1.20E+01**	---	---	**YES**
Endrin Ketone	**53494-70-5**	**1.60E-01**	**5.40E+00**	**6/ 109**	**1.75E+01**	**5.40E+00**	---	---	**YES**
Gamma Chlordane	5103-74-2	6.80E-01	5.10E+00	6/ 108	1.06E+02	5.10E+00	---	7.64E+03	NO:3
Gamma-BHC (Lindane)	58-89-9	4.30E-01	4.30E-01	1/ 109	5.45E+00	4.30E-01	---	4.40E+03	NO:1
Heptachlor	76-44-8	2.00E-01	2.00E-01	1/ 109	5.20E+00	2.00E-01	---	1.27E+03	NO:1
Heptachlor Epoxide	1024-57-3	1.40E-01	6.80E-01	7/ 109	1.14E+01	6.80E-01	---	6.29E+02	NO:3
Methoxychlor	72-43-5	1.50E+00	1.00E+02	2/ 109	8.37E+01	8.37E+01	---	1.02E+06	NO:1
Semi-Volatile Organic Compounds (µg/kg)									
1,2-Dichlorobenzene	95-50-1	6.40E-01	6.40E-01	1/ 133	4.50E+02	6.40E-01	---	2.92E+00	NO:1
2,4-Dimethylphenol	105-67-9	3.10E+04	3.10E+04	1/ 130	3.93E+02	3.93E+02	---	1.25E+06	NO:1
2-Benzyl-4-Chlorophenol	**120-32-1**	**1.20E+02**	**1.20E+02**	**1/ 17**	**2.03E+02**	**1.20E+02**	---	---	**YES**
2-Methylnaphthalene	91-57-6	2.50E+01	2.30E+04	9/ 145	7.32E+02	7.32E+02	---	8.18E+05	NO:3
2-Methylphenol	95-48-7	1.30E+04	1.30E+04	1/ 133	3.69E+02	3.69E+02	---	1.02E+07	NO:1
3,3'-Dichlorobenzidine	91-94-1	4.80E+01	4.80E+01	1/ 130	6.12E+02	4.80E+01	---	3.88E+03	NO:1
4-Methylphenol	106-44-5	4.60E+01	2.50E+04	2/ 133	4.01E+02	4.01E+02	---	1.02E+06	NO:1
Acenaphthene	83-32-9	1.90E+01	5.10E+03	22/ 145	7.35E+02	7.35E+02	---	3.09E+06	NO:3
Acenaphthylene	208-96-8	3.50E+01	7.30E+02	6/ 145	6.75E+02	6.75E+02	---	---	NO:1
Anthracene	120-12-7	1.90E+01	3.80E+04	35/ 145	9.03E+02	9.03E+02	---	1.55E+07	NO:3
Benzo(a)anthracene	**56-55-3**	**2.00E+01**	**9.60E+04**	**54/ 145**	**1.00E+03**	**1.00E+03**	---	**1.98E+03**	**YES**
Benzo(a)pyrene	**50-32-8**	**2.00E+01**	**1.10E+05**	**54/ 145**	**9.27E+02**	**9.27E+02**	---	**1.98E+02**	**YES**
Benzo(b)fluoranthene	**205-99-2**	**2.20E+01**	**1.20E+05**	**56/ 145**	**1.01E+03**	**1.01E+03**	---	**1.98E+03**	**YES**
Benzo(g,h,i)perylene	**191-24-2**	**2.00E+01**	**1.65E+05**	**47/ 145**	**1.04E+03**	**1.04E+03**	---	---	**YES**
Benzo(k)fluoranthene	**207-08-9**	**1.90E+01**	**1.10E+05**	**52/ 145**	**9.73E+02**	**9.73E+02**	---	**1.98E+04**	**YES**
Benzoic Acid	65-85-0	4.50E+01	1.70E+02	5/ 72	1.91E+03	1.70E+02	---	2.49E+08	NO:3
Benzyl Alcohol	100-51-6	1.70E+04	1.70E+04	1/ 73	3.87E+02	3.87E+02	---	1.87E+07	NO:1

Table 2.6: Identification of Constituents of Potential Concern for the Site Employee Exposed to Surface Soil in Parcel 8

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Bis(2-ethylhexyl)phthalate	117-81-7	3.10E+01	2.30E+03	79/ 130	4.01E+02	4.01E+02	---	1.25E+05	NO:3
Butyl Benzyl Phthalate	85-68-7	3.20E+01	5.20E+02	15/ 130	3.71E+02	3.71E+02	---	1.25E+07	NO:3
Carbazole	86-74-8	1.90E+01	1.70E+03	23/ 74	4.48E+02	4.48E+02	---	8.72E+04	NO:3
Chrysene	218-01-9	2.60E+01	1.20E+05	55/ 132	9.38E+02	9.38E+02	---	1.98E+05	NO:3
Dibenz(a,h)anthracene	**53-70-3**	**2.00E+01**	**7.50E+02**	**27/ 143**	**7.40E+02**	**7.40E+02**	---	**1.98E+02**	**YES**
Dibenzofuran	132-64-9	2.80E+01	1.10E+03	15/ 130	3.85E+02	3.85E+02	---	1.25E+05	NO:3
Diethyl Phthalate	84-66-2	2.00E+01	1.00E+02	3/ 130	3.56E+02	1.00E+02	---	4.99E+07	NO:1
Dimethyl Phthalate	131-11-3	1.30E+02	1.30E+02	1/ 130	3.52E+02	1.30E+02	---	2.04E+09	NO:1
Di-n-butyl Phthalate	84-74-2	1.90E+01	7.80E+04	28/ 130	3.76E+02	3.76E+02	---	6.23E+06	NO:3
Di-n-octyl Phthalate	117-84-0	2.70E+01	3.50E+05	16/ 130	3.81E+02	3.81E+02	---	8.18E+06	NO:3
Fluoranthene	206-44-0	2.40E+01	1.80E+05	72/ 145	1.31E+03	1.31E+03	---	2.06E+06	NO:3
Fluorene	86-73-7	2.30E+01	2.10E+04	24/ 145	8.29E+02	8.29E+02	---	2.06E+06	NO:3
Hexachlorobenzene	118-74-1	4.90E+01	4.90E+01	1/ 133	3.48E+02	4.90E+01	---	1.09E+03	NO:1
Indeno(1,2,3-cd)pyrene	**193-39-5**	**1.60E+01**	**1.20E+05**	**45/ 143**	**8.09E+02**	**8.09E+02**	---	**1.98E+03**	**YES**
Isophorone	78-59-1	4.10E+02	7.80E+02	2/ 130	3.33E+02	3.33E+02	---	1.84E+06	NO:1
N-Nitroso-di-n-propylamine	621-64-7	7.40E+02	7.40E+02	1/ 130	3.45E+02	3.45E+02	---	2.49E+02	NO:1
N-Nitrosodiphenylamine	86-30-6	1.50E+02	1.50E+02	1/ 130	3.50E+02	1.50E+02	---	3.56E+05	NO:1
Pentachlorophenol	87-86-5	1.80E+02	1.90E+02	2/ 133	1.34E+03	1.90E+02	---	7.12E+03	NO:1
Phenanthrene	**85-01-8**	**1.80E+01**	**1.00E+05**	**61/ 145**	**1.42E+03**	**1.42E+03**	---	---	**YES**
Phenol	108-95-2	2.20E+04	2.20E+04	1/ 133	3.79E+02	3.79E+02	---	1.87E+07	NO:1
Pyrene	129-00-0	1.90E+01	1.60E+05	69/ 145	1.28E+03	1.28E+03	---	1.55E+06	NO:3
Volatile Organic Compounds (µg/kg)									
1,1,1-Trichloroethane	71-55-6	3.00E+00	1.10E+01	4/ 138	4.20E+00	4.20E+00	---	5.72E+07	NO:1
1,2-cis-Dichloroethene (DCE)	156-59-2	2.37E-01	1.12E+03	11/ 13	3.04E+04	1.12E+03	---	2.04E+06	NO:3
1,2-Dichloroethane	107-06-2	1.00E+00	1.00E+00	1/ 141	4.12E+00	1.00E+00	---	6.29E+04	NO:1
1,2-Dichloroethene	540-59-0	4.33E-01	1.16E+03	12/ 148	6.48E+00	6.48E+00	---	1.84E+06	NO:3
1,2-trans-Dichloroethene	156-60-5	3.61E+01	4.38E+02	2/ 16	6.82E+03	4.38E+02	---	4.09E+06	NO:3
2-Butanone	78-93-3	1.00E+00	2.10E+01	11/ 140	9.60E+00	9.60E+00	---	1.23E+08	NO:3
2-Hexanone	591-78-6	3.00E+00	6.10E+01	3/ 138	8.66E+00	8.66E+00	---	---	NO:1
4-Methyl-2-pentanone	108-10-1	6.00E-01	2.00E+01	5/ 138	8.49E+00	8.49E+00	---	1.64E+07	NO:1
Acetone	67-64-1	3.00E+00	2.10E+02	61/ 136	2.20E+01	2.20E+01	---	1.84E+08	NO:3
Acetonitrile	**75-05-8**	**6.70E+01**	**6.70E+01**	**1/ 20**	**7.99E+01**	**6.70E+01**	---	---	**YES**
Acrylonitrile	107-13-1	8.00E+00	8.00E+00	1/ 23	1.93E+02	8.00E+00	---	1.06E+04	NO:1
Benzene	71-43-2	1.00E+00	2.00E+00	2/ 159	4.14E+00	2.00E+00	---	1.04E+05	NO:1
Carbon Disulfide	75-15-0	3.00E+00	9.00E+00	2/ 138	4.37E+00	4.37E+00	---	2.04E+07	NO:1
Carbon Tetrachloride	56-23-5	2.00E+00	2.00E+00	1/ 141	4.32E+00	2.00E+00	---	4.40E+04	NO:1
Chlorobenzene	108-90-7	2.00E+00	2.00E+00	1/ 141	4.11E+00	2.00E+00	---	4.09E+06	NO:1
Chloromethane	74-87-3	6.00E+00	6.00E+00	1/ 138	6.45E+00	6.00E+00	---	---	NO:1
Dichloromethane (Methylene Chloride)	75-09-2	1.00E+00	1.40E+03	88/ 138	2.76E+01	2.76E+01	---	7.63E+05	NO:3
Ethylbenzene	100-41-4	8.00E-01	1.70E+01	8/ 156	4.08E+00	4.08E+00	---	2.04E+07	NO:3
FREON-113	76-13-1	2.00E+00	2.00E+00	1/ 37	6.54E+00	2.00E+00	---	6.13E+09	NO:1
Naphthalene	91-20-3	4.50E+01	4.50E+03	10/ 145	7.11E+02	7.11E+02	---	1.24E+06	NO:3
Styrene	100-42-5	6.00E-01	2.00E+00	4/ 138	4.26E+00	2.00E+00	---	4.09E+07	NO:1
Tetrachloroethene (PCE)	127-18-4	2.58E-01	2.54E+03	18/ 154	8.96E+00	8.96E+00	---	1.06E+04	NO:3
Toluene	108-88-3	5.70E-01	7.00E+01	23/ 156	4.36E+00	4.36E+00	---	4.09E+07	NO:3
Trichloroethylene (TCE)	79-01-6	2.81E-01	9.52E+03	22/ 154	9.64E+00	9.64E+00	---	1.43E+04	NO:3
Trichloromethane (Cholorform)	67-66-3	3.00E-01	2.00E+00	8/ 141	4.01E+00	2.00E+00	---	2.04E+06	NO:3
Vinyl Chloride	75-01-4	3.86E-01	6.82E+01	5/ 154	9.14E+00	9.14E+00	---	3.82E+03	NO:1
Xylenes, Total	1330-20-7	3.00E-01	1.50E+02	12/ 156	4.56E+00	4.56E+00	---	4.09E+07	NO:3
Radionuclides (pCi/g)									
Actinium-227 +L***	**14952-40-0L**	**3.80E-02**	**2.65E+00**	**296/2160**	**2.64E-01**	**2.64E-01**	**1.10E-01**	**5.02E-01**	**YES**
Actinium-228	14331-83-0	3.80E-05	2.48E+00	998/1309	6.69E-01	6.69E-01	---	2.01E-01	NO:6
Americium-241	**14596-10-2**	**3.00E-02**	**3.36E+01**	**209/2258**	**1.07E-01**	**1.07E-01**	---	**9.93E+00**	**YES**
Bismuth-207	13982-38-2	1.00E-02	1.53E-01	7/1562	3.57E-02	3.57E-02	---	1.29E-01	NO:1
Bismuth-210M	BI-210M	9.70E-02	2.41E+00	30/1518	5.06E-02	5.06E-02	---	8.67E-01	NO:1
Bismuth-212	14913-49-6	5.30E-01	2.40E+00	36/ 37	1.48E+00	1.48E+00	---	1.03E+00	NO:6
Bismuth-214 ****	14733-03-0	2.81E-05	1.97E+00	1366/1381	6.18E-01	6.18E-01	1.20E+00	1.22E-01	NO:4
Cesium-137	10045-97-3(+D)	1.00E-02	1.40E+00	253/2281	5.61E-02	5.61E-02	4.20E-01	3.56E-01	NO:4
Cobalt-60	10198-40-0	1.00E-02	1.01E+00	33/2245	5.15E-02	5.15E-02	---	7.35E-02	NO:1
Lead-210 +D ****	14255-04-0(+D)	2.40E-01	1.17E+01	374/2066	1.13E+00	1.13E+00	1.20E+00	1.19E+00	NO:4
Lead-212	15092-94-1	3.44E-05	2.67E+00	1400/1406	6.51E-01	6.51E-01	1.50E+00	1.73E+00	NO:4
Lead-214 ****	15067-28-4	2.10E-01	1.32E+00	480/ 482	5.99E-01	5.99E-01	1.20E+00	9.29E-01	NO:4
Neptunium-237	13994-20-2(+D)	2.00E-02	2.40E-01	4/ 4	3.16E+05	2.40E-01	---	1.08E+00	NO:3
Plutonium-238	**13981-16-3**	**4.74E-03**	**8.44E+03**	**2473/4317**	**2.59E+01**	**2.59E+01**	**1.30E-01**	**1.13E+01**	**YES**
Plutonium-239	15117-48-3	9.00E-03	1.24E-01	2/ 4	4.77E+03	1.24E-01	---	1.12E+01	NO:3
Plutonium-239/240	PU-239/240	3.30E-03	2.01E+01	788/2330	6.02E-02	6.02E-02	1.80E-01	1.11E+01	NO:4
Plutonium-242	13982-10-0	1.40E-01	5.50E-01	4/ 5	2.78E+02	5.50E-01	---	1.17E+01	NO:3
Potassium-40	13966-00-2	1.32E-03	4.64E+01	1468/1471	1.88E+01	1.88E+01	3.70E+01	1.12E+00	NO:4
Radium-224	13233-32-4	2.36E-01	2.50E+00	8/ 8	1.97E+00	2.50E+00	1.50E+00	5.47E+00	NO:3
Radium-226	13982-63-3(+D)	2.81E-05	3.91E+00	2124/2249	7.96E-01	7.96E-01	2.00E+00	1.05E-01	NO:4
Radium-228 +L	**15262-20-1L**	**2.40E-01**	**2.48E+00**	**327/ 483**	**7.00E-01**	**7.00E-01**	---	**6.92E-02**	**YES**
Strontium-90	10098-97-2(+D)	4.60E-01	1.62E+00	14/ 118	5.55E-01	5.55E-01	7.20E-01	1.50E+01	NO:3
Thallium-208	14913-50-9	4.70E-02	5.70E-01	428/ 430	2.61E-01	2.61E-01	---	5.18E-02	NO:6
Thorium-227	15623-47-9	2.00E-02	6.00E-01	48/ 53	3.07E-01	3.07E-01	---	2.17E+00	NO:3
Thorium-228 +L	14274-82-9L	3.85E-02	2.50E+01	2272/2291	7.96E-01	7.96E-01	1.50E+00	1.14E-01	NO:4
Thorium-230	14269-63-7(+D)	5.00E-02	5.23E+00	2281/2600	1.15E+00	1.15E+00	1.90E+00	9.58E-02	NO:4
Thorium-232	7440-29-1(+D)	5.60E-02	3.77E+01	2606/4290	7.52E-01	7.52E-01	1.40E+00	6.88E-02	NO:4
Thorium-232 Daughters (PCI/G)	TH-232DA	4.10E-01	4.90E-01	2/ 2	0.00E+00	4.90E-01	1.40E+00	---	NO:2

Table 2.6: Identification of Constituents of Potential Concern for the Site Employee Exposed to Surface Soil in Parcel 8

Analyte (SRC)	CAS Number	Minimum Concentration	Maximum Concentration	Detection Frequency	95% UCL	EPC	Background Value	RBGV	COPC?
Thorium-234	15065-10-8	6.26E-01	5.41E+00	9/ 9	3.14E+00	5.41E+00	- - -	2.58E+01	NO:3
Tritium	10028-17-8p	6.80E-02	8.95E+02	292/ 436	5.43E+01	5.43E+01	1.60E+00	1.45E+04	NO:3
Uranium-233/234	**U-233/234**	**4.47E-01**	**8.13E-01**	**12/ 12**	**6.86E-01**	**8.13E-01**	- - -	**5.52E-01**	**YES**
Uranium-234	13966-29-5	2.01E-01	1.26E+01	309/ 310	8.97E-01	8.97E-01	1.10E+00	1.97E+01	NO:3
Uranium-235	15117-96-1(+D)	3.00E-03	1.02E+00	188/1318	4.01E-01	4.01E-01	1.10E-01	1.55E+00	NO:3
Uranium-235/236	U-235/236	4.82E-02	4.82E-02	1/ 4	2.02E-01	4.82E-02	- - -	3.32E-01	NO:3
Uranium-238 +L	7440-61-1L	1.10E-01	1.10E+02	372/1421	8.41E-01	8.41E-01	1.20E+00	9.36E-02	NO:4

CAS - Chemical Abstract Service
COPC - Constituents of Potential Concern
EPC - exposure point concentration (lower of maximum concentration and 95%UCL).
mg/kg - milligram per kilogram
ug/kg - microgram per kilogram
pCi/g - picocurie per gram
RBGV - Risk Based Guideline Value
UCL - Upper Confidence Limit
+D - Plus daughters up to the next long-lived daughter
+L - Includes long-lived daughters.

NO:1 - <5% Detects
NO:2 - Max<Background
NO:3 - Max< Risk Based Guideline Value
NO:4 - EPC< Background
NO:5 Essential Human Nutrients
NO:6 Part of a Chain that has members above that are COPCs
*** Ac-227 background level assumes secular equilibrium with U235/236.
**** Pb-210, Pb-214 and Bi-214 background levels assume secular equilibrium with U-238.
Bold text indicates COPCs selected

Lithium note: The RREM background value for lithium is 26 mg/kg and not 0.00 mg/kg as presented in this table; however, since the analyte would still become a COPC, the value in the table was not modified.

- - - : not applicable, not available, or not calculated due to insufficient toxicity data

Background values are based on the Operable Unit 9 Background Soils Investigation Chemistry Report (DOE 1994) or, in the case of nuclides with short half lives (Ac-227, Pb-210, and Pa-231) are based on the parent nuclide background and assumption of equilibrium with the parent nuclide.

Ra-228 note: A background value has not been calculated for Ra-228 and why none is provided in the table above. However, if Ra-228's parent nuclide background is considered (Th-232 at 1.4 pCi/g), Ra-228 would not be brought forward as a COPC. To be consistent with previous RREs, Ra-228 was presented with no background value and was brought forward as a COPC.

3.0 EXPOSURE ASSESSMENT

The goal of the RRE exposure assessment is to estimate the type and magnitude of contaminant exposures for specific receptors that may occur under current conditions and in the future. The information gathered in the exposure assessment is integrated with toxicity information to characterize potential risks associated with exposure to residual contamination in Parcel 6, 7, and 8. The parcels have been considered as a separate exposure areas to produce risk values for the construction worker and site employee for each parcel.

3.1 Characterization of Exposure Setting

Parcels 6, 7, and 8 consist of approximately 103 acres and include parts of the plant site that were developed as part of the original plant construction project. A brief discussion of the histories of the buildings and PRSs located in Parcel 6, 7, and 8 follows. More detailed information on Parcel 6, 7, and 8 buildings and PRSs can be found in Appendices C and D, respectively.

Parcel 6 occupies approximately 14 acres. At the time of transfer, there will be three buildings (28, 45, and OSE) in the parcel. Sixteen sites of former buildings are included in the parcel. Details of current and historic buildings are provided in Appendix C. Included in the activities that once took place in Parcel 6 are ceramic development and production, health physics calibration, weld development, various administrative functions (print shop, personnel, medical, records storage), and other support services (garage, maintenance shops, security operations).

Parcel 7 occupies approximately 42 acres. At the time of transfer, there will be four buildings (2, 61, 63, and 126) in the parcel. Forty-one sites of former buildings are included in the parcel. Details of current and historic buildings are provided in Appendix C. Included in the activities that once took place in Parcel 7 are Radioisotopic Thermoelectric Generator (RTG) assembly and testing, nuclear processing (special metallurgical and plutonium processing), administrative support (purchasing, office buildings), and other support services (fire house, maintenance, storage, and a number of warehouses).

Parcel 8 occupies approximately 47 acres. At the time of transfer, there will be three buildings (COS, OSW, and T) in the parcel. The sites of seventy-three former buildings are included in the parcel. Details of current and historic buildings are provided in Appendix C. Activities that once took place in Parcel 8 include tritium development and operations, explosives processing and production, sanitary sewage disposal plant, radioactive liquid waste processing and disposal, power house, explosives storage, analytical services, environmental labs, bioremediation, standards laboratory,

Consolidated Waste Processing facility, Alpha Treatment Facility, various administrative functions (office buildings), and other support services (weather monitoring, maintenance, guard posts, paint shop).

3.2 Identifying Exposure Pathways

Although many exposure pathways are possible, the RRE focuses on those pathways that are likely to occur and are likely to contribute significantly (>10-6) to the overall risk. When identifying exposure pathways, it is important to keep in mind the four elements of an exposure pathway. An exposure pathway consists of (1) a source of chemical release; (2) transport media, (3) a point of potential human contact with the contaminant or contaminated media, and (4) an exposure route (e.g. ingestion, inhalation or dermal contact). If any of these elements is missing or eliminated, the pathway will be incomplete and exposure will not occur.

A pictorial representation of the exposure pathways identified for potential receptors is included in a conceptual site model for the Parcel 6, 7, and 8 (Figure 3.1). The conceptual site model summarizes the pathways that hazardous substances may take to reach potential receptors. Exposure assumptions used to evaluate potential exposure pathways were drawn from the Mound Plant *Risk-Based Guideline Values* guidance (DOE 1997b) and the RREM (DOE 1997a). Exposure assumptions used to quantify COPC exposures for the construction worker and site employee scenarios are summarized in Table 3.1.

3.3 Identifying Exposure Scenarios

Residual contamination in Parcel 6, 7, and 8 was evaluated for two potential use scenarios. Residual contamination in Parcel 6, 7, and 8 was evaluated for adult construction workers and site employees. It was assumed that construction workers would routinely be exposed to surface and subsurface soil and that site employees would be exposed to surface soil. The evaluation of risk associated with exposure to residual contamination in Parcel 6, 7, and 8 for these receptors will indicate whether commercial/industrial redevelopment can be safely conducted in the area.

3.3.1 Construction Worker Scenario

Since it is reasonable to assume that construction activities could occur within Parcel 6, 7, or 8; adult construction workers were identified as potential receptors. During construction activities, these receptors could be exposed to residual contamination present in soil at or below land surface. Construction workers were assumed to be on the job 8 hours per day, 250 days per year over a 5-year period. Since construction workers are assumed to be adults, a body weight of 70 kilograms was used to assess

exposure to COPCs.

Construction workers are not expected to have regular contact with surface water or groundwater. Exposure pathways evaluated for the construction worker scenario include:

- incidental ingestion of soil at or below land surface;
- inhalation of airborne contaminated dust or volatile emissions from soil 0-10 feet below land surface;
- dermal exposure to soil at or below land surface; and
- external exposure to ionizing radiation from radionuclides in soil at or below land surface.

The parameters used to evaluate these pathways and their references are provided in Table 3.1.

3.3.2 Site Employee Scenario

Although exposures will vary depending on the type of work performed, it is reasonable to assume that a site employee at Parcel 6, 7, and 8 will be exposed to residual contamination left on the property. Such occupations are not expected to involve direct work with surrounding soils, as would be expected with the construction worker. The exposure routes evaluated for the site employee scenario are similar to those evaluated for the construction worker except the site employee is assumed to work indoors and therefore have less exposure to site soil. Adult site employees were assumed to be on the job 8 hours per day, 250 days per year over a 25-year period. Since workers are assumed to be adults, a body weight of 70 kilograms was used to assess exposure to COPCs.

Exposure pathways evaluated for the site employee scenario include:

- incidental ingestion of surface soil (0-2 feet below land surface);
- inhalation of airborne contaminated dust or volatile emissions from surface soil (0-2 feet below land surface);
- dermal exposure to surface soil (0-2 feet below land surface);
- external exposure to ionizing radiation from radionuclides in surface soil (0-2 feet below land surface); and

The parameters used to evaluate these pathways and their references are provided in Table 3.1.

3.4 Exposure Point Concentrations

EPCs are the concentrations of contaminants available to human receptors at the point of contact. The EPC for soil used in the RRE was calculated as the 95%UCL of the arithmetic mean of the data, using the Student's t-statistic. If the data were found to be log normally distributed, the EPC estimate was calculated as the 95%UCL using the H-statistic (EPA 1992a).

Only surface soil data (0-2 feet below land surface) were used to calculate the EPC for the site employee scenario. Site employees are assumed to spend most of their time indoors and have limited contact with surface soil. Construction workers are assumed to be exposed to both surface and subsurface soil. Therefore, the EPC for the construction worker was calculated using soil sample data collected at any depth.

3.5 Human Intake Equations and Assumptions

The exposure assumptions presented in the previous section were used with the intake equations presented in this section. This approach is in accordance with methods presented in RAGS Part A (EPA 1989) and the RREM (DOE 1997a). Human intake assumptions for each of the potential receptors were developed to represent high-end or RME conditions.

There is a fundamental difference in the measurement of exposures from chemical constituents as compared to radiological constituents. For chemicals, exposure generally refers to the mass intake (e.g., inhalation, ingestion, dermal exposure) of the chemical, expressed in units of milligrams per kilogram bodyweight per day (mg/kg-day). Toxicity values for chemicals are generally expressed in these terms; therefore, the product of the intake estimate with the toxicity value yields a risk value. Radionuclide intake is typically expressed in units of activity (i.e., curie [Ci]) rather than mass. In addition, dose has a different meaning for radionuclides than for chemicals since adverse effects are related to rate of decay rather than amount or mass. For radionuclides, dose is equal to the energy imparted to a unit mass of human tissue.

The approach used to estimate intake for chemical constituents largely applies to radionuclides. However, there are a few key differences in the methods. For example, in addition to the ingestion, inhalation and dermal contact pathways considered for chemical constituents, external exposure to penetrating radiation was also evaluated for radionuclides. Equations for estimating the intake of radionuclides have been modified by omitting the body weight and averaging time from the denominator. This is done because radiation exposure assessments do not end with the calculation of intake, but use dose conversion factors to estimate dose equivalents to specified organs.

Oral and inhalation intakes are expressed as the amount of chemical at the exchange

boundary (e.g., skin, lungs, intestine) that is available for absorption. These intakes are not equivalent to the absorbed dose (the amount of chemical actually absorbed into the blood stream). Dermal doses are expressed as estimates of absorbed dose. The toxicological reference values used to calculate risk have been adjusted to account for this difference; however, this discrepancy is a source of uncertainty when comparing or combining dermal doses with intakes from other exposure routes. Assessment of dermal risks was performed using the methodologies presented in *Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment* (hereafter referred to as *RAGS Part E,* EPA 2004a).

Exposure to soil through incidental ingestion was evaluated for the construction worker and site employee receptors. Intakes for the chemical constituents in the soil ingestion pathway were estimated using the following equation:

$$\text{Intake (mg/kg-day)} = \frac{C_{so} \times IR \times FI \times EF \times ED \times CF}{BW \times AT}$$

Where:

C_{so}	=	Constituent concentration in soil (mg/kg)
IR	=	Ingestion rate (mg/day)
FI	=	Fraction ingested from contaminated source (1.0) (unitless)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
CF	=	Conversion factor (10^{-6} kg/mg)
BW	=	Body weight (kg)
AT	=	Averaging time for cancer and non-cancer effects (days)

Radionuclide intakes for the soil ingestion pathway were estimated using the following equation:

$$\text{Intake (pCi)} = C_{so} \times IR \times FI \times EF \times ED \times CF$$

Where:

C_{so}	=	Radiological activity in soil (pCi/g)
IR	=	Ingestion rate (mg/day)
FI	=	Fraction ingested from contaminated source (1.0) (unitless)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
CF	=	Conversion factor (10^{-3} g/mg)

Dermal exposure to soil was assumed to occur simultaneously with incidental ingestion exposure. Exposure to soil through dermal contact was evaluated for the construction worker and site employee under current and future land-use scenarios. Chemical intakes for the soil pathway via dermal exposure were estimated using the following equation:

$$\text{Dermal Absorbed Dose (mg/kg-day)} = \frac{DA_{event} \times EF \times ED \times EV \times SA}{BW \times AT}$$

Where:

DA_{event}	=	Chemical-specific absorbed dose per event (mg/cm^2-event) (See equation below.)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
EV	=	Event frequency (events/day)
SA	=	Skin surface area available for contact (cm^2)
BW	=	Body weight (kg)
AT	=	Averaging time for cancer and non-cancer effects (days)

$$DA_{event}\ (mg/cm^2\text{-event}) = C_{soil} \times CF \times AF \times ABS_d$$

Where:

C_{soil}	=	Chemical concentration in soil (mg/kg)
CF	=	Conversion factor (10^{-6} kg/mg)
AF	=	Adherence factor of soil to skin (mg/cm^2-event)
ABS_d	=	Dermal absorption fraction

Exposure to external radiation from radionuclides in soil was estimated by using the following equation:

$$\text{External Exposure (pCi-yr/g)} = C_{so} \times ED \times Te \times (1\text{-}Se)$$

Where:

C_{SO}	=	Radionuclide activity in soil (pCi/g)
ED	=	Exposure duration (years)
Te	=	Gamma exposure time factor (hrs/hrs)
Se	=	Shielding factor (unitless)

Unlike inhalation, ingestion, and dermal exposure, the external radiation exposure term is defined as a radionuclide concentration in soil that a receptor could be exposed to for a particular exposure duration. The exposure term is adjusted for exposure time and shielding. A default shielding factor of 20% was assumed for the Parcel 6, 7, and 8 RRE. These assumptions provide for a conservative estimate of external radiation exposure.

Intake of soil (fugitive dust) via inhalation was evaluated for the construction worker and site employee in Parcel 6, 7, and 8. The intake equation for chemical constituents for this pathway is provided below:

$$\text{Intake (mg/kg-day)} = \frac{C_{so} \times IR \times ET \times EF \times ED}{PEF \times BW \times AT}$$

Where:

C_{SO}	=	Constituent concentration in soil (mg/kg)
IR	=	Inhalation rate (m^3/hr)
ET	=	Exposure time (hrs/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
PEF	=	Particulate emission factor ($1.32x10^9$ m^3/kg, default value)
BW	=	Body weight (kg)
AT	=	Averaging time for cancer and non-cancer effects (days)

The intake equation for radionuclides via inhalation of fugitive dust was estimated using the following equation:

$$\text{Intake (pCi)} = \frac{C_{so} \times IR \times ET \times EF \times ED}{PEF}$$

Where:

C_{SO}	=	Radiological activity in soil (pCi/g)
IR	=	Inhalation rate (m^3/hr)
ET	=	Exposure time (hrs/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
PEF	=	Particulate emission factor ($1.32x10^9$ m^3/g, default value)

The particulate emission factor (PEF) relates the concentration of the constituent in soil to the concentration of respirable particles in the air from fugitive dust emissions. These emissions result from wind erosion. The *Soil Screening Guidance: User's Guide* default value of $1.32x10^9$ m^3/kg was used to represent a surface with unlimited erosion potential (EPA 1996).

Table 3.1 Exposure Assumptions for the Parcel 6, 7, 8 Residual Risk Evaluations

Parameter	Units	Construction Worker Adult	Site Worker Adult	Reference
Surface soil (0 - 2 ft.)				
Incidental ingestion				
Soil ingestion rate	mg/day	480	50	a,b
Exposure frequency	days/year	250	250	a,b
Exposure time	hrs/day	8	8	a,c
Exposure duration	years	5	25	a,b
Body weight	kg	70	70	a,b
Carcinogen averaging time	days	25550	25550	a,b
Noncarcinogen averaging time	days	1825	9125	a,b
Conversion Factor	kg/mg	1.00E-06	1.00E-06	
Inhalation of VOCs and dust				
Inhalation rate	m^3/day m^3/hr	20 0.83	20 0.83	a
Exposure frequency	days/year	250	250	a
Exposure Time	hrs/day	8	8	a,c
Exposure duration	years	5	25	a
Body weight	kg	70	70	a,b
Carcinogen averaging time	days	25550	25550	a,b
Noncarcinogen averaging time	days	1825	9125	a,b
Particle Emissions Factor	m^3/kg	1.32E+09	1.32E+09	g
Volatilization Factor	m^3/kg	Chem. Specific	Chem. Specific	a
Conversion Factor	g/kg	1000	1000	
Conversion Factor	days/hour	0.042	0.042	
External Exposure				
Gamma Shielding Factor	unitless	0.1	0.2	a,e
Gamma Exposure Time Factor	unitless	0.33	0.08	a
Exposure Duration	years	5	25	a,b
Exposure Frequency	day/year	250	250	a,b
Dermal Exposure (Soil)				
Skin Surface Area	cm^2	5700	5700	a,b
Soil Adherence Factor	mg/cm^2day	0.2	0.2	d
Units Conversion Factor	kg/mg	1.00E-06	1.00E-06	
Subsurface soil (all depths)				
Incidental ingestion				
Soil ingestion rate	mg/day	480	NA	a,b
Exposure frequency	days/year	250	NA	a,b
Exposure duration	years	5	NA	a,b
Body weight	kg	70	NA	a,b
Carcinogen averaging time	days	25550	NA	a,b
Noncarcinogen averaging time	days	1825	NA	a,b
Fraction Ingested	unitless	NA		
Conversion Factor	kg/mg	1.00E-06	NA	
Inhalation of VOCs and dust				
Exposure frequency	days/year	250	NA	a,b
Exposure time	hours/day	8	NA	a,b
Exposure duration	years	5	NA	a,b
Body weight	kg	70	NA	a,b
Carcinogen averaging time	days	25550	NA	a,b
Noncarcinogen averaging time	days	1825	NA	a,d
Particle Emissions Factor	m^3/kg	1.32E+09	NA	g
Volatilization Factor	m^3/kg	Chem. Specific	NA	a
Conversion Factor	g/kg	1000	NA	
Conversion Factor	days/hour	0.042	NA	
External Exposure				
Gamma Shielding Factor	unitless	0.1	NA	a,e
Gamma Exposure Time Factor	unitless	0.33	NA	b,c,e

Parameter	Units	Construction Worker Adult	Site Worker Adult	Reference
Exposure Duration	years	5	NA	a,b
Exposure Frequency	day/year	250	NA	a,b
Dermal Exposure				
Skin Surface Area	cm^2	5700	NA	a,b
Soil Adherence Factor	mg/cm^2 – day	0.2	NA	d
Units Conversion Factor	kg/mg	1.00E-06	NA	
Sediment ingestion rate	kg/day	NA	NA	a,b
Exposure time	hours/day	NA	NA	a
Exposure frequency	days/year	NA	NA	a
Exposure duration	years	NA	NA	a,b
Body weight	kg	NA	NA	a,b
Carcinogen averaging time	days	NA	NA	a,b
Noncarcinogen averaging time	days	NA	NA	a,b
Conversion Factor	days/hour	NA	NA	
Dermal contacta				
Skin Surface Area	cm^2	NA	NA	a,b
Sediment Adherence Factor	mg/cm^2 – day	NA	NA	b
Exposure frequency	events/year	NA	NA	a,b
Units Conversion Factor	kg/mg	NA	NA	

a Risk-Based Guideline Values, Mound Plant, Miamisburg, Ohio. (DOE 1997b).
b Risk Assessment Guidance for Superfund, Volume I:Human Health Evaluation Manual Part A, OSWER Directive 9285.701A, July 1989. (EPA 1989)
c Risk Assessment Guidance for Superfund:Volume I- Human Health Evaluation Manual, Supplement Guidance, "Standard Default Exposure Factors". Office of Emergency and Remedial Response. OSWER Directive 9285.6-03. March 25, 1991. (EPA 1991a)
d Exposure Factors Handbook, Volume I Table 1-2 (EPA 1997)
e Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, Part B "Development of Risk-Based Preliminary Remediation Goals" OSWER Directive 9285.7-01B, Dec 1991. (EPA 1991b)
f Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, Part E Supplemental Guidance for Dermal Risk Assessment" OSWER Directive 9285.7-02EP, July 2004. (EPA 2004a)
g Soil Screening Guidance:User's Guide, OSWER Publication 9355.4-23. July 1996 (EPA 1996)

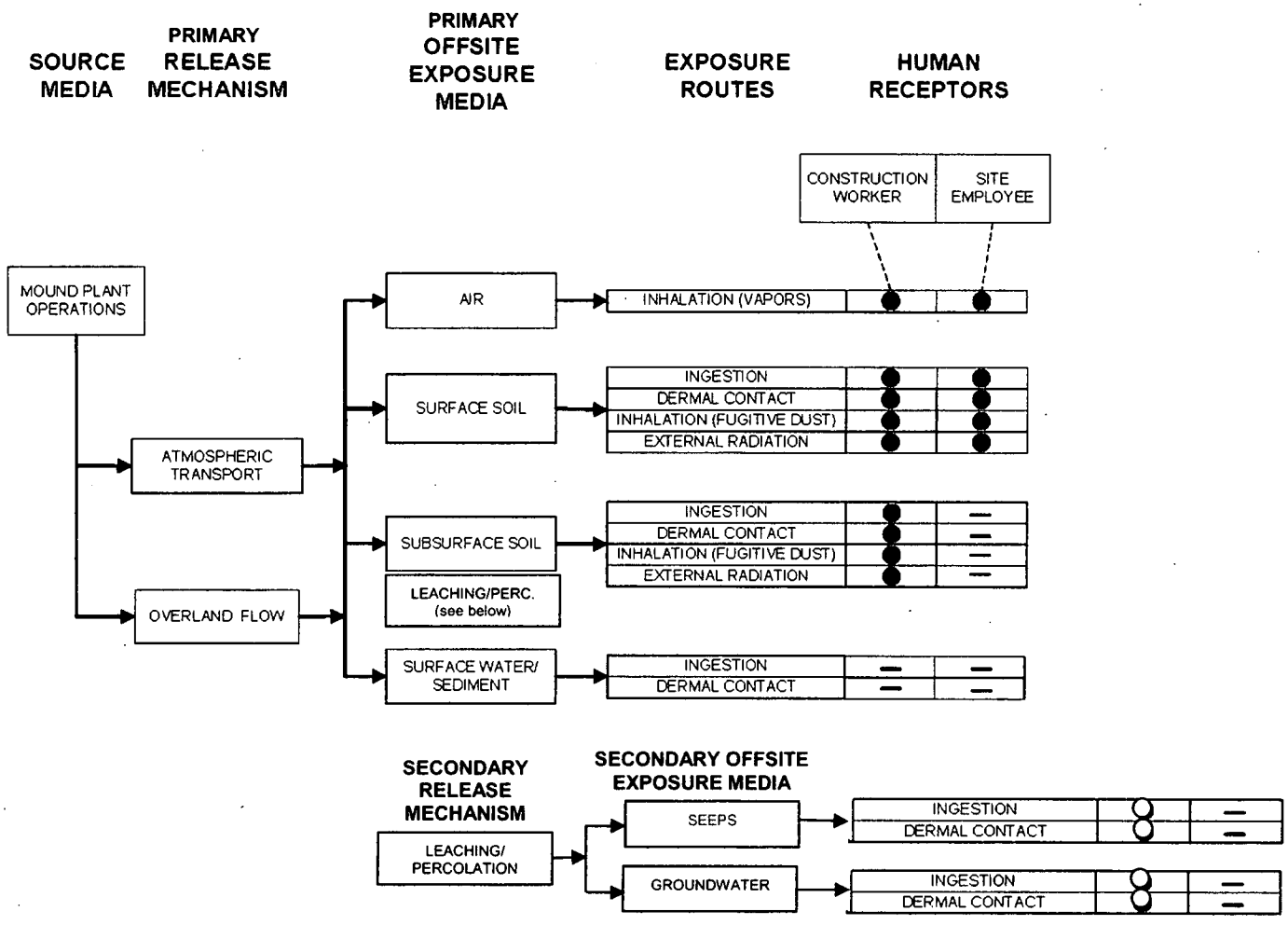


Figure 3.1
Conceptual Site Model for the MCP Parcels 6, 7 & 8 RRE

4.0 TOXICITY ASSESSMENT

The objectives of the toxicity assessment are to identify and select toxicological values for use in estimating the significance of the exposure and to evaluate potential adverse effects associated with exposure to compounds detected in Parcel 6, 7, and 8. The Parcel 6, 7, and 8 RRE evaluated chronic exposures using methods recommended in the RREM (DOE 1997a) and by EPA's RAGS guidance (EPA 1989, 1991b, and 2004a) for evaluating human cancer and non-cancer health effects resulting from exposure to the COPCs.

Toxicity criteria used in the Parcel 6, 7, and 8 RRE were obtained from the most current update of the EPA Integrated Risk Information System (IRIS) or, if the information was not available in IRIS, the EPA Health Effects Assessment Summary Tables (HEAST). IRIS is an electronic database containing the most current descriptive and quantitative EPA regulatory information related to non-carcinogenic and carcinogenic health effects of chemical constituents. HEAST is a published reference, updated periodically by EPA. It contains toxicity information and values for constituents from health effects documents and profiles. These toxicity criteria were accessed using DOE's Risk Assessment Information System website (http://risk.lsd.ornl.gov/). The information on this website was last updated January 6, 2005. Table 4.1 presents a summary of toxicological criteria used along with the chemical-specific characteristics used to estimate residual risk.

In addition to the toxicological reference values obtained from IRIS and HEAST, provisional values for some COPCs were obtained from USEPA's National Center for Environmental Assessment (NCEA). The NCEA serves as the national resource center for the overall process of human health and ecological risk assessments. Toxicological reference values for trichloroethylene are based on California EPA values as accepted by Ohio EPA. Toxicological reference values for PAHs are based on toxicity equivalence factors relative to benzo(a)pyrene assigned by NCEA (EPA 1993).

In assessing the potential for non-cancer health effects, EPA assumes a threshold exists below which no adverse toxic effects are expected. For example, a toxic threshold would exist if a substance had no toxic effect at a low level of exposure but did have a toxic effect at a higher level. EPA derives and publishes reference dose factors (RfDs) and reference concentration factors (RfCs) for use in evaluating adverse non-carcinogenic effects. These are estimates (with uncertainty spanning an order of magnitude or greater) of daily human exposures, including sensitive sub-populations, that may go without appreciable harmful effects during a lifetime (EPA 1989). EPA derives RfDs and RfCs for humans based on estimates of the no-observable-adverse-

effect-level (NOAEL) or lowest-observable-adverse-effect-level observed in test organisms.

Carcinogenesis, however, is generally thought to be a phenomenon without a threshold for effect (EPA 1989). The basis for this presumption is that an extremely low level of exposure to some carcinogens may result in chromosomal or enzyme changes leading to uncontrolled cellular proliferation or cancer. EPA does not therefore estimate an effect threshold for carcinogenic chemicals. EPA uses a two-part evaluation for carcinogens. First, the constituent is assigned a weight-of-evidence classification based on both epidemiological evidence of carcinogenic effects and laboratory tests conducted with animals. Then a cancer potency factor, or cancer slope factor (CSF), is calculated. The slope factor is a plausible upper-bound estimate of the slope of the dose-response curve in the low dose range. In risk assessment, the CSF is used to estimate the excess lifetime probability of a carcinogenic effect occurring in exposed receptors.

4.1 Toxicity Values for Evaluating the Dermal Pathway

Toxicological reference values are generally available only for the oral and inhalation pathways and the majority of these values are based on intake (i.e., administered dose) rather than an absorbed dose. The effects of the dermal pathway cannot be quantified where a dermal absorption factor is not available (i.e., antimony and thallium). Because the intake equation for the dermal contact pathway calculates absorbed dose (by incorporating a dermal absorption factor or a permeability coefficient), it is necessary to convert the administered dose toxicity value to an absorbed dose toxicity value in order to calculate dermal risk. For the Parcel 6, 7, and 8 RRE, oral administered-dose toxicity values were adjusted using compound specific gastrointestinal absorption factors when the gastrointestinal absorption factors were less than 0.5 (EPA 2004a). For non-carcinogens, the administered dose toxicity value (i.e., the RfD) was multiplied by the gastrointestinal absorption factor. For carcinogens, the slope factor was divided by the gastrointestinal absorption factor. Gastrointestinal adjustment factors and soil dermal absorption factors were drawn from *RAGS Part E* (EPA 2004a).

Table 4.1 Toxicity Values and Chemical Specific Parameters

	Non-Cancer					Cancer					Dermal Exposure Parameters		
Chemical	Oral RFDo	Ref	Dermal Adjusted RFDa	Inhalation RFDi	Ref	Oral CSFo	Ref	Dermal Adjusted CSFa	Inhalation CSFi	Ref	External Radiation	Ref	Percent Absorbed ^{ABS}GI	Ref	Dermal Absorption Fraction from Soil ^{ABS}d
INORGANICS	**(mg/kg/day)**		**(mg/kg/day)**	**(mg/kg/day)**		**(mg/kg/day)$^{-1}$**		**(mg/kg/day)$^{-1}$**	**(mg/kg/day)$^{-1}$**				**(Unitless)**		**(Unitless)**
Antimony	4.00E-04	i	6.00E-05	NA		NA		NA	NA		NA		0.15	r	NA
Arsenic	3.00E-04	i	3.00E-04	NA		1.50E+00	i	1.50E+00	1.50E+01	d	NA		1	r	0.03
Asbestos	NA		NA	NA		NA		NA	NA	u	NA				
Beryllium	2.00E-03	i	NA	5.71E-06	i	NA		NA	8.40E+00	d	NA		0.007	r	NA
Bismuth	NA		NA	NA		NA		NA	NA		NA		NA		NA
Copper	4.00E-02	h	4.00E-02	NA		NA		NA	NA		NA		1	r	NA
Lead	NA		NA	NA		NA		NA	NA		NA		1	r	NA
Thallium	6.60E-05		6.60E-05	NA		NA		NA	NA		NA		1	r	NA
Dioxins	**(mg/kg/day)**		**(mg/kg/day)**	**(mg/kg/day)**		**(mg/kg/day)$^{-1}$**		**(mg/kg/day)$^{-1}$**	**(mg/kg/day)$^{-1}$**				**(Unitless)**		**(Unitless)**
HpCDD	NA		NA	NA		1.50E+03		1.50E+03	1.16E+03		NA		1		NA
SVOCs	**(mg/kg/day)**		**(mg/kg/day)**	**(mg/kg/day)**		**(mg/kg/day)$^{-1}$**		**(mg/kg/day)$^{-1}$**	**(mg/kg/day)$^{-1}$**				**(Unitless)**		**(Unitless)**
2,4-Dinitrophenol	2.00E-03	i	2.00E-03	NA		NA		NA	NA		NA		1	r	0.1
Benzo(a)anthracene	NA		NA	NA		7.30E-01	p	7.30E-01	3.08E-01	p	NA		1	r	0.13
Benzo(a)pyrene	NA		NA	NA		7.30E+00	p	7.30E+00	3.08E+00	p	NA		1	r	0.13
Benzo(b)fluoranthene	NA		NA	NA		7.30E-01	p	7.30E-01	3.08E+00	p	NA		1	r	0.13
Benzo(ghi)perylene	NA		NA	NA		NA		NA	NA		NA		1	r	0.13
Benzo(k)flouranthene	NA		NA	NA		NA		7.30E-02	NA		NA		1		0.13
Carbazole	NA		NA	NA		2.00E-02	h	2.00E-02	NA		NA		1	r	0.1
Chrysene	NA		NA	NA		7.30E-03	p	7.30E-03	3.08E-03	p	NA		1	r	0.13
Dibenz(a,h)anthracene	NA		NA	NA		7.30E+00	p	7.30E+00	3.08E+00	p	NA		1	r	0.13
Dibenzofuran	4.00E-03	v	4.00E-03	NA		NA		NA	NA		NA		1	r	0.1
Fluorene	4.00E-02	i	4.00E-02	NA		NA		NA	NA		NA		1	r	0.13
Indeno(1,2,3-cd)pyrene	NA		NA	NA		7.30E-01	p	7.30E-01	3.08E-01	p	NA		1	r	0.13
Naphthalene	2.00E-02	i	2.00E-02	8.57E-04	i	NA		NA	NA		NA		1	r	0.1
Phenanthrene	NA		NA	NA		NA		NA	NA		NA		1	r	0.13
Polychlorinated Biphenyls (PCBs)	NA		NA	NA		2.00E+00	i	2.08E+00	2.00E+00	i	NA		0.96	r	NA
VOCs	**(mg/kg/day)**		**(mg/kg/day)**	**(mg/kg/day)**		**(mg/kg/day)$^{-1}$**		**(mg/kg/day)$^{-1}$**	**(mg/kg/day)$^{-1}$**				**(Unitless)**		**(Unitless)**
1,1,1-trichloroethane	2.00E-01	v	2.00E-01	6.29E-01	v	NA		NA	NA		NA		1	r	NA
1,2-cis-Dichloroethene	1.00E-02	h	1.00E-02	NA		NA		NA	NA		NA		1	r	NA
1,2-trans-Dichloroethene	2.00E-02	i	2.00E-02	NA		NA		NA	NA		NA		1	r	NA
2-Methylnaphthalene	4.00E-03	i	4.00E-03			NA		NA	NA		NA		1	r	NA
Benzene	4.00E-03	i	4.00E-03	NA		5.50E-02	i	5.50E-02	2.73E-02	d	NA		1	r	NA
Ethylbenzene	1.00E-01	i	1.00E-01	2.86E-01	i	NA		NA	3.85E-03	d	NA		1	r	NA
Tetrachloroethene (PCE)	1.00E-02	n	1.00E-02	NA		5.20E-02	n	5.20E-02	2.03E-03	c	NA		1	r	NA
Toluene	2.00E-01	i	2.00E-01	1.14E-01	i	NA		NA	NA		NA		1	r	NA
Trichloroethene (TCE)	5.00E-01	c	5.00E-01	1.70E-01	c	1.30E-02	c	1.30E-02	7.00E-03	c	NA		1	r	NA
Vinyl Chloride	3.00E-03	i	3.00E-03	2.86E-02	i	1.50E+00	i	1.50E+00	3.08E-02	d	NA		1	r	NA
Xylenes, Total	2.00E-01	i	2.00E-01	2.86E-02	i	NA		NA	NA		NA		1	r	NA

Chemical	Non-Cancer				Cancer						Dermal Exposure Parameters			
	Oral RFDo	Ref	Dermal Adjusted RFDa	Inhalation RFDi	Ref	Oral CSFo	Ref	Dermal Adjusted CSFa	Inhalation CSFi	Ref	External Radiation	Ref	Percent Absorbed ^{ABS}GI	Ref	Dermal Absorption Fraction from Soil ^{ABS}d
RADIONUCLIDES						risk/pCi			risk/pCi		risk/y per pCi/g				
Actinium-227 +L	NA		NA	NA		1.16E-09	h	NA	2.09E-07	h	1.47E-06	h	NA		NA
Actinium-228	NA		NA	NA		5.55E-12	h	NA	4.92E-11		4.53E-06	h	NA		NA
Americium-241	NA		NA	NA		2.17E-10	h	NA	2.81E-08	h	2.76E-08	h	NA		NA
Bismuth-207	NA		NA	NA		1.49E-11	h	NA	2.10E-11	h	7.08E-06	h	NA		NA
Bismuth-210m	NA		NA	NA		1.45E-10	h	NA	1.17E-08	h	1.01E-06	h	NA		NA
Bismuth-212	NA		NA	NA		1.78E-12	h	NA	7.77E-11	h	8.87E-07	h	NA		NA
Bismuth-214	NA		NA	NA		4.33E-13	h	NA	2.90E-11	h	7.48E-06	h	NA		NA
Cesium-137 +D	NA		NA	NA		4.33E-11	h	NA	1.19E-11	h	2.55E-06	h	NA		NA
Cobalt-60	NA		NA	NA		4.03E-11	h	NA	3.58E-11	h	1.24E-05	h	NA		NA
Lead-210 +D	NA		NA	NA		2.66E-09	h	NA	1.39E-08	h	4.21E-09	h	NA		NA
Lead-212	NA		NA	NA		6.70E-11	h	NA	5.77E-10	h	5.09E-07	h	NA		NA
Lead-214	NA		NA	NA		8.51E-13	h	NA	3.63E-11	h	9.82E-07	h	NA		NA
Plutonium-238	NA		NA	NA		2.72E-10	h	NA	3.36E-08	h	7.22E-11	h	NA		NA
Plutonium-239	NA		NA	NA		2.76E-10	h	NA	3.33E-08	h	2.00E-10	h	NA		NA
Plutonium-240	NA		NA	NA		2.77E-10	h	NA	3.33E-08	h	6.98E-11	h	NA		NA
Plutonium-239/240[1]	NA		NA	NA		2.77E-10	h	NA	3.33E-08	h	6.98E-11	h	NA		NA
Plutonium-241	NA		NA	NA		3.29E-12	h	NA	3.34E-10	h	4.11E-12	h	NA		NA
Plutonium-242	NA		NA	NA		2.63E-10	h	NA	3.13E-08	h	6.25E-11	h	NA		NA
Polonium-209	NA		NA	NA		NA		NA	NA		NA		NA		NA
Polonium-210	NA		NA	NA		7.96E-10	h		1.08E-08	h	3.95E-11	h	NA		NA
Protactinium-231+D	NA		NA	NA		1.53E-09	h	NA	2.55E-07	h	1.61E-06	h	NA		NA
Radium-226 +D	NA		NA	NA		7.30E-10	h	NA	1.16E-08	h	8.49E-06	h	NA		NA
Radium-228 +D	NA		NA	NA		2.29E-09	h	NA	5.23E-09	h	4.53E-06	h	NA		NA
Silver-108m	NA		NA	NA		1.92E-11	h	NA	2.67E-11	h	7.18E-06	h	NA		NA
Strontium-90 +D	NA		NA	NA		1.44E-10	h	NA	1.13E-10	h	1.96E-08	h	NA		NA
Thorium-228 +L	NA		NA	NA		8.09E-10	h	NA	1.43E-07	h	7.76E-06	h	NA		NA
Thorium-230	NA		NA	NA		2.02E-10	h	NA	2.85E-08	h	8.19E-10	h	NA		NA
Thorium-232	NA		NA	NA		2.31E-10	h	NA	4.33E-08	h	3.42E-10	h	NA		NA
Tritium (particulate)	NA		NA	NA		2.20E-13	h	NA	1.99E-13	h	NA	h	NA		NA
Uranium-232	NA		NA	NA		5.74E-10	h	NA	1.95E-08	h	5.98E-10	h	NA		NA
Uranium-233	NA		NA	NA		1.60E-10	h	NA	1.16E-08	h	9.82E-10	h	NA		NA
Uranium-234	NA		NA	NA		1.58E-10	h	NA	1.14E-08	h	2.52E-10	h	NA		NA
Uranium-235 +D	NA		NA	NA		1.63E-10	h	NA	1.01E-08	h	5.43E-07	h	NA		NA
Uranium-236	NA		NA	NA		1.49E-10	h	NA	1.05E-08	h	1.25E-10	h	NA		NA
Uranium-238 +L	NA		NA	NA		2.10E-10	h	NA	9.35E-09	h	1.14E-07	h	NA		NA

NA = Not Available
RfD = Reference Dose
CSF = Cancer Slope Factor
GI = Gastrointestinal
ABS = Dermal Absorption Factor
Ref = Reference
SVOCs = Semi-volatile Organic Compounds
1.00E-06 Is equivalent to 1.00 x 10-6
+D = Used to estimate risk from radionuclide plus its short-lived radiological decay products (half-lives <= 6 months)
1 = Most conservative value used - Pu239

References:
i = Integrated Risk Information System (IRIS). (EPA 2005)

h = Health Effects and Environmental Affects Summary Table (HEAST). (EPA 2001)
c = Cal/EPA as accepted by Ohio EPA for TCE values (Cal/EPA 2003).
p = *Provisional Guidance for Qualitative Risk Assessment of Polycyclic Aromatic Hydrocarbons* (EPA 1993)
u = Inhalation Unit Risk Factor is available on IRIS with incompatible units for Inhalation CSFi calculation.
n = National Center for Environmental Assessment (NCEA). U.S. Environmental Protection Agency.
r = Risk Assessment Guidance for Superfund: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment (EPA 2004a)
d = calculated from inhalation unit risk as described in *Supplemental Guidance to RAGS: Region 4 Bulletins* (EPA 1995)
v = Provisional Value as accepted by National Center for Environmental Assessment (NCEA). U.S. Environmental Protection Agency.

5.0 RISK CHARACTERIZATION

This section presents the risk characterization for Parcel 6, 7, and 8. In this section, information from the exposure assessment (Section 3.0) is combined with information from the toxicity assessment (Section 4.0) to characterize human health risks. Risk characterization integrates the exposure and toxicity assessments by comparing estimates of intake or dose with appropriate toxicity values. This in turn provides an indication of the potential for adverse effects to exposed receptors. The objective of the risk characterization is to determine if exposure to COPCs detected in environmental media could result in risks that exceed EPA target levels for human health effects.

5.1 Risk Characterization Methods

The Parcel 6, 7, and 8 RRE reports total, background and incremental risk for each COPC evaluated. Total risk was calculated using the EPCs calculated for each COPC retained for the parcels. Similarly, background risk was calculated based on the lower of the maximum detected concentration and the 95%UCL of the Mound background data set. Background risk is the risk resulting from sources other than the Mound-related residual contamination. Incremental risk is the difference between total and background risk levels. Incremental risk can be used to assess the increase in risk above background levels due to Mound Plant operations.

The Parcel 6, 7, and 8 risk characterization presents a separate evaluation of non-carcinogenic and carcinogenic effects. The assessment distinguishes cancer from non-cancer effects because organisms typically respond differently following exposure to carcinogenic or non-carcinogenic agents. Quantification methods for cancer and non-cancer effects are discussed separately in the following sections.

5.1.1 Quantification of Carcinogenic Risk

Cancer risks are probabilistic estimates of the excess (incremental) lifetime cancer risk for an individual specifically attributable to long-term exposure to carcinogenic constituents. The procedure for calculating risk associated with exposure to

carcinogenic compounds has been established by EPA (EPA 1989). A non-threshold, dose-response model was used to calculate a cancer slope (potency) factor for each COPC. To derive an estimate of risk, the cancer slope factor was multiplied by the estimated chronic daily intake experienced by the exposed individual:

$$Risk = CDI \times CSF$$

Where:

Risk = High end estimate of the excess lifetime cancer risk to an individual (unitless probability)

CDI = Chronic daily intake averaged over an established period (mg/kg body weight/day)

CSF = Cancer slope factor (95% upper-bound estimate of the slope of the dose-response curve) expressed as (mg/kg body weight/day)$^{-1}$.

To evaluate the risk of exposure to more than one carcinogenic COPC, the risk estimates for each COPC were summed to provide an overall estimate of total carcinogenic risk (EPA 1989).

$$Risk_T = \sum_{i=1}^{n} Risk_i$$

Where:

$Risk_T$ = combined excess lifetime cancer risk across chemical carcinogens

$Risk_i$ = risk estimate for the i^{th} chemical of n chemicals under evaluation.

5.1.2 Quantification of Non-carcinogenic Risk

The traditionally accepted practice of evaluating exposure to non-carcinogenic compounds has been to experimentally determine a NOAEL and to divide this by a safety factor to establish an acceptable human dose, for example, acceptable daily

intake or RfD. The RfD is then compared to the daily intake of the exposed population to obtain a measure of concern for adverse non-carcinogenic effects:

$$HQ = \frac{\text{Intake}}{\text{RfD}}$$

Where:

HQ = Hazard Quotient: potential for adverse non-carcinogenic effects

Intake = Average daily intake for chronic exposure (mg/kg body weight/day)

RfD = Acceptable intake for chronic exposure (mg/kg body weight/day).

To evaluate exposure to multiple non-carcinogenic COPCs the HQs for all COPCs were summed to obtain the Hazard Index (HI).

$$HI = \Sigma HQ_i$$

Where:

HI = Hazard Index

HQ_i = Hazard Quotient for the i^{th} chemical of n chemicals under evaluation.

EPA has established target risk levels for use in determining the need for site remediation. For non-carcinogenic effects, EPA has set the target HQ at one. If the HQ is >1, there is the potential for adverse health effects at the given exposure/dose level, but the HQ value is not an indication of the severity of the effects. For multiple non-carcinogens, the HQs for all of the chemicals under evaluation are summed resulting in the HI. If the HI is > 1, the potential also exists for adverse health effects resulting from exposure to mixtures of chemicals. In cases where the HQ for individual substances is below one yet several HQs sum to greater than one, EPA recommends segregating the compounds into groups with like or common toxicological effects and re-evaluating the potential for the various adverse health effects. In cases where HQs for individual substances are greater than one, this step is not necessary or useful.

5.2 Risk Characterization Results

The following sections present the risk characterization results for Parcel 6, 7 and 8 by potential receptor. Risk estimates for individual soil COPCs for all scenarios and pathways are presented in Tables 5.1 through 5.18. Tables 5.1 through 5.3 present soil risk estimates for Parcel 6 based on construction worker exposure parameters, and Tables 5.4 through 5.6 present Parcel 6 soil risk estimates based on site employee exposure parameters. Tables 5.7 through 5.9 present soil risk estimates for Parcel 7 based on construction worker exposure parameters, and Tables 5.10 through 5.12 present Parcel 7 soil risk estimates based on site employee exposure parameters. Tables 5.13 through 5.15 present soil risk estimates for Parcel 8 based on construction worker exposure parameters, and Tables 5.16 through 5.18 present Parcel 8 soil risk estimates based on site employee exposure parameters. Total risk was calculated using the total EPC of the COPCs detected in Parcel 6, 7, and 8. Background risk was based on background levels of the COPCs and incremental risk was calculated using the difference between total and background levels. Incremental risk can be used to assess the increase in risk above background levels due to Mound Plant operations.

Total, background, and incremental non-cancer HIs for the construction worker and site employee scenario in Parcel 6, 7, and 8 were less than one and are considered to be acceptable. Therefore, non-cancer risk for all three parcels is below a level of concern so it will not be discussed in the following sections.

5.2.1 Construction Worker Risk Results

Parcel 6

Tables 5.1 through 5.3 present total, background, and incremental risk for the construction worker scenario in Parcel 6, respectively. Chromium, lithium, benzo(a)pyrene, benzo(g,h,i)perylene, dibenz(a,h)anthracene, phenanthrene, plutonium-238 and thorium-230+D were identified as COPCs in Parcel 6 soil. Total residual cancer risk from soil for the construction worker scenario is 3.5x10-5, which falls within the acceptable risk range of 10^{-4} to 10^{-6}. Background residual risk from soil for the construction worker scenario in Parcel 6 is $2.0x10^{-5}$ and is based on background concentrations of thorium-230+D and plutonium-238. Incremental residual soil risk is 1.5x10-5 and is based on oral and dermal exposure to benzo(a)pyrene and oral and external exposure to plutonium-238 and thorium-230+D. Carcinogenic risk drivers for the Parcel 6 construction worker are benzo(a)pyrene via oral and dermal pathways, plutonium-238 via the oral pathway, and thorium-230+D via oral and external pathways.

Parcel 7

Tables 5.7 through 5.9 present total, background, and incremental risk for the construction worker scenario in Parcel 7, respectively. Antimony, dypsprosium, erbium, europium, gadolinium, holmium, lanthanum, lithium, lutetium, neodymium, praseodymium, samarium, tantalum, terbium, ytterbium, 2,4,6-tribromophenol, 2-flourobiphenyl, 2-flourophenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, dibenz(a,h)anthracene, nitrobenzene-d5, p-terphenyl-d14, phenanthrene, phenol-d5, methyl cyclohexane, trichloroethylene (TCE), actinium-227+D, plutonium-238, radium-228+D, and uranium-233/234 were identified as COPCs for the construction worker in Parcel 7. Total residual cancer risk from soil for the construction worker scenario is 2.1x10-5. Background residual risk from soil for the construction worker scenario in Parcel 7 is 2.6x10-7 and is based on background concentrations of radionuclides. Incremental residual soil risk is 2.1x10-5 which falls within the acceptable risk range of 10-4 to 10-6. Carcinogenic risk drivers for the Parcel

7 construction worker are plutonium-238 via the oral pathway and radium-228 and uranium-233/234 via oral and external pathways.

Parcel 8

Tables 5.13 through 5.15 present total, background, and incremental risk for the construction worker scenario in Parcel 8, respectively. For the construction worker exposed to soil in Parcel 8, antimony, erbium, lithium, neodymium, tantalum, thallium, 1,2,3,4,6,7,8-HpCDD, HpCDD, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene, tetrachloroethene (PCE), trichloroethylene (TCE), actinium-227+L, americium-241, plutonium-238, radium-228+L, , and uranium-233/234 were identified as COPCs in soil (Table 2.5). Total residual cancer risk from soil for the construction worker scenario is 2.2x10-5. Background residual risk from soil for the construction worker scenario in Parcel 8 is 1.7x10-8. Incremental residual cancer risk for a construction worker in Parcel 8 is 2.2x10-5, which falls within the acceptable risk range of 10-4 to 10-6. Carcinogenic risk drivers for the Parcel 8 construction worker are benzo(a)pyrene, dibenzo(a,h)anthracene, and plutonium-238 via the oral pathway; radium-228 via oral and external pathways, and uranium-233/234 via the total of oral and external pathways.

5.2.2 Site Employee Risk Results

Parcel 6

Tables 5.4 through 5.6 present total, background, and incremental risk for the site employee scenario in Parcel 6, respectively. For the site employee exposed to soil in Parcel 6 chromium, lithium, benzo(a)pyrene, benzo(g,h,i)perylene, dibenz(a,h)anthracene, phenanthrene, plutonium-238, and thorium-230+D were identified as COPCs in soil (Table 2.2). Total residual cancer risk for the site employee

in Parcel 6 is 3.5x10-5. Background residual risk from soil for the site employee in Parcel 6 is 2.0x10-5. Incremental residual soil risk is 1.5x10-5, which falls within the acceptable risk range of 10-4 to 10-6. Carcinogenic risk drivers for the Parcel 6 site employee are benzo(a)pyrene via oral and dermal pathways, dibenz(a,h)anthracene via the total of oral and dermal pathways, plutonium-238 via the oral pathway, and thorium-230+D via oral and external pathways.

Parcel 7

Tables 5.10 through 5.12 present total, background, and incremental risk for the site employee scenario in Parcel 7, respectively. For the site employee exposed to soil in Parcel 7 dypsprosium, erbium, europium, gadolinium, lanthanum, lithium, neodymium, praseodymium, tantalum, 2,4,6-tribromophenol, 2-fluorobiphenyl, 2-fluorophenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, nitrobenzene-d5, p-terphenyl-d14, phenanthrene, phenol-d5, methyl cyclohexane, actinium-227+D, plutonium-238, radium-228+D, and uranium-233/234 were identified as COPCs in soil (Table 2.4). Total residual cancer risk from soil for the site employee in Parcel 7 is 1.7x10-5. Background residual cancer risk for the site employee in Parcel 7 is 1.1x10-8. Incremental residual cancer risk is 1.7x10-5, which falls within the acceptable risk range of 10-4 to 10-6. Carcinogenic risk drivers for the Parcel 7 site employee are benzo(a)pyrene via the dermal pathway, dibenzo(a,h)anthracene via the total of oral and dermal pathways, plutonium-238 via the oral pathway, and radium-228 and uranium-233/234 via the external pathway.

Parcel 8

Tables 5.16 through 5.18 present total, background, and incremental risk for the site employee scenario in Parcel 8, respectively. For the site employee exposed to soil in Parcel 8 erbium, lithium, tantalum, 1,2,3,4,6,7,8-HpCDD, HpCDD, Endosulfan II, Endosulfan sulfate, endrin aldehyde, endrin ketone, 2-benzyl-4-chlorophenol,

benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene, acetonitrile, actinium-227+L, americium-241, plutonium-238, radium-228+L, and uranium-233/234 were identified as COPCs in soil (Table 2.6). Total residual cancer risk from soil for the site employee in Parcel 8 is 2.6x10-5. Background residual risk from soil for the site employee scenario in Parcel 8 is 9.0x10-9. Incremental residual cancer risk is 2.6x10-5, which falls within the acceptable risk range of 10-4 to 10-6. Carcinogenic risk drivers for the Parcel 8 site employee are HpCDD and plutonium-238 via the oral pathway, benzo(a)pyrene via oral and dermal pathways, dibenzo(a,h)anthracene via the dermal pathway, and radium-228 and uranium-233/234 via the external pathway.

5.2.3 Overall Summary of Risk Results

Overall total, background, and incremental cancer and non-cancer risks are presented in Table ES.1 included with the Executive Summary and Tables 5.1 through 5.18. The values in the tables are the sum of all of the media and associated pathways for the construction worker and site employee scenarios. Where sufficient toxicity data were available, the Hazard Indices (HIs) for the construction worker and site employee scenario in Parcels 6, 7, and 8 were less than one and are considered to be acceptable. The carcinogenic risks for both receptors in Parcel 6, 7, and 8 fall within the target risk range and are considered to be acceptable when compared to the National Oil & Hazardous Substances Pollution Contingency Plan (NCP, EPA 1990) the acceptable risk range of 10-4 to 10-6 (increased cancer risk of 1 human in 10,000 to 1 human in 1 million). The OEPA (Ohio Environmental Protection Agency) has a target risk goal of 1E-5.

Table 5.1: Total Soil Risk for a Construction Worker in Parcel 6

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS				
			Route-Specific Risk					Cancer	Route-Specific HQ				Non-Cancer
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Risk Total	Oral	Dermal	Inhalation Dust	Inhalation VOCs	HI Total
Inorganic Compounds (mg/kg)													
Chromium	7440-47-3	2.1E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lithium	7439-93-2	3.9E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)													
Benzo(a)pyrene	50-32-8	1.2E+00	3.0E-06	1.4E-06	0.0E+00	NAP	NAP	4.4E-06	---	---	---	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	5.7E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	2.2E-01	5.3E-07	2.5E-07	0.0E+00	NAP	NAP	7.8E-07	---	---	---	NAP	0.0E+00
Phenanthrene	85-01-8	3.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Radionuclides (pCi/g)													
Plutonium-238	13981-16-3	2.9E+01	4.7E-06	NAP	1.8E-08	NAP	2.2E-09	4.8E-06	---	---	---	NAP	0.0E+00
Thorium-230 +D	14269-63-7(+D)	2.3E+00	5.0E-06	NAP	2.4E-09	NAP	2.0E-05	2.5E-05	---	---	---	NAP	0.0E+00
TOTAL			1.3E-05	1.6E-06	2.1E-08	0.0E+00	2.0E-05	**3.5E-05**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on Table 2.1.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not applicable pathway.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.2: Background Soil Risk for a Construction Worker in Parcel 6

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS				
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ				Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	
Inorganic Compounds (mg/kg)													
Chromium	7440-47-3	1.4E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lithium	7439-93-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)													
Benzo(a)pyrene	50-32-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Phenanthrene	85-01-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Radionuclides (pCi/g)													
Plutonium-238	13981-16-3	1.0E-01	1.7E-08	---	6.6E-11	NAP	7.7E-12	1.7E-08	---	---	---	NAP	0.0E+00
Thorium-230 +D	14269-63-7(+D)	1.8E+00	3.9E-06	---	1.9E-09	NAP	1.6E-05	2.0E-05	---	---	---	NAP	0.0E+00
TOTAL			3.9E-06	0.0E+00	1.9E-09	0.0E+00	1.6E-05	**2.0E-05**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on Appendix E of DOE 2004.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not applicable pathway; not a VOC.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.

Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.3: Incremental Soil Risk for a Construction Worker in Parcel 6

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS				
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ				Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	
Inorganic Compounds (mg/kg)													
Chromium	7440-47-3	6.8E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lithium	7439-93-2	3.9E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)													
Benzo(a)pyrene	50-32-8	1.2E+00	3.0E-06	1.4E-06	0.0E+00	NAP	NAP	**4.4E-06**	---	---	---	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	5.7E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	2.2E-01	5.3E-07	2.5E-07	0.0E+00	NAP	NAP	7.8E-07	---	---	---	NAP	0.0E+00
Phenanthrene	85-01-8	3.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Radionuclides (pCi/g)													
Plutonium-238	13981-16-3	2.9E+01	4.7E-06	NAP	1.8E-08	NAP	2.1E-09	**4.7E-06**	---	---	---	NAP	0.0E+00
Thorium-230 +D	14269-63-7(+D)	5.0E-01	1.1E-06	NAP	5.1E-10	NAP	4.4E-06	**5.4E-06**	---	---	---	NAP	0.0E+00
TOTAL			9.3E-06	1.6E-06	1.9E-08	0.0E+00	4.4E-06	**1.5E-05**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on the difference between Total EPC and Background EPC.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not applicable pathway; not a VOC.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.4: Total Soil Risk for a Site Employee in Parcel 6

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ					Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	
Inorganic Compounds (mg/kg)														
Chromium	7440-47-3	2.1E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lithium	7439-93-2	3.9E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
Benzo(a)pyrene	50-32-8	1.2E+00	1.6E-06	4.6E-06	---	NAP	NAP	6.2E-06	---	---	---	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	5.7E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	2.2E-01	2.8E-07	8.2E-07	---	NAP	NAP	1.1E-06	---	---	---	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	3.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Radionuclides (pCi/g)														
Plutonium-238	13981-16-3	2.9E+01	2.5E-06	---	2.8E-08	NAP	2.4E-09	2.5E-06	---	---	---	NAP	NAP	0.0E+00
Thorium-230 +D	14269-63-7(+D)	2.3E+00	2.6E-06	---	3.7E-09	NAP	2.3E-05	2.5E-05	---	---	---	NAP	NAP	0.0E+00
TOTAL			6.9E-06	5.4E-06	3.2E-08	0.0E+00	NAP	**3.5E-05**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	NAP	0.0E+00

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on Table 2.2.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not an applicable pathway.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.5: Background Soil Risk for a Site Employee in Parcel 6

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ					Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	
Inorganic Compounds (mg/kg)														
Chromium	7440-47-3	1.4E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lithium	7439-93-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
Benzo(a)pyrene	50-32-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Radionuclides (pCi/g)														
Plutonium-238	13981-16-3	1.0E-01	8.8E-09		1.0E-10	NAP	8.6E-12	9.0E-09	---	---	---	NAP	NAP	0.0E+00
Thorium-230 +D	14269-63-7(+D)	1.8E+00	2.0E-06		2.9E-09	NAP	1.8E-05	2.0E-05	---	---	---	NAP	NAP	0.0E+00
TOTAL			2.1E-06	0.0E+00	3.0E-09	0.0E+00	1.8E-05	**2.0E-05**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on Appendix E of DOE 2004.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not an applicable pathway.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.6: Incremental Soil Risk for a Site Employee in Parcel 6

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ					Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	
Inorganic Compounds (mg/kg)														
Chromium	7440-47-3	6.8E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lithium	7439-93-2	3.9E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
Benzo(a)pyrene	50-32-8	1.2E+00	1.6E-06	4.6E-06	---	NAP	NAP	6.2E-06	---	---	---	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	5.7E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	2.2E-01	2.8E-07	8.2E-07	---	NAP	NAP	1.1E-06	---	---	---	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	3.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Radionuclides (pCi/g)														
Plutonium-238	13981-16-3	2.9E+01	2.5E-06	NAP	2.8E-08	NAP	2.4E-09	2.5E-06	---	---	---	NAP	NAP	---
Thorium-230 +D	14269-63-7(+D)	5.0E-01	5.6E-07	NAP	7.9E-10	NAP	4.8E-06	5.4E-06	---	---	---	NAP	NAP	---
TOTAL			4.9E-06	5.4E-06	2.9E-08	0.0E+00	4.9E-06	**1.5E-05**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

CAS Number — Chemical Abstract Services number
EPC — exposure point concentration (lower of maximum concentration and 95%UCL) based on the difference between Total EPC and Background EPC.
mg/kg — Milligram per kilogram.
--- — not applicable, not available, or not calculated due to insufficient toxicity data
NAP — Not an applicable pathway.
pCi/g — Picocuries per gram
+D — Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.7: Total Soil Risk for a Construction Worker in Parcel 7

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer	Route-Specific HQ					Non-Cancer
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Risk Total	Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	HI Total
Inorganic Compounds (mg/kg)														
Antimony	7440-36-0	7.2E-01	---	---	---	NAP	NAP	0.0E+00	8.5E-03	***	---	NAP	NAP	8.5E-03
Dysprosium	7429-91-6	3.1E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Erbium	7440-52-0	4.8E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Europium	7440-53-1	1.3E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Gadolinium	7440-54-2	2.0E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Holmium	7440-60-0	1.5E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lanthanum	7439-91-0	9.6E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lithium	7439-93-2	2.3E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lutetium	7439-94-3	3.9E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Neodymium	7440-00-8	2.4E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Praseodymium	7440-10-0	2.3E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Samarium	7440-19-9	1.2E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Tantalum	7440-25-7	4.6E+02	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Terbium	7440-27-9	8.5E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Ytterbium	7440-64-4	2.5E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
2,4,6-Tribromophenol	118-79-6	1.7E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
2-Fluorobiphenyl	321-60-8	1.4E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
2-Fluorophenol	367-12-4	1.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(a)anthracene	56-55-3	2.6E-01	6.3E-08	2.9E-08	---	NAP	NAP	9.2E-08	---	---	---	NAP	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	2.5E-01	6.2E-07	2.9E-07	---	NAP	NAP	9.1E-07	---	---	---	NAP	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	2.5E-01	6.1E-08	2.8E-08	---	NAP	NAP	9.0E-08	---	---	---	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	2.4E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	2.2E-01	5.5E-07	2.5E-07	---	NAP	NAP	8.0E-07	---	---	---	NAP	NAP	0.0E+00
Nitrobenzene-d5	4165-60-0	1.3E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
P-Terphenyl-d14	1718-51-0	1.4E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	3.0E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Phenol-d5	4165-62-2	1.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)														
Methyl Cyclohexane	108-87-2	6.0E-03	---	---	---	---	NAP	0.0E+00	---	---	1.03E-12	6.8E-07	NAP	6.8E-07
Trichloroethylene (TCE)	79-01-6	5.5E-03	7.4E-10	0.0E+00	2.3E-14	1.2E-08	NAP	1.3E-08	8.7E-05	---	7.20E-11	3.7E-05	NAP	1.2E-04
Radionuclides (pCi/g)														
Actinium-227	14952-40-0(+D)	2.1E-01	1.5E-07	NAP	8.4E-10	NAP	3.2E-07	4.7E-07	---	---	---	---	---	0.0E+00
Plutonium-238	13981-16-3	5.9E+01	9.7E-06	NAP	3.8E-08	NAP	4.4E-09	9.7E-06	---	---	---	---	---	0.0E+00
Radium-228 +D	15262-20-1(+D)	1.1E+00	1.5E-06	NAP	1.0E-10	NAP	4.9E-06	6.4E-06	---	---	---	---	---	0.0E+00
Uranium-233/234	U-233/234	1.4E+00	1.2E-06	NAP	6.2E-09	NAP	1.7E-06	2.9E-06	---	---	---	---	---	0.0E+00
TOTAL			1.4E-05	6.0E-07	4.5E-08	1.2E-08	6.9E-06	**2.1E-05**	8.6E-03	0.0E+00	7.3E-11	3.7E-05	0.0E+00	**8.6E-03**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on Table 2.3.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not applicable pathway.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).
***	not calculated due to the absence of a dermal absorption factor (EPA, 2004a)

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Number is bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.8: Background Soil Risk for a Construction Worker in Parcel 7

			CANCER EFFECTS						NON-CANCER EFFECTS				
			Route-Specific Risk					Cancer	Route-Specific HQ				Non-Cancer
Constituent	CAS Number	EPC	Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Risk Total	Oral	Dermal	Inhalation Dust	Inhalation VOCs	HI Total
Inorganic Compounds (mg/kg)													
Antimony	7440-36-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Dysprosium	7429-91-6	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Erbium	7440-52-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Europium	7440-53-1	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Gadolinium	7440-54-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Holmium	7440-60-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lanthanum	7439-91-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lithium	7439-93-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lutetium	7439-94-3	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Neodymium	7440-00-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Praseodymium	7440-10-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Samarium	7440-19-9	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Tantalum	7440-25-7	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Terbium	7440-27-9	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Ytterbium	7440-64-4	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)													
2,4,6-Tribromophenol	118-79-6	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
2-Fluorobiphenyl	321-60-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
2-Fluorophenol	367-12-4	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(a)anthracene	56-55-3	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Nitrobenzene-d5	4165-60-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
P-Terphenyl-d14	1718-51-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Phenanthrene	85-01-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Phenol-d5	4165-62-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)													
Methyl Cyclohexane	108-87-2	0.0E+00	---	---	---	0.0E+00	NAP	0.0E+00	---	---	---	0.0E+00	0.0E+00
Trichloroethylene (TCE)	79-01-6	0.0E+00	---	---	---	0.0E+00	NAP	0.0E+00	---	---	---	0.0E+00	0.0E+00
Radionuclides (pCi/g)													
Actinium-227 +D	14952-40-0(+D)	1.1E-01	7.7E-08	---	4.4E-10	NAP	1.7E-07	2.4E-07	---	---	---	NAP	0.0E+00
Plutonium-238	13981-16-3	1.3E-01	2.1E-08	---	8.3E-11	NAP	9.6E-12	2.1E-08	---	---	---	NAP	0.0E+00
Radium-228 +D	15262-20-1(+D)	0.0E+00	0.0E+00	---	0.0E+00	NAP	0.0E+00	0.0E+00	---	---	---	NAP	0.0E+00
Uranium-233/234	U-233/234	0.0E+00	0.0E+00	---	0.0E+00	NAP	0.0E+00	0.0E+00	---	---	---	NAP	0.0E+00
TOTAL			9.8E-08	0.0E+00	5.2E-10	0.0E+00	1.7E-07	**2.6E-07**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on Appendix E of DOE 2004.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not applicable pathway; not a VOC.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.9: Incremental Soil Risk for a Construction Worker in Parcel 7

			CANCER EFFECTS						NON-CANCER EFFECTS				
			Route-Specific Risk					Cancer	Route-Specific HQ				Non-Cancer
Constituent	CAS Number	EPC	Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Risk Total	Oral	Dermal	Inhalation Dust	Inhalation VOCs	HI Total
Inorganic Compounds (mg/kg)													
Antimony	7440-36-0	7.2E-01	---	---	---	NAP	NAP	0.0E+00	8.5E-03	***	---	NAP	8.5E-03
Dysprosium	7429-91-6	3.1E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Erbium	7440-52-0	4.8E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Europium	7440-53-1	1.3E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Gadolinium	7440-54-2	2.0E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Holmium	7440-60-0	1.5E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lanthanum	7439-91-0	9.6E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lithium	7439-93-2	2.3E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lutetium	7439-94-3	3.9E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Neodymium	7440-00-8	2.4E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Praseodymium	7440-10-0	2.3E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Samarium	7440-19-9	1.2E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Tantalum	7440-25-7	4.6E+02	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Terbium	7440-27-9	8.5E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Ytterbium	7440-64-4	2.5E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)													
2,4,6-Tribromophenol	118-79-6	1.7E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
2-Fluorobiphenyl	321-60-8	1.4E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
2-Fluorophenol	367-12-4	1.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(a)anthracene	56-55-3	2.6E-01	6.3E-08	2.9E-08	0.0E+00	NAP	NAP	9.2E-08	---	---	---	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	2.5E-01	6.2E-07	2.9E-07	0.0E+00	NAP	NAP	9.1E-07	---	---	---	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	2.5E-01	6.1E-08	2.8E-08	0.0E+00	NAP	NAP	9.0E-08	---	---	---	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	2.4E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	2.2E-01	5.5E-07	2.5E-07	0.0E+00	NAP	NAP	8.0E-07	---	---	---	NAP	0.0E+00
Nitrobenzene-d5	4165-60-0	1.3E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
P-Terphenyl-d14	1718-51-0	1.4E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Phenanthrene	85-01-8	3.0E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Phenol-d5	4165-62-2	1.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)													
Methyl Cyclohexane	108-87-2	6.0E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	NAP	0.0E+00	---	---	1.03E-12	6.8E-07	6.8E-07
Trichloroethylene (TCE)	79-01-6	5.5E-03	7.4E-10	0.0E+00	2.3E-14	1.2E-08	NAP	1.3E-08	8.7E-05	---	7.20E-11	3.7E-05	1.2E-04
Radionuclides (pCi/g)													
Actinium-227	14952-40-0(+D)	1.0E-01	7.1E-08	NAP	4.0E-10	NAP	1.5E-07	2.3E-07	---	---	---	---	0.0E+00
Plutonium-238	13981-16-3	5.9E+01	9.7E-06	NAP	3.8E-08	NAP	4.4E-09	9.7E-06	---	---	---	---	0.0E+00
Radium-228	15262-20-1(+D)	1.1E+00	1.5E-06	NAP	1.0E-10	NAP	4.9E-06	6.4E-06	---	---	---	---	0.0E+00
Uranium-233/234	U-233/234	1.4E+00	1.2E-06	NAP	6.2E-09	NAP	1.7E-06	2.9E-06	---	---	---	---	0.0E+00
TOTAL			1.4E-05	6.0E-07	4.4E-08	1.2E-08	6.8E-06	**2.1E-05**	8.6E-03	0.0E+00	7.3E-11	3.7E-05	**8.6E-03**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on the difference between Total EPC and Background EPC.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not applicable pathway; not a VOC.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).
***	not calculated due to the absence of a dermal absorption factor (EPA, 2004a)

Numbers written as 1.0E-03 equal $1x10^{-3}$.

Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.10: Total Soil Risk for a Site Employee in Parcel 7

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ					Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	
Inorganics (mg/kg)														
Dysprosium	7429-91-6	4.5E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Erbium	7440-52-0	7.2E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Europium	7440-53-1	1.6E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Gadolinium	7440-54-2	6.6E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lanthanum	7439-91-0	1.6E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lithium	7439-93-2	2.0E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Neodymium	7440-00-8	3.0E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Praseodymium	7440-10-0	1.2E+02	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Tantalum	7440-25-7	4.6E+02	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
2,4,6-Tribromophenol	118-79-6	1.7E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
2-Fluorobiphenyl	321-60-8	1.4E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
2-Fluorophenol	367-12-4	1.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(a)anthracene	56-55-3	4.5E-01	5.8E-08	1.7E-07	---	NAP	NAP	2.3E-07	---	---	---	NAP	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	4.4E-01	5.6E-07	1.7E-06	---	NAP	NAP	2.2E-06	---	---	---	NAP	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	4.7E-01	6.0E-08	1.8E-07	---	NAP	NAP	2.4E-07	---	---	---	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	3.5E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	2.5E-01	3.2E-07	9.5E-07	---	NAP	NAP	1.3E-06	---	---	---	NAP	NAP	0.0E+00
Indeno(1,2,3-cd)pyrene	193-39-5	3.3E-01	4.3E-08	1.3E-07	---	NAP	NAP	1.7E-07	---	---	---	NAP	NAP	0.0E+00
Nitrobenzene-d5	4165-60-0	1.3E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
P-Terphenyl-d14	1718-51-0	1.4E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	7.2E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Phenol-d5	4165-62-2	1.9E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)														
Methyl Cyclohexane	108-87-2	6.0E-03	---	---	---	---	NAP	0.0E+00	---	---	3.2E-13	6.8E-07	NAP	6.8E-07
Radionuclides (pCi/g)														
Actinium-227 +D	14952-40-0(+D)	2.1E-01	7.5E-08	---	1.3E-09	NAP	3.5E-07	4.3E-07	---	---	---	NAP	NAP	0.0E+00
Plutonium-238	13981-16-3	4.4E+01	3.7E-06	---	4.3E-08	NAP	3.6E-09	3.8E-06	---	---	---	NAP	NAP	0.0E+00
Radium-228 +D	15262-20-1(+D)	1.1E+00	7.5E-07	---	1.6E-10	NAP	5.4E-06	6.2E-06	---	---	---	NAP	NAP	0.0E+00
Uranium-233/234	U-233/234	1.4E+00	6.3E-07	---	9.6E-09	NAP	1.9E-06	2.5E-06	---	---	---	NAP	NAP	0.0E+00
	TOTAL		6.2E-06	3.1E-06	5.4E-08	0.0E+00	7.6E-06	**1.7E-05**	0.0E+00	0.0E+00	3.2E-13	6.8E-07	NAP	**6.8E-07**

CAS Number — Chemical Abstract Services number
EPC — exposure point concentration (lower of maximum concentration and 95%UCL) based on Table 2.4.
mg/kg — Milligram per kilogram.
--- — not applicable, not available, or not calculated due to insufficient toxicity data
NAP — Not an applicable pathway.
pCi/g — Picocuries per gram
+D — Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.11: Background Soil Risk for a Site Employee in Parcel 7

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ					Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	
Inorganics (mg/kg)														
Dysprosium	7429-91-6	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Erbium	7440-52-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Europium	7440-53-1	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Gadolinium	7440-54-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lanthanum	7439-91-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lithium	7439-93-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Neodymium	7440-00-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Praseodymium	7440-10-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Tantalum	7440-25-7	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
2,4,6-Tribromophenol	118-79-6	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
2-Fluorobiphenyl	321-60-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
2-Fluorophenol	367-12-4	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(a)anthracene	56-55-3	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Nitrobenzene-d5	4165-60-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
P-Terphenyl-d14	1718-51-0	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Phenol-d5	4165-62-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)														
Methyl Cyclohexane	108-87-2	0.0E+00	---	---	---	---	NAP	0.0E+00	---	---	0.0E+00	NAP	NAP	0.0E+00
Radionuclides (pCi/g)														
Actinium-227 +D	14952-40-0(+D)	0.0E+00	0.0E+00		0.0E+00	NAP	0.0E+00	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Plutonium-238	13981-16-3	1.3E-01	1.1E-08		1.3E-10	NAP	1.1E-11	1.1E-08	---	---	---	NAP	NAP	0.0E+00
Radium-228 +D	15262-20-1(+D)	0.0E+00	0.0E+00		0.0E+00	NAP	0.0E+00	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Uranium-233/234	U-233/234	0.0E+00	0.0E+00		0.0E+00	NAP	0.0E+00	0.0E+00	---	---	---	NAP	NAP	0.0E+00
TOTAL			1.1E-08	0.0E+00	1.3E-10	0.0E+00	1.1E-11	**1.1E-08**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	NAP	**0.0E+00**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on Appendix E of DOE 2004.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not an applicable pathway.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.12: Incremental Soil Risk for a Site Employee in Parcel 7

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ					Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	
Inorganics (mg/kg)														
Dysprosium	7429-91-6	4.5E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Erbium	7440-52-0	7.2E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Europium	7440-53-1	1.6E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Gadolinium	7440-54-2	6.6E+01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Lanthanum	7439-91-0	1.6E+01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Lithium	7439-93-2	2.0E+01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Neodymium	7440-00-8	3.0E+01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Praseodymium	7440-10-0	1.2E+02	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Tantalum	7440-25-7	4.6E+02	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
2,4,6-Tribromophenol	118-79-6	1.7E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
2-Fluorobiphenyl	321-60-8	1.4E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
2-Fluorophenol	367-12-4	1.9E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Benzo(a)anthracene	56-55-3	4.5E-01	5.8E-08	1.7E-07	—	NAP	NAP	2.3E-07	—	—	—	NAP	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	4.4E-01	5.6E-07	1.7E-06	—	NAP	NAP	2.2E-06	—	—	—	NAP	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	4.7E-01	6.0E-08	1.8E-07	—	NAP	NAP	2.4E-07	—	—	—	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	3.5E-01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	2.5E-01	3.2E-07	9.5E-07	—	NAP	NAP	1.3E-06	—	—	—	NAP	NAP	0.0E+00
Indeno(1,2,3-cd)pyrene	193-39-5	3.3E-01	4.3E-08	1.3E-07	—	NAP	NAP	1.7E-07	—	—	—	NAP	NAP	0.0E+00
Nitrobenzene-d5	4165-60-0	1.3E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
P-Terphenyl-d14	1718-51-0	1.4E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	7.2E-01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Phenol-d5	4165-62-2	1.9E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)														
Methyl Cyclohexane	108-87-2	6.0E-03	—	—	—	—	NAP	0.0E+00	—	—	3.2E-13	6.8E-07	NAP	6.8E-07
Radionuclides (pCi/g)														
Actinium-227 +D	14952-40-0(+D)	2.1E-01	7.5E-08		1.3E-09	NAP	3.5E-07	4.3E-07	—	—	—	NAP	NAP	0.0E+00
Plutonium-238	13981-16-3	4.4E+01	3.7E-06		4.3E-08	NAP	3.6E-09	3.8E-06	—	—	—	NAP	NAP	0.0E+00
Radium-228 +D	15262-20-1(+D)	1.1E+00	7.5E-07		1.6E-10	NAP	5.4E-06	6.2E-06	—	—	—	NAP	NAP	0.0E+00
Uranium-233/234	U-233/234	1.4E+00	6.3E-07		9.6E-09	NAP	1.9E-06	2.5E-06	—	—	—	NAP	NAP	0.0E+00
TOTAL			6.2E-06	3.1E-06	5.4E-08	0.0E+00	7.6E-06	**1.7E-05**	0.0E+00	0.0E+00	3.2E-13	6.8E-07	NAP	**6.8E-07**

CAS Number — Chemical Abstract Services number
EPC — exposure point concentration (lower of maximum concentration and 95%UCL) based on the difference between Total EPC and Background EPC.
mg/kg — Milligram per kilogram.
— — not applicable, not available, or not calculated due to insufficient toxicity data
NAP — Not an applicable pathway.
pCi/g — Picocuries per gram
+D — Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.13: Total Soil Risk for a Construction Worker in Parcel 8

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer	Route-Specific HQ					Non-Cancer
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Risk Total	Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	HI Total
Inorganic Compounds (mg/kg)														
Antimony	7440-36-0	9.9E+00	---	---	---	NAP	NAP	0.0E+00	1.2E-01	***	---	NAP	NAP	1.2E-01
Erbium	7440-52-0	1.6E+02	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lithium	7439-93-2	2.0E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Neodymium	7440-00-8	2.2E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Tantalum	7440-25-7	2.7E+02	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Thallium	7440-28-0	7.1E-01	---	---	---	NAP	NAP	0.0E+00	5.0E-02	***	---	NAP	NAP	5.0E-02
Dioxins & Dibenzofurans (mg/kg)														
1,2,3,4,6,7,8-HpCDD	35822-46-9	4.3E-04	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
HpCDD	37871-00-4	7.6E-04	3.8E-07	---	9.3E-12	NAP	NAP	3.8E-07	---	---	---	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
Benzo(a)anthracene	56-55-3	5.1E-01	1.3E-07	5.8E-08	---	NAP	NAP	1.8E-07	---	---	---	NAP	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	4.9E-01	1.2E-06	5.6E-07	---	NAP	NAP	1.8E-06	---	---	---	NAP	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	5.2E-01	1.3E-07	5.9E-08	---	NAP	NAP	1.9E-07	---	---	---	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	5.2E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(k)fluoranthene	207-08-9	5.1E-01	1.2E-08	5.8E-09	---	NAP	NAP	1.8E-08	---	---	---	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	4.3E-01	1.0E-06	4.8E-07	---	NAP	NAP	1.5E-06	---	---	---	NAP	NAP	0.0E+00
Indeno(1,2,3-cd)pyrene	193-39-5	4.6E-01	1.1E-07	5.2E-08	---	NAP	NAP	1.6E-07	---	---	---	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	6.2E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)														
Tetrachloroethene (PCE)	127-18-4	8.2E-03	1.5E-09	---	1.8E-15	7.5E-10	NAP	2.2E-09	3.8E-06	---	1.21E-10	5.0E-05	NAP	5.4E-05
Trichloroethylene (TCE)	79-01-6	9.3E-03	1.2E-09	---	3.9E-14	2.0E-08	NAP	2.1E-08	1.5E-04	---	1.21E-10	6.1E-05	NAP	2.1E-04
Radionuclides (pCi/g)														
Actinium-227 +L	14952-40-0L	2.6E-01	1.8E-07	NAP	1.0E-09	NAP	3.9E-07	5.7E-07	---	---	---	---	---	0.0E+00
Americium-241	14596-10-2	1.1E-01	1.4E-08	NAP	5.7E-11	NAP	3.1E-09	1.7E-08	---	---	---	---	---	0.0E+00
Plutonium-238	13981-16-3	3.2E+01	5.3E-06	NAP	2.1E-08	NAP	2.4E-09	5.3E-06	---	---	---	---	---	0.0E+00
Radium-228 +L	15262-20-1L	7.0E-01	1.3E-06	NAP	2.0E-09	NAP	8.8E-06	1.0E-05	---	---	---	---	---	0.0E+00
Uranium-233/234	U-233/234	7.3E-01	6.4E-07	NAP	3.3E-09	NAP	8.8E-07	1.5E-06	---	---	---	---	---	0.0E+00
TOTAL			1.0E-05	1.2E-06	2.7E-08	2.1E-08	1.0E-05	**2.2E-05**	1.7E-01	0.0E+00	2.4E-10	1.1E-04	0.0E+00	**1.7E-01**

CAS Number — Chemical Abstract Services number
EPC — exposure point concentration (lower of maximum concentration and 95%UCL) based on Table 2.5.
mg/kg — Milligram per kilogram.
--- — not applicable, not available, or not calculated due to insufficient toxicity data
NAP — Not applicable pathway.
pCi/g — Picocuries per gram
+D — Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).
+L — Includes long-lived daughters.
*** — not calculated due to the absence of a dermal absorption factor (EPA, 2004a)

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.14: Background Soil Risk for a Construction Worker in Parcel 8

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS				
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ				Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	
Inorganics (mg/kg)													
Antimony	7440-36-0	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Erbium	7440-52-0	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Lithium	7439-93-2	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Neodymium	7440-00-8	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Tantalum	7440-25-7	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Thallium	7440-28-0	1.6E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Dioxins & Dibenzofurans (mg/kg)													
1,2,3,4,6,7,8-HpCDD	35822-46-9	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
HpCDD	37871-00-4	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)													
Benzo(a)anthracene	56-55-3	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Benzo(k)fluoranthene	207-08-9	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Indeno(1,2,3-cd)pyrene	193-39-5	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Phenanthrene	85-01-8	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)													
Tetrachloroethene (PCE)	127-18-4	---	---	---	---	---	NAP	0.0E+00	---	---	---	---	0.0E+00
Trichloroethylene (TCE)	79-01-6	---	---	---	---	---	NAP	0.0E+00	---	---	---	---	0.0E+00
Radionuclides (pCi/g)													
Actinium-227 +L ***	14952-40-0L	---	---	NAP	---	NAP	---	0.0E+00	---	---	---	NAP	0.0E+00
Americium-241	14596-10-2	---	---	NAP	---	NAP	---	0.0E+00	---	---	---	NAP	0.0E+00
Plutonium-238	13981-16-3	1.0E-01	1.7E-08	NAP	6.6E-11	NAP	7.7E-12	1.7E-08	---	---	---	NAP	0.0E+00
Radium-228 +L	*15262-20-1L*	---	---	*NAP*	---	*NAP*	---	0.0E+00	---	---	---	NAP	0.0E+00
Uranium-233/234	U-233/234	---	---	NAP	---	NAP	---	0.0E+00	---	---	---	NAP	0.0E+00
TOTAL			1.7E-08	0.0E+00	6.6E-11	0.0E+00	7.7E-12	**1.7E-08**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

CAS Number — Chemical Abstract Services number

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

mg/kg — Milligram per kilogram.
--- — not applicable, not available, or not calculated due to insufficient toxicity data
NAP — Not applicable pathway
pCi/g — Picocuries per gram
+D — Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).
+L — Includes long-lived daughters.
EPC — exposure point concentration (lower of maximum concentration and 95%UCL) based on Appendix E of DOE 2004.
*** Ac-227 background level assumes secular equilibrium with U235/236.

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.15: Incremental Soil Risk for a Construction Worker in Parcel 8

			CANCER EFFECTS						NON-CANCER EFFECTS				
			Route-Specific Risk					Cancer	Route-Specific HQ				Non-Cancer
Constituent	CAS Number	EPC	Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Risk Total	Oral	Dermal	Inhalation Dust	Inhalation VOCs	HI Total
Inorganic Compounds (mg/kg)													
Antimony	7440-36-0	9.9E+00	—	—	—	NAP	NAP	0.0E+00	1.2E-01	***	—	NAP	1.2E-01
Erbium	7440-52-0	1.6E+02	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	0.0E+00
Lithium	7439-93-2	2.0E+01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	0.0E+00
Neodymium	7440-00-8	2.2E+01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	0.0E+00
Tantalum	7440-25-7	2.7E+02	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	0.0E+00
Thallium	7440-28-0	5.5E-01	—	—	—	NAP	NAP	0.0E+00	3.9E-02	***	—	NAP	3.9E-02
Dioxins & Dibenzofurans (mg/kg)													
1,2,3,4,6,7,8-HpCDD	35822-46-9	4.3E-04	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	0.0E+00
HpCDD	37871-00-4	7.6E-04	3.8E-07	—	9.3E-12	NAP	NAP	3.8E-07	—	—	—	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)													
Benzo(a)anthracene	56-55-3	5.1E-01	1.3E-07	5.8E-08	—	NAP	NAP	1.8E-07	—	—	—	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	4.9E-01	1.2E-06	5.6E-07	—	NAP	NAP	1.8E-06	—	—	—	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	5.2E-01	1.3E-07	5.9E-08	—	NAP	NAP	1.9E-07	—	—	—	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	5.2E-01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	0.0E+00
Benzo(k)fluoranthene	207-08-9	5.1E-01	1.2E-08	5.8E-09	—	NAP	NAP	1.8E-08	—	—	—	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	4.3E-01	1.0E-06	4.8E-07	—	NAP	NAP	1.5E-06	—	—	—	NAP	0.0E+00
Indeno(1,2,3-cd)pyrene	193-39-5	4.6E-01	1.1E-07	5.2E-08	—	NAP	NAP	1.6E-07	—	—	—	NAP	0.0E+00
Phenanthrene	85-01-8	6.2E-01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)													
Tetrachloroethene (PCE)	127-18-4	8.2E-03	1.5E-09	—	1.8E-15	7.5E-10	NAP	2.2E-09	3.8E-06	—	1.21E-10	5.0E-05	5.4E-05
Trichloroethylene (TCE)	79-01-6	9.3E-03	1.2E-09	—	3.9E-14	2.0E-08	NAP	2.1E-08	1.5E-04	—	1.21E-10	6.1E-05	2.1E-04
Radionuclides (pCi/g)													
Actinium-227 +L ***	14952-40-0L	2.6E-01	1.8E-07	NAP	1.0E-09	NAP	3.9E-07	5.7E-07	—	—	—	—	0.0E+00
Americium-241	14596-10-2	1.1E-01	1.4E-08	NAP	5.7E-11	NAP	3.1E-09	1.7E-08	—	—	—	—	0.0E+00
Bismuth-214 ****	14733-03-0	0.0E+00	0.0E+00	NAP	0.0E+00	NAP	0.0E+00	0.0E+00	—	—	—	—	0.0E+00
Plutonium-238	13981-16-3	3.2E+01	5.3E-06	NAP	2.0E-08	NAP	2.4E-09	5.3E-06	—	—	—	—	0.0E+00
Radium-228 +L	15262-20-1L	7.0E-01	1.3E-06	NAP	2.0E-09	NAP	8.8E-06	1.0E-05	—	—	—	—	0.0E+00
Uranium-233/234	U-233/234	7.3E-01	6.4E-07	NAP	3.3E-09	NAP	8.8E-07	1.5E-06	—	—	—	—	0.0E+00
TOTAL			1.0E-05	1.2E-06	2.7E-08	2.1E-08	1.0E-05	**2.2E-05**	1.6E-01	0.0E+00	2.4E-10	1.1E-04	**1.6E-01**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on the difference between Total EPC and Background EPC.
mg/kg	Milligram per kilogram.
—	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not applicable pathway.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).
+L	Includes long-lived daughters.
***	not calculated due to the absence of a dermal absorption factor (EPA, 2004a)

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total of risk

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.16: Total Soil Risk for a Site Employee in Parcel 8

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ					Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	
Inorganics (mg/kg)														
Erbium	7440-52-0	6.9E+01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Lithium	7439-93-2	1.6E+01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Tantalum	7440-25-7	4.4E+02	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Dioxins & Dibenzofurans (mg/kg)														
1,2,3,4,6,7,8-HpCDD	35822-46-9	2.3E-03	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
HpCDD	37871-00-4	4.1E-03	1.1E-06	—	7.8E-11	NAP	NAP	1.1E-06	—	—	—	NAP	NAP	0.0E+00
Pesticides & PCBs (mg/kg)														
Endosulfan II	33213-65-9	4.4E-03	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Endosulfan Sulfate	1031-07-8	1.3E-03	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Endrin Aldehyde	7421-93-4	1.2E-02	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Endrin Ketone	53494-70-5	5.4E-03	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
2-Benzyl-4-Chlorophenol	120-32-1	1.2E-01	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Benzo(a)anthracene	56-55-3	1.0E+00	1.3E-07	3.8E-07	—	NAP	NAP	5.1E-07	—	—	—	NAP	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	9.3E-01	1.2E-06	3.5E-06	—	NAP	NAP	4.7E-06	—	—	—	NAP	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	1.0E+00	1.3E-07	3.8E-07	—	NAP	NAP	5.1E-07	—	—	—	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	1.0E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Benzo(k)fluoranthene	207-08-9	9.7E-01	1.2E-08	3.7E-08	—	NAP	NAP	4.9E-08	—	—	—	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	7.4E-01	9.4E-07	2.8E-06	—	NAP	NAP	3.7E-06	—	—	—	NAP	NAP	0.0E+00
Indeno(1,2,3-cd)pyrene	193-39-5	8.1E-01	1.0E-07	3.1E-07	—	NAP	NAP	4.1E-07	—	—	—	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	1.4E+00	—	—	—	NAP	NAP	0.0E+00	—	—	—	NAP	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)														
Acetonitrile	75-05-8	6.7E-02	—	—	—	—	NAP	0.0E+00	—	—	1.8E-10	—	NAP	1.8E-10
Radionuclides (pCi/g)														
Actinium-227 +L	14952-40-0L	2.6E-01	9.6E-08	NAP	1.6E-09	NAP	4.4E-07	5.4E-07	—	—	—	NAP	NAP	0.0E+00
Americium-241	14596-10-2	1.1E-01	7.3E-09	NAP	8.8E-11	NAP	3.4E-09	1.1E-08	—	—	—	NAP	NAP	0.0E+00
Plutonium-238	13981-16-3	2.6E+01	2.2E-06	NAP	2.5E-08	NAP	2.1E-09	2.2E-06	—	—	—	NAP	NAP	0.0E+00
Radium-228 +L	15262-20-1L	7.0E-01	6.8E-07	NAP	3.0E-09	NAP	9.8E-06	1.1E-05	—	—	—	NAP	NAP	0.0E+00
Uranium-233/234	U-233/234	8.1E-01	3.7E-07	NAP	5.6E-09	NAP	1.1E-06	1.5E-06	—	—	—	NAP	NAP	0.0E+00
TOTAL			6.9E-06	7.4E-06	3.6E-08	0.0E+00	1.1E-05	**2.6E-05**	0.0E+00	0.0E+00	1.8E-10	0.0E+00	NAP	**1.8E-10**

CAS Number — Chemical Abstract Services number
EPC — exposure point concentration (lower of maximum concentration and 95%UCL) based on Table 2.6.
mg/kg — Milligram per kilogram.
— — *not applicable, not available, or not calculated due to insufficient toxicity data*
NAP — Not an applicable pathway.
pCi/g — Picocuries per gram
+D — *Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months–see HEAST).*
+L — Includes long-lived daughters.

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk values

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.17: Background Soil Risk for a Site Employee in Parcel 8

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ					Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	
Inorganics (mg/kg)														
Erbium	7440-52-0	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lithium	7439-93-2	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Tantalum	7440-25-7	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Dioxins & Dibenzofurans (mg/kg)														
1,2,3,4,6,7,8-HpCDD	35822-46-9	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
HpCDD	37871-00-4	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Pesticides & PCBs (mg/kg)														
Endosulfan II	33213-65-9	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Endosulfan Sulfate	1031-07-8	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Endrin Aldehyde	7421-93-4	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Endrin Ketone	53494-70-5	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
2-Benzyl-4-Chlorophenol	120-32-1	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(a)anthracene	56-55-3	0.0E+00	0.0E+00	0.0E+00	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	0.0E+00	0.0E+00	0.0E+00	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	0.0E+00	0.0E+00	0.0E+00	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(k)fluoranthene	207-08-9	---	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	0.0E+00	0.0E+00	0.0E+00	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.0E+00	0.0E+00	0.0E+00	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	0.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)														
Acetonitrile	75-05-8	---	---	---	---	---	NAP	0.0E+00	---	---	---	---	NAP	0.0E+00
Radionuclides (pCi/g)														
Actinium-227 +L***	14952-40-0L	---	---	NAP	---	NAP	---	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Americium-241	14596-10-2	0.0E+00	0.0E+00	NAP	0.0E+00	NAP	0.0E+00	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Plutonium-238	13981-16-3	1.0E-01	8.8E-09	NAP	1.0E-10	NAP	8.6E-12	9.0E-09	---	---	---	NAP	NAP	0.0E+00
Radium-228 +L	15262-20-1L	---	---	NAP	---	NAP	---	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Uranium-233/234	U-233/234	---	---	NAP	---	NAP	---	0.0E+00	---	---	---	NAP	NAP	0.0E+00
TOTAL			8.8E-09	0.0E+00	1.0E-10	0.0E+00	8.6E-12	**9.0E-09**	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on Appendix E of DOE 2004.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not an applicable pathway.
pCi/g	*Picocuries per gram*
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).
+L	Includes long-lived daughters.

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk values

*** Ac-227 background level assumes secular equilibrium with U235/236.

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

Table 5.18: Incremental Soil Risk for a Site Employee in Parcel 8

Constituent	CAS Number	EPC	CANCER EFFECTS						NON-CANCER EFFECTS					
			Route-Specific Risk					Cancer Risk Total	Route-Specific HQ					Non-Cancer HI Total
			Oral	Dermal	Inhalation Dust	Inhalation VOCs	External		Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	
Inorganics (mg/kg)														
Erbium	7440-52-0	6.9E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Lithium	7439-93-2	1.6E+01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Tantalum	7440-25-7	4.4E+02	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Dioxins & Dibenzofurans (mg/kg)														
1,2,3,4,6,7,8-HpCDD	35822-46-9	2.3E-03	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
HpCDD	37871-00-4	4.1E-03	1.1E-06	---	7.8E-11	NAP	NAP	1.1E-06	---	---	---	NAP	NAP	0.0E+00
Pesticides & PCBs (mg/kg)														
Endosulfan II	33213-65-9	4.4E-03	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Endosulfan Sulfate	1031-07-8	1.3E-03	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Endrin Aldehyde	7421-93-4	1.2E-02	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Endrin Ketone	53494-70-5	5.4E-03	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Semi-Volatile Organic Compounds (mg/kg)														
2-Benzyl-4-Chlorophenol	120-32-1	1.2E-01	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(a)anthracene	56-55-3	1.0E+00	1.3E-07	3.8E-07	---	NAP	NAP	5.1E-07	---	---	---	NAP	NAP	0.0E+00
Benzo(a)pyrene	50-32-8	9.3E-01	1.2E-06	3.5E-06	---	NAP	NAP	4.7E-06	---	---	---	NAP	NAP	0.0E+00
Benzo(b)fluoranthene	205-99-2	1.0E+00	1.3E-07	3.8E-07	---	NAP	NAP	5.1E-07	---	---	---	NAP	NAP	0.0E+00
Benzo(g,h,i)perylene	191-24-2	1.0E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Benzo(k)fluoranthene	207-08-9	9.7E-01	1.2E-08	3.7E-08	---	NAP	NAP	4.9E-08	---	---	---	NAP	NAP	0.0E+00
Dibenz(a,h)anthracene	53-70-3	7.4E-01	9.4E-07	2.8E-06	---	NAP	NAP	3.7E-06	---	---	---	NAP	NAP	0.0E+00
Indeno(1,2,3-cd)pyrene	193-39-5	8.1E-01	1.0E-07	3.1E-07	---	NAP	NAP	4.1E-07	---	---	---	NAP	NAP	0.0E+00
Phenanthrene	85-01-8	1.4E+00	---	---	---	NAP	NAP	0.0E+00	---	---	---	NAP	NAP	0.0E+00
Volatile Organic Compounds (mg/kg)														
Acetonitrile	75-05-8	6.7E-02	---	---	---	---	NAP	0.0E+00	---	---	1.8E-10	---	NAP	1.8E-10
Radionuclides (pCi/g)														
Actinium-227 +L	14952-40-0L	2.6E-01	9.6E-08	NAP	1.6E-09	NAP	4.4E-07	5.4E-07	---	---	---	NAP	NAP	0.0E+00
Americium-241	14596-10-2	1.1E-01	7.3E-09	NAP	8.8E-11	NAP	3.4E-09	1.1E-08	---	---	---	NAP	NAP	0.0E+00
Plutonium-238	13981-16-3	2.6E+01	2.2E-06	NAP	2.5E-08	NAP	2.1E-09	2.2E-06	---	---	---	NAP	NAP	0.0E+00
Radium-228 +L	15262-20-1L	7.0E-01	6.8E-07	NAP	3.0E-09	NAP	9.8E-06	1.1E-05	---	---	---	NAP	NAP	0.0E+00
Uranium-233/234	U-233/234	8.1E-01	3.7E-07	NAP	5.6E-09	NAP	1.1E-06	1.5E-06	---	---	---	NAP	NAP	0.0E+00
TOTAL			6.9E-06	7.4E-06	3.6E-08	0.0E+00	1.1E-05	**2.6E-05**	0.0E+00	0.0E+00	1.8E-10	0.0E+00	NAP	**1.8E-10**

CAS Number	Chemical Abstract Services number
EPC	exposure point concentration (lower of maximum concentration and 95%UCL) based on the difference between Total EPC and Background EPC.
mg/kg	Milligram per kilogram.
---	not applicable, not available, or not calculated due to insufficient toxicity data
NAP	Not an applicable pathway.
pCi/g	Picocuries per gram
+D	Toxicity criteria used to calculate risk include exposure to the radioisotope and its short-lived radioactive decay daughter products (i.e., decay products with radioactive half-lives less than or equal to 6 months--see HEAST).
+L	Includes long-lived daughters.

Numbers written as 1.0E-03 equal $1x10^{-3}$.
Numbers in bold total risk value

0.0E+00 is not a calculated number, rather an indicator that the value was not calculated due to the absence of data

6.0 UNCERTAINTY IN THE RISK ASSESSMENT

The following section presents an evaluation of the sources of uncertainty affecting the Parcel 6, 7, and 8 RRE and the relative influence of these uncertainties on the results of the evaluation. Uncertainty is inherent in every step of the risk assessment process. Risk assessment of contaminated sites must not be viewed as yielding single value, invariant results. Rather, the results of risk assessment are estimates that span a range of possible values, and should be interpreted only in light of the assumptions and methods used in the evaluation.

Uncertainty can be found at all phases in the risk assessment: in the analytical data, the exposure assessment, the toxicity assessment, and the risk characterization. Where uncertainty does exist, the RRE uses conservative assumptions to ensure that the outcome will be protective.

6.1 Uncertainty in Analytical Data

Uncertainty was introduced to the RRE when sample locations are selected and when samples were collected and analyzed. For the RRE, the long-term exposure concentrations were upper estimates of site concentrations (e.g., maximum detect or 95%UCL); therefore, a conservative bias to overestimate potential exposure has been incorporated into the risk estimates. Also, many samples are directed toward areas of known or likely contamination which introduces a conservative bias. The uncertainty associated with the statistical analysis of environmental data is low, with little introduction of bias. Although it is possible that contaminated areas of Parcel 6, 7, and 8 were not sampled, it is also possible that uncontaminated areas are under represented in the data set.

The RRE data were collected over a 17-year period. During this period analytical detection limits and methods have changed resulting in ever lower detection limits. Improved analytical techniques bias the RRE data set. In some cases, earlier data with higher detection limits had non-detected results at concentrations that were higher than

current maximum detected concentrations. Substitution of half the detection limit for non-detected analytes with an elevated detection limit tends to bias the EPC high.

6.2 Uncertainty in Exposure Assessment

Exposure assessment may introduce considerable uncertainty in the risk assessment process. The Parcel 6, 7, and 8 RRE utilized exposure assumptions and intake calculations presented in the RREM. The same exposure assumptions were used to update the site-specific RBGVs. The exposure assumptions are based on best professional judgment regarding potential land use, contaminant fate and transport, and receptor behavior. The uncertainty associated with the exposure assumptions used in the risk assessment is potentially significant. It most likely overestimates the actual risks because the exposure scenarios likely incorporate receptor movement throughout smaller exposure areas rather than throughout entire parcels.

Another source of uncertainty in the Parcel 6, 7, and 8 RRE involves external exposure to gamma-emitting radionuclides. External exposure refers to the irradiation of tissues by radiation emitted by radionuclides located outside the body either dispersed in air, on skin surfaces, or deposited on ground surfaces. Gamma and x-rays are the most penetrating of the emitted radiation and comprise the primary contribution to radiation dose from external exposures.

The calculation of risk from external radiation exposure assumes that any gamma-emitting radionuclide in soil is uniformly distributed in soil. The calculation of external radiation exposure risk includes a gamma-shielding factor (Se) to account for attenuation of radiation by structures, terrain or engineered barriers. Se is expressed as a fractional value between 0 and 1, representing the possible risk reduction range, from 0% to 100%, due to shielding. For the Parcel 6, 7, and 8 RRE a default value of 0.2 or 20% shielding for the site employee and 0.1 or 10% shielding for the construction worker scenarios was used in the risk calculations. The gamma-shielding values are conservative assumptions but are consistent with values previously used in the calculation of the RBGVs. A typical value, used for the default scenario in DOE's

RESidual RADiation (RESRAD) code is 0.5 (Yu 2001). This value implies that indoor levels of external radiation are 50% lower than outdoor levels, which will likely be conservative for situations involving low to moderate energy emitters. The gamma shielding factors used for the Parcel 6, 7, and 8 RRE (0.2 for the site employee, 0.1 for the construction worker) assume less shielding and are more conservative than the RESRAD default value of 0.5.

Identification of contaminants to be carried through the Residual Risk Evaluation (RRE) calculations is a multi-step process beginning with the identification of all contaminants detected in the area and then eliminating contaminants based upon a set of established screening criteria described in the Residual Risk Evaluation Methodology (RREM). One of the screening criteria utilized to identify COPCs were regulator-approved background levels presented in Appendix A of the RREM guidance (DOE, 1997a). The approved background values listed in the RREM are 95% upper tolerance limit (UTL) values while the exposure point concentrations used to quantify total risk are the lower of the 95% upper confidence limit (UCL) or the maximum detected concentration from the verification sample data set. The 95%UTLs estimate the high end of the detected range of the concentrations while the 95%UCLs estimate a bounding concentration based on the central tendency of the distribution. This difference may result in a less conservative screening of COPCs and characterization of background risk. To characterize the magnitude of the difference, a comparison of the 95%UTLs and the 95%UCLs for analytes in the background data set was conducted and is described in Appendix G. When the background values (95%UTLs) were compared to the 95%UCLs the difference was less than an order of magnitude for all background analytes. Since the difference between the background values (95%UTLs) and the 95%UCLs was less than an order of magnitude using the RREM background values to screen the COPCs and characterize background risk will have a small impact on outcome of risk calculations.

6.3 Uncertainties Related to Toxicity Information

Although EPA approved toxicity values were used for the RRE; a significant amount of uncertainty may surround these values. Identification of the sources of this uncertainty

enables the risk assessor to establish the degree of confidence associated with the toxicity values.

Uncertainty is inherent within the toxicity assessment primarily due to differences in study design, species, sex, routes of exposure, or dose-response relationships. A major source of uncertainty involves using toxicity values based on experimental studies that substantially differ from typical human exposure scenarios. The derivation of the toxicity values must take into account such differences as 1) using dose-response information from animal studies to predict effects in humans, 2) extrapolating dose-response information from high-dose studies to predict adverse health effects from low doses, 3) using data from short-term studies to predict chronic effects, and 4) extrapolating from uniform animal populations to variable human populations.

Cancer slope factors, in particular, are based on studies that may differ greatly from realistic situations. Experimental cancer bioassays typically expose animals to very high levels of chemicals (i.e., the maximum tolerated dose) for their entire lifetime. After appropriate studies have been identified, the slope factor is calculated as the upper 95th percent confidence limit of the slope of the dose-response curve. This introduces a degree of conservatism to the risk assessment process. In addition, carcinogens are assumed to be human carcinogens regardless of EPA's weight-of-evidence classification.

The derivation of reference doses involves the use of animal studies. Uncertainty factors ranging from 1 to 1,000 are incorporated into the reference dose to provide an extra level of health protection. The factors used depend on the type of study from which the value has been derived (e.g., animal or human, chronic or acute, study design). The scientific basis for this practice is somewhat subjective. In general, high uncertainty factors are meant to bias the results conservatively so that exposures at the reference dose level will not result in adverse health effects.

Toxicity values derived from oral administered dose studies have been converted to absorbed dose toxicity values for use in evaluating the dermal contact pathway. This is considered a more accurate approach than using unadjusted oral toxicity values for the dermal pathway. Uncertainty is introduced in the use of the gastrointestinal absorption factors. Limited information is available on the gastrointestinal absorption of some analytes and many have no information at all. In addition, no adjustments have been made for the medium of exposure (e.g., when the medium of exposure differs from the medium of exposure assumed by the toxicity value). The uncertainty associated with using the absorbed dose toxicity values for the dermal pathway is moderate and the bias unknown.

There are some chemicals for which no toxicity value exists and for which little information is available. Therefore, a quantitative risk estimate cannot be calculated for these chemicals. For example, many chemicals are not evaluated for the inhalation pathway because of limited inhalation-based toxicological information. The lack of toxicity information for some chemicals contributes to the underestimation of risks.

To estimate potential impact associated with simultaneous exposure to multiple chemicals, cancer risks were summed for all COPCs and hazard indexes were summed for all COPCs. In the case of carcinogens, this gives carcinogens with a class B or class C weight-of-evidence the same weight as carcinogens with a class A weight-of-evidence. It also equally weighs slope factors derived from animal data with those derived from human data. Uncertainties in the combined risks are also compounded because RfDs and cancer slope factors do not have equal accuracy or levels of confidence and are not based on the same severity of effect.

6.4 Uncertainties in Risk Characterization

Uncertainties in any phase of the risk analysis are reflected in the risk estimates. Some uncertainty is associated with the summation of risks and HQs for multiple chemical constituents. As stated in RAGS (EPA 1989), "The assumption of dose additivity ignores possible synergistic or antagonistic effects among chemicals, and assumes

similarity in mechanisms of action and metabolism." However, summing risks and HQs for multiple substances in this risk assessment provides a conservative estimate.

6.5 Conclusions

The residual risk in Parcel 6, 7, and 8 fall within acceptable risk range for industrial/commercial when compared to the National Oil & Hazardous Substances Pollution Contingency Plan (NCP, EPA 1990) the acceptable risk range of 10^{-4} to 10^{-6} (increased cancer risk of 1 human in 10,000 to 1 human in 1 million). The OEPA (Ohio Environmental Protection Agency) has a target risk goal of $1E^{-5}$.

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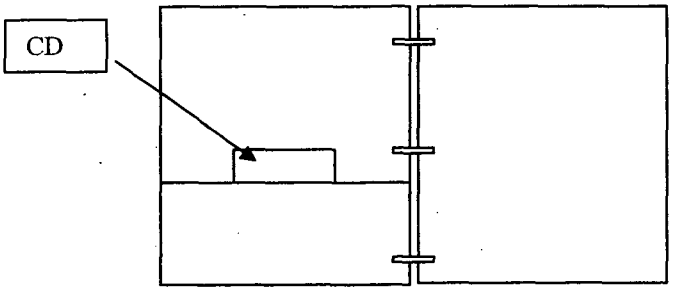
Appendix A
Parcel 6, 7, and 8 Data Sets
(Included on CD)

Envelope with CD

Included Inside Front Cover



Appendix B
RBGV Update for Construction Worker and Site Employee Receptors

Appendix B: Risk-Based Guideline Value (RBGV) Update for the Parcel 6, 7, and 8 RRE

B.1 Introduction

This appendix presents the risk-based guideline values (RBGVs) developed for the Miamisburg Closure Project (MCP), Parcel 6, 7, 8, Residual Risk Evaluation (RRE). The RBGVs are media-specific concentrations of constituents that correspond to specific human health risk levels for specified exposure scenarios and were used to screen Constituents of Potential Concern (COPCs). The RBGVs were developed for the Construction Worker and the Site Employee scenarios using the equations and exposure assumptions presented in the RBGV guidance (DOE 1997b). Since toxicological reference values and computational guidance relevant to the calculation of RBGVs have been updated since release of the Mound RBGV guidance in 1997, the Mound Facility RBGVs were updated for the Parcel 6, 7, and 8 RRE in 2006.

B.2 Development of Risk-Based Guideline Values

The RBGVs used to screen site-related constituents (SRCs) were developed specifically for Mound, following methods approved by the Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and Ohio EPA (DOE 1997b). The RBGVs correspond to the target risk level (TRL) of $1x10^{-6}$ for carcinogenic constituents and radionuclides, and to a target hazard index (THI) of one for each non-carcinogen constituent. A $1x10^{-6}$ risk level represents an incremental increase of one chance in one million of developing cancer as a result of exposure to the RBGV concentration. Since the TRL for carcinogenic constituents specified in the National Contingency Plan is a range of $1x10^{-4}$ to $1x10^{-6}$, screening SRCs against the RBGV of $1x10^{-6}$, or the low end of the range, is protective. The RBGVs for non-carcinogenic constituents were calculated for a HI of one. When both non-carcinogenic and carcinogenic values were calculated for a constituent, the lowest (most conservative) value was used as the RBGV.

To account for the possibility of more than one non-carcinogenic constituent, SRCs were screened using 1/10 the RBGV for non-carcinogenic constituents. Carcinogenic or radioactive constituents that exceed their RBGVs and non-carcinogenic constituents that exceed one-tenth of their RBGV were carried to the next step of constituent of potential concern (COPC) selection.

Exposure media evaluated for the Parcel 6, 7, and 8 RBGVs were based on the Mound RBGV guidance which included air, soil/sediment, groundwater and surface water. Receptors for the Parcel 6, 7, and 8 RBGVs included construction worker and site employee. Exposure pathways were similar to those in the Mound RBGVs with the addition of dermal exposure to soil and sediment.

An equation of the following general form was used to derive the RBGVs for carcinogens:

$$RBGV_{cancer} = \frac{TRL}{(Intake_{Ing} \times CSF_{Oral}) + (Intake_{Inh} \times CSF_{Inh}) + (Intake_{Derm} \times CSF_{Derm})}$$

Where:

TRL	=	target risk level (risk),
$Intake_{Ing}$	=	media-specific intake for ingestion pathway (mg/kg-day),
CSF_{Oral}	=	oral cancer slope factor for constituent i $(mg/kg\text{-}day)^{-1}$),
$Intake_{Inh}$	=	media-specific intake for inhalation pathway (mg/kg-day),
CSF_{Inh}	=	inhalation cancer slope factor for constituent i $((mg/kg\text{-}day)^{-1})$,
$Intake_{Derm}$	=	media-specific intake (i.e. absorbed dose) for dermal pathway (mg/kg-day), and
CSF_{Derm}	=	dermal cancer slope factor for constituent i $((mg/kg\text{-}day)^{-1})$.

The following equation was used to derive the RBGVs for non-carcinogens:

$$RBGV_{non-cancer} = \frac{THI}{(Intake_{Ing} / RFD_{Oral}) + (Intake_{Inh} / RFD_{Inh}) + (Intake_{Derm} / RFD_{Derm})}$$

Where:

THI	=	target hazard index (unitless),
$Intake_{Ing}$	=	media-specific intake for ingestion pathway (including food, where appropriate) (mg/kg-day),
RFD_{Oral}	=	oral chronic reference dose for constituent i (mg/kg-day),
$Intake_{Inh}$	=	media-specific intake for inhalation pathway (mg/kg-day),
RFD_{Inh}	=	inhalation chronic reference dose factor for constituent i (mg/kg-day),
$Intake_{Derm}$	=	media-specific intake (i.e., absorbed dose) for dermal pathway (mg/kg-day), and
RfD_{Derm}	=	dermal chronic reference dose factor for constituent i (mg/kg-day).

Dermal exposure to COPCs present in soil was not assessed by the original RBGV document but was included as a complete, significant exposure pathway for the Parcel 6, 7, and 8 RRE. Evaluation of the dermal exposure pathway follows guidance presented in EPA's RAGS Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment, Final) (EPA 2004a). Dermal exposure to sediment was also assessed using exposure assumptions similar to those used for soil. Specifically, the following information and procedures from RAGS Part E were used in development of RBGVs for dermal exposure to SRCs present in soil or sediment.

1) Gastrointestinal absorption (GI) and dermal absorption (ABS) factors were taken from RAGS Part E;
2) For exposure to soil and sediment, when no chemical-specific ABS value was available, no quantitative assessment of the dermal pathway is included in the RBGV calculation;
3) If the chemical-specific GI factor is less than 50 percent, the oral toxicity criteria are adjusted by the GI to generate dermal toxicity criteria. When GI factor is greater than 50 percent, the unadjusted oral toxicity criteria are used as the dermal toxicity criteria; and

4) For exposure to surface water, dermal exposure is included in the RBGV calculation only when dermal absorbed dose is greater than 10 percent of the oral intake, per RAGS Part E guidance.

Dermal exposure was assessed for soil and sediment exposure for all receptors. The following equation represents the equation used in calculating the RBGV screening values for dermal exposure to soil and sediment:

Chemical non-carcinogen exposure to soil and sediment:

$$CS_{derm} = \frac{(THI)(AT)(365\ days/yr)}{(EF)(CF)(1/RfD)(ABS_d)(SFS_{adj})}$$

Chemical carcinogen exposure to soil and sediment:

$$CS_{derm} = \frac{(TR)(AT)(365\ days/yr)}{(EF)(CF)(CSF_d)(ABS_d)(SFS_{adj})}$$

Where:

THI = Target Hazard Index

AT = Averaging Time

EF = Exposure Frequency

RfD = Reference Dose

ABS_d = Dermal Absorption Factor

TR = Target Risk

CF = Conversion Factor

CSF_d = Dermal Cancer Slope Factor

B.3 Exceptions and Updates for RBGVs

Exposure assumptions used for the RBGV updates were similar to those

presented in the RBGV guidance with a few exceptions. The Particle Emission Factors were replaced based on updated guidance from the Soil Screening Guidance: User's Guide (EPA 1996) Additional assumptions regarding chemical-specific dermal absorption factors and gastrointestinal factors were taken from "Supplemental Guidance for Dermal Risk Assessment," RAGS Part E (EPA 2004a).

B.4 Toxicity Values and Chemical Specific Parameters

RBGVs for all pathway and medium combinations were calculated using EPA approved toxicity criteria from the Integrated Risk Information System (IRIS, EPA 2005) and Health Effects Assessment Summary table (HEAST) (EPA 2001). IRIS is an electronic database (maintained online at http://www.epa.gov/iris/index.html) containing the most current descriptive and quantitative EPA regulatory information related to non-carcinogenic and carcinogenic health effects of chemical constituents. HEAST is a published reference, updated periodically by EPA. It contains toxicity information and values for constituents from health effects documents and profiles. Toxicological reference values used to calculate the RBGVs are presented in Table 3.1. Updated values were taken from HEAST (EPA 2001), IRIS (EPA 2005), RAGS E (EPA 2004a), and NCEA (EPA 1993).

B.5 Risk-Based Guideline Values

The Risk-Based Guideline Values are presented in tables B.1 through B.2.

B.2 Site Employee - Soil/Sediment Exposure Pathway					
		Chemical - Carcinogens (mg/kg)	Chemical - Noncarcinogens 1/ 10 Hazard Index (mg/kg)	Screening Values (mg/kg)	
Chemical	CAS Number	GV Total	GV Total	1.00E-06 RBGV	See Footnote
Metals					
Actinium	7440-34-8	---	---	---	
Aluminum	7429-90-5	---	1.69E+05	1.69E+05	b
Antimony	7440-36-0	---	8.18E+01	8.18E+01	b
Arsenic	7440-38-2	2.26E+00	3.64E+01	2.26E+00	a
Barium	7440-39-3	---	1.25E+04	1.25E+04	b
Beryllium	7440-41-7	2.25E+03	3.70E+02	3.70E+02	b
Bismuth	7440-69-9	---	---	---	
Boron	7440-42-8	---	4.05E+04	4.05E+04	b
Cadmium	7440-43-9s	3.00E+03	1.01E+01	1.01E+01	b
Calcium	7440-70-2	---	---	---	
Cerium	7440-45-1	---	3.85E+04	3.85E+04	b
Chromium	7440-47-3	---	---	---	
Chromium III	16065-83-1	---	3.07E+05	3.07E+05	b
Chromium VI	18540-29-9	6.51E+01	4.34E+02	6.51E+01	a
Cobalt	7440-48-4	1.93E+03	1.98E+03	1.93E+03	a
Copper	7440-50-8	---	8.18E+03	8.18E+03	b
Cyanide	57-12-5	---	4.09E+03	4.09E+03	b
Dypsprosium	7429-91-6	---	---	---	
Erbium	7440-52-0	---	---	---	
Europium	7440-53-1	---	---	---	
Gadolinium	7440-54-2	---	---	---	
Holmium	7440-60-0	---	---	---	
Iron	7439-89-6	---	---	---	
Lanthanum	7439-91-0	---	---	---	
Lead	7439-92-1	---	---	---	
Lithium	7439-93-2	---	---	---	
Lutetium	7439-94-3	---	---	---	
Magnesium	7439-95-4	---	---	---	
Manganese	7439-96-5s	---	3.25E+03	3.25E+03	b
Mercury	7439-97-6	---	5.78E+04	5.78E+04	b
Molybdenum	7439-98-7	---	1.02E+03	1.02E+03	b
Neodymium	7440-00-8	---	---	---	
Nickel	7440-02-0	---	4.09E+03	4.09E+03	b
Nitrate	14797-55-8	---	3.27E+05	3.27E+05	b
Nitrite	14797-65-0	---	2.04E+04	2.04E+04	b
Osmium	7440-04-2	---	---	---	
Potassium	7440-09-7	---	---	---	
Praseodym	7440-10-0	---	---	---	
Rubidium	7440-17-7	---	---	---	
Samarium	7440-19-9	---	---	---	
Selenium	7782-49-2	---	1.02E+03	1.02E+03	b
Silicon	7440-21-3	---	---	---	
Silver	7440-22-4	---	1.02E+03	1.02E+03	b
Sodium	7440-23-5	---	---	---	
Strontium	7440-24-6	---	1.23E+05	1.23E+05	b

Tantalum	7440-25-7	---	---	---	
Terbium	7440-27-9	---	---	---	
Thallium	7440-28-0	---	1.35E+01	1.35E+01	b
Tin	7440-31-5	---	1.23E+05	1.23E+05	b
Titanium	7440-32-6	---	7.17E+05	7.17E+05	b
Uranium	7440-61-1	---	4.09E+01	4.09E+01	b
Vanadium	7440-62-2	---	2.04E+02	2.04E+02	b
Ytterbium	7440-64-4	---	---	---	
Zinc	7440-66-6	---	6.13E+04	6.13E+04	b
Zirconium	7440-67-7	---	---	---	
BTEX Compounds					
Ethylbenzene	100-41-4	---	2.04E+04	2.04E+04	b
Xylenes, Total	1330-20-7	---	4.09E+04	4.09E+04	b
Dioxins/Dibenzofurans					
1,2,3,4,6,7,8-HpCDD	35822-46-9	---	---	---	
1,2,3,4,6,7,8-HpCDF	67562-39-4	---	---	---	
1,2,3,4,7,8,9-HpCDF	55673-89-7	---	---	---	
1,2,3,4,7,8-HxCDD	39227-28-6	---	---	---	
1,2,3,4,7,8-HxCDF	70648-26-9	---	---	---	
1,2,3,5,7,8-HxCDF	57117-44-9	---	---	---	
1,2,3,6,7,8-HxCDD	57653-85-7	---	---	---	
1,2,3,6,7,8-HxCDF	55684-94-1	3.81E-04	---	3.81E-04	a
1,2,3,7,8,9-HxCDD	19408-74-3	9.23E-04	---	9.23E-04	a
1,2,3,7,8,9-HxCDF	72918-21-9	---	---	---	
1,2,3,7,8-PeCDD	40321-76-4	---	---	---	
1,2,3,7,8-PeCDF	57117-41-6	7.63E-05	---	7.63E-05	a
2,3,4,6,7,8-HxCDF	60851-34-5	---	---	---	
2,3,4,7,8-PeCDF	57117-31-4	7.63E-04	---	7.63E-04	a
2,3,7,8-TCDD	1746-01-6	2.27E-05	---	2.27E-05	a
2,3,7,8-TCDF	51207-31-9	3.81E-04	---	3.81E-04	a
HpCDD	37871-00-4	3.81E-03	---	3.81E-03	a
HpCDF	38998-75-3	3.81E-03	---	3.81E-03	a
HxCDD	34465-46-8	3.81E-04	---	3.81E-04	a
OCDD	3268-87-9	3.81E-02	---	3.81E-02	a
OCDF	39001-02-0	3.81E-02	---	3.81E-02	a
PeCDD	36088-22-9	7.63E-05	---	7.63E-05	a
PeCDF	30402-15-4	---	---	---	
TCDD, Total	41903-57-5	---	---	---	
TCDF	30402-14-3	---	---	---	
Explosives					
1,3,5-Trinitrobenzene	99-35-4	---	6.13E+03	6.13E+03	b
1,3-Dinitrobenzene	99-65-0	---	2.04E+01	2.04E+01	b
2,4,6-Trinitrotoluene	118-96-7	1.91E+02	1.02E+02	1.02E+02	b
2,4-Dinitrotoluene	121-14-2	2.57E+00	1.25E+02	2.57E+00	a
2,6-Dinitrotoluene	606-20-2	2.57E+00	6.23E+01	2.57E+00	a
2-Amino-4,6-Dinitrotoluene	35572-78-2	---	---	---	
HMX	2691-41-0	---	1.02E+04	1.02E+04	b
Nitrobenzene	98-95-3	---	3.12E+01	3.12E+01	b
Nitroglycerin	55-63-0	---	---	---	
PETN	78-11-5	---	---	---	
RDX	121-82-4	5.20E+01	6.13E+02	5.20E+01	a
Tetryl	479-45-8	---	2.04E+03	2.04E+03	b

Pesticides and/or PCBs					
4,4'-DDD	72-54-8	2.38E+01	---	2.38E+01	a
4,4'-DDE	72-55-9	1.68E+01	---	1.68E+01	a
4,4'-DDT	50-29-3	9.56E+00	5.81E+01	9.56E+00	a
Aldrin	309-00-2	1.03E-01	1.87E+00	1.03E-01	a
Alpha Chlordane	5103-71-9	7.64E+00	4.77E+01	7.64E+00	a
Alpha-BHC	319-84-6	9.08E-01	1.02E+02	9.08E-01	a
Aroclor-1016	12674-11-2	1.95E+01	3.41E+00	3.41E+00	b
Aroclor-1221	11104-28-2	---	---	---	
Aroclor-1232	11141-16-5	---	---	---	
Aroclor-1242	53469-21-9	---	---	---	
Aroclor-1248	12672-29-6	---	---	---	
Aroclor-1254	11097-69-1	6.83E-01	9.75E-01	6.83E-01	a
Aroclor-1260	11096-82-5	---	---	---	
Beta-BHC	319-85-7	3.18E+00	4.09E+01	3.18E+00	a
Chlordane	57-74-9	7.64E+00	4.77E+01	7.64E+00	a
Delta-BHC	319-86-8	---	---	---	
Dieldrin	60-57-1	3.58E-01	1.02E+01	3.58E-01	a
Endosulfan I	959-98-8	---	---	---	
Endosulfan II	33213-65-9	---	---	---	
Endosulfan Sulfate	1031-07-8	---	---	---	
Endrin	72-20-8	---	6.13E+01	6.13E+01	b
Endrin Aldehyde	7421-93-4	---	---	---	
Endrin Ketone	53494-70-5	---	---	---	
Gamma Chlordane	5103-74-2	7.64E+00	4.77E+01	7.64E+00	a
Gamma-BHC (Lindane)	58-89-9	4.40E+00	6.13E+01	4.40E+00	a
Heptachlor	76-44-8	1.27E+00	1.02E+02	1.27E+00	a
Heptachlor Epoxide	1024-57-3	6.29E-01	2.66E+00	6.29E-01	a
Methoxychlor	72-43-5	---	1.02E+03	1.02E+03	b
Polychlorinated Biphenyls (PCBs)	1336-36-3	2.86E+00	4.09E+00	2.86E+00	a
Toxaphene	8001-35-2	5.20E+00	---	5.20E+00	a
Semi-Volatile Organics					
1,2,4-Trichlorobenzene	120-82-1	---	6.23E+02	6.23E+02	b
1,2-Dichlorobenzene	95-50-1	---	2.92E-03	2.92E-03	b
1,2-Diphenylhydrazine	122-66-7	2.18E+00	---	2.18E+00	a
1,3-Dichlorobenzene	541-73-1	---	1.87E+03	1.87E+03	b
1,4-Dichlorobenzene	106-46-7	7.27E+01	1.87E+03	7.27E+01	a
2,2'-oxybis(1-chloropropane)	108-60-1	8.17E+01	8.18E+03	8.17E+01	a
2,4,5-Trichlorophenol	95-95-4	---	6.23E+03	6.23E+03	b
2,4,6-Trichlorophenol	88-06-2	1.59E+02	6.23E+00	6.23E+00	b
2,4-Dichlorophenol	120-83-2	---	1.74E+02	1.74E+02	b
2,4-Dimethylphenol	105-67-9	---	1.25E+03	1.25E+03	b
2,4-Dinitrophenol	51-28-5	---	1.25E+02	1.25E+02	b
2,4-Dinitrotoluene	121-14-2	2.57E+00	1.25E+02	2.57E+00	a
2,6-Dinitrotoluene	606-20-2	2.57E+00	6.23E+01	2.57E+00	a
2-Benzyl-4-Chlorophenol	120-32-1	---	---	---	
2-Chloronaphthalene	91-58-7	---	1.64E+04	1.64E+04	b
2-Chlorophenol	95-57-8	---	3.12E+02	3.12E+02	b
2-Methylnaphthalene	91-57-6	---	8.18E+02	8.18E+02	b
2-Methylphenol	95-48-7	---	1.02E+04	1.02E+04	b
2-Nitroaniline	88-74-4	---	5.95E+02	5.95E+02	b
2-Nitrophenol	88-75-5	---	---	---	
3,3'-Dichlorobenzidine	91-94-1	3.88E+00	---	3.88E+00	a
3-Nitroaniline	99-09-2	8.31E+01	1.87E+01	1.87E+01	b
4,6-Dinitro-o-Cresol	534-52-1	---	6.23E+00	6.23E+00	b
4-Bromophenyl-phenyl Ether	101-55-3	---	---	---	

4-Chloro-3-Methylphenol	59-50-7	---	---	---	
4-Chloroaniline	106-47-8	---	2.49E+02	2.49E+02	b
4-Chlorophenyl-Phenylether	7005-72-3	---	---	---	
4-Methylphenol	106-44-5	---	1.02E+03	1.02E+03	b
4-Nitroaniline	100-01-6	8.31E+01	1.87E+02	8.31E+01	a
4-Nitrophenol	100-02-7	---	---	---	
Acenaphthene	83-32-9	---	3.09E+03	3.09E+03	b
Acenaphthylene	208-96-8	---	---	---	
Anthracene	120-12-7	---	1.55E+04	1.55E+04	b
Benzidine	92-87-5	7.59E-03	1.87E+02	7.59E-03	a
Benzo(a)anthracene	56-55-3	1.98E+00	---	1.98E+00	a
Benzo(a)pyrene	50-32-8	1.98E-01	---	1.98E-01	a
Benzo(b)fluoranthene	205-99-2	1.98E+00	---	1.98E+00	a
Benzo(g,h,i)perylene	191-24-2	---	---	---	
Benzo(k)fluoranthene	207-08-9	1.98E+01	---	1.98E+01	a
Benzoic Acid	65-85-0	---	2.49E+05	2.49E+05	b
Benzyl Alcohol	100-51-6	---	1.87E+04	1.87E+04	b
Bis(2-chloroethoxy)methane	111-91-1	---	---	---	
Bis(2-chloroethyl)ether	111-44-4	1.59E+00	---	1.59E+00	a
Bis(2-ethylhexyl)phthalate	117-81-7	1.25E+02	1.25E+03	1.25E+02	a
Butyl Benzyl Phthalate	85-68-7	---	1.25E+04	1.25E+04	b
Carbazole	86-74-8	8.72E+01	---	8.72E+01	a
Chrysene	218-01-9	1.98E+02	---	1.98E+02	a
Di-n-butyl Phthalate	84-74-2	---	6.23E+03	6.23E+03	b
Di-n-octyl Phthalate	117-84-0	---	8.18E+03	8.18E+03	b
Dibenz(a,h)anthracene	53-70-3	1.98E-01	---	1.98E-01	a
Dibenzofuran	132-64-9	---	1.25E+02	1.25E+02	b
Dichloromethane	75-09-02	---	---	---	
Diethyl Phthalate	84-66-2	---	4.99E+04	4.99E+04	b
Dimethyl Phthalate	131-11-3	---	2.04E+06	2.04E+06	b
Fluoranthene	206-44-0	---	2.06E+03	2.06E+03	b
Fluorene	86-73-7	---	2.06E+03	2.06E+03	b
Hexachlorobenzene	118-74-1	1.09E+00	4.99E+01	1.09E+00	a
Hexachlorobutadiene	87-68-3	2.24E+01	1.87E+01	1.87E+01	b
Hexachlorocyclopentadiene	77-47-4	---	3.70E+02	3.70E+02	b
Hexachloroethane	67-72-1	1.25E+02	6.23E+01	6.23E+01	b
Indeno(1,2,3-cd)pyrene	193-39-5	1.98E+00	---	1.98E+00	a
Isophorone	78-59-1	1.84E+03	1.25E+04	1.84E+03	a
N-Nitroso-di-n-propylamine	621-64-7	2.49E-01	---	2.49E-01	a
N-Nitrosodimethylamine	62-75-9	3.42E-02	4.99E-01	3.42E-02	a
N-Nitrosodiphenylamine	86-30-6	3.56E+02	1.25E+03	3.56E+02	a
Naphthalene	91-20-3	---	1.24E+03	1.24E+03	b
Nitrobenzene	98-95-3	---	3.12E+01	3.12E+01	b
Pentachlorophenol	87-86-5	7.12E+00	9.15E+02	7.12E+00	a
Phenanthrene	85-01-8	---	---	---	
Phenol	108-95-2	---	1.87E+04	1.87E+04	b
Pyrene	129-00-0	---	1.55E+03	1.55E+03	b
Pyridine	110-86-1	---	6.23E+01	6.23E+01	b
Tributyl phosphate	126-73-8	1.90E+02	1.25E+04	1.90E+02	a
Volatile Organics					
1,1,1,2-Tetrachloroethane	630-20-6	2.20E+02	6.13E+03	2.20E+02	a
1,1,1-Trichloroethane	71-55-6	---	5.72E+04	5.72E+04	b
1,1,2,2-Tetrachloroethane	79-34-5	2.86E+01	1.23E+04	2.86E+01	a
1,1,2-Trichloro-1,2,2-Trifluoroethane (FREON-113)	76-13-1	---	6.13E+06	6.13E+06	b
1,1,2-Trichloroethane	79-00-5	1.00E+02	8.18E+02	1.00E+02	a

1,1-Dichloroethane	75-34-3	---	2.04E+04	2.04E+04	b
1,1-Dichloroethene	75-35-4	---	1.02E+04	1.02E+04	b
1,1-Dichloropropene	563-58-6	---	---	---	
1,2,3-Trichlorobenzene	87-61-6	---	---	---	
1,2,3-Trichloropropane	96-18-4	2.86E+00	1.23E+03	2.86E+00	a
1,2,4-Trichlorobenzene	120-82-1	---	5.11E-05	5.11E-05	b
1,2,4-Trimethylbenzene	95-63-6	---	1.02E+04	1.02E+04	b
1,2-Dibromo-3-Chloropropane	96-12-8	4.09E+00	---	4.09E+00	a
1,2-Dichlorobenzene	95-50-1	---	2.92E-03	2.92E-03	b
1,2-Dichloroethane	107-06-2	6.29E+01	4.09E+03	6.29E+01	a
1,2-Dichloroethene	540-59-0	---	1.84E+03	1.84E+03	b
1,2-Dichloropropane	78-87-5	8.42E+01	---	8.42E+01	a
1,2-Diethylbenzene	135-01-3	---	---	---	
1,2-cis-Dichloroethene	156-59-2	---	2.04E+03	2.04E+03	b
1,2-trans-Dichloroethene	156-60-5	---	4.09E+03	4.09E+03	b
1,3,5-Trimethylbenzene	108-67-8	---	1.02E+04	1.02E+04	b
1,3-Dichlorobenzene	541-73-1	---	1.87E+03	1.87E+03	b
1,3-Dichloropropane	142-28-9	---	4.09E+03	4.09E+03	b
1,3-Diethylbenzene	141-93-5	---	---	---	
1,3-cis-Dichloropropene	10061-01-5	---	---	---	
1,3-trans-Dichloropropene	10061-02-6	---	---	---	
1,4-Dichlorobenzene	106-46-7	6.50E-05	1.18E-02	6.50E-05	a
1,4-Diethylbenzene	105-05-5	---	---	---	
1-Chlorohexane	544-10-5	---	---	---	
2,2'-oxybis(1-chloropropane)	108-60-1	8.18E+01	8.18E+03	8.18E+01	a
2,2-Dichloropropane	594-20-7	---	---	---	
2-Butanone	78-93-3	---	1.23E+05	1.23E+05	b
2-Chloroethylvinylether	110-75-8	---	---	---	
2-Chlorotoluene	95-49-8	---	4.09E+03	4.09E+03	b
2-Hexanone	591-78-6	---	---	---	
4-Chlorotoluene	106-43-4	---	---	---	
4-Methyl-2-pentanone	108-10-1	---	1.64E+04	1.64E+04	b
Acetone	67-64-1	---	1.84E+05	1.84E+05	b
Acetonitrile	75-05-8	---	---	---	
Acrylonitrile	107-13-1	1.06E+01	2.04E+02	1.06E+01	a
Benzene	71-43-2	1.04E+02	8.18E+02	1.04E+02	a
Benzyl Chloride	100-44-7	3.37E+01	---	3.37E+01	a
Bromobenzene (Phenyl bromide, Monobromobenzene)	108-86-1	---	4.09E+03	4.09E+03	b
Bromochloromethane	74-97-5	---	---	---	
Bromodichloromethane	75-27-4	9.23E+01	4.09E+03	9.23E+01	a
Bromoform	75-25-2	7.24E+02	4.09E+03	7.24E+02	a
Bromomethane	74-83-9	---	2.86E+02	2.86E+02	b
Carbon Disulfide	75-15-0	---	2.04E+04	2.04E+04	b
Carbon Tetrachloride	56-23-5	4.40E+01	1.43E+02	4.40E+01	a
Chlorobenzene	108-90-7	---	4.09E+03	4.09E+03	b
Chloroethane	75-00-3	1.97E+03	8.18E+04	1.97E+03	a
Chloroform (Trichloromethane)	67-66-3	---	2.04E+03	2.04E+03	b
Chloromethane	74-87-3	---	---	---	
Chlorotoluene	25168-05-2	---	---	---	
Dibromochloromethane	124-48-1	6.81E+01	4.09E+03	6.81E+01	a
Dibromomethane	74-95-3	---	2.04E+03	2.04E+03	b
Dichlorodifluoromethane	75-71-8	---	4.09E+04	4.09E+04	b
Dichloromethane (Methylene Chloride)	75-09-2	7.63E+02	1.23E+04	7.63E+02	a
Ethylbenzene	100-41-4	---	2.04E+04	2.04E+04	b
Ethylene Dibromide (1,2-Dibromoethane)	106-93-4	2.86E+00	1.84E+03	2.86E+00	a
Freon	76-13-1	---	6.13E+06	6.13E+06	b
Fluorobenzene	462-06-6	---	---	---	

Hexachlorobutadiene	87-68-3	2.24E+01	1.87E+01	1.87E+01	b
Hexane	110-54-3	---	2.25E+06	2.25E+06	b
Iodomethane	74-88-4	---	---	---	
Isopropyl Benzene	98-82-8	---	2.04E+04	2.04E+04	b
Naphthalene	91-20-3	---	4.38E-05	4.38E-05	b
O-Chloroflurobenzene	348-51-6	---	---	---	
Phenyl Bromide	108-86-1	---	4.09E+03	4.09E+03	b
Styrene	100-42-5	---	4.09E+04	4.09E+04	b
Tetrachloroethene	127-18-4	1.06E+01	2.04E+03	1.06E+01	a
Toluene	108-88-3	---	4.09E+04	4.09E+04	b
Total VOC's	TVOC	---	---	---	
Trichloroethene	79-01-6	1.43E+01	6.13E+01	1.43E+01	a
Trichlorofluoromethane	75-69-4	---	6.13E+04	6.13E+04	b
Vinyl Acetate	108-05-4	---	2.04E+05	2.04E+05	b
Vinyl Chloride	75-01-4	3.82E+00	6.13E+02	3.82E+00	a
Xylenes, Total	1330-20-7	---	4.09E+04	4.09E+04	b
m-Xylene	108-38-3	---	4.09E+05	4.09E+05	b
mp-Xylene	mp-Xylene	---	---	2.79E+02	b
n-Butylbenzene	104-51-8	---	---	---	
n-propylbenzene	103-65-1	---	---	---	
o-Xylene	95-47-6	---	4.09E+05	4.09E+05	b
p-Isopropyltoluene	99-87-6	---	---	---	
p-Xylene	106-42-3	---	---	---	
sec-Butylbenzene	135-98-8	---	---	---	
tert-Butylbenzene	98-06-6	---	---	---	

a= carcinogenic risk
b=non-carcinogenic risk

Radiological		**GV Total**
		pCi/g
Actinium	7440-34-8	---
Actinium-227	14952-40-0	7.49E+00
Actinium-227 +D	14952-40-0(+D)	5.02E-01
Actinium-227 long lived decay	14952-40-0L	5.02E-01
Actinium-228	14331-83-0	2.01E-01
Americium-241	14596-10-2	9.93E+00
Antimony-124	14683-10-4	1.03E-01
Antimony-125	14234-35-6	5.03E-01
Antimony-125+D	14234-35-6(+D)	5.03E-01
Barium-133	13981-41-4	6.32E-01
Barium-133m	13981-41-4m	4.59E+00
Barium-140	14798-08-4	1.18E+00
Beryllium-7	13966-02-4	4.28E+00
Bismuth-207	13982-38-2	1.29E-01
Bismuth-210	14331-79-4	9.07E+01
Bismuth-210m	BI-210M	8.67E-01
Bismuth-211	15229-37-5	4.85E+00
Bismuth-212	14913-49-6	1.03E+00
Bismuth-214	14733-03-0	1.22E-01
Cerium-139	CE-139	---
Cerium-141	13967-74-3	3.95E+00
Cerium-144	14762-78-8	1.15E+01
Cerium-144+D	14762-78-8(+D)	3.34E+00
Cesium-134	13967-70-9	1.28E-01
Cesium-134m	13967-70-9m	1.82E+01
Cesium-137	10045-97-3	7.08E+01

Cesium-137 +D	10045-97-3(+D)	3.56E-01
Cesium-137 long lived decay	10045-97-3L	3.56E-01
Chromium-51	14392-02-0	7.18E+00
Cobalt-57	13981-50-5	2.56E+00
Cobalt-58	13981-38-9	2.04E-01
Cobalt-58m	13981-38-9m	9.13E+03
Cobalt-60	10198-40-0	7.35E-02
Cobalt-60m	10198-40-0m	4.90E+01
Europium-152	14683-23-9	1.72E-01
Europium-152m	14683-23-9m	6.85E-01
Europium-154	15585-10-1	1.56E-01
Europium-155	14391-16-3	7.27E+00
Iodine-131	24267-56-9	---
Iridium-192	12154-84-6	---
Iron-59	14596-12-4	1.56E-01
Lanthanum-140	13981-28-7	7.93E-02
Lead-210	14255-04-0	1.73E+00
Lead-210+D	14255-04-0(+D)	1.19E+00
Lead-210 long lived decay	14255-04-0L	1.19E+00
Lead-212	15092-94-1	1.73E+00
Lead-214	15067-28-4	9.29E-01
Manganese-54	13966-31-9	2.34E-01
Mercury-203	13982-78-0	9.87E-01
Neptunium-237	13994-20-2	9.43E+00
Neptunium-237+D	13994-20-2(+D)	1.08E+00
Niobium-95	13967-76-5	2.58E-01
Niobium-95m	13967-76-5m	3.88E+00
Plutonium-238	13981-16-3	1.13E+01
Plutonium-238/239	PU-238/239	1.12E+01
Plutonium-239	15117-48-3	1.12E+01
Plutonium-239/240	PU-239/240	1.11E+01
Plutonium-241	14119-32-5	9.40E+02
Plutonium-242	13982-10-0	1.17E+01
Polonium-210	13981-52-7	4.00E+00
Potassium-40	13966-00-2	1.12E+00
Protactinium-231	14331-85-2	3.66E+00
Protactinium-231+D	14331-85-2D	4.41E-01
Protactinium-231 long lived decay	14331-85-2L	4.41E-01
Protactinium-233	13981-14-1	1.22E+00
Protactinium-234	15100-28-4	1.05E-01
Protactinium-234m	15100-28-4m	1.33E+01
Radium-223	15623-45-7	1.47E+00
Radium-224	13233-32-4	5.47E+00
Radium-225	13981-53-8	1.07E+01
Radium-226	13982-63-3	3.94E+00
Radium-226+D	13982-63-3(+D)	1.05E-01
Radium-226 long lived decay	13982-63-3L	9.64E-02
Radium-228	15262-20-1	1.40E+00
Radium-228+D	15262-20-1(+D)	1.76E-01
Radium-228 long lived decay	15262-20-1L	6.92E-02
Ruthenium-103	13968-53-1	4.47E-01
Ruthenium-106	13967-48-1	2.69E+01
Ruthenium-106+D	13967-48-1(+D)	9.12E-01
Scandium-46	13967-63-0	9.47E-02
Silver	7440-22-4	---
Silver-108m	14391-65-2m	1.27E-01
Sodium-22	13966-32-0	8.85E-02
Strontium-85	13967-73-2	4.14E-01

Strontium-85m	13967-73-2m	1.11E+00
Strontium-89	14158-27-1	5.34E+01
Strontium-90	10098-97-2	3.42E+01
Strontium-90+D	10098-97-2(+D)	1.50E+01
Thallium-208	14913-50-9	5.18E-02
Thorium-227	15623-47-9	2.17E+00
Thorium-228	14274-82-9	9.18E+00
Thorium-228+D	14274-82-9(+D)	1.14E-01
Thorium-228 long lived decay	14274-82-9L	1.14E-01
Thorium-229	15594-54-4	2.39E+00
Thorium-229+D	15594-54-4(+D)	5.86E-01
Thorium-229 long lived decay	15594-54-4L	5.86E-01
Thorium-230	14269-63-7	1.50E+01
Thorium-230 D+	14269-63-7(+D)	9.58E-02
Thorium-230 long lived decay	14269-63-7L	9.58E-02
Thorium-232	7440-29-1	1.30E+01
Thorium-232 +D	7440-29-1(+D)	6.88E-02
Thorium-232 long lived decay	7440-29-1L	6.88E-02
Thorium-234	15065-10-8	2.58E+01
Tin-113	13966-06-8	3.85E+01
Tin-126	15832-50-5	7.62E+00
Tritium (particulate)	10028-17-8p	1.45E+04
Tritium (water)	10028-17-8w	3.46E+04
Uranium-232	14158-29-3	5.50E+00
Uranium-233	13968-55-3	1.92E+01
Uranium-233 long lived decay	13968-55-3L	5.69E-01
Uranium-233/234	U-233/234	5.52E-01
Uranium-234	13966-29-5	1.97E+01
Uranium-235	15117-96-1	1.62E+00
Uranium-235+D	15117-96-1(+D)	1.55E+00
Uranium-235 long lived decay	15117-96-1L	3.43E-01
Uranium-235/236	U-235/236	3.32E-01
Uranium-238	7440-61-1	2.19E+01
Uranium-238+D	7440-61-1(+D)	5.22E+00
Uranium-238 long lived decay	7440-61-1L	9.36E-02
Yttrium-88	7440-65-5	---
Zinc-65	13982-39-3	3.24E-01
Zirconium-95	13967-71-0	2.68E-01

Table B.1: Construction Worker - Soil/Sediment Exposure Pathway					
		Chemical - Carcinogens (mg/kg)	Chemical - Noncarcinogens 1/ 10 Hazard Index (mg/kg)	Screening Values (mg/kg)	
Chemical	CAS Number	GV Total	GV Total	1.00E-06 RBGV	See Footnote
Metals					
Actinium	7440-34-8	- - -	- - -	- - -	
Aluminum	7429-90-5	- - -	2.08E+04	2.08E+04	b
Antimony	7440-36-0	- - -	8.52E+00	8.52E+00	b
Arsenic	7440-38-2	1.85E+00	5.96E+00	1.85E+00	a
Barium	7440-39-3	- - -	1.47E+03	1.47E+03	b
Beryllium	7440-41-7	1.12E+04	4.21E+01	4.21E+01	b
Bismuth	7440-69-9	- - -	- - -	- - -	
Boron	7440-42-8	- - -	4.25E+03	4.25E+03	b
Cadmium	7440-43-9s	1.50E+04	5.46E+00	5.46E+00	b
Calcium	7440-70-2	- - -	- - -	- - -	
Cerium	7440-45-1	- - -	3.85E+04	3.85E+04	b
Chromium	7440-47-3	- - -	- - -	- - -	
Chromium III	16065-83-1	- - -	3.19E+04	3.19E+04	b
Chromium VI	18540-29-9	3.26E+02	6.12E+01	6.12E+01	b
Cobalt	7440-48-4	9.64E+03	3.83E+02	3.83E+02	b
Copper	7440-50-8	- - -	8.52E+02	8.52E+02	b
Cyanide	57-12-5	- - -	4.26E+02	4.26E+02	b
Dypsprosium	7429-91-6	- - -	- - -	- - -	
Erbium	7440-52-0	- - -	- - -	- - -	
Europium	7440-53-1	- - -	- - -	- - -	
Gadolinium	7440-54-2	- - -	- - -	- - -	
Holmium	7440-60-0	- - -	- - -	- - -	
Iron	7439-89-6	- - -	- - -	- - -	
Lanthanum	7439-91-0	- - -	- - -	- - -	
Lead	7439-92-1	- - -	- - -	- - -	
Lithium	7439-93-2	- - -	- - -	- - -	
Lutetium	7439-94-3	- - -	- - -	- - -	
Magnesium	7439-95-4	- - -	- - -	- - -	
Manganese	7439-96-5s	- - -	4.85E+02	4.85E+02	b
Mercury	7439-97-6	- - -	5.78E+04	5.78E+04	b
Molybdenum	7439-98-7	- - -	1.06E+02	1.06E+02	b
Neodymium	7440-00-8	- - -	- - -	- - -	
Nickel	7440-02-0	- - -	4.26E+02	4.26E+02	b
Nitrate	14797-55-8	- - -	3.41E+04	3.41E+04	b
Nitrite	14797-65-0	- - -	2.13E+03	2.13E+03	b
Osmium	7440-04-2	- - -	- - -	- - -	
Potassium	7440-09-7	- - -	- - -	- - -	
Praseodym	7440-10-0	- - -	- - -	- - -	
Rubidium	7440-17-7	- - -	- - -	- - -	
Samarium	7440-19-9	- - -	- - -	- - -	
Selenium	7782-49-2	- - -	1.06E+02	1.06E+02	b
Silicon	7440-21-3	- - -	- - -	- - -	
Silver	7440-22-4	- - -	1.06E+02	1.06E+02	b
Sodium	7440-23-5	- - -	- - -	- - -	
Strontium	7440-24-6	- - -	1.28E+04	1.28E+04	b
Tantalum	7440-25-7	- - -	- - -	- - -	
Terbium	7440-27-9	- - -	- - -	- - -	

Thallium	7440-28-0	---	1.41E+00	1.41E+00	b
Tin	7440-31-5	---	1.28E+04	1.28E+04	b
Titanium	7440-32-6	---	8.39E+04	8.39E+04	b
Uranium	7440-61-1	---	4.26E+00	4.26E+00	b
Vanadium	7440-62-2	---	2.13E+01	2.13E+01	b
Ytterbium	7440-64-4	---	---	---	
Zinc	7440-66-6	---	6.39E+03	6.39E+03	b
Zirconium	7440-67-7	---	---	---	
BTEX Compounds					
Ethylbenzene	100-41-4	7.80E+01	4.76E+02	7.80E+01	a
Xylenes, Total	1330-20-7	---	6.42E+01	6.42E+01	b
Dioxins/Dibenzofurans					
1,2,3,4,6,7,8-HpCDD	35822-46-9	---	---	---	
1,2,3,4,6,7,8-HpCDF	67562-39-4	---	---	---	
1,2,3,4,7,8,9-HpCDF	55673-89-7	---	---	---	
1,2,3,4,7,8-HxCDD	39227-28-6	---	---	---	
1,2,3,4,7,8-HxCDF	70648-26-9	---	---	---	
1,2,3,5,7,8-HxCDF	57117-44-9	---	---	---	
1,2,3,6,7,8-HxCDD	57653-85-7	---	---	---	
1,2,3,6,7,8-HxCDF	55684-94-1	1.99E-04	---	1.99E-04	a
1,2,3,7,8,9-HxCDD	19408-74-3	4.81E-04	---	4.81E-04	a
1,2,3,7,8,9-HxCDF	72918-21-9	---	---	---	
1,2,3,7,8-PeCDD	40321-76-4	---	---	---	
1,2,3,7,8-PeCDF	57117-41-6	3.97E-05	---	3.97E-05	a
2,3,4,6,7,8-HxCDF	60851-34-5	---	---	---	
2,3,4,7,8-PeCDF	57117-31-4	3.97E-04	---	3.97E-04	a
2,3,7,8-TCDD	1746-01-6	1.86E-05	---	1.86E-05	a
2,3,7,8-TCDF	51207-31-9	1.99E-04	---	1.99E-04	a
HpCDD	37871-00-4	1.99E-03	---	1.99E-03	a
HpCDF	38998-75-3	1.99E-03	---	1.99E-03	a
HxCDD	34465-46-8	1.99E-04	---	1.99E-04	a
OCDD	3268-87-9	1.99E-02	---	1.99E-02	a
OCDF	39001-02-0	1.99E-02	---	1.99E-02	a
PeCDD	36088-22-9	3.97E-05	---	3.97E-05	a
PeCDF	30402-15-4	---	---	---	
TCDD, Total	41903-57-5	---	---	---	
TCDF	30402-14-3	---	---	---	
Explosives					
1,3,5-Trinitrobenzene	99-35-4	---	6.39E+02	6.39E+02	b
1,3-Dinitrobenzene	99-65-0	---	2.13E+00	2.13E+00	b
2,4,6-Trinitrotoluene	118-96-7	9.94E+01	1.06E+01	1.06E+01	b
2,4-Dinitrotoluene	121-14-2	3.54E+00	3.44E+01	3.54E+00	a
2,6-Dinitrotoluene	606-20-2	3.54E+00	1.72E+01	3.54E+00	a
2-Amino-4,6-Dinitrotoluene	35572-78-2	---	---	---	
HMX	2691-41-0	---	1.06E+03	1.06E+03	b
Nitrobenzene	98-95-3	---	8.60E+00	8.60E+00	b
Nitroglycerin	55-63-0	---	---	---	
PETN	78-11-5	---	---	---	
RDX	121-82-4	2.71E+01	6.39E+01	2.71E+01	a
Tetryl	479-45-8	---	2.13E+02	2.13E+02	b
Pesticides and/or PCBs					
4,4'-DDD	72-54-8	1.24E+01	---	1.24E+01	a

4,4'-DDE	72-55-9	8.77E+00	---	8.77E+00	a
4,4'-DDT	50-29-3	8.12E+00	9.86E+00	8.12E+00	a
Aldrin	309-00-2	1.42E-01	5.16E-01	1.42E-01	a
Alpha Chlordane	5103-71-9	7.61E+00	9.52E+00	7.61E+00	a
Alpha-BHC	319-84-6	4.73E-01	1.06E+01	4.73E-01	a
Aroclor-1016	12674-11-2	3.20E+01	1.12E+00	1.12E+00	b
Aroclor-1221	11104-28-2	---	---	---	
Aroclor-1232	11141-16-5	---	---	---	
Aroclor-1242	53469-21-9	---	---	---	
Aroclor-1248	12672-29-6	---	---	---	
Aroclor-1254	11097-69-1	1.12E+00	3.20E-01	3.20E-01	b
Aroclor-1260	11096-82-5	---	---	---	
Beta-BHC	319-85-7	1.66E+00	4.26E+00	1.66E+00	a
Chlordane	57-74-9	7.61E+00	9.52E+00	7.61E+00	a
Delta-BHC	319-86-8	---	---	---	
Dieldrin	60-57-1	1.86E-01	1.06E+00	1.86E-01	a
Endosulfan I	959-98-8	---	---	---	
Endosulfan II	33213-65-9	---	---	---	
Endosulfan Sulfate	1031-07-8	---	---	---	
Endrin	72-20-8	---	6.39E+00	6.39E+00	b
Endrin Aldehyde	7421-93-4	---	---	---	
Endrin Ketone	53494-70-5	---	---	---	
Gamma Chlordane	5103-74-2	7.61E+00	9.52E+00	7.61E+00	a
Gamma-BHC (Lindane)	58-89-9	2.29E+00	6.39E+00	2.29E+00	a
Heptachlor	76-44-8	6.62E-01	1.06E+01	6.62E-01	a
Heptachlor Epoxide	1024-57-3	3.28E-01	2.77E-01	2.77E-01	b
Methoxychlor	72-43-5	---	1.06E+02	1.06E+02	b
Polychlorinated Biphenyls (PCBs)	1336-36-3	1.49E+00	4.26E-01	4.26E-01	b
Toxaphene	8001-35-2	2.71E+00	---	2.71E+00	a
Semi-Volatile Organics					
1,2,4-Trichlorobenzene	120-82-1	---	1.72E+02	1.72E+02	b
1,2-Dichlorobenzene	95-50-1	---	1.55E+03	1.55E+03	b
1,2-Diphenylhydrazine	122-66-7	3.01E+00	---	3.01E+00	a
1,3-Dichlorobenzene	541-73-1	---	5.16E+02	5.16E+02	b
1,4-Dichlorobenzene	106-46-7	1.00E+02	5.16E+02	1.00E+02	a
2,2'-oxybis(1-chloropropane)	108-60-1	4.26E+01	8.52E+02	4.26E+01	a
2,4,5-Trichlorophenol	95-95-4	---	1.72E+03	1.72E+03	b
2,4,6-Trichlorophenol	88-06-2	2.19E+02	1.72E+00	1.72E+00	b
2,4-Dichlorophenol	120-83-2	---	5.05E+01	5.05E+01	b
2,4-Dimethylphenol	105-67-9	---	3.44E+02	3.44E+02	b
2,4-Dinitrophenol	51-28-5	---	3.44E+01	3.44E+01	b
2,4-Dinitrotoluene	121-14-2	3.54E+00	3.44E+01	3.54E+00	a
2,6-Dinitrotoluene	606-20-2	3.54E+00	1.72E+01	3.54E+00	a
2-Benzyl-4-Chlorophenol	120-32-1	---	---	---	
2-Chloronaphthalene	91-58-7	---	1.70E+03	1.70E+03	b
2-Chlorophenol	95-57-8	---	8.60E+01	8.60E+01	b
2-Methylnaphthalene	91-57-6	---	8.52E+01	8.52E+01	b
2-Methylphenol	95-48-7	---	1.06E+03	1.06E+03	b
2-Nitroaniline	88-74-4	---	6.37E+01	6.37E+01	b
2-Nitrophenol	88-75-5	---	---	---	
3,3'-Dichlorobenzidine	91-94-1	5.35E+00	---	5.35E+00	a
3-Nitroaniline	99-09-2	1.15E+02	5.16E+00	5.16E+00	b
4,6-Dinitro-o-Cresol	534-52-1	---	1.72E+00	1.72E+00	b
4-Bromophenyl-phenyl Ether	101-55-3	---	---	---	
4-Chloro-3-Methylphenol	59-50-7	---	---	---	

4-Chloroaniline	106-47-8	- - -	6.88E+01	6.88E+01	b
4-Chlorophenyl-Phenylether	7005-72-3	- - -	- - -	- - -	
4-Methylphenol	106-44-5	- - -	1.06E+02	1.06E+02	b
4-Nitroaniline	100-01-6	1.15E+02	5.16E+01	5.16E+01	b
4-Nitrophenol	100-02-7	- - -	- - -	- - -	
Acenaphthene	83-32-9	- - -	9.76E+02	9.76E+02	b
Acenaphthylene	208-96-8	- - -	- - -	- - -	
Anthracene	120-12-7	- - -	4.88E+03	4.88E+03	b
Benzidine	92-87-5	1.05E-02	5.16E+01	1.05E-02	a
Benzo(a)anthracene	56-55-3	3.12E+00	- - -	3.12E+00	a
Benzo(a)pyrene	50-32-8	3.12E-01	- - -	3.12E-01	a
Benzo(b)fluoranthene	205-99-2	3.12E+00	- - -	3.12E+00	a
Benzo(g,h,i)perylene	191-24-2	- - -	- - -	- - -	
Benzo(k)fluoranthene	207-08-9	3.12E+01	- - -	3.12E+01	a
Benzoic Acid	65-85-0	- - -	6.88E+04	6.88E+04	b
Benzyl Alcohol	100-51-6	- - -	5.16E+03	5.16E+03	b
Bis(2-chloroethoxy)methane	111-91-1	- - -	- - -	- - -	
Bis(2-chloroethyl)ether	111-44-4	2.19E+00	- - -	2.19E+00	a
Bis(2-ethylhexyl)phthalate	117-81-7	1.72E+02	3.44E+02	1.72E+02	a
Butyl Benzyl Phthalate	85-68-7	- - -	3.44E+03	3.44E+03	b
Carbazole	86-74-8	1.20E+02	- - -	1.20E+02	a
Chrysene	218-01-9	3.12E+02	- - -	3.12E+02	a
Di-n-butyl Phthalate	84-74-2	- - -	1.72E+03	1.72E+03	b
Di-n-octyl Phthalate	117-84-0	- - -	8.52E+02	8.52E+02	b
Dibenz(a,h)anthracene	53-70-3	3.12E-01	- - -	3.12E-01	a
Dibenzofuran	132-64-9	- - -	3.44E+01	3.44E+01	b
Dichloromethane	75-09-02	- - -	- - -	- - -	
Diethyl Phthalate	84-66-2	- - -	1.38E+04	1.38E+04	b
Dimethyl Phthalate	131-11-3	- - -	2.13E+05	2.13E+05	b
Fluoranthene	206-44-0	- - -	6.51E+02	6.51E+02	b
Fluorene	86-73-7	- - -	6.51E+02	6.51E+02	b
Hexachlorobenzene	118-74-1	1.51E+00	1.38E+01	1.51E+00	a
Hexachlorobutadiene	87-68-3	3.09E+01	5.16E+00	5.16E+00	b
Hexachlorocyclopentadiene	77-47-4	- - -	1.03E+02	1.03E+02	b
Hexachloroethane	67-72-1	1.72E+02	1.72E+01	1.72E+01	b
Indeno(1,2,3-cd)pyrene	193-39-5	3.12E+00	- - -	3.12E+00	a
Isophorone	78-59-1	2.54E+03	3.44E+03	2.54E+03	a
N-Nitroso-di-n-propylamine	621-64-7	3.44E-01	- - -	3.44E-01	a
N-Nitrosodimethylamine	62-75-9	4.72E-02	1.38E-01	4.72E-02	a
N-Nitrosodiphenylamine	86-30-6	4.92E+02	3.44E+02	3.44E+02	b
Naphthalene	91-20-3	- - -	3.44E+02	3.44E+02	b
Nitrobenzene	98-95-3	- - -	8.60E+00	8.60E+00	b
Pentachlorophenol	87-86-5	1.56E+01	4.01E+02	1.56E+01	a
Phenanthrene	85-01-8	- - -	- - -	- - -	
Phenol	108-95-2	- - -	5.16E+03	5.16E+03	b
Pyrene	129-00-0	- - -	4.88E+02	4.88E+02	b
Pyridine	110-86-1	- - -	1.72E+01	1.72E+01	b
Tributyl phosphate	126-73-8	2.62E+02	3.44E+03	2.62E+02	a
Volatile Organics					
1,1,1,2-Tetrachloroethane	630-20-6	2.73E+01	6.39E+02	2.73E+01	a
1,1,1-Trichloroethane	71-55-6	- - -	6.84E+02	6.84E+02	b
1,1,2,2-Tetrachloroethane	79-34-5	3.50E+00	1.28E+03	3.50E+00	a
1,1,2-Trichloro-1,2,2-Trifluoroethane (FREON-113)	76-13-1	- - -	6.93E+03	6.93E+03	b
1,1,2-Trichloroethane	79-00-5	8.19E+00	8.52E+01	8.19E+00	a

1,1-Dichloroethane	75-34-3	- - -	1.93E+02	1.93E+02	b
1,1-Dichloroethene	75-35-4	- - -	4.20E+01	4.20E+01	b
1,1-Dichloropropene	563-58-6	- - -	- - -	- - -	
1,2,3-Trichlorobenzene	87-61-6	- - -	- - -	- - -	
1,2,3-Trichloropropane	96-18-4	1.49E+00	1.06E+00	1.06E+00	b
1,2,4-Trichlorobenzene	120-82-1	- - -	1.91E+01	1.91E+01	b
1,2,4-Trimethylbenzene	95-63-6	- - -	1.71E+01	1.71E+01	b
1,2-Dibromo-3-Chloropropane	96-12-8	2.12E+00	7.28E-01	7.28E-01	b
1,2-Dichlorobenzene	95-50-1	- - -	2.86E+02	2.86E+02	b
1,2-Dichloroethane	107-06-2	3.45E+00	3.48E+00	3.45E+00	a
1,2-Dichloroethene	540-59-0	- - -	1.92E+02	1.92E+02	b
1,2-Dichloropropane	78-87-5	4.38E+01	2.08E+00	2.08E+00	b
1,2-Diethylbenzene	135-01-3	- - -	- - -	- - -	
1,2-cis-Dichloroethene	156-59-2	- - -	2.13E+02	2.13E+02	b
1,2-trans-Dichloroethene	156-60-5	- - -	4.26E+02	4.26E+02	b
1,3,5-Trimethylbenzene	108-67-8	- - -	6.90E+00	6.90E+00	b
1,3-Dichlorobenzene	541-73-1	- - -	5.16E+02	5.16E+02	b
1,3-Dichloropropane	142-28-9	- - -	4.26E+02	4.26E+02	b
1,3-Diethylbenzene	141-93-5	- - -	- - -	- - -	
1,3-cis-Dichloropropene	10061-01-5	- - -	- - -	- - -	
1,3-trans-Dichloropropene	10061-02-6	- - -	- - -	- - -	
1,4-Dichlorobenzene	106-46-7	2.97E+01	3.86E+02	2.97E+01	a
1,4-Diethylbenzene	105-05-5	- - -	- - -	- - -	
1-Chlorohexane	544-10-5	- - -	- - -	- - -	
2,2'-oxybis(1-chloropropane)	108-60-1	2.19E+01	8.52E+02	2.19E+01	a
2,2-Dichloropropane	594-20-7	- - -	- - -	- - -	
2-Butanone	78-93-3	- - -	6.65E+03	6.65E+03	b
2-Chloroethylvinylether	110-75-8	- - -	- - -	- - -	
2-Chlorotoluene	95-49-8	- - -	4.26E+02	4.26E+02	b
2-Hexanone	591-78-6	- - -	- - -	- - -	
4-Chlorotoluene	106-43-4	- - -	- - -	- - -	
4-Methyl-2-pentanone	108-10-1	- - -	1.47E+03	1.47E+03	b
Acetone	67-64-1	- - -	1.92E+04	1.92E+04	b
Acetonitrile	75-05-8	- - -	2.00E+02	2.00E+02	b
Acrylonitrile	107-13-1	1.82E+00	2.34E+00	1.82E+00	a
Benzene	71-43-2	6.46E+00	1.08E+01	6.46E+00	a
Benzyl Chloride	100-44-7	1.75E+01	- - -	1.75E+01	a
Bromobenzene (Phenyl bromide, Monobromobenzene)	108-86-1	- - -	9.01E+00	9.01E+00	b
Bromochloromethane	74-97-5	- - -	- - -	- - -	
Bromodichloromethane	75-27-4	4.81E+01	4.26E+02	4.81E+01	a
Bromoform	75-25-2	3.77E+02	4.26E+02	3.77E+02	a
Bromomethane	74-83-9	- - -	1.26E+00	1.26E+00	b
Carbon Disulfide	75-15-0	- - -	1.16E+02	1.16E+02	b
Carbon Tetrachloride	56-23-5	2.44E+00	1.49E+01	2.44E+00	a
Chlorobenzene	108-90-7	- - -	4.85E+01	4.85E+01	b
Chloroethane	75-00-3	1.03E+03	1.57E+03	1.03E+03	a
Chloroform (Trichloromethane)	67-66-3	2.56E+00	1.89E+01	2.56E+00	a
Chloromethane	74-87-3	- - -	1.59E+01	1.59E+01	b
Chlorotoluene	25168-05-2	- - -	- - -	- - -	
Dibromochloromethane	124-48-1	3.55E+01	4.26E+02	3.55E+01	a
Dibromomethane	74-95-3	- - -	2.13E+02	2.13E+02	b
Dichlorodifluoromethane	75-71-8	- - -	3.19E+01	3.19E+01	b
Dichloromethane (Methylene Chloride)	75-09-2	8.25E+01	5.77E+02	8.25E+01	a
Ethylbenzene	100-41-4	7.80E+01	4.76E+02	7.80E+01	a
Ethylene Dibromide (1,2-Dibromoethane)	106-93-4	2.59E-01	1.14E+01	2.59E-01	a

Freon	76-13-1	---	6.93E+03	6.93E+03	b
Fluorobenzene	462-06-6	---	---	---	
Hexachlorobutadiene	87-68-3	3.09E+01	5.16E+00	5.16E+00	b
Hexane	110-54-3	---	4.08E+01	4.08E+01	b
Iodomethane	74-88-4	---	---	---	
Isopropyl Benzene	98-82-8	---	5.28E+01	5.28E+01	b
Naphthalene	91-20-3	---	1.79E+01	1.79E+01	b
O-Chloroflurobenzene	348-51-6	---	---	---	
Phenyl Bromide	108-86-1	---	9.01E+00	9.01E+00	b
Styrene	100-42-5	---	1.46E+03	1.46E+03	b
Tetrachloroethene	127-18-4	3.66E+00	1.52E+01	3.66E+00	a
Toluene	108-88-3	---	2.00E+02	2.00E+02	b
Total VOC's	TVOC	---	---	---	
Trichloroethene	79-01-6	4.38E-01	4.49E+00	4.38E-01	a
Trichlorofluoromethane	75-69-4	---	1.30E+02	1.30E+02	b
Vinyl Acetate	108-05-4	---	1.39E+02	1.39E+02	b
Vinyl Chloride	75-01-4	1.07E+00	1.20E+01	1.07E+00	a
Xylenes, Total	1330-20-7	---	6.42E+01	6.42E+01	b
m-Xylene	108-38-3	---	4.26E+04	4.26E+04	b
mp-Xylene	mp-Xylene	---	---	2.77E+02	b
n-Butylbenzene	104-51-8	---	---	---	
n-propylbenzene	103-65-1	---	---	---	
o-Xylene	95-47-6	---	4.26E+04	4.26E+04	b
p-Isopropyltoluene	99-87-6	---	---	---	
p-Xylene	106-42-3	---	---	---	
sec-Butylbenzene	135-98-8	---	---	---	
tert-Butylbenzene	98-06-6	---	---	---	

a - carcinogen value
b - noncarcinogen value

Radiological		GV Total
		pCi/g
Actinium	7440-34-8	---
Actinium-227	14952-40-0	4.37E+00
Actinium-227 +D	14952-40-0(+D)	4.56E-01
Actinium-227 long lived decay	14952-40-0L	4.56E-01
Actinium-228	14331-83-0	2.17E-01
Americium-241	14596-10-2	6.32E+00
Antimony-124	14683-10-4	1.10E-01
Antimony-125	14234-35-6	5.41E-01
Antimony-125+D	14234-35-6(+D)	5.41E-01
Barium-133	13981-41-4	6.79E-01
Barium-133m	13981-41-4m	4.88E+00
Barium-140	14798-08-4	1.25E+00
Beryllium-7	13966-02-4	4.61E+00
Bismuth-207	13982-38-2	1.39E-01
Bismuth-210	14331-79-4	5.52E+01
Bismuth-210m	14331-79-4m	8.97E-01
Bismuth-211	15229-37-5	5.23E+00
Bismuth-212	14913-49-6	1.11E+00
Bismuth-214	14733-03-0	1.31E-01
Cerium-139	CE-139	---
Cerium-141	13967-74-3	4.18E+00
Cerium-144	14762-78-8	8.91E+00

Cerium-144+D	14762-78-8(+D)	3.23E+00
Cesium-134	13967-70-9	1.38E-01
Cesium-134m	13967-70-9m	1.96E+01
Cesium-137	10045-97-3	3.77E+01
Cesium-137 +D	10045-97-3(+D)	3.82E-01
Cesium-137 long lived decay	10045-97-3L	3.82E-01
Chromium-51	14392-02-0	7.72E+00
Cobalt-57	13981-50-5	2.76E+00
Cobalt-58	13981-38-9	2.19E-01
Cobalt-58m	13981-38-9m	4.78E+03
Cobalt-60	10198-40-0	7.91E-02
Cobalt-60m	10198-40-0m	5.28E+01
Europium-152	14683-23-9	1.85E-01
Europium-152m	14683-23-9m	7.36E-01
Europium-154	15585-10-1	1.68E-01
Europium-155	14391-16-3	7.73E+00
Iodine-131	24267-56-9	- - -
Iridium-192	12154-84-6	- - -
Iron-59	14596-12-4	1.68E-01
Lanthanum-140	13981-28-7	8.54E-02
Lead-210	14255-04-0	9.05E-01
Lead-210+D	14255-04-0(+D)	6.25E-01
Lead-210 long lived decay	14255-04-0L	6.25E-01
Lead-212	15092-94-1	1.79E+00
Lead-214	15067-28-4	1.00E+00
Manganese-54	13966-31-9	2.53E-01
Mercury-203	13982-78-0	1.06E+00
Neptunium-237	13994-20-2	7.04E+00
Neptunium-237+D	13994-20-2(+D)	1.10E+00
Niobium-95	13967-76-5	2.78E-01
Niobium-95m	13967-76-5m	4.13E+00
Plutonium-238	13981-16-3	6.12E+00
Plutonium-238/239	PU-238/239	6.03E+00
Plutonium-239	15117-48-3	6.03E+00
Plutonium-239/240	14119-33-6	6.01E+00
Plutonium-241	14119-32-5	5.06E+02
Plutonium-242	13982-10-0	6.33E+00
Polonium-210	13981-52-7	2.09E+00
Potassium-40	13966-00-2	1.18E+00
Protactinium-231	14331-85-2	2.73E+00
Protactinium-231+D	14331-85-2D	3.91E-01
Protactinium-231 long lived decay	14331-85-2L	3.91E-01
Protactinium-233	13981-14-1	1.31E+00
Protactinium-234	15100-28-4	1.13E-01
Protactinium-234m	15100-28-4m	1.43E+01
Radium-223	15623-45-7	1.21E+00
Radium-224	13233-32-4	3.24E+00
Radium-225	13981-53-8	5.91E+00
Radium-226	13982-63-3	2.17E+00
Radium-226+D	13982-63-3(+D)	1.10E-01
Radium-226 long lived decay	13982-63-3L	9.37E-02
Radium-228	15262-20-1	7.31E-01
Radium-228+D	15262-20-1(+D)	1.67E-01
Radium-228 long lived decay	15262-20-1L	6.96E-02
Ruthenium-103	13968-53-1	4.80E-01
Ruthenium-106	13967-48-1	1.40E+01

Ruthenium-106+D	13967-48-1(+D)	9.49E-01
Scandium-46	13967-63-0	1.02E-01
Silver	7440-22-4	- - -
Silver-108m	14391-65-2m	1.37E-01
Sodium-22	13966-32-0	9.53E-02
Strontium-85	13967-73-2	4.46E-01
Strontium-85m	13967-73-2m	1.20E+00
Strontium-89	14158-27-1	3.55E+01
Strontium-90	10098-97-2	1.80E+01
Strontium-90+D	10098-97-2(+D)	9.40E+00
Thallium-208	14913-50-9	5.59E-02
Thorium-227	15623-47-9	2.14E+00
Thorium-228	14274-82-9	5.58E+00
Thorium-228+D	14274-82-9(+D)	1.19E-01
Thorium-228 long lived decay	14274-82-9L	1.19E-01
Thorium-229	15594-54-4	1.90E+00
Thorium-229+D	15594-54-4(+D)	5.09E-01
Thorium-229 long lived decay	15594-54-4L	5.09E-01
Thorium-230	14269-63-7	8.19E+00
Thorium-230 D+	14269-63-7D	9.26E-02
Thorium-230 long lived decay	14269-63-7L	9.26E-02
Thorium-232	7440-29-1	7.20E+00
Thorium-232 D+	7440-29-1D	6.90E-02
Thorium-232 long lived decay	7440-29-1L	6.90E-02
Thorium-234	15065-10-8	1.76E+01
Tin-113	13966-06-8	3.59E+01
Tin-126	15832-50-5	6.96E+00
Tritium (particulate)	10028-17-8p	7.58E+03
Tritium (water)	10028-17-8w	1.80E+04
Uranium-232	14158-29-3	2.90E+00
Uranium-233	13968-55-3	1.03E+01
Uranium-233 long lived decay	13968-55-3L	4.85E-01
Uranium-233/234	U-233/234	4.82E-01
Uranium-234	13966-29-5	1.05E+01
Uranium-235	15117-96-1	1.61E+00
Uranium-235+D	15117-96-1(+D)	1.54E+00
Uranium-235 long lived decay	15117-96-1L	3.12E-01
Uranium-235/236	U-235/236	3.10E-01
Uranium-238	7440-61-1	1.16E+01
Uranium-238+D	7440-61-1(+D)	4.13E+00
Uranium-238 long lived decay	7440-61-1L	8.98E-02
Yttrium-88	7440-65-5	- - -
Zinc-65	13982-39-3	3.48E-01
Zirconium-95	13967-71-0	2.89E-01

Appendix C
Parcel 6, 7, and 8 Building Information

BUILDINGS LOCATED IN PARCEL 6

Building 28.
The building was used for ceramics development and production. It is currently leased by MMCIC. The facility is a one-story structure slab-on-grade structure reinforced concrete masonry structure with slab-on-grade floor, a built-up membrane roof along with an adjacent metal storage shed. Electric, water and sewer are available. The building has a stand-alone boiler.

Building 45.
The facility was used for calibrating Health Physics instrumentation and personnel dosimeters. The facility consists of an original single-story concrete block structure. The original building structure was constructed in 1968. The first addition, totaling 2,784 sq. ft., was built in 1988. The original building and first addition consist of a single story concrete structure with a penthouse for housing mechanical equipment. The second addition, totaling approximately 6,800 sq. ft. was completed in 1995 and consists of a two-story structure on the southern side of the original building and a one-story structure on the northern side of the original building.

Building OSE.
Building OSE housed offices for the Department of Energy, an auditorium, photographic services, and the site computer facility. The building was used for the same purpose since construction. The Building is a steel frame four-story structure and penthouse, with a brick facing and built-up membrane roof. The building had central steam and chilled water for heating and air conditioning.

BUILDINGS DEMOLISHED IN PARCEL 6

Building 40
On the first floor of the structure (approximately 6,150 sq. ft.) was printing and microfilming shops and a vault for document storage. Offices were located on the second floor (approximately 3,880 sq. ft.). The third floor (approximately 2,170 sq. ft.) housed utility services with interstitial space between the ceiling and roof for ductwork. The building had been used for the same purpose since construction. No research, development or production activities using radioactive or energetic materials were known to have occurred in the building.

Building 46.
The building contained specialized welding facilities that supported the heat source program. Welding development for energetic materials was also performed, along with machine shop activities, which were conducted in the building. No research, development, and testing activities using radioactive materials have been known to have occurred in the building.

Building 47.
The building was originally utilized as the plant fire station. From 1987 to the late 1990's, the building housed administrative offices for protective security personnel,

weapons storage areas, and classified waste storage areas. The building was renovated to serve its original purpose as a fire station allowing Building 98 to be demolished as part of the PRS66 cleanup.

Building 60.
The facility was used for ceramic development and non-destructive testing since its construction. The building had been leased by the MMCIC in 1995 for a period of time.

Building 65.
Building 65 was a one-story, 2,400-square-foot wooden modular structure. The building was bordered by Building GP-1 (north), Building 28 (south), a parking lot (east), and Building W (west). Building 65 was constructed in 1979 for use as an office area. The building was emptied and dismantled in 1996. It was used for the same purpose since construction. The building was not contaminated with radiological or energetic material.

Building 91.
Building 91 was a two story 8,065-square-foot, steel frame, wood-sided modular building with a Hypalon roof. The facility was located south of the perimeter fence in the northeast region of the Mound site. Building 91 was constructed in 1985 with the purpose of providing program support office space and space for dosimeter evaluation.

Building 96.
Building 96 was a 432-square-foot, prefabricated metal building. The facility was assembled in 1984. It was bordered by Building W on the west, Building 47 to the east, Buildings 60 and 28 to the south, and Building GP-1 to the north. The facility was sold to a private party, disassembled, and moved offsite. The building was not known to be contaminated with radiological or energetic materials.

Building 99.
The first and second floors of the facility were used as administrative areas for security personnel. The first floor also contained a locksmith shop and communications center. The third floor housed the Emergency Operations Center (EOC). The fourth floor was a penthouse used as a mechanical room. The building had been used for the same purposes since construction.

A Building.
Offices were on the first and second floors, with the medical facility on the first floor. The basement contained the Classification Office and Document Control. This building had been used for the same purpose since construction. No research, development, or production activities using radioactive or energetic materials have occurred in the building. Building A was located between, and connected to Buildings OSW and OSE.

C Building.
Building C was a one-story structure, with a basement, constructed of concrete block with brick face exterior. Building C was one of the original buildings constructed in 1948 and contained 13,403 square feet. Adjacent buildings were Building A to the north, Building M to the south, Building 40 to the east, and Building H to the west. The building

was originally the old cafeteria and provided that service until 1986. Afterwards the building was used for offices, record storage, engineering project storage, maintenance storage, and as an emergency shelter. The building was not contaminated with radioactive or energetic materials.

G Building.
Building G served as the repair maintenance facility for plant vehicles and heavy-duty equipment. The building was located south of OSE Building and between Building 40 and GW Building.

GP-15 Building.
Guard Post 15 was a 53 square-foot building demolished in 2002.

GP-5A Building.
Guard Post 5A was a 60 square-foot building demolished in 1998.

GW Building.
GW building was originally built to house offices, bonded stores, and receiving/inspection for weapons programs. Before it was demolished, it housed long-term record storage and offices.

BUILDINGS LOCATED IN PARCEL 7

Building 2.
Building 2, Energetic Materials Destructive Testing, is a one-story, 6,291-square-foot, reinforced concrete and concrete block structure. The building has two attached metal storage sheds. The building is bounded by Building 63-E/63-W to the north, and Buildings 3 and 49 were to the west and east, respectively. Building 2 was constructed in 1953 and had been used for the same purpose since construction.

Building 61.
Building 61 was a central warehouse and receiving facility at Mound. No research, development, or production activities using radioactive or energetic materials have occurred in the building. It should be noted that at various times contaminated equipment for disposition has passed through it; however, no cleanup actions are anticipated. The building is a split level design. One-half of the building has offices; the other half contains high, open bays for materials storage handling.

Building 63.
Building 63 is comprised of two structures connected together: Building 63-E contained quality product testing laboratories on the first floor and offices and lavatory facilities on the second. Building 63-W, an environmental storage and spin test facility, is a one-story, 3,100-square-foot, concrete block, slab-on-grade structure. This portion of the building contained offices, environmental storage chambers, a spin test facility, and a lavatory. The building is bounded by a parking lot to the north, Building 49 to the east, a roadway to the south, and Building 59 to the west. Building 63-E/63-W was constructed in 1981. The building was used for the same purpose since construction. Research and

testing activities using energetic materials occurred in the building. Research, development and testing activities using radioactive materials did not occur there.

Building 126.
Building 126, a single story office building, was constructed in support of the Nuclear Energy mission at Mound. The building currently serves as office space for DOE Legacy Management and contractor personnel.

BUILDINGS DEMOLISHED IN PARCEL 7

Building 27
Building 27 was named the Explosive Processing Facility and located in the area to the west of the former "Test Fire Area". The area was a small complex of five structures including Building 42 a production building, Building 67 an office structure, and explosive magazines 52 and 64. The building was used for explosive formulation. It was constructed of masonry walls with blowout panels in the walls. Also included was an addition to the building that included explosive processing cells, a micro room, instrument room, and offices.

Building 29
Building 29 was used for plastics formulation and manufacturing. The building was bounded by Building 98 to the west, a parking lot to the south, a roadway to the north and Building 45 across the roadway. The main floor contained a mechanical room, refrigeration storage unit, plastic test room, roll mill room, mixer room, solvent supply room, dry plastic process room and office support including toilets, locker, janitorial, storage, and office. The mezzanine supported an asbestos slurry kettle and the penthouse equipment, including two varnish kettles, a Malta mixer, acetone pumps, and the building air exhaust filter system. A lean-to on the northeast side of the building held two tank containers for contaminated acetone. A lean-to on the opposite side of the building provided shelter for containers of new acetone. The building operations ended in 1987. The building was used for the same purpose since construction.

Building 30.
Building 30 housed a radiological counting laboratory. Liquid scintillation counting was used to count paper smear samples for the detection of tritium and gross alpha/beta activity. Several years ago Building 30 was converted from use as an office/storage area to a counting laboratory. The building previously housed a gamma scan facility for waste drums and boxes.

Building 31.
Building 31 was used for storage of radiological waste in sealed containers. The facility was a prefabricated metal building with a metal roof and slab-on-grade floor. The facility plus ancillary concrete slabs and loading docks have been removed.

Building 33.

Building 33 was assigned to the D&D group for the storage of materials, protective clothing, and parts, and for the maintenance of heavy and light equipment used in the D&D process. The building supported the repair of specific equipment removed from D&D to be reused elsewhere at Mound, transferred to other DOE activities, or sold. Building 33 was constructed in 1965. The building had been used for equipment maintenance and storage since construction.

Building 36.
The building was used to support general-purpose heat source testing operations. Operations conducted in the building were high-temperature bakeout and cleaning of graphite modules. No research, development, or production activities using radioactive or energetic materials have been known to have occurred in the building.

Building 37.
Building 37 was used for two purposes. One use was research, development and production in conjunction with the US Advance Battery Consortium. The other use was converting processes with freon or other hazardous materials to processes that use safer materials. The building was later converted to a machine shop in support of the heat source program. The activities performed were machining, cleaning, heat treating, and inspection. No research, development, or production activities using radiation or energetic materials have been known to have occurred in the building.

Building 38.
Building 38, also called PP (Plutonium Processing) Building, was formerly used as a Pu-238 production processing facility, the assembly and testing of Radioisotopic Thermoelectric Generators (RTGs), the repackaging and storage of excess nuclear material, and the storage and identification of orphan sources from Mound. The following additions were made to the original structure: (1) a men's change room, 1,764 sq. ft.; (2) a low level liquid waste facility and tanker loading pad, 547 sq. ft.; (3) a waste solidification facility, 2,184 sq. ft.; and (4) two 360 sq. ft. dock towers with an overhead rail crane in each.

Building 44.
Building 44 was bordered on three sides by a combination of gravel, dirt, and grass. The west side of the building paralleled a paved road. Adjacent buildings were Building SM on the west and Building GP-44 on the north. The building contained an office, store room, dining area, lavatories, and a combination food preparation and dishwashing room. Building 44 was constructed in 1970 and was used for the same purpose since construction until September 1994 when it was used as an employee rest area, "brown bag" lunch room, and meeting and training facility for employees working in the SM/PP area.

Building 49.
The building contained production laboratories, office lavatories, a locker room, storage, and a large staging area. Production activities using energetic materials have occurred in the building. The building had been used for the same purpose since its construction

in 1971. Research, development and testing activities using radioactive materials have not been known to have occurred in the building.

Building 50.
Building 50 was the radioisotopic thermoelectric generator (RTG) assembly and testing facility. The first floor of the structure was a process area for the assembly of RTGs. RTGs are sealed radioactive sources containing encapsulated plutonium. The building was segregated into two areas, a buffer area where RTG assembly and storage was conducted and a controlled area, where support activities occur. The second floor penthouse housed utility services.

Building 51.
Building 51 was located in the central portion of the Test Fire Valley between the Main Hill and the SM/PP Hill. The building was constructed in 1970 to provide waste incineration for the Mound Plant.

Building 66.
Building 66, an office building, was a 650-square-foot, one-story wood-sided structure. It was a modular structure, setting on concrete footings. The building was bounded by a parking lot (south), Building 98 to the east, a dirt area leading to a street (north), and Building 51 (west). Building 66 was constructed in 1980. The building was built for a supply support office. No research, development, or production activities using radioactive or energetic materials occurred in the building.

Building 71.
Building 71 was a flammable liquids storage facility. The building contained 820 square feet of storage space.

Building 73.
Building 73 was the central compressed gas cylinder storage location at the Mound facility. It was situated north of Building 61 and south of Building 71. To the east was a 800,000-gallon impoundment, built to retain storm runoff and associated sediments. The building was constructed in 1983.

Building 88.
Building 88 was a 7,200-square-foot, single-story, prefabricated structure. It was modular in design and had a wood exterior structure. The building was located in the SM/PP area of Mound. A roadway and Buildings 50 and 37 were to the south. The other three sides of the building were surrounded by an open grassed area. Building 88 was erected in 1984 to provide administrative offices to the radioisotopes thermoelectric generator (RTG) program.

Building 98.
Building 98 was a two-story, 8,517-square-foot, firehouse. Offices, personnel support and training facilities, the operations center, and vehicles were located on the second floor. Vehicles housed there included those for structural fires, an ambulance and a

hazardous materials (HAZMAT) mobile unit with response materials. Building 98 was constructed in 1987and was used for the same purpose since construction.

Building 110.
Building 110 was the fuel facility that had been located in the upper portion of the Test Fire Valley between the Main Hill and the Special Metallurgical/Plutonium Processing (SM/PP) Hill, between Building 51 and the Brickmaker. Built in 1988, the facility included two above ground fuel tanks (a 6,000-gallon gasoline tank and a 4,000-gallon diesel fuel tank), two filling station-type gas pumps, and an oil/water separator. The facility served to supply fuel to plant vehicles and emergency power diesel engines. Services to the facility were terminated prior to demolition. No waste was stored at the Building 110 facility.

Building 118.
Building 118 was 360 a square-foot Inspection Station.

Building 120.
Building 120 was constructed in 1980. The building was built for an office and the storage of Radiological Assistance Team supplies. It later became administrative offices for the Decontamination and Decommissioning (D&D) Group and the Heat Source Program.

Buildling 128.
Building 128 was constructed in 2001 in support of the Nuclear Energy mission at Mound. The building contained two 100 HP hot water boilers and a duplex primary/secondary pumping system to provide hot water to Buildings 50, 36, 37 and 126.

Brickmaker.
The Brickmaker Tents were constructed in 1992 as temporary structures to house the brickmaker equipment. The three tents were steel-framed Rubb®-Brand buildings measuring approximately 39 x 60 feet, 15 x 40 feet, and 25 x 60 feet. The tents were located in the upper portion of the Test Fire Valley between the Main Hill and the Special Metallurgical/Plutonium Processing (SM/PP) Hill. The Brickmaker equipment, which had been housed in the tents, was designed to compress low-level radioactively contaminated soils into extruded bricks for soil offsite disposal. Trial runs of the equipment occurred in 1994 and 1995. However, elevated disposal costs for compacted soil, as well as equipment operational challenges caused the brickmaker equipment to be uneconomical. Later, a pilot program to test a process to combine coal and paper sludge into briquettes was initiated and then abandoned. In 1999, the brickmaker equipment was radiologically surveyed and cleared for free release. The equipment was sold at auction and removed from the site. Adjacent to the Brickmaker Tents, there had also been a single-wide trailer with wooden decking. That trailer was removed in 1997, transferred to the Spoils Area, and later demolished. Subsequent to the removal of the brickmaker equipment, the tents were used to provide temporary shelter to heavy equipment. No waste was stored in the Brickmaker Tents. There were no utilities or sanitary services provided at the Brickmaker Tents. There was a sump

(located just south of where the largest tent had been located) that had been used to contain runoff from the brickmaker equipment. After completing the Brickmaker Tent demolition, the sump fluid was removed and analyzed. The analytical results were all below appropriate screening levels. The sump was then removed, radiologically surveyed, and disposed of, and the resulting excavation backfilled. There were no Potential Release Sites (PRSs) associated with the Brickmaker Tents.

CS Building.
CS Building was a 3000 square foot Carpenter Shop that was demolished prior to 1959.

EG-2.
EG-2 provided operational space for an emergency diesel generator. It included a 5000-gallon underground storage tank, which had been filled with concrete and a 500-gallon above ground fuel oil tank.

EG-7.
EG-7 was a single-story, 80 sq. ft. rectangular building used to house an emergency generator to provide emergency power to the Test Fire Valley. EG-7 was built in 1972, and taken out of commission in the 1990s. EG-7 was located immediately adjacent to the Test Fire substation. Due to its proximity to the 12,470V underground lines of the Test Fire substation, and with the concurrence of the Core Team, the concrete slab was left in place following removal of the building and generator.

GP-16.
Guard Post 16 was a 102 square-foot building demolished in 1998.

GP-38.
Guard Post 38 was a 50 square-foot building demolished in 1998.

GP-44.
Building GP-44, a former guard post, was a 365-square-foot, one-story structure. The building contained an equipment room, the former guard office, and a clothing storage room. When GP-44 was an active guard post, Room 4 was used for uniform storage and Room 3 was used as a laundry room for security uniforms.

Magazine 6.
Magazine 6 was a one-story, 90-square-foot reinforced concrete structure. The roof was also of reinforced concrete. Magazine 6 was constructed in 1949 and was used for storage of energetic materials since construction.

SM Building.
SM was a large building that processed radioactive materials. It was demolished in the 1990s, and contaminated soils associated with the building were removed.

Warehouse 4.
Warehouse 4 was 2507 square-foot warehouse demolished between 1949 and 1959 (based on aerial photos).

Warehouse 5.
Old Warehouse 5 was 9540 square-foot warehouse demolished between 1949 and 1959 (based on aerial photos).

Warehouse 6.
Old Warehouse 6 was 2611 square-foot warehouse demolished between 1949 and 1959 (based on aerial photos).

Warehouse 8.
Warehouse 8 was 3450 square-foot warehouse demolished prior to 1959 (based on aerial photos).

Warehouse 10.
Warehouse 10 was 4235 square-foot warehouse demolished between 1949 and 1959 (based on aerial photos).

Warehouse 13.
Warehouse 13 was 4299 square-foot warehouse demolished between 1949 and 1959 (based on aerial photos).

Warehouse 14.
Warehouse 14 was 3960 square-foot warehouse demolished between 1965 and 1968 (based on aerial photos).

Warehouse 15.
Warehouse 15 was 6248 square-foot warehouse demolished between 1965 and 1968 (based on aerial photos).

Warehouse 15A.
Warehouse 15A was 1052 square-foot warehouse demolished between 1965 and 1968 (based on aerial photos).

BUILDINGS LOCATED IN PARCEL 8

COS Building.
The building was used for production support for weapons components including explosive laboratories, a standards lab and a robotics lab. The building has been leased since 1995 by the DOE to the MMCIC. It has been subleased since 1995 by MMCIC.

OSW Building.
Building OSW housed computer aided design (CAD) products, process, drawing control program management and administrative offices, including the MEMP's project office. The building had been used as an administrative support facility since its construction.

T Building.

Building T is a heavily-reinforced, underground concrete structure built in 1948. The building had two floors that were compartmentalized into three general areas by two 30 inch thick fire walls. The reinforced concrete exterior structure has a 15-foot thick roof, 16-foot thick walls on an eight-foot thick slab. The overall design of the building was to withstand a direct hit by a bomb. Access to the building is by tower either at the east and west end of the building or by a service tunnel. Adjacent buildings were Buildings E, M, and R to the north, Building HH to the south, and Building DS (above). Building T was originally used to purify Polonium-210 for use in nuclear weapons. The facility was later used to extract various other radionuclides, such as bismuth and beryllium. Other operations included nickel carbonyl vapor deposition plating processes, neutron activation analysis, and the storage of packaged transuranic (TRU) materials. Building T was later used for tritium operations, recovery and purification, calorimetry production, heat source calibration, and x-ray and safeguards gamma scanning.

BUILDINGS DEMOLISHED IN PARCEL 8

Building 1.
Building 1 was constructed in 1958. It consisted of four heavy-walled rooms, plus a small office area. Research and testing activities involving energetic materials have been conducted in the building. In the past, the building was used for processing and blending of explosive powders. More recently, it was used for packaging of energetic materials.

Building 5.
Building 5 was a 375 square-foot Inspection Station demolished in 1998.

Building 16.
Building 16 was a one-story metal structure on a concrete slab with a metal roof. The building was constructed in 1958 and was used to store equipment in support of operations in Building I. The building was located on the western perimeter of the main hill. Adjacent buildings were Building I to the northwest, Building SW to the east, and Magazines 7 and 11 to the south.

Building 17.
Building 17 was constructed in 1961. Adjacent buildings were Building I to the north and west, Building SW across the roadway to the east, and Magazines 7 and 11 to the south, and Building 16 to the west. The building was used to store and stage chemicals in support of Bonded Stores during production. Chemicals were only opened in the building to sample or test them. Prior to storing chemicals, metal rods and excess material, other than chemicals, were stored there.

Building 19.
The building was a metal jumbo Quonset hut with interior offices/areas/walls. It was initially used for excess equipment storage and salvage sales. More recently the building was used as an investigative-derived materials (IDM) storage facility and as a preparation/packaging facility for samples involving CERCLA project activities.

Building 22.
Building 22 was used to store excess equipment and engineering project materials. In the summer of 1995, the building was modified to accommodate solid radioactive LLW storage activities.

Building 23.
The building was originally constructed as a warehouse for the staging and shipping of low-level radioactive waste. The building was then used to store mixed and transuranic (TRU) mixed waste. The building was modified in 1994 to contain spills by coating the floor and installing trenches and dikes.

Building 25.
The building initially was used as a low-level counting (radiological measurement) facility. Historical documents indicate that pre-World War II materials were sought for the counting facility, presumably to eliminate the possibility that trace levels of man-made radionuclides would influence the analysis. It later housed instrumentation that was used to collect meteorological information. Computers in the building received data from two onsite weather-monitoring towers. These computers were connected to Lawrence Livermore Laboratory, where the information would be used to predict dispersion patterns in the event of any airborne releases.

Building 26.
Building 26 was constructed in 1965. The building was used for a welding shop, storage, and office areas. It was emptied and dismantled in 1996

Building 34.
The building served as the old burn building, an area formerly used for training Mound firefighters. Various fuels and flammable materials were burned to simulate potential emergency situations. The facility was later used as the soils counting lab.

Building 41.
Building 41 was a 234 square-foot Waste Transfer Station that was demolished between 1983 and 1994 (based on aerial photos).

Building 48.
Building 48 was constructed in 1970. Offices were on the first floor, and analytical laboratories and a machine shop were located on the second floor. This building was renovated in the late 1999 timeframe to serve as the environmental monitoring laboratory.

Building 55.
Building 55 was constructed in the early 1970's. The two-room structure consisted of a former water testing laboratory containing a sink and an electric water heater and a storage/equipment room. The building was most recently used for storing water sampling equipment, supplies, and containers.

Building 56.

The building and associated structures were used as the booster station for fire suppression since its initial construction. It was not known to be contaminated with radioactive or energetic materials. It housed a diesel-powered fire suppression water pump station and a 500-gallon (above grade) fuel storage tank. The facility included an at-grade 350,000 gallon metal groundwater storage tank adjacent to the building.

Building 57.
The building was the control room/lab for the Sanitary Sewer Plant since its initial construction.

Building 58.
Building 58 was the alpha and beta air filter bank and plenum exhaust for Building SW. A HEPA filtration system filtered out alpha and beta particulate from the exhaust of several rooms in Building SW. The building contained ventilation equipment possibly contaminated with radioactive materials.

Building 68.
Building 68 was constructed in 1979. Adjacent buildings were Building R to the north, Building E to the east, and Building DS to the south. Building 68 was used as a staging area for Decontamination and Decommissioning (D&D) operations and as a storage area for Maintenance. Containers of radioactive waste, primarily of low-specific activity (LSA), from Buildings R and SW were staged for shipping. A portion of Building 68 was used to store parts and materials for maintenance operations. The building was used for the same purpose since construction. No research, development or production activities using radiation or energetic materials occurred in the building.

Building 69.
Building 69 was a 1,620-square-foot, single-story, modular wooden building. The building was bordered by Building M to the north, Building T west tower to the west, Building T east tower to the east, and Building DS to the south. The building was used for offices and was sold in 1996.

Building 70.
Building 70 was a 3,366-square-foot building that housed offices. The building was bordered by Building E to the north, Building T west tower to the west, Building T east tower to the east, and Building DS to the south. The building was used for offices and was sold in 1996.

Building 72.
Building 72 was designed for and was used for hazardous waste storage since it was constructed. Constructed in 1984, had three bays, with a dry sump under each bay to collect spillage. The sump's contents were pumped to drums. An interior masonry wall provided extra protection for the storage of explosive materials.

Building 79.
Building 79 was a modular office trailer located east of Buildings 23 and WD, and south of Building 56. The building was used exclusively for offices. No research,

development, or production activities using radioactive or energetic materials occurred in the building.

Building 89.
The building was originally used for the storage of sealed energetic materials. Since leasing the building in 1999, the MMCIC had used it for general storage. No research, development, or production activities using radioactive materials were known to have occurred in the building.

Building 92.
Building 92 was a one-story wooden modular structure on concrete pillars. The building was brought on site in 1984 and was located on the western perimeter of the main hill. Building 92 was originally used for several years as a training facility in support of production operations at Mound. The types of training classes taught were production documentation methods, product index training, microscope and gauging techniques, and solder certification. Chemicals used in the solder certification training were ethyl alcohol, lead-based solder, soldering flux, and remover. Later the building was converted to offices for Industrial Hygiene.

Building 93.
Building 93 was constructed in 1984. The building was originally assembled as an office facility. The building was used for the same purpose since construction. The building was not contaminated with radiological or energetic materials.

Building 94.
Building 94 was used for CERCLA environmental program contractor staging and for soil and water sample storage. The building originally housed a laboratory in one bay and environmental ovens in the other two bays. Investigations related to materials compatibility were conducted using energetic materials.

Building 104.
The facility served as the maintenance shop for the test fire area and contained office areas and electronics and small parts assembly room, parts storage, and a fabrication/maintenance shop. No research, development, or production activities using radioactive or energetic materials occurred in the building.

Building 112.
Building 112 contained equipment filters and effluent treatment, testing and monitoring. Building 112, constructed in 1985, was one of the buildings that comprised the Mound Wastewater Treatment Plant (MWWTP), commonly referred to as the Sanitary Disposal (SD) Facility.

Building 113.
Building 113 contained dewatering equipment and was used for chemical and equipment storage. This was one of the buildings that which comprise the Mound Wastewater Treatment Plant (MWWTP), commonly referred to as the Sanitary Disposal (SD) Facility.

Building 114.
Building 114 had 432 sq. ft. and in 1990 was being used for Nitrogen separation.

Building 123.
Building 123 was a 3838 square-foot Waste Processing building demolished in 2004.

Building 124.
The facility was used for size-reducing waste from site removals that contain both radioactive and chemical contamination. The facility housed a box repackaging area, plasma arc cutting station, a blasting room, and a compactor station. This facility was a temporary Rubb Manufactured Building erected on an 8-inch reinforced concrete slab.

Building 125.
The Alpha Treatment System facility was located at Mound on a site formerly occupied by Building 79. The facility was a temporary building structure, mirroring the radioactive wastewater treatment process done in Building WD.

Building 415.
Building 415 was used for chemical and equipment storage. This is one of six buildings which comprise the Mound Wastewater Treatment Plant (MWWTP), commonly referred to as the Sanitary Disposal (SD) Facility.

Building 432.
Building 432 contained equipment to test samples of water. This was one of six buildings which comprise the Mound Wastewater Treatment Plant (MWWTP), commonly referred to as the Sanitary Disposal (SD) Facility.

B Building.
Until 1956, B Building was used for biological animal studies addressing acute and chronic effects of exposure to polonium and actinium. After 1956, the building was used for the production of inert and/or plastic components of weapons devices and detonators. It was used for non-destructive testing, laser welding and marking, physical vapor deposition (PVD), metallurgical inspections, and as a mold shop. Organic solvents were used in many of these operations. There was a clean room in the north addition that had high-efficiency particulate air (HEPA) filter modules in the wall to filter incoming room air. The clean room was used for physical vapor deposition and transducer production.

BPB
BPB was a 11,250 square-foot Ex-Situ Bioremediation facility demolished in 2001.

DS Building.
Building DS housed metrology, receiving inspection, and non-destructive testing facilities. The metrology area contained processes conventional to metrology: measurement, calibrations and testing for the following five areas: electrical, dimensional, physical, mass, and temperature.

E Building and Annex.
E Building, the "electronics laboratory" was constructed in 1948, as one of Mound's original structures. E Building was constructed to provide an area for repairing, designing and building electronic equipment that was used in the various laboratories and processing areas. Building activities included explosives research and beryllium machining. Later the building supported analytical laboratories used for environmental analysis, offices for the site environmental monitoring personnel and for waste management personnel. The building was not contaminated with energetic materials. Minor chemical and radiological contamination may have been present prior to demolition.

EG-1.
The building housed a Caterpillar D348 diesel generator that provided standby power to the T/R/SW West Stack and portions of Building SW. It also included a 5000 gallon underground storage tank which has been filled with concrete.

EG-4.
The building housed a Caterpillar D348 diesel generator.

EG-6.
The building housed a Caterpillar D348 diesel generator that serves as the standby power to the Building 58 exhaust fans and portions of Building SW.

EG-7.
Electrical Generator #7 supported TF Security Lights and was removed in 2001.

EG-8.
This facility housed an emergency generator and was one of six buildings which comprise the Mound Wastewater Treatment Plant (MWWTP), commonly referred to as the Sanitary Disposal (SD) Facility.

FH-1.
Stack Fan House-1 and 2 were constructed as brick buildings to house exhaust fans that serviced T Building.

FH-2.
Stack Fan House-1 and 2 were constructed as brick buildings to house exhaust fans that serviced T Building.

GP-5.
Building GP-5 was a guard post located to the east of T Building.

GP-8.
Building GP-8 was a security guard post located along the Mound Road at the east entrance to the Mound Plant, north of Building 61.

GP-8A.
Building GP-8A was a security guard post located along the Mound Road at the east entrance to the Mound Plant, north of Building 61.

H Building.
Building H housed the laundry facilities for plant uniforms worn by radiation workers, explosives workers, and maintenance personnel. The water generated from the laundry was collected in a holding tank on the "hot side" of the building. Then the water was drained through a pipe to a lift station at Building SW and transferred to WD Building.

HH Building.
The building was originally built to receive and process highly acidic and highly contaminated liquid radioactive waste from the polonium processing operations in Building T. This waste was processed to recover bismuth for reuse. Liquid waste from this process was collected in a sump in the southwest corner of Room 6 and then sent via an underground line to WD Building (this pipeline was removed a few years ago). The polonium waste processing ended about 1958. In the mid-1950s, the building was also used for several projects involving the separation of Pa-231 and Th-230, as well as other isotopes from some processed uranium byproduct materials obtained from other AEC operations. In about 1960, HE-3 separation was started in Building-HH using thermal diffusion columns. In the early 1960s, the building was used for the separation of a variety of stable isotopes using gaseous thermal diffusion, liquid thermal diffusion, and cryogenic processes. In the late 1970s, there was some experimental work done with uranium. From about 1964 to about 1985, He-3 was separated in Rooms 17 and 18 using cryogenic carbon traps to remove the tritium from the feed gas. In the early 1980s, chemical exchange experimentation was also conducted in the building. The sulfur, calcium, and nitrogen isotopes were separated using packed columns. The building has been demolished.

I Building.
Building I was used for loading and testing of explosive actuators in support of defense programs. There were two Class 100,000 clean rooms in the building. One of the clean rooms, which had never been used, was on the newly remodeled second floor of the northwest addition. This clean room had high efficiency particulate air absorber (HEPA) filter modules in the ceiling to filter incoming room air and new HEPA lab benches throughout.

M Building.
Building M was one of the original buildings constructed in 1948. Building M was the former machine shop and housed electroplating operations. Other functions conducted in the building over the years included electronics maintenance, an electrical substation, and excess material staging and storing.

Mag-10.
Magazine 10 was a one-story reinforced concrete structure constructed for storage of pyrotechnics and energetic materials.

Mag-11.
Magazine 11 was a one-story reinforced concrete structure constructed for storage of pyrotechnics and energetic materials.

Mag-5.
Magazine 5 was a one-story reinforced concrete structure constructed for storage of pyrotechnics and energetic materials.

Mag-54.
Magazine 54 was a one-story reinforced concrete structure constructed for storage of pyrotechnics and energetic materials.

Mag-7.
Magazine 7 was a one-story reinforced concrete structure constructed for storage of pyrotechnics and energetic materials.

P Building.
The power house provided space for the centralized process and breathing air, boilers for steam, chilled water supply and return along with treatment of raw water (potable) and electrical power distribution. The Mound East electrical substation was located within Room 3, on the first floor of Building P. Both received power from three parallel DP&L 12.5 KV feeders. Electrical power was then distributed throughout Mound to each substation. In addition to the office-related rooms, the first floor contained the two main boilers, three chillers, potable water treatment equipment, a standby generator, the main plant control/utilities distribution and consumption monitoring console station, chemicals/chemical injection equipment, and plant controls. The mezzanine contained pumps, compressors and two chillers.

PS Building.
This facility housed the paint shop with an OEPA-permitted paint spray booth. It contained processes conventional to painting such as brush painting and spray painting, storage of supplies (latex and non-latex paints), sanding, priming, and drying. The building also housed a sign fabrication area that made computer-generated signs.

R Building.
Building R was one of the original buildings constructed in 1948. The building was divided into two areas: the "cold" side and the "hot" side. The "hot" side was associated with radiological areas; in particular, it was used for tritium recovery and various analytical support tasks. The "cold" side of the building contained research and development laboratories, analytical laboratories, a respirator fitting facility, offices, and the library. The building was contaminated with energetic and radiological materials. In several rooms, beryllium contamination existed in fumehoods and associated ductwork.

S-B.
Shed B occupied 60 square-feet and was removed in 2000.

SD Building.

Building SD was a two-story, 1,593-square-foot facility that was used for sewage disposal. It was constructed in 1948. It remained in service until 1975. The building was bordered by Building 56 on the west, Building WD to the east and north, and a roadway along the south side. The building was used for sanitary treatment and sewage disposal. The facility was potentially contaminated with radioactive materials and metals.

SW Building.
Building SW was located on the main hill. Adjacent buildings were Building B to the north, Building R to the east, and Building I to the west. Building SW was used for tritium recovery and purification, tritium component development, component evaluation, titanium hydride synthesis, and analysis of materials. Past operations included research projects on plutonium, uranium, thorium, and protactinium. The building was contaminated with radiological materials. No research, development or production activities using energetic materials have occurred in the building.

WD Building.
Building WD was the treatment facility for low specific activity (LSA) radioactive liquid wastes generated by process activities at Mound. Processes, which were housed within the WD facility, include alpha wastewater treatment, beta wastewater treatment, laboratory and bench-scale research, LSA waste drum repackaging, a glass melter furnace and a packed bed reactor.

Warehouse 15.
WH-15 was a 6248 square-foot warehouse that was demolished between 1965 and 1968 (based on aerial photos).

Warehouse 7.
WH-7 was a 4200 square-foot warehouse that was demolished between 1949 and 1959 (based on aerial photos).

Warehouse 9.
WH-9 was a 1470 square-foot warehouse that was demolished between 1959 and 1965 (based on aerial photos).

Appendix D
Parcel 6, 7 and 8 Potential Release Site Information

PARCEL 6

PRS-106: G Building Soils (a.k.a. Garage Area).

PRS-107, PRS-108 and PRS-109: G Building Gasoline Tank (Tank 202).
PRSs 107, 108, and 109 were the locations of three historical underground gasoline storage tanks. All three tanks were removed. Soil around the tanks was excavated, spread out at a stockpile location to volatilize the gasoline, and disposed at the Mound construction spoils area.

PRS-126 and PRS-127: Building 28 Solvent Storage Area.
PRSs 126 and 127 refer to the temporary storage locations for waste solvents generated by the Building 28/60 operations. The solvents were used in cleaning operations during the manufacture of weapon components.

PRS-211: A-Building Decontamination Shower Water Tank (Tank 28)..

PRS 212: A-Building Decontamination Shower Water Tank (Tank 29).

PRS-241: Northwest Parking Lots.
PRS 241 consists of the northwest parking lots, including the parking lots east of OSE Building, south of GH Building and the parking lot north of A Building. This PRS was created due to several positive soil gas detections..

PRS-242: Volatile Organic Compound (VOC) Potential Hot Spot Location 1016.
The site was designated a PRS because of VOC detections during a soil gas survey.

PARCEL 7

PRS-308: Site Survey Project Potential Hot Spot Location C0028.
The PRS 308 was identified as a radiological hot spot (C0028) located near the eastern boundary of Mound Plant SM/PP Hill.

PRS-412: Soil Contamination – Radiological.
PRS 412 (hot spot C0033) was identified during the radiological Site Survey Project. Thorium was detected at 42 pCi/g at this location.

PRS-32: Underground Sanitary Sewer Line G12.
PRSs 31-36, 125 and 270 were identified as the result of breaks and/or separations in Mound's sanitary sewer lines, identified during a 1982 video survey of the lines.

PRS-36: Underground Sanitary Sewer Line G15.
Potential Release Sites (PRSs) 31-36, 125 and 270 were identified as PRSs as a result of breaks and/or separations in Mound's sanitary sewer lines, identified during a 1982 video survey of the lines.

PRS-37: Building 51 Waste Solvent Storage Tank (Tank 220).
PRS 37 was identified as an underground storage tank used to hold waste solvents prior to incineration, in Building 51.

PRS-38: Building 51 Waste Incinerator.
This PRS was associated with Building 51 which was demolished to facilitate the PRS 66 Removal Action.

PRS-39: Building 51 Waste Incinerator Scrubber.
This PRS was associated with Building 51 which was demolished to facilitate the PRS 66 Removal Action.

PRS-40: Building 66 Lot.
PRS 40 was identified as a local area of plutonium-238 contamination found during a construction project.

PRS-65: Building 61 Area, Former Heavy Equipment Area.
PRS 65 was identified the Building 61 Heavy Equipment Storage Area.

PRS-66: Area 7, Thorium and Polonium Wastes.
PRS 66 encompassed a historical ravine that had been leveled with fill, and paved over with asphalt. Records show the practice of disposing waste items into the ravine continued through the mid-1960s.

PRS-67: Plant Drainage Ditch.
PRS 67 is an open, unlined channel that flows above ground through the central part of the facility from Building 22 to the retention basins on the western plant boundary. The ditch carries surface run-off from both the Main Hill and SM/PP Hill areas and the asphalt lined pond that drains the ditch through culvert, emerging behind Building 22. From that point the open ditch falls 40 feet over a length of 1800 feet.

PRS-68: Asphalt-Lined Pond.
The Asphalt-lined pond (near Building 61) was identified as a PRS during the Preliminary Review/Visual Site Inspection for RCRA facilities in 1988. The Asphalt-lined pond began operating in the 1970s. It was approximately 150 ft by 150 ft with a nominal capacity of 1.5 million gallons. The pond received storm water from the SM/PP Hill storm sewers, SM/PP hillside runoff, and non-contact cooling water. The pond provided temporary storage, flow equalization, and retention time for removing suspended solids prior to discharge to the drainage ditch (PRS 67).

PRS-72: Area 13, Polonium-Contaminated Wood from Dayton, Unit IV.
PRS 72 was identified as the area used in the early 1950s for the storage of contaminated materials (i.e., wood, equipment and other material) brought to Mound from the former Dayton Unit operations.

PRS-77: Warehouse 10.

This PRS is the footprint of previously removed warehouse.

PRS-78: Warehouse 13.
This PRS was the footprint of previously removed warehouse.

PRS-79: Warehouse 15.
PRS 79 was the historical warehouse 15. It was identified as a PRS because of thorium redrumming operations performed in the warehouse. It was dismantled in mid-1960s and the Central Fire House (Building 98) was constructed on the location.

PRS-80: Warehouse 15A.
PRS 80 was identified due to process history pertaining to operations in Warehouse 15A, primarily the loading of radioactive waste for offsite shipment.

PRS-83: Building 2 Propane Storage Tank (Tank 122).

PRS-85: Building 29 Solvent Storage Shed.
PRS 85 was identified due to its use as a solvent storage shed. Construction and operation of the shed began in 1972 and the shed became inactive in 1990.

PRS-86: Building 29 Septic Tank (Tank 224).
PRS 86 is an actinium contaminated soils area near an inactive underground septic tank.

PRS-87: Building 49 Solvent Storage Shed.
PRS 87 refers to the sheds that supplied solvents to the cleaning operations performed in Building 49. The Building 49 operations used two sheds. The first shed was built in 1968 and operated until 1986. This shed, located on the north side of Building 49, was demolished in 1986 to provide space for the construction of the Building 49 addition. Another shed was built and was located approximately 100 feet east of the Building 49 addition. This shed was a small metal structure (8x12x10 feet) that was operational from 1986 to the early 1990s.

PRS-89: Test Fire Residual Storage Area.

PRS-235: Area of Possible Elevated Thorium Activity.
As a result of the 1983 Radiological Site Survey, this plot of soil (25000 ft^2) was identified as an area of possible elevated thorium activity.

PRS-266: Area 8, Thorium-Contaminated Soils from Areas 1 and 9.
PRS 266 was identified as a potential release site as a result of historical information and the Radiological Site Survey performed in October 1983. The 25,000 sq. ft. area has three sets of data indicating high levels of thorium-232 (greater than 200 pCi/g).

PRS-267: Area 9, Thorium Storage and Redrumming Area.

PRS 267 was identified as one of the site's historic thorium redrumming areas. It became a PRS based on historic operations and sample results above screening levels.

PRS-268: Building 31, Contaminated Material Storage Building.

PRS-269: Building 36 Historic Gasoline Tanks (Tanks 239 and 240).
Potential Release Site (PRS) 269 is an area of land where two underground fuel storage tanks were shown to be located in support of original plant construction in a 1948 construction drawing that indicated a fueling facility existed near the northwest corner of Building 50. No documentation of the tanks having been removed has been found, although it is believed that they were removed as part of construction demobilization.

PRS-270: Underground Sanitary Sewer Lines G6 and G7.
Potential Release Sites (PRSs) 31-36, 125 and 270 were identified as PRSs as a result of breaks and/or separations in Mound's sanitary sewer lines, identified during a 1982 video survey of the lines.

PRS-271: Building 37 Sanitary Waste Tank (Tank 100).

PRS-272: Area 10, Concrete Debris.
This soils area was identified as a Potential Release Site (PRS) because of (1) evidence that polonium-210 contaminated debris was dumped in the area and (2) suspicion of thorium-232 and or plutonium-238 run-off from Area 12 (PRS 273).

PRS-273: Area 12, Thorium-Contaminated Soil from Area 1.
This soils area was identified as a PRS due to historic use as a disposal site for radiological contaminated soil. Plutonium and thorium exist in the soil of PRS 273 at levels which present an unacceptable risk to potential future construction activities.

PRS-274: Area 21 Former Detonator Shack.
The Potential Release Site (PRS) 274/275 Removal Action was performed at a soil location on the south central slope of the Special Metallurgical/Plutonium Processing (SM/PP) Hill, west-northwest of Building 105 on the southeast end of the Mound Plant.

PRS-275: Former Explosives Bunker.
Potential Release Sites (PRS) 274/275 were former structures located in the east-central part of the Mound Plant property.

PRS-277: Area J, Hillside Disposal Area (AKA Dredged Material Disposal Area 11a).
Potential Release Site (PRS) 277/278 is a former disposal area (chemical and radiological) and catch basin located in the east central part of the Mound property.

PRS-278: Area J, Hillside Catch Basin.

Potential Release Site (PRS) 277/278 is a former disposal area (chemical and radiological) and catch basin located in the east central part of the Mound property, and was binned Further Assessment by the Core Team in 1995.

PRS-285: Area 11, Contamination from SM Building Operations.

PRS-286: Area 16, SM Building Sanitary Sewage Septic Tank Leach Field.

PRS-287: SM Building Historic Septic Tank (Tank 241).

PRS-288: Area 17, SM Building Soils.

PRS-289: SM Building Alpha Wastewater Tank (Tank 210).

PRS-290: SM Building Alpha Wastewater Tank (Tank 211).

PRS-291: SM Building Alpha Wastewater Tank (Tank 212).

PRS-292: SM Building Alpha Wastewater Tank (Tank 213).

PRS-293: SM Building Solidification Unit (Room SM-1).

PRS-294: WS Building Solidification Unit.

PRS-295: Building 38 Solid Radioactive Waste Compactors (2 units).

PRS-296: Building 38 West Dock Sump (Tank 25).

PRS-297: Building 38 Alpha Wastewater Sump (Tank 26).

PRS-298: Building 38 Alpha Wastewater Sump (Tank 27).

PRS-299: Building 38 Diesel Fuel Storage Tank (Tank 121).

PRS-300: Area 19, Underground Waste Transfer Line.
This PRS was identified based on the fact that a pair of lines (waste transfer system) had been installed to transfer plutonium-238 contaminated waste solutions from SM Building to WD Building. The PRS consists of the WTS lines and the soil surrounding them from the SM area to the WD Building, a distance of approximately 2,600 feet.

PRS-301: Building 38 In-Line Incinerator.

PRS-302: Area D, Acid Leach Field.
PRS 302 was identified as the acid leach field, which was intended to neutralize acidic solutions spilled from a plutonium processing facility.

PRS-303: Warehouse 14 (AKA Pad 14).
Potential Release Site (PRS) 303 was identified as a result of historical storage of waste materials in Warehouse 14 (AKA, Pad 14).

PRS-305: SM Stack.

PRS-307: Site Survey Project Potential Hot Spot Location C0007.
Potential Release Site (PRS) 307 was identified due to a subsurface thorium detection.

PRS-309: Site Survey Project Potential Hot Spot Location S0307.
Potential Release Site (PRS) 309 was identified due to a single thorium detection during the site survey project. No hazardous or radioactive waste generating processes were known to have occurred at this location.

PRS-310: Site Survey Project Potential Hot Spot Location S0647.
Potential Release Site (PRS) 310 was created due to a cesium detection. Potential Release Site (PRS) 382 was identified from relatively elevated qualitative soil gas information (PETREX).

PRS-319: Epoxy Resin Disposal. (Waste Transportation Vehicles, Trash Dumpsters, and Epoxy Resin Waste Storage Site – Building 49).
Potential Release Sites (PRSs) 315, 316 and 319 were identified in the 1988 RCRA Facility Assessment (RFA) during the Visual Site Inspection (VSI) at Mound. They were identified due to potential releases from the trash dumpsters or the waste transport vehicles.

PRS-326: Building 38 Sanitary Sump (Tank 254).

PRS-330: Building 2 Fuel Oil Tank (Tank 260).
PRS 330 is the site of a former underground storage tank located in the western sector of the original Mound Plant.

PRS-331: Building 2 Tank (Tank 261).
This location was identified as a Potential Release Site (PRS) because the tank had been used to receive the discharge of sanitary waste water from Building 2.

PRS-336: Building 37 Waste Tank (AKA Low Risk Waste Tank) (Tank 270).
Potential Release Site (PRS) 336 was identified as the Building 29 Septic Tank, which is now inactive.

PRS-338: Building 29 Septic Tank (Tank 270).
This tank is approximately 20 feet beneath the parking lot in fill material east of Building 29.

PRS-364: Elevated Soil Gas Location.

Potential Release Site (PRS) 364 was identified due to elevated qualitative PETREX hydrocarbon levels.

PRS-382: Elevated Soil Gas Location (Soil Contamination – Building 95).
Potential Release Site (PRS) 382 was created due to a cesium detection. The cesium at PRS 382 has subsequently been removed and sampling conducted in 1995 indicated that no cesium was present.

PRS-385: Elevated Soil Gas Location.
This PRS was identified as a result of elevated, qualitative PETREX soil gas sampling during an OU5 investigation.

PRS-386: Elevated Soil Gas Location.
This PRS was identified as a result of elevated, qualitative PETREX soil gas sampling during an OU5 investigation.

PRS-387: Elevated Soil Gas Location.
This PRS was identified as a result of elevated, qualitative PETREX soil gas sampling during an OU5 investigation.

PRS-388: Elevated Soil Gas Location (Soil Contamination – Parking Lot Area Near SM/PP Hillside
Potential Release Site (PRS) 388 was identified due to elevated qualitative PETREX hydrocarbon levels.

PRS-389: Elevated Soil Gas Location.
PRSs 389 and 392 were located in the eastern sector of the original Mound plant. These soil locations were identified as PRSs due to qualitative hydrocarbon detections found during the PETREX soil gas portion of the OU5, *Non Area of Concern* investigation.

PRS-390: Elevated Soil Gas Location (Soil Contamination – Organic Compounds).
PRSs 390, 393 and 394 were located in the northern sector of the original Mound plant. These soil locations were identified as PRSs due to qualitative hydrocarbon detections found during the PETREX soil gas portion of the OU5, *Non Area of Concern* investigation.

PRS-391: Elevated Soil Gas Location.
This area was identified as a Potential Release Site in June 1994 due to qualitative PETREX soil gas results obtained during the OU5, Operational Area Phase I Investigation.

PRS-392: Elevated Soil Gas Location.
PRSs 389 and 392 were located in the eastern sector of the original Mound plant. These soil locations were identified as PRSs due to qualitative hydrocarbon detections

found during the PETREX soil gas portion of the OU5, *Non Area of Concern* investigation.

PRS-393: Elevated Soil Gas Location (Soil Contamination – Organic Compounds).
PRSs 390, 393 and 394 were located in the northern sector of the original Mound plant. These soil locations were identified as PRSs due to qualitative hydrocarbon detections found during the PETREX soil gas portion of the OU5, *Non Area of Concern* investigation.

PRS-394: Elevated Soil Gas Location (Soil Contamination – Organic Compounds).
PRSs 390, 393 and 394 were located in the northern sector of the original Mound plant. These soil locations were identified as PRSs due to qualitative hydrocarbon detections found during the PETREX soil gas portion of the OU5, *Non Area of Concern* investigation.

PRS-395: Elevated Soil Gas Location.
This PRS was identified due to qualitative PETREX soil gas results from an OU5 investigation. Subsequent, quantitative sample indicated all concentrations of VOCs, SVOCs, PCBs, pesticides, metals, radionuclides, and explosives below regulatory and 10^{-6} risk based levels.

PRS-396: Elevated Soil Gas Location.
This area was identified as Potential Release Site in June 1994 due to qualitative PETREX soil gas results during the OU5, Operational Area Phase I Investigation.

PRS-397: Elevated Soil Gas Location.
Potential Release Site (PRS) 397 is located south of the former fuel tanks (Figure 1). FA was performed and confirmed that levels of BTEX and PAH were acceptable.

PRS-398: Elevated Soil Gas Location.
This PRS is within the footprint of the PRS 66 Removal Action.

PRS-399: Elevated Soil Gas Location.
PRS 399 was identified as a result of a single elevated relative soil gas reading near the Building 51 Solvent Waste Tank. The tank was removed in 1990. Soil sampling in 1991, 1992, and 1996 failed to detect any organics above the guideline criteria. In addition, all samples indicated that radionuclides were below guideline criteria.

PRS-400: Elevated Soil Gas Location.
This soils location was identified as PRS 400 due to a single plutonium-238 detection found during the OU5, Operational Area Phase I Investigation.

PRS-401: Elevated Plutonium-238 Location
This soils location was identified as PRS 401 due to a single plutonium-238 detection found during the OU5, Operational Area Phase I Investigation.

PRS-402: Elevated Soil Gas Location.
This PRS was identified as a result of qualitative soil gas sampling during an OU5 investigation.

PRS-403: Elevated Soil Gas Location.
This PRS was identified as a result of qualitative soil gas sampling during an OU5 investigation.

PRS-404: Elevated Soil Gas Location.
This PRS was identified as a result of qualitative soil gas sampling during an OU5 investigation.

PRS-422: Plutonium Hot Spot (Elevated Plutonium-238 Spot).
PRS 422 was identified as a PRS based on a historic elevated plutonium-238 sample that was collected in 1982.

PARCEL 8

PRS-7: Plant Sanitary Outfall Pipeline.

PRS-14: Area C, Waste Storage Area (AKA Drum Staging Area and Chemical Waste Storage).
Potential Release Site (PRS) 14 was suspected to contain Volatile Organic Compounds (VOCs) due to the historical use as a drum storage area for staging chemical waste prior to off-site disposal.

PRS-15: Area C, Lithium Burn Area (AKA Lithium Carbonate Disposal).
PRS 15 was identified due to process history pertaining to the disposal of lithium hydride residue left in drums during the mid-1950s.

PRS-17: Oil Burn Structure.
This Potential Release Site is the Building 34, Oil Burn Structure. It was identified as a PRS because aviation fuel was used in the test-burning operation in the structure. The 1993 OU3, Limited Field Investigation sampled the area in and around the structure.

PRS-18: Building 34, Fire Fighting Training Facility Pit.
The Potential Release Site (PRS) 18 is a former location of the fire fighting training area. In 1989, a cleanup operation was performed at PRS 18 to remove uranium contamination in soil. In 1995, a second cleanup operation was performed at PRS 18 to removed petroleum contamination in soil.

PRS-19: Building 34, Historical Fire Fighting Training Pit.
This Potential Release Site (PRS) 19 is the historical fire fighting pit. It was identified as a Potential Release Site in 1993 during the OU3, Limited Field Investigation.

PRS-20: Building 34, Aviation Fuel Storage Tank (Tank 219).

Potential Release Site (PRS) 20 was identified because of its use as an aviation fuel underground storage tank. The tank was removed in 1990.

PRS-31: Underground Sanitary Sewer Line G5.
Potential Release Sites (PRSs) 31-36, 125 and 270 were identified as PRSs as a result of breaks and/or separations in Mound's sanitary sewer lines, identified during 1982 video survey of the lines.

PRS-32: Underground Sanitary Sewer Line G12.
Potential Release Sites (PRSs) 31-36, 125 and 270 were identified as PRSs as a result of breaks and/or separations in Mound's sanitary sewer lines, identified during 1982 video survey of the lines.

PRS-35: Underground Sanitary Sewer Lines G19 and G14.
Potential Release Sites (PRSs) 31-36, 125 and 270 were identified as PRSs as a result of breaks and/or separations in Mound's sanitary sewer lines, identified during 1982 video survey of the lines.

PRS-41: Area 3, Thorium Drum Storage and Redrumming Area.

PRS-42: Area A, construction Soils from T-Building.
Potential Release Site (PRS) 42 was identified as a PRS due to T Building construction activities and the placement of the excavated soils at this location.

PRS-43: Wastewater Treatment Plant Building 57 Grit Chamber (Tank 101).

PRS-44: Building 57 Grit Conveyer.

PRS-45: Building 57 Comminuter (Tank 102).

PRS-46: Building 57 Equalization Basin (Tank 103).

PRS-47: Building 57 Equalization Basin (Tank 104).

PRS-48: Building 57 Equalization Basin (Tank 105).

PRS-49: Building 57 Equalization Basin (Tank 106).

PRS-50: Building 57 Aeration Basin (Tank 107).

PRS-51: Building 57 Aeration Basin (Tank 108).

PRS-52: Building 57 Clarifier (Tank 109).

PRS-53: Building 57 Clarifier (Tank 110).

PRS-54: Building 57 Sand Filters (2 units).

PRS-55: Building 57 Chlorine Contact Chamber (Tank 111).

PRS-56: Building 57 Chlorine Contact Chamber (Tank 112).

PRS-57: Sludge Spoil Drying Beds.
The sludge drying beds were identified as a Potential Release Site (PRS) 57, in 1988, when elevated levels of plutonium-238 at 1,235 pCi/g and thorium-232 at 63 pCi/g were measured during the construction project to remove the beds. The elevated concentrations were not from the beds but from the soil under the beds after removal. The contamination in the area came from PRS 41, an area that includes PRS 57.

PRS-58: Dredge Spoil Drying Beds.
Potential Release Site (PRS) 58 was identified by the RCRA Facility Assessment due to its use as a storage area for the dredged spoils drying beds.

PRS-59: Contaminated Soil Box Storage Area.
PRS 59 was identified as a storage area for boxes containing plutonium contaminated soil during a USEPA 1988 Preliminary Review/Visual Site Inspection.

PRS-60: Hazardous Waste Storage Area (Building 72).

PRS-61: Building 72 Outdoor Hazardous Waste Storage Area.

PRS-62: Building 72 Empty Drum Storage Area.

PRS-63: Building 19 Soils (Soil Contamination – Building 29).
This site became a PRS because of potential Cobalt-60 and Cesium-137 contamination.

PRS-64: Building 19 Historic Gasoline Tank (Tank 238).

PRS-67: Plant Drainage Ditch.
PRS 67 is an open, unlined channel that flows above ground through the central part of the facility from Building 22 to the retention basins on the western plant boundary. The ditch carries surface run-off from both the Main Hill and SM/PP Hill areas and the asphalt lined pond that drains the ditch through culvert, emerging behind Building 22. From that point the open ditch falls 40 feet over a length of 1800 feet.

PRS-69: Overflow Pond.
PRS 69 is the Mound Overflow Pond and outflow pipe. It is a PRS due to the presence of plutonium-238 contamination, site sanitary landfill leachate, effluent from the plant drainage system, and storm water runoff. The overflow pond is located near the southwest corner of the original plant property. Operating continuously since 1979, the pond has a capacity of 5 million gallons.

PRS-70: Retention Basins and Weir Basin.
This PRS consists of an open-topped impoundment with earthen sides which is used to control the flow of water from the open drainage ditch. The bottom is partitioned into basins by concrete dividers. Also included in this PRS is the Weir basin. It is connected to the retention basins by a spillway.

PRS-71: Building 85 Waste Solvent Tank (Tank 136).
Historical process knowledge indicated that this Potential Release Site (PRS), which is a below grade tank located adjacent to Building 85, was never used.

PRS-75: Railroad Siding (Historical Railroad Spur Area).
Potential Release Site (PRS) 75 is a soils area in the vicinity of the railway siding, created due to its use as a radioactive drum storage, loading, unloading, and repackaging area.

PRS-76: Warehouse 9.
This location was identified as a PRS as a result of historical information on operations conducted in the warehouse. Warehouse 9 was built as part of the original construction of Mound.

PRS-82: Building 57 Diesel Fuel Storage Tank (Tank 118).
Potential Release Site (PRS) 82 was identified as an underground storage tank used to store diesel fuel to start an emergency generator near Building 57.

PRS-84: Building 56 Diesel Fuel Storage Tank (Tank 123).
This former location of a diesel fuel tank was identified as a Potential Release Site (PRS) because of its inclusion in the Mound Plant Underground Storage Tank Program Plan and Regulatory Status Review.

PRS-90: Site Survey Project Potential Hot Spot Location S0425 (Soil Contamination – Building 22).
Potential Release Site (PRS) 90 was based on an isolated thorium reading of 5.74 pCi/g gathered during the 1983 site survey; however, no known radioactive or hazardous waste generating processes were known to have occurred at the location of PRS 90.

PRS-91: Main Hill Seep 0601.
This is one of several seeps located on the hillside of the Main Hill. Water from the seeps shows elevated concentrations of tritium and VOCs.

PRS-92: Main Hill Seep 0602.
This is one of several seeps located on the hillside of the Main Hill. Water from the seeps shows elevated concentrations of tritium and VOCs.

PRS-101: Cooling Tower Basins.

PRS-102: Cooling Tower Drum Storage Area.

PRS-103: E Building Soils.
This soils location was identified as a Potential Release Site (PRS) because of the detection of Volatile Organic Compounds (VOCs) during the Mound Reconnaissance Sampling soil gas survey.

PRS-104: Scintillation Vial Storage Area.
This PRS was located in E Building.

PRS-105: E Building Solvent Storage Shed.
Potential Release Site (PRS) 105 is a remediated soils location that was the former location of the E Building Solvent Storage Shed.

PRS-110: I-Building Soils.
This PRS was identified due to VOC detections during a quantitative OU 5 investigation.

PRS-111: Monitor Well 0034.
Potential Release Site (PRS) 111 was initially identified as a result of a visual inspection of Monitoring Well 0034 which discovered an oily substance during surveillance activities in 1986.

PRS-112: Paint Shop Area.

PRS-113: Powerhouse Soils (Former Tank Site – Powerhouse Fuel Oil Storage Tanks and Soil Contamination).
PRS 113 refers to a single toluene soil gas .

PRS-114, 115, 116, 117: Powerhouse Fuel Oil Storage Tanks (Tanks 113, 114, 115, 116) (Former Tank Site – Powerhouse Fuel Oil Storage Tanks and Soil Contamination).
PRSs 114-117 were the four underground fuel oil tanks near the Powerhouse.

PRS-118: M Building Soils.

PRS-119: Room M-38 Metal Plating Rinse Water Sump (Tank 225).

PRS-120: Room M-108 Metal Plating Rinse Water Tank (Tank 119)

PRS-121: Vapor Degreasers.

PRS-123: Area 5, Radioactive Waste Line Break.
PRS 123 was identified as a result of a December 1970 waste line break. Several radionuclides were detected in the soils at PRS 123.

PRS-124: Building 48 Hillside.

Potential Release Site (PRS) 124 was identified due to a release on 11-09-1967. 1,500 to 2,000 gallons of low-level radioactive wastewater were accidentally released during waste line repair.

PRS-125: Underground Sanitary Sewer Line G24.
Potential Release Sites (PRSs) 31-36, 125, and 270 were identified as PRSs as a result of breaks and/or separations in Mound's sanitary sewer lines, identified during a 1982 video survey of the lines.

PRS-126: Building 28 Solvent Storage Area (Solvent Storage Site – Outside Area Next to Building 28).
Potential Release Sites (PRSs) 126 and 127 refer to the temporary storage locations for waste solvents generated by the Building 28/60 operations.

PRS-128: DS Building Solvent Storage Shed.

PRS-129: B Building Solvent Storage Shed.
PRS 129/130 was the B Building solvent storage shed and its adjacent drum storage pad. VOCs were detected in the soils around PRS 129/130.

PRS-130: B Building Temporary Drum Storage Area.
PRS 129/130 was the B Building solvent storage shed and its adjacent drum storage pad. VOCs were detected in the soils around PRS 129/130.

PRS-131: SW Building Soils.

PRS-132: Area 15, Entombed SW Cave (Rooms SW 1-B).

PRS-133: SW Building Room 1-A.

PRS-134: SW Building Drum Storage Area.

PRS-135: Rooms SW-8 Beta Wastewater Tank (Tank 20).

PRS-136: Room SW-125 Beta Wastewater Tank (Tank 21).

PRS-137: Room SW-143 Beta Wastewater Tank (Tank 22).

PRS-138: Room SW-137 Beta Wastewater Sump (Tank 23).

PRS-139: Room SW-10 Beta Wastewater Sump (Tank 226).

PRS-140: Beta Waste Solidification Facility – SW Building.

PRS-141: Tritium Effluent Removal System.

PRS-142: SW/R Building Solid Radioactive Waste Compactor.

PRS-143: R/SW-T Building Stack Diesel Fuel Storage Tank (Tank 117).

PRS-144: R Building Sanitary Waste Collection Tank (Tank 120).

PRS-145: Room R-128 Alpha Wastewater Tank (Tank 19).

PRS-146: R Building Room 121, 144, 146 and 148 Entombed Drains.

PRS-147: HH Building Soils.
Potential Release Site (PPRS) 147 was identified as a result of the Soil Gas Survey which detected toluene levels ranging from 5 to 23, 142 parts per billion (ppb). No detection of toluene was indicated in the down gradient seep #602, which is approximately 250 feet from PRS 147.

PRS-148: HH Building Solidification Unit.

PRS-149: HH Building Pilot Incinerator.

PRS-150: Room HH-15 Beta Wastewater Sump (Tank 236).

PRS-151: Room HH-6 Alpha Wastewater Sump (Tank 237).

PRS-152: HH Building Beta Wastewater Sump (Tank 24).

PRS-153: Area 20, Radioactive Waste Line Break.
Potential Release Site (PRS) 153 is a soil area on the hillside west of the Hydrolysis House (HH) Building and bounded on the south by a roadway. This soils area, also known as Area 20, was designated a PRS because of contamination by leaks of wastewater from the 3-inch underground pipeline that transversed the northern boundary of this soil area.

PRS-154: Area 23, Thorium Contaminated Soil.
Potential Release Site (PRS) 154, also known as Area 23, is located on the WD hillside and was identified as a PRS based on historic soil sample detections of Plutonium-238, Radium-226, and Uranium-238.

PRS-155: Old Sanitary Disposal (SD) Plant (AKA Old Sanitary Wastewater Treatment Plant).

PRS-156: Old SD Plant Tank (Tank 205).

PRS-157: Old SD Plant Tank (Tank 206).

PRS-158: Old SD Plant Tank (Tank 207).

PRS-159: Area 4A, Sewage Sludge Drying Pits.

PRS 160: Mixed Waste Storage Area (Building 23).

PRS-161: Glass Melter Furnace.

PRS-162: Glass Melter Feed Drum.

PRS-163: Off-Gas Treatment System Deluge Tank.

PRS-164: Off-Gas Treatment System Venturi Scrubber.

PRS-165: Off-Gas Treatment System Cyclone Demister.

PRS-166: Off-Gas Treatment System HEPA Filter.

PRS-167: Off-Gas Treatment System WD Building Filter Bank.

PRS-168: Off-Gas Treatment System Recycle Tank.

PRS-169: Off-Gas Treatment System Strainer.

PRS-170: Off-Gas Treatment System Leaf Solution Filter.

PRS-171: Off-Gas Treatment System Iodine Absorption Filter.

PRS-172: WDA Building Basement Wash Sump (Tank 11) (AKA Glass Melter Room Sump).

PRS-173: Cyclone Incinerator.

PRS-174: WD Building Drum Staging Area.

PRS-175: Area 4, WD Building Influent Tank Overflow.

PRS-176: Area 14, Radioactive Waste Line Break.
In 1974, the soils associated with the WTS leaks (PRS-176) were remediated. In the mid 1980s, the WTS line, the two holding tanks, and Building 43 were removed.

PRS-177: Building 41 Alpha Wastewater Tank (Tank 208).

PRS-178: Building 41 Alpha Wastewater Tank (Tank 209).

PRS-179: WD Building Alpha Wastewater Influent Tank (Tank 3).

PRS-180: WD Building Alpha Wastewater Influent Tank (Tank 4).

PRS-181: WD Building Alpha Wastewater Influent Tank (Tank 5).

PRS-182: WD Building Alpha Influent Tank (Tank 6).

PRS-183: Room WD-1 Basement Sump (Tank 12).

PRS-184: Room WD-1 Alpha Wastewater Sump (Tank 17).

PRS-185: Room WD-1 Sanitary Waste Sump (Tank 134).

PRS-186: Room WD-8 Alpha Wastewater Sump (Tank 18).

PRS-187: WD Building Alpha Wastewater Clariflocculators (2 units).

PRS-188: WD Building Alpha Wastewater Mixing Box.

PRS-189: WD Building Alpha Wastewater Sand Filters (2 units).

PRS-190: WD Building Alpha Wastewater Bone Char Columns (2 units).

PRS-191: WD Building Alpha Wastewater Effluent Tank (Tank 7).

PRS-192: WD Building Alpha Wastewater Effluent Tank (Tank 8).

PRS-193: WD Building Alpha Wastewater Effluent Tank (Tank 9).

PRS-194: WD Building Alpha Wastewater Effluent Tank (Tank 10).

PRS-195: WD Building Alpha Wastewater Sludge Pits (2 units).

PRS-196: WD Building Alpha Wastewater Solidification/Drumming Unit.

PRS-197: WD Building Solid Radioactive Waste Compactor.

PRS-198: WDA Building Basement Sanitary Waste Tank (Tank 135).

PRS-199: WDA Building Beta Wastewater Influent Tank (Tank 13).

PRS-200: WDA Building Beta Wastewater Influent Tank (Tank 14).

PRS-201: WDA Building Beta Wastewater Metering Station.

PRS-202: WDA Building Beta Wastewater Mixing/Solidification Unit.

PRS-203: WDA Building Alpha Wastewater Influent Tank (Tank 15).

PRS-204: WDA Building Alpha Wastewater Influent Tank (Tank 16).

PRS-205: WDA Building Alpha Wastewater Effluent Tank (Tank 214).

PRS-206: WDA Building Alpha Wastewater Influent Tank (Tank 215).

PRS-207: WDA Building Alpha Wastewater Influent Tank (Tank 216).

PRS-208: WDA Building Solidification Unit.

PRS-209: Building 62 Stack Deluge Tank (Tank 1).

PRS-210: Room H-131 Laundry Water Tank (Tank 2).

PRS-213: T Building Solidification Unit.

PRS-214: T Building Solid Radioactive Waste Compactor.

PRS-215: Room T-1 Cooling Water Sump (Tank 124).

PRS-216: T Building, Corridor 2 Sanitary Wastewater Sump (Tank 125).

PRS-217: Room T-11F Sanitary Wastewater Sump (Tank 126).

PRS-218: Room T-15 Sanitary Wastewater Sump (Tank 127).

PRS-219: T Building, Stair 3 Cooling Water Sump (Tank 128).

PRS-220: Room T-78 Steam Condensate Sump (Tank 129).

PRS-221: T Building, Corridor 8 Sanitary Wastewater Sump (Tank 130).

PRS-222: Room T-78A Sanitary Wastewater Sump (Tank 131).

PRS-223: Room T-90 Cooling System Condensate Sump (Tank 132).

PRS-224: Room T-99 Sanitary Wastewater Sump (Tank 133).

PRS-225: Room T-23 Beta Wastewater Sump (Tank 227).

PRS-226: Room T-3 Floor Drain Sump (Tank 228).

PRS-227: Room T-40 Alpha Wastewater Sump (Tank 229).

PRS-228: Room T-41 Alpha Wastewater Sump (Tank 230).

PRS-229: Room T-50 Alpha Wastewater Sump (Tank 231).

PRS-230: Room T-50 Alpha Wastewater Sump (Tank 232).

PRS-231: T Building, Corridor 8 Alpha Wastewater Sump (Tank 233).

PRS-232: T Building, Corridor 7 Alpha Wastewater Sump (Tank 234).

PRS-233: Room T-63 Alpha Wastewater Sump (Tank 235).

PRS-234: Building 58 Diesel Fuel Storage Tank (Tank 222).
This Potential Release Site (PRS) 234 is a former location of a 3,000 gallon unlined, steel tank that was used to supply diesel fuel to an emergency generator.

PRS-235: Area of Possible Elevated Thorium Activity.
This plot of soil (25000 ft^2) was identified as an area of possible elevated thorium activity as a result of the 1983 Radiological Site Survey.

PRS-236: Site Survey Project Potential Hot Spot Location S0166.
Potential Release Site (PRS) 236 was identified after 34.5 pCi/g of plutonium-238 was detected in a surface sample, location S0166, collected from the dock area on the southwest corner of SW Building in 1983-84.

PRS-237: Site Survey Project Potential Hot Spot Location S0175.
Potential Release Site (PRS) 237 became a PRS due to the elevated detections of cesium-137 and cobalt-60 found during the Site Survey Project. PRS 237 is located approximately 100 feet northwest of I Building at the edge of the road.

PRS-238: Site Survey Project Potential Hot Spot Location S1092.

PRS-239: Site Survey Project Potential Hot Spot Location S0208.
This site was identified as a Potential Release Site (PRS) due to detectable plutonium-238 levels at surface soil samples.

PRS-240: Site Survey Project Potential Hot Spot Location S0472.

PRS-243: VOC Potential Hot Spot Location 1064.
The soils location was identified as a Potential Release Site (PRS) because of the detection of toluene during the Mound Reconnaissance Sampling soil gas survey.

PRS-244: VOC Potential Hot Spot Locations 1076, 1077, 1079, and 1080. Potential Release Site (PRS) 244 was designated as a PRS because of the detection of volatile organic compounds (VOCs) in four sampling locations surrounding the Mound Plant road located west of B Building and OSW Building during the 1992 Soil Gas Survey.

The contaminants of concern were toluene and trichloroethane. Both were below their respective guideline criteria. Core Team decided that PRS 244 requires No Further Assessment.

PRS-245: VOC Potential Hot Spot Location 1085.
This soils location was identified as a Potential Release Site (PRS) because of the detection of Volatile Organic Compounds (VOCs) during the Mound Reconnaissance Sampling soil gas survey.

PRS-246: VOC Potential Hot Spot Locations 1117 and 1118.
Potential Release Site (PRS) 246 was designated as a PRS due to the detection of trichloroethene (TCE and tetrachloroethene (PCE) during the 1993 Soil Gas Survey.

PRS-247: VOC Potential Hot Spot Location 1129.
This Potential Release Site (PRS) was created due to quantitative soil gas volatile organic compound (VOC) detection.

PRS-248: HH Building Stack.

PRS-249 SW Building Stack (NCDPF).

PRS-250: SW Building Stack (SW1C).

PRS-251: SW Building Stack (HEFS).

PRS-252: B Building Stack.

PRS-253: T Building WEST Stack.

PRS-254: T Building EAST Stack.

PRS-255: WD Building Stack (ALR).

PRS-256: WD Building Stack (AHR).

PRS-257: WD Building Stack (SS).

PRS-282: Spoils Disposal Area/Construction Spoils Area.

PRS-300: Area 19, Underground Waste Transfer Line.
This PRS was identified based on the fact that a pair of lines (waste transfer system) had been installed to transfer plutonium-238 contaminated waste solutions from SM Building to WD Building. The PRS consists of the WTS lines and the soil surrounding them from the SM area to the WD Building, a distance of approximately 2,600 feet.

PRS-327: R-111 Calorimetry Bath (Tank 255).

PRS-328: R-111 Calorimetry Bath (Tank 266).

PRS-329: Building 62 Hot Waste Sump (Tank 258).

PRS-337: Building H Condensate Sump (Tank 268).

PRS-339: T-44 Wastewater Sump (Tank 250).

PRS-340: T-16b Wastewater Sump (Tank 251).

PRS-341: T-90 Condensate Sump (Tank 269).

PRS-342: T-1 Hot Side Fire Water Tank (Tank 271).

PRS-343: T-20 Fire Water Sump (Tank 272).

PRS-344: T-37 Fire Water Sump (Tank 273).

PRS-345: Former Equipment Storage Area (see related site 16).
The area became a Potential Release Site (PRS) because it was used by contractors in the 1980s as an equipment yard and staging area. The area was associated with Area C Lithium Burn Area and the Past Hazardous Waste Storage Facility in the OU9 Site Scoping Report.

PRS-347, 348, 355 and 370: Elevated Soil Gas Locations.
PRSs 346, 347, 348, 355 and 370 were soil Potential Release Sites (PRSs) located in the southern sector of the original Mound Plant.

PRS-351, 352, 353, 360, 361, 362, 385, 386, and 387: Elevated Soil Gas Location.
PRSs 351, 352, 353, 357, 359, 360, 361, 362, 385, 386, and 387 were located in the western sector of the original Mound Plant.

PRS-356: Elevated Soil Gas Location.

PRS-363: Elevated Soil Gas Location. PRS 363 was an isolated Pu-238 hot spot identified during the site survey for the OU5, Non-AOC investigation in June 1994 – October 1994). No radioactive or hazardous waste generating processes were known to have occurred at the location of PRS 363. Core Team decided that PRS 363 requires No Further Assessment.

PRS-366: PRS 366 is a soil Potential Release Site (PRS) located in the western sector of the original Mound Plant. This soil location was identified as a PRS due to qualitative hydrocarbon detections found during the PETREX soil gas portion of the OU5, Non-AOC investigation. Core Team decided that PRS 366 requires No Further Assessment.

PRS-367: Elevated Soil Gas Location. PRS 367 is a soil Potential Release Site (PRS) located in the western sector of the original Mound Plant. This soil location was identified as a PRS due to qualitative hydrocarbon detections found during the PETREX soil gas portion of the OU5, Non-AOC investigation. Core Team decided that PRS 367 requires No Further Assessment.

PRS-368: Elevated Soil Gas Location.

PRS-405: (North of Bldg. 23) Oil and PCB Potential in Soil. Potential Release Site (PRS) 405 is a soil area located approximately 5 feet north of Building 23 (Waste Management Facility) at the east end of that building. PRS 405 was identified during construction activities in June 1994 when an oily substance was discovered.

PRS-408: Prism Separator Oil Leak.
PRS 408 is a chemical (Shell Rotella 10W lubricating oil) contamination soils area located in the "Prism" nitrogen production membrane system, which supplied house nitrogen to R and SW buildings.

PRS-411: Soil Contamination – Asphalt Roadway.
Potential Release Site (PRS) 411 was identified as a PRS site due to elevated FIDLER readings that were discovered during a Health Physics Survey.

PRS-413: Soil Contamination – creosote.
PRS 413 is a chemically contaminated soil location situated in the vicinity of the old Sanitary Disposal (SD) facility. The SD facility, now removed, was located on the southwest side of the Mound Plant Main Hill, approximately northwest of, and on terrain elevated above, the Plant Waste Disposal (WD) Building.

PRS-415: Soil Contamination – Radiological.
Potential Release Site (PRS) 415 was established during the binning process for DS Building. A data review of soils areas around DS Building identified soil sampling location ID SCR307 with values of Plutonium-238 and Thorium-232 above guideline criteria.

PRS-417: Soil Contamination-High Soil Gas Near Well 0312.

PRS-423, 424, 425, 426, 427 and 428: Hot Waste Line – Segments 1A, 1B, 2, 5, 6, and 7. PRSs 423, 424, 425, 426, 427 and 428 were identified because the underground line segments carried radioactively contaminated effluent from H Building operations to the Waste Disposal Building (WD).

PRS-429, 430, 431, 432, 433, 434, 435, and 436: Hot Waste Line – Segments 9a, 10, 11, 12, 13a, 13b, 14.
PRSs 429, 430, 431, 432, 433, 434, 435, and 436 were identified because the underground line segments carried radioactively contaminated effluent from T Building operations to the Waste Disposal Building (WD).

PRS-437, 438, and 439: Hot Waste Line – Segment 3, 4, 4a. PRS 437, 438 and 439 were identified because the underground line segments carried radioactively contaminated effluent from R and SW Building operations to the Waste Disposal Building (WD).

PRS-440: Hot Waste Line – Segment 8. PRS 440 was identified because the underground line segment carried radioactively contaminated effluent from SW Building operations to the Waste Disposal Building (WD).

PRS-442: PRS 442 is the subsurface area located below the asphalt-lined pond (PRS 68). PRS 442 was identified as a PRS due to the evidence of backfill within the footprint of the pond prior to its construction.

Appendix E

Demonstration of Equilibrium

Several of the radionuclides of interest at Mound are part of the naturally occurring decay chains. The naturally occurring decay chains are the uranium-238 chain (The Uranium Series), the uranium-235 chain (The Actinium Series) and the thorium-232 chain (The Thorium Series). These chains satisfy the conditions of secular equilibrium. The conditions for secular equilibrium are met if a parent substance decays much more slowly than any of the other members of the chain. Secular equilibrium means the activities of each member of the decay chain are equal.

By assuming secular equilibrium for radionuclides of interest at Mound, one can conservatively calculate risk using the sum of the member's slope factors. Table E1 lists the members of the extended chains (designated "long lived decay"").

The Phase I Risk Working group (MEMP, OEPA, USEPA, and BWXTO) identified overlap of the mean plus/minus two standard deviations as the metric to demonstrate secular equilibrium. Figures E1-E6 illustrate that the surface (0-2 ft) and subsurface (all data regardless of depth) soil data for Parcel 6 demonstrate that the parent and daughters for the uranium-235, uranium-238, and thorium-232 chains can be assumed to be in equilibrium. Figures E7-E12 illustrate that surface and subsurface soil data for Parcel 7 demonstrate that the parent and daughter radionuclides can be assumed to be in equilibrium. Figures E13-E18 illustrate that the surface and subsurface soil data for Parcel 8 demonstrate that the parent and daughters can be assumed to be in equilibrium.

For calculating soil risk, the exposure point concentration for each chain was assigned as follows:

U-238 chain represented by U-238 EPC
U-235 chain represented by Ac-227 EPC
Th-232 chain represented by Th-228 EPC

The process used to select the EPC to represent the chain was based on process history, knowledge of sampling analysis and methods, contaminants of concern for Parcels 6, 7, and 8, use of a conservative concentration, and a review of the distribution of the data.

For calculating background risk, the established background value for the principal (parent) nuclide of the chain is used.

The risk is then calculated or quantified using the EPC and the total of the slope factors for each daughter (Table E2).

An example of how the risk is calculated for the Th-228 chain is as follows: In soil, Th-228 screens out as a contaminant of concern in Table 2.5. To calculate risk, from contaminated soil, for the Th-228 chain, the EPC for Th-228 is used. Table 2.5 indicates the EPC for Th-228 for the construction worker is 0.826 pCi/g and Table 2.6 indicates the EPC for the site employee is 0.796 pCi/g. The slope factors used to calculate risk start with Th-228 and incorporate the long lived decay daughters as shown in Table E2. These summed slope factors are multiplied by the intake concentrations for soil to derive risk levels (see Section 5.1.1), which are quantified on Tables 5.13 through 5.18.

Table E1: Long Lived Decay Chains

Long Lived Decay Chain	Parent	Terminal Nuclide	$HEAST_1$	$HEAST_2$	$HEAST_3$	$HEAST_4$	$HEAST_5$	Compare to HEAST
Ac-227	Ac-227	Pb-207	Ac-227+D					Same as HEAST Ac-227+D
Cs-137	Cs-137	Ba-137	Cs-137+D					Same as HEAST Cs-137+D
Pb-210	Pb-210	Pb-206	Pb-210+D					Same as HEAST Pb-210+D
Pa-231	Pa-231	Pb-207	Pa-231	Ac-227+D				Differs, HEAST lists no '+D'
Ra-226	Ra-226	Pb-206	Ra226+D	Pb210+D				Differs, HEAST does not include Pb210+D
Ra-228	Ra-228	Pb-208	Ra-228+D	Th-228+D				Differs, HEAST does not include Th-228+D
Th-228	Th-228	Pb-208	Th-228+D					Same as HEAST Th-228+D
Th-229	Th-229	Bi-209	Th-229+D					Same as HEAST Th-229+D
Th-230	Th-230	Pb-208	Th-230	Ra-226+D	Pb-210+D			Differs, no "+D" in HEAST
Th-232	Th-232	Pb-208	Th-232	Ra-228+D	Th-228+D			Differs, No '+D' in HEAST
U-233	U-233	Bi-209	U-233	Th-229+D				Differs, HEAST does not include Th-229+D
U-235	U-235	Pb-207	U-235+D	Pa-231	Ac-227+D			Differs, HEAST does not include Pa-231 and Ac-227+D
U-238	U-238	Pb-206	U-238+D	U-234	Th-230	Ra-226+D	Pb-210+D	Differs, HEAST does not include U-234, Th-230, Ra-226+D and Pb-210+D

Slope factor of Chain 'X+11d' = Sum of slope factors of $HEAST_n$

Table E2: Slope Factors for Long Lived Decay Chains

Chemical	CAS Number	Decay Chain Additions	Oral Soil Ingestion SF (risk/pCi)	Oral Water Ingestion SF (risk/pCi)	Inhalation SF (risk/pCi)	External SF (risk/yr per pCi/g soil)
Actinium-227 + long lived decay	14952-40-0(+D)	Actinium-227+D	1.16E-09	4.86E-10	2.09E-07	1.47E-06
	14952-40-0L	Total	1.16E-09	4.86E-10	2.09E-07	1.47E-06
Cesium-137 + long lived decay	10045-97-3(+D)	Cesium-137+D	4.33E-11	3.04E-11	1.19E-11	2.55E-06
	10045-97-3L	Total	4.33E-11	3.04E-11	1.19E-11	2.55E-06
Lead-210 + long lived decay	14255-04-0(+D)	Pb-210+D	2.66E-09	1.27E-09	1.39E-08	4.21E-09
	14255-04-0L	Total	2.66E-09	1.27E-09	1.39E-08	4.21E-09
Protactinium-231 + long lived Decay	14331-85-2	Protactinium-231	3.74E-10	1.73E-10	4.55E-08	1.39E-07
	14952-40-0(+D)	Actinium-227+D	1.16E-09	4.86E-10	2.09E-07	1.47E-06
	14331-85-2L	Total	1.53E-09	6.59E-10	2.55E-07	1.61E-06
Radium-226 + long lived decay	13982-63-3(+D)	Radium-226+D	7.30E-10	3.86E-10	1.16E-08	8.49E-06
	14255-04-0(+D)	Lead-210+D	2.66E-09	1.27E-09	1.39E-08	4.21E-09
	13982-63-3L	Total	3.39E-09	1.66E-09	2.55E-08	8.49E-06
Radium-228 + long lived decay	15262-20-1(+D)	Radium-228+D	2.29E-09	1.04E-09	5.23E-09	4.53E-06
	14274-82-9(+D)	Thorium-228+D	8.09E-10	3.00E-10	1.43E-07	7.76E-06
	15262-20-1L	Total	3.10E-09	1.34E-09	1.48E-07	1.23E-05
Thorium-228 +Long lived Decay	14274-82-9(+D)	Thorium-228+D	8.09E-10	3.00E-10	1.43E-07	7.76E-06
	14274-82-9L	Total	8.09E-10	3.00E-10	1.43E-07	7.76E-06
Thorium-229 +Long lived Decay	15594-54-4(+D)	Thorium-229+D	1.29E-09	5.28E-10	2.25E-07	1.17E-06
	15594-54-4L	Total	1.29E-09	5.28E-10	2.25E-07	1.17E-06
Thorium-230 + Long lived Decay	14269-63-7	Thorium-230	2.02E-10	9.10E-11	2.85E-08	8.19E-10
	13982-63-3(+D)	Radium-226+D	7.30E-10	3.86E-10	1.16E-08	8.49E-06
	14255-04-0(+D)	Lead-210+D	2.66E-09	1.27E-09	1.39E-08	4.21E-09
	14269-63-7L	Total	3.59E-09	1.75E-09	5.40E-08	8.50E-06
Thorium-232 + long lived decay	7440-29-1	Thorium-232	2.31E-10	1.01E-10	4.33E-08	3.42E-10
	15262-20-1(+D)	Radium-228+D	2.29E-09	1.04E-09	5.23E-09	4.53E-06
	14274-82-9(+D)	Thorium-228+D	8.09E-10	3.00E-10	1.43E-07	7.76E-06
	7440-29-1L	Total	3.33E-09	1.44E-09	1.92E-07	1.23E-05
Uranium-233 + long lived Decay	13968-55-3	Uranium-233	1.60E-10	7.18E-11	1.16E-08	9.82E-10
	15594-54-4(+D)	Thorium-229+D	1.29E-09	5.28E-10	2.25E-07	1.17E-06
	13968-55-3L	Total	1.45E-09	6.00E-10	2.37E-07	1.17E-06
Uranium-235 + long lived Decay	15117-96-1(+D)	Uranium-235+D	1.63E-10	7.18E-11	1.01E-08	5.43E-07
	14331-85-2	Protactinium-231	3.74E-10	1.73E-10	4.55E-08	1.39E-07
	14952-40-0(+D)	Actinium-227+D	1.16E-09	4.86E-10	2.09E-07	1.47E-06
	15117-96-1L	Total	1.70E-09	7.31E-10	2.65E-07	2.15E-06
Uranium-238 + long lived Decay	7440-61-1(+D)	Uranium-238+D	2.10E-10	8.71E-11	9.35E-09	1.14E-07
	13966-29-5	Uranium-234	1.58E-10	7.07E-11	1.14E-08	2.52E-10
	14269-63-7	Thorium-230	2.02E-10	9.10E-11	2.85E-08	8.19E-10
	13982-63-3(+D)	Radium-226+D	7.30E-10	3.86E-10	1.16E-08	8.49E-06
	14255-04-0(+D)	Lead-210+D	2.66E-09	1.27E-09	1.39E-08	4.21E-09
	7440-61-1L	Total	3.96E-09	1.90E-09	7.48E-08	8.61E-06

Source for slope factors: HEAST, April 2002

Figure E.1 Mean concentrations of U-238 decay products in Parcel 6 subsurface soil.

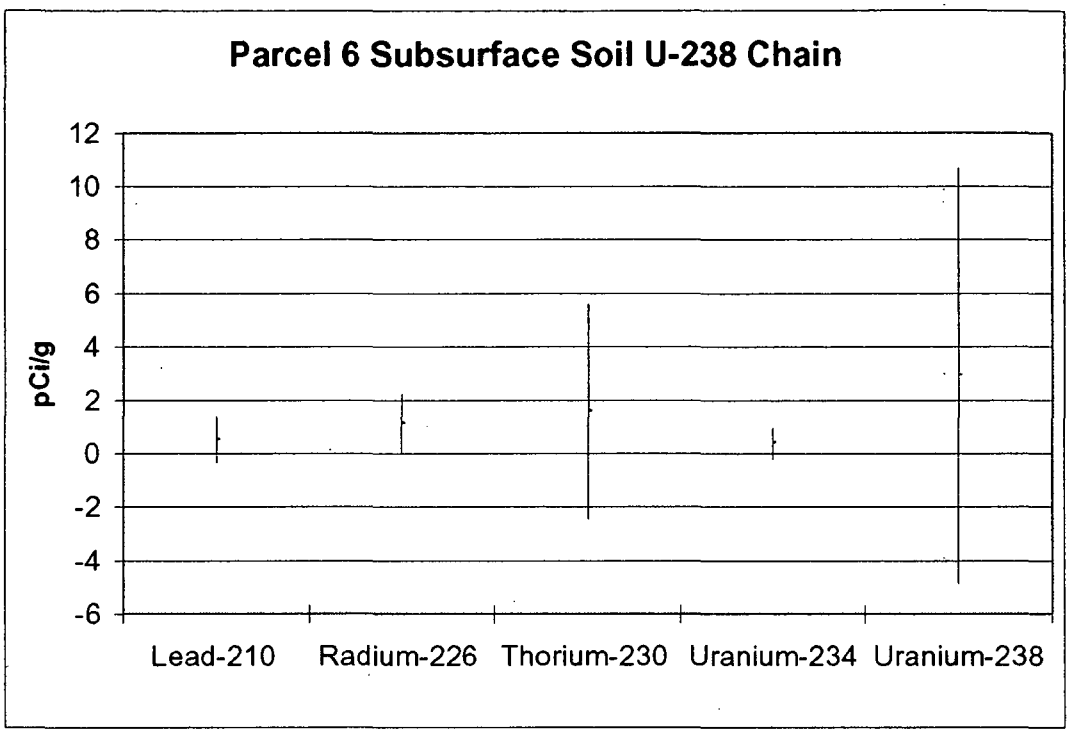


Figure E.2 Mean concentrations of U-238 decay products in Parcel 6 surface soil.

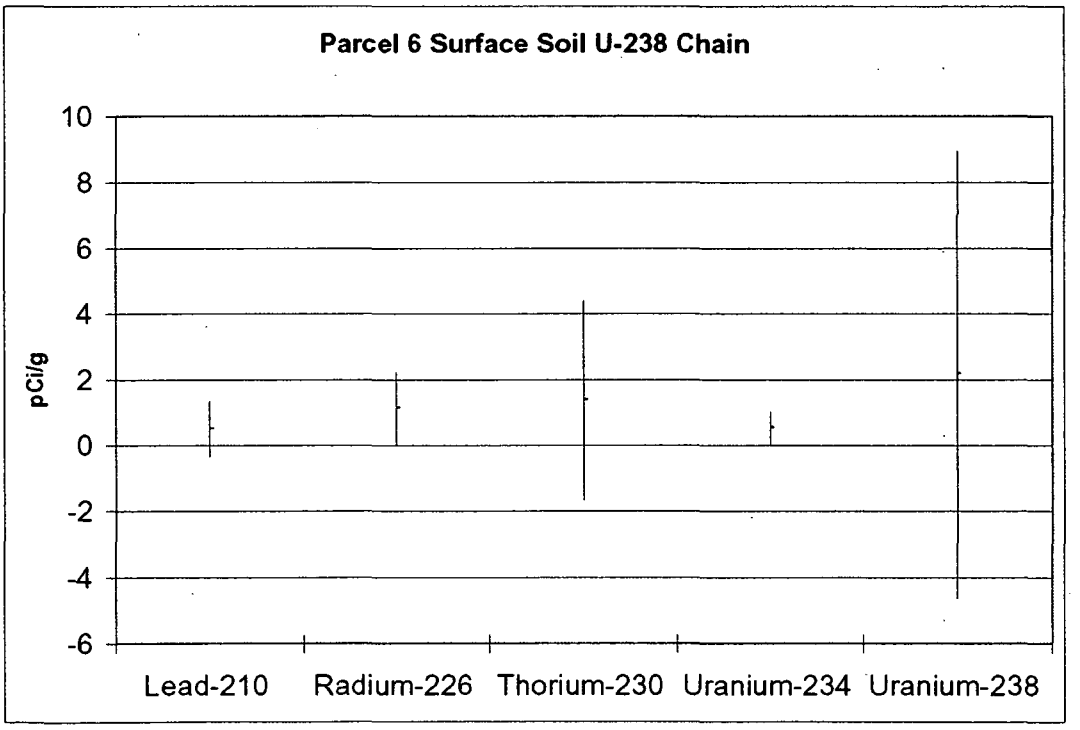


Figure E.3 Mean concentrations of Th-232 decay products in Parcel 6 subsurface soil.

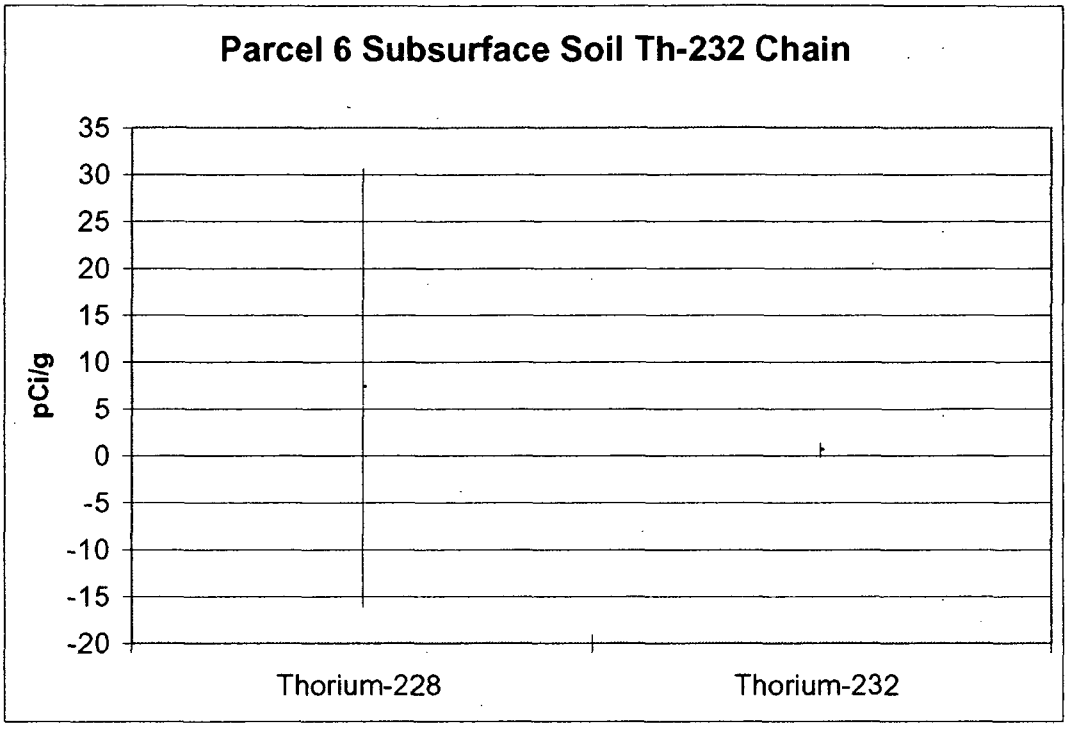


Figure E.4 Mean concentrations of Th-232 decay products in Parcel 6 surface soil.

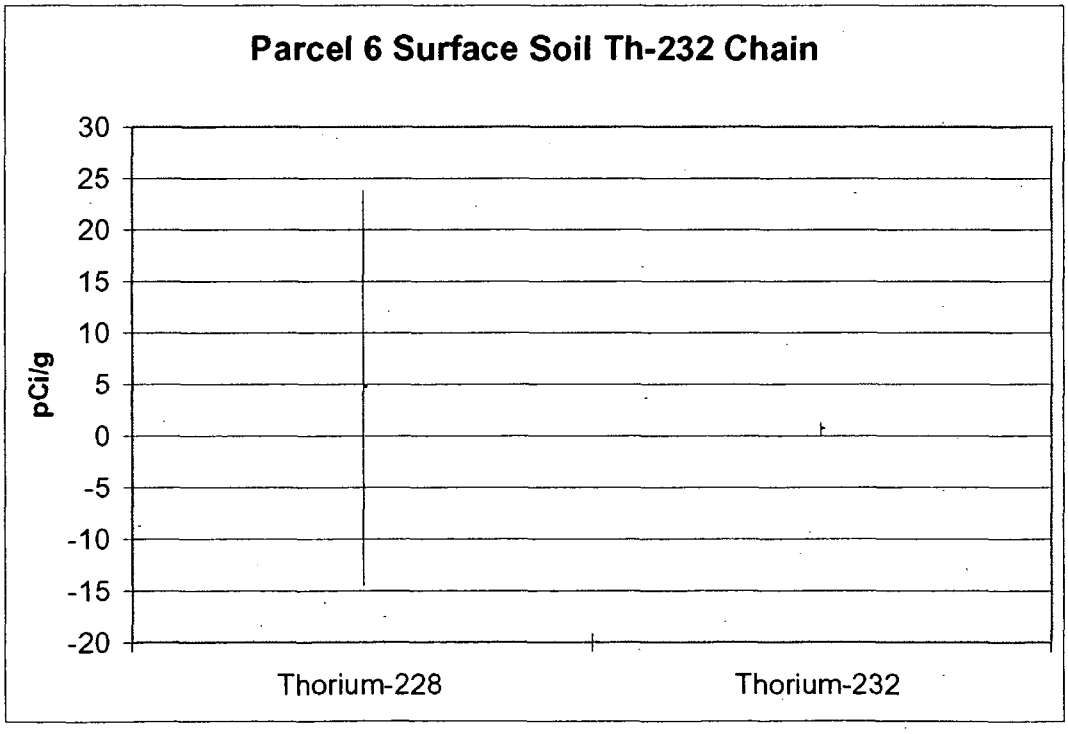


Figure E.5 Mean concentrations of U-235 decay products in Parcel 6 subsurface soil.

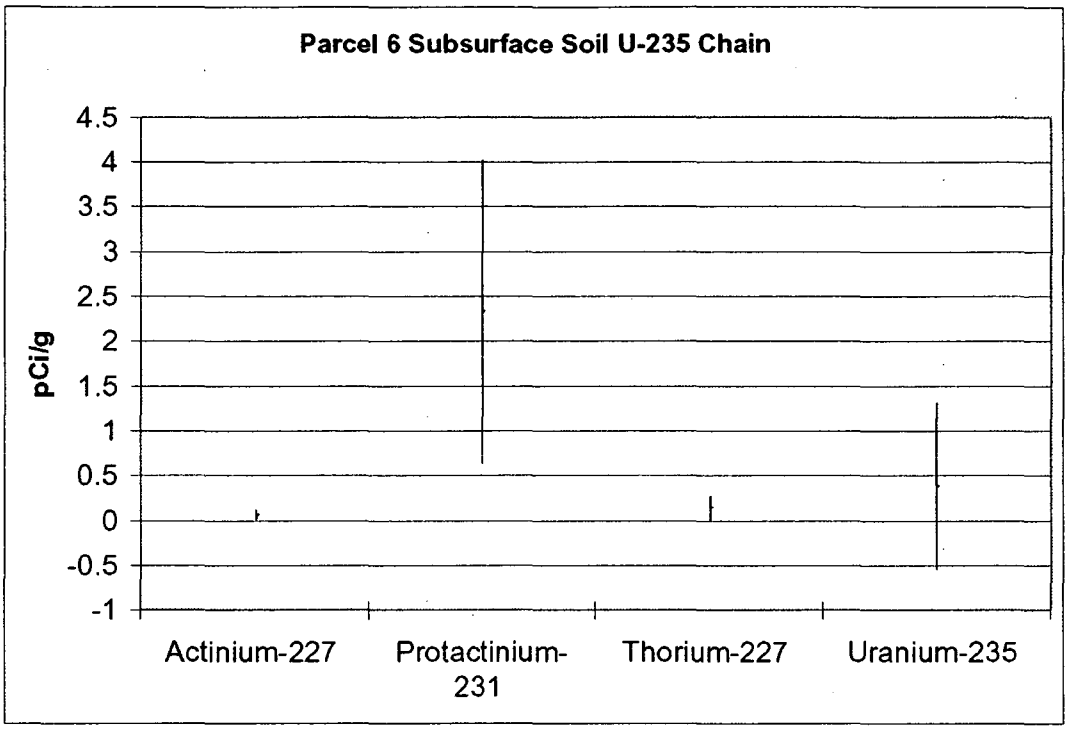


Figure E.6 Mean concentrations of U-235 decay products in Parcel 6 surface soil.

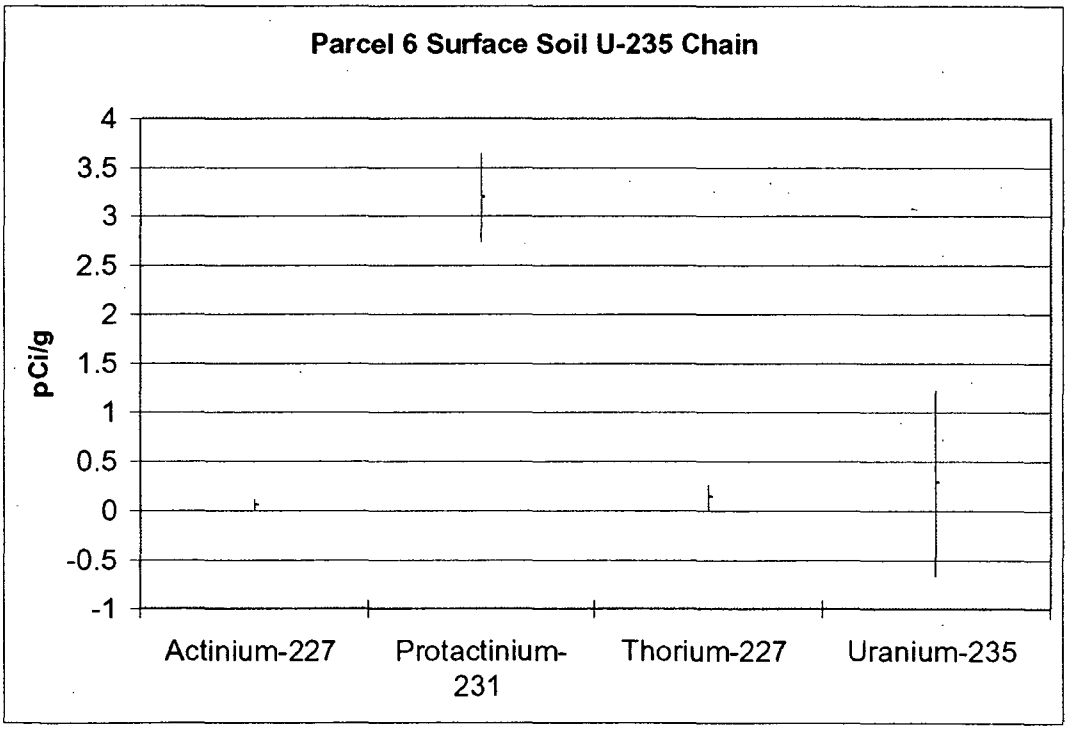


Figure E.7 Mean concentrations of U-238 decay products in Parcel 7 subsurface soil.

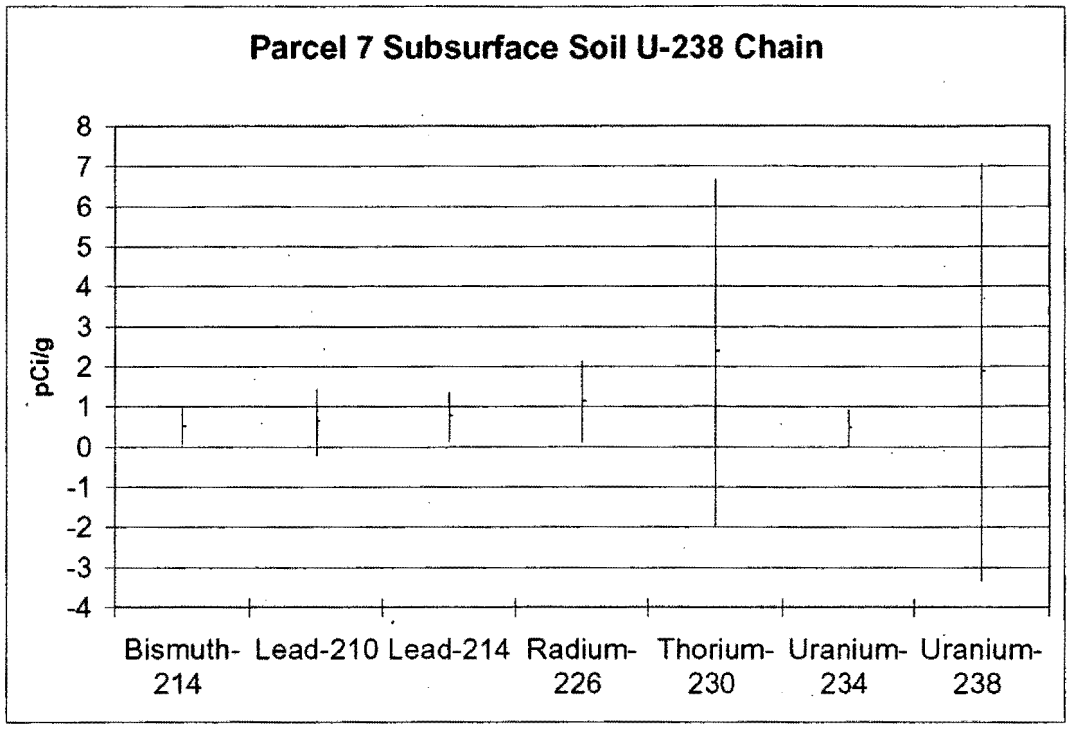


Figure E.8 Mean concentrations of U-238 decay products in Parcel 7 surface soil.

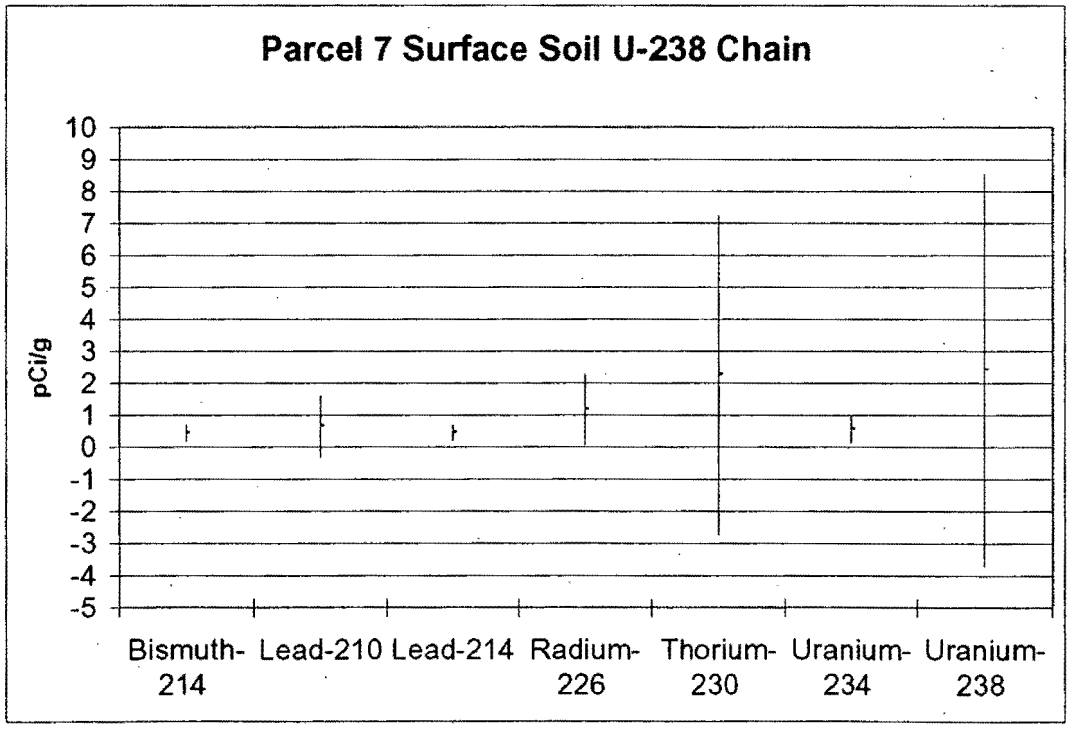


Figure E.9 Mean concentrations of Th-232 decay products in Parcel 7 subsurface soil.

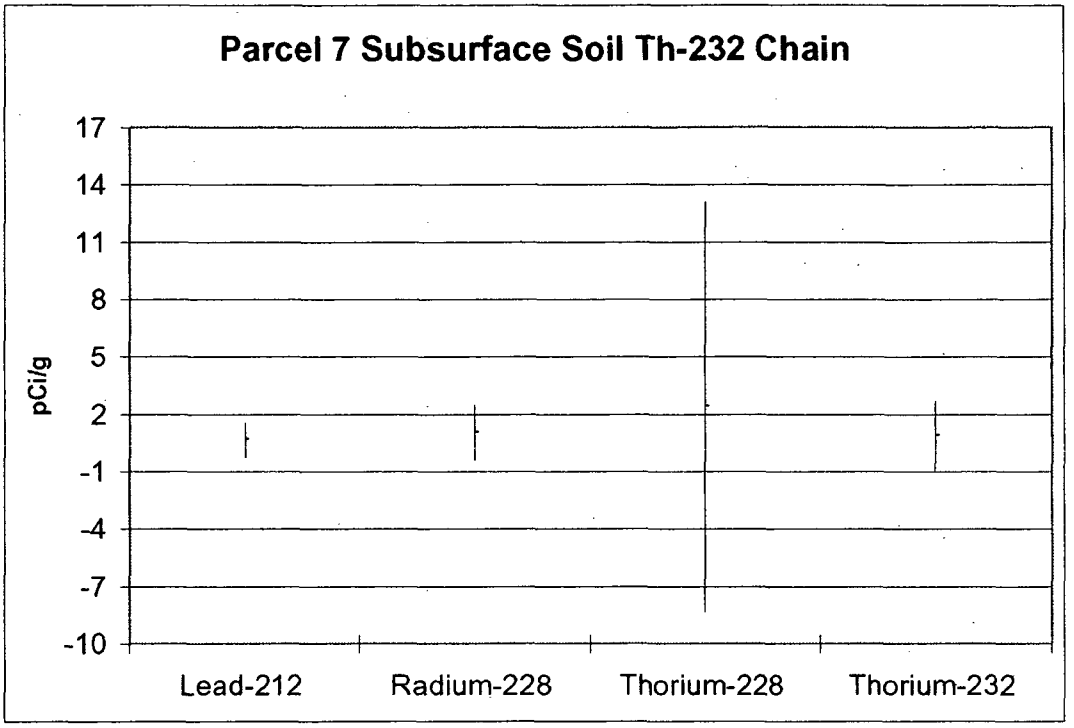


Figure E.10 Mean concentrations of Th-232 decay products in Parcel 7 surface soil.

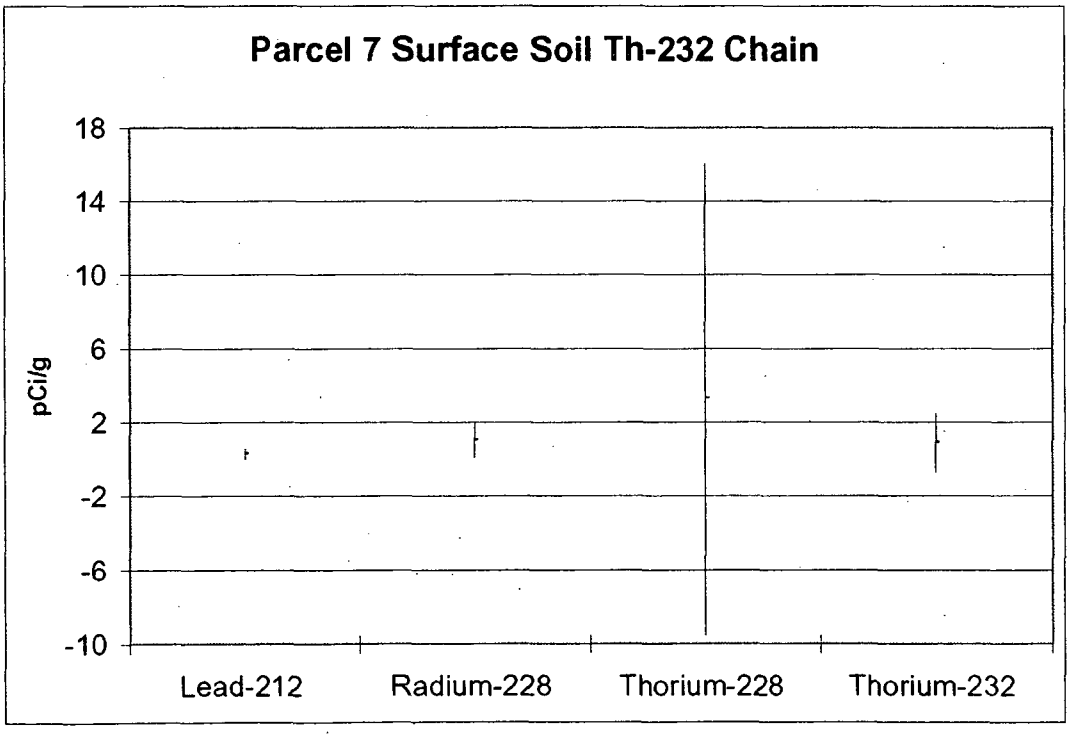


Figure E.11 Mean concentrations of U-235 decay products in Parcel 7 subsurface soil.

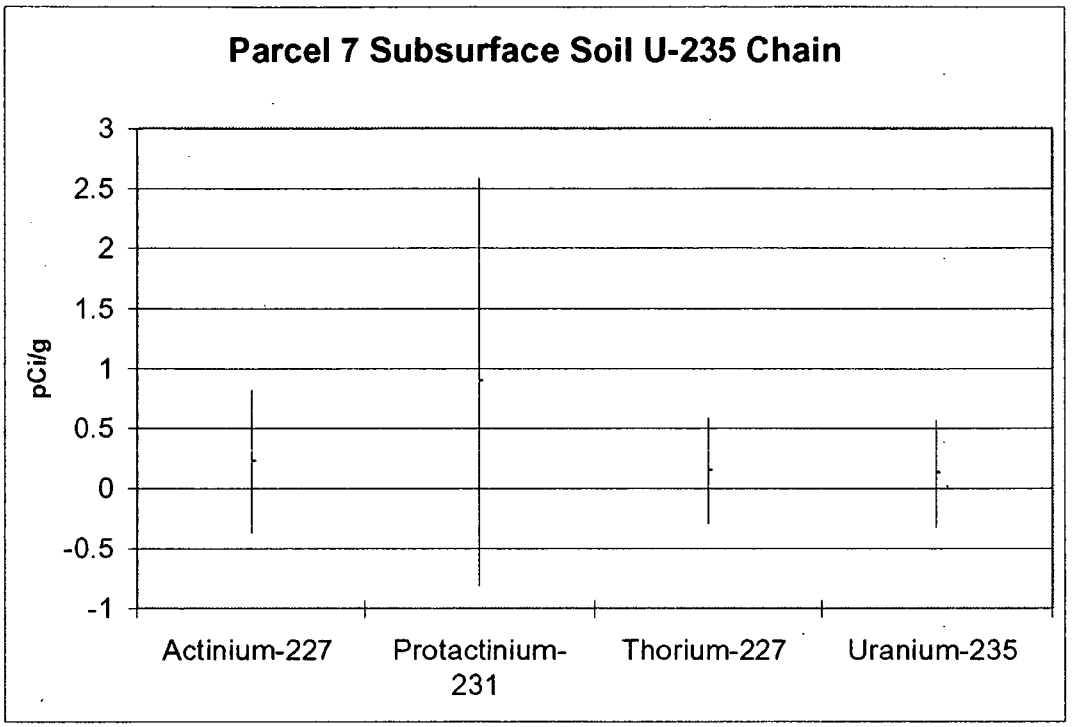


Figure E.12 Mean concentrations of U-235 decay products in Parcel 7 surface soil.

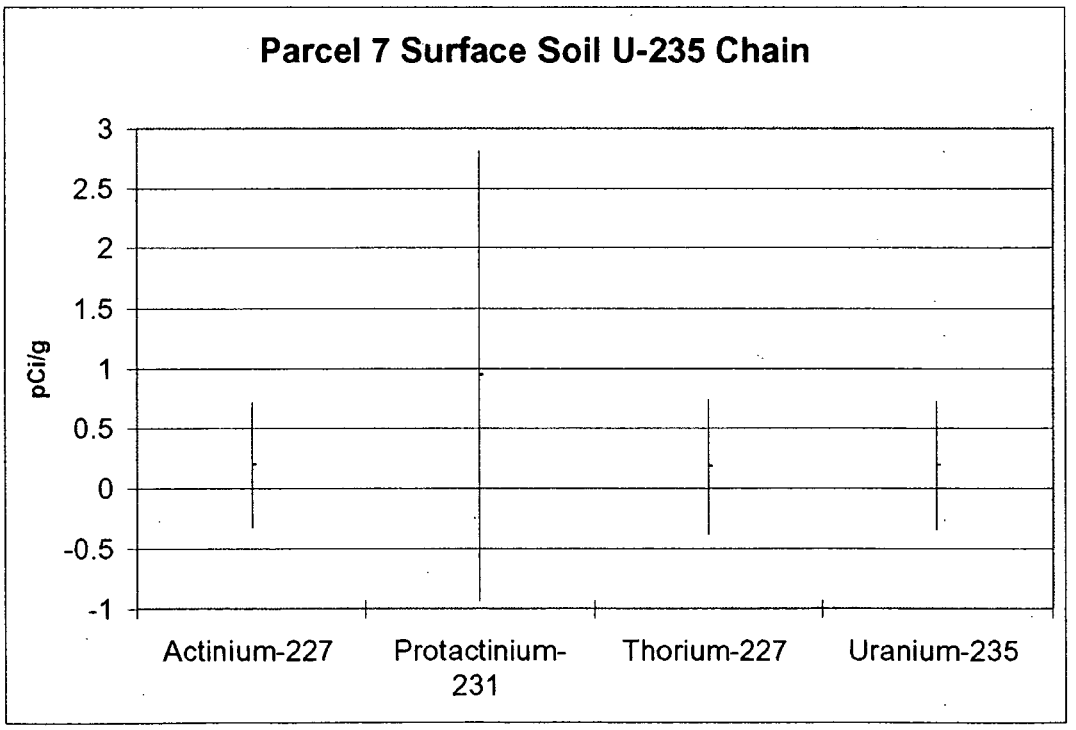


Figure E.13 Mean concentrations of U-238 decay products in Parcel 8 subsurface soil.

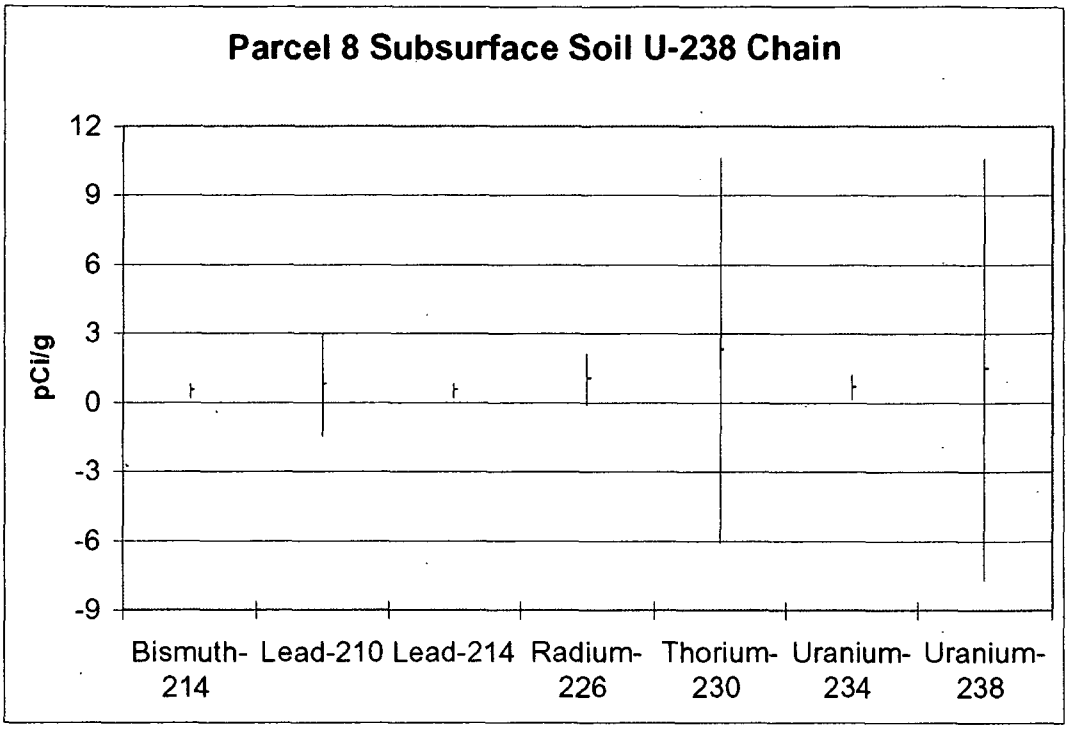


Figure E.14 Mean concentrations of U-238 decay products in Parcel 8 surface soil.

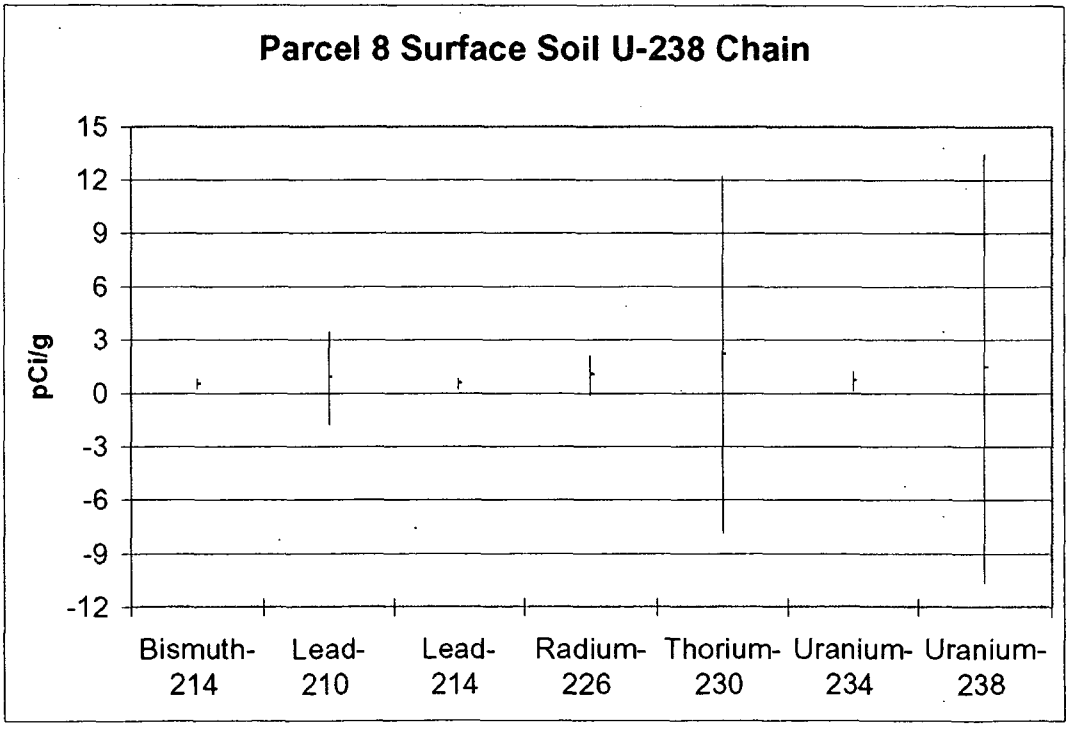


Figure E.15 Mean concentrations of Th-232 decay products in Parcel 8 subsurface soil.

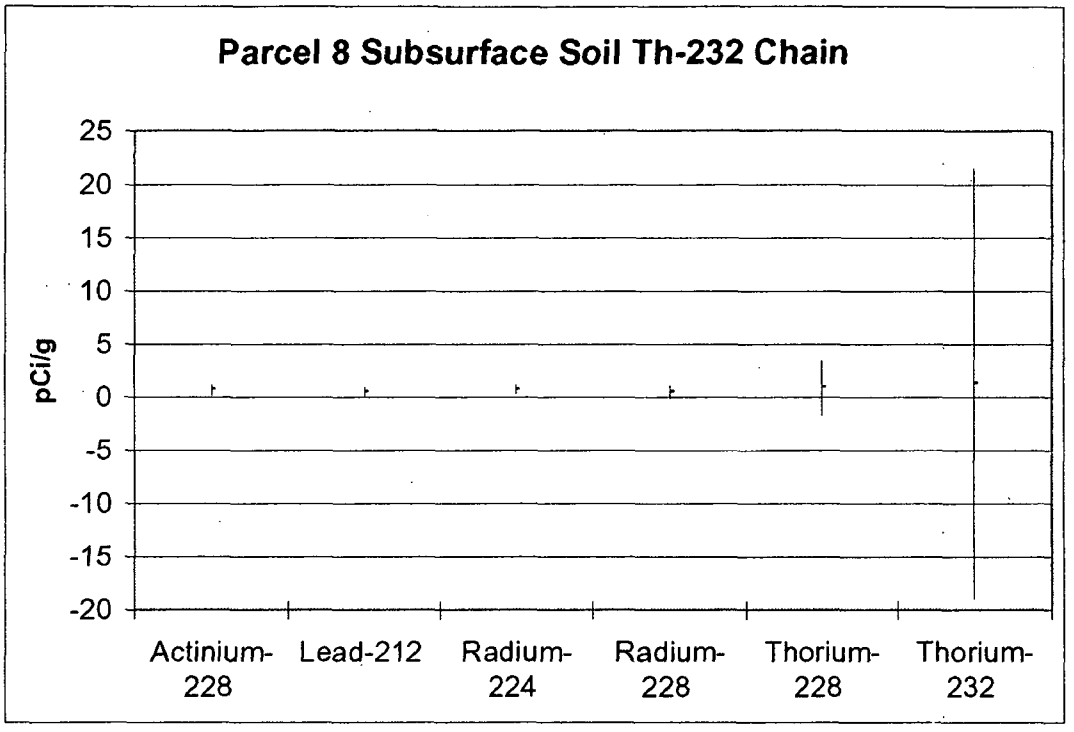


Figure E.16 Mean concentrations of Th-232 decay products in Parcel 8 surface soil.

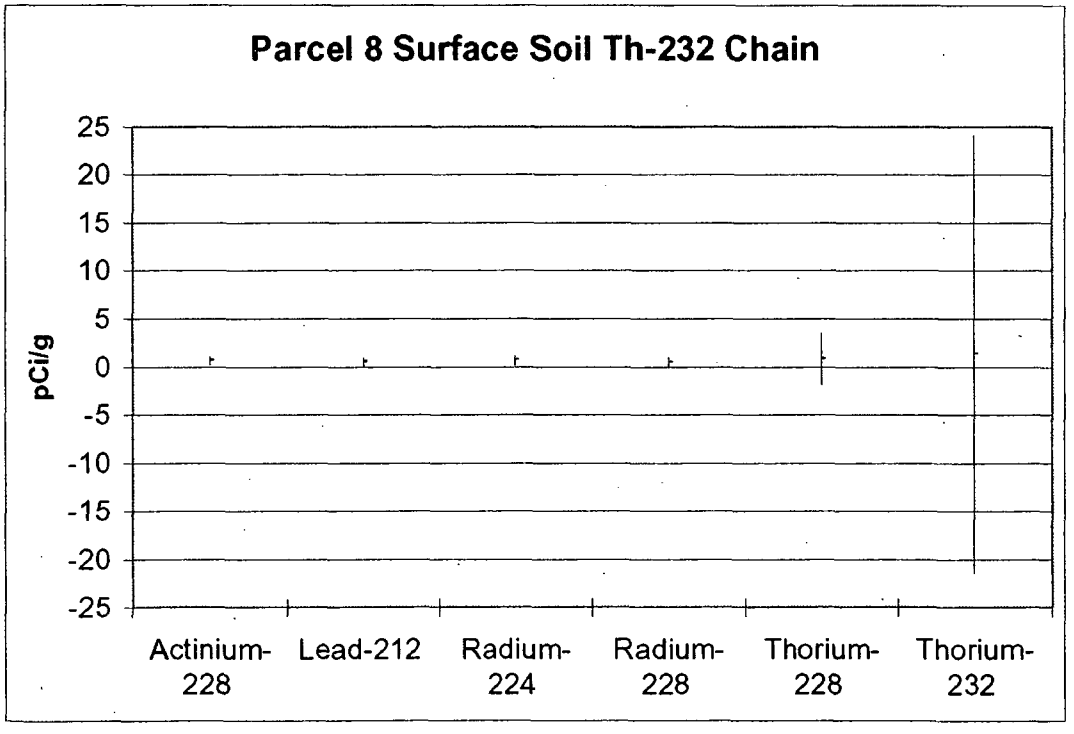


Figure E.17 Mean concentrations of U-235 decay products in Parcel 8 subsurface soil.

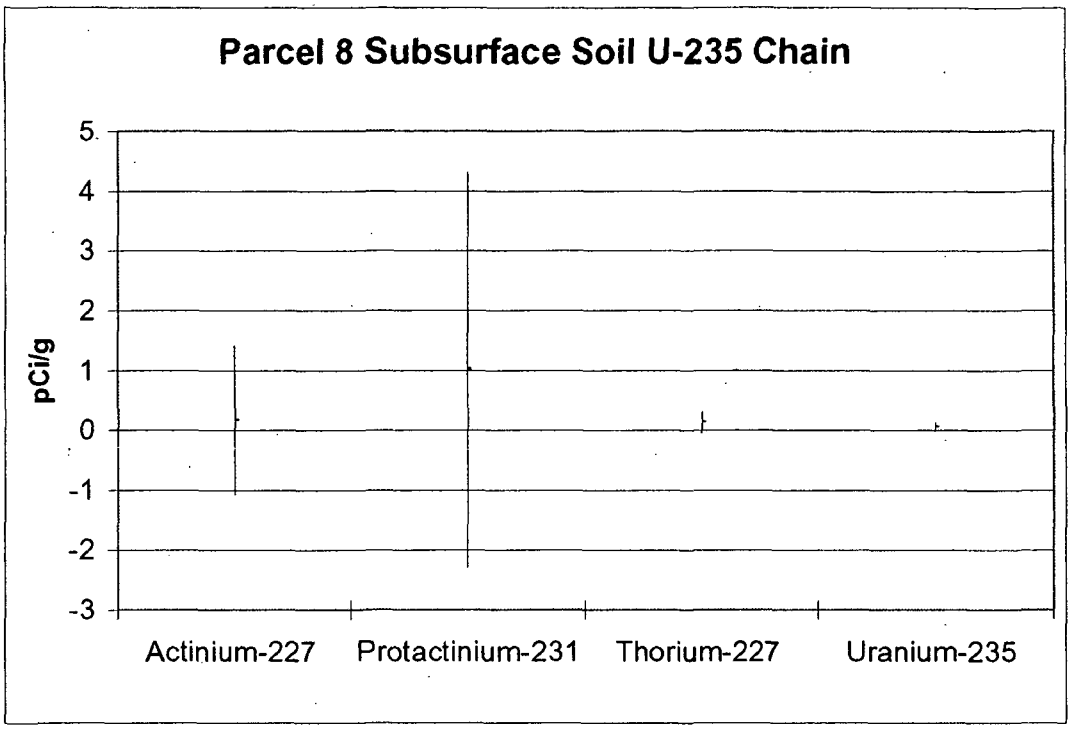
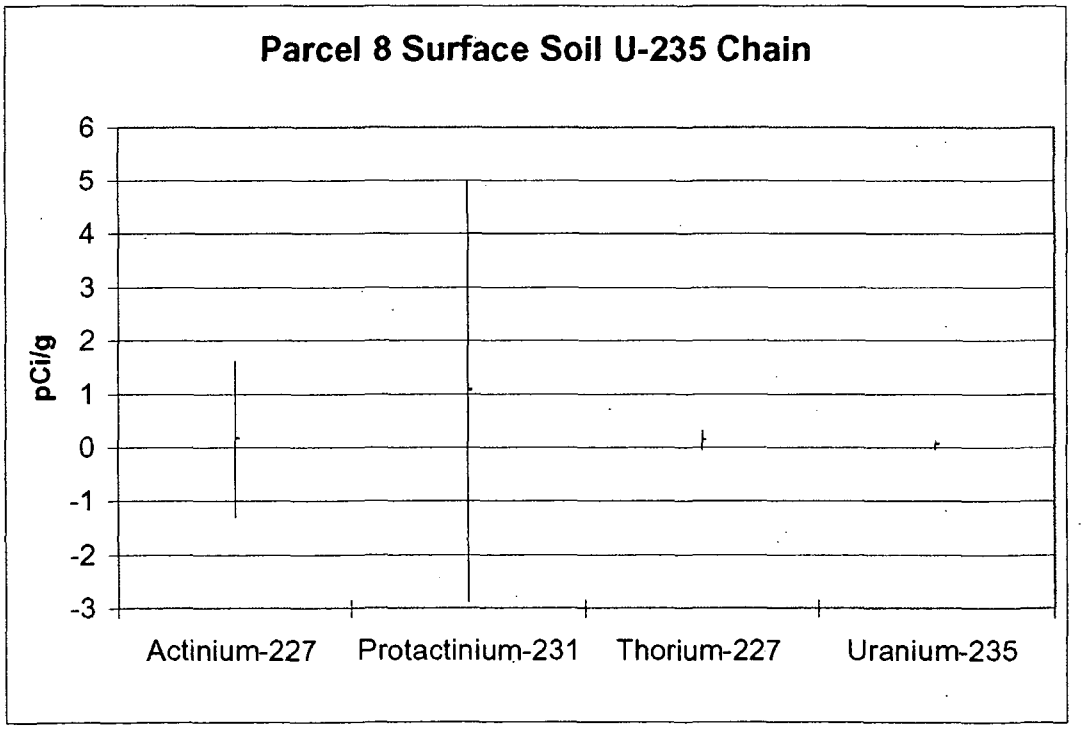


Figure E.18 Mean concentrations of U-235 decay products in Parcel 8 surface soil.



Appendix F

Exceptions to Screening Criteria

TABLE X1 - PARCEL 8 PU238 DATA ABOVE HOT SPOT CRITERIA

Project Id	Sample Id	Station	CAS Number	CAS Description	Result	Adjust	Adjusted Unit of Measure	Date Collected	Start Sample Depth	Ending Sample Depth	Depth Units	X Coord	Y Coord	NOTES
OU6RECON	0076-0001	MND11-0076	13981-16-3	Plutonium-238	253	253	PCI/G	7/23/89	0	0.5	FT	1464486	598272.6	This location was a part of the OU-6 Area 14 remediation (Ref OU6 Verification Report, October 1994). This area was previously remediated as part of the WTS line remediation from 1985-1990. Subsequent to remediation, reconnaissance samples were taken in 1989, independent verification by Argonne National Labs was done in 1990 and verification sampling was performed in 1992. Based on the sampling performed, it is apparent that this specific data point was inappropriately left in the dataset.
OU6RECON	0064-0001	MND11-0064	13981-16-3	Plutonium-238	293	293	PCI/G	7/23/89	0	0.5	FT	1464420	598318.7	This location was a part of the OU-6 Area 14 remediation (Ref OU6 Verification Report, October 1994). This area was previously remediated as part of the WTS line remediation from 1985-1990. Subsequent to remediation, reconnaissance samples were taken in 1989, independent verification by Argonne National Labs was done in 1990 and verification sampling was performed in 1992. Based on the sampling performed, it is apparent that this specific data point was inappropriately left in the dataset.
OU6RECON	0068-0001	MND11-0068	13981-16-3	Plutonium-238	173	173	PCI/G	7/23/89	0	0.5	FT	1464442	598330.9	This location was a part of the OU-6 Area 14 remediation (Ref OU6 Verification Report, October 1994). This area was previously remediated as part of the WTS line remediation from 1985-1990. Subsequent to remediation, reconnaissance samples were taken in 1989, independent verification by Argonne National Labs was done in 1990 and verification sampling was performed in 1992. Based on the sampling performed, it is apparent that this specific data point was inappropriately left in the dataset.
OU6RECON	0071-0001	MND11-0071	13981-16-3	Plutonium-238	8435	8435	PCI/G	7/23/89	0	0.5	FT	1464453	598266.9	This location was a part of the OU-6 Area 14 remediation (Ref OU6 Verification Report, October 1994). This area was previously remediated as part of the WTS line remediation from 1985-1990. Subsequent to remediation, reconnaissance samples were taken in 1989, independent verification by Argonne National Labs was done in 1990 and verification sampling was performed in 1992. Based on the information and sampling performed, this specific data point was inappropriately left in the dataset. However, because of the high plutonium 238 sample result from this location, the Ohio Department of Health at the request of Ohio EPA, conducted a walkover survey on June 1, 2007 to verify that the area had been excavated. Two samples were collected by Ohio EPA from the area with the highest relative survey readings for analysis at the on site laboratory. Plutonium 238 levels were found to be less than the detection limits for the two samples (<6.6 pCi/g and <5.9 pCi/g). See the attached PRS 176 Retention Pond Survey data sheets and analytical results for additional information confirming the location had been remediated.
OU6RECON	0071-0001	MND11-0071	13981-16-3	Plutonium-238	6150	6150	PCI/G	7/24/89	0	0.5	FT	1464453	598266.9	This location was a part of the OU-6 Area 14 remediation (Ref OU6 Verification Report, October 1994). This area was previously remediated as part of the WTS line remediation from 1985-1990. Subsequent to remediation, reconnaissance samples were taken in 1989, independent verification by Argonne National Labs was done in 1990 and verification sampling was performed in 1992. Based on the information and sampling performed, this specific data point was inappropriately left in the dataset. However, because of the high plutonium 238 sample result from this location, the Ohio Department of Health at the request of Ohio EPA, conducted a walkover survey on June 1, 2007 to verify that the area had been excavated. Two samples were collected by Ohio EPA from the area with the highest relative survey readings for analysis at the on site laboratory. Plutonium 238 levels were found to be less than the detection limits for the two samples (<6.6 pCi/g and <5.9 pCi/g). See the attached PRS 176 Retention Pond Survey data sheets and analytical results for additional information confirming the location had been remediated.
2680	SDBH11	SDBH11	13981-16-3	Plutonium-238	256	256	PCI/G	7/21/94	0	1.5	FT	1464303	597853.9	This location was a part of the PRS 41 Ditch removal (Ref PRS 41 Data Report, June 2006). This area was excavated and verified as part of survey unit 5. Based on these surveys it is apparent that the data was inappropriately left in the dataset.
WD_B41	37	D04	13981-16-3	Plutonium-238	240	240	PCI/G	10/1/90	0	2	FT	1464431	598228.5	This location was a part of the OU-6 Area 14 remediation (Ref OU6 Verification Report, October 1994). This area was previously remediated as part of the WTS line remediation from 1985-1990. Subsequent to remediation, reconnaissance samples were taken in 1989, independent verification by Argonne National Labs was done in 1990 and verification sampling was performed in 1992. Based on the sampling performed, it is apparent that this specific data point was inappropriately left in the dataset.

TABLE X2 - PARCEL 8 U238 DATA ABOVE HOT SPOT CRITERIA

Project Id	Sample Id	Station	CAS Number	CAS Description	Result	Adjust	Adjusted Unit of Measure	Date Collected	Start Sample Depth	Ending Sample Depth	Depth Units	X Coord	Y Coord	NOTES
MND17	0557-5012	MND17-0557	7440-61-1	Uranium-238	5.37	5.37	PCI/G	8/23/95	8	12	FT	1464754	598701.5	This location appears to have been excavated as part of the PRS 415 removal (Ref: PRS 123, 415, 429, 430, 434-436 Post-Ex SUD (SU-1&SU-4). However the specific survey unit was not re-verified for Uranium 238. Therefore the data was conservatively left in the dataset.
MND17	9201-5016	MND17-9201	7440-61-1	Uranium-238	14.15	14.15	PCI/G	7/27/95	12	16	FT	1464950	598374.8	This location was excavated as part of the PRS 154/238 (Area 23) removal action (Ref: PRS154/238 OSC Report, January 2003). The area was sampled and verified but the data was inappropriately left in the dataset.
MND17	9203-5016	MND17-9203	7440-61-1	Uranium-238	10.23	10.23	PCI/G	7/26/95	12	16	FT	1464950	598364.8	This location was excavated as part of the PRS 154/238 (Area 23) removal action (Ref: PRS154/238 OSC Report, January 2003). The area was sampled and verified but the data was inappropriately left in the dataset.
MND17	9204-5016	MND17-9204	7440-61-1	Uranium-238	14.24	14.24	PCI/G	7/27/95	12	16	FT	1464960	598374.8	This location was excavated as part of the PRS 154/238 (Area 23) removal action (Ref: PRS154/238 OSC Report, January 2003). The area was sampled and verified but the data was inappropriately left in the dataset.
MND-UGLD-3	B16-0-8	B-16	7440-61-1	Uranium-238	110	110	PCI/G	4/27/93	0	8	FT	1464736	598559.2	This location was excavated and sampled as part of the Underground Line (UGL) soil removal action (Ref: PRS 153, 154, 238, 240, 405. Buildings 23 and 125 Footprint, Survey Unit Design (SUD), August 2005. The area was verified as part of Survey Unit 1 and this data point was inappropriately left in the dataset.

TABLE X3 - PARCEL 8 TH232 DATA ABOVE HOT SPOT CRITERIA

Project Id	Sample Id	Station	CAS Number	CAS Description	Result	Adjust	Adjusted Unit of Measure	Date Collected	Start Sample Depth	Ending Sample Depth	Depth Units	X Coord	Y Coord	NOTES
SEWER	17157	BH0897	7440-29-1	Thorium-232	5.8	5.8	PCI/G	9/16/87	11.5	13.5	FT	1464740	598761.8	This location was originally part of PRS 438. Because of the location, it was removed from PRS 438 then excavated and sampled as part of Survey Unit 2 of the R/SW Building soil removal (Ref: PRS 131 OSC report, July 2006). The data from this data point was inappropriately left in the dataset.
RSS	5985	S0287	7440-29-1	Thorium-232	8.94	8.94	PCI/G	7/1/84	0	0	NA	1465723	598900.8	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	5986	S0288	7440-29-1	Thorium-232	8.09	8.09	PCI/G	7/1/84	0	0	NA	1465701	598890.5	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	1735	C0010	7440-29-1	Thorium-232	11.15	11.15	PCI/G	5/1/83	3	3	FT	1465754	599051.8	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	1736	C0010	7440-29-1	Thorium-232	18	18	PCI/G	5/1/83	4.5	4.5	FT	1465754	599051.8	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	1737	C0010	7440-29-1	Thorium-232	14.41	14.41	PCI/G	5/1/83	7.5	7.5	FT	1465754	599051.8	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	1738	C0010	7440-29-1	Thorium-232	27.83	27.83	PCI/G	5/1/83	9	9	FT	1465754	599051.8	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	1739	C0010	7440-29-1	Thorium-232	5.76	5.76	PCI/G	5/1/83	13.5	13.5	FT	1465754	599051.8	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	1742	C0010	7440-29-1	Thorium-232	5.44	5.44	PCI/G	5/1/83	18	18	FT	1465754	599051.8	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	1784	C0011	7440-29-1	Thorium-232	37.69	37.69	PCI/G	5/1/83	1.5	1.5	FT	1465719	599008.4	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	1785	C0011	7440-29-1	Thorium-232	4.43	4.43	PCI/G	5/1/83	6	6	FT	1465719	599008.4	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
RSS	1790	C0011	7440-29-1	Thorium-232	11.13	11.13	PCI/G	5/1/83	18	18	FT	1465719	599008.4	The location of these samples was discovered to be in error due to coordinate disposition (Ref PRS 235 Core Team Recommendation, 1997). The actual location was in PRS 266 which was part of response action. Because of this error, the data was inappropriately left in the dataset.
OU6RECON	0071-0001	MND11-0071	7440-29-1	Thorium-232	5.1	5.1	PCI/G	7/23/89	0	0.5	FT	1464453	598266.9	This location was a part of the OU-6 Area 14 verification (Ref OU6 Verification Report, October 1994), the area was verified and the data was inappropriately left in the dataset.
WTSVS	316	31	7440-29-1	Thorium-232	4.5	4.5	PCI/G	8/1/86	6	7	FT	1465296	598179.6	This location was identified as above current cleanup criteria but below previous DOE clean up criteria and outside of any identified PRS. It was determined by the Core Team via approval of the PRS 300 Package as No Further Assessment that this location would not be remediated; therefore the associated data would be included in the RRE as part of the risk calculation.

TABLE X4 - PARCEL 7 PU238 DATA ABOVE HOT SPOT CRITERIA

Project Id	Sample Id	Station	CAS Number	CAS Description	Result	Adjust	Adjusted Unit of Measure	Date Collected	Start Sample Depth	Ending Sample Depth	Depth Units	X Coord	Y Coord	NOTES
SMFDT	SMG01108	388	13981-16-3	Plutonium-238	259	259	PCI/G	4/26/96	0	0.5	FT	1466352	598161.1	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset. This surface location was located within Piece C of the D&D area which was previously remediated. Being a surface location, this contamination was likely removed removed as part of the D&D cleanup.
SMFDT	SS700111	425	13981-16-3	Plutonium-238	174.2	174.2	PCI/G	4/28/97	0	0.5	FT	1466343	598216.2	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMFDT	SMG00899	175	13981-16-3	Plutonium-238	233.7	233.7	PCI/G	3/25/97	0	0.5	FT	1466385	598232.3	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
PRS286V	28	PRS286-028	13981-16-3	Plutonium-238	206	206	PCI/G	1/11/05	0	0	NA	1465973	598382.1	This location was excavated and sampled as part of the SM Building Soils removal but the data was inappropriately left in the dataset.
SMADDRV	9011916	2B-4	13981-16-3	Plutonium-238	254	254	PCI/G	11/19/90	2	2	FT	1466286	598266.9	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMADDRV	90112027	1G-4	13981-16-3	Plutonium-238	182	182	PCI/G	11/20/90	2	2	FT	1466360	598244.5	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SM_WEST	SM_WEST 121A	121	13981-16-3	Plutonium-238	229.9	229.9	PCI/G	8/19/96	0	0	NA	1466216	598353.6	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMFDT	SMG01306	587	13981-16-3	Plutonium-238	226	226	PCI/G	5/3/97	0	0.5	FT	1466307	598193.6	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMFDT	SMG01399	636	13981-16-3	Plutonium-238	171	171	PCI/G	5/22/97	0	0.5	FT	1466297	598214.7	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
RSS	1298	C0122	13981-16-3	Plutonium-238	494	494	PCI/G	12/1/82	1.5	1.5	FT	1466487	598258.5	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SOASPH2	SMG01351	25-2	13981-16-3	Plutonium-238	217	217	PCI/G	5/14/97	0	0.5	FT	1466271	598099.4	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
PRS67V	MDSS0033	SU2FSS027	13981-16-3	Plutonium-238	295	295	PCI/G	3/15/05	0	0	NA	1465417	598111.2	This area was part of the PRS 67 removal action. This specific data point was a sample taken as part of the Survey Unit 2 verification samples. During verification sampling, several points were identified as above clean-up criteria. These areas became a new Survey Unit (#6) and were excavated and verified (Ref: PRS 67, 41 Ditch, and PRS 363 Post-Excavation SUD, Final February 2006. This data point was inappropriately left in the dataset.
SCRDATA	9405478	SCR921	7440-29-1	Thorium-232	3.7	3.7	PCI/G	5/25/94	3	3	FT	1466464	598330.8	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMFDT	SS700044	65	7440-29-1	Thorium-232	4.4	4.4	PCI/G	1/27/97	0	0.5	FT	1466405	598230.4	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMFDT	SS700097	275	7440-29-1	Thorium-232	4.6	4.6	PCI/G	4/3/97	0	0.5	FT	1466367	598153.6	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.

TABLE X5 - PARCEL 7 TH232 DATA ABOVE HOT SPOT CRITERIA

Project Id	Sample Id	Station	CAS Number	CAS Description	Result	Adjust	Adjusted Unit of Measure	Date Collected	Start Sample Depth	Ending Sample Depth	Depth Units	X Coord	Y Coord	NOTES
RSS	6497	S0248	7440-29-1	Thorium-232	3.73	3.73	PCI/G	8/1/84	0	0	NA	1466393	598902.1	This area is not identified with any PRS. As part of PRS266 activities, a walkover survey was performed in this area and the reading could not be reproduced. Therefore no action was taken but the data was conservatively left in the dataset.
RSS	2821	S0307	7440-29-1	Thorium-232	6.46	6.46	PCI/G	10/1/83	0	0	NA	1466131	598921	This area is not identified with any PRS. As part of PRS266 activities, a walkover survey was performed in this area and the reading could not be reproduced. Therefore no action was taken but the data was conservatively left in the dataset.
RSS	9789	S0645	7440-29-1	Thorium-232	4.3	4.3	PCI/G	6/1/85	0	0	NA	1465745	597521.6	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
PRS 66_1	10037	B109	7440-29-1	Thorium-232	9.96	9.96	PCI/G	11/29/99	30	35	FT	1465991	599061.7	This area was a part of the PRS 66 removal action (Ref: PRS 66 PRS Package, July 2000). The area was excavated and sampled but the data was inappropriately left in the dataset.
PRS 66V	105	VVI06	7440-29-1	Thorium-232	4.9	4.9	PCI/G	12/3/03	0	0	NA	1465830	598952.1	This area was a part of the PRS 66 removal action (Ref: PRS 66 PRS Package, July 2000). The area was excavated and sampled but the data was inappropriately left in the dataset.
SMFDT	SS700163	480	7440-29-1	Thorium-232	3.7	3.7	PCI/G	4/30/97	0	0.5	FT	1466334	598227.1	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMFDT	SS700168	505	7440-29-1	Thorium-232	5	5	PCI/G	4/30/97	0	0.5	FT	1466329	598177.4	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMADDRV	9011918	3.00E-04	7440-29-1	Thorium-232	4.4	4.4	PCI/G	11/19/90	2	2	FT	1466333	598277.3	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SCRDATA	89052291	SCR605	7440-29-1	Thorium-232	29.2	29.2	PCI/G	5/19/89	0	0	NA	1466021	597855.4	This area was re-sampled as part of the PRS 277/278 removal action. A survey of the area was conducted in October 2002 (Ref Survey 02-ER-706) and and no elevated reading were discovered. The datapoint was conservatively left in the dataset.
SCRDATA	89052292	SCR605	7440-29-1	Thorium-232	5.7	5.7	PCI/G	5/19/89	0	0	NA	1466021	597855.4	This area was re-sampled as part of the PRS 277/278 removal action. A survey of the area was conducted in October 2002 (Ref Survey 02-ER-706) and and no elevated reading were discovered. The datapoint was conservatively left in the dataset.
SCRDATA	8905239	SCR605	7440-29-1	Thorium-232	6.4	6.4	PCI/G	5/22/89	0	0	NA	1466021	597855.4	This area was re-sampled as part of the PRS 277/278 removal action. A survey of the area was conducted in October 2002 (Ref Survey 02-ER-706) and and no elevated reading were discovered. The datapoint was conservatively left in the dataset.
RSS	1726	C0012	7440-29-1	Thorium-232	5.44	5.44	PCI/G	5/1/83	3	3	FT	1465820	599026.9	This area was a part of the PRS 66 removal action (Ref: PRS 66 PRS Package, July 2000). The area was excavated and sampled but the data was inappropriately left in the dataset.
RSS	1727	C0012	7440-29-1	Thorium-232	5.88	5.88	PCI/G	5/1/83	4.5	4.5	FT	1465820	599026.9	This area was a part of the PRS 66 removal action (Ref: PRS 66 PRS Package, July 2000). The area was excavated and sampled but the data was inappropriately left in the dataset.
RSS	1845	C0015	7440-29-1	Thorium-232	4.84	4.84	PCI/G	5/1/83	19.5	19.5	FT	1465837	598952.4	This area was a part of the PRS 66 removal action (Ref: PRS 66 PRS Package, July 2000). The area was excavated and sampled but the data was inappropriately left in the dataset.
RSS	1815	C0025	7440-29-1	Thorium-232	3.9	3.9	PCI/G	5/1/83	1	1	FT	1465912	598848.8	This area was part of the laydown area used during the PRS 66 removal action. Although the area was not excavated, the soil was dispurbed and then sampled as part of the PRS 66 removal. The original data was inappropriately left in the dataset.
RSS	1816	C0025	7440-29-1	Thorium-232	4.02	4.02	PCI/G	5/1/83	3	3	FT	1465912	598848.8	This area was part of the laydown area used during the PRS 66 removal action. Although the area was not excavated, the soil was dispurbed and then sampled as part of the PRS 66 removal. The original data was inappropriately left in the dataset.
RSS	1550	C0141	7440-29-1	Thorium-232	5.65	5.65	PCI/G	4/1/83	1.5	1.5	FT	1466113	598138.5	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SOASPH1	SS600434	30	7440-29-1	Thorium-232	3.8	3.8	PCI/G	9/27/96	0	0.5	FT	1466333	598106.7	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SOASPH1	SS600708	93	7440-29-1	Thorium-232	3.9	3.9	PCI/G	12/9/96	0	0.5	FT	1466377	598108.5	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SOASPH1	SS600714	99	7440-29-1	Thorium-232	4.7	4.7	PCI/G	12/9/96	0	0.5	FT	1466377	598106.5	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
11256	BS0401	BS004	7440-29-1	Thorium-232	5.4	5.4	PCI/G	5/19/93	3	3.9	FT	1466148	598002.1	This location not was excavated and but was sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
PRS 66_3	21695	B179	7440-29-1	Thorium-232	7.32	7.32	PCI/G	11/16/01	15	20	FT	1465884	598986.5	This area was a part of the PRS 66 removal action (Ref: PRS 66 PRS Package, July 2000). The area was excavated and sampled but the data was inappropriately left in the dataset.

SCRDATA	9405478	SCR921	7440-29-1	Thorium-232	3.7	3.7	PCI/G	5/25/94	3	3	FT	1466464	598330.8	This location not was excavated and but was sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMFDT	SS700044	65	7440-29-1	Thorium-232	4.4	4.4	PCI/G	1/27/97	0	0.5	FT	1466405	598230.4	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.
SMFDT	SS700097	275	7440-29-1	Thorium-232	4.6	4.6	PCI/G	4/3/97	0	0.5	FT	1466367	598153.6	This location was excavated and sampled as part of the Building 38 Soil (PRS Group 5) removal action (Ref: Building 38 Soil (PRS Group 5) REMOVAL ACTION OSC REPORT, July 2005). This area was sampled and verified as part of the verification sampling associated with this action and this data point was inappropriately left in the dataset.

Appendix G

Assessment of Soil Data in Parcel 6, 7, and 8

Assessment of Soil Data in Parcels 6, 7, & 8

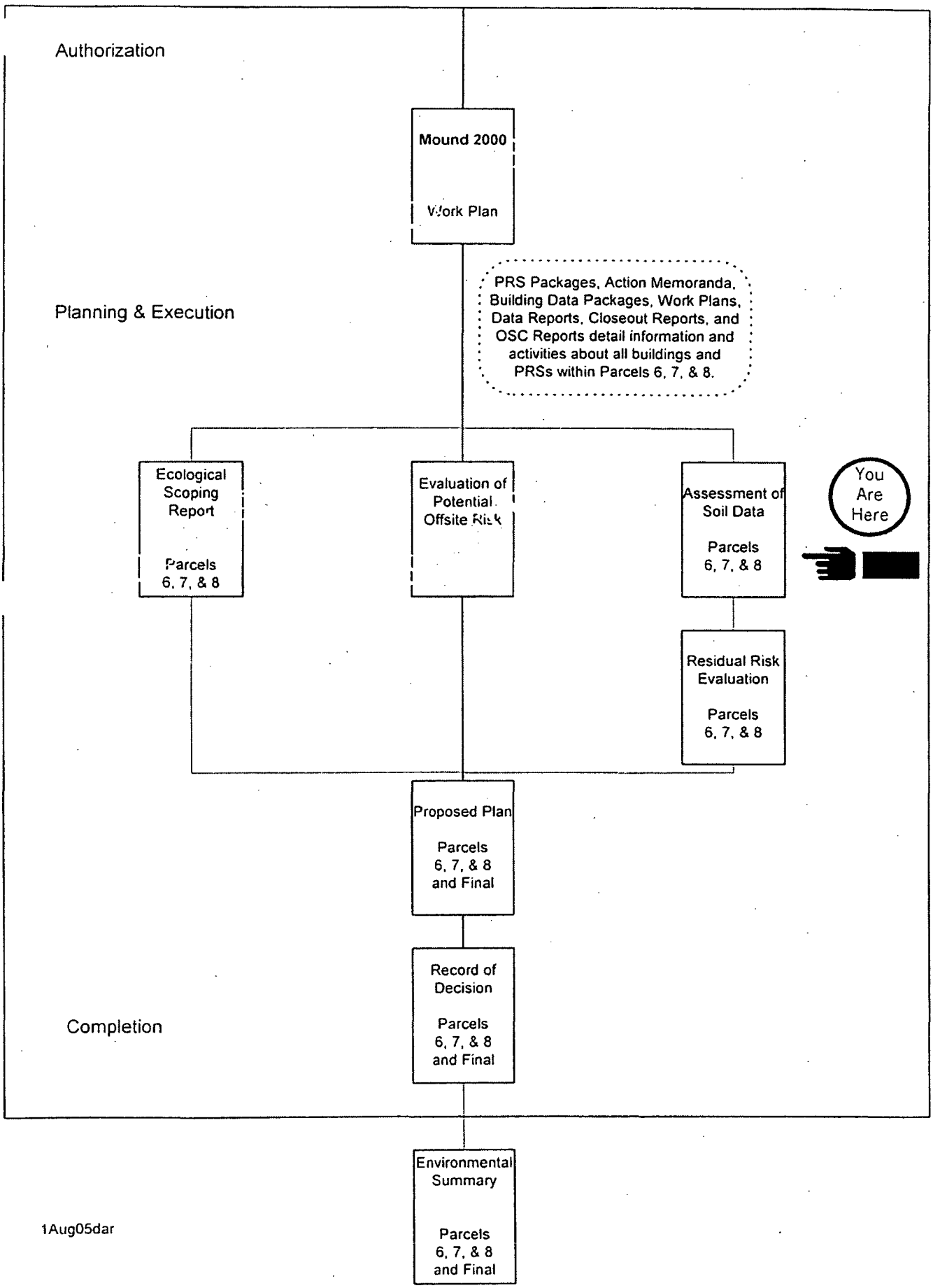
July 2007

Final

Department of Energy
Miamisburg Closure Project

CH2MHILL

Parcels 6, 7, and 8



Appendix X to the Parcel 6, 7, and 8 Residual Risk Evaluation: Assesment of Soil Data in Parcels 6, 7, and 8

X.1 Introduction

Analytical data from historic sample locations within Parcels 6, 7 and 8 were reviewed to identify results that exceed current cleanup objectives. A total of 76 sample locations (not included in Potential Release Sites) have data that exceed cleanup objectives. The purpose of this Appendix is to summarize the status of these outlier sample locations and the logic used for inclusion or exclusion in the residual risk assessment

X.2 Data Replaced by Re-sample Data

- Fourteen of the locations were re-sampled to evaluate the accuracy of the original sample results. These locations are shown in green on Figure 1 and original results are summarized in Tables 1 and the re-sampling results appear in Table 2. All of the results of the resampled locations were below current cleanup objectives. For the residual risk assessment, original results will be superseded by re-sampling results where improved analytical method quality or lower detection limits are apparent.

  The 14 locations were selected because:

  - they were accessible to a drill rig,
  - they had not been included in more recent closure documentation (PRS Package, Building Data Package, OSC Report)
  - presented results from analytical screening tools (i.e. bicron detector), or
  - were requested by OEPA (1N, 2N, 3N)

X.3 Data Replaced By Data in Closure Documentation

- Eleven of the locations were investigated and the area resampled. These locations are depicted in red on Figure 1 and summarized in Table 3. The historic results will not be included in the residual risk assessment; instead the results cited in the closure documentation will be employed.

X.4 Data included in the RRE

- Fifty-one of the locations were neither excavated nor re-sampled during the course of remedial activities. These results are depicted in blue on Figure 1 and summarized in Table 4. Many of these results are only slightly above cleanup objectives and all were below "hot spot" criteria. The comment field in Table 4 also identifies locations where previous building closeout reports for removal actions or building demolitions concluded that the outlier location required no further action. All these locations are representative of "as left" conditions and will be included in the residual risk assessment.

Location	Analyte	Result	CO Value	Unit of Measure	Lab Qual	Data Qual	Detection Limit	Date Collected	Start Sample Depth	Ending Sample Depth	Depth Units	Comments
1N	Plutonium-238	62	55.00	PCI/G	NJ		0	08/06/1990	0.0	1.0	FT	Resampled
1N	Plutonium-238	56	55.00	PCI/G	NJ		0	08/06/1990	2.0	3.0	FT	Resampled
1N	Plutonium-238	66	55.00	PCI/G	NJ		0	08/06/1990	4.0	5.0	FT	Resampled
1N	Plutonium-238	62	55.00	PCI/G	NJ		0	08/06/1990	6.0	7.0	FT	Resampled
1N	Plutonium-238	70	55.00	PCI/G	NJ		0	08/06/1990	8.0	9.0	FT	Resampled
1N	Plutonium-238	62	55.00	PCI/G	NJ		0	08/06/1990	10.0	11.0	FT	Resampled
1N	Plutonium-238	73	55.00	PCI/G	NJ		0	08/06/1990	12.0	13.0	FT	Resampled
1N	Plutonium-238	63	55.00	PCI/G	NJ		0	08/06/1990	14.0	15.0	FT	Resampled
1N	Plutonium-238	65	55.00	PCI/G	NJ		0	08/06/1990	16.0	17.0	FT	Resampled
1N	Plutonium-238	60	55.00	PCI/G	NJ		0	08/06/1990	18.0	19.0	FT	Resampled
1N	Plutonium-238	72	55.00	PCI/G	NJ		0	08/06/1990	20.0	21.0	FT	Resampled
1N	Plutonium-238	64	55.00	PCI/G	NJ		0	08/06/1990	22.0	23.0	FT	Resampled
1N	Plutonium-238	58	55.00	PCI/G	NJ		0	08/06/1990	24.0	25.0	FT	Resampled
2N	Plutonium-238	73	55.00	PCI/G	NJ		0	08/06/1990	1.0	2.0	FT	Resampled
2N	Plutonium-238	57	55.00	PCI/G	NJ		0	08/06/1990	3.0	4.0	FT	Resampled
2N	Plutonium-238	70	55.00	PCI/G	NJ		0	08/06/1990	5.0	6.0	FT	Resampled
2N	Plutonium-238	64	55.00	PCI/G	NJ		0	08/06/1990	7.0	8.0	FT	Resampled
2N	Plutonium-238	75	55.00	PCI/G	NJ		0	08/06/1990	9.0	10.0	FT	Resampled
2N	Plutonium-238	76	55.00	PCI/G	NJ		0	08/06/1990	11.0	12.0	FT	Resampled
2N	Plutonium-238	65	55.00	PCI/G	NJ		0	08/06/1990	13.0	14.0	FT	Resampled
2N	Plutonium-238	78	55.00	PCI/G	NJ		0	08/06/1990	15.0	16.0	FT	Resampled
2N	Plutonium-238	59	55.00	PCI/G	NJ		0	08/06/1990	17.0	18.0	FT	Resampled
2N	Plutonium-238	68	55.00	PCI/G	NJ		0	08/06/1990	19.0	20.0	FT	Resampled
2N	Plutonium-238	74	55.00	PCI/G	NJ		0	08/06/1990	21.0	22.0	FT	Resampled
2N	Plutonium-238	68	55.00	PCI/G	NJ		0	08/06/1990	23.0	24.0	FT	Resampled
3N	Plutonium-238	73	55.00	PCI/G	NJ		0	08/06/1990	0.0	1.0	FT	Resampled
3N	Plutonium-238	73	55.00	PCI/G	NJ		0	08/06/1990	2.0	3.0	FT	Resampled
3N	Plutonium-238	70	55.00	PCI/G	NJ		0	08/06/1990	4.0	5.0	FT	Resampled
3N	Plutonium-238	80	55.00	PCI/G	NJ		0	08/06/1990	6.0	7.0	FT	Resampled
3N	Plutonium-238	62	55.00	PCI/G	NJ		0	08/06/1990	8.0	9.0	FT	Resampled
C0006	Thorium-232	3.24	2.10	PCI/G			2	11/01/1984	4.5	4.5	FT	Resampled
C0006	Thorium-232	2.65	2.10	PCI/G			2	11/01/1984	9.0	9.0	FT	Resampled
C0007	Thorium-232	41.63	2.10	PCI/G			2	11/01/1984	4.5	4.5	FT	Resampled
C0007	Thorium-232	5.14	2.10	PCI/G			2	11/01/1984	9.0	9.0	FT	Resampled
C0022	Thorium-232	4.16	2.10	PCI/G			2	11/01/1984	4.5	4.5	FT	Resampled
C0022	Thorium-232	2.53	2.10	PCI/G			2	11/01/1984	6.7	6.7	FT	Resampled
C0023	Thorium-232	2.81	2.10	PCI/G			2	05/01/1983	1.5	1.5	FT	Resampled
C0087	Thorium-232	3.29	2.10	PCI/G			2	05/01/1983	1.5	1.5	FT	Resampled
C0087	Thorium-232	3.36	2.10	PCI/G			2	05/01/1983	5.5	5.5	FT	Resampled
MND17-8809	Plutonium-238	152.5	55.00	PCI/G	U		152.5	09/05/1995	0.0	0.5	FT	Resampled
MND17-8856	Uranium-238	4.01	2.09	PCI/G			0	09/01/1995	8.0	12.0	FT	Resampled
MND17-9404	Plutonium-238	80.7	55.00	PCI/G			0	08/29/1995	4.0	8.0	FT	Resampled
S0412	Thorium-232	2.97	2.10	PCI/G			2	08/01/1984	0.0	0.0	NA	Resampled
S0425	Thorium-232	5.74	2.10	PCI/G			2	10/01/1983	0.0	0.0	NA	Resampled
SCR830	Thorium-232	7.9	2.10	PCI/G			0	03/10/1989	2.0	2.0	FT	Resampled
SCR830	Thorium-232	20.9	2.10	PCI/G			0	03/10/1989	2.0	2.0	FT	Resampled
SCR830	Thorium-232	2.4	2.10	PCI/G			0	03/10/1989	4.0	4.0	FT	Resampled

N - Spiked sample not within control limits
J - Value is an estimated quantity

Table 2. Re-sampling I

			Co-60		Cs-137+D		Pb-210		Ra-226+D		Ac-227 +D	
cleanup objective (pCi/g)			0.7		3.8		7.4		2.9		4.6	
Location ID	Date	interval of sample (feet)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)
1N	1/27/05	0-4	0	0.08	0.01	0.06	0.26	0.74	0.91	0.85	0	0.27
	1/27/05	4-8	0	0.1	0.01	0.08	0.27	0.76	0.93	0.85	0.04	0.28
	1/27/05	8-12	0	0.07	0.02	0.06	0.43	0.76	1.15	0.83	0	0.29
	1/27/05	12-16	0.01	0.05	0.02	0.06	0.3	0.68	1.56	0.67	0.16	0.21
	1/27/05	16-20	0.02	0.07	0	0.06	0.41	0.77	1.24	0.76	0.03	0.36
	1/27/05	20-24	0	0.09	0.11	0.08	0.74	0.98	1.62	1.02	0.2	0.44
	1/27/05	24-28	0.02	0.04	0	0.05	0.88	0.64	1.48	0.74	0.08	0.24
2N	1/26/05	0-4	0.02	0.04	0	0.04	0.73	0.57	1.29	0.62	0.08	0.21
	1/26/05	4-8	0.01	0.05	0.01	0.04	0.66	0.52	1.12	0.62	0	0.21
	1/26/05	8-12	0.03	0.03	0.04	0.03	0.31	0.51	1.35	0.55	0	0.23
	1/26/05	12-16	0	0.07	0.02	0.04	0.45	0.55	1.33	0.74	0.05	0.22
	1/26/05	16-20	0.01	0.06	0.02	0.05	1.17	0.74	1.9	0.85	0	0.32
	1/26/05	20-24	0	0.07	0	0.05	0.41	0.59	1.37	0.61	0	0.23
	1/26/05	24-28	0.04	0.04	0	0.04	1.02	0.48	1.12	0.64	0	0.24
3N	1/26/05	0-4	0	0.09	0.1	0.05	1.09	0.7	1.35	0.8	0.04	0.26
	1/26/05	4-8	0	0.06	0.03	0.05	1.07	0.63	1.46	0.79	0	0.28
	1/26/05	8-12	0.01	0.04	0.02	0.03	0.57	0.51	1.44	0.57	0	0.2
	1/26/05	12-16	0	0.06	0.12	0.04	0.87	0.49	1.07	0.56	0	0.21
	1/26/05	16-20	0	0.05	0.05	0.03	0.37	0.58	1.96	0.7	0	0.21
	1/26/05	20-24	0	0.05	0	0.04	0.5	0.38	0.86	0.51	0	0.16
	1/26/05	24-28	0	0.06	0	0.03	0.74	0.52	1.72	0.57	0.1	0.18
C0006	1/28/05	0-2	0	0.03	0	0.03	0.13	0.45	0.58	0.54	0.03	0.17
	1/28/05	2-4	0	0.07	0	0.03	0.32	0.43	0.77	0.49	0.11	0.14
	1/28/05	4-6	0.01	0.03	0.03	0.03	0.67	0.54	1.17	0.61	0	0.22
	1/28/05	6-8	0	0.06	0.01	0.04	0.94	0.55	1.4	0.66	0.1	0.21
	1/28/05	8-10	0	0.04	0.01	0.03	0.84	0.5	1.72	0.67	0.04	0.19
C0006A	1/28/05	0-2	0	0.06	0.02	0.03	0.62	0.42	0.84	0.57	0.08	0.2
offset location	1/28/05	2-4	0.01	0.05	0.01	0.03	0.42	0.42	0.77	0.55	0.07	0.17
	1/28/05	4-6	0.01	0.04	0.02	0.02	0.48	0.44	0.7	0.56	0.07	0.16
	1/28/05	6-8	0.02	0.05	0.03	0.03	0.66	0.59	1.28	0.69	0	0.24
	1/28/05	8-10	0.03	0.05	0	0.04	0.61	0.49	1.42	0.66	0	0.19
C0007	1/31/05	0-2	0	0.04	0.02	0.05	0.79	0.53	1.57	0.64	0.04	0.22
	1/31/05	2-4	0	0.07	0.03	0.04	0.38	0.66	1.14	0.69	0.06	0.25
	1/31/05	4-6	0	0.07	0.03	0.06	1.26	0.72	1.53	0.83	0.11	0.28
	1/31/05	6-8	0.01	0.07	0.04	0.06	1.02	0.72	1.71	0.85	0	0.29
	1/31/05	8-10	0.02	0.06	0	0.06	1.03	0.76	1.92	0.86	0.16	0.27
C0022	1/27/05	0-2	0	0.09	0	0.08	0.98	0.77	1.55	0.89	0.13	0.28
	1/27/05	2-4	0	0.09	0.06	0.05	0.77	0.82	1.53	0.86	0.03	0.31
	1/27/05	4-6	0.01	0.08	0	0.08	0.82	0.93	2.05	1.04	0.09	0.36
	1/27/05	6-8	0	0.1	0.04	0.06	0	1.03	1.06	1.09	0	0.46
C0023	1/27/05	0-2	0	0.12	0.08	0.09	1.08	0.96	1.69	1.04	0.07	0.35
	1/27/05	2-4	0	0.11	0.03	0.09	0.68	1.01	1.51	1.05	0.16	0.35
	1/27/05	4-6	0	0.09	0	0.08	0.98	0.77	1.55	0.89	0.13	0.28
	1/27/05	6-8	0	0.09	0.06	0.05	0.77	0.82	1.53	0.86	0.03	0.31
	1/27/05	8-10	0.01	0.08	0	0.08	0.82	0.93	2.05	1.04	0.09	0.36
	1/27/05	10-12	0	0.1	0.04	0.06	0	1.03	1.06	1.09	0	0.46
C0087	1/28/05	0-2	0	0.08	0.05	0.05	0.98	0.67	2.02	0.74	0	0.3
	1/28/05	2-4	0	0.06	0.05	0.04	0.92	0.6	2.01	0.76	0	0.25
	1/28/05	4-6	0	0.08	0.03	0.05	1.01	0.77	2.52	0.9	0	0.31
	1/28/05	6-8	0	0.07	0	0.05	1.03	0.73	1.95	0.84	0.08	0.26
MND17-8809	1/28/05	0-2	0	0.11	0.02	0.07	0.5	0.85	2.22	0.9	0.17	0.32
	1/28/05	2-4	0	0.09	0	0.07	0.82	0.74	1.21	0.95	0.02	0.32
	1/28/05	4-6	0.04	0.1	0	0.07	0.57	0.89	1.93	0.98	0	0.45
	1/28/05	6-8	0	0.08	0	0.07	0.41	0.85	1.43	0.75	0	0.41

Table 2. Re-sampling Investigation Results.

			Co-60		Cs-137+D		Pb-210		Ra-226+D		Ac-227 +D		Th-230+D		Th-232 +D		Pu-238		Am-241		U-238+D	
cleanup objective (pCi/g)			0.7		3.8		7.4		2.9		4.6		2.8	*	2.1		55		63		2.2	
Location ID	Date	interval of sample (feet)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)	activity (pCi/g)	MDA (pCi/g)
MND17-8856	1/28/05	0-2	0	0.12	0	0.09	1.19	0.85	2.56	0.89	0	0.47	6.72	9.51	0.69	0.3	4.1	16.68	0.01	0.1	0.58	1.01
	1/28/05	2-4	0	0.1	0.02	0.06	0.69	0.8	1.79	0.73	0	0.41	1.58	8.38	0.85	0.25	0.51	14.99	0.02	0.09	0.69	0.85
	1/28/05	4-6	0.04	0.07	0.02	0.07	0.48	0.84	0.97	0.95	0	0.4	3.16	8.91	0.81	0.26	0	15.53	0	0.1	1.05	0.88
	1/28/05	6-8	0	0.09	0	0.07	0.7	0.79	1.1	0.91	0.21	0.31	0	9.33	1.08	0.26	0	15.99	0.05	0.09	0.73	0.87
	1/28/05	8-10	0	0.11	0	0.07	0.81	0.85	1.55	0.97	0.07	0.42	0	9.34	1.11	0.15	0	17.5	0	0.1	0.9	0.92
	1/28/05	10-12	0	0.09	0	0.1	0.65	1.01	2	1.07	0	0.51	1.19	9.84	0.97	0.28	0	18.85	0.05	0.11	1.22	0.96
	1/28/05	12-14	0.04	0.09	0	0.08	0.84	0.99	1.34	1.05	0	0.38	0	9.96	0.98	0.32	0	18.54	0	0.12	1.12	1.01
MND17-9404	1/31/05	0-2	0.03	0.05	0.03	0.05	0.64	0.6	1.4	0.72	0	0.24	1.03	6.47	0.76	0.18	0	14.02	0	0.06	NR	NR
	1/31/05	2-4	0.02	0.04	0.09	0.03	1	0.61	1.68	0.68	0	0.26	2.43	6.47	0.43	0.24	0	15.21	0.02	0.07	NR	NR
	1/31/05	4-6	0.01	0.06	0.1	0.05	0.72	0.66	1.28	0.78	0	0.28	3.04	7.29	1	0.2	2.45	15.07	0.04	0.07	NR	NR
	1/31/05	6-8	0	0.11	0.06	0.05	1.15	0.72	1.3	0.89	0	0.31	4.44	7.59	0.63	0.32	3	19.89	0.02	0.08	NR	NR
	1/31/05	8-10	0	0.07	0	0.05	0.96	0.67	2.13	0.79	0	0.26	2.93	7.66	0.83	0.23	0	15.02	0.01	0.07	NR	NR
SO412	2/2/05	Surface	0	0.07	0	0.05	1.78	0.62	2.73	0.69	0	0.24	0	6.81	0.45	0.17	1.17	14.89	0	0.07	NR	NR
SO425	2/2/05	Surface	0	0.08	0.03	0.06	1.19	0.68	1.04	0.73	0.11	0.24	0.89	6.82	0.29	0.18	2.59	15.56	0.02	0.07	NR	NR
SCR 830	1/27/05	0-2	0.03	0.06	0.07	0.05	0.56	0.64	1.9	0.79	0	0.27	1.39	7.11	1.22	0.15	0	15.33	0	0.07	NR	NR
	1/27/05	2-4	0	0.08	0.05	0.05	0.72	0.68	1.37	0.95	0.09	0.26	2.05	7.68	1.13	0.23	6.86	14.99	0.03	0.07	NR	NR
	1/27/05	4-6	0	0.06	0.01	0.05	0.33	0.73	1.88	0.84	0.12	0.27	4.98	7.47	1.53	0.19	3.39	15.93	0	0.08	NR	NR

NOTES:

These samples were analyzed on site using gamma spectroscopy.

* If Th-230 is not a COC MCP will use our normal sample analysis process through gamma spectroscopy unless specified differently in a sampling and analysis plan. MCP will assure that the Th-230 MDA is less than 10 pCi/g. If Th-230 is detected greater than the MDA but below 10 pCi/g, MCP may re-analyze (gamma or alpha spectroscopy) the soil sample to confirm the absence or presence of Th-230. The MDA must be less than 10 pCi/g for the Th-230 result to be of value. 10 pCi/g is not a screening level for Th-230, rather an MDA for Th-230, at which gamma spec analysis can cease and results can be reported. It is more a reporting limit and defines the count time for the analysis suite because it is the limiting isotope

NR Not Reported

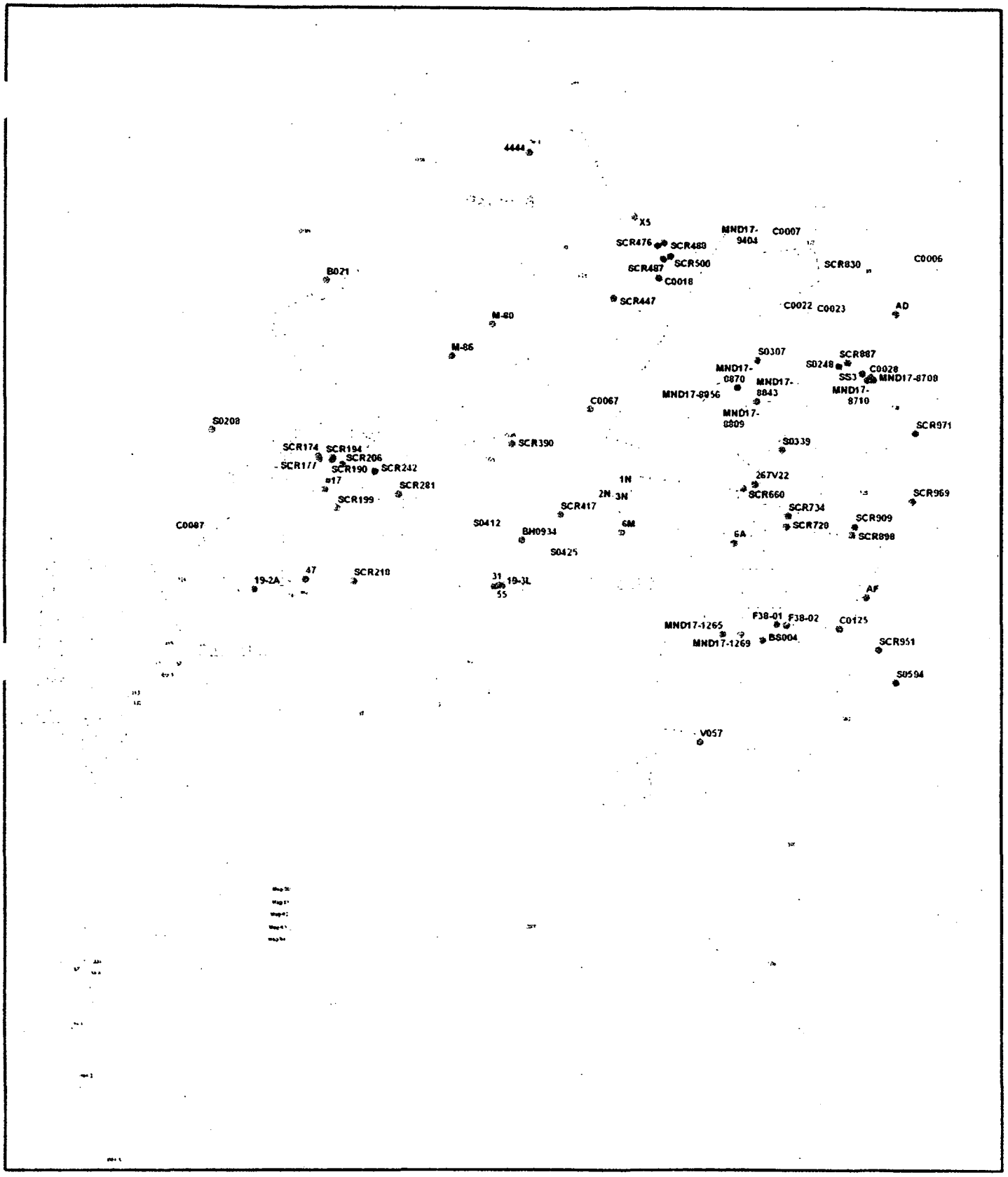
Location	Analyte	Result	CO Value	Unit of Measure	Lab Qual	Data Qual	Detection Limit	Date Collected	Start Sample Depth	Ending Sample Depth	Depth Units	Con
#17	Cesium-137	24	3.84	PCI/G			0	08/25/1991	0.0	0.5	FT	Not
C0028	Thorium-232	29.45	2.10	PCI/G			2	12/01/1982	18.0	18.0	FT	Not
C0028	Thorium-232	58	2.10	PCI/G			2	12/01/1982	8.5	8.5	FT	Not
C0028	Thorium-232	97	2.10	PCI/G			2	12/01/1982	13.0	13.0	FT	Not
MND17-8708	Radium-226	4.29	2.93	PCI/G			0	08/29/1995	0.0	0.5	FT	Not
MND17-8708	Uranium-238	5.67	2.09	PCI/G			0	08/29/1995	4.0	7.0	FT	Not
MND17-8710	Uranium-238	9.82	2.09	PCI/G			0	08/28/1995	0.0	0.5	FT	Not
SCR190	Thorium-232	2.1	2.10	PCI/G			0	12/09/1993	0.0	0.0	NA	Not
SCR190	Thorium-232	2.2	2.10	PCI/G			0	12/09/1993	0.0	0.0	NA	Not
SCR190	Thorium-232	2.2	2.10	PCI/G			0	12/09/1993	0.0	0.0	NA	Not
SCR194	Thorium-232	2.1	2.10	PCI/G			0	12/10/1993	0.0	0.0	NA	Not
SCR194	Thorium-232	2.2	2.10	PCI/G			0	12/10/1993	0.0	0.0	NA	Not
SCR194	Thorium-232	2.2	2.10	PCI/G			0	12/10/1993	0.0	0.0	NA	Not
SCR194	Thorium-232	2.4	2.10	PCI/G			0	12/10/1993	0.0	0.0	NA	Not
SCR194	Thorium-232	2.4	2.10	PCI/G			0	12/10/1993	0.0	0.0	NA	Not
SCR194	Thorium-232	2.5	2.10	PCI/G			0	12/10/1993	0.0	0.0	NA	Not
SCR194	Thorium-232	2.6	2.10	PCI/G			0	12/10/1993	0.0	0.0	NA	Not
SCR199	Plutonium-238	57	55.00	PCI/G			0	01/18/1991	0.0	0.0	NA	Not
SCR199	Thorium-232	2.2	2.10	PCI/G			0	01/18/1991	0.0	0.0	NA	Not
SCR206	Plutonium-238	64	55.00	PCI/G			0	04/15/1994	0.0	0.0	NA	Not
SCR281	Plutonium-238	85	55.00	PCI/G			0	01/24/1994	0.0	0.0	NA	Not
SCR281	Thorium-232	2.6	2.10	PCI/G			0	01/24/1994	0.0	0.0	NA	Not
SCR281	Thorium-232	3.4	2.10	PCI/G			0	01/24/1994	0.0	0.0	NA	Not
SCR281	Thorium-232	3.8	2.10	PCI/G			0	01/24/1994	0.0	0.0	NA	Not
SCR281	Thorium-232	5.5	2.10	PCI/G			0	01/24/1994	0.0	0.0	NA	Not
SCR281	Thorium-232	6	2.10	PCI/G			0	01/24/1994	0.0	0.0	NA	Not
SCR281	Thorium-232	7	2.10	PCI/G			0	01/24/1994	0.0	0.0	NA	Not
SCR660	Plutonium-238	56	55.00	PCI/G			0	04/25/1994	0.0	0.0	NA	Not
SCR660	Plutonium-238	63	55.00	PCI/G			0	04/25/1994	0.0	0.0	NA	Not

Location	Analyte	Result	CO Value	Unit of Measure	Lab Qual	Data Qual	Detection Limit	Date Collected	Start Sample Depth	Ending Sample Depth	De Ur
19-2A	Thorium-232	2.39	2.1	PCI/G			0	10/08/1993	0.0	2.0	
19-3L	Thorium-228	4.17	2.6	PCI/G			0	09/24/1993	20.0	22.0	
267V22	Thorium-228	2.73	2.6	PCI/G			0.04	10/21/2004	0.0	0.0	
267V22	Thorium-232	2.66	2.1	PCI/G			0.03	10/21/2004	0.0	0.0	
31	Thorium-232	4.5	2.1	PCI/G			2	08/01/1986	6.0	7.0	
4444	Radium-226	3.53	2.9	PCI/G			0.45	01/18/1999	0.0	0.0	
47	Thorium-232	2.9	2.1	PCI/G			2	08/04/1986	2.0	3.0	
47	Thorium-232	3.3	2.1	PCI/G			2	08/04/1986	3.0	4.0	
55	Thorium-232	2.7	2.1	PCI/G			2	08/05/1986	2.0	3.0	
6A	Thorium-232	2.8	2.1	PCI/G	NJ		0	07/11/1990	2.0	3.0	
6M	Plutonium-238	58	55.0	PCI/G	NJ		0	07/26/1990	5.0	6.0	
AD	Radium-226	3.49	2.9	PCI/G			0.797	04/13/1994	1.5	2.0	
AD	Thorium-232	2.1	2.1	PCI/G			0	04/13/1994	1.0	2.0	
AF	Thorium-232	2.1	2.1	PCI/G			0	04/18/1994	0.0	0.5	
B021	Uranium-234	2.28	2.1	PCI/G			0.0216	05/20/2002	0.0	2.0	
BH0934	Thorium-232	2.2	2.1	PCI/G			0	04/28/1988	3.0	3.0	
BS004	Thorium-228	4.4	2.1	PCI/G			0	05/19/1993	3.0	3.9	
BS004	Thorium-232	5.4	2.1	PCI/G			0	05/19/1993	3.0	3.9	
C0018	Thorium-232	2.53	2.1	PCI/G			2	11/01/1984	6.0	6.0	
C0018	Thorium-232	4.52	2.1	PCI/G			2	11/01/1984	3.0	3.0	
C0067	Thorium-232	3.61	2.1	PCI/G			2	11/01/1984	7.5	7.5	
C0125	Thorium-232	3.11	2.1	PCI/G			2	12/01/1982	3.0	3.0	
C0125	Thorium-232	3.25	2.1	PCI/G			2	12/01/1982	6.0	6.0	
F38-01	Plutonium-238	78.1	55.0	PCI/G			0.118	06/09/2004	0.0	0.0	
F38-02	Plutonium-238	72.1	55.0	PCI/G			0.054	06/09/2004	0.0	0.0	
M-80	Radium-226	3.05	2.9	PCI/G			2.1	03/02/2000	0.0	4.0	
M-86	Thorium-230	5.23	2.8	PCI/G			5.11	03/02/2000	0.0	4.0	
MND17-1265	Radium-226	4.06	2.9	PCI/G			0	08/08/1995	0.5	4.0	
MND17-1269	Radium-226	2.95	2.9	PCI/G			0	07/31/1995	4.0	8.0	
MND17-8843	Plutonium-238	81.26	55.0	PCI/G			0	09/12/1995	4.0	8.0	
MND17-8870	Plutonium-238	60	55.0	PCI/G			0	08/31/1995	0.5	4.0	
S0208	Plutonium-238	61	55.0	PCI/G			0.01	10/01/1983	0.0	0.0	
S0248	Thorium-232	3.73	2.1	PCI/G			2	08/01/1984	0.0	0.0	
S0307	Thorium-232	6.46	2.1	PCI/G			2	10/01/1983	0.0	0.0	
S0594	Thorium-232	2.7	2.1	PCI/G			2	10/01/1983	0.0	0.0	
SCR174	Plutonium-238	59	55.0	PCI/G			0	12/02/1993	0.0	0.0	
SCR174	Thorium-232	2.2	2.1	PCI/G			0	12/02/1993	0.0	0.0	
SCR177	Thorium-232	2.2	2.1	PCI/G			0	11/23/1993	0.0	0.0	
SCR218	Plutonium-238	67	55.0	PCI/G			0	05/20/1991	1.0	2.0	
SCR242	Plutonium-238	85	55.0	PCI/G			0	01/31/1994	0.0	0.0	
SCR390	Thorium-232	2.1	2.1	PCI/G			0	06/07/1988	3.0	3.0	
SCR417	Thorium-232	2.3	2.1	PCI/G			0	04/28/1988	3.0	3.0	
SCR447	Thorium-232	2.1	2.1	PCI/G			0	03/07/1988	1.0	1.0	
SCR447	Thorium-232	2.3	2.1	PCI/G			0	03/07/1988	2.0	2.0	
SCR476	Thorium-232	2.3	2.1	PCI/G			0	03/18/1994	0.0	0.0	
SCR487	Thorium-232	2.2	2.1	PCI/G			0	04/04/1994	0.0	0.0	

Table 4. Results Exceeding Cleanup Objectives To Be Included in Residual Risk Evaluation

Location	Analyte	Result	CO Value	Unit of Measure	Lab Qual	Data Qual	Detection Limit	Date Collected	Start Sample Depth	Ending Sample Depth	Depth Units	Comments
SCR500	Thorium-232	2.1	2.1	PCI/G			0	12/10/1993	0.0	0.0	NA	Included in RRE dataset - Result near CO, below HS
SCR728	Thorium-232	2.6	2.1	PCI/G			0	03/15/1994	0.0	0.0	NA	Included in RRE dataset - NFA Bldg. 38 area VSAP
SCR728	Thorium-232	2.6	2.1	PCI/G			0	03/15/1994	0.0	0.0	NA	Included in RRE dataset - NFA Bldg. 38 area VSAP
SCR734	Thorium-232	2.1	2.1	PCI/G			0	03/15/1994	0.0	0.0	NA	Included in RRE dataset - Result near CO, Below HS
SCR867	Thorium-232	2.3	2.1	PCI/G			0	03/01/1994	2.5	2.5	FT	Included in RRE dataset - Result near CO, Below HS
SCR898	Thorium-232	2.1	2.1	PCI/G			0	12/21/1993	0.0	0.0	NA	Included in RRE dataset - NFA Bldg. 38 area VSAP
SCR898	Thorium-232	2.2	2.1	PCI/G			0	12/21/1993	0.0	0.0	NA	Included in RRE dataset - NFA Bldg. 38 area VSAP
SCR898	Thorium-232	2.3	2.1	PCI/G			0	12/21/1993	0.0	0.0	NA	Included in RRE dataset - NFA Bldg. 38 area VSAP
SCR898	Thorium-232	2.6	2.1	PCI/G			0	12/21/1993	0.0	0.0	NA	Included in RRE dataset - NFA Bldg. 38 area VSAP
SCR898	Thorium-232	2.7	2.1	PCI/G			0	12/21/1993	0.0	0.0	NA	Included in RRE dataset - NFA Bldg. 38 area VSAP
SCR909	Thorium-232	2.1	2.1	PCI/G			0	12/21/1988	2.0	2.0	FT	Included in RRE dataset - Result near CO, Below HS
SCR909	Thorium-232	2.9	2.1	PCI/G			0	06/08/1994	0.0	0.0	NA	Included in RRE dataset - Result above CO below HS
SCR951	Thorium-232	2.2	2.1	PCI/G			0	03/08/1988	1.0	1.0	FT	Included in RRE dataset - Result near CO, Below HS
SCR969	Thorium-232	2.2	2.1	PCI/G			0	03/04/1988	6.0	6.0	FT	Included in RRE dataset - Result near CO, Below HS
SCR969	Thorium-232	2.2	2.1	PCI/G			0	03/04/1988	6.0	6.0	FT	Included in RRE dataset - Result near CO, Below HS
SCR971	Thorium-232	2.2	2.1	PCI/G			0	02/17/1988	2.0	2.0	FT	Included in RRE dataset - Result near CO, Below HS
SS3	Thorium-232	2.4	2.1	PCI/G			0	10/02/1996	0.0	1.0	FT	Included in RRE dataset - Result near CO, Below HS
V057	Thorium-232	2.49	2.1	PCI/G			0.0102	10/28/2002	0.0	0.0	NA	Included in RRE dataset - NFA PRS 277/278 OSC Report
X5	Thorium-230	10.1	2.8	PCI/G			0.0172	02/09/1999	4.0	8.0	FT	Included in RRE dataset - PRS 99/100 FA Data Report

N - Spiked sample not within control limits
J - Value is an estimated quantity
CO - Cleanup Objective
HS - Hot Spot Criteria
VSAP - Verification Sampling and Analysis Plan
OSC - On-Scene Coordinator
NFA - No Further Assessment



Legend

- Soil Sample (Resampled)
- Soil Sample (Included in RRE)
- SoiL Sample (Excluded from RRE)
- Building
- PRS_Area
- Parcel
- Railroad
- Paved_Drives_Parking
- Unpaved_Drives_Parking

Figure 1: Parcel 6, 7 & 8 Historic Samples above Cleanup Objective that are not within a PRS Area

DATE: 08/09/05 | BY: SSP | APPROVED:

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