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Parcel 3

Proposed Plan

Mound Plant
Miamisburg, Ohio

Prepared by BWXT of Ohio, Inc.

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PUBLIC REVIEW DRAFT

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ARARs	Applicable or Relevant and Appropriate Requirements
BVA	Buried Valley Aquifer
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act
FFA	Federal Facilities Agreement
FOD	frequency of detection
GH	Guard House
GIS	Guard Island Station
GV	Guideline Value
HI	Hazard Index
HTO	tritium
MCL	maximum contaminant level
MEMP	Miamisburg Environmental Management Project
MMCIC	Miamisburg Mound Community Improvement Corporation
NCP	National Contingency Plan
NFA	No Further Assessment
NPL	National Priority List
OEPA	Ohio Environmental Protection Agency
ODH	Ohio Dept. of Health
OU	Operable Unit
ppb	parts per billion
PRS	Potential Release Site
RD/RA	Remedial Design/Remedial Action
ROD	Record of Decision
RRE	Residual Risk Evaluation
RREM	Residual Risk Evaluation Methodology
RTG	Radioisotopic Thermal Generators
SM/PP	Special Metallurgical/Plutonium Processing

TCE	trichloroethene
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
UTL	upper tolerance limit
VOC	volatile organic compound

PROPOSED PLAN
PARCEL 3

1. SITE NAME, LOCATION, AND DESCRIPTION

The U.S. Department of Energy (US DOE) Mound Plant (CERCLIS ID-04935) is located within the city limits of Miamisburg, in southern Montgomery County, Ohio (Figure 1). The Site is approximately ten miles southwest of Dayton and 45 miles north of Cincinnati. Miamisburg is predominantly a residential community with supportive commercial facilities and industrial development. The adjacent upland areas are used primarily for residences and agriculture or are unused open spaces. The Mound Plant will remain in industrial/commercial use into the future. This future use has been determined based upon agreement among DOE, United States Environmental Protection Agency (US EPA), Ohio Environmental Protection Agency (OEPA), and interested stakeholders. This land use is reflected in the *Mound Comprehensive Reuse Plan* of the Miamisburg Mound Community Improvement Corporation (MMCIC) and is currently codified in the City of Miamisburg Zoning Ordinance for industrial use.

Mound Golf Course and Miamisburg Mound State Memorial Park, both directly east of the Mound Plant across Mound Road, are frequented during favorable weather. The park is the site of a 68-foot high ancient Indian mound, located 380 feet east of the Mound Plant boundary. Other recreational areas within one mile of the Mound Plant include the Miamisburg Municipal Park, Harmon Athletic Field, and Library Park. These areas are used extensively during the summer.

There are no large lakes within a 5-mile radius of the Mound Plant. Some vestiges of the old Miami-Erie Canal lie between the Norfolk Southern Railroad and Dayton-Cincinnati Pike west of the Mound Plant. This remnant of the old Miami-Erie Canal is designated as Operable Unit (OU) 4. The only major water body in the vicinity of the Mound Plant is the Great Miami River located approximately 2,000 feet to the west. The river is approximately 150 to 200 feet wide in this area.

Agricultural land within a 5-mile radius around the Mound Plant is primarily used for corn and soybean production and for livestock grazing.

According to 1990 census figures, the population of Miamisburg is 17,834, Dayton is 182,044, and Montgomery County is 573,809.

This Proposed Plan addresses Parcel 3 (Figure 2) which is located on the northern border of the Mound Plant. Parcel 3 is generally bound to the south and west by the plant proper, to the north by off-site residences, and the east by the parking lot transferred to MMCIC (Release Block H).

Parcel 3 lies within what was once called Operable Unit 2 (OU2). There are two structures in Parcel 3. There are three Potential Release Sites (PRSs) in Parcel 3. Two PRSs have undergone previous investigations; one was the subject of a removal action. Before transfer of a parcel can be completed, all buildings and PRSs must be evaluated for protectiveness or remediated to be protective. The status of the PRSs in Parcel 3 is summarized in Table 1. The status of the buildings in Parcel 3 is summarized in Table 2. Any residual risks associated with remaining contamination in Parcel 3 have been evaluated and are presented in the *Parcel 3 Residual Risk Evaluation* (RRE).

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 History

Mound was originally established by the DOE as an integrated research, development, and production facility that supported the nation's weapons and energy programs. To reconfigure and consolidate the nuclear complex, the DOE has decided to phase out the defense mission at Mound. As a result, the Mound has been designated an environmental management site and the plant is in the process of being remediated, transferred, and converted into a research and industrial/commercial site. Currently BWXT of Ohio, Inc. manages Mound for the DOE.

Early Mound programs investigated the chemical and metallurgical properties of polonium-210 and its applications; particularly, the fabrication of neutron and alpha sources for weapon and non-weapon use. Investigations involving uranium, protactinium-231, and plutonium-239 were performed from 1950 to 1963 as part of the national civilian power reactor program. In 1954, Mound began the separation of stable isotopes.

In the mid-1950s, Mound initiated efforts to develop a large-scale process for the recovery of thorium from a variety of thorium-bearing ores. Even though this project was canceled prior to full-scale operation, approximately 1,650 tons of sludge containing thorium were received at Mound. Due to its corrositivity, the thorium sludge was continually repackaged and relocated. This resulted in a number of thorium-contaminated areas around the site.

Plutonium-238 research and development activity began at Mound in the mid-1950s. From the early 1960s to the late 1970s, Mound processed plutonium-238 for use in heat sources within Radioisotopic Thermal Generators (RTGs). The fabrication of heat sources from plutonium metal was terminated in the mid-1960s. Oxide processes continued into the late 1970s. Since early 1979, Mound has not handled unencapsulated plutonium-238.

As a result of historic disposal practices and contaminant releases to the environment, the Mound Plant was placed on the National Priorities List (NPL) on November 21, 1989. The DOE signed a *Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 120 Federal Facility Agreement* (FFA) with the US EPA, effective October 1990. In 1993, this agreement was modified and expanded to include the OEPA.

The PRSs at Mound were identified based on knowledge of historical land use that was considered potentially detrimental and/or an actual sampling result showing elevated concentrations of contaminants. Tables 1 and 2 contain information and close-out status for Parcel 3 PRSs and buildings. Figure 3 depicts buildings and PRSs currently within Parcel 3.

Table 1: Parcel 3 PRSs and Core Team Conclusions

PRS	Reason for Identification	Core Team Decision	Close Out of PRS
99	Reported disposal of drums containing sand contaminated with polonium-210, cobalt-60, and cesium-137	Removal Action conducted in August, 1999	OSC Report signed by Core Team on August 16, 2000.
100	Reported disposal of neutralized chromium plating bath solution and process tank	Binned No Further Assessment (NFA)	Recommendation for NFA signed by Core Team on August 16, 2000.
241	Several positive soil gas detections during the Mound Plant Soil Gas and Geophysical Investigation (Reconnaissance Sampling Report - Soil Gas and Geophysical Investigations Mound Plant and SM/PP Hill, February 1993)	Binned NFA	Recommendation for NFA signed by Core Team on 5/13/97.

Table 2: Parcel 3 Buildings and Core Team Conclusions

Building	Description	Core Team Decision	Close Out of BDP
GH	Office	Binned NFA	Recommendation for NFA signed by Core team on 2/9/99.
GP-1	Guard force headquarters	Binned NFA	Recommendation for NFA signed by Core Team on 2/9/99.

Parcel 3 includes parts of the plant that were developed as part of the original plant construction project (e.g., GH (Guard House) Building and the parking area west of GH Building). Some of these areas were used in ensuing years for disposal (e.g., the parking area south of GH Building) and for additional development (e.g., construction, parking areas).

A brief discussion of the histories of the areas and buildings (both past and present) located in Parcel 3 follows.

GH BUILDING: GH Building was constructed in 1948, in a grassy area on the northern end of the Main Hill at what was, in 1948, the main entrance to the plant site. GH Building, originally designated as the "Guard House" was constructed as a one-story structure with a reinforced concrete roof bearing on exterior walls of face brick and masonry block. It was constructed to serve as an office area to house guard personnel and their equipment. It included a change room and office area for Mound security staff.

In 1949, GH building also served as a visitor control center. The visitor control function remained in GH Building until about 1993. In the early 1950s, the Purchasing group occupied offices within the GH Building. Between 1982 and 1994, GH Building was used as an office area for newly-hired Mound employees who were not yet security cleared and could not access the site unescorted . From 1994 to 1996, GH Building was used as an office area for the "Mound Transition Center" offering employment search services to displaced Mound workers. Between 1996 and early 1997, GH Building served as an office area for Mound's Health Physics staff members. In early 1997, the Health Physics staff moved out, and GH Building has remained vacant since that time.

Today GH Building is an unoccupied office complex surrounded by parking areas. The structure currently has 5,347 square foot of floor space. GH Building also has a utility penthouse (i.e., a second floor) that was built in 1966; the roof construction is built-up-membrane coal tar.

GP-1 BUILDING: Based upon the engineering drawings dated in late 1949 (Drawings numbered 4-1110 and 4-1111) and upon aerial photographs from late 1949, Guard Post 1 (or GP-1) was likely constructed in 1950.

In the original architectural drawings, this building was designated as "Guard Station-1," a "trooper post". It was constructed to serve as a training center and to provide office space for security personnel. It continued to serve as an office and training area until it was vacated in the later 1990s, in anticipation of its transfer to the MMCIC.

Initially GP-1 measured approximately 15'x21'x7.5' and occupied an area of 315 ft^2. Additions to GP-1 in 1961, 1963, 1968, and 1981, increased the square footage of

GP-1 to about 8,000 ft^2. With these additions, GP-1 also housed the practice firing range (previously located outside) and fitness center for the guard force.

THE PAVED PARKING AREA LOCATED WEST OF GH BUILDING AND THE ROADWAY: This parking area presently covers part of the area that was, in 1948, the original parking area. The original parking area has diminished in size due to the encroachment of buildings (e.g., OSE and the former Building 91) and the removal of the grassy island. The paved portion of the parking area in use today has been in use as a parking area since the late 1940s.

THE PAVED PARKING AREA LOCATED SOUTH OF GH BUILDING: This area once was a sloped area on the Main Hill's northern flank. Through time, this area received debris and waste materials from plant operations and construction projects. Eventually the hillside was filled in, and the area leveled off to approximate the elevations in the adjacent areas to the north and south. It was paved in about 1984, and then used as a parking area. In 1999, as part of the plant site's cleanup program, parts of the area (PRSs 99 and 100) were sampled to determine if they were contaminated. A CERCLA Removal Action followed for PRS 99. The area was then back-filled and re-paved. It is again in use as a parking area.

THE PAVED PARKING AREA LOCATED NORTH OF THE ROADWAY: This parking area is a smaller lot that was constructed atop an area that was back-filled. The date that this area was constructed could not be determined. This area appears as a paved parking area in 1970s and 1980s plant site photographs. According to Mound Drawing 352000-01005, this parking area was constructed in late 1950. Initially, this lot was gravel and mat pavement, with space for 35 cars.

CERCLA PRSs IN PARCEL 3: The PRSs located in Parcel 3 include PRSs 99, 100, and 241. PRSs 99 and 100 are discussed above in conjunction with the paved parking area south of GH Building (a.k.a., the GH Parking Lot). PRS 241 includes all of the existing parking areas, the roadway, and the parts of the GH Parking Lot not included in PRSs 99 and 100. PRS 241 boundaries extend to the west beyond this parcel to encompass the DOE parking area, but are not a subject of the Parcel 3 transfer.

OTHER STRUCTURES AND FEATURES IN PARCEL 3: In addition to the guard stations or posts noted above, this area also included the following features.

GIS (Guard Island Station) was constructed in about 1948 in a grassy island in the roadway to the north of GH Building. This structure was constructed as a guard station; a function that it served until it was demolished in 1997.

A modular structure was located near the current OSE Building within the Parcel 3 area in the late 1980s. This modular structure was located just outside the fence north

of the former Building 91 location, and east of OSE Building. The purpose of this structure was to serve as an entrance to the plant site (through the lobby and OSE Building). This building was a guard post, containing x-ray equipment used for surveillance of materials carried into the plant site and was not assigned an official name or designation; it was known among the members of the guard force as "OSE X-ray".

Also included in this transfer is a concrete stairway down the north side of the Main Hill that extends to the fence line. This stair once served as an access to a water pump-house and tank that was constructed in 1948. The purpose of this pump house and tank was to act as an emergency backup supply of water. The City of Miamisburg, via a hookup to their water main, provided the water. Today the stairway is marginally overgrown with vegetation.

2.2 Enforcement and Agreements - Mound 2000 Process

The DOE, the US EPA, and the OEPA had originally planned to address the Plant's environmental restoration issues under a set of OUs, each of which would include a number of PRSs. For each OU, the site would follow the traditional CERCLA process: a Remedial Investigation/Feasibility Study (RI/FS) followed by a Record of Decision (ROD), followed by Remedial Design/Remedial Action (RD/RA). After initiating remedial investigations for several OUs, the DOE and its regulators realized during a strategic review in 1995 that, for Mound, the OU approach was inefficient. The DOE and its regulators agreed that it would be more appropriate to evaluate each PRS or building separately, use removal action authority to remediate them as needed, and establish a goal for no additional remediation other than institutional controls for the final remedy documented in the ROD. To evaluate any residual risk after all removals have been completed, a RRE is conducted to ensure the conditions at the parcel do not pose an unacceptable risk to human health when the parcel is used for industrial/commercial purposes. This process was named the Mound 2000 Process. DOE and its regulators pursued this approach with the understanding that US EPA and OEPA reserve all rights to enforce all provisions of the FFA and participation in the Mound 2000 Process does not constitute a waiver of US EPA and OEPA rights to enforce the FFA.

The Mound 2000 Process established a "Core Team" consisting of representatives of the DOE Miamisburg Environmental Management Project (MEMP), US EPA, and OEPA. The Core Team evaluates each of the PRSs and recommends the appropriate response. The Core Team uses process knowledge, site visits, and existing data to determine whether or not any action is warranted concerning the PRS. If a decision cannot be made, the Core Team identifies specific information needed to make a decision (e.g., data collection, investigations). The Core Team also receives input from technical experts as well as the general public and/or public interest groups. Thus, all stakeholders have the opportunity to express their opinions or suggestions

involving each PRS. The details of this process are explained in the *Work Plan for Environmental Restoration at the Mound Plant, The Mound 2000 Approach,* (December 1998).

Originally, the Mound property was divided into nineteen "release blocks," which are contiguous tracts of property designated for transfer of ownership. Release Blocks D and H were transferred to MMCIC in 1999. Recently, the nineteen release blocks were reconfigured and renamed parcels. Currently, the Mound property is divided into ten parcels.

The Mound 2000 Residual Risk Evaluation Methodology (RREM), Mound Plant, Final, Revision 0, (January 1997) was developed as a framework for evaluating human health risks associated with residual levels of contamination. The RREM is applied to a parcel once necessary remediation has been completed, and the remaining PRSs or buildings in the parcel have been designated as No Further Assessment (NFA). Once the identified environmental concerns have been adequately addressed by the Core Team, a RRE is performed. The RRE documents whether the parcel is acceptable for industrial/commercial redevelopment. The results of the Parcel 3 RRE are discussed in Section 4 through Section 6 of this Proposed Plan. The risk exceeds the acceptable risk range and is primarily driven by the conservative groundwater analysis. Risk due to soil and air contaminants is within the acceptable risk range for commercial/industrial reuse.

A ROD will be generated for each release block/parcel to be transferred. The ROD will document the most appropriate remedy that meets statutory requirements and ensures protection of human health and the environment.

After the Parcel 3 ROD is final, DOE will submit to US EPA and OEPA documentation that shows the property meets CERCLA 120 (h) (3) requirements. This documentation, *Parcel 3 Environmental Summary*, must be sent to the Administrator of US EPA for concurrence on the property transfer. After concurrence is obtained, the title of the property may be formally transferred. Prior to acceptance of the deed for any discrete parcel, the Buyer shall acknowledge that it has reviewed the Mound environmental reports provided by DOE. Acceptance of the deed thereby acknowledges and commits the Buyer to abiding by institutional controls specified in the ROD.

3. HIGHLIGHTS OF PREVIOUS COMMUNITY PARTICIPATION

The community has been an active participant in this process to date. Comments from the public on the PRS and building recommendations have been incorporated as part of the remedy evaluation. DOE believes all comments have been resolved with the commentor and the documents, comments, and responses have been placed in the CERCLA Public Reading Room. The Mound 2000 RREM has also gone through a public comment cycle and copies are in the CERCLA Public Reading Room. The

Parcel 3 RRE is in a public review cycle concurrent with this Proposed Plan.

Table 3 lists documents relevant to Parcel 3, along with the dates they were made available for public comment. This Proposed Plan will have a 30-day public comment period.

Table 3: Parcel 3 Documents and Public Comment Periods

DOCUMENT	COMMENT PERIOD (BEGIN)	COMMENT PERIOD (END)
PRS 99 Action Memo	5/3/00	6/3/00
PRS 100 Data Package	8/23/00	9/25/00
PRS 241 Data Package	6/17/97	7/18/97
GH Building Data Package	3/17/99	4/17/99
GP-1 Building Data Package	3/17/99	4/17/99
Parcel 3 RRE	Concurrent with this Proposed Plan	

4. SCOPE AND ROLE OF PARCEL 3

This Proposed Plan addresses one of ten separate parcels at Mound. Three parcels have been transferred to MMCIC, the remaining seven parcels may be reconfigured to accommodate transfer of Mound property for economic development.

A ROD will be generated for each parcel of property to be transferred. Each Proposed Plan and resulting ROD will document the most appropriate remedy that meets statutory requirements and ensures protection of human health and the environment. This Proposed Plan for Parcel 3 represents one of a number of Proposed Plans that will be generated for parts of Mound. As such, this Plan identifies the proposed final action for Parcel 3. Once the ROD for Parcel 3 is final and in effect, DOE could petition the US EPA to delist Parcel 3 from the NPL.

After a ROD has been generated for each of the parcels, the Core Team plans for a site-wide final ROD to address any areas or media associated with the Mound Plant that were not previously addressed.

5. SITE CHARACTERISTICS

5.1 Geologic Setting

The bedrock section beneath the Mound Plant consists of thin, nearly flat-lying beds of alternating shale and limestone of the Richmond Stage of the Cincinnati Group (Upper Ordovician -- about 450 million years ago). The Cincinnati Group is present at the surface of the Mound Plant and underlies Parcel 3. The limestone beds range from two to six inches in thickness and the shale layers are commonly five to eight feet thick.

Pleistocene age (less than about two million years old) glacial deposits at the Mound Plant include both till and outwash deposits. The till in the area of the Mound Plant is composed of an unsorted, unstratified mixture of clay, silt, sand, and coarser material. Water-lain deposits consist of outwash composed of well-sorted sand and gravel. The sand and gravel is horizontally layered, and commonly cross-bedded. The outwash in the vicinity of the Mound Plant occurs as restricted valley-train deposits that were formed by the aggregation of glacial meltwater streams.

The outwash deposited in the Miami River Valley and the associated tributary valley forms the Buried Valley Aquifer (BVA) and contiguous deposits. A general discussion of the geology is presented in the *Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan, Final* (May 1992).

5.2 Hydrogeologic Setting

There are two hydrogeologic regimes at the Mound Plant: flow through the bedrock beneath the Main Hill and the Special Metallurgical/Plutonium Processing (SM/PP) Hill, and flow within the unconsolidated glacial deposits and alluvium associated with the BVA in the Great Miami River Valley and the tributary valley between the Main Hill and SM/PP Hill. The BVA is a US EPA-designated sole source aquifer. The bedrock system, an interbedded sequence of shale and limestone, is dominated by fracture flow especially in the upper portions of the bedrock. Groundwater movement within the till and sand and gravel, within the buried valley, is through porous media. Groundwater flow from the Mound Plant is generally to the west and southwest toward the BVA of the Great Miami River Valley. A discussion of the hydrogeology of Mound is presented in the *Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan, Final* (May 1992) and the *Operable Unit 9; Hydrogeologic Investigation: Buried Valley Aquifer Report, Technical Memorandum, Revision 1* (September 1994) and *Operable Unit 9 Hydrogeologic Investigation: Bedrock Report, Technical Memorandum, Revision 0* (January 1994).

5.3 Available Data for Parcel 3

The PRSs in Parcel 3 have been evaluated by the Core Team. The following sections

discuss the data relevant to Parcel 3 that are available from the general source documents and the Potential Release Site packages.

5.3.1 Background Data

Soils. Background concentrations measure the amount of a chemical that is naturally occurring (like metals) or anthropogenic (man-made but, for background purposes, originating from sources other than the Mound Plant). Background concentrations are used as a screening tool to determine which contaminants should be carried through a risk evaluation as described in Section 5.4 of this Proposed Plan. Regional background concentrations in soil were determined and are documented in *Operable Unit 9 Background Soils Investigation Soil Chemistry Report Technical Memorandum, Revision 2* (September 1994) and *Operable Unit 9 Regional Soils Investigation Report, Revision 2* (August 1995).

Groundwater. Background concentrations for groundwater were developed from two sources of data. For the BVA, background values were reported in *OU9 Hydrologic Investigation: Groundwater Sweeps Report, Technical Memorandum* (April 1995). Background concentrations for bedrock groundwater were reported in *OU5 New Property Remedial Investigation Report, Final, Revision 0* (February 1996).

5.3.2 Groundwater Contaminant Data

Groundwater data consist of water analyses of the Mound Plant production wells screened within the BVA, and analyses of groundwater from the Mound Plant monitoring wells screened in the bedrock aquifer. These wells are sampled as part of the site-wide groundwater monitoring network. The RRE for Parcel 3 documents the specific groundwater data used to evaluate the current and future groundwater profile for Parcel 3.

5.3.3 PRS Contaminant Data

Soil data can be divided into three types: (1) data obtained through commercial analytical laboratory analysis, (2) data obtained through "screening" techniques conducted in a DOE laboratory, and (3) data obtained through screening techniques conducted in the field. Analytical laboratory data are obtained using strict methods and are subjected to exacting quality control procedures. These data are of the highest quality, and are quantitative. The laboratory screening data are considered to be of lower quality because sample preparation does not occur, and the measuring instruments are less precise. The field screening techniques are the least accurate due to instrument limitations and the effects of ambient conditions on field measurements. Due to these limitations, field screening data were not used for any calculations in the RRE for Parcel 3.

Soil contaminant data for Parcel 3 collected prior to the Mound 2000 Process are documented in the following reports:

- OU-9 Regional Soils Investigation Report, Revision 2 (August 1995) (purpose was to give a regional soil description without including the impacts of Mound operations),

- *OU-9 Site Scoping Report, Volume 3 - Radiological Site Survey, Final* (June 1993) (a compendium of existing data).

In the Mound 2000 Process, radionuclide and chemical contaminants were studied on a PRS basis. The results, as taken from the PRS packages, are described below.

There are three Potential Release Sites (PRSs 99, 100, and 241) located within Parcel 3. The locations of these PRSs are shown in Figure 3.

The rationale for designation of PRSs 99, 100, and 241 is outlined as follows:

PRS 241 is the result of several soil gas detections by the Soil Gas Survey and Geophysical Investigation (*Reconnaisance Sampling Report; Soil Gas Survey and Geophysical Investigations; Mound Plant Main Hill and SM/PP Hill; Final, Revision 2 (February 1993)*). PRS 241 includes the northwest parking lots, including the parking lots east of OSE Building, south of GH Building and the parking lot north of A Building. No operations are known to have been performed in the parking lots. The items reportedly included in the fill material on which the parking lot south of GH is located prompted the identification of PRSs 99 and 100. The Radiological Site Survey Project (*OU-9 Site Scoping Report, Vol. 3 - Radiological Site Survey, Final* (June 1993)) observed plutonium-238, thorium, tritium, cesium-137, and radium-226 below Risk Based Guideline Values. The reconnaissance soil gas sampling detected trichloroethene (TCE) at 8 ppb (parts per billion, i.e., 1 in 1,000,000,000) and toluene at 255 ppb. Both are below Risk Based Guideline Values. In May 1997, the Core Team recommended PRS 241 required No Further Assessment.

PRS 99, also known as Area 6 or WD Building Filter Cleaning Waste, is a former trench in the parking lot south of GH Building. It was believed to contain drums of polonium-210 contaminated sand resulting from the sandblast cleaning of the WD building sand filters. It was thought that the sand may also be contaminated with cobalt-60 and cesium-137. In February 1999, 137 samples were collected from 46 borings in the parking lot south of GH Building to include PRS 99. One sample displayed an elevated concentration of plutonium-238 (120 pCi/g by on-site gamma-ray spectrometry, 297 pCi/g by off-site isotopic analysis). A trenching investigation yielded evidence of greater contamination (up to 839 pCi/g of plutonium-238). A removal action was performed and subsequent verification sampling documented remaining plutonium-238 concentrations below the 55 pCi/g Risk Based Guideline Value (*On-*

Scene Coordinator (OSC) Report, PRS 99, Removal Action, Final, (August 2000)).

PRS 100, also known as Area F or Chromium Trench, is located south of the GH Building. PRS 100 was designated a PRS because of the reported disposal of "neutralized" chromium plating bath solution in a trench. At least one of the plating shop process tanks was reportedly disposed of in the same area as the chromium sludge. The February 1999 sampling at PRS 99 included PRS 100. As noted above, one sample at PRS 99 exceeded a Risk Based Guideline Value for a contaminant of concern. All other samples showed no sign of contamination or visual indication of waste. There were no elevated detections or visual indications of debris associated with any of the PRS 100 samples. In August 2000, the Core Team changed the status of PRS 100 to NFA.

5.3.4 Building Contaminant Data

Fixed radiological contamination was found on the main door threshold of GH Building and an adjacent manhole cover. The threshold was scabbled to remove the contamination and the manhole cover was replaced. The final radiological survey met all surface contamination guidelines. In February 1999, the Core Team recommended NFA for the GH Building (*GH Building Data Package,* July 1999).

5.3.5 Air Contaminant Data

For purposes of evaluating cumulative residual risk, air pathway data are also reported in each RRE. Per the RREM document, 1994 data collected at the Mound Plant perimeter air sampling stations are used to bound the concentrations, and, therefore, the risks from inhalation of radionuclides present in the ambient air. The risk data for tritium (HTO), plutonium-238, and plutonium-239/240 reported in the *Residual Risk Evaluation , Release Block D, Final* (December 1996) were reviewed and found to require no update or changes. It was observed, however, that the site employee risk calculations did not include an adjustment factor to account for the time spent indoors. While this approach is inconsistent with that applied to analogous outdoor pathways, it is conservative in nature.

5.4 Summary of Contaminants Detected in Parcel 3

The complete list of all contaminants detected at least once within Parcel 3 is provided in the Parcel 3 RRE in Table 1 (Soil, Construction Worker Scenario), Table 3 (Soil, Site Employee Scenario), Table 5 (Current Groundwater, Construction Worker), Table 7 (Current Groundwater, Site Employee), Table 9 (Future Groundwater, Construction Worker), and Table 11 (Future Groundwater, Site Employee). These tables present the maximum concentration of each contaminant, and also present appropriate background concentrations, Guideline Values, and additional screening criteria for comparative purposes. These Tables are reproduced in Appendix B of this Proposed Plan as Tables

7, 9, 11, 13, 15, and 17.

Only contaminants exceeding (1) background, (2) a base level of potential health concern, and (3) certain frequency of detection (FOD) criteria are carried through the RRE process. In general, whether or not a contaminant is present at or above background is determined by comparing the sample result to the 95% upper tolerance limit (UTL) for background data on that contaminant. Secondly, the levels of health concern used as screening criteria are the Guideline Values (GVs) established for Mound. GVs are media-specific concentrations of contaminants that correspond to certain risk levels for certain exposure scenarios. GVs for Mound were compiled in *Risk-Based Guideline Values, Mound Plant, Miamisburg, OH, Final, Rev. 4* (March 1997). Some of these values have been revised to reflect revised toxicity values and/or include the effect of additional decay products. Thirdly, FOD criteria are used to screen out contaminants when the compound is infrequently detected and there is no reason to believe the compound is present. Infrequently is defined, for RRE screening purposes, as a detection rate below 5% (one sample in 20). A more detailed discussion of the screening process is located in the RREM.

Contaminants carried forward in the RRE for Parcel 3 are identified in the Parcel 3 RRE in Table 2 (Soil, Construction Worker), Table 4 (Soil, Site Employee), Table 6 (Current Groundwater, Construction Worker), Table 8 (Current Groundwater, Site Employee), Table 10 (Future Groundwater, Construction Worker), and Table 12 (Future Groundwater, Site Employee). These tables document the results of the screening process by listing the reason specific contaminants were screened out of the RRE. These Tables are reproduced in Appendix B of this Proposed Plan as Tables 8, 10, 12, 14, 16, and 18.

5.4.1 Screening Results for Soil Contaminants

For the construction worker scenario, eight volatile organic compounds (VOCs), four inorganic (metal), and fifteen radiological compounds were considered as potential contaminants of concern for the soil component of the RRE. For the site worker scenario, eight VOCs and twelve radiological compounds were considered as potential contaminants of concern for the soil component of the RRE. Soil concentrations of those compounds were compared to the screening criteria listed above to determine if a given compound should be included in the RRE.

Organic compounds. Because the organic contaminants found at Mound are generally not naturally-occurring substances, background concentrations were not available. The organic compounds were therefore screened against Guideline Values, and against the FOD factor (the contaminant must have been detected at least once in every twenty samples collected to be carried forward in the RRE). Using these screening criteria, the number of organic compounds was reduced from eight to none for both the construction worker and site employee scenarios. (See Tables 2 and 4 of

the RRE, reproduced in Appendix B of this report as Tables 8 and 10.)

Inorganic compounds. Inorganic compounds were screened against background concentrations, Guideline Values, FOD criteria, and whether they are common constituents of most soils, such as sodium and potassium. Compounds classified as essential human nutrients were eliminated from further consideration. Using these screening criteria, the number of inorganic compounds was reduced from four to none for the construction worker scenario. (See Table 2 of the RRE, reproduced in Appendix B of this report as Table 8.)

Radiological compounds. Radiological contaminants were screened against background (95% UTL) and Guideline Values. Using these screening criteria, the number of radionuclides was reduced from fifteen to one for the construction worker scenario and from twelve to one for the site employee scenario. (See Tables 2 and 4 of the RRE, reproduced in Appendix B of this report as Tables 8 and 10.)

5.4.2 Screening Results for Current Groundwater Contaminants

"Current" groundwater contaminants are defined as those found in the Mound Plant production wells (0076 and 0271). For screening purposes, eighteen organic, twenty-two inorganic, and seventeen radiological compounds were identified as potential contaminants of concern. Similar to the approach for soils data, current groundwater concentrations were screened against background, Guideline Values, frequency of detection, and on the basis of whether they are common water quality parameters, such as alkalinity or dissolved solids that are not health-related parameters.

For both scenarios, the screening process reduced the number of organic contaminants from eighteen to none. For both scenarios, the screening process reduced the number of inorganic contaminants from twenty-two to three. For the construction worker scenario, the screening process reduced the number of radiological contaminants from seventeen to one. For the site employee scenario, the screening process reduced the number of radiological contaminants from seventeen to five. (See Tables 6 and 8 of the RRE, reproduced in Appendix B of this report as Tables 12 and 14.)

5.4.3 Screening Results for Future Groundwater Contaminants

Future groundwater contaminants are defined as those currently in the Mound Plant production wells, combined with contaminants measured in Mound Plant bedrock monitoring wells. This definition assumes that all contaminants in the bedrock aquifer water (that exceed background) will migrate to the production wells within the BVA in the future. To create this combined list of contaminants, the bedrock contaminants were screened against BVA background concentrations. This list was combined with the current groundwater list. These contaminants were screened with respect to BVA background concentrations, Guideline Values, frequency of detection, and whether they are common

water quality parameters not associated with health impacts. The screening reduced the number of future organic contaminants for the construction worker scenario from twenty-three to four, the inorganic contaminants from thirty-six to twelve, and the radiological contaminants from eighteen to six. The screening reduced the number of future organic contaminants for the site employee scenario from twenty-three to three, the inorganic contaminants from thirty-six to twelve, and the radiological contaminants from nineteen to ten. (See Tables 10 and 12 of the RRE, reproduced in Appendix B of this report as Tables 16 and 18.)

6. SUMMARY OF SITE RISKS

For the Mound Plant, the human health risk associated with exposure to residual levels of contamination is evaluated pursuant to the RREM. The RREM is applied to a limited area, such as a parcel, after all necessary remediation has been completed and the remaining PRSs or buildings within that parcel have been designated as NFA. Once the Core Team has determined that all environmental concerns have been adequately addressed, the residual risk evaluation is performed for confirmation and to assess residual risk. The RRE consists of five steps:

Step 1: Identification of Contaminants to be Evaluated

Step 2: Exposure Assessment

Step 3: Toxicity Assessment

Step 4: Risk Characterization

Step 5: Evaluation of Potential Residual Risks

The information needed for Step 1 was presented in Section 5 of this Proposed Plan. Steps 2 through 5 are described below. After the Core Team reviews and approves an RRE, it is placed in the public reading room for a formal 30-day public review period.

6.1 Exposure Assessment

The two exposure scenarios examined in the Parcel 3 RRE involve an onsite construction worker, and a site employee engaged in non-construction activities (office work). The construction worker and site employee are assumed to be exposed to soil contaminated at the levels described by currently available data. The workers are assumed to be exposed to the existing soil contamination both now and into the future. For the groundwater pathways, both current and future exposures are assumed. Current groundwater exposures are estimated based on the concentration levels in the Mound Plant production wells 0076 and 0271 (which are screened in the BVA) because they supply potable water to the Mound Plant and represent a potential future potable

water supply. The bedrock water under Parcel 3 is not a current source of drinking water.

Future groundwater contamination is assumed to be appropriately represented by combining current BVA contamination with additional contamination currently in the nearby bedrock aquifer. Bedrock aquifer groundwater from across the entire Mound Plant is assumed to eventually mix with BVA water, and thereby contribute bedrock aquifer contamination to the BVA. It is this mix of BVA and bedrock contaminated water to which the future construction worker and site employee are assumed to be exposed.

6.1.1 Construction Worker Scenario

It is assumed that activities requiring earth-moving, such as construction of new buildings, will occur in Parcel 3. These construction activities could result in worker exposure to contaminants in soil, on dust particles, in air, and in groundwater. This scenario characterizes the potential exposure to a construction worker by assuming the worker is onsite eight hours per day, 250 days per year, for five years. The construction worker is assumed to be an adult weighing 70 kg. The amount of soil ingested is assumed to be 480 mg/day based on "heavy" construction work. All parameters needed to calculate intakes are listed in Table 13 of the Parcel 3 RRE.

6.1.2 Site Employee Scenario

It is assumed that normal activities associated with light industry, small business, and general office work will occur on the Parcel 3 property. These activities could result in worker exposure to contaminants in soil, on dust particles, in air, and in groundwater. This scenario characterizes the potential exposure of a site employee assumed to work on the property eight hours per day, 250 days per year, for 25 years. No exposure to potential interior building contamination is assumed or addressed here. The site employee is assumed to be an adult weighing 70 kg. The site employee is assumed to ingest 50 mg/day of contaminated soil, the amount incidentally ingested while working at the site. All parameters needed to calculate intakes are listed in Table 13 of the Parcel 3 RRE.

6.2 Identification of Exposure Pathways

An exposure pathway describes the course a chemical or radionuclide takes from a source to an exposed individual. An exposure pathway generally consists of a source and mechanism of release, an environmental medium in which the contaminant is contained or transported, a human or environmental receptor, and an exposure route. As an example, a source of contamination could be shallow soil that received a spill, a release mechanism could be resuspension of the soil by wind action, the affected environmental medium would be the atmosphere into which the soil was suspended, and a construction worker would be the receptor. In this example, the exposure route

would be inhalation. Other typical exposure routes include uptake by ingestion and/or dermal contact.

6.3 Residual Risk Evaluation

To estimate the residual risks associated with the use of Parcel 3, toxicity and exposure assessments were summarized and integrated into quantitative expressions of risks and hazards. Both a risk characterization and a hazard characterization were performed. The first is the calculation of carcinogenic risk associated with cancer-causing compounds, including radionuclides. The second is the calculation of a Hazard Index (HI) for noncarcinogens. These calculations are performed for both the hypothetical construction worker and the hypothetical site employee. The results for Parcel 3 are summarized below.

6.3.1 Hazards and Risks for the Construction Worker

The RRE methodology established for Mound is intentionally conservative and tends to over-estimate hazards and risk. For the construction worker-related scenarios, a conservative assumption of daily exposure to Parcel 3 contamination throughout a five-year period was used.

6.3.1.1 Non-Cancer Hazards

Overall hazards across all pathways, soil + air + current groundwater and soil + air + future groundwater, were summed to provide a cumulative HI. Cumulative HIs were developed for incremental, background, and total exposures. See Tables 4, 5, and 6. US EPA guidance sets a limit of 1.0 for the cumulative HI. The current and future cumulative incremental HIs (1.3 and 5.3, respectively) exceed this limit.

The soil + air + current groundwater cumulative incremental HI (1.3) is due to the groundwater pathway (HI = 1.3). Much of the non-carcinogenic hazard for this scenario is attributable to ingestion of groundwater containing antimony. The uncertainties associated with the antimony concentration and the conclusion that it does not represent current conditions were presented in Section 6 of the RRE. Elimination of questionable antimony results would lower the estimated current HI of 1.3 for the construction worker down to an HI of 0.6 which is well below the acceptable threshold.

The larger value for the soil + air + future groundwater cumulative incremental HI (5.3) is due to a predicted increase in hexavalent chromium and antimony concentrations at the BVA. The bedrock water is assumed to eventually mix with BVA groundwater, which is the potable water supply for the Mound Plant. Actual exposure to BVA groundwater is likely to be less than assumed here as the hazards were calculated assuming no dilution and using only the highest concentrations of the more toxic form of chromium (hexavalent) detected in groundwater. The uncertainties associated with this predictive

model are discussed in greater detail in the RRE. It should be noted that the elevated levels of chromium and other metals in the bedrock and BVA groundwater are currently under investigation. No contaminant source areas are known to exist in Parcel 3.

6.3.1.2 Cancer Risks

Risks from carcinogenic, including radiological, contaminants across all pathways were summed to provide a cumulative risk based on incremental (i.e., above background), background, and total exposures. The results from the RRE are also shown in Tables 4, 5, and 6.

Currently, cumulative incremental cancer risk for the Parcel 3 construction worker (8.4×10^{-6}) is within the 10^{-4} to 10^{-6} (1 human in 10,000 to 1 human in 1,000,000 incremental cancer incidence) acceptable risk range established by CERCLA and the National Contingency Plan (NCP). Much of the risk for this scenario (6.1×10^{-6}) is attributable to plutonium-238 observed in the soil.

Future cumulative incremental cancer risk for the Parcel 3 construction worker (3.0×10^{-4}) exceeds the 10^{-4} to 10^{-6} (1 human in 10,000 to 1 human in 1,000,000 incremental cancer incidence) acceptable risk range established by CERCLA and the National Contingency Plan. This increase is due to the potential presence of tritium in the future groundwater. The uncertainties associated with the future groundwater model results are presented in Section 6 of the RRE.

6.3.2 Hazards and Risks for the Site Employee

The RRE methodology established for Mound is intentionally conservative and tends to overestimate hazards and risk. For the site employee-related scenarios, a conservative assumption of daily exposure to Parcel 3 contamination throughout a 25-year period was used.

6.3.2.1 Non-Cancer Hazards

Overall hazards across all pathways for soil + air + current groundwater, and for soil+ air + future groundwater, were summed to provide a cumulative HI. Cumulative HIs were developed for incremental, background, and total exposures. See Tables 4, 5, and 6. Background exposure and hazards are minimal.

For current exposure conditions, the ingestion of antimony from groundwater dominates the cumulative incremental HI (1.1).

As discussed previously, the primary difference between the calculated current and future groundwater cumulative incremental HI (1.1 and 4.9, respectively) is due to the potential presence of hexavalent chromium, antimony, and thallium in modeled future groundwater.

6.3.2.2 Cancer Risks

Current and future incremental cancer risks for the Parcel 3 site employee scenario (2.4×10^{-5} and 5.8×10^{-5}) are within the 10^{-4} to 10^{-6} (1 in 10,000 to 1 in 1,000,000 incremental cancer incidence) acceptable risk range established by CERCLA and the NCP. Risks from carcinogenic contaminants across all pathways were summed to provide a cumulative risk based on incremental exposures (above background), background, and total exposures. See Tables 4, 5, and 6.

For incremental cancer risk, the soil and groundwater pathways make the following contributions to the incremental risk (2.6×10^{-6} from soil, and 2.0×10^{-5} from current groundwater, and 5.4×10^{-5} from future groundwater). Much of the risk for this scenario is attributable to plutonium-238 in the soil; thorium-230 in current groundwater; and tritium in the modeled future groundwater.

6.4 Conclusions

Overall total, background, and incremental carcinogenic and non-carcinogenic risks are presented in Tables 4 through 6. The risk values in the tables are broken out by media (i.e., groundwater, air, and soil) and are the sum of risks for all pathways for the construction worker and site employee scenarios. Overall carcinogenic risk and non-carcinogenic hazard associated with exposure to soil and air fall within the acceptable risk range of 10^{-4} to 10^{-6} and an HI of less than one for both potential receptors. Incremental and total carcinogenic risks are within the acceptable risk range for the current construction worker and current and future site employee. Incremental and total non-carcinogenic hazards for the current and future construction worker, and current and future site employee exceed an HI of one due to potential exposure to groundwater. The incremental excess lifetime cancer risk for the future construction worker scenario (3.0×10^{-4}) exceeds the acceptable risk range (10^{-4} to 10^{-6}). Where overall risk exceeds acceptable levels, these risks are driven by exposure to groundwater. These exceedences result from the conservative nature of the groundwater analysis. The groundwater model does not take into account natural physical and chemical processes such as dilution, dispersion, adsorption, and soil properties that may reduce contaminant levels by the time they reach the BVA. As a result, the future groundwater exposure point concentration is biased high and conservative. Specifically, using the maximum detection value (a single measurement) from a data set that spans approximately seventeen years as the concentration representing a contaminant of potential concern and assuming contaminants are present only in their most toxic form overestimate the risk. Details

are provided in Section 6 of the RRE, Uncertainties. Given the conservative nature of the RRE and the associated uncertainties, the risks presented in Tables 4, 5, and 6 represent the upper-bound plausible limit of risks (worst case scenario). Based on the protective measures presented in the Proposed Plan for Parcel 3 and the conservative nature of the RRE, the future groundwater risks presented will be managed to be protective of human and environmental health.

Because the scope of the RRE was limited to industrial/commercial use, the soils within Parcel 3 have not been evaluated for unrestricted release (e.g. residential use). Disposition of Parcel 3 soils without proper handling, sampling, and management could create an unacceptable risk to human health and the environment.

6.5 Ecological Risk

Based on the results of an ecological characterization of the Mound Plant (*OU-9 Ecological Characterization Report, Technical Memorandum, Rev. 0* (March 1994)), there are no endangered species or critical habitats of endangered species on Parcel 3. Parcel 3 is composed primarily of an asphalt paved parking lot, roads, and two buildings. There are no wetlands or surface waters located in Parcel 3 and no sensitive habitats. Therefore, DOE has determined, with concurrence from US EPA and OEPA that an ecological assessment for Parcel 3 is not necessary (letter US EPA to DOE, (March 9, 2000) and letter OEPA to DOE, (March 30, 2000)).

7. DESCRIPTIONS OF ALTERNATIVES

In light of the planned exit of DOE from the site, and the residual levels of contaminants in the soil and groundwater in Parcel 3, a remedy must be implemented to protect human heath and the environment into the future. Two alternatives were considered for Parcel 3:

Alternative 1, No Action
Regulations governing the Superfund program require that the "no action" alternative be evaluated at every site to establish a baseline for comparison. Under this alternative, DOE would take no action at Parcel 3 to prevent exposure to soil and groundwater contamination.

Alternative 2, Institutional Controls
Institutional controls in the form of deed restrictions on future land use would be placed on Parcel 3. The objective of these institutional controls is to prevent an unacceptable risk to human health and the environment by restricting the use of Parcel 3, including Parcel 3 soils, to that which is consistent with assumptions in the Parcel 3 RRE. DOE or its successors would retain the right and responsibility to monitor, maintain, and enforce these institutional controls. In order to maintain

protection of human health and the environment at Parcel 3 in the future, the institutional controls (in the form of deed restrictions) would be adopted.

The deed restrictions include:

- Maintenance of industrial/commercial land use;
- Prohibition against residential use;
- Prohibition against the use of groundwater;
- Site access for federal and state agencies for the purpose of sampling and monitoring; and
- Prohibition against the removal of Parcel 3 soils from the DOE Mound property (as owned in 1998) boundary without approval from the Ohio Department of Health and the Ohio Environmental Protection Agency.

8. EVALUATION OF ALTERNATIVES

The US EPA has developed threshold, balancing, and modifying criteria to aid in the evaluation of alternatives. There are two (2) threshold criteria, five (5) balancing criteria, and two (2) modifying criteria. An evaluation of the alternatives in terms of these criteria follows.

8.1 THRESHOLD CRITERIA - *must be met for an alternative to be eligible for selection:*

8.1.1 CRITERIA 1: Overall protection of human health and the environment

This criterion addresses whether an alternative provides adequate protection of human health and the environment. The "no action" alternative does not meet this criterion in that the level of risk to human health posed by the site was found to be unacceptable for an industrial/commercial scenario primarily due to potential groundwater exposure. In addition, no evaluation was made of the risks posed by unrestricted use of the property. Deed restrictions are therefore required as a mechanism to ensure the continued future use of Parcel 3 is limited to industrial/commercial purposes and to prohibit groundwater usage.

8.1.2 CRITERIA 2: Compliance with applicable or relevant and appropriate requirements (ARARs)

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4).

Applicable requirements are those substantive environmental protection

requirements, criteria, or limitations promulgated under Federal or State law that specifically address hazardous substances, the remedial action to be implemented at the site, the location of the site, or other circumstances present at the site. Relevant and Appropriate Requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law which, while not applicable to the hazardous materials found at the site, the remedial action itself, the site location, or other circumstances at the site, nevertheless address problems or situations sufficiently similar to those encountered at the site that their use is well-suited to the site.

Compliance with ARARs addresses whether a remedy will meet all the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides the basis for invoking a waiver. ARARs are of several types: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. For Parcel 3, maximum contaminant levels or "MCLs" established under the Safe Drinking Water Act constitute chemical-specific ARARs and are listed in Appendix B. They apply to the groundwater beneath Parcel 3. Currently, contamination above MCLs is not observed in this groundwater. Consequently, ARARs with respect to groundwater are met by Alternatives 1 and 2.

Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are located in specific locations, e.g., floodplains, wetlands, historic places, etc. For Parcel 3, Ohio has identified two statutory provisions that describe site conditions that would prompt certain response actions. (See Appendix B.) These provisions are similar to location-specific ARARs. Alternative 2 meets both of these requirements.

Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy. For Alternative 2, the remedy is an institutional control - deed restrictions. The ARARs are applicable State requirements concerning the recording of deeds. (See Appendix B.) Alternative 2 meets these requirements.

It should be noted that any onsite management of Parcel 3 soils, not associated with a CERCLA removal action, in a manner inconsistent with State law or any disposition of Parcel 3 soils away from the DOE Mound property (as owned in 1998) would be subject to applicable Ohio regulations, which are enforceable independent of CERCLA.

8.2 BALANCING CRITERIA - *used to weigh major trade-offs among alternatives:*

8.2.1 CRITERIA 3: Long-term effectiveness and permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk and the adequacy and reliability of controls. Only Alternative 2, Institutional Controls, provides some degree of long-term protectiveness. The implementation of institutional controls in the form of land use restrictions is necessary to ensure that future use remains compatible with the evaluated residual risk associated with Parcel 3.

This remedy will result in hazardous substances remaining in Parcel 3 above levels that allow for unlimited use and unrestricted exposure. An annual review and report will be submitted to OEPA, Ohio Department of Health (ODH), and US EPA (pursuant to CERCLA) determining whether or not the remedy is in effect and being complied with to ensure that it is adequately protective of human health and the environment. DOE reserves the right to petition the US EPA, OEPA, and ODH for a modification to the frequency established for conducting the effectiveness reviews.

8.2.2 CRITERIA 4: Reduction of toxicity, mobility, or volume through treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of the remedy.

Since neither of the alternatives includes treatment, this criterion does not require further evaluation. All necessary remediation in Parcel 3 was accomplished previously on an individual PRS or building basis.

8.2.3 CRITERIA 5: Short-term effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers and the community during construction and operation of the remedy until clean-up goals are achieved.

Alternative 1, No Action, would not provide short-term effectiveness because there is no assurance of protection of human health and the environment after the property is transferred. Alternative 2, Institutional Controls, provides this assurance.

8.2.4 CRITERIA 6: Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered. Since Alternative 1 involves no action, there is no time or cost required for implementation. Alternative 2, Institutional Controls, is expected to require approximately one month and minimal cost to implement in accordance with the memorandum to file from Randolph Tormey, Deputy Chief Counsel, Ohio Field Office, US DOE dated February 17, 1999.

8.2.5 CRITERIA 7: Cost

The range of costs is zero dollars ($0) for Alternative 1, No Action, to approximately $5,000 annually for the maintenance of the deed restrictions for Alternative 2, Institutional Controls.

8.3 MODIFYING CRITERIA - *to be considered after public comment is received on the Proposed Plan and of equal importance to the balancing criteria*:

8.3.1 CRITERIA 8: State/Support Agency Acceptance

Both US EPA and the State do not believe that Alternative 1, No Action, provides adequate protection of human health and the environment in the future. However, both agencies support Alternative 2, Institutional Controls.

8.3.2 CRITERIA 9: Community Acceptance

To evaluate community acceptance, this Proposed Plan will be the subject of a formal public comment and review period of 30 days.

9. THE PREFERRED ALTERNATIVE

The preferred alternative is Alternative 2, Institutional Controls, in the form of deed restrictions on future land use. DOE or its successors would retain the right and responsibility to monitor, maintain, and enforce these institutional controls. The objective of these restrictions is:

- maintenance of industrial/commercial land use;
- prohibition against residential use;
- prohibition against the use of groundwater;
- site access for federal and state agencies for the purpose of sampling and monitoring; and
- prohibition against removal of Parcel 3 soils from the DOE Mound property (as

owned in 1998) boundary without approval from the Ohio Department of Health and the Ohio Environmental Protection Agency.

The soils within Parcel 3 have not been evaluated for any use other than on-site industrial/commercial use. Any off-site disposition of Parcel 3 soil without proper handling, sampling, and management could create an unacceptable risk to off-site receptors.

The initial costs associated with these deed restrictions are those associated with the writing and recording of the restrictions with the deed. DOE will ensure the deed restrictions are implemented prior or upon property transfer. The costs associated with monitoring and enforcing the land use and property deed restrictions are estimated to be $5,000 per year.

10. OPPORTUNITIES FOR COMMUNITY PARTICIPATION

This Proposed Plan will be available for public review and comment from April 25, 2001 to May 25, 2001. During this time, a public meeting will be held to discuss the Proposed Plan.

All of the supporting documentation for this Proposed Plan is located in the Administrative Record File, which is available for public review at the Mound CERCLA Public Reading Room located at the Miamisburg Senior Adult Center. Any questions or comments related to this Proposed Plan should be forwarded to Ms. Jane Greenwalt, Public Affairs Officer, DOE/MEMP at (937) 865-3116 or via e-mail at jane.greenwalt@em.doe.gov. Should you have questions or comments you wish to present directly to the regulators, the points-of-contact are Mr. Tim Fischer and Mr. Brian Nickel of the US EPA and OEPA, respectively. Mr. Fischer can be reached at (312) 886-5787; Mr. Nickel can be reached at (937) 285-6468.

11. REFERENCES

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Appendix A

Figures

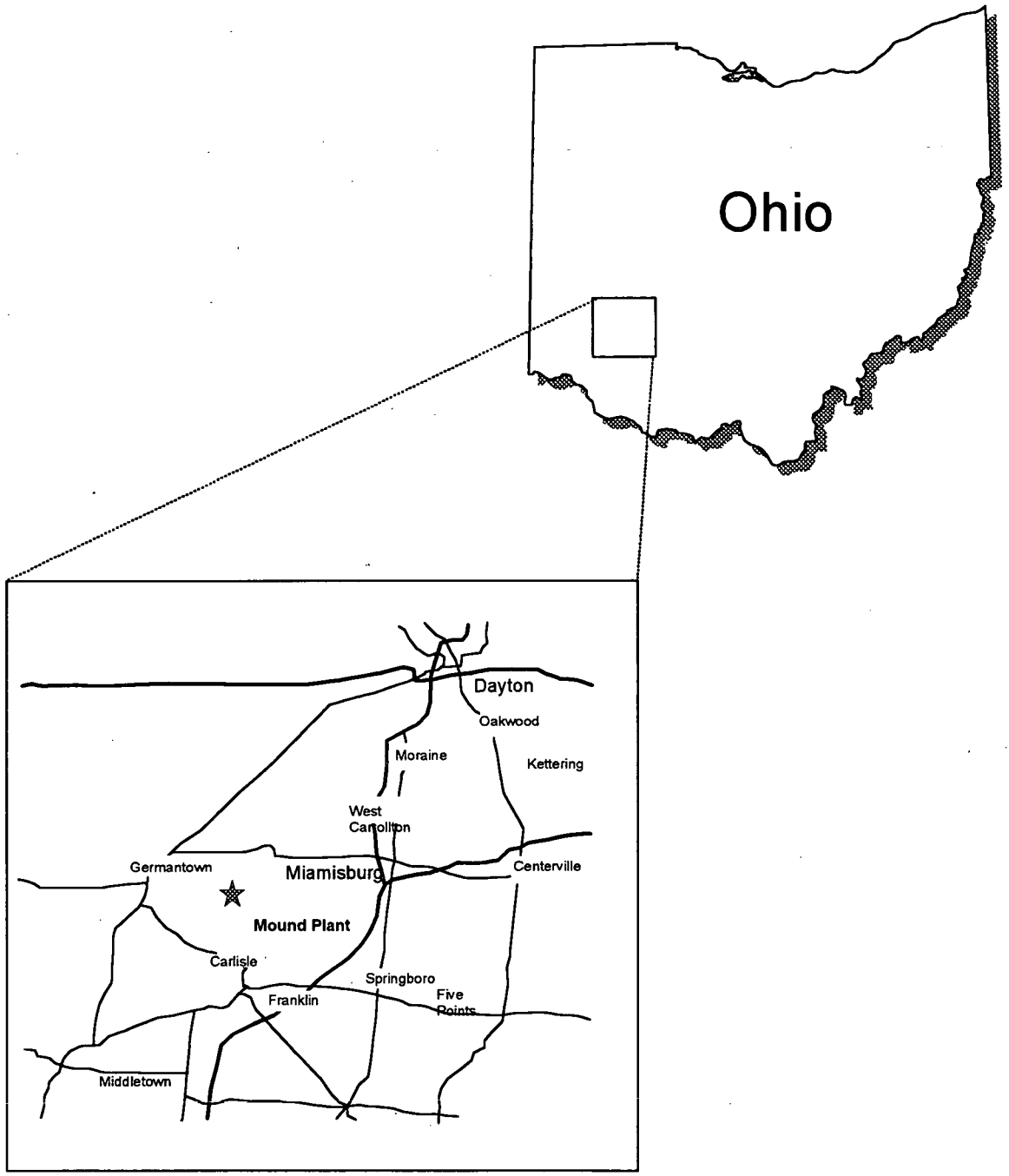

Figure 1: Regional Context of the Mound Plant

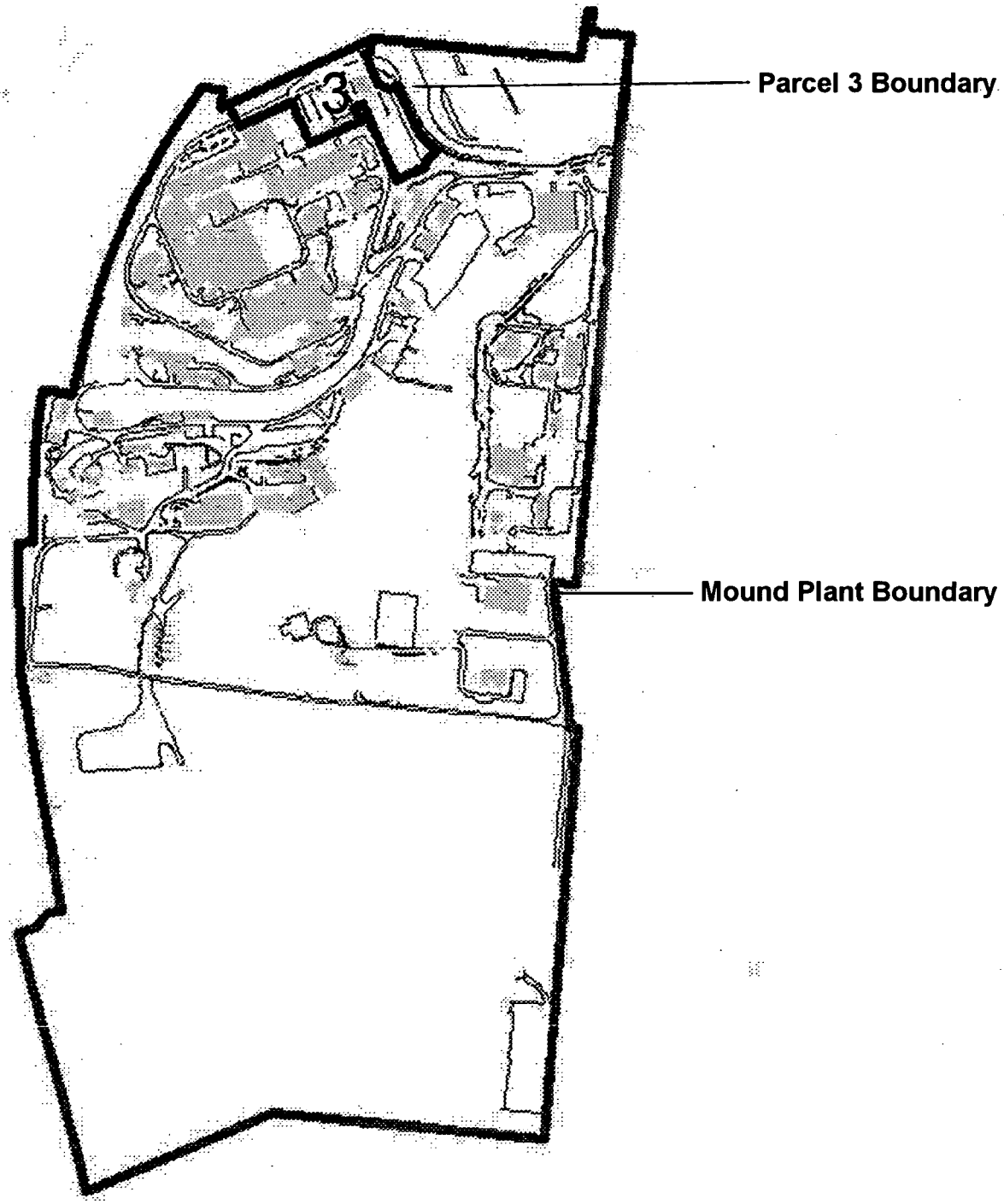

Figure 2: Location of Parcel 3

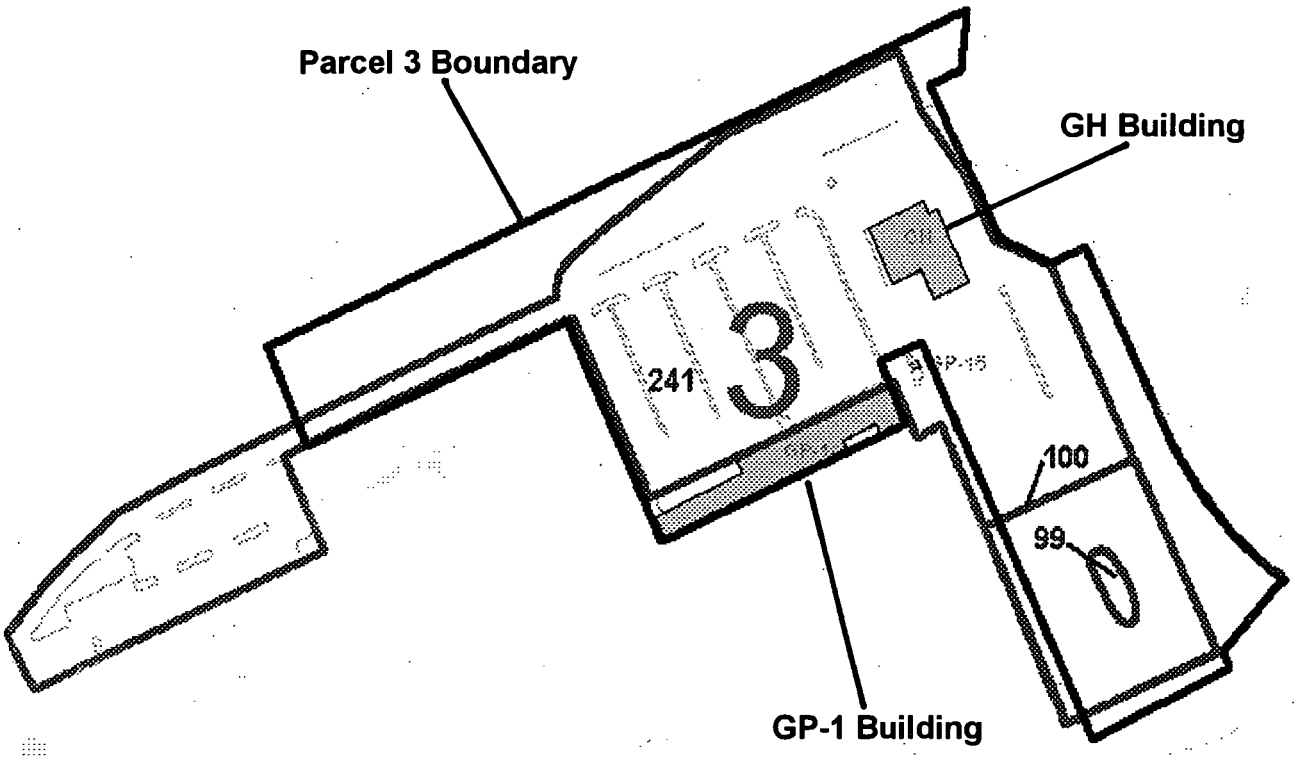

Figure 3: PRSs and Buildings in Parcel 3

Appendix B

Tables

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Table 11 Initial Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario

Table 12 Final Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario

Table 13 Initial Identification of Current Groundwater Constituents of Potential Concern for the Site Employee Scenario

Table 14 Final Identification of Current Groundwater Constituents of Potential Concern for the Site Employee Scenario

Table 15 Initial Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario

Table 16 Final Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario

Table 17 Initial Identification of Future Constituents of Potential Concern for the Site Employee Scenario

Table 18 Final Identification of Future Groundwater Constituents of Potential Concern for the Site Employee Scenario

Table 4: Incremental Residual Risk for Parcel 3 Summary Table**

Scenario and Receptor	Media	Constituents	Pathway	Total Noncancer HI	Total Cancer Risk
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	NA	**6.1E-06**
			Inhalation of Dust	NA	5.5E-09
			Inhalation of VOCs	NA	NA
			External	NA	6.9E-10
		Soil Total Risk		NA	**6.1E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.1E-06**
			Dermal Contact	1.9E-01	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**1.3E+00**	**2.1E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**4.9E+00**	**9.6E-06**
			Dermal Contact	4.6E-01	**2.8E-04**
			Inhalation While Showering	4.8E-04	7.6E-08
		Future Groundwater Total Risk		**5.3E+00**	**2.9E-04**
	Air*	Radiological	Inhalation	NA	2.0E-07
		Air Total Risk		NA	2.0E-07
	Cumulative Incremental Current Risk			**1.3E+00**	**8.4E-06**
	Cumulative Incremental Future Risk			**5.3E+00**	**3.0E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	NA	**2.6E-06**
			Inhalation of Dust	NA	2.2E-08
			Inhalation of VOCs	NA	NA
			External	NA	6.2E-10
		Soil Total Risk		NA	**2.6E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.0E-05**
		Current Groundwater Total Risk		**1.1E+00**	**2.0E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**4.9E+00**	**5.4E-05**
		Future Groundwater Total Risk		**4.9E+00**	**5.4E-05**
	Air*	Radiological	Inhalation	NA	9.9E-07
		Air Total Risk		NA	9.9E-07
	Cumulative Incremental Current Risk			**1.1E+00**	**2.4E-05**
	Cumulative Incremental Future Risk			**4.9E+00**	**5.8E-05**

NA - Not applicable
*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)
Numbers written as 1.0E-03 equal $1x10^{-3}$
bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1
bls - below land surface

** source: Table 35 of Parcel 3 RRE Public Review Draft

Table 5: Background Residual Risk for Parcel 3 Summary Table **

Scenario and Receptor	Media	Constituents	Pathway	Total Noncancer HI	Total Cancer Risk
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	NA	2.3E-08
			Inhalation of Dust	NA	2.1E-11
			Inhalation of VOCs	NA	NA
			External	NA	2.6E-12
		Soil Total Risk		NA	2.3E-08
	Groundwater (Current)	Chemical and Radiological	Ingestion	1.4E-02	NA
			Dermal Contact	2.3E-03	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		1.7E-02	NA
	Groundwater (Future)	Chemical and Radiological	Ingestion	1.1E-01	**2.0E-06**
			Dermal Contact	7.2E-03	**6.5E-06**
			Inhalation While Showering	NA	1.7E-09
		Future Groundwater Total Risk		1.2E-01	**8.5E-06**
	Air*	Radiological	Inhalation	NA	7.7E-09
		Air Total Risk		NA	7.7E-09
	Cumulative Background Current Risk			1.7E-02	3.1E-08
	Cumulative Background Future Risk			1.2E-01	**8.5E-06**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	NA	1.2E-07
			Inhalation of Dust	NA	1.0E-10
			Inhalation of VOCs	NA	NA
			External	NA	2.9E-12
		Soil Total Risk		NA	1.2E-07
	Groundwater (Current)	Chemical and Radiological	Ingestion	1.4E-02	**1.6E-06**
		Current Groundwater Total Risk		1.4E-02	**1.6E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	1.1E-01	**4.5E-06**
		Future Groundwater Total Risk		1.1E-01	**4.5E-06**
	Air*	Radiological	Inhalation	NA	3.9E-08
		Air Total Risk		NA	3.9E-08
	Cumulative Background Current Risk			1.4E-02	**1.8E-06**
	Cumulative Background Future Risk			1.1E-01	**4.7E-06**

NA - Not applicable
*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)
Numbers written as 1.0E-03 equal $1x10^{-3}$
bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1
bls - below land surface

** Source: Table 34 of Parcel 3 RRE Public Review Draft

Table 6: Total Residual Risk for Parcel 3 Summary Table**

Scenario and Receptor	Media	Constituents	Pathway	Total Noncancer HI	Total Cancer Risk
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	NA	**6.2E-06**
			Inhalation of Dust	NA	5.6E-09
			Inhalation of VOCs	NA	NA
			External	NA	6.9E-10
		Soil Total Risk		NA	**6.2E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.1E-06**
			Dermal Contact	1.9E-01	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**1.3E+00**	**2.1E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.0E+00**	**9.8E-06**
			Dermal Contact	4.7E-01	**2.9E-04**
			Inhalation While Showering	4.8E-04	7.7E-08
		Future Groundwater Total Risk		**5.5E+00**	**3.0E-04**
	Air*	Radiological	Inhalation	NA	2.1E-07
		Air Total Risk		NA	2.1E-07
	Cumulative Total Current Risk			**1.3E+00**	**8.5E-06**
	Cumulative Total Future Risk			**5.5E+00**	**3.1E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	NA	**2.6E-06**
			Inhalation of Dust	NA	2.3E-08
			Inhalation of VOCs	NA	NA
			External	NA	7.7E-10
		Soil Total Risk		NA	**2.6E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.2E-05**
		Current Groundwater Total Risk		**1.1E+00**	**2.2E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.0E+00**	**5.9E-05**
		Future Groundwater Total Risk		**5.0E+00**	**5.9E-05**
	Air*	Radiological	Inhalation	NA	**1.0E-06**
		Air Total Risk		NA	**1.0E-06**
	Cumulative Total Current Risk			**1.1E+00**	**2.6E-05**
	Cumulative Total Future Risk			**5.0E+00**	**6.3E-05**

NA - Not applicable
*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)
Numbers written as 1.0E-03 equal $1x10^{-3}$
bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1
bls - below land surface

**Source: Table 33 of Parcel 3 RRE Public Review Draft

Table 7: Initial Identification of Current and Future Soil Constituents of Potential Concern for the Construction Worker Scenario (Maximum Detected Values Compared to Background and Risk-Based Guideline Values) Source: Table 1 of Parcel 3 RRE

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	Concentration Used for Screening	Background Value	Construction Worker Risk-Based GV	Reference Risk-Based GV
Metals										
7440-43-9	Cadmium	0.09	0.75	mg/kg	G4 (16)	132-144	0.75	2.1	21.00	a
7440-47-3	Chromium**	0.98	26.00	mg/kg	X10 (16)	150-297	26.00	20	63.90	a,e
7439-92-1	Lead	3.60	41.70	mg/kg	X1 (8)	144-144	41.70	48		
7440-02-0	Nickel	4.10	64.10	mg/kg	D3 (12)	144-144	64.10	32	430.00	a
Volatile Organic Compounds										
76-13-1	1,1,2 Trichloro-1,2,2-trifluoroethane	1.41	1.41	ug/kg	607 (0)	1-10	1.41		7000000.00	a, e
78-93-3	2-Butanone	3.33	28.13	ug/kg	603 (0)	10-10	28.13		930000.00	b
67-64-1	Acetone	12.59	142.36	ug/kg	603 (0)	9-10	142.36		2100000.00	a
100-41-4	Ethylbenzene	18.01	18.01	ug/kg	602 (0)	1-10	18.01		48.00	b
75-09-2	Methylene Chloride	8.07	20.24	ug/kg	602 (0)	10-10	20.24		100000.00	c
79-34-5	Tetrachloroethene	2.94	2.94	ug/kg	602 (0)	1-10	2.94		210000.00	a
108-88-3	Toluene	1.33	23.44	ug/kg	602 (0)	3-10	23.44		25000.00	b
1330-20-7	Xylenes, Total	76.99	76.99	ug/kg	602 (0)	1-10	76.99		43000000.00	a
Radionuclides										
7440-34-8	Actinium-227+D	0.07	0.54	pCi/g	PRS99/100	40-139	0.54		1.00	d
14596-10-2	Americium-241	0.02	0.15	pCi/g	PRS99/100	8-166	0.15		4.95	d
10045-97-3	Cesium-137+D	0.02	0.50	pCi/g	S011 (0)	54-165	0.50	0.42	0.46	d
7440-48-4	Cobalt-60	0.02	0.06	pCi/g	PRS99/100	9-165	0.06		0.10	d
14255-04-0	Lead-210+D *	0.47	2.99	pCi/g	4459 (0)	70-145	2.99	1.2	1.65	d, e
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	36-177	34.80	0.13	5.50	d
13981-16-3	Plutonium-239/240	0.01	0.31	pCi/g	602 (0)	5-24	0.31	0.18	5.50	d
13966-00-2	Potassium-40	3.70	31.20	pCi/g	601 (0)	24-24	31.20	37	1.57	d, e
13982-63-3	Radium-226+D	0.40	3.53	pCi/g	4444 (0)	142-164	3.53	2	0.14	d
14274-82-9	Thorium-228+D	0.44	0.95	pCi/g	D1 (8)	24-24	0.95	1.5	0.16	d, e
14269-63-7	Thorium-230	0.40	10.10	pCi/g	X5 (8)	145-156	10.10	1.9		f
7440-29-1	Thorium-232+D	0.17	4.47	pCi/g	C0004 (3)	155-175	4.47	1.4	0.10	d, e
13966-29-5	Uranium-234	0.16	0.37	pCi/g	X5 (8)	13-13	0.37	1.1	37.50	d
15117-96-1	Uranium-235	0.02	0.03	pCi/g	PRS99/100 (12)	2-13	0.03	0.11	3.35	d
7440-61-1	Uranium-238+D	0.18	0.34	pCi/g	X5 (8)	13-13	0.34	1.2	0.12	d, e

a= 1/10th HI for ingestion
b= 1/10th HI for ingestion + inhalation
c= 10^{-6} cancer risk for ingestion
d= 10^{-6} cancer risk for ingestion + inhalation + external
e = Risk-Based Guideline Values calculated using the methodology, equations, and parameters presented in Mound Screening GV 3/97, calculations presented in Appendix C
f = Guideline Value is under review
CAS= Chemical Abstract Service
COPC= Constituent of Potential Concern
GV= Mound Risk Based Guideline Value
** the chromium data set includes Cr-III and Cr-VI measurements
* Lead-210 background value is based upon its parent uranium-238 background value.

NO:1 - <5% Detects
NO:2 - <Background
NO:3 - < Risk-Based Guideline Value
NO:2,3 - <Background and Risk-Based Guideline Value

Table 8: Final Identification of Current and Future Soil Constituents of Potential Concern for the Construction Worker Scenario
(Exposure Point Concentration Compared to Background Value)
Source: Table 2 of Parcel 3 RRE

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	95 Percent UCL	Concentration Used for Screening	Background Value	COPC for RRE
Radionuclides										
10045-97-3	Cesium-137+D	0.02	0.50	pCi/g	S011 (0)	54-165	0.07	0.07	0.42	NO
14255-04-0	Lead-210+D*	0.47	2.99	pCi/g	4459 (0)	70-145	0.85	0.85	1.2	NO
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	36-177	67.20	34.80	0.13	YES
13982-63-3	Radium-226+D	0.40	3.53	pCi/g	4444 (0)	142-164	1.48	1.48	2	NO
14269-63-7	Thorium-230	0.40	10.10	pCi/g	X5 (8)	145-156	1.27	1.27	1.9	NO
7440-29-1	Thorium-232+D	0.17	4.47	pCi/g	C0004 (3)	155-175	0.75	0.75	1.4	NO

CAS = Chemical Abstract Service
COPC = Constituent of Potential Concern
NO < Background
RRE = Residual Risk Evaluation
UCL = Upper Confidence Limit
* Lead-210 background value is based upon its parent Uranium-238 background value.

Table 9: Initial Identification of Current and Future Soil Constituents of Potential Concern for the Site Employee Scenario (Maximum Detected Values Compared to Background and Risk-Based Guideline Values) Source: Table 3 of Parcel 3 RRE

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	Concentration Used for Screening	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV
Volatile Organic Compounds										
76-13-1	1,1,2 Trichloro-1,2,2-trifluoroethane	1.41	1.41	ug/kg	607 (0)	1-10	1.41		7000000.00	a, e
78-93-3	2-Butanone	3.33	28.13	ug/kg	603 (0)	10-10	28.13		930000.00	b
67-64-1	Acetone	12.59	142.36	ug/kg	603 (0)	9-10	142.36		20000000.00	a
100-41-4	Ethylbenzene	18.01	18.01	ug/kg	602 (0)	1-10	18.01		48.00	b
75-09-2	Methylene Chloride	8.07	20.24	ug/kg	602 (0)	10-10	20.24		100000.00	c
79-34-5	Tetrachloroethane	2.94	2.94	ug/kg	602 (0)	1-10	2.94		2000000.00	b
108-88-3	Toluene	1.32	23.44	ug/kg	602 (0)	3-10	23.44		25000.00	b
1330-20-7	Xylenes, Total	76.90	76.90	ug/kg	602 (0)	1-10	76.90		410000000.00	a
Radionuclides										
7440-34-8	Actinium-227+D	0.07	0.54	pCi/g	PRS99/100	40-139	0.54		1.10	d
14596-10-2	Americium-241	0.02	0.15	pCi/g	PRS99/100	8-142	0.15		9.20	d
10045-97-3	Cesium-137+D	0.02	0.50	pCi/g	S011 (0)	53-142	0.50	0.42	0.42	d
7440-48-4	Cobalt-60	0.02	0.06	pCi/g	PRS99/100	9-142	0.06		0.09	d
14255-04-0	Lead-210+D*	0.47	2.99	pCi/g	4459 (0)	70-145	2.99	1.2	3.20	d, e
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	28-160	34.80	0.13	11.00	d
PU-239/240	Plutonium-239/240	0.01	0.31	pCi/g	602 (0)	5-10	0.31	0.18	10.00	d
13966-00-2	Potassium-40	16.80	31.20	pCi/g	601 (0)	10-10	31.20	37	1.43	d, e
13982-63-3	Radium-226+D	0.40	3.53	pCi/g	4444 (0)	119-141	3.53	2	0.13	d
14274-82-9	Thorium-228+D	0.60	0.82	pCi/g	601 (0)	10-10	0.82	1.5	0.13	d, e
14269-63-7	Thorium-230	0.40	6.09	pCi/g	4442 (0)	131-142	6.09	1.9		f
7440-29-1	Thorium-232+D	0.17	2.71	pCi/g	PRS99/100	139-158	2.71	1.4	0.09	d, e

a= 1/10th HI for ingestion
b= 1/10th HI for ingestion + inhalation
c= 10^{-6} cancer risk for ingestion
d= 10^{-6} cancer risk for ingestion + inhalation + external
e= Risk-Based Guideline Values calculated using the methodology, equations, and parameters presented in Mound Screening GV 3/97
f = Guideline Value is under review
The calculations for new or revised GVs are presented in Appendix C.
CAS = Chemical Abstract Service
COPC = Constituent of Potential Concern
GV = Guideline Value
* Lead-210 background value is based upon its parent Uranium-238 background value.

NO:1 - <5% Detects
NO:2 - <Background Value
NO:3 - < Risk-Based Guideline Value
NO:2,3 - <Background and Risk-Based Guideline Value

Table 10: Final Identification of Current and Future Soil Constituents of Potential Concern for the Site Employee Scenario
(Exposure Point Concentration Compared to Background Value)
Source: Table 4 of Parcel 3 RRE

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	95 Percent UCL	Concentration Used for Screening (EPC)	Background Value	COPC for RRE
Radionuclides										
10045-97-3	Cesium-137+D	0.02	0.50	pCi/g	S011 (0)	53-142	0.05	0.05	0.42	NO
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	28-160	28.20	28.20	0.13	YES
13982-63-3	Radium-226+D	0.40	3.53	pCi/g	4444 (0)	119-141	1.48	1.48	2	NO
14269-63-7	Thorium-230	0.40	6.09	pCi/g	4442 (0)	131-142	1.27	1.27	1.9	NO
7440-29-1	Thorium-232+D	0.17	2.71	pCi/g	PRS99/100	139-158	0.73	0.73	1.4	NO

CAS - Chemical Abstract Service
COPC - Constituent of Potential Concern
EPC - Exposure Point Concentration
NO <Background Value
UCL - Upper Confidence Limit
RRE - Residual Risk Evaluation

Table 11: Initial Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Maximum Detected Values Compared to Background and Risk-Based Guideline Values) (first of two pages)
Source: Table 5 of Parcel 3 RRE

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Concentration Used for Screening and Risk	Background Value	Construction Worker Risk-Based GV	Reference Risk-Based GV	Initial COPC
Inorganics									
Aluminum	67.91	148.00	ug/L	7-29	148.00	37.523	10200	a, f	NO:3
Antimony	2.8	40.20	ug/L	5-29	40.20	0.578	4.1	a	YES
Barium	75	115.00	ug/L	27-29	115.00	310.209	710	a	NO:2,3
Cadmium	4.6	7.70	ug/L	6-32	7.70		5.1	a	YES
Calcium	94300	126000.00	ug/L	33-33	126000.00	111110.664			NO:4
Chromium (assume all VI)	18.3	24.91	ug/L	6-32	24.91	6.076	30	a,f	NO:3
Copper	1.6	593.00	ug/L	22-32	593.00	1.167	409	a,f	YES
Iron	18.8	1890.00	ug/L	14-31	1890.00	4064.888			NO:2
Lead	3.4	40.00	ug/L	5-32	40.00	10.05			YES
Lithium	2.9	2.90	ug/L	4-10	2.90	55.7			NO:2
Magnesium	29100	39600.00	ug/L	32-32	39600.00	40428.111			NO:2
Manganese	2.8	224.00	ug/L	30-32	224.00	229.568	51	a	NO:2
Molybdenum	1.6	2.70	ug/L	5-10	2.70	5.597			NO:2
Nickel	2.1	27.10	ug/L	5-32	27.10	34.957	200	a	NO:2,3
Potassium	2390	3761.00	ug/L	27-33	3761.00	4461.063			NO:2
Selenium	1.5	1.50	ug/L	1-32	1.50				NO:1
Silver	16.9	24.20	ug/L	6-29	24.20		51	a	NO:3
Sodium	46600	84200.00	ug/L	32-32	84200.00	62425.563			NO:4
Thallium	2.4	2.40	ug/L	1-29	2.40				NO:1
Tin	8.7	8.70	ug/L	1-10	8.70	34.382			NO:2
Vanadium	3.9	14.60	ug/L	12-29	14.60	17.1	71	a	NO:2,3
Zinc	4.5	57.70	ug/L	10-32	57.70	119.6	3100	a	NO:2,3
Volatile Organic Compounds									
1,1,1-trichloroethane	0.30	3.30	ug/L	79-193	3.30	0.668	180.00	a,f	NO:3
1,1,2 trichloro-1,2,2-trifluoroethane	2.00	34.00	ug/L	13-18	34.00		250000.00	a,f	NO:3
1,1-Dichloroethane	2.50	3.50	ug/L	2-191	3.50		950.00	a	NO:1
1,1-Dichloroethene	1.70	1.70	ug/L	1-193	1.70				NO:1
1,2-cis-Dichloroethene	0.47	4.00	ug/L	103-159	4.00	0.999	100.00	b, f	NO:3
1,2-trans-Dichloroethene	0.50	3.00	ug/L	8-195	3.00		200.00	b	NO:1
1,3-cis-Dichloropropene	0.50	1.20	ug/L	2-195	1.20				NO:1
2-Butanone	7.00	41.00	ug/L	3-12	41.00		5300.00	a	NO:3
Acetone	1.00	12.00	ug/L	6-12	12.00		1000.00	a	NO:3
Bromodichloromethane	2.20	3.70	ug/L	2-193	3.70		4.50	d	NO:1
Chloroform	0.50	5.40	ug/L	9-197	5.40	0.516	24.00	d	NO:1
Dichloromethane	3.00	13.00	ug/L	8-195	13.00		38.00	d	NO:1
Ethylbenzene	0.50	0.60	ug/L	2-197	0.60		69.00	a	NO:1
Tetrachloroethene	0.15	2.20	ug/L	109-196	2.20		12.00	a	NO:3
Toluene	0.60	1.50	ug/L	4-197	1.50		150.00	a	NO:1
Trichloroethene	0.47	5.90	ug/L	176-197	5.90		15.00	d	NO:3
Trichlorofluoromethane	2.20	2.50	ug/L	2-188	2.50		2200.00	a	NO:1
Xylenes, Total	0.60	3.60	ug/L	8-190	3.60		20000.00	b	NO:1

Table 11: (continued) Initial Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Maximum Detected Values Compared to Background and Risk-Based Guideline Values)
Source: Table 5 of Parcel 3 RRE

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Concentration Used for Screening and Risk	Background Value	Construction Worker Risk-Based GV	Reference Risk-Based GV	Initial COPC
Radionuclides									
Actinium-227+D	0.50	0.50	pCi/L	1-10	0.50		1.30	c	NO:3
Americium-241	0.03	0.03	pCi/L	1-9	0.03	0.139	2.40	c	NO:2,3
Bismuth-210	0.11	0.39	pCi/L	2-19	0.39		110.00	c, f	NO:3
Plutonium-238	0.01	0.25	pCi/L	8-48	0.25	0.087	2.70	c	NO:3
Plutonium-239/240	0.002	2.00	pCi/L	6-20	2.00	0.125	2.50	c	NO:3
Radium-226+D	0.10	0.52	pCi/L	6-19	0.52	0.996	2.70	c	NO:2,3
Strontium-85	25.00	25.00	pCi/L	1-2	25.00		570.00	c, f	NO:3
Strontium-90	0.50	0.50	pCi/L	3-19	0.50	0.975	14.00	c	NO:2,3
Thorium-227	0.01	0.10	pCi/L	8-14	0.10		19.80	c, f	NO:3
Thorium-228+D	0.01	2.17	pCi/L	14-35	2.17	0.779	3.50	c, f	NO:3
Thorium-230	0.01	1.99	pCi/L	11-32	1.99			g	YES
Thorium-232+D	0.0025	0.10	pCi/L	8-33	0.10	0.314	1.60	c, f	NO:2,3
Tritium	110.00	7200.00	pCi/L	112-128	7200.00	1485.47	11000.00	e	NO:3
Uranium-233/234	0.17	0.36	pCi/L	30-30	0.36		18.00	c	NO:3
Uranium-234	0.20	8.14	pCi/L	14-19	8.14	0.792	18.00	c	NO:3
Uranium-235	0.10	2.30	pCi/L	23-43	2.30	0.814	17.00	c	NO:3
Uranium-238+D	0.13	8.25	pCi/L	41-48	8.25	0.688	0.56	c, f	YES

COPC - Constituent of Potential Concern
GV - Guideline Values
a= 1/10th HI for ingestion + inhalation + dermal
b= 1/10th HI for ingestion
c= 10^{-6} cancer risk for ingestion
d= 10^{-6} cancer risk for ingestion + dermal + inhalation
e= 10^{-6} cancer risk for ingestion + inhalation + external
f= New Risk-Based Guideline Values calculated according to Mound GV 3/97 methodology
g = Guideline Value is under review
The calculations for updated GVs are presented in Appendix C.

NO:1 - <5% Detects
NO:2 - <Background Value
NO:3 - < Risk-Based Guideline Value
NO:2,3 - <Background and Risk-Based Guideline Value
NO:4 - Essential Nutrient

Table 12: Final Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Exposure Point Concentration Compared to Background Value)
Source: Table 6 of Parcel 3 RRE

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	95 Percent UCL	Concentration Used for Screening EPC	Background Value	COPC for RRE
Inorganics								
Antimony	2.8	40.20	ug/L	5-29	80.30	40.20	0.578	YES
Cadmium	4.6	7.70	ug/L	6-32	5.25	5.25		YES
Copper	1.6	593.00	ug/L	22-32	22.70	22.70	1.167	YES
Lead	3.4	40.00	ug/L	5-32	7.28	7.28	10.05	NO
Radionuclides								
Thorium-230	0.01	1.99	pCi/L	11-32	1.25	1.25		YES
Uranium-238+D	0.13	8.25	pCi/L	41-48	0.47	0.47	0.688	NO

COPC= Constituent of Potential Concern
EPC= Exposure Point Concentration, minimum of 95% UCL or maximum detected concentration
NO <Background Value
RRE= Residual Risk Evaluation
UCL= Upper Confidence Limit

Table 13: Initial Identification of Current Groundwater Constituents of Potential Concern for the Site Employee Scenario
(Maximum Detected Values Compared to Background and Risk-Based Guideline Values) (first of two pages)
Source: Table 7 of Parcel 3 RRE

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Concentration Used for Screening and Risk	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV	Initial COPC
Inorganics									
Aluminum	67.91	148.00	ug/L	7-29	148.00	37.523	10000.00	a,d	NO:3
Antimony	2.8	40.20	ug/L	5-29	40.20	0.578	4.10	a	YES
Barium	75	115.00	ug/L	27-29	115.00	310.209	720.00	a	NO:2,3
Cadmium	4.6	7.70	ug/L	6-32	7.70		5.10	a	YES
Calcium	94300	126000.00	ug/L	33-33	126000.00	111110.664			NO:4
Chromium (assume all is VI)	18.3	24.91	ug/L	6-32	24.91	6.076	31.00	b,d	NO:3
Copper	1.6	593.00	ug/L	22-32	593.00	1.167	410.00	a, d	YES
Iron	18.8	1890.00	ug/L	14-31	1890.00	4064.888			NO:2
Lead	3.4	40.00	ug/L	5-32	40.00	10.05			YES
Lithium	2.9	2.90	ug/L	4-10	2.90	55.7			NO:2
Magnesium	29100	39600.00	ug/L	32-32	39600.00	40428.111			NO:2
Manganese	2.8	224.00	ug/L	30-32	224.00	229.568	51.00	a	NO:2
Molybdenum	1.6	2.70	ug/L	5-10	2.70	5.597			NO:2
Nickel	2.1	27.10	ug/L	5-32	27.10	34.957	200.00	a	NO:2,3
Potassium	2390	3761.00	ug/L	27-33	3761.00	4461.063			NO:2
Selenium	1.5	1.50	ug/L	1-32	1.50				NO:1
Silver	16.9	24.20	ug/L	6-29	24.20		51.00	a	NO:3
Sodium	46600	84200.00	ug/L	32-32	84200.00	62425.563			NO:4
Thallium	2.4	2.40	ug/L	1-29	2.40				NO:1
Tin	8.7	8.70	ug/L	1-10	8.70	34.382			NO:2
Vanadium	3.9	14.60	ug/L	12-29	14.60	17.1	72.00	a	NO:2,3
Zinc	4.5	57.70	ug/L	10-32	57.70	119.6	3100.00	a	NO:2,3
Volatile Organic Compounds									
1,1,1-Trichloroethane	0.30	3.30	ug/L	79-193	3.30	0.668	360.00	a, d	NO:3
1,1,2 Trichloro-1,2,2-trifluoroethane	2.00	34.00	ug/L	13-18	34.00		310000.00	a, d	NO:3
1,1-Dichloroethane	2.50	3.50	ug/L	2-191	3.50		1000.00	a	NO:1
1,1-Dichloroethene	1.70	1.70	ug/L	1-193	1.70				NO:1
cis-1,2-Dichloroethene	0.47	4.00	ug/L	103-159	4.00	0.999	100.00	a, d	NO:3
trans-1,2-Dichloroethene	0.50	3.00	ug/L	8-195	3.00		200.00	a	NO:1
cis-1,3-Dichloropropene	0.50	1.20	ug/L	2-195	1.20				NO:1
2-Butanone	7.00	41.00	ug/L	3-12	41.00		6100.00	a	NO:3
Acetone	1.00	12.00	ug/L	6-12	12.00		1000.00	a	NO:3
Bromodichloromethane	2.20	3.70	ug/L	2-193	3.70		4.60	c	NO:1
Chloroform (trichloromethane)	0.50	5.40	ug/L	9-197	5.40	0.516	47.00	c	NO:1
Dichloromethane	3.00	13.00	ug/L	8-195	13.00		38.00	c	NO:1
Ethylbenzene	0.50	0.60	ug/L	2-197	0.60		1000.00	a	NO:1
Tetrachloroethene	0.15	2.20	ug/L	109-196	2.20		100.00	a	NO:3
Toluene	0.60	1.50	ug/L	4-197	1.50		2000.00	a	NO:1
Trichloroethene	0.47	5.90	ug/L	176-197	5.90		26.00	f	NO:3
Trichlorofluoromethane	2.20	2.50	ug/L	2-188	2.50		3100.00	a	NO:1
Xylenes, Total	0.60	3.60	ug/L	8-190	3.60		20000.00	a	NO:1

Table 13: (continued) Initial Identification of Current Groundwater Constituents of Potential Concern for the Site Employee Scenario
(Maximum Detected Values Compared to Background and Risk-Based Guideline Values)
Source: Table 7 of Parcel 3 RRE

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Concentration Used for Screening and Risk	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV	Initial COPC
Radionuclides									
Actinium-227+D	0.50	0.50	pCi/L	1-10	0.50		0.26	c	YES
Americium-241	0.03	0.03	pCi/L	1-9	0.03	0.139	0.49	c	NO:2,3
Bismuth-210	0.11	0.39	pCi/L	2-19	0.39		22.00	c,d	NO:3
Plutonium-238	0.01	0.25	pCi/L	8-48	0.25	0.087	0.54	c	NO:3
Plutonium-239/240	0.002	2.00	pCi/L	6-20	2.00	0.125	0.51	c	YES
Radium-226+D	0.10	0.52	pCi/L	6-19	0.52	0.996	0.54	c	NO:2,3
Strontium-85	25.00	25.00	pCi/L	1-2	25.00		110.00	c,d	NO:3
Strontium-90	0.50	0.50	pCi/L	3-19	0.50	0.975	2.90	c	NO:2,3
Thorium-227	0.01	0.10	pCi/L	8-14	0.10		4.00	c,d	NO:3
Thorium-228+D	0.01	2.17	pCi/L	14-35	2.17	0.779	0.69	c,d	YES
Thorium-230	0.01	1.99	pCi/L	11-32	1.99			e	YES
Thorium-232+D	0.0025	0.10	pCi/L	8-33	0.10	0.314	0.31	c,d	NO:2,3
Tritium	110.00	7200.00	pCi/L	112-128	7200.00	1485.47	2200.00	c	YES
Uranium-233/234	0.17	0.36	pCi/L	30-30	0.36		3.60	c	NO:3
Uranium-234	0.20	8.14	pCi/L	14-19	8.14	0.792	3.60	c	YES
Uranium-235	0.10	2.30	pCi/L	23-43	2.30	0.814	3.40	c	NO:3
Uranium-238+D	0.13	8.25	pCi/L	41-48	8.25	0.688	0.11	c,d	YES

COPC - Constituent of Potential Concern
GV - Guideline Value
a= 1/10th HI for ingestion
b= 1/10th HI for ingestion of Cr VI
c= 10^{-6} cancer risk for ingestion
d= New Risk-Based Guideline Values calculated according to Mound GV 3/97 methodology
The calculations for new or revised GVs are presented in Appendix C.
e= Guideline Value is under review
f = 10^{-6} cancer risk for ingestion + inhalation

NO:1 - <5% Detects
NO:2 - <Background Value
NO:3 - < Risk-Based Guideline Value
NO:2,3 - <Background and Risk-Based Guideline Value
NO:4 - Essential Nutrient

Table 14: Final Identification of Current Groundwater Constituents of Potential Concern for the Site Employee Scenario
(Exposure Point Concentration Compared to Background Values)
Source: Table 8 of Parcel 3 RRE

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	95 Percent UCL	Concentration Used for Screening and EPC	Background Value	COPC for RRE
Inorganics								
Antimony	2.8	40.20	ug/L	5-29	80.30	40.20	0.578	YES
Cadmium	4.6	7.70	ug/L	6-32	5.25	5.25		YES
Copper	1.6	593.00	ug/L	22-32	22.70	22.70	1.167	YES
Lead	3.4	40.00	ug/L	5-32	7.28	7.28	10.05	NO
Radionuclides								
Actinium-227+D	0.50	0.50	pCi/L	1-10	NC	0.50		YES
Plutonium-239/240	0.00	2.00	pCi/L	6-20	8.87	2.00	0.125	YES
Thorium-228+D	0.01	2.17	pCi/L	14-35	105.00	2.17	0.779	YES
Thorium-230	0.01	1.99	pCi/L	11-32	1.25	1.25		YES
Tritium	110.00	7200.00	pCi/L	112-128	861.00	861.00	1485.47	NO
Uranium-234	0.20	8.14	pCi/L	14-19	NC	8.14	0.792	YES
Uranium-238+D	0.13	8.25	pCi/L	41-48	0.47	0.47	0.688	NO

COPC= Constituent of Potential Concern
EPC= minimum of 95% UCL or maximum detected concentration
NC= Not calculated, fewer than 20 samples in the data set
NO <Background Value
RRE= Residual Risk Evaluation
UCL= Upper Confidence Limit

Table 15: Initial Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Maximum Detected Concentrations Compared to Background and Risk-Based Guideline Values) (first of three pages)
Source: Table 9 of Parcel 3 RRE

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Construction Worker Risk-Based GV	Reference	COPC?
Inorganics										
Aluminum	20.1	31500.00	ug/L	107/ 115	6840.00	31500.00	37.523	10000.00	a, e	YES
Ammonia**	110	37500.00	ug/L	34/ 61	403.00	37500.00	162			NO:5
Antimony	0.35	41.60	ug/L	21/ 122	2.82	41.60	0.578	4.10	a	YES
Arsenic**	0.3	933.00	ug/L	26/ 114	11.80	933.00	32.997	3.10	a	YES
Barium	17.5	329.00	ug/L	112/ 114	130.00	329.00	310.209	710.00	a	NO:3
Beryllium**	0.03	2.30	ug/L	41/ 115	0.47	2.30		0.07	c	YES
Bismuth**	0.9	264.00	ug/L	23/ 103	23.20	264.00				YES
Boron**	110	110.00	ug/L	1/ 2	NC	110.00		900.00	a, e	NO:3
Cadmium	0.14	13.10	ug/L	11/ 124	0.75	13.10		5.10	a	YES
Calcium	116	1510000.00	ug/L	164/ 164	199000.00	1510000.00	111110.664			NO:4
Chloride**	8100	17700000.00	ug/L	74/ 74	908000.00	17700000.00	105821			NO:5
Chromium*	0.27	44800.00	ug/L	78/ 120	5010.00	44800.00	6.076	30.00	a, e	YES
Cobalt**	0.31	295.00	ug/L	46/ 115	18.50	295.00	1.032	600.00	a, e	NO:3
Copper	0.38	514.00	ug/L	81/ 117	26.80	514.00	1.167	400.00	a, e	YES
Cyanide**	5.5	14.20	ug/L	3/ 45	4790.00	14.20		200.00	a	NO:3
Dissolved Solids	499000	32500000.00	ug/L	47/ 47	2480000.00	32500000.00				NO:4
Fluoride**	150	2400.00	ug/L	57/ 58	678.00	2400.00	419			NO:5
Iron	0.154	192000.00	ug/L	151/ 165	45400.00	192000.00	4064.888			NO:5
Lead**	0.4	32.00	ug/L	55/ 125	4.90	32.00	10.05			YES
Lithium	8.8	4280.00	ug/L	87/ 102	123.00	4280.00	55.7			YES
Magnesium	26.9	719000.00	ug/L	165/ 165	77500.00	719000.00	40428.111			NO:4
Manganese	0.037	3030.00	ug/L	155/ 165	737.00	3030.00	229.568	51.00	a	YES
Mercury**	0.1	1.40	ug/L	3/ 115	0.06	1.40		3.10	a	NO:1
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	474.00	5.597	50.00	a, e	YES
Nickel	1.2	11600.00	ug/L	82/ 120	749.00	11600.00	34.957	200.00	a	YES
Phosphate**	60	10100.00	ug/L	31/ 41	792.00	10100.00	231			NO:5
Potassium	2.12	214000.00	ug/L	150/ 164	15200.00	214000.00	4461.063			NO:4
Selenium	1.3	7.00	ug/L	10/ 112	1.78	7.00		50.00	a, e	NO:3
Silicon**	2230	12300.00	ug/L	6/ 6	NC	12300.00				NO:4
Silver	0.72	29.40	ug/L	7/ 115	1.24	29.40		51.00	a	NO:3
Sodium	68.2	7270000.00	ug/L	162/ 162	346000.00	7270000.00	62425.563			NO:4
Sulfate	5000	456000.00	ug/L	73/ 76	205000.00	456000.00				NO:4
Thallium	3.1	6.90	ug/L	6/ 107	4.44	6.90		0.80	a, e	YES
Tin	1.4	357.20	ug/L	27/ 100	14.90	357.20	34.382	6000.00	a, e	NO:3
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	277.00	17.1	71.00	a	YES
Zinc	1.4	399.00	ug/L	78/ 117	47.10	399.00	119.6	3100.00	a	NO:3

Table 15: (continued) Initial Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Maximum Detected Concentrations Compared to Background and Risk-Based Guideline Values)
Source: Table 9 of Parcel 3 RRE

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Construction Worker Risk-Based GV	Reference	COPC?
Organic Compounds										
1,1,1-Trichloroethane	0.40	7.00	ug/L	20/ 238	0.67	7.00	0.668	180.00	a, e	NO:3
1,1,2 Trichloro-1,2,2-trifluoroethane	2.20	2.20	ug/L	1/ 118	1.08	2.20		250000.00	a, e	NO:1
1,1-Dichloroethane^^	2.00	2.00	ug/L	1/ 238	0.75	2.00		950.00	a	YES
cis-1,2-Dichloroethene	0.06	17.00	ug/L	48/148	1.61	17.00	0.999	100.00	a, e	NO:3
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	35.00				YES
trans-1,2-Dichloroethene	0.43	10.00	ug/L	13/217	0.76	10.00		200.00	b	NO:3
1,3-Dichlorobenzene**	1.50	1.50	ug/L	1/ 147	3.92	1.50				NO:1
2-Butanone	3.00	65.00	ug/L	14/ 106	6.48	65.00		5300.00	a	NO:3
4-Methylphenol	12.00	61.00	ug/L	2/ 71	6.05	61.00		48.00	a	NO:1
Acetone	1.00	17.00	ug/L	25/ 81	9.19	17.00		1000.00	a	NO:3
Alpha Chlordane**	0.01	0.069	ug/L	3/ 62	0.11	0.07				NO:1
Benzene**	2.50	2.50	ug/L	1/ 241	1.26	2.50		7.50	c	NO:1
Benzoic Acid**	1.00	890.00	ug/L	2/ 68	35.70	890.00		40000.00	a	NO:1
Bis(2-ethylhexyl)phthalate**	0.50	950.00	ug/L	16/ 72	17.20	950.00	8.41	12.00	c	NO:6
Carbon Tetrachloride**	1.50	1.50	ug/L	1/ 238	0.94	1.50		2.00	c	NO:1
Chloroform	0.50	0.70	ug/L	2/ 239	0.65	0.70	0.516	24.00	c	NO:1
Chloromethane**	3.40	3.40	ug/L	1/ 85	4.12	3.40				NO:1
Dibromomethane**	2.80	2.80	ug/L	1/ 182	1.01	2.80				NO:1
Dichloromethane	1.00	610.00	ug/L	41/ 239	3.28	610.00		38.00	c	YES
Di-n-butyl Phthalate**	0.50	3.00	ug/L	5/ 71	5.80	3.00		410.00	a	NO:6
Tetrachloroethene**	0.30	25.00	ug/L	55/ 247	3.37	25.00		12.00	a	YES
Toluene	0.50	8.00	ug/L	13/ 243	1.27	8.00		150.00	a	NO:3
Trichloroethene	0.44	46.00	ug/L	152/ 273	5.12	46.00		15.00	c	YES

Table 15: (continued) Initial Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Maximum Detected Concentrations Compared to Background and Risk-Based Guideline Values)
Source: Table 9 of Parcel 3 RRE

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Construction Worker Risk-Based GV	Reference	COPC?
Radionuclides										
Americium-241	0.6750	0.17	pCi/L	6/ 43	2.87	0.17	0.139	2.40	d	NO:3
Bismuth-210	0.12	0.26	pCi/L	2/ 55	7.99	0.26		110.00	d,e	NO:1
Gross Alpha**	1.03	1930.00	pCi/L	8/ 12	NC	1930.00				NO:4
Plutonium-238	0.012	1.870	pCi/L	8/ 60	0.15	1.87	0.087	2.70	d	NO:3
Plutonium-239/240	0.003	0.18	pCi/L	12/ 51	0.42	0.18	0.125	2.50	d	NO:3
Potassium-40**	129.000	258.00	pCi/L	3/ 61	133.00	258.00				NO:1
Radium-226+D	0.1260	39.47	pCi/L	43/ 59	2.34	39.47	0.996	2.70	d	YES
Radium-228**	1.50	1.50	pCi/L	1/ 1	NC	1.50		1.70	d,e	NO:3
Strontium-90	0.74	42.40	pCi/L	7/ 57	2.22	42.40	0.975	14.00	d	YES
Thorium-228 + D	0.02	8.50	pCi/L	39/ 54	90.70	8.50	0.779	3.50	d	YES
Thorium-230	0.0044	4.07	pCi/L	43/ 56	0.57	4.07				YES
Thorium-232 + D	0.0005	2.11	pCi/L	31/ 63	0.78	2.11	0.314	1.60	d,e	YES
Tritium	2.95	2816310.00	pCi/L	4440/4455	206000.00	2816310.00	1485.47	11000.00	c	YES
Uranium-233/234	0.154	0.928	pCi/L	4/ 4	NC	0.93		18.00	d	NO:3
Uranium-234	0.03	59.10	pCi/L	60/ 69	2.12	59.10	0.792	18.00	d	YES
Uranium-235	0.01	0.36	pCi/L	18/ 45	5.71	0.36	0.814	17.00	d	NO:2,3
Uranium-235/236**	0.04	0.05	pCi/L	2/ 26	0.10	0.05		17.00	d	NO:3
Uranium-238 + D	0.03	1.34	pCi/L	57/ 75	0.51	1.34	0.688	0.60	d,e	YES

a= 1/10th HI for ingestion + inhalation + dermal
b= 1/10th HI for ingestion
c= 10^{-6} cancer risk for ingestion+ inhalation+dermal
d=10^{-6} cancer risk for ingestion
e= Risk-Based Guideline Values calculated using the methodology, equations, and parameters presented in Mound Screening GV 3/97, see Appendix C
COPC= Constituent of Potential Concern
NC= 95% UCL not calculated, less than 20 samples in the data set.
* = Chromium conservatively assumed to be present in the hexavalent state.
** = Constituent detected in bedrock well, but not in production well
^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production wells analyses

NO:1 - <5% Detects
NO:2 - <Background Value
NO:3 - < Risk-Based Guideline Value
NO:2,3 - <Background and Risk-Based Guideline Value
NO:4 - Essential Nutrient or General Quality Parameter
NO:5 - Water Quality Parameter
NO:6 - Common laboratory contaminant (EPA, 1998)
GV= Guideline Value

Table 16: Final Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Bedrock 95% UCL or Maximum Detected Concentration Compared to Background Values)
Source: Table 10 of Parcel 3 RRE

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	COPC?
Inorganics								
Aluminum	20.1	31500.00	ug/L	107/ 115	6840.00	6840.00	37.523	YES
Antimony	0.35	41.60	ug/L	21/ 122	2.82	2.82	0.578	YES
Arsenic**	0.3	933.00	ug/L	26/ 114	11.80	11.80	32.997	NO
Beryllium**	0.03	2.30	ug/L	41/ 115	0.47	0.47		YES
Bismuth**	0.9	264.00	ug/L	23/ 103	23.20	23.20		YES
Cadmium	0.14	13.10	ug/L	11/ 124	0.75	0.75		YES
Chromium*	0.27	44800.00	ug/L	78/ 120	5010.00	5010.00	6.076	YES
Copper	0.38	514.00	ug/L	81/ 117	26.80	26.80	1.167	YES
Lead**	0.4	32.00	ug/L	55/ 125	4.90	4.90	10.05	NO
Lithium	8.8	4280.00	ug/L	87/ 102	123.00	123.00	55.7	YES
Manganese	0.037	3030.00	ug/L	155/ 165	737.00	737.00	229.568	NO:1
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	32.50	5.597	YES
Nickel	1.2	11600.00	ug/L	82/ 120	749.00	749.00	34.957	YES
Thallium	3.1	6.90	ug/L	6/ 107	4.44	4.44		YES
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	33.00	17.1	YES
Organic Compounds								
1,1-Dichloroethane^^	2.00	2.00	ug/L	1/ 238	0.75	0.75		NO:1
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	6.61		YES
Dichloromethane	1.00	610.00	ug/L	41/ 239	3.28	3.28		YES
Tetrachloroethene**	0.30	25.00	ug/L	55/ 247	3.37	3.37		YES
Trichloroethene	0.44	46.00	ug/L	152/ 273	5.12	5.12		YES
Radionuclides								
Radium-226+D	0.1260	39.47	pCi/L	43/ 59	2.34	2.34	0.996	YES
Strontium-90	0.74	42.40	pCi/L	7/ 57	2.22	2.22	0.975	YES
Thorium-228 + D	0.02	8.50	pCi/L	39/ 54	90.70	8.50	0.779	YES
Thorium-230	0.0044	4.07	pCi/L	43/ 56	0.57	0.57		YES
Thorium-232 + D	0.0005	2.11	pCi/L	31/ 63	0.78	0.78	0.314	NO:1
Tritium	2.95	2816310.00	pCi/L	4440/4455	206000.00	206000.00	1485.47	YES
Uranium-234	0.03	59.10	pCi/L	60/ 69	2.12	2.12	0.792	YES
Uranium-238 + D	0.03	1.34	pCi/L	57/ 75	0.51	0.51	0.688	NO

NO:1 = Flow tube modeled manganese (179.2 ug/L) and thorium-232 (0.1747pCi/L) concentrations were below backgroud values and are screened out of the RRE.
COPC= Constituent of Potential Concern
UCL= Upper Confidence Limit
* = Chromium conservatively assumed to be present in the hexavalent state.
** = Constituent detected in bedrock well, but not in production well
^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production wells analyses

Table 17: Initial Identification of Future Constituents of Potential Concern for the Site Employee Scenario
(Maximum Detected Concentration Compared to Background and Risk-Based Guideline Values) (first of three pages)
Source: Table 11 of Parcel 3 RRE

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Site Employee Risk-Based GV	Reference Risk Based GV	COPC?
Inorganics										
Aluminum	20.1	31500.00	ug/L	107/ 115	6840.00	31500.00	37.523	10000.00	a,d	YES
Ammonia**	110	37500.00	ug/L	34/ 61	4030.00	37500.00	162			NO:5
Antimony	0.35	41.60	ug/L	21/ 122	2.82	41.60	0.578	4.10	a	YES
Arsenic**	0.3	933.00	ug/L	26/ 114	11.80	933.00	32.997	3.10	a	YES
Barium	17.5	329.00	ug/L	112/ 114	130.00	329.00	310.209	720.00	a	NO:3
Beryllium**	0.03	2.30	ug/L	41/ 115	0.47	2.30		0.07	c	YES
Bismuth**	0.9	264.00	ug/L	23/ 103	23.20	264.00				YES
Boron**	110	110.00	ug/L	1/ 2	NC	110.00		920.00	a,d	NO:3
Cadmium	0.14	13.10	ug/L	11/ 124	0.75	13.10		5.10	a	YES
Calcium	116	1510000.00	ug/L	164/ 164	199000.00	1510000.00	111110.664			NO:4
Chloride**	8100	17700000.00	ug/L	74/ 74	908000.00	17700000.00	105821			NO:5
Chromium*	0.27	44800.00	ug/L	78/ 120	5010.00	44800.00	6.076	31.00	a,d	YES
Cobalt**	0.31	295.00	ug/L	46/ 115	18.50	295.00	1.032	610.00	a,d	NO:3
Copper	0.38	514.00	ug/L	81/ 117	26.80	514.00	1.167	410.00	a,d	YES
Cyanide**	5.5	14.20	ug/L	3/ 45	4.79	14.20		200.00	a	NO:3
Dissolved Solids	499000	32500000.00	ug/L	47/ 47	2480000.00	32500000.00				NO:5
Fluoride**	150	2400.00	ug/L	57/ 58	678.00	2400.00	419			NO:5
Iron	0.154	192000.00	ug/L	151/ 165	45400.00	192000.00	4064.888			NO:4
Lead**	0.4	32.00	ug/L	55/ 125	4.90	32.00	10.05			YES
Lithium	8.8	4280.00	ug/L	87/ 102	123.00	4280.00	55.7			YES
Magnesium	26.9	719000.00	ug/L	165/ 165	77500.00	719000.00	40428.111			NO:4
Manganese	0.037	3030.00	ug/L	155/ 165	737.00	3030.00	229.568	51.00	a	YES
Mercury**	0.1	1.40	ug/L	3/ 115	0.06	1.40	na	3.10	a	NO:1
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	474.00	5.597	51.00	a,d	YES
Nickel	1.2	11600.00	ug/L	82/ 120	749.00	11600.00	34.957	200.00	a	YES
Phosphate**	60	10100.00	ug/L	31/ 41	792.00	10100.00	231			NO:5
Potassium	2.12	214000.00	ug/L	150/ 164	15200.00	214000.00	4461.063			NO:4
Selenium	1.3	7.00	ug/L	10/ 112	1.78	7.00		51.00	a,d	NO:3
Silicon**	2230	12300.00	ug/L	6/ 6	NC	12300.00				NO:4
Silver	0.72	29.40	ug/L	7/ 115	1.24	29.40		51.00	a	NO:3
Sodium	68.2	7270000.00	ug/L	162/ 162	346000.00	7270000.00	62425.563			NO:4
Sulfate	5000	456000.00	ug/L	73/ 76	205000.00	456000.00		0.82	a	NO:5
Thallium	3.1	6.90	ug/L	6/ 107	4.44	6.90				YES
Tin	1.4	357.20	ug/L	27/ 100	14.90	357.20	34.382	6100.00	a,d	NO:3
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	277.00	17.1	72.00	a	YES
Zinc	1.4	399.00	ug/L	78/ 117	47.10	399.00	119.6	3100.00	a	NO:3

Table 17: (continued) Initial Identification of Future Constituents of Potential Concern for the Site Employee Scenario
(Maximum Detected Concentration Compared to Background and Risk-Based Guideline Values)
Source: Table 11 of Parcel 3 RRE

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV	COPC?
Organic Compounds										
1,1,1-Trichloroethane	0.40	7.00	ug/L	20/ 238	0.67	7.00	0.668	360.00	a,d	NO:3
1,1,2 Trichloro-1,2,2-trifluoroethane	2.20	2.20	ug/L	1/ 118	1.08	2.20		310000.00	a,d	NO:1
1,1-Dichloroethane^^	2.00	2.00	ug/L	1/ 238	0.75	2.00		1000.00	a	NO:1
cis-1,2-Dichloroethene	0.06	17.00	ug/L	48/148	1.61	17.00	0.999	100.00	a,d	NO:3
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	35.00				YES
trans-1,2-Dichloroethene	0.43	10.00	ug/L	13/217	0.76	10.00		200.00	a	NO:3
1,3-Dichlorobenzene**	1.50	1.50	ug/L	1/ 147	3.92	1.50				NO:1
2-Butanone	3.00	65.00	ug/L	14/ 106	6.48	65.00		6100.00	a	NO:3
4-Methylphenol	12.00	61.00	ug/L	2/ 71	6.05	61.00		51	a	NO:1
Acetone	1.00	17.00	ug/L	25/ 81	9.19	17.00		1000.00	a	NO:3
Alpha Chlordane**	0.01	0.069	ug/L	3/ 62	0.11	0.07				NO:1
Benzene**	2.50	2.50	ug/L	1/ 241	1.26	2.50		9.90	c	NO:1
Benzoic Acid**	1.00	890.00	ug/L	2/ 68	35.70	890.00		8.20E+08	a	NO:1
Bis(2-ethylhexyl)phthalate**	0.50	950.00	ug/L	16/ 72	17.20	950.00	8.41	20.00	c	NO:6
Carbon Tetrachloride**	1.50	1.50	ug/L	1/ 238	0.94	1.50		2.20	c	NO:1
Chloroform	0.50	0.70	ug/L	2/ 239	0.65	0.70	0.516	47.00	c	NO:1
Chloromethane**	3.40	3.40	ug/L	1/ 85	4.12	3.40				NO:1
Dibromomethane**	2.80	2.80	ug/L	1/ 182	1.01	2.80				NO:1
Dichloromethane	1.00	610.00	ug/L	41/ 239	3.28	610.00		38.00	c	YES
Di-n-butyl Phthalate**	0.50	3.00	ug/L	5/ 71	5.80	3.00		1000.00	a	NO:3
Tetrachloroethene**	0.30	25.00	ug/L	55/ 247	3.37	25.00		100.00	a	NO:3
Toluene	0.50	8.00	ug/L	13/ 243	1.27	8.00		2000.00	a	NO:3
Trichloroethene	0.44	46.00	ug/L	152/ 273	5.12	46.00		26.00	c	YES

Table 17: (continued) Initial Identification of Future Constituents of Potential Concern for the Site Employee Scenario
(Maximum Detected Concentration Compared to Background and Risk-Based Guideline Values)
Source: Table 11 of Parcel 3 RRE

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV	COPC?
Radionuclides										
Actinium-227+D^^	0.50	0.50	pCi/L	1/ 10	NA	0.50	0.26		c	YES
Americium-241	0.6750	0.17	pCi/L	6/ 43	2.87	0.17	0.139	0.49	c	NO:3
Bismuth-210	0.12	0.26	pCi/L	2/ 55	7.99	0.26		22.00	c,d	NO:1
Gross Alpha**	1.03	1930.00	pCi/L	8/ 12	NC	1930.00				NO:5
Plutonium-238	0.012	1.870	pCi/L	8/ 60	0.15	1.87	0.087	0.54	c	YES
Plutonium-239/240	0.003	0.18	pCi/L	12/ 51	0.42	0.18	0.125	0.51	c	NO:3
Potassium-40**	129.000	258.00	pCi/L	3/ 61	133.00	258.00				YES:2
Radium-226+D	0.1260	39.47	pCi/L	43/ 59	2.34	39.47	0.996	0.54	c	YES
Radium-228**	1.50	1.50	pCi/L	1/ 1	NC	1.50		0.33	c,d	YES
Strontium-90	0.74	42.40	pCi/L	7/ 57	2.22	42.40	0.975	2.90	c	YES
Thorium-228 + D	0.02	8.50	pCi/L	39/ 54	90.70	8.50	0.779	0.69	c	YES
Thorium-230	0.0044	4.07	pCi/L	43/ 56	0.57	4.07				YES
Thorium-232 + D	0.0005	2.11	pCi/L	31/ 63	0.78	2.11	0.314	0.31	c,d	YES
Tritium	2.95	2816310.00	pCi/L	4440/4455	206000.00	2816310.00	1485.47	2200.00	c	YES
Uranium-233/234	0.154	0.928	pCi/L	4/ 4	NC	0.93		3.60	c	NO:3
Uranium-234	0.03	59.10	pCi/L	60/ 69	2.12	59.10	0.792	3.60	c	YES
Uranium-235	0.01	0.36	pCi/L	18/ 45	5.71	0.36	0.814	3.40	c	NO:2,3
Uranium-235/236**	0.04	0.05	pCi/L	2/ 26	0.10	0.05		3.40	c	NO:3
Uranium-238 + D	0.03	1.34	pCi/L	57/ 75	0.51	1.34	0.688	0.11	c,d	YES

a= 1/10th HI for ingestion
b= 1/10th HI for ingestion of Cr VI
c= 10^{-6} cancer risk for ingestion
d= Risk-Based Guideline Values calculated using the methodology, equations, and parameters in Mound Screening GV 3/97, see Appendix C
* = Chromium conservatively assumed to be present in the hexavalent state.
** = Constituent detected in bedrock well, but not in production well
^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production well analyses

NO:1 - <5% Detects
NO:2 - <Background Value
NO:3 - < Risk-Based Guideline Value
NO:2,3 - <Background and Risk-Based Guideline Value
NO:4 - Essential Nutrient
NO:5 - General Water Quality Parameter
NO:6 - common laboratory contaminant
YES:2 - COPC in current groundwater, therefore, COPC in future groundwater

GV= Guideline Value
COPC= Constituent of Potentia Concern
NC= 95% UCL not calculated, fewer than 20 samples in the data set.

Table 18: Final Identification of Future Groundwater Constituents of Potential Concern for the Site Employee Scenario (Bedrock 95% UCL or Maximum Detected Concentration Compared to Background Values) Source: Table 12 of Parcel 3 RRE

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	COPC?
Inorganics								
Aluminum	20.1	31500.00	ug/L	107/ 115	6840.00	6840.00	37.523	YES
Antimony	0.35	41.60	ug/L	21/ 122	2.82	2.82	0.578	YES
Arsenic**	0.3	933.00	ug/L	26/ 114	11.80	11.80	32.997	NO
Beryllium**	0.03	2.30	ug/L	41/ 115	0.47	0.47		YES
Bismuth**	0.9	264.00	ug/L	23/ 103	23.20	23.20		YES
Cadmium	0.14	13.10	ug/L	11/ 124	0.75	0.75		YES
Chromium*	0.27	44800.00	ug/L	78/ 120	5010.00	5010.00	6.076	YES
Copper	0.38	514.00	ug/L	81/ 117	26.80	26.80	1.167	YES
Lead**	0.4	32.00	ug/L	55/ 125	4.90	4.90	10.05	NO
Lithium	8.8	4280.00	ug/L	87/ 102	123.00	123.00	55.7	YES
Manganese	0.037	3030.00	ug/L	155/ 165	737.00	737.00	229.568	NO:1
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	32.50	5.597	YES
Nickel	1.2	11600.00	ug/L	82/ 120	749.00	749.00	34.957	YES
Thallium	3.1	6.90	ug/L	6/ 107	4.44	4.44		YES
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	33.00	17.1	YES
Organic Compounds								
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	6.61		YES
Dichloromethane	1.00	610.00	ug/L	41/ 239	3.28	3.28		YES
Trichloroethene	0.44	46.00	ug/L	152/ 273	5.12	5.12		YES
Radionuclides								
Actinium-227+D^^	0.500	0.500	pCi/L	1/10	NA	0.50		YES
Plutonium-238	0.012	1.870	pCi/L	8/ 60	0.15	0.15	0.087	YES
Plutonium-239/240	0.003	0.18	pCi/L	12/ 51	0.42	0.18	0.125	YES:2
Radium-226+D	0.1260	39.47	pCi/L	43/ 59	2.34	2.34	0.996	YES
Radium-228**	1.50	1.50	pCi/L	1/ 1	NC	1.50		YES
Strontium-90	0.74	42.40	pCi/L	7/ 57	2.22	2.22	0.975	YES
Thorium-228 + D	0.02	8.50	pCi/L	39/ 54	90.70	8.50	0.779	YES
Thorium-230	0.0044	4.07	pCi/L	43/ 56	0.57	0.57		YES
Thorium-232 + D	0.0005	2.11	pCi/L	31/ 63	0.78	0.78	0.314	NO:1
Tritium	2.95	2816310.00	pCi/L	4440/4455	206000.00	206000.00	1485.47	YES
Uranium-234	0.03	59.10	pCi/L	60/ 69	2.12	2.12	0.792	YES
Uranium-238 + D	0.03	1.34	pCi/L	57/ 75	0.51	0.51	0.688	NO

COPC= Constituent of Potential Concern
NC= 95% UCL not calculated, less than 20 samples in the data set.
UCL= Upper confidence Limit
NO:1 = Future groundwater concentrations (modeled bedrock plus current concentrations) for manganese (179.2.ug/L) and thorium-232 (0.1747 pCi/L) are below background values and are screened out of the RRE.
* = Chromium conservatively assumed to be present in the hexavalent state.
** = Constituent detected in bedrock well, but not in production well
^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production wells analyses
YES:2 - Current groundwater COPC, therefore, future groundwater COPC

Appendix C

Listing of ARARs

Chemical Specific ARARs

OAC 3745-81-11,	Maximum Contaminant Levels for Inorganic Chemicals
OAC 3745-81-12,	Maximum Contaminant Levels for Organic Chemicals
OAC 3745-81-13,	Maximum Contaminant Levels for Turbidity
OAC 3745-81-15,	Maximum Contaminant Levels for Radium 226, 228, Gross Alpha
OAC 3745-81-16,	Maximum Contaminant Levels for Beta Particle & Photon Radioactivity

Location Specific ARARs

ORC 6111.03,	Protection of Waters of the State
ORC 3734.20,	Description of Ohio EPA Director's power for Protection of Public Health and the Environment

Action Specific ARARs

ORC 317.08,	Criteria for County Recording of Deeds
ORC 5301.25(A),	Proper Recording of Land Encumbrances

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