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Proposed Plan for Release Block D, Mound Plant, Miamisburg, Ohio

December, 1998

TABLE OF CONTENTS

ACRONYMS iii

1. SITE NAME, LOCATION, AND DESCRIPTION 1
FIGURE 1.1 Location of the Mound Plant 2

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES 3
2.1 History 3
FIGURE 1.2 Location of Release Block D 4
2.2 Enforcement and Agreements - Mound 2000 5
TABLE 2.1 Release Block D PRSs and Buildings and Core Team Conclusions 6

3. HIGHLIGHTS OF PREVIOUS COMMUNITY PARTICIPATION 8
TABLE 3.1 Release Block D Documents and Public Comment Periods 9

4. SCOPE AND ROLE OF RELEASE BLOCK D 10

5. SITE CHARACTERISTICS 10
5.1 Geologic Setting 10
5.2 Hydrogeologic Setting 11
5.3 Available Data for Release Block D 11
5.3.1 Background Data 11
5.3.2 Groundwater Contaminant Data 12
5.3.3 Soil Contaminant Data 12
FIGURE 5.1 PRSs Within Release Block D 14
5.4 Summary of Contaminants Detected in Release Block D 16
5.4.1 Screening Results for Soil Contaminants 17
5.4.2 Screening Results for the Current Groundwater Scenario 18
5.4.3 Screening Results for the Future Groundwater Scenario 18
TABLE 5.1 Soil Contaminants Carried Through the RRE for RB D 20
Table 5.2 Current Groundwater Contaminants Carried Through RRE for RB D 21
Table 5.3 Future Groundwater Contaminants Carried Through RRE for RB D 22

TABLE OF CONTENTS (continued)

6. SUMMARY OF SITE RISKS 23
6.1 Exposure Assessment 23
6.1.1 Construction Worker Scenario 24
6.1.2 Site Employee Scenario 24
6.2 Identification of Exposure Pathways 25
6.3 Residual Risk Evaluation 25
6.3.1 Hazards and Risks for the Construction Worker 25
6.3.1.1 Non-Cancer Risks 25
6.3.1.2 Cancer Risks 26
TABLE 6.1 Summary of Current and Future Incremental Risks at Release Block D, Mound Facility 28
6.3.2 Hazards and Risks for the Site Employee 29
6.3.2.1 Non-Cancer Risks 29
6.3.2.2 Cancer Risks 30
6.4 Conclusions 30
6.5 Ecological Risk 31

7. DESCRIPTIONS OF ALTERNATIVES 31

8. EVALUATION OF ALTERNATIVES 32
8.1 THRESHOLD CRITERIA 32
8.1.1 CRITERIA 1: Overall protection of human health and the environment 32
8.1.2 CRITERIA 2: Compliance with applicable or relevant and appropriate requirements 32
8.2 PRIMARY BALANCING CRITERIA 33
8.2.1 CRITERIA 3: Long-term effectiveness and permanence 33
8.2.2 CRITERIA 4: Reduction of toxicity, mobility or volume through treatment 33
8.2.3 CRTIERIA 5: Short-term effectiveness 34
8.2.4 CRITERIA 6: Implementability 34
8.2.5 CRITERIA 7: Cost 34
8.3 MODIFYING CRITERIA 34
8.3.1 CRITERIA 8: State/Support Agency Acceptance 34
8.3.2 CRITERIA 9: Community Acceptance 35

9. THE PREFERRED ALTERNATIVE 35

10. OPPORTUNITIES FOR COMMUNITY PARTICIPATION 36

11. REFERENCES 37

ACRONYMS

AOC	Area of Concern
ARAR	Applicable Requirements and Appropriate Requirements
BDP	Building Data Package
BVA	Buried Valley Aquifer
BWX	Babcock and Wilcox
CERCLA	Comprehensive Environmental Response Compensation & Liability Act
DOE	Department of Energy
FFA	Federal Facilities Agreement
FOD	Frequency of Detection
GV	Guideline Value
HI	Hazard Index
IDM	Investigative Derived Material
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
OSC	On-Scene Coordinator
OU	Operable Unit
p/Ci	picocurie
PAH	Polynuclear aromatic hydrocarbon
PETREX	(trade name for a type of soil sampling)
PRS	Potential Release Site
RB	Release Block
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RRE	Residual Risk Evaluation
RREM	Residual Risk Evaluation Methodology
SM/PP	Special Metallurgical/Plutonium Processing
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

PROPOSED PLAN
RELEASE BLOCK D
MOUND PLANT, OHIO

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 1.1). The Site is approximately ten (10) miles south-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 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.

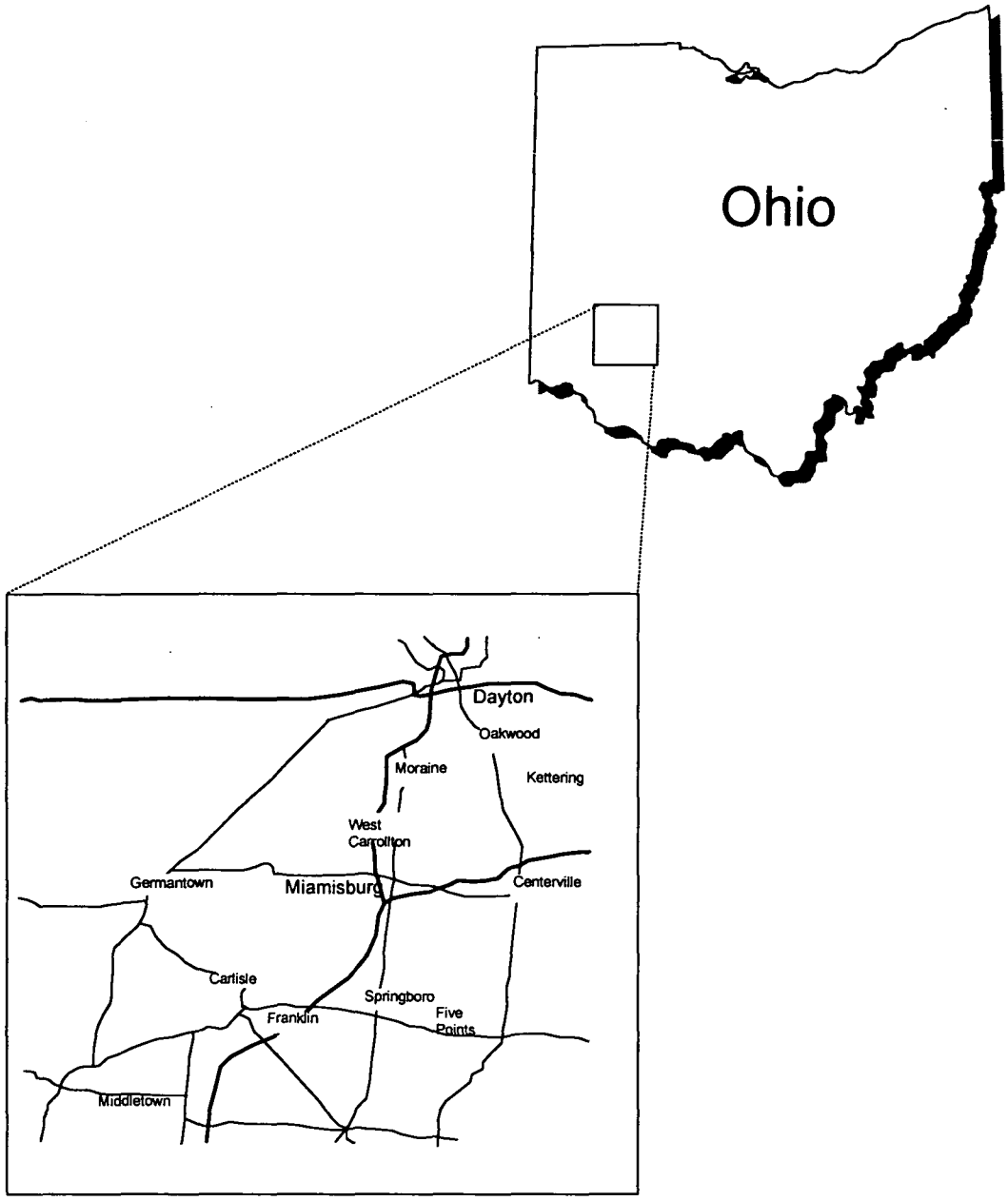
Mound Golf Course and Miamisburg Mound State Memorial Park, both directly east of the Mound facility across Mound Road, are frequented during favorable weather. The park is the site of a 68-foot high ancient Indian mound, located 380 feet east of the Mound Plant boundary. Other recreational areas within one (1) mile of the facility 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 Site. Some vestiges of the old Miami-Erie Canal lie between the Conrail Railroad and Dayton-Cincinnati Pike west of the site. This remnant of the old Miami-Erie Canal is designated as Operable Unit (OU) 4. The major water body in the vicinity of the Mound Plant is the Great Miami River located approximately 2 miles to the west. The river is approximately 150 to 200 feet wide in this area.

Agricultural land within a 5-mile radial area around the Site 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.

FIGURE 1.1 Location of the Mound Plant



This Proposed Plan addresses Release Block (RB) D (Figure 1.2) which is located in the southeast corner of the developed area of the plant. RB D is generally bound to the south by the "South Property" (the undeveloped portion of the Mound Plant), to the east by offsite residences, to the north by a parking lot and group of small buildings (numbered 39, 77, 78, 97, 95, 101 and 102), and to the west by a fenced area for storage of Investigative Derived Material (IDM) (just west of Building 100).

There are two (2) main structures in RB D. Building 105, which was built in 1990 as a machine shop and is still used for that purpose, and Building 100, which was the Guard Force Precinct bunker. Also located in the block is a large storm sewer manway/dump station.

RB D lies within what was once called Operable Unit 5 (OU5). RB D includes a collection of individual areas called Potential Release Sites or PRSs that have undergone previous investigations. Before transfer of a release block can be completed, all buildings and PRSs must be evaluated for protectiveness or remediated to be protective. Any residual risks associated with remaining contamination in RB D have been evaluated and presented in the RB D Residual Risk Evaluation (RRE) December 1996 and its supplement "Residual Risk Evaluation, Release Block D Revision Summary, December 1998." The PRSs and buildings associated with RB D are listed in Table 2.1

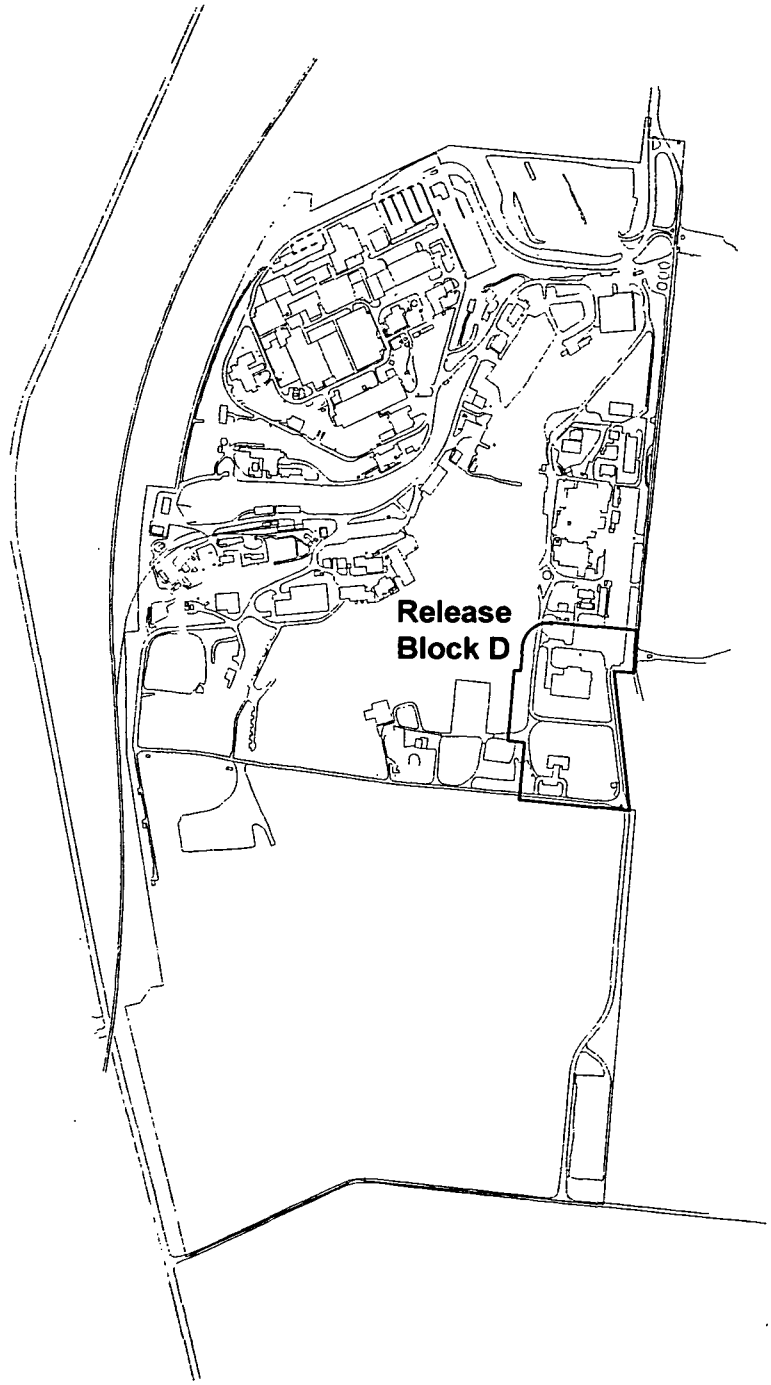
2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 History

The Mound facility 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 Site 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 site. Currently BWX Technologies, Inc. manages Mound for the DOE.

Early Mound Plant 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.

FIGURE 1.2 Location of Release Block D



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 corrosivity, the thorium sludge was continually repackaged and relocated. This resulted in a number of thorium-contaminated areas around the site.

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 Resource 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 in RB D were identified on the basis of potential radiological and chemical (non-radioactive) contamination using knowledge of historical land use or on actual measurements of contaminants. The primary sources of potential radioactive contamination in RB D resulted from wastewater treatment, storage of radioactive materials, and ground disposal of soils and construction spoils. The PRSs and buildings within RB D are listed in Table 2.1, with the activity that caused concern and the evaluation results.

2.2 Enforcement and Agreements - Mound 2000

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 Record of Decision. To evaluate any residual risk after all removals have been completed, a residual risk evaluation is conducted to ensure the block or parcel is protective of human health for industrial reuse. 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.

TABLE 2.1 Release Block D PRSs and Buildings and Core Team Conclusions

PRS/ BLDG	Reason for Identification	Core Team Decision	Close Out of PRS/BDP
279	Location of the Old Firing Range Drum Storage Area	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 10/18/95
304	Past use as a soil disposal area - thorium contamination.	Removal Action conducted in October 1998.	OSC Report signed by Core Team on 12/17/98.
310	Elevated cesium-137 sample location	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 1/14/97
312	Elevated thorium sample location	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 10/18/95
313	Elevated thorium sample location	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 2/19/97
372/374	Elevated qualitative soil gas detections	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 5/8/96
373	Elevated plutonium sample location	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 10/18/95
375/377 /378	Elevated qualitative soil gas detections	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 5/8/96
376	Elevated plutonium sample location	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 10/3/96
379	Elevated plutonium sample location	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 10/18/95
380/381	Elevated qualitative soil gas detections	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 5/8/96
382	Elevated qualitative soil gas detections	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 1/14/97
Bldg. 100	Building used for site operations	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 8/5/97
Bldg. 105	Building used for site operations	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 8/5/97

The Mound 2000 process established a "core team" consisting of representatives of the Miamisburg Environmental Management Project (MEMP) of DOE, US EPA, and OEPA. The Core Team evaluates each of the potential contamination problems 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 possible problem area. 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 potential problem area. The details of this process are explained in the "Workplan for Environmental Restoration at the Mound Plant, The Mound 2000 Approach," December 1998.

The Mound property is divided into eighteen "release blocks," which are contiguous tracts of property designated for transfer of ownership. These eighteen release blocks may be reconfigured to accommodate transfer of Mound property for economic development.

"The Mound 2000 Residual Risk Evaluation Methodology (RREM), Mound Plant, Final, Revision 0, January 6, 1997" was developed as a framework for evaluating human health risks associated with residual levels of contamination. The RREM is applied to a release block once necessary remediation has been completed, and the remaining PRSs or buildings in the release block have been designated as No Further Assessment (NFA). Once these environmental concerns have been adequately addressed by the Core Team, a residual risk evaluation is performed. The evaluation documents whether the release block is acceptable for industrial redevelopment. The results of the Residual Risk Evaluation for RB D are discussed in Section 4 through Section 6 of this Proposed Plan. These results indicate that Release Block D is protective of human health.

A Record of Decision (ROD) will be generated for each piece of property to be transferred. The ROD will document the most appropriate remedy that meets statutory requirements and ensures protection of human health and the environment. The Core Team expects that institutional controls will be specified in the ROD for RB D.

After the ROD for RB D is final, DOE will submit to US EPA and OEPA documentation that shows the property meets CERCLA 120 (h) (3) requirements. This documentation 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 existing environmental reports provided by DOE for the Mound Facility. 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 disposition 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 and the RRE for RB D have also gone through a public comment cycle and copies are in the CERCLA Public Reading Room. With this Proposed Plan, a supplement to the RB D Residual Risk Evaluation is being issued to incorporate data previously not included due to a slight change in RB D boundaries and to incorporate recently acquired soils data generated during the PRS 304 removal action and investigation.

Table 3.1 lists all RB D PRS packages, Building Data Packages, and the RB D RRE, along with the dates they were made available for public comment. This Proposed Plan will have a thirty (30) day public comment period ending on January 21, 1999.

TABLE 3.1 Release Block D Documents and Public Comment Periods

DOCUMENT (PRS/BUILDING)	COMMENT PERIOD (BEGIN)	COMMENT PERIOD (END)
279	02/15/96	02/29/96
304/313	05/08/97	06/16/97
PRS 304 Action Memo	10/01/98	10/31/98
310	01/15/97	02/15/97
312	10/24/95	02/15/96
372/374	05/15/96	06/17/96
373	02/15/96	02/29/96
375/377/378	05/15/96	06/17/96
376	10/15/96	11/15/96
379	02/15/96	02/29/96
380/381	05/15/96	06/17/96
382	01/15/97	02/15/97
Building 100	09/04/97	10/20/97
Building 105	09/04/97	10/20/97
RB D Residual Risk Evaluation	08/21/96	09/20/96
Supplemental RB D Residual Risk Evaluation	12/22/98	01/21/99

4. SCOPE AND ROLE OF RELEASE BLOCK D

This Proposed Plan addresses one of 18 separate release blocks at Mound. These eighteen release blocks may be reconfigured to accommodate transfer of Mound property for economic development.

A ROD will be generated for each piece of property to be transferred. The 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 RB D represents one of a number of Proposed Plans that will be generated for parts of the Mound site. As such, this Plan identifies the proposed final action for RB D. Once the ROD for RB D is final and effective, DOE could petition the US EPA to delist RB D from the NPL.

After a ROD has been generated for each of the release blocks, 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 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 at Mound Plant and underlies RB D. The limestone beds range from 2 to 6 inches in thickness and the shale layers are commonly 5 to 8 feet thick.

Pleistocene age (less than about 2 million years old) glacial deposits at Mound Plant include both till and outwash deposits. The till in the area of 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 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 Mound Plant: flow through the bedrock beneath the Main Hill and the SM/PP Hill, and flow within the unconsolidated glacial deposits and alluvium associated with the Buried Valley Aquifer (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 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 OU9 work plan 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 Release Block D

All of the PRSs within RB D have been evaluated by the Core Team and, if necessary, addressed by either assessment or remediation. The following sections discuss the data relevant to RB D that are available from the general source documents and the individual Potential Release Sites 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 during investigations conducted in September 1994 and August 1995 and are documented in reports titled "Operable Unit 9 Background Soils Investigation Soil Chemistry Report" and "Operable Unit 9, Regional Soils Investigation Report."

Groundwater. Background concentrations for groundwater were developed from two sources of data. For the Buried Valley Aquifer, background values were reported in the April 1995 "OU9 Hydrologic Investigation: Groundwater Sweeps Report." Background concentrations for bedrock groundwater were reported in the April 1995 "OU5 New Property Remedial Investigation Report."

5.3.2 Groundwater Contaminant Data

Groundwater data consist of water analyses of the Mound production wells screened within the Buried Valley Aquifer, and analyses of groundwater from monitoring wells screened in the bedrock aquifer on the Mound property. These wells are sampled as part of the site-wide groundwater monitoring network. Section 2.2.2 of the RRE for RB D documents the specific groundwater data used to evaluate the current and future groundwater profile for RB D.

5.3.3 Soil Contaminant Data

Soil contaminant data for RB D collected prior to the Mound 2000 process are documented in a number of DOE reports. These references include:

- Other Soils Characterization Report, Volume I - Text. Final, Revision 0. May 1, 1995 *(results of systematic sampling)*,

- OU-5 Operational Area Phase I Investigation Non-AOC Field Reports, Volume I - Text. Final, Revision 0. June 1, 1995 *(results of systematic sampling in southern area of site, gives general overview of soils not thought to be contaminated)*,

- OU-9 Regional Soils Investigation Report, Revision 2. August 1, 1995 *(purpose was to give a regional soil description away from impacts of Mound operations)*,

- OU-3 Miscellaneous Sites Limited Field Investigation Report, Volumes 1, 2, and 3. Final, Revision 0. July 1, 1993 *(purpose was to address areas noted in previous surveys; but, not thought to endanger human health or environment)*,

- OU-9 Site Scoping Report, Volume 3 - Radiological Site Survey, Final, June 1, 1993 *(a compendium of existing data)*, and

- Soil Gas Confirmation Sampling. Revision 0. April 1, 1996 *(results of a study following up on a prior qualitative study).*

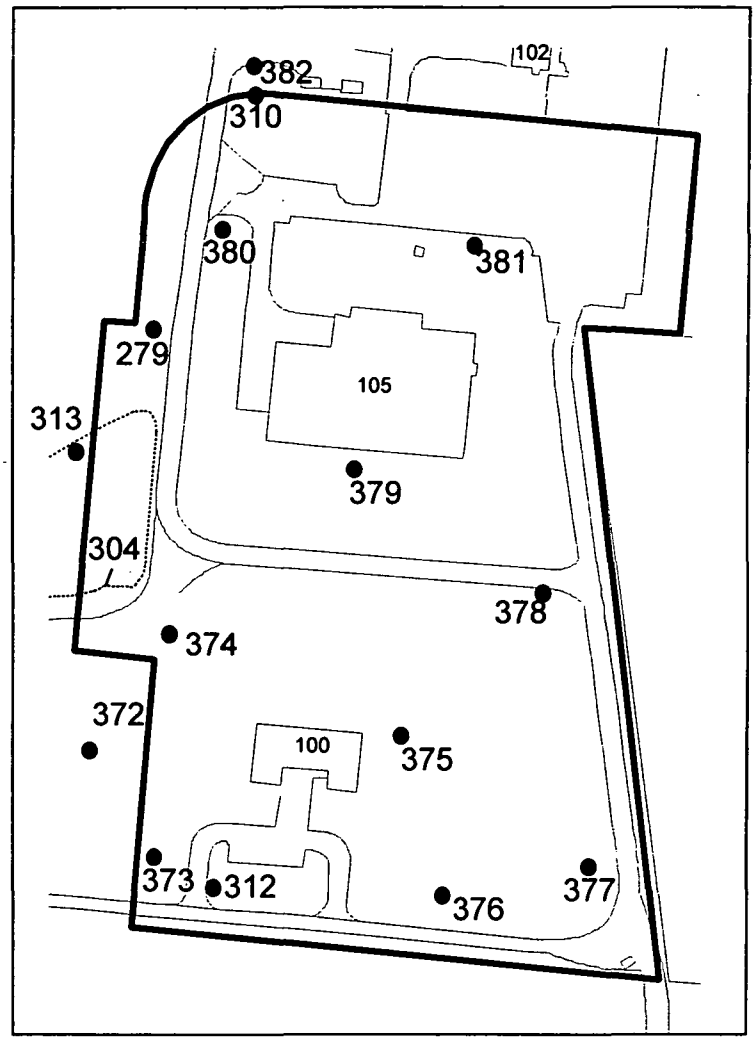
In the Mound 2000 process, radionuclide and chemical contaminants were studied on a PRS basis. The results are described below.

There are 14 Potential Release Sites (PRSs) located within RB D and two PRSs near the northern and western edges of RB D. The PRSs are numbered 279, 304, 310, 312, 313, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, and 382. The PRSs were identified based on either knowledge of historical land use that was considered potentially detrimental, or on actual sampling results showing elevated concentrations of contaminants. The rationale for designation of RB D PRSs is outlined in Table 2.1. The locations of these PRSs are shown on Figure 5.1.

Many of the PRSs (372, 374, 375, 377, 378, 380, 381, and 382) were established based solely on soil gas readings. The soil gas study that identified these PRSs was conducted in 1994, utilizing PETREX tubes. The PETREX collector tubes measure relative ion counts of volatile and semi-volatile organic compounds; therefore, the method only provides qualitative indications of possible contamination.

Eight of the PRSs were identified based on previous radionuclide measurements. Brief descriptions of those measurements appear after Figure 5-1.

FIGURE 5.1 PRSs Within Release Block D



- At PRS 310, elevated cesium-137 was found in a surface soil sample in 1987, and was remediated immediately upon its detection. In December 1991, soil samples were again collected from this area. Of the 28 samples collected, two had cesium-137 concentrations above the detection limit. At the same location, 25 samples were analyzed for radium-226. All samples contained detectable concentrations of radium-226. In 1995, additional soil samples collected in this area did not indicate the presence of cesium-137 or any other contaminant.

- At PRS 373, PRS 376 and PRS 379, plutonium-238 was detected in surface samples in 1994, 1995 and 1996, respectively, and found (as measured by the Mound Soil Screening Laboratory) at or slightly above the method detection limit. The surface samples with detectable plutonium-238 concentrations were shown (by surrounding samples) to be isolated to the PRS locations only. Due to its low solubility and concentration, plutonium at these locations is not expected to adversely affect groundwater at potential drinking water sources.

- At PRS 312, a surface sample collected in 1993 indicated an elevated thorium-232 concentration of 5.02 pCi/g. Nearby samples did not indicate elevated levels, suggesting the elevated result was an isolated event.

- PRS 279 was identified based on photographs that showed drum storage at this location. This drum storage area had been referred to as the Old Firing Range Storage Site and was used between 1970 and 1974. Plutonium-238, cobalt-60, radium-226, and thorium-228 were measured in this area.

  There were no elevated soil gas measurements detected at this location. A deep (3 to 5 feet) soil sample near PRS 279 had detectable polynuclear aromatic hydrocarbons (PAHs) at an elevated concentration of approximately 59 mg/kg. This sample was a composite of four samples collected at the corners of a 30 foot x 30 foot square. A second composite prepared similarly from about 100 feet away found similar contaminants at 1 to 3 mg/kg. Other nearby sample locations nearby did not detect any of the contaminants. These chemicals are commonly associated with asphalt, which is present in the area.

A February 1996 soil sample in the vicinity of PRS 279 contained low levels of organic and inorganic compounds, plutonium-238, radium-226, and thorium-228.

- PRS 313, which neighbors PRS 304, was a soil segregation area that contained the overburden soils excavated from the decommission and decontamination of a waste transfer line (PRS 300) and from Area 12 (PRS 273). PRS 313 was identified due to an elevated thorium result. Sampling in 1995 in the area of PRS 313 indicated no contaminants in excess of guideline criteria.

- PRS 304 was identified as a former soil disposal area. PRSs 304/313 were originally binned NFA on February 19, 1997, based on data existing at that time. However, a recent radiological survey and sampling event conducted in the fall of 1998 identified two small "hot spots" which were subsequently removed. The results from the 1998 removal actions are available in the "On Scene Coordinator (OSC) Report for PRS 304 Removal Action, December 1998" which is being issued concurrently with this Proposed Plan.

Soil data can be divided into three types: (a) data obtained through commercial analytical laboratory analysis, (b) data obtained through "screening" techniques conducted in a DOE laboratory, and (c) 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 RB D.

5.4 Summary of Contaminants Detected in Release Block D

The complete list of all contaminants detected at least once within RB D is provided in the RB D RRE Supplement in Tables II.2, II.3, and II.4 for soil, current groundwater and future groundwater, respectively. These tables present the maximum concentration of each contaminant, and also present appropriate background concentrations, Guideline Values, and additional screening criteria for comparative purposes. The three categories (soil, current groundwater, and future groundwater) represent the exposure routes of concern in the RRE.

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. 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, for RRE screening purposes, is a detection rate below 5% (one sample in 20).

Contaminants carried forward in the RRE for Release Block D are identified in Tables 5-1 through 5-3. The tables document the results of the screening process by listing the reason specific contaminants were carried through the RRE. A more detailed discussion of the screening process is located in the Mound 2000 Residual Risk Methodology.

5.4.1 Screening Results for Soil Contaminants

For RB D, 50 organic, 34 inorganic, and 20 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. The comparison to guideline values was completed using the GVs found in "Risk-Based Guideline Values, Mound Plant, Miamisburg, OH December 1995. "

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 20 samples collected to be carried forward in the RRE). Using these screening criteria, the number of organic compounds was reduced from 50 to 17.

Inorganic compounds. Inorganic compounds were screened against background concentrations, Guideline Values, frequency of detection criteria, and whether they are common constituents of most soils, such as sodium and potassium. Compounds classified as human nutrients were eliminated from further consideration. Using these screening criteria, the number of inorganic compounds was reduced from 34 to 5.

Radiological compounds. Radiological contaminants were screened against background (95% UTL) and Guideline Values. Using these screening criteria, the number of radionuclides was reduced from 20 to 5.

5.4.2 Screening Results for the Current Groundwater Scenario

"Current" groundwater contaminants are defined as those currently found in the Mound production wells. For screening purposes, 16 organic, 28 inorganic, and 12 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, and on the basis of whether they are common water quality parameters, such as alkalinity or dissolved solids that are not health-related parameters.

The screening process reduced the number of organic contaminants from 16 to 3, the number of inorganic contaminants from 28 to 3, and the number of radiological contaminants from 12 to 6. The contaminants that were carried through the RRE process for the current groundwater scenario are summarized in Table 5.2.

5.4.3 Screening Results for the Future Groundwater Scenario

Future groundwater contaminants are defined as those currently in the Mound production wells, combined with contaminants measured in Mound site 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 bedrock background concentrations. The screening process reduced the number of bedrock contaminants from 74 to 39. This list was combined with the current groundwater list. As a result, the complete list of future groundwater contaminants contained 22 organic compounds, 21 inorganic contaminants, and 16 radiological contaminants.

These contaminants were screened with respect to BVA background concentrations, Guideline Values, and whether they are common water quality parameters not associated with health impacts.

The screening reduced the number of future organic contaminants from 22 to 3, the inorganic contaminants from 21 to 8, and the radiological contaminants from 16 to 6. The contaminants that were carried through the RRE process for the future groundwater scenario are summarized in Table 5.3.

TABLE 5.1 Soil Contaminants Carried Through the RRE for RB D

Soil Constituents	Maximum concentration Any Depth	Maximum concentration Shallow (<2' deep)	Screening Concentration (either Bkgd or G.V.)	Reason for carrying through RRE
ORGANICS (mg/kg)				
Acenaphtene	6.4	3.8		F.O.D. =18%
Acenaphthylene	0.22	0.029		F.O.D. = 8%
Benzo(a)anthracene	41.5	6.8	4.10[1]	Max Conc > G.V.
Benzo(a)pyrene	33.5	7.5	0.41[1]	Conc. > G.V.
Benzo(b)fluoranthene	53	12	4.10[1]	Max Conc > G.V.
Benzo(g,h,i) perylene	3.9	3.9		F.O.D. = 25%
Carbazole	0.165	0.165		F.O.D. = 15%
Dibenz(a,h)anthracene	1.3	1.3	0.41	Conc. > G.V.
Dibenzofuran	3.8	3.0		F.O.D. = 20%
2,4-Dinitrophenol	0.97	0.97		F.O.D. = 5.6%
Fluorene	6.3	3.3		F.O.D. = 27%
Indeno(1,2,3-cd)pyrene	20.5	4.7	4.10[1]	Max. Conc. > G.V.
2-Methylnaphthalene	1.4	1.4		F.O.D. =20%
Naphthalene	1.9	1.9		F.O.D. = 23%
Phenanthrene	49.5	13		F.O.D. = 40%
1,1,1-Trichloroethane	0.0025	0.002		F.O.D. = 12.5%
1,1,2-Trichloro-1,2,2-trifluoroethane	0.003	0.003		F.O.D. = 50%
INORGANICS (mg/kg)				
Antimony	39.2	39.2	85[5]	Conc. > G.V.
Arsenic	15.8	12.35	64[5]	Conc. > G.V. & Bkgd.[6]
Beryllium	1.8	1.8	0.7	Conc. > Bkgd.
Bismuth	5.7	5.7		F.O.D. = 17%
Copper (total)	33.1	30.5	26[4]	Conc. > Bkgd.[6]
RADIONUCLIDES (pCi/g)				
Cesium-137	1.7	1.7	0.46[2]	Conc. > G.V.[6]
Lead-210	2.91	2.91		F.O.D. = 100%
Plutonium-238	60	60	5.50[2]	Conc. > G.V[7] >Bkgd.
Thorium-228	3.57	3.57	0.83[8]	Conc. > G.V.
Thorium-232	7	7	0.83[2,3]	Conc. > G.V. [6]

1 - Total Risk 10^{-6} for Ingestion only.
2 - Total Risk 10^{-6} for Ingestion, Inhalation and External.
3 - Guideline Values from Thorium-228+D.
4 - Background value
5 - Hazard Quotient for Ingestion only. (decision made on 0.1 x G.V.)
6 - Arsenic, cesium-137, copper and thorium-232 were carried through the RRE in the first screening (as indicated in the table). However, arsenic, cesium-137, copper and thorium-232 total values were less than the background value therefore not carried through the RRE at a subsequent screening. Soil exposure concentrations for RB D were based on the 95th% UCL for all parameters with greater than 20 analyses. These exclude the Site employee value for flourene and naphthalene, all carbazole, bismuth and 1,1,2-trichloro-1,2,2-trifluoroethane data. These parameters use the maximum concentration value since N<20 samples.
7 - Pu-238 values were log-normally distributed and hence, concentrations (95th%UCL) shown were based on the log-transformed data.
8 - The Th-228 G.V. has not been formally modified to reflect new risk data. However, all Th-228 risk calculations were performed using updated slope factors.
F.O.D. Frequency of detection. Contaminants with a F.O.D. greater than 5% were carried thru the RRE.

Table 5.2 Current Groundwater Contaminants Carried Through RRE for RB D

Groundwater Constituents	Maximum concentration	Screening Concentration (either background or G.V.)	Reason for carrying through RRE
ORGANICS (mg/L)			
1,1-Dichloroethene	0.0017	---	No Bkgd. or G.V. available
1,1,1-Trichloroethane	0.0018	0.0007[3]	Conc. > Bkgd.; no G.V. available
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087	---	No Bkgd. or G.V. available
INORGANICS (mg/L)			
Cadmium	0.0077	0.051[1]	Conc. >G.V., no Bkgd. available
Copper	0.593	0.0012[3]	Conc. > Bkgd.; no G.V. available
Lead	0.040	0.0101[3]	Conc. > Bkgd.; no G.V. available
RADIONUCLIDES (pCi/L)			
Actinium-227	0.335	0.26[2]	Conc. > G.V.; no Bkgd. available
Bismuth-210	0.39	---	No Bkgd. or G.V. available
Plutonium-239/240	2.0	0.125[3]	Conc. > Bkgd. & G.V.
Tritium	7200	1485[2]	Conc. > Bkgd. & G.V.
Uranium-234	8.14	0.792[3]	Conc. > Bkgd. & G.V.
Uranium-238	8.25	0.688[3]	Conc. > Bkgd. & G.V.

[1] - Hazard Index for Ingestion + Dermal + Inhalation. (decision made on 0.1 x G.V.)
[2] - Total Risk 10^{-6} for Ingestion only.
[3] - Background value.

Table 5.3 Future Groundwater Contaminants Carried Through RRE for RB D

Groundwater Constituents	Estimated Maximum Concentration	Screening Concentration (either background or G.V.)	Reason for carrying through RRE
ORGANICS (mg/L)			
1,1-Dichloroethene	0.0017	---	No Bkgd. or G.V. available
1,1,1-Trichloroethane	0.0065	0.0007[3]	Conc > Bkgd.; no G.V. available
1,1,2,-Trichloro-1,2,2-trifluoroethane	0.0087	---	No Bkgd. or G.V. available
INORGANICS (mg/L)			
Beryllium	0.0001	6.6E-05[2]	Conc. > G.V.
Bismuth	0.0016	---	No Bkgd. or G.V. available
Cadmium	0.0077	0.051[3]	Conc > G.V.; no Bkgd. available
Chromium	0.4961	0.0061[3]	Conc > Bkgd. and G.V.
Cobalt	0.0039	0[3]	Conc > Bkgd.; no G.V. available
Copper	0.5964	0.0012[3]	Conc > Bkgd.; no G.V. available
Lead	0.04	0.010[3]	Conc > Bkgd.; no G.V. available
Molybdenum	0.0096	0.0056[3]	Conc > Bkgd.; no G.V. available
RADIONUCLIDES (pCi/L)			
Actinium-227	0.355	0.26[1]	Conc > G.V.; no Bkgd. available
Bismuth-210	0.39	---	No Bkgd. or G.V. available
Plutonium-239/240	2.020	0.125[3]	Conc > Bkgd. and G.V.
Tritium	10427	1485[3]	Conc > Bkgd. and G.V.
Uranium-234	8.14	0.792[3]	Conc > Bkgd. and G.V.
Uranium-238	8.25	0.688[3]	Conc > Bkgd. and G.V.

[1] - Total Risk 10^{-6} for Ingestion only.
[2] - Total Risk 10^{-6} for Ingestion + Dermal + Inhalation
[3] - Background value.

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 Mound 2000 Residual Risk Evaluation Methodology (RREM) document described previously in this Proposed Plan. The RREM is applied to a limited area, such as a release block, after all necessary remediation has been completed and the remaining PRSs or buildings within that release block 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. 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. In the specific case of RB D, a supplemental RRE was needed to address recently-generated contaminant data. The public review period for the RRE supplement is running concurrently with the public review period for this Proposed Plan.

6.1 Exposure Assessment

The two exposure scenarios examined in the RB D RRE involve an onsite construction worker, and a site employee engaged in non-construction activities. 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 current concentration levels in Mound production wells 0076 and 0271 (which are screened in the Buried Valley Aquifer) because they supply potable water to Mound. The bedrock water under RB D 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 RB D. 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 an 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 specified in the Mound 2000 RREM.

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 RB D 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 specified in the Mound 2000 RREM.

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 RB D, toxicity and exposure assessments were summarized and integrated into quantitative expressions of risk. Two types of risk characterization are performed. The first is the calculation of a Hazard Index (HI) for noncarcinogens. The second is the calculation of carcinogenic risk associated with cancer-causing compounds, including radionuclides. These calculations are performed for both the hypothetical construction worker and the hypothetical site employee. The results for Release Block D 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 RB D contamination throughout a five-year period was used.

6.3.1.1 Non-Cancer Risks

Overall hazards across all pathways, soil+current groundwater and soil+ future groundwater, were summed to provide a comprehensive Hazard Index (HI). The HI is based on the overall risk to a hypothetical construction worker from contaminants present in soil and groundwater (current and future). The HI is based on incremental contaminant concentrations, i.e., concentrations above

background. However, comprehensive Hazard Indices were also developed based on background and total exposures. Since background exposures and hazards were negligible, the Hazard Indices based on incremental and total exposures were the same, 0.16 for soil+current groundwater and 1.1 for soil and future groundwater (Table 6.1). For comparison purposes, US EPA guidance sets a limit of 1.0 for the Comprehensive Hazard Index.

The soil + current groundwater HI is dominated by the soil pathway. Virtually all of the non-carcinogenic risk for this scenario is attributable to daily ingestion of soil containing antimony and 2,4-dinitrophenol.

The larger value for the soil + future groundwater HI is due to a predicted increase in chromium concentrations in 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 chromium detected in groundwater. It should be noted that the elevated levels of chromium and other metals in the bedrock and BVA groundwater are currently under investigation.

6.3.1.2 Cancer Risks

Cancer risks for the RB D construction worker 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. Overall risks from carcinogenic, including radiological, contaminants across all pathways were summed to provide an overall risk based on incremental (i.e., above background) exposures. Overall risks were also developed based on background and total exposures. The risks based on incremental exposures were 3.5×10^{-5} for soil + current groundwater and 3.5×10^{-5} for soil + future groundwater. The risks based on background exposures were 1.4×10^{-7} for soil + current groundwater and the same for soil+future groundwater. The risks based on total exposures (background plus incremental) were 4.9×10^{-5} for soil + current groundwater and 5.0×10^{-5} for soil + future groundwater.

The results from the RRE are shown in Table 6-1. For organic and inorganic carcinogens, the soil pathway dominates the risk. Virtually all of the risk to the construction worker from soil is attributable to a series of polynuclear aromatic hydrocarbons that are naturally occurring products in petroleum and are also components of asphalt.

For radionuclides, the "soil" exposure route is the largest contributor. This result is attributable to thorium-228 and its daughters.

TABLE 6.1 Summary of Current and Future Incremental Risks at Release Block D, Mound Facility

	Construction Worker				
	Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future
Non-carcinogenic Hazard Index for Organics & Inorganics	1.3E-01	3.7E-02	1.0E+00	HI = 1.6E-01	HI = 1.1E+00
Carcinogenic Risks for Organics & Inorganics	9.6E-06	9.9E-08	4.0E-07	Risk = 9.7E-06	Risk = 1.0E-05
Carcinogenic Risks for Radionuclides	2.3E-05	2.1E-06	2.4E-06	Risk = 2.5E-05	Risk = 2.5E-05
		Construction Worker			
			Overall HI =	1.6E-01	1.1E+00
			Overall Risk =	3.5E-05	3.5E-05

	Site Employee				
	Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future
Non-carcinogenic Hazard Index for Organics & Inorganics	1.7E-02	3.7E-02	1.0E+00	HI = 5.4E-02	HI = 1.0E+00
Carcinogenic Risks for Organics & Inorganics	2.0E-06	NA	1.5E-06	Risk = 2.0E-06	Risk = 3.5E-06
Carcinogenic Risks for Radionuclides	2.3E-05	1.1E-05	1.2E-05	Risk = 3.4E-05	Risk = 3.5E-05
		Site Employee			
			Overall HI =	5.4E-02	1.0E+00
			Overall Risk =	3.6E-05	3.9E-05

6.3.2 Hazards and Risks for the Site Employee

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

6.3.2.1 Non-Cancer Risks

Overall hazards across all pathways for soil+current groundwater, and for soil+ future groundwater, were summed to provide a comprehensive Hazard Index. The HI is based on incremental exposures above background to a hypothetical site employee working at RB D (Table 6.1). Comprehensive Hazard Indices were also developed based on background and total exposures. Since background exposures and hazards were very small, the Hazard Indices based on incremental and total exposures (background plus incremental) were the same, 0.054 for soil + current groundwater, and 1.0 for soil + future groundwater.

For current exposure conditions, the ingestion of antimony and cadmium, for soil and groundwater respectively, dominate the HI.

As seen previously, the primary difference between the calculated current and future groundwater hazards was due to the modeled presence of chromium in future groundwater.

6.3.2.2 Cancer Risks

Overall risks from carcinogenic, including radiological, contaminants across all pathways were summed to provide an overall risk based on incremental exposures (above background). Carcinogenic risks to a hypothetical site employee working at RB D were then estimated (Table 6.1). Overall risks were developed based on background and total exposures. The risks based on incremental exposures were 3.6×10^{-5} for soil + current groundwater and 3.9×10^{-5} for soil + future groundwater. The risks based on background exposures were 1.7×10^{-5} for soil + current groundwater and the same for soil + future groundwater. The risks based on total exposures (background plus incremental) were 5.2×10^{-5} for soil + current groundwater and 5.5×10^{-5} for soil + future groundwater.

The carcinogenic risk to the site employee is dominated by the presence of radionuclides in soil. The primary contributor is to the risk is the thorium-228.

6.4 Conclusions

Cancer risks for RB D 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 National Contingency Plan (NCP). Non-cancer risks for RB D were also determined to be acceptable for future industrial use. Based on the RRE conducted for the construction worker and site employee, US EPA and OEPA agree with DOE that all risks and hazards are acceptable for industrial use and no further remediation is required for this land use.

Because the scope of the RRE was limited to industrial use, the soils within RB D have not been evaluated for unrestricted release (e.g. residential use). Disposition of RB D 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, March, 1984) there are no endangered species or critical habitats of endangered species on RB D. In addition, RB D is composed entirely of buildings, roads, and mowed lawns. There are no wetlands or surface waters located in RB D and no sensitive habitats. Therefore, DOE has determined, with concurrence from US EPA and OEPA, that an ecological assessment for RB D is not necessary.

7. DESCRIPTIONS OF ALTERNATIVES

As documented in Section 6, the risk from both carcinogens and non-carcinogens from RB D is within the acceptable range for the current industrial use. In light of the planned exit of DOE from the site, and the residual levels of contaminants in the soil and groundwater in RB D, a remedy must be implemented to protect human heath and the environment into the future. Two alternatives were considered for RB D:

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 the Site 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 RB D. The objective of these institutional controls is to prevent an unacceptable risk to human health and the environment by restricting the use of RB D, including RB D soils, to that which is consistent with assumptions in the RB D RRE. DOE or its successors would retain the right and responsibility to monitor, maintain, and enforce these institutional controls. The following property deed restrictions and requirements would be imposed on the property to maintain protection of human health and the environment in the future:

- Ensure that industrial land use is maintained;
- Prohibit the use of bedrock ground water;
- Provide site access for federal and state agencies for the purpose of sampling and monitoring; and
- Soils from RB D shall not be removed from the Mound NPL Facility boundary without approval from the Ohio Department of Health.

8. EVALUATION OF ALTERNATIVES

Pursuant to the NCP, each proposed alternative must be evaluated using nine (9) criteria. The nine criteria fall into three (3) groups: threshold criteria, primary balancing criteria, and 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 for future use as the land and buildings in RB D have only been determined to be protective in an industrial land use setting. Deed restrictions are required as a mechanism to ensure the continued future use of RB D is limited to industrial purposes.

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

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 collectivlely 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 there use is well-suited to the site.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides the basis for invoking a waiver. Both alternatives will attain their respective federal and state ARARs, as appropriate.

8.2 PRIMARY 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 RB D.

At a minimum of every five (5) years, a review would be necessary to evaluate the effectiveness of the selected alternative because hazardous substances would remain onsite in concentrations above unrestricted land use levels.

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 RB D was accomplished previously on an individual PRS basis.

8.2.3 CRTIERIA 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, would provide 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.

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 does not believe that Alternative 1, No Action, provides adequate protection of human health and the environment in the future. However, both agencies have expressed their support for Alternative 2, Institutional Controls.

8.3.2 CRITERIA 9: Community Acceptance

To evaluate community acceptance, this Proposed Plan, and the RRE supplement, 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 following property deed restrictions and requirements would be imposed on the property to maintain protection of human health and the environment in the future:

- Ensure that industrial land use is maintained;
- Prohibit the use of bedrock ground water;
- Provide site access for federal and state agencies for the purpose of sampling and monitoring; and
- Soils from RB D shall not be removed from the Mound NPL Facility boundary without approval from the Ohio Department of Health.

The soils within RB D have not been evaluated for any use other than on-site industrial use. Any off-site disposition of RB D 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. 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 December 22, 1998, to January 21, 1999. A public meeting will be held to discuss the Plan at 7:00 P.M. on January 14, 1999, in the OSE Cafeteria of the Mound Plant.

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

Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan, Final, May 1992.

Operable Unit 3 Miscellaneous Sites Limited Field Investigation Report, Volumes 1, 2, and 3. Final, Revision 0. July 1, 1993.

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Action Memorandum, PRS 304 Removal Action, Final, December, 1998.

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Letter from Mr. Timothy J. Fischer, Remedial Project Manager, US EPA to Mr. Arthur Kleinrath, US DOE dated December 4, 1998, RE: Ecological Risk Assessment, Release Block D.

Letter from Mr. Brian Nickel, Mound Project Manager, Office of Federal Facilities and Oversight, OEPA to Mr. Oba Vincent, US DOE dated December 8, 1998, RE: DOE Mound Release Block D Ecological Assessment.