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CERCLA 120(h) SUMMARY
NOTICE OF HAZARDOUS SUBSTANCES
Release Block H,
Mound Plant, Miamisburg, Ohio

July, 1999

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ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
BDP	Building Data Package
BVA	Buried Valley Aquifer
BWO	Babcock and Wilcox of Ohio
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act
COC	Contaminant of Concern
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 Priorities List
OEPA	Ohio Environmental Protection Agency
OSC	On-Scene Coordinator
OU	Operable Unit
pCi	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

ACRONYMS (continued)

RRE	Residual Risk Evaluation
RREM	Residual Risk Evaluation Methodology
SM/PP	Special Metallurgical/Plutonium Processing
SOF	Statement of Finding
TPR	Technical Position Report in Support of Release Block H Residual Risk Evaluation
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

CERCLA 120(h) SUMMARY
FINDING OF SUITABILITY TO TRANSFER
RELEASE BLOCK H
MOUND PLANT, MIAMISBURG, OHIO

I. PURPOSE

The information contained in this notice is required under the authority of regulations promulgated under section 120 (h) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). This summary is intended to support a transfer by deed to new ownership for economic development by documenting that the U.S. Department of Energy's (US DOE) Mound Plant has met the requirements of CERCLA 120 (h) for Release Block H (RB H). A copy shall be provided to all future owners.

II. PROPERTY DESCRIPTION

A. Description of Property Suitable for Transfer

Situated in the State of Ohio, County of Montgomery, being in the City of Miamisburg, being part of Section 30, and Section 36, Range 5, Township 2, lying in the Miami Rivers Survey (M.R.S.), and being part of city lots numbered 2258 and 2259 within the Corporation Limits of the City of Miamisburg, and being more particularly bounded and described with bearings referenced to the Ohio State Coordinate System, South Zone, as follows:

Beginning at a concrete monument, being the North East corner of Section 36 and the North West corner of Section 30, and being the point of beginning for the land herein described, thence S 5° 47' 45" W 130.89 feet to an iron pin being the TRUE POINT OF BEGINNING; thence S 85° 03' 12" E 1023.90 feet to a concrete monument, thence N 6° 54' 59" E 231.00 feet to a concrete monument, thence S 84° 36' 50" E 30.00 feet to a iron pin, thence S 6° 54' 54" W 100.00 feet to a iron pin, thence S 84° 36' 37" E 193.40 feet to a concrete monument, thence S 5° 34' 19" W 571.986 feet along the center line of Mound Road to a point, thence S 90° 0' 0" W 72.86 feet to a point, thence S 51° 28' 1.6" W 48.51 feet to a point, thence S 83° 32' 4" W 97.29 feet

to a point, thence S 63° 48' 53" W 98.67 feet to a point, thence N 89° 55' 58" W 173.02 feet to a point, thence N 83° 49' 39" W 244.21 feet to a point, thence along the arc of a curve to the right having a radius of 360.67 feet for a distance of 353.12 feet to a point, thence N 25° 03' 02" W 214.48 feet to a point, thence S 64° 03' 10" W 37.94 feet to a point, thence N 64° 35' 31" W 56.61 feet to a point, thence N 25° 43' 03" 160.76 feet to a point, thence N 65° 33' 00" E 35.05 feet to a point, thence N 5° 31' 01" E 57.67 feet to a iron pin being the true point of beginning containing 14.29 acres more or less, and subject to all legal highways and easements of record.

B. Regional Context of Mound Plant and Transferred Property

The Mound Plant occupies an approximately 306 acre site in Montgomery County within the City of Miamisburg, Ohio. The northern boundary of the plant is approximately 0.13 miles south of Mound Avenue in Miamisburg. Benner Road forms the southern boundary of the plant, and the Conrail Railroad roughly parallels the western boundary at a distance of 50-200 feet. The Mound Plant consists of the Operational Area and the New Property (also referred to as the South Property). Approximately 130 buildings with a total of 1.4 million square feet of floor space existed at one time at the Mound Plant (although the number of buildings is constantly diminishing as buildings are decommissioned and demolished); all of which were located in the Operational Area.

C. Historical Uses of Release Block H

The primary use of most of the area making up Block H, has been as a parking area for Mound employee vehicles. Occasional uses have included recent use as a staging area for empty trailers and staging for dismantled modular office structures. Release Block H, through the early 1950's, included office structures that housed the construction related crews involved in construction of the plant. No other uses of the area of the Mound facility referred to as Release Block H are known.

III. ENVIRONMENTAL FINDINGS

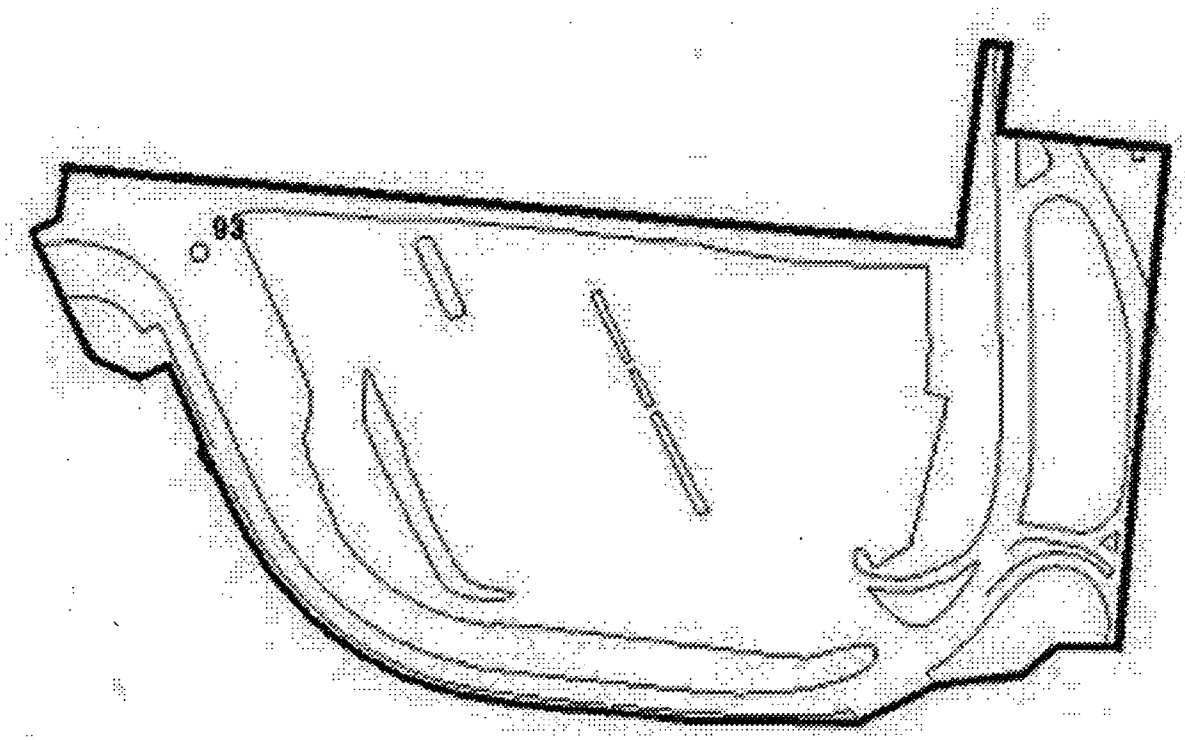
A. Methodology

In accordance with Section 120 (h)(3) of CERCLA, to the extent that information is available based on a complete search of DOE files, the following shall be placed in deeds: (1) a notice of the type and quantity of hazardous substances stored, disposed of, or released; (2) a notice of the time at which such storage, disposal, or release took place; and (3) a description of any remedial action taken. Information sources reviewed to obtain the information include:

- Federal Government records
- Recorded chain of title documents
- Reasonably obtainable aerial photographs
- Visual inspection of the property and adjacent properties
- Reasonably obtainable records of releases on adjacent properties
- Interviews with current or former employees
- Sampling, if appropriate under the circumstances.

RB H includes one Potential Release Site or PRS that has undergone previous investigations. This PRS was identified on the basis of potential radiological and chemical (non-radioactive) contamination using knowledge of historical land use or on actual measurements of contaminants. 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 H have been evaluated.

FIGURE 3-1 PRS Within Release Block H



A Core Team with representatives from the US DOE, US Environmental Protection Agency (US EPA), and Ohio EPA (OEPA) performs a joint agency evaluation of 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.

This summary is a result of a thorough analysis of information contained in the following reference documents:

1. The Potential Release Site (PRS) Data Package for the PRS located within Release Block H. The location of the PRS in RB H is shown on Figure 3-1. The rationale for designation of this PRS is outlined in Table 3-1.

   This PRS was identified on the basis of potential radiological and chemical (non-radioactive) contamination using knowledge of historical land use or on actual measurements of contaminants.

TABLE 3-1 Release Block H PRSs/Buildings and Conclusions

PRS	TITLE	DATE
93	Main Hill Seep Number 0603 - radiological/non-radiological.	Recommendation for NFA with continued monitoring signed by Core Team on 03/04/96.

2. Residual Risk Evaluation, Release Block H, Final, August 7 1997. *Provides the evaluation of human health risks associated with any residual contamination that may remain in the block after all remedies within a parcel have been completed. The evaluation ensures that future users of the land will not be exposed to contamination levels that would pose unacceptable health risks. This document should be used in conjunction with item 4.*

3. Proposed Plan for Release Block H, Mound Plant, Miamisburg, Ohio, Public Review Draft, Revision 0, May, 1999. *Identifies the preferred option for addressing the contamination at the Mound*

Site, Release Block H, to the public by briefly summarizing the alternatives studied and highlighting the key factors that led to identifying the preferred alternative.

4. Technical Position Report In Support of the Release Block H Residual Risk Evaluation, Final, Revision 0, July, 1999. *This report is a review of key risk data for soil and groundwater related pathways. This document should be used in conjunction with Item 2.*

5. Record of Decision (ROD) for Release Block H, Mound Plant, Miamisburg, Ohio, Final, July, 1999. *Documents the remedial action plan for a site and serves the following three functions: (1) certifies the remedy selection process was carried out in accordance with CERCLA, (2) describes the technical parameters of the remedy, specifying the treatment, engineering, and institutional components as well as clean up levels, and (3) provides the public with a consolidated summary of information about the site and the chosen remedy, including the rationale behind the selection.*

B. Results Summary

1. Results of Building Data Analysis

There are no DOE owned buildings within this release block. Consequently, there is no building related contamination warranting remedial action or environmental concern. Lease or sale of RB H for commercial/industrial use is protective of human health and the environment.

a. Asbestos

Asbestos material in buildings can be found in five forms: sprayed or troweled on ceilings and walls (surfacing materials); insulation around pipes, ducts, boilers and tanks (pipe and boiler insulation); transite (in ground piping); and in roofing materials (roofing felts); other products such as ceiling and floor tiles and wall boards (miscellaneous materials).

There are no DOE owned structures within Release Block H, therefore, there are no areas requiring repair prior to transfer.

b. Lead Paint

Lead based paint was used almost exclusively in the U.S. prior to the 1970's. Congress established maximum lead concentrations in residential paint in 1978.

There are no DOE owned structures within Release Block H, therefore, there are no areas requiring repair prior to transfer.

c. Radon

Radon studies are presented in a 1989-90 Mound Indoor Radon study for buildings. There are no DOE owned structures within Release Block H, therefore, there are no areas requiring abatement prior to transfer.

d. Radiological Surveys

There were no radiological processes performed in the Release Block H Area.

e. Polychlorinated Biphenyls

There are no areas within Release Block H requiring Polychlorinated Biphenyls (PCB) cleanup.

2. Results of Potential Release Site Soil Data Analysis

The US DOE, US EPA and OEPA have jointly decided that no additional remedial action for PRS 93 is necessary with the placement of Institutional Controls in the form of deed restrictions on future land use for RB H upon transfer. Monitoring of PRS 93 groundwater seep will continue.

Risks are quantified for both carcinogenic and non-carcinogenic contaminants. The risk associated with the intake of a known or

suspected carcinogen is reported in terms of the incremental lifetime cancer risk presented by that contaminant of concern (COC), as estimated using the appropriate slope factor and the amount of material ingested. Residual levels of contamination that remain on RB H for carcinogens indicate a probability or likelihood of one chance in 10,000 to one chance in 1,000,000 of an individual developing cancer based on an industrial use scenario. This probability or likelihood is consistent with the US EPA target risk range.

Potential human health hazards from exposure to non-carcinogenic contaminants are evaluated by using a Hazard Quotient (HQ). The HQ is the ratio of the intake of a COC to a reference dose or concentration for the COC that is believed to represent a no-observable effect level. The COC-specific HQs are then summed to provide an overall Hazard Index (HI). US EPA guidance sets a limit of 1.0 for the Comprehensive HI. The HIs for the future groundwater scenarios, however, are near or above the 1.0-limit. This is based on the bedrock groundwater contaminants flowing directly to the BVA that supplies drinking water for the plant. As a result, the selected remedy prohibits the use of bedrock groundwater. This institutional control, in the form of a deed restriction, will ensure that the residual risks associated with RB H remain acceptable.

Evaluation of residual contaminants within RB H have resulted in a determination that future users of the land will not be exposed to contaminant levels that would pose unacceptable risks as long as compliance with the deed restrictions described in the RB H Record of Decision are maintained. Remediation activities and additional assessment activities are nearing completion for adjacent property to the west. Remediation activities and additional assessment activities are scheduled in the future for adjacent properties to the south. Each removal action will be designed with containment methods to prevent migration via air pathways, surface water pathways and groundwater pathways. Stormwater management and sediment erosion control will be outlined in each of the decontamination and/or demolition project work plans. DOE believes that no additional contamination of RB H is likely from adjacent activities.

A brief summary of the history of PRS 93 and its measurements

follows. For a more detailed description of PRS 93, refer to the PRS data package as identified in Section III.A.1 of this report:

PRSs at Mound were identified based on either knowledge of historical land use that was considered potentially detrimental, or an actual sampling result showing elevated concentrations of contaminants. The location of PRS 93 is shown in Figure 3.1.

The rationale for designation of PRS 93 is outlined as follows:

Potential Release Site (PRS) 93 was historically identified as seep 603 and is located on-site, adjacent to the large parking lot. The investigation for seeps on the Main Hill was initiated in the spring of 1986. The investigation stemmed from the discovery of a groundwater seep on the western hillside below SW Building. Water from the seep was sampled and a laboratory analysis showed elevated tritium detected at low concentrations, i.e., in the range of 1,000 to 3,000 pCi/L. Flow was intermittent in the past and continues to be even recently. The latest data seem to indicate an increase in tritium concentrations but is most likely related to much diminished flow.

Soil was sampled at seep 603 as part of OU9, Regional Soils Investigation (OU9 Regional Soils Investigation Report, Rev 2, August, 1995). All radionuclide concentrations for seep 603 were at background. All other contaminants at seep 603 were in the range of background. Radiological Site Survey data from the vicinity of seep 603 shows a maximum concentration of Pu-238 of 3.46 pCi/g, which is less than Mound's ALARA guideline of 25 pCi/g. Thorium concentrations were all below the detection limit of 2 pCi/g.

C. Summary of All Soil and Groundwater Contaminants Detected

The COCs for RB H were identified by reviewing all of the sampling data for the release block. Based on that review, contaminants were eliminated for further evaluation based on criteria established in the Residual Risk Evaluation Methodology (RREM) (Residual Risk Evaluation Methodology, 1/6/97, Final, Rev 0). Specifically, only contaminants exceeding (1) background, (2) a base level of potential health concern, and (3) certain frequency of detection (FOD) criteria were carried through

the Residual Risk Evaluation (RRE) (Residual Risk Evaluation - Release Block H, Final, Rev 0, August, 1997 and Technical Position Report In Support of the Release Block H Residual Risk Evaluation, Final, Rev 0, July, 1999). The COCs established for RB H are listed in Tables 3-2, 3-3, and 3-4.

Exposures to the specific concentrations of COCs were evaluated assuming intake rates for soil and groundwater. Once the intakes were estimated, the human health implications of those intakes were evaluated by reviewing toxicological data for the COCs. For the special case of groundwater, the possible exposures to current and future COCs are evaluated. This approach ensures that the cumulative and long-term impacts of the COCs are adequately characterized. The risks to a theoretical site worker and to a theoretical site construction worker in RB H are listed in Table 3-5. Pursuant to the RREM, the risks were quantified for both carcinogenic and non-carcinogenic contaminants. The risks to a theoretical site worker and to a theoretical site construction worker in RB H are listed in Table 3-5. The overall risk values are in the acceptable range of 10^{-4} to 10^{-6}. The HIs for the future groundwater scenarios, however, are near or above the 1.0-limit. This is based on the bedrock groundwater contaminants flowing directly to the BVA that supplies drinking water for the plant. As a result, the selected remedy prohibits the use of bedrock groundwater. This institutional control, in the form of a deed restriction, will ensure that the residual risks associated with RB H remain acceptable.

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

Table 3-2. Soil Contaminants of Concern for RB H

Soil Constituent	CAS Numbers	Maximum Concentration Any Depth	Maximum concentration Shallow (<2' deep)	Screening Concentration (either Bkgd or G.V.)[1]
ORGANICS (mg/kg)				
Acenaphtene	83329	0.18	0.18	
Acenaphthylene	208968	0.7	0.7	
Aldrin	309002	0.0031	0.0031	
Benzo(a)pyrene	50328	1.115	1.115	0.41[2]
Benzo(g,h,i) perylene	191242	1.0625	1.0625	
delta-BHC	319868	0.00025	0.00025	
Carbazole	N/A	0.5875	0.5875	
alpha Chlordane	57749	0.01	0.01	
gamma Chlordane	57749	0.0074	0.0074	
4-chloro-3-methyl phenol	59507	0.047	0.047	
Dibenzo(a,h)anthracene	53703	0.78	0.78	0.41[2]
Dibenzofuran	132-64-9	1.035	1.035	
Fluorene	86737	1.45	1.45	
Heptachlor epoxide	1024573	0.0022	0.0022	
2-Methylnaphthalene	91576	0.92	0.92	
Naphthalene	91203	2.625	2.625	
Phenanthrene	3.75	3.75	3.75	

Soil Constituent	CAS Numbers	Maximum Concentration Any Depth	Maximum concentration Shallow (<2' deep)	Screening Concentration (either Bkgd or G.V.)[1]
1,1,2-Trichloro-1,2,2-trifluoroethane	N/A	0.002	0.002	
INORGANICS (mg/kg)				
Arsenic (total)	7440382	10.9	10.9	8.6[3]
Bismuth	7440-69-9	58.6	58.6	
Copper (total)	7440508	26.4	22.1	26[3]
Lead (total)	7439921	163	163	48[3]
Lithium	7439-69-9	40.2	19	26[3]
RADIONUCLIDES (pCi/g)				
Cesium-137	N/A	1.9	1.9	0.42[4]
Plutonium-238	N/A	56	56	0.13[3]
Plutonium-242	N/A	0.0143	0.0143	
Potassium-40	N/A	45.4	21	37[3]
Radium-226	N/A	3.15	3.15	0.13[4]

Note: Blanks indicate background or Guideline Value not available. The more restrictive GV was used to determine which contaminants were carried through the RRE.

[1] - Guideline values (GVs) are decision-making tools for the Core Team. GVs help the Core Team determine if contaminants are present at levels that warrant evaluation.

[2] - GV corresponds to a total risk of 10^{-6} for the ingestion pathway.

[3] - Background Value. When adequate numbers of measurements are available, background values are based on the 95% upper tolerance limit.

[4] - GV corresponds to a total risk 10^{-6} for the ingestion, inhalation and external pathways.

Reference: "Technical Position Report in Support of the Release Block H Residual Risk Evaluation", Public Review Draft Rev 2, April, 1999.

Table 3-3. Current Mound Plant Groundwater Contaminants of Concern Based on the Plant Water Supply

Groundwater Constituent	Maximum concentration	Screening Concentration (either background or G.V.)[1]
ORGANICS (mg/L)		
1,1-Dichloroethene	0.0017	—
1,1,1-Trichloroethane	0.0018	0.0007[4]
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087	—
INORGANICS (mg/L)		
Cadmium	0.0077	0.051[2]
Copper	0.593	0.0012[4]
Lead	0.040	0.0101[4]
RADIONUCLIDES (pCi/L)		
Actinium-227	0.335	0.26[3]
Bismuth-210	0.39	—
Plutonium-239/240	2.0	0.125[4]
Thorium-228	2.17	0.69[3]
Tritium	7200	1485[4]
Uranium-234	8.14	0.792[4]
Uranium-238	8.25	0.688[4]

[1] - Guideline values (GVs) are decision-making tools for the Core Team. GVs help the Core Team determine if contaminants are present at levels that warrant evaluation.
[2] - Hazard Quotient for ingestion, dermal and inhalation. Decision made on 0.1xGV.
[3] - GV corresponds to a total risk of 10^{-6} for ingestion only.
[4] - Background value. When adequate numbers of measurements are available, background values are based on the 95th% upper tolerance limit.

Table 3-4. Future Mound Plant Groundwater Contaminants of Concern

Groundwater Constituent	Estimated Maximum concentration	Screening Concentration (either background or G.V.)[1]
ORGANICS (mg/L)		
1,1-Dichloroethene	0.0017	---
1,1,1-Trichloroethane	0.0065	0.0007[4]
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087	---
INORGANICS (mg/L)		
Beryllium	0.0001	0.000066[5]
Bismuth	0.0016	---
Cadmium	0.0077	0.051[2]
Chromium	0.4961	0.0061[4]
Cobalt	0.0039	---
Copper	0.5964	0.0012[4]
Lead	0.040	0.010[4]
Molybdenum	0.0096	0.0056[4]
RADIONUCLIDES (pCi/L)		
Actinium-227	0.355	0.26[3]
Bismuth-210	0.39	---
Plutonium-239/240	2.02	0.125[4]
Thorium-228	2.17	0.69[3]
Tritium	10427	1485[4]
Uranium-234	8.14	0.792[4]
Uranium-238	8.25	0.688[4]

[1] - Guideline values (GVs) are decision-making tools for the Core Team. GVs help the Core Team determine if contaminants are present at levels that warrant evaluation.
[2] - Hazard Quotient for ingestion, dermal and inhalation. Decision made on 0.1xGV.
[3] - GV corresponds to a total risk of 10^{-6} for ingestion only.
[4] - Background value. When adequate numbers of measurements are available, background values are based on the 95th% upper tolerance limit.
[5] - Total Risk 10^{-6} for ingestion, dermal and inhalation

Reference: "Technical Position Report in Support of the Release Block H Residual Risk Evaluation", Public Review Draft Rev 2, April, 1999.

Table 3-5. Current and Future Residual Risks for Release Block H

	Construction Worker					
	Soil	**Air**	**Groundwater Current**	**Groundwater Future**	**Sum of Soil, Air and Groundwater Current**	**Sum of Soil, Air and Groundwater Future**
Non-carcinogenic Hazard Index for Organics & Inorganics	4.0E-02	N/A	3.7E-02	1.6E+00	HI = 7.7E-02	HI = 1.7E+00
Carcinogenic Risks for Organics & Inorganics	4.7E-06	N/A	N/A	N/A	Risk = 4.7E-06	Risk = 4.7E-06
Carcinogenic Risks for Radionuclides	1.7E-05	2.0E-07	2.5E-06	2.9E-06	Risk = 2.0E-05	Risk = 2.3E-05
			Construction Worker Overall HI =		7.7E-02	1.7E+00
			Overall Risk =		2.5E-05	2.8E-05

	Site Employee					
	Soil	**Air**	**Groundwater Current**	**Groundwater Future**	**Sum of Soil, Air and Groundwater Current**	**Sum of Soil, Air and Groundwater Future**
Non-carcinogenic Hazard Index for Organics & Inorganics	4.0E-03	N/A	3.7E-02	1.6E+00	HI = 4.1E-02	HI = 1.6E+00
Carcinogenic Risks for Organics & Inorganics	2.0E-06	N/A	N/A	N/A	Risk = 2.0E-06	Risk = 2.0E-06
Carcinogenic Risks for Radionuclides	1.8E-05	9.9E-07	1.3E-05	1.4E-05	Risk = 3.2E-05	Risk = 4.6E-05
			Site Employee Overall HI =		4.1E-02	1.6E+00
			Overall Risk =		3.4E-05	4.8E-05

D. Other Factors Considered

DOE developed a generic checklist of the issues to be considered in evaluating property to be transferred. The list was modified from those used by the Department of Defense in releasing property for sale. The list includes environmental problems from Mound Plant that are likely to concern a potential purchaser as well as items relating to the operational concerns from ongoing and future remedial actions. Table 3.6 contains a brief summary and references for all factors considered. Results of only those factors which affect RB H are presented as follows:

1. Drinking Water

Mound Plant has exceeded the action levels for lead and copper due to the corrosiveness of the water distribution system. When the action level for lead is exceeded, EPA regulations require corrosion control and public education programs. These programs are in place at Mound. Information on the steps being taken to reduce lead concentrations in the Mound Plant water system, and on the hazards associated with ingesting lead are available to all Mound drinking water users.

2. Monitoring Equipment

An easement will be executed between the US DOE and MMCIC prior to transfer of RB H to maintain access for continued monitoring and maintenance on one air monitoring station (Air Station 212) and at Seep 603 (PRS 93). Questions regarding terms and conditions should be directed to the DOE Realty Officer, Ohio Field Office. Ohio EPA will have access for continued monitoring and maintenance of its air monitors and Seep 603.

3. Floodplain

A small portion of the northeast corner of RB H lies within the 100-year floodplain, i.e., the area is subject to a 1% chance per year of inundation from a tributary of the Great Miami River. In accordance with 10 CFR 1022.5(d), DOE has identified those

uses that are restricted under Federal, state, and local floodplain regulations. Via this environmental summary, DOE is fulfilling its obligation to inform future owners of the applicability of those regulations to RB H.

The restrictions are listed in the Floodplain Assessment for the Transfer of Parcel H, December 21, 1998. A Notice of Floodplain Involvement was published in the Federal Register on January 12, 1999 (Volume 64, Number 7, pp. 1797 - 1798). The Statement of Findings (SOF) for the proposed action appeared in the Federal Register on April 26, 1999. The SOF indicated that the transfer of RB H conforms to floodplain protection standards in so much as any future land owner will be subject to the applicable codes governing development activities on property that lies within a floodplain.

TABLE 3.6 Summary of Other Factors Considered for Release Block D, Mound Plant

FACTOR CONSIDERED	AFFECTS RB H? YES	AFFECTS RB H? NO	RECOMMENDATION/CONCLUSION	REFERENCE
Cultural Resources		✔	There are no historic or cultural resources within RB H. None of the areas within this Release Block would fall under a Memorandum of Agreement (MOA) or require deed restrictions to be put in place prior to transfer to limit alterations to the structures.	Correspondence From Mark J. Epstein, Department Head, Resource Protection and Review, Ohio Historic Preservation Office dated July 31, 1998.
Drinking Water Quality		✔	Mound Plant has exceeded the action levels for lead and copper due to the corrosiveness of the water distribution system. When the action level for lead is exceeded, EPA regulations require corrosion control and public education programs. These programs are in place at Mound. Information on the steps being taken to reduce lead concentrations in the Mound Plant water system, and on the hazards associated with ingesting lead will be made available to all Mound drinking water users.	Miamisburg Environmental Management Project, Annual Site Environmental Report for Calendar Year 1997, September 1998.
Endangered Species		✔	Two state protected species were found, the dark-eyed junco (Junxo hyemalis) and the inland rush (Juncus interior). Because only one individual inland rush was located, it is not considered a viable breeding population at the Mound facility. The dark-eyed junco is not known to breed in southwestern Ohio. It has also been determined that the plant site is in the habitat range of the federally endangered species of Indiana Bat (Myotis sodalis), however, the Mound site does not provide a suitable habitat for the Indiana Bat. Neither the solitary sitings of the rush and the junco, nor the potential habitat for the Indiana bat, are expected to affect ongoing or future activities at the site.	Operable Unit 9 Hydrogeologic Investigation: Wetlands Determination Report, Technical Memorandum, Revision 1, January 1994.
Fragment Arcs		✔	No fragment arcs and clearance zones due to explosive hazards at onsite operations exist in Release Block H.	Drawing FSD 970058, "Clearance Zones and Fragment Arcs" Building 100 Technical Review, Appendix 7.3 - Lease Agreement for Building (Extract)

FACTOR CONSIDERED	AFFECTS RB H YES	AFFECTS RB H NO	RECOMMENDATION/CONCLUSION	REFERENCE
Monitoring Equipment	✔		An easement has been executed between the US DOE and MMCIC to maintain access for continued monitoring of air sampling station 212 and at seep 603 (PRS 93).	Groundwater Monitoring Program and Groundwater Protection Management Program Plan, April 1997, Revision 1. Mound Plant Environmental Monitoring Plan dated July 1997.
National Environmental Policy Act (NEPA)	✔		A Finding of No Significant Impact (FONSI) was issued on October 27, 1994 for the commercialization of the Mound Plant.	The Mound Plant EA for Commercialization of the Mound Plant, DOE/EA-1001 dated October, 1994 and FONSI for the Commercialization of the Mound Plant EA dated October 27, 1994.
Resource Conservation and Recovery Act (RCRA)		✔	DOE has found no RCRA regulated units within Release Block H warranting a RCRA closure action. It has been determined that the closest facility boundary from Buildings 23 and 72 will not change with the sale of Release Block H. Therefore, the risk assessment information in the RCRA Part B Permit will not change.	RCRA Part B Permit Application, Volume I, Section A, September 1995 (as amended) Responses to Information Requested by the Ohio HWFB Technical Staff transmitted to Bob Brown of the State of Ohio Hazardous Waste Facility Board dated March 12, 1996.

FACTOR CONSIDERED	AFFECTS RB H YES	AFFECTS RB H NO	RECOMMENDATION/CONCLUSION	REFERENCE
Underground Storage Tanks (USTs)		✔	There are no USTs located within RB H.	EG&G Mound Applied Technologies, Active Underground Storage Tank Plan, November 1994.
Wetlands		✔	Three characteristics must be present to be classified as jurisdictional wetlands: (1) hydrophytic vegetation, (2) hydric soils, and (3) wetlands hydrology. Absence of any one of these characteristics removes an area from consideration. None of the sites examined within Release Block H constitute jurisdictional wetlands	Operable Unit 9 Hydrogeologic Investigation: Wetlands Determination Report, Technical Memorandum, Revision 1, January 1994.
Floodplains	✔		A small portion of the northeast corner of Release Block H lies within the 100-year floodplain. Consistent with 10 CFR 1022, the applicability of floodplain regulations to the property must be disclosed to the new owner.	SOF for the Floodplain Assessment for the Transfer of Parcel H, April 26, 1999.

III. FINDING OF SUITABILITY TO TRANSFER

In accordance with the provisions of CERCLA Section 120 (h), contaminated property can only be transferred if one of the following applies:

(1) a remedial action has been taken that protects human health and the environment and EPA deems this condition to be satisfied if a remedy has been constructed and is operating successfully,

(2) a decision has been made that no remedial action is necessary.

This future industrial use of the Mound Plant has been determined based upon agreement among US DOE, US EPA and 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.

A joint agency decision among the US DOE, US EPA and OEPA has been made that a remedial action has been taken that protects human health and the environment. EPA deems this condition to be satisfied if the Institutional Controls are implemented and operating successfully. Institutional controls in the form of deed restrictions on future land use will be placed on RB H upon transfer as part of the remedy. The objective of these institutional controls is to prevent an unacceptable risk to human health and the environment by restricting the use of RB H, including RB H soils, to that which is consistent with assumptions in the RB H RRE. DOE or its successors will retain the right and responsibility to monitor, maintain, and enforce these institutional controls. The following property deed restrictions and requirements will be imposed on the property to maintain protection of human health and the environment in the future:

1. Ensure that industrial land use is maintained;
2. Prohibit the use of bedrock ground water;
3. Provide site access for federal and state agencies for the purpose of taking response actions, including sampling and monitoring; and
4. Prohibit removal of RB H soils from the DOE Mound property (as owned in 1998) boundary without approval from ODH and OEPA, or their successor agencies.

V. ENVIRONMENTAL COVENANTS

DOE is committed to include a covenant in accordance with Section 120 (h)(3) of CERCLA in the deed for the sale or transfer of the property that warrants that:

A. All remedial action necessary to protect human health and the environment has been taken as long as the deed restrictions limiting land and ground water use are in effect and enforced.

B. Any additional response action or corrective action found to be necessary after the date of sale or transfer shall be conducted by the United States [Section 120(h)(4)(D)(i)]. The requirements of the covenant shall not apply in any case in which the person or entity to whom the property is transferred is a potentially responsible party with respect to the property.

C. A clause granting the United States access to the property in any case in which a response action or corrective action is found to be necessary or such access is necessary to carry out a response action or corrective action on the adjoining property [Section 120 (h)(4)(D)(ii)]

VI. NOTIFICATION/PUBLIC PARTICIPATION

The community has been an active participant in this process to date. Comments from the public on the PRS recommendation 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.

Table 6.1 lists the RB H PRS package, RB H RRE, and RB H Proposed Plan along with the dates they were made available for public comment.

Table 6.1 Release Block H Documents and Public Comment Periods

DOCUMENT/PRS	COMMENT PERIOD (BEGIN)	COMMENT PERIOD (END)
PRS 93	March 18, 1996	April 1, 1996
RB H Residual Risk Evaluation	April 30, 1997	June 16, 1997
Technical Position Report in Support of Release Block H Residual Risk Evaluation	May 5, 1999	June 5, 1999
Proposed Plan for RB H	May 5, 1999	June 5, 1999

From: Brian Nickel <Brian.Nickel@epa.state.oh.us>
To: DOE_OH.MOUND(Kleinrath Arthur),MNDCONT.MNDPO(BAUEL...
Date: 4/23/99 1:42pm
Subject: Re: Additional Word Changes to the RB H TPR

Linda,
Looks fine, just indicate that the RBGV is Lead 210 +D. See bold below for suggested text change.

>>> Linda Bauer <BAUELR@doe-md.gov> 04/23 11:29 AM >>>
Based on input from Brian, two additional additions to the TPR are now planned.

(1) The following footnote will be added to Table II.1: "Th-232 95% Upper Confidence Level was less than background. Therefore, Th-232 was not carried through the risk calculations."

(2) A new Paragraph 3.1.6 "Lead-210" will be added. (Though Pb-210 screens out, it was felt necessary to add text to highlight the creation of Pb-210 RBGVs for soil.) The proposed paragraph reads: "During the February 1999 sampling event, lead-210 was detected in five of 11 samples. Since neither a risk-based guideline value nor a background level had been established for this radionuclide, a technical basis for evaluating the data was needed. To determine if Pb-210 should be carried through or screened from the RRE, soil risk-based guideline values were developed. The resultant GVs for Pb 210 +D (plus daughter products) were 1.7 pCi/g and 3.2 pCi/g for the
construction worker and the site employee, respectively. (GV calculations are shown in the Appendix.) Based on these GVs, lead-210 was not carried through the RRE."

Please advise if you concur with language as proposed.

Thanks,
LB

CC: DOE_OH.MOUND(Schmaltz Frank),MNDCONT.MNDPO(RAKEDA)

4/29/99 Status updated, to file

BWX Technologies, Inc.
Babcock & Wilcox, a McDermott company

Babcock & Wilcox of Ohio, In
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-30
(937) 865-4020

ESC-086/99
April 28, 1999

99-TC/04-28

Mr. Richard B. Provencher, Director
Miamisburg Environmental Management Project
U.S. Department of Energy
P.O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Dewain Eckman

SUBJECT: Contract No. DE-AC24-97OH20044
CERCLA Documents for Release Block H

REFERENCE: Statement of Work Requirement C 7.1e -- Regulator Reports

Dear Mr. Provencher:

Babcock & Wilcox of Ohio, Inc. (BWO) has completed the following CERCLA products for public review in support of the transfer of Release Block H: Technical Position Report in Support of the Release Block H Residual Risk Evaluation, and the Proposed Plan for Release Block H.

Pending approval from your office to release the documents to the public, copies will be placed in the CERCLA Public Reading Room for a thirty day public review period that starts May 1, 1999. If you or members of your staff hava any questions regarding the documents, or if additional support is needed, please contact Dave Rakel at extension 4203.

Sincerely,

Linda R. Bauer, Ph.D.
Manager, Environmental Safeguards & Compliance

LRB/nmg

Enclosures as stated

cc: Tim Fischer, USEPA, (1) w/attachments
Dave Meredith, TechLaw, Inc., (1) w/attachments
Brian Nickel, OEPA, (2) w/attachments
Ruth Vandergrift, ODH, (1) w/attachments
Art Kleinrath, MEMP, (1) w/attachments
Frank Schmaltz, MEMP, (1) w/attachments
Dann Bird, MMCIC, (1) w/attachments
Public Reading Room, (5) w/attachments
DCC

bc: L. Bauer, w/o attachments
J. Geneczko, w/o attachments
N. Grice, w/o attachments (file)
S. Mackey, w/o attachments
J. Price, w/o attachments
D. Rakel, w/o attachments

TECHNICAL POSITION REPORT IN SUPPORT OF THE RELEASE BLOCK H RESIDUAL RISK EVALUATION

PUBLIC REVIEW DRAFT
Rev. 2

MOUND PLANT
MIAMISBURG, OHIO

April 1999

Miamisburg Environmental Management Project
U.S. Department of Energy

Report prepared by
Babcock & Wilcox of Ohio, Inc.
under Contract No. DE-AC24-97OH20044

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TECHNICAL POSITION REPORT IN SUPPORT OF THE RELEASE BLOCK H RESIDUAL RISK EVALUATION

1.0 BACKGROUND AND PURPOSE

The original Residual Risk Evaluation (RRE) for Release Block (RB) H was published in August of 1997. Since that time, some of the risk conversion factors for chemicals and radionuclides have changed. Additionally, some errors in the soil and groundwater sections of the RRE have been detected. Also, new soil samples were collected from RB H in February of 1999. As a result, the Mound 2000 Core Team requested a review of the RRE for RB H. This report summarizes the review. The review addressed the following questions:

(1) what hazard and risk conversion factors have changed since the Mound Guideline Values (GVs) were established,
(2) what errors were present in the original RRE,
(3) how do those changes/errors affect the collection of compounds that screened through, or were eliminated from, the RB H hazard and risk calculations, and
(4) what is a reasonable estimate of the overall impact of the changes identified above on the hazard and risk analyses performed for RB H.

2.0 METHODOLOGY

Chronologies of change for the Health Effects Assessment Summary Tables (HEAST) and Integrated Risk Information System (IRIS) data bases were developed. The chronologies document changes to HEAST and IRIS since the Mound Plant GVs were published. As a result of this exercise, previously conducted for RB D, a listing of the changes to risk data for compounds of interest to Mound was generated (Table 2-1).

Updated reference dose and slope factor data were then compared to values used in the RRE to ensure: (1) the appropriate collection of compounds was carried through the RRE process, and (2) the appropriate risk conversion factors (e.g., reference doses, slope factors) were used. This review was conducted first for compounds detected in RB H soil, then for compounds detected, or projected to be present, in the groundwater regimes of the Buried Valley Aquifer and/or the Mound Plant bedrock. The risk data associated with ambient air pathways (inhalation of tritium and isotopes of plutonium) were also reviewed. All results are presented in Section 3.

Table 2-1. IRIS and HEAST Chronologies of Change for Compounds of Interest to the Mound Plant Exit Project.

Chemical	IRIS Updated	Description of Changes
INORGANICS		
Antimony	Feb-91	
Arsenic	Apr-98	No change to RfD, UR for INH established (4.3E-3/ug/m3), INH SF withdrawn, INH UR established (4.3E-3/ug/m3), Oral SF established (1.5E0/mg/kg-d), DW UR established (5E-5/ug/L water)
Barium	Jan-99	Text changes to oral RfD section (numerical value unchanged)
Beryllium	Apr-98	Lowered the RfD (5E-3 -> 2E-3), added an RfC (2E-2ug/m3), replaced INH SF with UR (2.4E-3/ug/m3), withdrew oral SF
Bismuth	X	
Cadmium	Feb-94	
Calcium	X	
Chloride	X	
Chromium (III)	Sep-98	Raised RfD slightly (1.0E0 -> 1.5E0 mg/kg-d), no RfC value
Chromium (VI)	Sep-98	Reduced RfD from 5E-3 -> 3E-3 mg/kg-d, added RfC (8E-6 mg/m3), no SFs
Cobalt	X	
Copper	Aug-91	
Cyanide	Feb-93	
Fluoride		
Iron	X	
Lead	Nov-93	
Lithium	X	
Magnesium	X	
Manganese	Dec-96	No change to RfD, RfC
Mercury	Jun-95	No change to RfC
Molybdenum	Aug-93	
Nickel	Dec-96	No change to RfD
Nitrate	Oct-91	
Nitrate/Nitrite	X	
Phosphate	X	
Potassium	X	
Silicon	X	
Silver	Dec-96	No change to RfD
Sulfate	X	
Thallium	X	
Tin	X	
Vandium (pentoxide)	Dec-96	RfD raised from 7E-3 -> 9E-3 mg/kg-d
Zinc	Oct-92	

Table 2-1 (continued).

Chemical	IRIS Updated	Description of Changes
ORGANICS		
Acenaphthene	Apr-94	
Acenaphthylene	Jan-91	
Acetone	Aug-93	
Anthracene	Sep-94	
Aroclor-1016	Nov-96	RfD = 7E-5 mg/kg-d
Aroclor-1248	Nov-96	RfD data deemed inadequate
Aroclor-1254	Nov-96	RfD deemed OK
Aroclor-1260	X	
Benzene	Oct-98	Oral SF established (2.9E-2/mg/kg-d), DW UR established (8.3E-7/ug/L water), INH UR established (≤7.8E-6/ug/m3)
Benz(a)anthracene	Sep-94	
Benzo(a)pyrene	Nov-94	
Benzo(b)fluoranthene	Mar-94	
Benzo(g,h,i)perylene	Dec-90	
Benzo(k)fluoranthene	Mar-94	
Benzoic acid	Jul-93	
Bromodichloromethane	Mar-93	
2-Butanone (methyl ethyle ketone)	May-93	
Carbazole	X	
Carbon disulfide	Aug-95	Established RfC (0.7 mg/m3)
Carbon tetrachloride	Jun-91	
Chloroform	Sep-92	
2-Chlorophenol	Jul-93	
Chrysene	Mar-94	
Dibutyl phthalate	Feb-93	
Di-n-octyl phthalate	X	
Dibenz(a,h)anthracene	Mar-94	
Dibenzofuran	May-92	
1,1-Dichloroethane	Dec-96	(no RfC, no RfD)
1,1-Dichloroethene	X	
1,2-Dichloroethene	X	
1,2-cis-Dichloroethene	X	
1,2-trans-Dichloroethene	X	
Dichloromethane	Feb-95	Oral SF = 7.5E-3/mg/kg-d, DW UR = 2.1E-7/ug/L water
Ethylbenzene	Aug-91	
bis(2-ethylhexyl) phthalate	X	
Fluoranthene	Sep-94	
Fluorene	Dec-90	Note: Oral RfD in past RRE documents = 0.4 mg/kg-d Correct oral RfD = 0.04 mg/kg-d

Table 2-1 (continued).

Chemical	IRIS Updated	Description of Changes
Indeno(1,2,3-cd) pyrene	Mar-94	
Isophorone	Nov-92	
Methoxychlor	Dec-93	
2-Methylnaphthalene	X	
4-Methyl-2-pentanone = MIBK	Aug-93	
4-Methylphenol	Aug-93	
Naphthalene	Sep-98	Oral RfD reduced from 50 -> 0.02 mg/kg-d Carcinogen class changed to C
N-Nitrosodiphenylamine	Jul-93	
Pentachlorophenol	Jul-93	
Phenol	Mar-91	
Pyrene	Sep-94	
Tetrachloroethene	X	
1,1,1-Trichloroethane	Feb-96	Oral RfD withdrawn
Trichloroethene	X	
Trichloroethylene	Jul-94	
Trichlorofluoromethane	Aug-92	
1,1,2-Trichloro-1,2,2-trifluoroethane	Feb-96	RfD = 3E+1mg/kg-d
Toluene	Apr-94	
Xylenes	Mar-91	

Table 2-1 (continued).

HEAST STATUS

RADIONUCLIDES	Slope Factors Ingestion (risk/pCi)	Inhalation (risk/pCi)	External (risk/yr/pCi/g soil)
Ac-227+D	6.26E-10	7.87E-08	***9.30E-07***
Bi-210	7.29E-12	5.12E-11	N/A
Cs-137+D	3.16E-11	1.91E-11	2.09E-06
H-3	7.15E-14	9.59E-14	N/A
K-40	1.25E-11	7.46E-12	6.11E-07
Pb-210+D	***1.01E-09***	***3.86E-09***	***1.45E-10***
Pu-238	2.95E-10	2.74E-08	1.94E-11
Pu-239/240	3.16E-10	2.78E-08	1.26E-11
Pu-242	3.00E-10	2.64E-08	1.55E-11
Ra-224	1.49E-10	2.25E-09	2.48E-08
Ra-226+D	2.96E-10	2.75E-09	6.74E-06
Ra-228+D	2.48E-10	9.94E-10	3.28E-06
Sr-85	1.40E-12	1.14E-12	1.54E-06
Sr-90	5.59E-11	6.93E-11	N/A
Th-228+D	2.31E-10	9.68E-08	***6.20E-06***
Th-230	3.75E-11	1.72E-08	4.40E-11
Th-232	3.28E-11	1.93E-08	1.97E-11
Th-234	1.93E-11	1.90E-11	3.50E-09
U-233/234	4.48E-11	1.41E-08	3.52E-11
U-235+D	4.70E-11	1.30E-08	2.65E-07
U-238+D	6.20E-11	1.24E-08	***6.57E-08***

Values in bold, italics were not considered during the development of the Guideline Values for Mound.

3.0 RESULTS

3.1 Soil Data

Based on the review, new risk information for three (3) chemicals of concern detected in RB H soil required evaluation. Additionally, the original RRE erroneously reported that slope factors were not available for two (2) radionuclides: potassium-40 and plutonium-242. Also, radium-226 was screened out from the RRE on the basis of its parent-daughter relationship with thorium-232. However, the Th-232 slope factor does not include decay products. Therefore, supplemental radionuclide risk data were required and are described below. (Note that given the natural occurrence of potassium-40, and the levels of K-40 detected in RB H relative to background, residual risks from this radionuclide are inconsequential and not further evaluated in this report.)

Necessary corrections and changes to the RRE have been made; the calculations and resultant risk or hazard quotient (HQ) values are shown in the Appendix to this report. The changes are also described below. As documented in Tables 3.1a and 3.1b, the Hazard Indices (HIs) and risk values did change appreciably but remain in the acceptable range. In the interest of completeness, revised (relative to the 1997 RRE) Tables II.1, V.1, V.4, F.7, F.10, F.19, and F.22 have also been included in the Appendix to this report. Note that the additional sampling performed in February of 1999 did not impact the RRE. More specifically, the new results did not change the list of compounds that screened through, or were screened out of, the RRE.

3.1.1 Arsenic

The IRIS oral slope factor for arsenic has been reduced from 15 mg/kg-d to 1.5 mg/kg-d. Therefore, the incremental risks from the ingestion of arsenic in soil for the construction worker and site employee were reduced from 1.2×10^{-5} to 1.2×10^{-6} and from 6.0×10^{-6} to 6.0×10^{-7}, respectively. (The risk calculations have been reproduced in Appendix B.) Given the linear nature of the risk calculations, the background and total risks from ingestion of arsenic in soil were also reduced by an order of magnitude. Neither the risks for other pathways, nor the HQs for all pathways, were affected by this change.

3.1.2 α- and γ-Chlordane

In 1998, the oral slope factor for chlordane was reduced from 1.3 to 0.35. Similarly, the oral reference dose was increased from 6.0×10^{-5} to 5.0×10^{-4}.

Therefore, the incremental and total risks and HQs from ingestion of chlordane in soil changed for both forms of chlordane, and for both the construction worker and site employee exposure scenarios. For the construction worker, the incremental/total HQ decreased from 7.8×10^{-4} to 9.4×10^{-5} and from 5.8×10^{-4} to 7.0×10^{-5} for α- and γ-chlordane, respectively. For the construction worker, the incremental/total risks decreased from 4.4×10^{-9} to1.2×10^{-9} and from 3.2×10^{-9} to 8.7×10^{-10} for α- and γ-chlordane, respectively. (The risk calculations have been reproduced in Appendix B.)

For the site employee, the incremental/total HQ decreased from 8.2×10^{-5} to 9.8×10^{-6} and from 6.0×10^{-5} to 7.2×10^{-6} for α- and γ-chlordane, respectively. For the site employee, the incremental/total risks decreased from 2.3×10^{-9} to 6.1×10^{-10} and from 1.7×10^{-9} to 4.5×10^{-10} for α- and γ-chlordane, respectively.

(Note: Incremental and total risks are numerically equivalent because the background risk is assumed to be zero. This assumption also applies to Sections 3.1.3 and 3.1.4 below.)

3.1.3 Lead-210 + Daughters

During the February 1999 sampling event, lead-210 was detected in five of 11 soil samples. Since neither a risk-based GV nor a background level had been established for this radionuclide, a technical basis for evaluating the data was needed. To determine if Pb-210 should be carried through or screened from the RRE, guideline values were developed. The resultant GVs were 1.7 pCi/g and 3.2 pCi/g for the construction worker and site employee, respectively. (GV calculations are shown in Appendix B.) Based on the GVs, lead-210 was screened from the RRE.

3.1.4 Naphthalene

The appropriate oral RfD for naphthalene is 0.02 mg/kg-d (down from 50 mg/kg-d). The HQs for incremental and total soil ingestion were therefore increased from 2.5×10^{-7} to 6.2×10^{-4} and from 2.6×10^{-8} to 6.4×10^{-5}, respectively, for the construction worker and site employee. (The risk calculations have been reproduced in Appendix B.)

3.1.5 Plutonium-242

The RRE reported that HEAST data were not available for Pu-242. However, ingestion, inhalation, and external exposure slope factors are available. Based on the HEAST data, the incremental and total soil risk values for the construction worker are 2.6×10^{-9}, 2.2×10^{-12}, and 3.3×10^{-13} for the ingestion, inhalation, and external exposure pathways, respectively. For the site employee, the incremental and total soil risk values are 1.3×10^{-9}, 1.1×10^{-11}, and 3.7×10^{-13} for the ingestion, inhalation, and external exposure pathways, respectively. (The risk calculations have been reproduced in Appendix B.)

3.1.6 Radium-226

The RRE excluded Ra-226 from analysis based on the parent-daughter relationship with Th-232. However, the Th-232 slope factor does not include decay products. Based on HEAST data for Ra-226 + D, the incremental soil risk values for the construction worker are 2.0×10^{-7}, 1.8×10^{-11}, and 1.2×10^{-5} for the ingestion, inhalation, and external exposure pathways, respectively. For the site employee, the incremental soil risk values are 1.1×10^{-7}, 9.2×10^{-11}, and 1.3×10^{-5} for the ingestion, inhalation, and external exposure pathways, respectively. (The risk calculations have been reproduced in Appendix B.)

3.1.7 Thorium-228 + Daughters

The RRE used an older external exposure slope factor. The new slope factor, and the resulting new GV, were used to re-evaluate Th-228 risks. Using the newer values, Th-228 still screens out from the RRE. (The GV calculations have been reproduced in Appendix B.)

3.2 Groundwater Data

Based on the review of groundwater data conducted during the validation of the RB D RRE, numerous corrections and updates were necessary. Many of the same changes were required for the RB H RRE and are documented below. However, as also shown below, additional corrections, beyond those required for the RB D RRE, were required for the RB H RRE. All groundwater calculations have been reviewed and validated. Tables II.2. and II.3 from the RRE have been revised and appear in the Appendix. The resultant risks shown in Tables 3-1a and 3-1b reflect all necessary corrections and/or updates.

3.2.1 Beryllium

Beryllium was not included in the current groundwater scenario, but was projected to present in future groundwater. The oral RfD for beryllium has been lowered by a factor of 2.5 and the oral slope factor has been withdrawn. These updates would trigger a change in the beryllium HQ for future incremental groundwater ingestion from $2x10^{-4}$ to $4.9x10^{-4}$ for both the construction worker and site employee. The updated risk data would also eliminate the carcinogenic risk estimate for beryllium since the slope factor has been withdrawn. Given the magnitude of the contribution to the HQ from beryllium, these changes are not significant.

3.2.2 Chromium

Chromium is present in the bedrock under various areas of the site, but was not included in the current groundwater scenario because the maximum concentration detected was below the guideline value. The chromium is, however, assumed to enter the BVA and be consumed in the future. As such, chromium is a dominant contributor to the future groundwater hazard index.

Since the 1997 RRE, the oral RfD for chromium (VI) was lowered by a factor of 1.7. This update would trigger a change in the chromium (VI) HQ for future incremental groundwater ingestion from 0.96 to 1.6 for both the construction worker and site employee. Though the increase in the HQ is significant, the possible need to apply institutional controls to restrict future groundwater consumption was recognized via the RB D RRE. Therefore, the conclusions regarding chromium remain valid. However, given that all chromium detected in groundwater is not in the hexavalent state, some consideration should be given to normalizing the chromium HQ to account for the ratio of chromium (VI) to chromium (III). The data needed to determine this ratio will be collected as part of an on-going investigation of chromium sources and their migration patterns. When the investigation is complete, the groundwater RRE will require re-evaluation.

3.2.3 1,1,1-Trichloroethane

The oral RfD for 1,1,1-trichloroethane has been withdrawn. Revisiting the RRE is not recommended.

3.2.4 1,1,1-Trichloro-1,2,2-trifluoroethane

An oral RfD was added for 1,1,1-trichloro-1,2,2-trifluoroethane. Given that the oral RfD is 30 mg/kg-d, the RRE would not be significantly affected. Specifically, the contribution to the HQ for incremental groundwater ingestion for both the construction worker and site employee is 2.8×10^{-6}.

3.2.5 Bismuth-210

Risk calculations for Bi-210 were not performed for the RRE; the RRE indicated slope factors were not available. Bi-210 slope factors are available; however, the missed risks were 3.6×10^{-9} and 1.8×10^{-8} for the construction worker and site employee, respectively. These risk increments are not significant.

3.2.6 Strontium-85

Stronium-85 erroneously appears in specific risk tables of the RRE (e.g., V.2, V.3, and V.5). For groundwater, there was a single detect for Sr-85. Based on a single positive result and the short half-life of Sr-85, it was appropriate to screen the radionuclide from the RRE. Therefore, the fact that the tables incorrectly state that toxicity data are not available for Sr-85 is of no consequence to the analysis.

3.2.7 Thorium-228 + Daughters

In the RRE, Th-228 + D was reported as eliminated (i.e., not carried through the RRE) because Th-228 is a decay product of Th-232. However, the Th-232 slope factors do not include daughters, and Th-232 was subsequently screened from the RRE because the 95% UCL concentration was less than background. Additionally, although Th-228 was reportedly screened out of the RRE, Th-228 risk values appear sporadically in tables. For example, Th-228 risk values are included in Table V.5 but not in Table V.6. Because of the inconsistencies encountered in the RRE, all thorium-228 + daughter intake and risk calculations were re-calculated as described below.

Using the maximum concentration of Th-228 detected/projected for current and future BVA, the radionuclide risk values for groundwater ingestion were calculated for this report. For the current use scenario, the overall radionuclide total risk from groundwater ingestion increased from 2.4×10^{-6} to 3.0×10^{-6} (construction worker), and from 1.2×10^{-5} to 1.5×10^{-5} (site employee). For the

future use scenario, the total risk from groundwater ingestion of radionuclides would have increased from 2.7×10^{-6} to 3.4×10^{-6} (construction worker), and from 1.3×10^{-5} to 3.2×10^{-5} (site employee).

Though the magnitude of these changes is significant on a relative basis, the overall risks remain in the acceptable range and the conclusions of the RRE remain valid.

3.2.8 Tritium

In the RRE, tritium was not listed in Table V.2, but the "shower inhalation" and "groundwater dermal" risk values for tritium were included and are numerically correct. The "groundwater ingestion" risk value, however, is missing from the table, but is not a significant contributor to risk (1.1×10^{-7}). The corrected risk value appears in Tables 3-1a and 3-1b.

3.2.9 Uranium-234, Uranium-238

Risk data for these radionuclides were omitted from Table V.5 of the RRE. The missed risks were 2.0×10^{-6} and 2.9×10^{-6}, respectively, for U-234 and U-238. The corrected risk values appear in Tables 3-1a and 3-1b.

3.3 Air Data

For purposes of evaluating cumulative residual risk, air pathway data are also reported in each RRE. Per the Residual Risk Evaluation Methodology 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 ambient air. The risk data for tritium (HTO), Pu-238, and Pu-239/240 reported in the RB H RRE 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.

3.4 Risk Data Summary

The residual risks for RB H, adjusted for updated and corrected data, are shown in Tables 3-1a and 3-1b for the construction worker and site employee, respectively. These data are appropriate for use in documenting the current and cumulative residual risks for Release Block H.

4.0 CONCLUSIONS AND RECOMMENDATIONS

For purposes of evaluating the need for institutional controls, the RB H RRE adequately characterizes the residual risks associated with the release block. However, changes to the risk data in IRIS and HEAST do occur and should be anticipated. IRIS updates are published monthly; HEAST updates occur much less frequently. A mechanism should be developed to ensure such changes are reviewed and adopted as appropriate.

It is also recommended that the changes noted in this report for groundwater-related risks be formally adopted. Since the groundwater risks will be identical for many of the parcels, a stand-alone report documenting the changes may be appropriate. The report should note prominently, though, that each subsequent RRE must be evaluated for parcel-specific leaching concerns that were not included in the site-wide analysis. Given that groundwater from numerous parcels may migrate toward the BVA, this evaluation should apply to any parcel in which new groundwater concerns arise – not just the parcel under consideration for sale.

A final recommendation is that consideration be given to the mechanism to update/re-validate the guideline values. The GV manual is a large document to which a small number of changes need to be made. The appropriate vehicle for documenting and adopting those changes should be identified.

Table 3-1a. Current and Cumulative RB H RRE Data for the Construction Worker.

Construction Worker	Hazard Index (HI) or Risk		
	Incremental	Background	Total
Soil – current			
HI	4.0E-02	1.3E-01	1.7E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	1.7E-05	2.3E-05	4.0E-05
Groundwater – current			
HI	3.7E-02	9.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	2.5E-06	5.1E-07	3.0E-06
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	2.0E-07	7.7E-09	2.1E-07
Totals – current			
HI	7.7E-02	1.3E-01	2.1E-01
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	2.0E-05	2.3E-05	4.3E-05
Groundwater – future			
HI	1.6E+00	3.1E-02	1.7E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	2.9E-06	5.1E-07	3.4E-06
Totals – cumulative			
HI	1.7E+00	1.6E-01	1.9E+00
Non-rad risk	4.7E-06	5.2E-06	9.9E-06
Rad risk	2.3E-05	2.4E-05	4.7E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

Table 3-1b. Current and Cumulative RB H RRE Data for the Site Employee.

Site Employee	Hazard Index (HI) or Risk		
	Incremental	Background	Total
Soil – current			
HI	4.0E-03	1.4E-02	1.8E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	1.8E-05	2.4E-05	4.2E-05
Groundwater – current			
HI	3.7E-02	7.6E-05	3.7E-02
Non-rad risk	N/A	N/A	N/A
Rad risk	1.3E-05	2.5E-06	1.5E-05
Air – current (1994)			
HI	N/A	N/A	N/A
Non-rad risk	N/A	N/A	N/A
Rad risk	9.9E-07	3.9E-08	1.0E-06
Totals – current			
HI	4.1E-02	1.4E-02	5.5E-02
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	3.2E-05	2.6E-05	5.8E-05
Groundwater – future			
HI	1.6E+00	3.1E-02	1.6E+00
Non-rad risk	N/A	N/A	N/A
Rad risk	1.4E-05	2.5E-06	1.7E-05
Totals – cumulative			
HI	1.6E+00	4.5E-02	1.7E+00
Non-rad risk	2.0E-06	2.3E-06	4.3E-06
Rad risk	4.6E-05	2.9E-05	7.5E-05

Notes: N/A = Not applicable.
Data represent RRE calculations prior to the implementation of the remedy.
HI calculated based on assumption that all chromium is Cr(VI). This approach significantly over-estimates the Cr risk as not all chromium present in groundwater is in the hexavalent state.

5.0 REFERENCES

1. **Risk-Based Guideline Values**, Mound Plant, Miamisburg, Ohio, Final, Revision 4, Revised by EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1997.

2. **Residual Risk Evaluation – Release Block D**, Mound Plant, Miamisburg, Ohio, Final, Revision 0, U.S. Department of Energy, Miamisburg, Ohio, December 1996.

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4. **Integrated Risk Information System (IRIS)** and updates to same, U.S. EPA web sites, April 1999.

5. **Health Effects Assessment Summary Tables (HEAST)** and updates to same, U.S. EPA web sites, December 1998.

6. **Mound 2000 Residual Risk Evaluation Methodology, Mound Plant**, U.S. Department of Energy, Miamisburg, Ohio, January 1997.

7. **Technical Position Report in Support of the Release Block D Residual Risk Evaluation**, U.S. Department of Energy, Miamisburg, Ohio, January 1999.

APPENDIX A
Updated RRE Data Tables

II.1 Summary Table of All Soil Contaminants Detected in Release Block H

II.2 Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells

II.3 Summary Table of All Future Groundwater Contaminants Assumed to be in BVA Production Wells with Input from the Bedrock Aquifer

V1 Characterization of Residual Risks at Release Block H - Construction Worker - Soil Pathways - Incremental

V4 Characterization of Residual Risks at Release Block H - Site Employee - Soil Pathways - Incremental

F7 Characterization of Residual Risks at Release Block H - Construction Worker - Soil Pathways - Background

F10 Characterization of Residual Risks at Release Block H - Site Employee - Soil Pathways - Background

F19 Characterization of Residual Risks at Release Block H - Construction Worker - Soil Pathways - Total

F22 Characterization of Residual Risks at Release Block H - Site Employee - Soil Pathways - Total

Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
ORGANICS (mg/kg)								
Acenaphthene	0.18	0.18				3/10	Yes	F.O.D.[7] = 30%
Acenaphthylene	0.7	0.7				1/10	Yes	F.O.D.[7] = 10%
Acetone	0.0355	0.0355		21000[2]	200000[2]	2/10	No	Conc. < G.V.
Aldrin	0.0031	0.0031				2 /11	Yes	F.O.D.[7] = 18%
Anthracene	1.25	1.25		64000[2]	610000[2]	2/10	No	Conc. < G.V.
Aroclor-1254	0.0037	0.0037	58	4.3[2]	41[2]	1/11	No	Conc. < G.V. and Bkgd.
Benzene	0.0015	0.0015		32[3]	8.9[3]	1/10	No	Conc. < G.V.
Benzo(a)anthracene	1.4	1.4		4.1[4]	7.8[4]	5/10	No	Conc. < G.V.
Benzo(a)pyrene	1.115	1.115		0.41[4]	0.78[4]	5/10	Yes	Conc. > G.V.
Benzo(b)fluoranthene	0.9125	0.9125		4.1[4]	7.8[4]	5/10	No	Conc < G.V.
Benzo(g,h,i) perylene	1.0625	1.0625				4/10	Yes	F.O.D.[7] = 40%
Benzo(k)fluoranthene	0.915	0.915		41[4]	78[4]	3/10	No	Conc < G.V.
Benzoic acid	0.072	0.072		850000[2]	8200000[2]	1/9	No	Conc. < G.V.
delta-BHC	0.00025	0.00025				1/11	Yes	F.O.D.[7] = 9%
2-Butanone	0.0115	0.0115		9300[1]	9300[1]	1/10	No	Conc. < G.V.
Carbazole	0.5875	0.5875				1/6	Yes	F.O.D.[7] = 17%
alpha Chlordane	0.01	0.01				4/7	Yes	F.O.D.[7] = 57%
gamma Chlordane	0.0074	0.0074				4/7	Yes	F.O.D.[7] = 57%
4-chloro-3-methyl phenol	0.047	0.047				1/10	Yes	F.O.D.[7] = 10%
Chrysene	1.4	1.4		410[4]	780[4]	5/10	No	Conc. < G.V.
Dibenzo(a,h)anthracene	0.78	0.78		0.41[4]	0.78[4]	2/10	Yes	Conc. > G.V.
Dibenzofuran	1.035	1.035				1/10	Yes	F.O.D.[7] = 10%
Dieldrin	0.145	0.145		0.185[3]	0.36[3]	3/11	No	Conc. < G.V.
bis(2-ethylhexyl)phthalate	3.4	0.13		215[4]	410[4]	5/10	No	Conc. < G.V.
Fluoranthene	2.325	2.325		8500[2]	82000[2]	7/10	No	Conc. < G.V.
Fluorene	1.45	1.45				1/10	Yes	F.O.D.[7] = 10%

Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Heptachlor epoxide	0.0022	0.0022				2/11	Yes	F.O.D.[7] = 18%
Indeno(1,2,3-cd)pyrene	0.99	0.99		4.1[4]	7.8[4]	5/10	No	Conc. < G.V.
Methylene chloride	0.0065	0.0065		1000[1]	1000[1]	4/10	No	Conc. < G.V.
2-Methylnaphthalene	0.92	0.92				1/10	Yes	F.O.D.[7] = 10%
Napthalene	2.625	2.625				1/10	Yes	F.O.D.[7] = 10%
Phenanthrene	3.75	3.75				5/10	Yes	F.O.D.[7] = 50%
Pyrene	1.975	1.975		6400[2]	61000[2]	6/10	No	Conc. < G.V.
Toluene	0.002	0.002		250[1]	250[1]	1/10	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-trifluoroethane	0.002	0.002				1/5	Yes	F.O.D.[7] = 20%
Xylenes, total	0.0018	0.0018		430000[2]	4100000[2]	1/10	No	Conc. < G.V.
INORGANICS (mg/kg)								
Aluminum	15900	13500	19000			11/11	No	Conc. < Bkgd.
Antimony	0.235	0.235		85[2]	820[2]	1/8	No	Conc. < G.V.
Arsenic (total)	10.9	10.9	8.6	64[2]	610[2]	11/11	Yes	Conc. > G.V. & Bkgd.
Barium (total)	249	249	180	15000[1]	140000[1]	11/11	No	Conc. < G.V.
Beryllium	0.89	0.89	1.3	0.7[3]	1.3[3]	11/11	No	Conc. < Bkgd.
Bismuth	58.6	58.6				4/7	Yes	F.O.D.[7] = 57%
Cadmium (total)	0.35	0.255	2.1	210[2]	2000[2]	12/22	No	Conc. < Bkgd. & G.V.
Calcium (total)	152000	152000	310000			11/11	No	Conc. < Bkgd.
Chloride	1300	1300	107			6/6	No	Common soil constituent
Chromium (total)	23.9	19.8	20	1100[2]	10000[2]	22/22	No	Conc. < G.V.
Cobalt (total)	12.3	12.3	19			11/11	No	Conc. < Bkgd.
Copper (total)	26.4	22.1	26			11/11	Yes	Conc. > Bkgd.
Cyanide	1.7	1.7		4300[2]	41000[2]	2/11	No	Conc. < G.V.
Fluoride	7.8	7.8	6.7			6/6	No	Common soil constituent
Iron (total)	34700	34700	35000			11/11	No	Conc. < Bkgd.
Lead (total)	163	163	48			22/22	Yes	Conc. > Bkgd.

Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Lithium	40.2	19	26			2/2	Yes	Conc. > Bkgd.
Magnesium (total)	54100	39900	40000			11/11	No	Common soil constituent
Manganese (total)	1200	1200	1400	27000[1]	150000[1]	11/11	No	Conc. < G.V. & Bkgd.
Mercury (total)	0.04	0.04		64[1]	610[1]	3/11	No	Conc. < G.V.
Molybdenum	7.7	0.935	27			2/2	No	Conc. < Bkgd.
Nickel (total)	29.5	23.4	32	4300[2]	41000[2]	22/22	No	Conc. < G.V. & Bkgd.
Nitrate	1.32	---				1/1	No	Common soil constituent
Nitrate/Nitrite	9	9	26			6/6	No	Conc. < Bkgd.
Organic Carbon	216670	216670				4/4	No	Common soil constituent
Potassium (total)	3750	1680	1900			11/11	No	Common soil constituent
Silver (total)	8.9	0.56	1.7	1100[2]	10000[2]	4/11	No	Conc. < G.V.
Sodium (total)	2670	2670	240			11/11	No	Common soil constituent
Sulfate	322	322	150			5/6	No	Common soil constituent
Vanadium	30.8	27.9	25	1500[2]	14000[2]	11/11	No	Conc. < G.V.
Zinc (total)	311	311	140	64000[2]	610000[2]	11/11	No	Conc. < G. V.
RADIONUCLIDES (pCi/g)								
Cesium-137	1.9	1.9	0.42	0.46[5]	0.42[5]	9/14	Yes	Conc. > G.V. & Bkgd.
Lead-210	1.42	1.42		1.7[8]	3.2[8]	5/11	No	Conc. < G.V.
Plutonium-238	56	56	0.13	5.5[5]	11[5]	563/573	Yes	Conc. > G.V. & Bkgd.
Plutonium-239/240	0.0328	0.0328	0.18	5.5[5]	10[5]	3/12	No	Conc. < G.V. & Bkgd.
Plutonium-242	0.0143	0.0143				2/5	Yes	F.O.D.[7] = 40%
Potassium-40	45.4	21	37			12/12	Yes	Conc. > Bkgd.
Radium-226	3.15	3.15	2	0.14[5]	0.13[5]	12/14	Yes	Conc. > G.V. & Bkgd.
Strontium-90	0.845	0.384	0.72	3.0[5]	57[5]	2/6	No	Conc. < G.V.
Thorium-228	1.17	0.847	1.5	0.11[5,9]	0.10[5,9]	11/11	No	Conc. < Bkgd.
Thorium-230	1.6	1.6	1.9	44[5]	81[5]	11/11	No	Conc. < Bkgd.
Thorium-232	4.47	2.3	1.4	0.11[5,6]	0.10[5,6]	475/561	Yes[10]	Conc. > G.V. & Bkgd.

Revised Table II.1. Summary Table of All Soil Contaminants Detected in Release Block H

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Tritium	0.3	---	1.6	23500[5]	45000[5]	1/3	No	Conc. < G.V. & Bkgd.
Uranium-234	1.02	0.851	1.1	37.5[5]	70[5]	10/11	No	Conc. < G.V. & Bkgd.
Uranium-235	0.0659	0.0659	0.11	3.35[5]	3.1[5]	3/11	No	Conc. < G.V. & Bkgd.
Uranium-238	0.962	0.962	1.2	11.0[5]	13.0[5]	10/11	No	Conc. < G.V. & Bkgd.

NOTES: Blanks indicate background or Guideline Value not available. The more restrictive G.V. was used to determine which contaminants were carried through the RRE.

--- No shallow data available.

[1] - Hazard Quotient for both ingestion and inhalation. (Decision made on 0.1 x G.V.)

[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)

[3] - Total Risk 10^{-6} for both ingestion and inhalation.

[4] - Total Risk 10^{-6} for ingestion only.

[5] - Total Risk 10^{-6} for ingestion, inhalation and external.

[6] - Guideline values from thorium-228+D used to account for Th-228+D ingrowth.

[7] - F.O.D. = Frequency of detection. Contaminants with a F.O.D. greater than 5% were carried through the RRE.

[8] - Pb-210 guideline value not previously available. G.V. calculations are shown in the Appendix.

[9] - Th-228 guideline values have been revised to reflect updated slope factors. G.V. calculations are shown in the Appendix.

[10] - Th-232 95% upper confidence level was less than background. Therefore, Th-232 was not carried through the risk calculations.

Revised Table II.2. Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
ORGANICS (mg/L)						
Acetone	0.012		10[1]	10[2]	No	Conc. < G.V.
Bromodichloromethane	0.0037		0.0045[3]	0.0046[4]	No	Conc. < G.V.
2-Butanone	0.041		53[1]	61[1]	No	Conc. < G.V.
Chloroform	0.0022	0.0005	0.024[3]	0.047[4]	No	Conc. < G.V.
1,1-Dichloroethane	0.0035		9.5[1]	10[2]	No	Conc. < G.V.
1,1-Dichloroethene	0.0017				Yes	No screening values
1,2-Dichloroethene	0.0047		2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-cis-Dichloroethene	0.0021	0.0010	2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-trans-Dichloroethene	0.003		2.0[2]	2.0[2]	No	Conc. < G.V.
Dichloromethane - Methylene chloride	0.0098		0.038[3]	0.038[4]	No	Conc. < G.V.
Isophorone	0.010		0.3[3]	0.3[4]	No	Conc. < G.V.
Tetrachloroethene	0.002		0.46[1]	1.0[2]	No	Conc. < G.V.
1,1,1-Trichloroethane	0.0018	0.0007			Yes	Conc. > Background
Trichloroethene	0.0046		0.024[3]	0.026[4]	No	Conc. < G.V.
Trichlorofluoromethane	0.0025		26[1]	31[2]	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.0087				Yes	No screening values
INORGANICS (mg/L)						
Alkalinity	335				No	Water quality parameter
Aluminum	0.0737	0.0375			No	Water quality parameter
Ammonia	0.58	0.162			No	Water quality parameter
Barium	0.0884	0.3102	7.1[1]	7.2[1]	No	Conc. < G.V.
Cadmium	0.0077		0.051[1]	0.051[2]	Yes	Conc. > G.V.
Calcium	126	111			No	Water quality parameter
Chloride	133	106			No	Water quality parameter
Chromium (total)	0.0249	0.0061	0.51[1]	0.51[2]	No	Conc. < G.V.
Copper	0.593	0.0012			Yes	Conc. > Bkgd.

Revised Table II.2. Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Dissolved Solids	719	603			No	Water quality parameter
Fluoride	0.18	0.419			No	Water quality parameter
Iron	0.780	4.065			No	Conc. < Background
Lead (soluble)	0.040	0.0101			Yes	Conc. > Background
Magnesium	39.6	40.43			No	Conc. < Background
Manganese	0.0248	0.2296	0.51[1]	0.51[2]	No	Conc. < G.V.
Nitrate/Nitrite	4.9	5.349			No	Conc. < Background
Nitrate	2.55				No	Water quality parameter
Nitrite	0.066				No	Water quality parameter
Nitrogen	0.62	0.324			No	Water quality parameter
Organic Carbon	1.1	1.987			No	Conc. < Background
Phosphate	0.22	0.231			No	Conc. < Background
Potassium	3.8	4.461			No	Conc. < Background
Silver	0.0242		0.51[1]	0.51[2]	No	Conc. < G.V.
Sodium	82.4	62.43			No	Water quality parameter
Sulfate	83.0	142.7			No	Conc. < Background
Suspended Solids	8.0	26.44			No	Conc. < Background
Vanadium	0.0244	0.0171	0.71[1]	0.72[2]	No	Conc. < G.V.
Zinc	0.0577	0.1196	31[1]	31[2]	No	Conc. < G.V.
RADIONUCLIDES (pCi/L)						
Actinium-227	0.335		1.34[4]	0.26[4]	Yes	Conc. > Site employee G.V.
Bismuth-210	0.39				Yes	No screening values
Plutonium-239,240	2.0	0.125	2.5[4]	0.51[4]	Yes	Conc. > Site employee G.V.
Radium-226	0.4	0.996	2.74[4]	0.54[4]	No	Conc. < Background
Stronium-85	25				No	Short half-life, single detect
Strontium-90	0.3	0.975	14[4]	2.9[4]	No	Conc. < G.V.
Thorium-228	2.17	0.779	3.5[4]	0.69[4]	Yes	Conc. > Site employee G.V.

Revised Table II.2. Summary Table of All Current Groundwater Contaminants Detected in BVA Production Wells

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Thorium-230	1.99	0.289	21[4]	4.3[4]	No	Conc. < G.V.
Thorium-232	0.1		24[4,5]	0.69[4,5]	No	Conc. < G.V.
Tritium	7200	1485	11000[3]	2200[4]	Yes	Conc. > Site employee G.V.
Uranium-234	8.14	0.792	18[4]	3.6[4]	Yes	Conc. > Site employee G.V.
Uranium-238	8.25	0.688	13[4]	2.6[4]	Yes	Conc. > Site employee G.V.

NOTES: Blanks indicate background or guideline values not available. The more restrictive G.V. was used to determine which contaminants were carried through the RRE.

[1] - Hazard Quotient for ingestion, dermal and inhalation. (Decision made on 0.1 x G.V.)

[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)

[3] - Total Risk 10^{-6} for ingestion, dermal and inhalation.

[4] - Total Risk 10^{-6} for ingestion only.

[5] - Guideline values from thorium-228+D.

Revised Table II.3. Summary Table of All Future Groundwater Contaminants Assumed to be in Production Wells with Input from the Bedrock Aquifer

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
ORGANICS (mg/L)						
Acetone	0.0129		10[1]	10[2]	No	Conc. < G.V.
Benzene	0.0001		0.0087[3]	0.0099[4]	No	Conc. < G.V.
Benzoic acid	0.071		400[1]	410[2]	No	Conc. < G.V.
Bromodichloromethane	0.0037		0.0045[3]	0.0046[4]	No	Conc. < G.V.
2-Butanone	0.0543		53[1]	61[1]	No	Conc. < G.V.
Carbon tetrachloride	0.0000135		0.002[3]	0.0022[4]	No	Conc. < G.V.
Chloroform	0.0022	0.0005	0.024[3]	0.047[4]	No	Conc. < G.V.
1,1-Dichloroethane	0.0035		9.5[1]	10[2]	No	Conc. < G.V.
1,1-Dichloroethene	0.0017				Yes	No screening values
1,2-Dichloroethene	0.0050		2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-cis-Dichloroethene	0.0023	0.0010	2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-trans-Dichloroethene	0.0032		2.0[2]	2.0[2]	No	Conc. < G.V.
Bis (2-ethylhexyl)phthalate	0.0153	0.0084	0.019[3]	0.02[3]	No	Conc. < G.V.
Isophorone	0.0100		0.3[3]	0.3[4]	No	Conc. < G.V.
4-Methylphenol	0.0004		0.48[1]	0.51[2]	No	Conc. < G.V.
Tetrachloroethene	0.0021		0.46[1]	1.0[2]	No	Conc. < G.V.
1,1,1-Trichloroethane	0.0065	0.0007			Yes	Conc. > Bkgd.
Trichloroethene	0.0050		0.024[3]	0.026[4]	No	Conc. < G.V.
Trichlorofluoromethane	0.0025		26[1]	31[2]	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087				Yes	No screening values
Toluene	0.0002		16[1]	20[2]	No	Conc. < G.V.
Xylenes (total)	0.000043		200[2]	200[2]	No	Conc. < G.V.
INORGANICS (mg/L)						
Antimony	0.0008	0.0006	0.041[1]	0.041[2]	No	Conc. < G.V.
Barium	0.0884	0.3102	7.1[1]	7.2[2]	No	Conc. < G.V.

Revised Table II.3. Summary Table of All Future Groundwater Contaminants Assumed to be in Production Wells with Input from the Bedrock Aquifer

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Beryllium	0.0001		0.000066[3]	0.000067[4]	Yes	Conc. > G.V.
Bismuth	0.0016				Yes	No screening values
Cadmium	0.0077		0.051[1]	0.051[2]	Yes	Conc. > G.V.
Chromium	0.4961	0.0061	0.51[1]	0.51[2]	Yes	Conc. > G.V.
Cobalt	0.0039				Yes	No screening values
Copper	0.5964	0.0012			Yes	Conc. > Bkgd.
Cyanide	0.0001		2.0[1]	2.0[2]	No	Conc. < G.V.
Iron	0.78	4.065			No	Conc. < Bkgd.
Lead (soluble)	0.04	0.0101			Yes	Conc. > Bkgd.
Lithium	0.0036	0.0557			No	Conc. < Bkgd.
Magnesium	43.974	40.428			No	Water quality parameter
Manganese	0.0248	0.2296	0.51[1]	0.51[2]	No	Conc. < G.V.
Molybdenum	0.0096	0.0056			Yes	Conc. > Bkgd.
Nickel	0.1003	0.0350	2.0[1]	2.0[2]	No	Conc. < Bkgd.
Phosphate	0.3664	0.231			No	Water quality parameter
Potassium	6.0034	4.461			No	Water quality parameter
Silver	0.0242		0.51[1]	0.51[2]	No	Conc. < G.V.
Vanadium	0.028	0.0171	0.71[1]	0.72[2]	No	Conc. < G.V.
Zinc	0.0577	0.1196	31[1]	31[2]	No	Conc. < G.V.
RADIONUCLIDES (pCi/L)						
Actinium-227	0.335		1.3[4]	0.26[4]	Yes	Conc. > Site employee G.V.
Bismuth-210	0.39				Yes	No screening values
Plutonium-238	0.0034	0.087	2.7[4]	0.54[4]	No	Conc. < G.V.
Plutonium-239,240	2.0199	0.125	2.5[4]	0.51[4]	Yes	Conc. > Site employee G.V.
Radium-226	0.6402	0.996	2.7[4]	0.54[4]	No	Conc. < Background
Stronium-85	25				No	Short half-life, single detect

Revised Table II.3. Summary Table of All Future Groundwater Contaminants Assumed to be in Production Wells with Input from the Bedrock Aquifer

Groundwater contaminants above detection limit	Maximum concentration	BVA background	G.V. for construction worker	G.V. for site employee	Carried through RRE?	Reason
Strontium-90	0.3121	0.975	14[4]	2.9[4]	No	Conc. < G.V.
Thorium-228	2.17	0.779	3.5[4]	0.69[4]	Yes	Conc. > Site employee G.V.
Thorium-230	2.0645	0.289	21[4]	4.3[4]	No	Conc. < G.V.
Thorium-232	0.1422		24[4,5]	0.69[4,5]	No	Conc. < G.V.
Tritium	10427	1485	11000[4]	2200[4]	Yes	Conc. > Site employee G.V.
Uranium-233	0.0002		18[4]	3.6[4]	No	Conc. < G.V.
Uranium-234	8.14	0.792	18[4]	3.6[4]	Yes	Conc. > Site employee G.V.
Uranium-235	0.0036	0.045	17[4]	3.4[4]	No	Conc. < G.V.
Uranium-235,236	0.0003		17[4]	3.4[4]	No	Conc. < G.V.
Uranium-238	8.25	0.688	13[4]	2.6[4]	Yes	Conc. > Site employee G.V.

NOTES: Blanks indicate background or guideline values not available. The more restrictive G.V. was used to determine which contaminants were carried through the RRE.

[1] - Hazard Quotient for ingestion, dermal and inhalation. (Decision made on 0.1 x G.V.)

[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)

[3] - Total Risk 10^{-6} for ingestion, dermal and inhalation.

[4] - Total Risk 10^{-6} for ingestion only.

[5] - Guideline values from thorium-228+D.

Revised **Table V.1 Characterization of Residual Risks at Release Block H - Construction Worker Soil Pathways - Incremental**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Aldrin	NA	***	4.9E-04	NA	1.0E-04	
α-Chlordane	NA	***	9.4E-05	NA	1.6E-04	
γ-Chlordane	NA	***	7.0E-05	NA	1.2E-04	
Heptachlor epoxide	NA	***	7.9E-04	NA	1.7E-04	
Acenaphthene	NA	***	1.4E-05	NA	2.9E-06	
Arsenic	NA	***	3.6E-02	NA	7.5E-04	
Fluorene	NA	***	1.7E-04	NA	3.5E-05	
Naphthalene	NA	***	6.2E-04	NA	5.1E-08	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.1E-10	NA	6.5E-11	
Acenaphthylene	NA	***	***	NA	NA	
δ-BHC	NA	***	***	NA	NA	
Bismuth	NA	***	***	NA	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	NA	
Copper	NA	***	***	NA	NA	
Dibenzofuran	NA	***	***	NA	NA	
Lithium	NA	***	***	NA	NA	
2-Methlynaphthalene	NA	***	***	NA	NA	
Phenanthrene	NA	***	***	NA	NA	Total HI =
Total:			3.8E-02		1.3E-03	4.0E-02
Carcinogens (Risk)						
Aldrin	NA	***	1.8E-08	NA	3.7E-09	
Arsenic	NA	***	1.2E-06	NA	2.4E-07	
Benzo(a)pyrene	NA	***	2.7E-06	NA	5.7E-07	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	1.2E-09	NA	9.1E-10	
γ-Chlordane	NA	***	8.7E-10	NA	6.7E-10	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	6.7E-09	NA	1.4E-09	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			3.9E-06		8.2E-07	4.7E-06
Radionuclides (Risk)						
Cesium-137	NA	1.6E-13	2.8E-08	4.7E-06	NA	
Plutonium-238	NA	1.8E-10	2.0E-07	3.2E-11	NA	Total Radionuclide
Plutonium-242	NA	2.2E-12	2.6E-09	3.3E-13	NA	Risk =
Radium-226	NA	1.8E-11	2.0E-07	1.2E-05	NA	
Total:		2.0E-10	4.3E-07	1.7E-05		1.7E-05

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table V.4 Characterization of Residual Risks at Release Block H - Site Employee Soil Pathways - Incremental**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Aldrin	NA	***	5.1E-05	NA	
α-Chlordane	NA	***	9.8E-06	NA	
γ-Chlordane	NA	***	7.2E-06	NA	
Heptachlor epoxide	NA	***	8.3E-05	NA	
Acenaphthene	NA	***	1.5E-06	NA	
Arsenic	NA	***	3.8E-03	NA	
Fluorene	NA	***	1.8E-05	NA	
Naphthalene	NA	***	6.4E-05	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.3E-11	NA	
Acenaphthylene	NA	***	***	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Phenanthrene	NA	***	***	NA	Total HI =
Total:			4.0E-03		4.0E-03
Carcinogens (Risk)					
Aldrin	NA	***	9.2E-09	NA	
Arsenic	NA	***	6.0E-07	NA	
Benzo(a)pyrene	NA	***	1.4E-06	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	6.1E-10	NA	
γ-Chlordane	NA	***	4.5E-10	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	3.5E-09	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			2.0E-06		2.0E-06
Radionuclides (Risk)					
Cesium-137	NA	8.2E-13	1.5E-08	5.2E-06	
Plutonium-238	NA	9.0E-10	1.1E-07	3.9E-11	Total Radionuclide
Plutonium-242	NA	1.1E-11	1.3E-09	3.7E-13	Risk =
Radium-226	NA	9.2E-11	1.1E-07	1.3E-05	
Total:		1.0E-09	2.4E-07	1.8E-05	1.8E-05

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table F.7 Characterization of Residual Risks at Release Block H - Construction Worker Soil Pathways - Background**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Arsenic	NA	***	1.3E-01	NA	2.8E-03	
Acenaphthalene	NA	***	0.0E+00	NA	0.0E+00	
Acenapthlyene	NA	***	***	NA	***	
Aldrin	NA	***	0.0E+00	NA	0.0E+00	
δ-BHC	NA	***	***	NA	***	
Bismuth	NA	***	***	NA	***	
α-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
γ-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
4-Chloro-3-methylphenol	NA	***	***	NA	***	
Copper	NA	***	***	NA	***	
Dibenzofuran	NA	***	***	NA	***	
Fluorene	NA	***	0.0E+00	NA	0.0E+00	
Heptachlor epoxide	NA	***	0.0E+00	NA	0.0E+00	
Lithium	NA	***	***	NA	***	
2-Methlynaphthalene	NA	***	***	NA	***	
Naphthalene	NA	***	0.0E+00	NA	0.0E+00	
Phenanthrene	NA	***	***	NA	***	
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	***	0.0E+00	NA	0.0E+00	Total HI =
Total:			1.3E-01		2.8E-03	1.3E-01
Carcinogens (Risk)						
Aldrin	NA	***	0.0E+00	NA	0.0E+00	
Arsenic	NA	***	4.3E-06	NA	9.0E-07	
Benzo(a)pyrene	NA	***	0.0E+00	NA	0.0E+00	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
γ-Chlordane	NA	***	0.0E+00	NA	0.0E+00	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	0.0E+00	NA	0.0E+00	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			4.3E-06		9.0E-07	5.2E-06
Radionuclides (Risk)						
Cesium-137	NA	4.7E-14	8.1E-09	1.3E-06	NA	
Plutonium-238	NA	2.1E-11	2.3E-08	3.7E-12	NA	Total Radionuclide
Plutonium-242	NA	NA	NA	NA	NA	Risk =
Radium-226	NA	3.1E-11	3.5E-07	2.1E-05	NA	
Total:		5.2E-11	3.8E-07	2.2E-05		2.3E-05

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table F.10 Characterization of Residual Risks at Release Block H - Site Employee**
Soil Pathways - Background

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Arsenic	NA	***	1.4E-02	NA	
Acenaphthalene	NA	***	0.0E+00	NA	
Acenapthlyene	NA	***	***	NA	
Aldrin	NA	***	0.0E+00	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
α-Chlordane	NA	***	0.0E+00	NA	
γ-Chlordane	NA	***	0.0E+00	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Fluorene	NA	***	0.0E+00	NA	
Heptachlor epoxide	NA	***	0.0E+00	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Naphthalene	NA	***	0.0E+00	NA	
Phenanthrene	NA	***	***	NA	
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	***	0.0E+00	NA	Total HI =
Total:			1.4E-02		1.4E-02
Carcinogens (Risk)					
Aldrin	NA	***	0.0E+00	NA	
Arsenic	NA	***	2.3E-06	NA	
Benzo(a)pyrene	NA	***	0.0E+00	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	0.0E+00	NA	
γ-Chlordane	NA	***	0.0E+00	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	0.0E+00	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			2.3E-06		2.3E-06
Radionuclides (Risk)					
Cesium-137	NA	2.3E-13	4.2E-09	1.5E-06	
Plutonium-238	NA	1.0E-10	1.2E-08	4.1E-12	Total Radionuclide
Plutonium-242	NA	NA	NA	NA	Risk =
Radium-226	NA	1.6E-10	1.9E-07	2.2E-05	
Total:		2.6E-10	2.1E-07	2.4E-05	2.4E-05

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table F.19 Characterization of Residual Risks at Release Block H - Construction Worker Soil Pathways - Total**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)						
Aldrin	NA	***	4.9E-04	NA	1.0E-04	
α-Chlordane	NA	***	9.4E-05	NA	1.6E-04	
γ-Chlordane	NA	***	7.0E-05	NA	1.2E-04	
Heptachlor epoxide	NA	***	7.9E-04	NA	1.7E-04	
Acenaphthene	NA	***	1.4E-05	NA	2.9E-06	
Arsenic	NA	***	1.7E-01	NA	3.6E-03	
Fluorene	NA	***	1.7E-04	NA	3.5E-05	
Naphthalene	NA	***	6.2E-04	NA	5.1E-08	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.1E-10	NA	6.5E-11	
Acenaphthylene	NA	***	***	NA	NA	
δ-BHC	NA	***	***	NA	NA	
Bismuth	NA	***	***	NA	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	NA	
Copper	NA	***	***	NA	NA	
Dibenzofuran	NA	***	***	NA	NA	
Lithium	NA	***	***	NA	NA	
2-Methlynaphthalene	NA	***	***	NA	NA	
Phenanthrene	NA	***	***	NA	NA	Total HI =
Total:			1.7E-01		4.2E-03	1.7E-01
Carcinogens (Risk)						
Aldrin	NA	***	1.8E-08	NA	3.7E-09	
Arsenic	NA	***	5.5E-06	NA	1.1E-06	
Benzo(a)pyrene	NA	***	2.7E-06	NA	5.7E-07	
Benzo(g,h,i)perylene	NA	***	***	NA	***	
Carbazole	NA	***	***	NA	***	
α-Chlordane	NA	***	1.2E-09	NA	9.1E-10	
γ-Chlordane	NA	***	8.7E-10	NA	6.7E-10	
Dibenzo(a,h)anthracene	NA	***	***	NA	***	
Heptachlor epoxide	NA	***	6.7E-09	NA	1.4E-09	Total Carcinogenic
Lead	NA	***	***	NA	***	Risk =
Total:			8.2E-06		1.7E-06	9.9E-06
Radionuclides (Risk)						
Cesium-137	NA	2.1E-13	3.6E-08	6.0E-06	NA	
Plutonium-238	NA	2.0E-10	2.3E-07	3.6E-11	NA	Total Radionuclide
Plutonium-242	NA	2.2E-12	2.6E-09	3.3E-13	NA	Risk =
Radium-226	NA	4.9E-11	5.5E-07	3.3E-05	NA	
Total:		2.5E-10	8.2E-07	3.9E-05		4.0E-05

*** - Toxicity values not available.

NA - Not applicable.

Revised **Table F22. Characterization of Residual Risks at Release Block H - Site Employee Soil Pathways - Total**

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)					
Aldrin	NA	***	5.1E-05	NA	
α-Chlordane	NA	***	9.8E-06	NA	
γ-Chlordane	NA	***	7.2E-06	NA	
Heptachlor epoxide	NA	***	8.3E-05	NA	
Acenaphthene	NA	***	1.5E-06	NA	
Arsenic	NA	***	1.8E-02	NA	
Fluorene	NA	***	1.8E-05	NA	
Naphthalene	NA	***	6.4E-05	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	3.3E-11	NA	
Acenaphthylene	NA	***	***	NA	
δ-BHC	NA	***	***	NA	
Bismuth	NA	***	***	NA	
4-Chloro-3-methylphenol	NA	***	***	NA	
Copper	NA	***	***	NA	
Dibenzofuran	NA	***	***	NA	
Lithium	NA	***	***	NA	
2-Methlynaphthalene	NA	***	***	NA	
Phenanthrene	NA	***	***	NA	Total HI =
Total:			1.8E-02		1.8E-02
Carcinogens (Risk)					
Aldrin	NA	***	9.2E-09	NA	
Arsenic	NA	***	2.9E-06	NA	
Benzo(a)pyrene	NA	***	1.4E-06	NA	
Benzo(g,h,i)perylene	NA	***	***	NA	
Carbazole	NA	***	***	NA	
α-Chlordane	NA	***	6.1E-10	NA	
γ-Chlordane	NA	***	4.5E-10	NA	
Dibenzo(a,h)anthracene	NA	***	***	NA	
Heptachlor epoxide	NA	***	3.5E-09	NA	Total Carcinogenic
Lead	NA	***	***	NA	Risk =
Total:			4.3E-06		4.3E-06
Radionuclides (Risk)					
Cesium-137	NA	1.1E-12	1.9E-08	6.6E-06	
Plutonium-238	NA	1.1E-09	1.3E-07	4.3E-11	Total Radionuclide
Plutonium-242	NA	1.1E-11	1.3E-09	3.7E-13	Risk =
Radium-226+D	N/A	2.5E-10	3.0E-07	3.5E-05	
Total:		1.4E-09	4.5E-07	4.2E-05	4.2E-05

*** - Toxicity values not available.

NA - Not applicable.

APPENDIX B
Supporting Calculations

Risk and HI Calculations for Arsenic Soil Inhalation and Ingestion

Risk and HI Calculations for α- and γ-Chlordane Soil Inhalation and Ingestion

Risk Calculations for Lead-210 Inhalation, Soil Ingestion and External Exposure

HI Calculations for Naphthalene Soil Ingestion

Risk Calculations for Pu-210 Inhalation, Soil Ingestion and External Exposure

Risk Calculations for Ra-226 Inhalation, Soil Ingestion and External Exposure

Risk Calculations for Th-228 Inhalation, Soil Ingestion and External Exposure

Release Block H
Risk and HI Calculations for Arsenic Soil Inhalation and Ingestion
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental Soil Concentration
2.3 mg/kg Construction Worker/Site Employee

Oral Slope Factor
1.5E+00 mg/kg-d

Oral Reference Dose
3.0E-04 mg/kg-d

Construction Worker Intake, Carcinogenic

Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **7.72E-07** mg/kg-d

Construction Worker Intake, Non-Carcinogenic

Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.08E-05** mg/kg-d

Site Employee Intakes, Carcinogenic

Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **4.02E-07** mg/kg-d

Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.3	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.13E-06** mg/kg-d

Arsenic Risk and Hazard Index (HI) Values
Soil Ingestion and Inhalation

Risk = Intake * Slope Factor
HI = Intake/Reference Dose

Construction Worker	Risk	HI
Soil ingestion	1.2E-06	3.6E-02
Soil inhalation	N/A	N/A

Site Employee	Risk	HI
Soil ingestion	6.0E-07	3.8E-03
Soil inhalation	N/A	N/A

Release Block H
Risk and HI Calculations for α- and γ-Chlordane Soil Inhalation and Ingestion
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations

0.01 mg/kg	α-chlordane: Construction Worker/Site Employee
0.0074 mg/kg	γ-chlordane: Construction Worker/Site Employee

Oral Slope Factor
3.5E-01 mg/kg-d

Oral Reference Dose
5.0E-04 mg/kg-d

Construction Worker Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **3.35E-09** mg/kg-d

γ-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	480	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **2.48E-09** mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **4.70E-08** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **3.48E-08** mg/kg-d

Construction Worker Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
BW =	70	kilograms (BW = body weight)
AT =	70	years (AT = averaging time)

Intake = **3.27E-14** mg/kg-d

γ-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
EF =	250	days/year (EF = exposure frequency)
ED =	5	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
BW =	70	kilograms (BW = body weight)
AT =	70	years (AT = averaging time)

Intake = **2.42E-14** mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
IR =	20	m^3/day (IR = inhalation rate)
EF =	250	days/year (EF = exposure frequency)
BW =	70	kilograms (BW = body weight)

Intake = **4.57E-13** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
IR =	20	m^3/day (IR = inhalation rate)
EF =	250	days/year (EF = exposure frequency)
BW =	70	kilograms (BW = body weight)

Intake = **3.38E-13** mg/kg-d

Site Employee Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **1.75E-09** mg/kg-d

γ-Chlordane, Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*ED*10-6 kg/mg*IR)/(AT*BW*365 d/yr)

CS =	0.0074	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
ED =	25	years (ED = exposure duration)
IR =	50	mg/day (IR = ingestion rate)
AT =	70	years (AT = averaging time)
BW =	70	kilograms (BW = body weight)

Intake = **1.29E-09** mg/kg-d

Site Employee Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	0.01	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **4.89E-09** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Ingestion
Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS = 0.0074 mg/kg (CS = concentration in soil)
EF = 250 days/year (EF = exposure frequency)
IR = 50 mg/day (IR = ingestion rate)
BW = 70 kilograms (BW = body weight)

Intake = **3.62E-09** mg/kg-d

Site Employee Intakes, Carcinogenic

α-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)
CS = 0.01 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
EF = 250 days/year (EF = exposure frequency)
ED = 25 years (ED = exposure duration)
IR = 20 m^3/day (IR = inhalation rate)
BW = 70 kilograms (BW = body weight)
AT = 70 years (AT = averaging time)

Intake = **1.63E-13** mg/kg-d

γ-Chlordane, Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*EF*ED*IR)/(BW*AT*365 d/yr)
CS = 0.0074 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
EF = 250 days/year (EF = exposure frequency)
ED = 25 years (ED = exposure duration)
IR = 20 m^3/day (IR = inhalation rate)
BW = 70 kilograms (BW = body weight)
AT = 70 years (AT = averaging time)

Intake = **1.21E-13** mg/kg-d

Construction Worker Intakes, Non-Carcinogenic

α-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)
CS = 0.01 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
IR = 20 m^3/day (IR = inhalation rate)
EF = 250 days/year (EF = exposure frequency)
BW = 70 kilograms (BW = body weight)

Intake = **4.57E-13** mg/kg-d

γ-Chlordane, Non-Carcinogenic, Inhalation
Intake, mg/kg-d = ((CS/PEF)*IR*EF*)/(BW*365 d/yr)
CS = 0.0074 mg/kg (CS = concentration in soil)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
IR = 20 m^3/day (IR = inhalation rate)
EF = 250 days/year (EF = exposure frequency)
BW = 70 kilograms (BW = body weight)

Intake = **3.38E-13** mg/kg-d

Chlordane Risk and Hazard Index (HI) Values
Soil Ingestion and Inhalation

Risk = Intake * Slope Factor
HI = Intake/Reference Dose

	α-Chlordane		γ-Chlordane	
Construction Worker	Risk	HI	Risk	HI
Soil ingestion	1.2E-09	9.4E-05	8.7E-10	7.0E-05
Soil inhalation	N/A	N/A	N/A	N/A

	α-Chlordane		γ-Chlordane	
Site Employee	Risk	HI	Risk	HI
Soil ingestion	6.1E-10	9.8E-06	4.5E-10	7.2E-06
Soil inhalation	N/A	N/A	N/A	N/A

Risk Calculations for Lead-210 Soil Inhalation, Soil Ingestion and External Exposure
For use in establishing risk-based guideline values for Pb-210.
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Pb-210 Soil Concentration

1.7 pCi/g	Construction worker
3.2 pCi/g	Site employee

Pb-210+D Slope Factors

1.01E-09 risk/pCi ingested
3.86E-09 risk/pCi inhaled
1.45E-10 risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	1.7	pCi/g (CS = concentration in soil)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)

Intake = **1.02E+03** pCi

Construction Worker Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	1.7	pCi/g (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = **9.93E-03** pCi

Construction Worker External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	1.7	pCi/g
TE =	3.33E-01	TE = gamma shielding factor, dimensionless
SE =	1.00E-01	SE =gamma exposure time factor, dimensionless
ED =	5.00E+00	yr (ED = exposure duration)

Exposure = 2.55E+00 pCi-yr/g

Site Employee Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	3.2	mg/kg (CS = concentration in soil)
ED =	25	years (ED = exposure duration)

EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)

Intake = **1.00E+03** pCi

Site Employee Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	3.2	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = **9.35E-02** pCi

Site Employee External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	3.2	pCi/g
TE =	8.30E-02	TE = gamma shielding factor, dimensionless
SE =	2.00E-01	SE =gamma exposure time factor, dimensionless
ED =	25	yr (ED = exposure duration)

Exposure = 5.31E+00 pCi-yr/g

Pb-210+D Risk Values
Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake • Slope Factor

Construction Worker	Risk
Soil ingestion	1.0E-06
Soil inhalation	3.8E-11
Ext Exp	3.7E-10

Site Employee	Risk
Soil ingestion	1.0E-06
Soil inhalation	3.6E-10
Ext Exp	7.70E-10

Release Block H
HI Calculations for Naphthalene Soil Ingestion

(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations

2.625 mg/kg Construction Worker/Site Employee

Oral Reference Dose

2.0E-02 mg/kg-d

Construction Worker Intake, Non-Carcinogenic

Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.625	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.23E-05** mg/kg-d

Site Employee Intake, Non-Carcinogenic

Ingestion

Intake, mg/kg-d = (CS*EF*10-6 kg/mg*IR)/(BW*365 d/yr)

CS =	2.625	mg/kg (CS = concentration in soil)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)
BW =	70	kilograms (BW = body weight)

Intake = **1.28E-06** mg/kg-d

Naphthalene Hazard Index (HI) Values
Soil Ingestion

HI = Intake/Reference Dose

Construction Worker	Risk	HI
Soil ingestion	N/A	6.2E-04
Soil inhalation	N/A	N/A

Site Employee	Risk	HI
Soil ingestion	N/A	6.4E-05
Soil inhalation	N/A	N/A

Release Block H

Risk Calculations for Pu-242 Soil Inhalation, Soil Ingestion and External Exposure

(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental and Total Soil Concentrations

0.0143 pCi/g Construction Worker/Site Employee

Slope Factors

3.00E-10 risk/pCi ingested
2.64E-08 risk/pCi inhaled
1.55E-11 risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	0.0143	pCi/g (CS = concentration in soil)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)

Intake = 8.58E+00 pCi

Construction Worker Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	0.0143	pCi/g (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = 8.35E-05 pCi

Construction Worker External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	1.43E-02	pCi/g
TE =	3.33E-01	TE = gamma shielding factor, dimensionless
SE =	1.00E-01	SE =gamma exposure time factor, dimensionless
ED =	5.00E+00	yr (ED = exposure duration)

Exposure = 2.14E-02 pCi-yr/g

Site Employee Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	0.0143	mg/kg (CS = concentration in soil)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)

Intake = 4.47E+00 pCi

Site Employee Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	0.0143	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = 4.18E-04 pCi

Site Employee External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	1.43E-02	pCi/g
TE =	8.30E-02	TE = gamma shielding factor, dimensionless
SE =	2.00E-01	SE =gamma exposure time factor, dimensionless
ED =	25	yr (ED = exposure duration)

Exposure = 2.37E-02 pCi-yr/g

Pu-242 Risk Values

Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake * Slope Factor

Construction Worker	Risk
Soil ingestion	2.6E-09
Soil inhalation	2.2E-12
Ext Exp	3.3E-13

Site Employee	Risk
Soil ingestion	1.3E-09
Soil inhalation	1.1E-11
Ext Exp	3.68E-13

Release Block H
Risk Calculations for Ra-226 Soil Inhalation, Soil Ingestion and External Exposure
(Ref: Equation and parameter values from Appendix D, 1997 RRE)

Incremental Soil Concentration
1.15 pCi/g Construction Worker/Site Employee

Slope Factors
2.96E-10 risk/pCi ingested
2.75E-09 risk/pCi inhaled
6.74E-06 risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	1.15	pCi/g (CS = concentration in soil)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)

Intake = 6.90E+02 pCi

Construction Worker Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	1.15	pCi/g (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = 6.72E-03 pCi

Construction Worker External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	1.15E+00	pCi/g
TE =	3.33E-01	TE = gamma shielding factor, dimensionless
SE =	1.00E-01	SE =gamma exposure time factor, dimensionless
ED =	5.00E+00	yr (ED = exposure duration)

Exposure = 1.72E+00 pCi-yr/g

Site Employee Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	1.15	mg/kg (CS = concentration in soil)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)

Intake = 3.59E+02 pCi

Site Employee Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	1.15	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = 3.36E-02 pCi

Site Employee External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	1.15E+00	pCi/g
TE =	8.30E-02	TE = gamma shielding factor, dimensionless
SE =	2.00E-01	SE =gamma exposure time factor, dimensionless
ED =	25	yr (ED = exposure duration)

Exposure = 1.91E+00 pCi-yr/g

Ra-226 Risk Values
Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake * Slope Factor

Construction Worker	Risk
Soil ingestion	2.0E-07
Soil inhalation	1.8E-11
Ext Exp	1.2E-05

Site Employee	Risk
Soil ingestion	1.1E-07
Soil inhalation	9.2E-11
Ext Exp	1.29E-05

Risk Calculations for Th-228 Soil Inhalation, Soil Ingestion and External Exposure
For use in establishing risk-based guideline values for Th-228.

Th-228 Soil Concentration

0.11	pCi/g	Construction worker
0.10	pCi/g	Site employee

Th-228+D Slope Factors

2.31E-10	risk/pCi ingested
9.68E-08	risk/pCi inhaled
6.20E-06	risk/yr/pCi/g

Construction Worker Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	0.11	pCi/g (CS = concentration in soil)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	480	mg/day (IR = ingestion rate)

Intake = **6.60E+01** pCi

Construction Worker Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	0.11	pCi/g (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	5	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = **6.43E-04** pCi

Construction Worker External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	0.11	pCi/g
TE =	3.33E-01	TE = gamma shielding factor, dimensionless
SE =	1.00E-01	SE =gamma exposure time factor, dimensionless
ED =	5.00E+00	yr (ED = exposure duration)

Exposure = 1.65E-01 pCi-yr/g

Site Employee Ingestion

Intake, pCi = CS*ED*EF*0.001*IR

CS =	0.1	mg/kg (CS = concentration in soil)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	50	mg/day (IR = ingestion rate)

Intake = **3.13E+01** pCi

Site Employee Inhalation

Intake, mg/kg-d = ((CS*1000/PEF)*ED*EF*IR

CS =	0.1	mg/kg (CS = concentration in soil)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
ED =	25	years (ED = exposure duration)
EF =	250	days/year (EF = exposure frequency)
IR =	20	m^3/day (IR = inhalation rate)

Intake = **2.92E-03** pCi

Site Employee External Exposure

Exposure = CS*TE*(1-SE)*ED

CS =	0.1	pCi/g
TE =	8.30E-02	TE = gamma shielding factor, dimensionless
SE =	2.00E-01	SE =gamma exposure time factor, dimensionless
ED =	25	yr (ED = exposure duration)

Exposure = 1.66E-01 pCi-yr/g

Th-228+D Risk Values
Soil Ingestion, Soil Inhalation, and External Exposure

Risk = Intake * Slope Factor

Construction Worker	Risk
Soil ingestion	1.5E-08
Soil inhalation	6.2E-11
Ext Exp	1.0E-06

Site Employee	Risk
Soil ingestion	7.2E-09
Soil inhalation	2.8E-10
Ext Exp	1.0E-06

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

Prepared by Babcock and Wilcox of Ohio, Inc.

Contract # DE-AC24-979OH20044

PUBLIC REVIEW DRAFT (REV. 0)

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ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant 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
pCi	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

ACRONYMS (continued)

RRE	Residual Risk Evaluation
RREM	Residual Risk Evaluation Methodology
SM/PP	Special Metallurgical/Plutonium Processing
TPR	Technical Position Report in Support of Release Block Residual Risk Evaluation
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

PROPOSED PLAN
RELEASE BLOCK H
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.

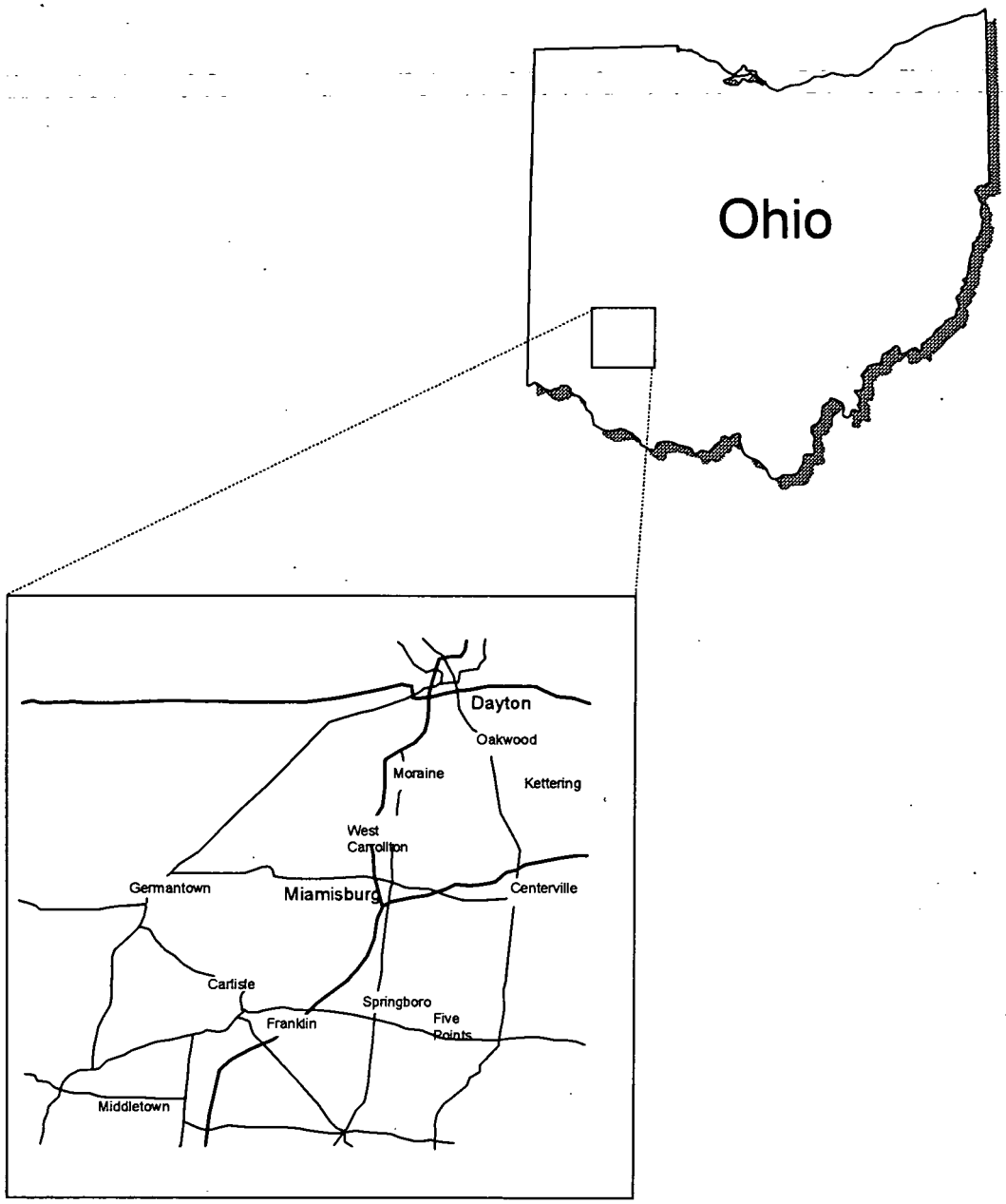
Mound Golf Course and Miamisburg Mound State Memorial Park, both directly east of the Mound facility across Mound Road, are frequented during favorable weather. The park is the site of a 68-foot high ancient Indian mound, located 380 feet east of the Mound Plant boundary. Other recreational areas within 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.

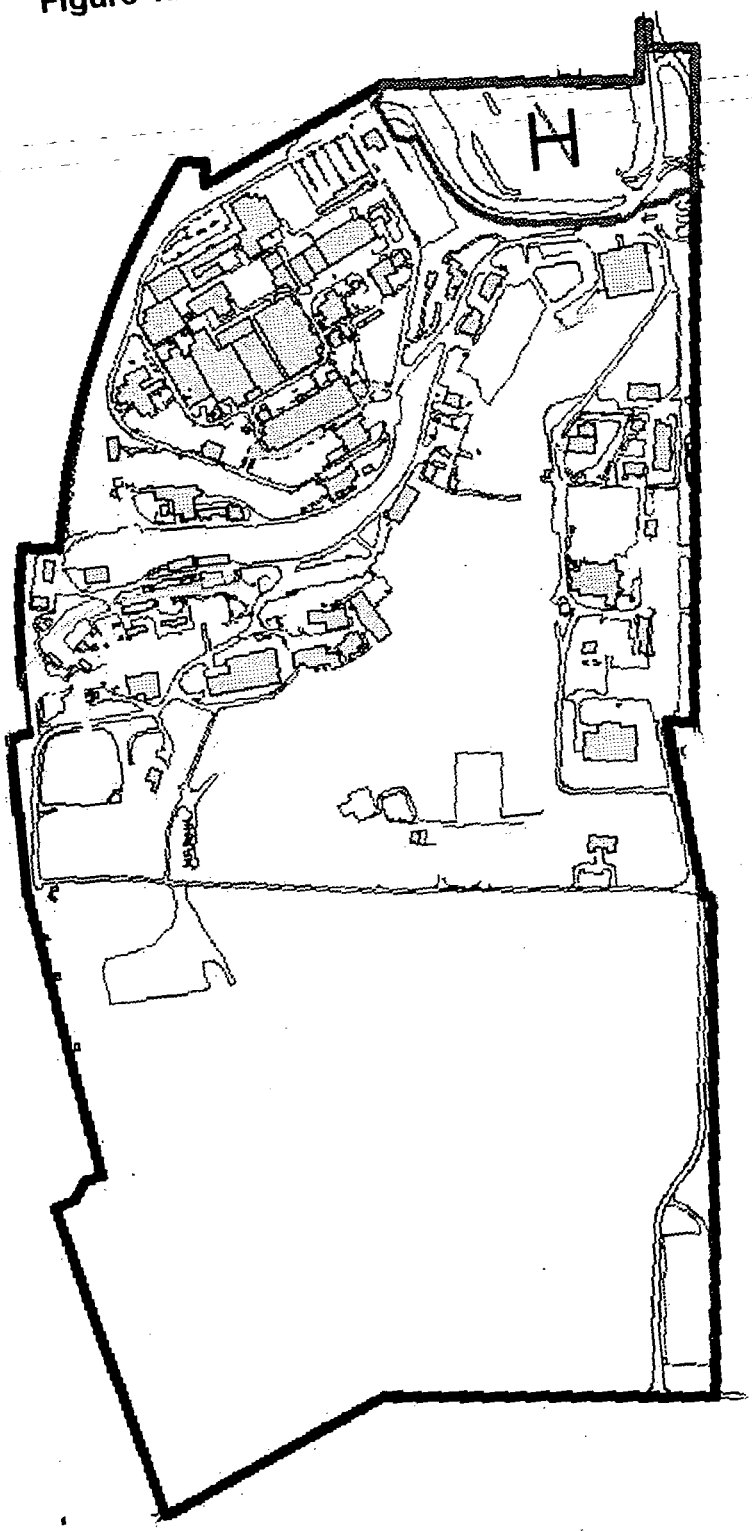
Figure 1.1 Regional Context of the Mound Plant



This Proposed Plan addresses Release Block (RB) H (Figure 1.2) which is located in the northeast corner of the original, developed plant site. RB H is generally bound to the south and west by the plant proper, and to the north and east by off-site residences. The area encompassed by RB H has been used primarily as a parking lot for most of Mound Plant's operational history.

RB H lies within what was once called Operable Unit 2 (OU2). There are no structures in Release Block H. RB H does include an area called a Potential Release Site or PRS 93 that has undergone previous investigations. The status of the PRS in RB H is summarized in Table 2.1. 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 H have been evaluated and presented in the RB H Residual Risk Evaluation (RRE), August 1997. The " Technical Position Report In Support of the Release Block H Residual Risk Evaluation" provides RB H risk information revised for two reasons; inclusion of data obtained in a recent investigation and revisions in toxicologic values.

Figure 1.2 Location of Release Block H



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.

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 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 at Mound 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. Elevated concentrations of tritium prompted the creation of PRS 93 in Release Block H - Main Hill Seep - Location 0603. No radiological (or hazardous) waste generation processes are known to have occurred at the location of PRS 93. There are no buildings in RB H. The PRS in RB H is 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 H PRS and Core Team Conclusions

PRS	Reason for Identification	Core Team Decision	Close Out of PRS/BDP
93	Main Hill Seep Number 0603 - radiological/non-radiological.	Binned for No Further Assessment	Recommendation for NFA with continued monitoring signed by Core Team on 03/04/96.

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 nineteen "release blocks," which are contiguous tracts of property designated for transfer of ownership. These nineteen 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 H revised by the TPR are discussed in Section 4 through Section 6 of this Proposed Plan. These results indicate that Release Block H is protective of human health for industrial re-use (as defined by construction worker and site employee in the RREM).

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 H.

After the ROD for RB H 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 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 H have also gone through a public comment cycle and copies are in the CERCLA Public Reading Room.

Table 3.1 lists the RB H PRS package and the RB H RRE, along with the dates they were made available for public comment. This Proposed Plan and the "Technical Position Report (TPR) in Support of the Release Block H Residual Risk Evaluation, Final, Rev. 1, April, 1999" will have a thirty (30) day public comment period ending on May 31, 1999.

Table 3.1 Release Block H Documents and Public Comment Periods

DOCUMENT (PRS)	COMMENT PERIOD (BEGIN)	COMMENT PERIOD (END)
93	03/15/96	04/01/96
RB H Residual Risk Evaluation	4/30/97	6/16/97

4. SCOPE AND ROLE OF RELEASE BLOCK H

This Proposed Plan addresses one of 19 separate release blocks at Mound. These nineteen 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 H 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 H. Once the ROD for RB H is final and effective, DOE could petition the US EPA to delist RB H 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 H. 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 the 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 H

The PRS in RB H has been evaluated by the Core Team. The following sections discuss the data relevant to RB H that are available from the general source documents and the Potential Release Site package.

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 H documents the specific groundwater data used to evaluate the current and future groundwater profile for RB H.

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 RB H.

Soil contaminant data for RB H 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, as taken from the PRS packages, are described below.

There is one Potential Release Site (PRS 93) located within RB H. The PRSs at Mound were identified based on either knowledge of historical land use that was considered potentially detrimental, or an actual sampling result showing elevated concentrations of contaminants. The location of PRS 93 is shown in Figure 5.1.

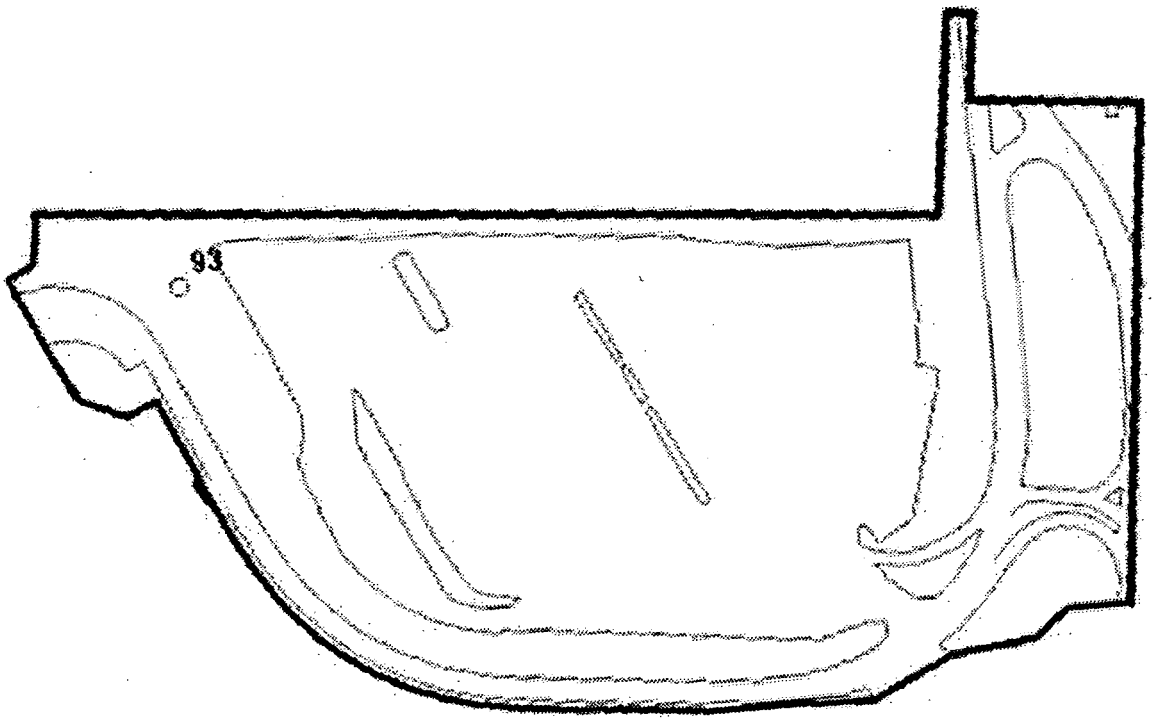
The rationale for designation of PRS 93 is outlined as follows:

> Potential Release Site (PRS) 93 was historically identified as seep 603 and is located on-site, adjacent to the large parking lot. The investigation for seeps on the Main Hill was initiated in the spring of 1986. The investigation stemmed from the discovery of a groundwater seep on the western hillside below SW Building. The seep was sampled and a laboratory analysis showed elevated tritium detected at low concentrations, i.e., in the range of 1,000 to 3,000 pCi/L. Flow was intermittent in the past and continues to be even recently. The latest data seems to indicate an increase in tritium concentrations but is most likely related to much diminished flow.
>
> Soil was sampled at seep 603 as part of OU9, Regional Soils Investigation. All radionuclide concentrations for seep 603 were at background. All other contaminants at seep 603 were in the range of background. Radiological Site Survey data from the vicinity of seep 603 shows a maximum concentration of Pu-238 of 3.46 pCi/g, which is less than Mound's ALARA guideline of 25 pCi/g and the 10^{-6} risk based guideline value of 5.5 pCi/g. Thorium concentrations were all below the detection limit of 2 pCi/g.

5.3.4 Air Contaminant Data

For purposes of evaluating cumulative residual risk, air pathway data are also reported in each RRE. Per the Residual Risk Evaluation Methodology 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), Pu-238, and Pu-239/240 reported in the RB H RRE 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.

Figure 5.1 PRS In Release Block H



5.4 Summary of Contaminants Detected in Release Block H

The complete list of all contaminants detected at least once within RB H is provided in the RB H RRE and TPR in Tables II.1, II.2, and II.3 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. Air contaminant data are put forth in the *Technical Position Report in Support of the Release Block H Residual Risk Evaluation*.

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 H are identified in Tables 5-1 through 5-3 of this Proposed Plan for Release Block H. 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 H, 36 organic, 32 inorganic, and 14 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 March 1997. "

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 36 to 18.

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 32 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 15 to 6.

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 7. 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 7. 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 H

Soil Contaminants Above Detection Limit	Maximum Concentration Any Depth	Maximum Concentration Shallow - Only	Soil Background	G.V. for Construction Worker	G.V. for Site Employee	Detects / Analyses	Carried through RRE?	Reason
ORGANICS (mg/kg)								
Acenaphthene	0.18	0.18				3/10	Yes	F.O.D.[7]= 30%
Acenaphthylene	0.7	0.7				1/10	Yes	F.O.D.[7]= 10%
Acetone	0.0355	0.0355		21000[2]	200000[2]	2/10	No	Conc. < G.V.
Aldrin	0.0031	0.0031				2 /11	Yes	F.O.D.[7]= 18%
Anthracene	1.25	1.25		64000[2]	610000[2]	2/10	No	Conc. < G.V.
Aroclor-1254	0.0037	0.0037	58	4.3[2]	41[2]	1/11	No	Conc. < G.V. and Bkgd.
Benzene	0.0015	0.0015		32[3]	8.9[3]	1/10	No	Conc. < G.V.
Benzo(a)anthracene	1.4	1.4		4.1[4]	7.8[4]	5/10	No	Conc. < G.V.
Benzo(a)pyrene	1.115	1.115		0.41[4]	0.78[4]	5/10	Yes	Conc. > G.V.
Benzo(b)fluoranthene	0.9125	0.9125		4.1[4]	7.8[4]	5/10	No	Conc < G.V.
Benzo(g,h,i) perylene	1.0625	1.0625				4/10	Yes	F.O.D.[7]= 40%
Benzo(k)fluoranthene	0.915	0.915		41[4]	78[4]	3/10	No	Conc < G.V.
Benzoic acid	0.072	0.072		850000[2]	8200000[2]	1/9	No	Conc. < G.V.
delta-BHC	0.00025	0.00025				1/11	Yes	F.O.D.[7]= 9%
2-Butanone	0.0115	0.0115		9300[1]	9300[1]	1/10	No	Conc. < G.V.
Carbazole	0.5875	0.5875				1/6	Yes	F.O.D.[7]= 17%
alpha Chlordane	0.01	0.01				4/7	Yes	F.O.D.[7]= 57%
gamma Chlordane	0.0074	0.0074				4/7	Yes	F.O.D.[7]= 57%
4-chloro-3-methyl phenol	0.047	0.047				1/10	Yes	F.O.D.[7]= 10%
Chrysene	1.4	1.4		410[4]	780[4]	5/10	No	Conc. < G.V.
Dibenzo(a,h)anthracene	0.78	0.78		0.41[4]	0.78[4]	2/10	Yes	Conc. > G.V.
Dibenzofuran	1.035	1.035				1/10	Yes	F.O.D.[7]= 10%
Dieldrin	0.145	0.145		0.185[3]	0.36[3]	3/11	No	Conc. < G.V.
bis(2-ethylhexyl)phthalate	3.4	0.13		215[4]	410[4]	5/10	No	Conc. < G.V.

Soil Contaminants Above Detection Limit	Maximum Concentration Any Depth	Maximum Concentration Shallow - Only	Soil Background	G.V. for Construction Worker	G.V. for Site Employee	Detects / Analyses	Carried through RRE?	Reason
Fluoranthene	2.325	2.325		8500[2]	82000[2]	7/10	No	Conc. < G.V.
Fluorene	1.45	1.45				1/10	Yes	F.O.D.[7]= 10%
Heptachlor epoxide	0.0022	0.0022				2/11	Yes	F.O.D.[7]= 18%
Indeno(1,2,3-cd)pyrene	0.99	0.99		4.1[4]	7.8[4]	5/10	No	Conc. < G.V.
Methylene chloride	0.0065	0.0065		1000[1]	1000[1]	4/10	No	Conc. < G.V.
2-Methylnaphthalene	0.92	0.92				1/10	Yes	F.O.D.[7]= 10%
Napthalene	2.625	2.625				1/10	Yes	F.O.D.[7]= 10%
Phenanthrene	3.75	3.75				5/10	Yes	F.O.D.[7]= 50%
Pyrene	1.975	1.975		6400[2]	61000[2]	6/10	No	Conc. < G.V.
Toluene	0.002	0.002		250[1]	250[1]	1/10	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-trifluoroethane	0.002	0.002				1/5	Yes	F.O.D.[7]= 20%
Xylenes, total	0.0018	0.0018		430000[2]	4100000[2]	1/10	No	Conc. < G.V.
INORGANICS (mg/kg)								
Aluminum	15900	13500	19000			11/11	No	Conc. < Bkgd.
Antimony	0.235	0.235		85[2]	820[2]	1/8	No	Conc. < G.V.
Arsenic (total)	10.9	10.9	8.6	64[2]	610[2]	11/11	Yes	Conc. > G.V. & Bkgd.
Barium (total)	249	249	180	15000[1]	140000[1]	11/11	No	Conc. < G.V.
Beryllium	0.89	0.89	1.3	0.7[3]	1.3[3]	11/11	No	Conc. < Bkgd.
Bismuth	58.6	58.6				4/7	Yes	F.O.D.[7]= 57%
Cadmium (total)	0.35	0.255	2.1	210[2]	2000[2]	12/22	No	Conc. < Bkgd. & G.V.
Calcium (total)	152000	152000	310000			11/11	No	Conc. < Bkgd.
Chloride	1300	1300	107			6/6	No	Common soil constituent
Chromium (total)	23.9	19.8	20	1100[2]	10000[2]	22/22	No	Conc. < G.V.
Cobalt (total)	12.3	12.3	19			11/11	No	Conc. < Bkgd.
Copper (total)	26.4	22.1	26			11/11	Yes	Conc. > Bkgd.
Cyanide	1.7	1.7		4300[2]	41000[2]	2/11	No	Conc. < G.V.
Fluoride	7.8	7.8	6.7			6/6	No	Common soil constituent
Iron (total)	34700	34700	35000			11/11	No	Conc. < Bkgd.

Soil Contaminants Above Detection Limit	Maximum Concentration Any Depth	Maximum Concentration Shallow - Only	Soil Background	G.V. for Construction Worker	G.V. for Site Employee	Detects / Analyses	Carried through RRE?	Reason
Lead (total)	163	163	48			22/22	Yes	Conc. > Bkgd.
Lithium	40.2	19	26			2/2	Yes	Conc. > Bkgd.
Magnesium (total)	54100	39900	40000			11/11	No	Common soil constituent
Manganese (total)	1200	1200	1400	27000[1]	150000[1]	11/11	No	Conc. < G.V. & Bkgd.
Mercury (total)	0.04	0.04		64[1]	610[1]	3/11	No	Conc. < G.V.
Molybdenum	7.7	0.935	27			2/2	No	Conc. < Bkgd.
Nickel (total)	29.5	23.4	32	4300[2]	41000[2]	22/22	No	Conc. < G.V. & Bkgd.
Nitrate	1.32	---				1/1	No	Common soil constituent
Nitrate/Nitrite	9	9	26			6/6	No	Conc. < Bkgd.
Organic Carbon	216670	216670				4/4	No	Common soil constituent
Potassium (total)	3750	1680	1900			11/11	No	Common soil constituent
Silver (total)	8.9	0.56	1.7	1100[2]	10000[2]	4/11	No	Conc. < G.V.
Sodium (total)	2670	2670	240			11/11	No	Common soil constituent
Sulfate	322	322	150			5/6	No	Common soil constituent
Vanadium	30.8	27.9	25	1500[2]	14000[2]	11/11	No	Conc. < G.V.
Zinc (total)	311	311	140	64000[2]	610000[2]	11/11	No	Conc. < G. V.
RADIONUCLIDES (pCi/g)								
Cesium-137	1.9	1.9	0.42	0.46[5]	0.42[5]	9/14	Yes	Conc. > G.V. & Bkgd.
Lead-210	**1.42**	**1.42**		**1.7[9]**	**3.2[9]**	**5/11**	**No**	**Conc. < G.V.**
Plutonium-238	56	56	0.13	5.5[5]	11[5]	563/573	Yes	Conc. > G.V. & Bkgd.
Plutonium-239/240	0.0328	0.0328	0.18	5.5[5]	10[5]	3/12	No	Conc. < G.V. & Bkgd.
Plutonium-242	0.0143	0.0143				2/5	Yes	F.O.D.[7] = 40%
Potassium-40	45.4	21	37			12/12	Yes	Conc. > Bkgd.
Radium-226	3.15	3.15	2	0.14[5]	0.13[5]	12/14	Yes	Conc. > G.V. & Bkgd.
Strontium-90	0.845	0.384	0.72	3.0[5]	57[5]	2/6	No	Conc. < G.V.
Thorium-228	1.17	0.847	1.5	**0.11[5,9]**	**0.10[5,9]**	11/11	No	Conc. < Bkgd.
Thorium-230	1.6	1.6	1.9	44[5]	81[5]	11/11	No	Conc. < Bkgd.
Thorium-232	4.47	2.3	1.4	**0.11[5,6]**	**0.10[5,6]**	475/561	Yes[10]	Conc. > G.V. & Bkgd.
Tritium	0.3	---	1.6	23500[5]	45000[5]	1/3	No	Conc. < G.V. & Bkgd.

Soil Contaminants Above Detection Limit	Maximum Concentration Any Depth	Maximum Concentration Shallow - Only	Soil Background	G.V. for Construction Worker	G.V. for Site Employee	Detects / Analyses	Carried through RRE?	Reason
Uranium-234	1.02	0.851	1.1	37.5[5]	70[5]	10/11	No	Conc. < G.V. & Bkgd.
Uranium-235	0.0659	0.0659	0.11	3.35[5]	3.1[5]	3/11	No	Conc. < G.V. & Bkgd.
Uranium-238	0.962	0.962	1.2	11.0[5]	13.0[5]	10/11	No	Conc. < G.V. & Bkgd.

NOTES: Blanks indicate background or Guideline Value not available. **The more restrictive G.V. was used to determine which contaminants were carried through the RRE.**
--- No shallow data available.
[1] - Hazard Quotient for both ingestion and inhalation. (Decision made on 0.1 x G.V.)
[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)
[3] - Total Risk 10^{-6} for both ingestion and inhalation.
[4] - Total Risk 10^{-6} for ingestion only.
[5] - Total Risk 10^{-6} for ingestion, inhalation and external.
[6] - Guideline values from thorium-228+D **used to account for Th-228+D ingrowth.**
[7] - F.O.D. = Frequency of detection. Contaminants with a F.O.D. greater than 5% were carried through the RRE.
[8] - Pb-210 guideline value not previously available. G.V. calculations are shown in the Appendix.
[9] - Th-228 guideline values have been revised to reflect updated slope factors. G.V. calculations are shown in the Appendix.
[10] - Th-232 95% upper confidence level was less than background. Therefore, Th-232 was not carried through the risk calculations.

Table 5.2 Current Groundwater Contaminants Carried Through RRE for RB H

Groundwater Contaminants above Detection Limit	Maximum Concentration	BVA Background	G.V. for Construction Worker	G.V. for Site Employee	Carried through RRE?	Reason
ORGANICS (mg/L)						
Acetone	0.012		10[1]	10[2]	No	Conc. < G.V.
Bromodichloromethane	0.0037		0.0045[3]	0.0046[4]	No	Conc. < G.V.
2-Butanone	0.041		53[1]	61[1]	No	Conc. < G.V.
Chloroform	0.0022	0.0005	0.024[3]	0.047[4]	No	Conc. < G.V.
1,1-Dichloroethane	0.0035		9.5[1]	10[2]	No	Conc. < G.V.
1,1-Dichloroethene	0.0017				Yes	No screening values
1,2-Dichloroethene	0.0047		2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-cis-Dichloroethene	0.0021	0.0010	2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-trans-Dichloroethene	0.003		2.0[2]	2.0[2]	No	Conc. < G.V.
Dichloromethane - Methylene chloride	0.0098		0.038[3]	0.038[4]	No	Conc. < G.V.
Isophorone	0.010		0.3[3]	0.3[4]	No	Conc. < G.V.
Tetrachloroethene	0.002		0.46[1]	1.0[2]	No	Conc. < G.V.
1,1,1-Trichloroethane	0.0018	0.0007			Yes	Conc. > Background
Trichloroethene	0.0046		0.024[3]	0.026[4]	No	Conc. < G.V.
Trichlorofluoromethane	0.0025		26[1]	31[2]	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.0087				Yes	No screening values
INORGANICS (mg/L)						
Alkalinity	335				No	Water quality parameter
Aluminum	0.0737	0.0375			No	Water quality parameter
Ammonia	0.58	0.162			No	Water quality parameter
Barium	0.0884	0.3102	7.1[1]	7.2[1]	No	Conc. < G.V.
Cadmium	0.0077		0.051[1]	0.051[2]	Yes	Conc. > G.V.
Calcium	126	111			No	Water quality parameter
Chloride	133	106			No	Water quality parameter
Chromium (total)	0.0249	0.0061	0.51[1]	0.51[2]	No	Conc. < G.V.
Copper	0.593	0.0012			Yes	Conc. > Bkgd.

Groundwater Contaminants above Detection Limit	Maximum Concentration	BVA Background	G.V. for Construction Worker	G.V. for Site Employee	Carried through RRE?	Reason
Dissolved Solids	719	603			No	Water quality parameter
Fluoride	0.18	0.419			No	Water quality parameter
Iron	0.780	4.065			No	Conc. < Background
Lead (soluble)	0.040	0.0101			Yes	Conc. > Background
Magnesium	39.6	40.43			No	Conc. < Background
Manganese	0.0248	0.2296	0.51[1]	0.51[2]	No	Conc. < G.V.
Nitrate/Nitrite	4.9	5.349			No	Conc. < Background
Nitrate	2.55				No	Water quality parameter
Nitrite	0.066				No	Water quality parameter
Nitrogen	0.62	0.324			No	Water quality parameter
Organic Carbon	1.1	1.987			No	Conc. < Background
Phosphate	0.22	0.231			No	Conc. < Background
Potassium	3.8	4.461			No	Conc. < Background
Silver	0.0242		0.51[1]	0.51[2]	No	Conc. < G.V.
Sodium	82.4	62.43			No	Water quality parameter
Sulfate	83.0	142.7			No	Conc. < Background
Suspended Solids	8.0	26.44			No	Conc. < Background
Vanadium	0.0244	0.0171	0.71[1]	0.72[2]	No	Conc. < G.V.
Zinc	0.0577	0.1196	31[1]	31[2]	No	Conc. < G.V.
RADIONUCLIDES (pCi/L)						
Actinium-227	0.335		**1.34[4]**	0.26[4]	Yes	Conc. > **Site employee** G.V.
Bismuth-210	0.39				Yes	No screening values
Plutonium-239,240	2.0	0.125	**2.5[4]**	0.51[4]	Yes	Conc. > **Site employee** G.V.
Radium-226	0.4	0.996	**2.74[4]**	0.54[4]	No	Conc. < Background
Stronium-85	25				No	Short half-life, single detect
Strontium-90	0.3	0.975	**14[4]**	2.9[4]	No	Conc. < G.V.
Thorium-228	2.17	0.779	**3.5[4]**	0.69[4]	**Yes**	**Conc. > Site employee G.V.**
Thorium-230	1.99	0.289	**21[4]**	4.3[4]	No	Conc. < G.V.

Groundwater Contaminants above Detection Limit	Maximum Concentration	BVA Background	G.V. for Construction Worker	G.V. for Site Employee	Carried through RRE?	Reason
Thorium-232	0.1		**24**[4,5]	0.69[4,5]	No	Conc. < G.V.
Tritium	7200	1485	**11000**[3]	2200[4]	Yes	Conc. > **Site employee** G.V.
Uranium-234	8.14	0.792	**18**[4]	3.6[4]	Yes	Conc. > **Site employee** G.V.
Uranium-238	8.25	0.688	**13**[4]	**2.6**[4]	**Yes**	**Conc. > Site employee** G.V.

[1] - Hazard Quotient for ingestion, dermal and inhalation. (Decision made on 0.1 x G.V.)
[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)
[3] - Total Risk 10^{-6} for ingestion, dermal and inhalation.
[4] - Total Risk 10^{-6} for ingestion only.
[5] - Guideline values from thorium-228+D.

Table 5.3 Future Groundwater Contaminants Carried Through RRE for RB H

Groundwater Contaminants above Detection Limit	Maximum Concentration	BVA Background	G.V. for Construction Worker	G.V. for Site Employee	Carried through RRE?	Reason
ORGANICS (mg/L)						
Acetone	0.0129		10[1]	10[2]	No	Conc. < G.V.
Benzene	0.0001		0.0087[3]	0.0099[4]	No	Conc. < G.V.
Benzoic acid	0.071		400[1]	410[2]	No	Conc. < G.V.
Bromodichloromethane	0.0037		0.0045[3]	0.0046[4]	No	Conc. < G.V.
2-Butanone	0.0543		53[1]	61[1]	No	Conc. < G.V.
Carbon tetrachloride	0.0000135		0.002[3]	0.0022[4]	No	Conc. < G.V.
Chloroform	0.0022	0.0005	0.024[3]	0.047[4]	No	Conc. < G.V.
1,1-Dichloroethane	0.0035		9.5[1]	10[2]	No	Conc. < G.V.
1,1-Dichloroethene	0.0017				Yes	No screening values
1,2-Dichloroethene	0.0050		2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-cis-Dichloroethene	0.0023	0.0010	2.0[2]	2.0[2]	No	Conc. < G.V.
1,2-trans-Dichloroethene	0.0032		2.0[2]	2.0[2]	No	Conc. < G.V.
Bis (2-ethylhexyl)phthalate	0.0153	0.0084	0.019[3]	0.02[3]	No	Conc. < G.V.
Isophorone	0.0100		0.3[3]	0.3[4]	No	Conc. < G.V.
4-Methylphenol	0.0004		0.48[1]	0.51[2]	No	Conc. < G.V.
Tetrachloroethene	0.0021		0.46[1]	1.0[2]	No	Conc. < G.V.
1,1,1-Trichloroethane	0.0065	0.0007			Yes	Conc. > Bkgd.
Trichloroethene	0.0050		0.024[3]	0.026[4]	No	Conc. < G.V.
Trichlorofluoromethane	0.0025		26[1]	31[2]	No	Conc. < G.V.
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087				Yes	No screening values
Toluene	0.0002		16[1]	20[2]	No	Conc. < G.V.

Groundwater Contaminants above Detection Limit	Maximum Concentration	BVA Background	G.V. for Construction Worker	G.V. for Site Employee	Carried through RRE?	Reason
Xylenes (total)	0.000043		200[2]	200[2]	No	Conc. < G.V.
INORGANICS (mg/L)						
Antimony	0.0008	0.0006	0.041[1]	0.041[2]	No	Conc. < G.V.
Barium	0.0884	0.3102	7.1[1]	7.2[2]	No	Conc. < G.V.
Beryllium	0.0001		0.000066[3]	0.000067[4]	Yes	Conc. > G.V.
Bismuth	0.0016				Yes	No screening values
Cadmium	0.0077		0.051[1]	0.051[2]	Yes	Conc. > G.V.
Chromium	0.4961	0.0061	0.51[1]	0.51[2]	Yes	Conc. > G.V.
Cobalt	0.0039				Yes	No screening values
Copper	0.5964	0.0012			Yes	Conc. > Bkgd.
Cyanide	0.0001		2.0[1]	2.0[2]	No	Conc. < G.V.
Iron	0.78	4.065			No	Conc. < Bkgd.
Lead (soluble)	0.04	0.0101			Yes	Conc. > Bkgd.
Lithium	0.0036	0.0557			No	Conc. < Bkgd.
Magnesium	43.974	40.428			No	Water quality parameter
Manganese	0.0248	0.2296	0.51[1]	0.51[2]	No	Conc. < G.V.
Molybdenum	0.0096	0.0056			Yes	Conc. > Bkgd.
Nickel	0.1003	0.0350	2.0[1]	2.0[2]	No	Conc. < Bkgd.
Phosphate	0.3664	0.231			No	Water quality parameter
Potassium	6.0034	4.461			No	Water quality parameter
Silver	0.0242		0.51[1]	0.51[2]	No	Conc. < G.V.
Vanadium	0.028	0.0171	0.71[1]	0.72[2]	No	Conc. < G.V.
Zinc	0.0577	0.1196	31[1]	31[2]	No	Conc. < G.V.
RADIONUCLIDES (pCi/L)						
Actinium-227	0.335		1.3[4]	0.26[4]	Yes	Conc. > Site employee G.V.
Bismuth-210	0.39				Yes	No screening values
Plutonium-238	0.0034	0.087	2.7[4]	0.54[4]	No	Conc. < G.V.
Plutonium-239,240	2.0199	0.125	2.5[4]	0.51[4]	Yes	Conc. > Site employee G.V.
Radium-226	0.6402	0.996	2.7[4]	0.54[4]	No	Conc. < Background
Stronium-85	25				No	Short half-life, single detect
Strontium-90	0.3121	0.975	14[4]	2.9[4]	No	Conc. < G.V.
Thorium-228	2.17	0.779	3.5[4]	0.69[4]	Yes	Conc. > Site employee G.V.

Groundwater Contaminants above Detection Limit	Maximum Concentration	BVA Background	G.V. for Construction Worker	G.V. for Site Employee	Carried through RRE?	Reason
Thorium-230	2.0645	0.289	21[4]	4.3[4]	No	Conc. < G.V.
Thorium-232	0.1422		24[4,5]	0.69[4,5]	No	Conc. < G.V.
Tritium	10427	1485	11000[4]	2200[4]	Yes	Conc. > Site employee G.V.
Uranium-233	0.0002		18[4]	3.6[4]	No	Conc. < G.V.
Uranium-234	8.14	0.792	18[4]	3.6[4]	Yes	Conc. > Site employee G.V.
Uranium-235	0.0036	0.045	17[4]	3.4[4]	No	Conc. < G.V.
Uranium-235,236	0.0003		17[4]	3.4[4]	No	Conc. < G.V.
Uranium-238	8.25	0.688	13[4]	2.6[4]	Yes	Conc. > Site employee G.V.

[1] - Hazard Quotient for ingestion, dermal and inhalation. (Decision made on 0.1 x G.V.)
[2] - Hazard Quotient for ingestion only. (Decision made on 0.1 x G.V.)
[3] - Total Risk 10^{-6} for ingestion, dermal and inhalation.
[4] - Total Risk 10^{-6} for ingestion only.
[5] - Guideline values from thorium-228+D.

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.

6.1 Exposure Assessment

The two exposure scenarios examined in the RB H 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 H 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 H. 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 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 H 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 H, 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 H 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 H contamination throughout a five-year period was used.

6.3.1.1 Non-Cancer Risks

Overall hazards across all pathways, soil + air + current groundwater and soil + air + 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. See Tables 6.1, 6.2, and 6.3. Background exposures and hazards are minimal. US EPA guidance sets a limit of 1.0 for the Comprehensive Hazard Index.

The soil pathway makes the primary contribution (1.7E-01) to the soil + air + current groundwater HI (2.1E-01). Much of the non-carcinogenic risk for this scenario is attributable to daily ingestion of soil containing arsenic and groundwater containing cadmium.

The larger value for the soil + air + future groundwater HI (1.9E+00) 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 H 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 results from the RRE are also shown in Tables 6.1, 6.2, and 6.3.

For organic and inorganic carcinogens, only the soil pathway contributes to the risk (9.9E-06) which is within the acceptable range established by CERCLA and the NCP.

For radionuclides, the soil and groundwater pathways make the major contributions to the risk (4E-05 for soil, 3.0E-6 from current groundwater, and 3.4 E-06 from future groundwater). Much of the risk for this scenario is attributable to Ra-226 in the soil and Th-228 + daughters in groundwater.

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 H contamination throughout a 25-year period was used.

Table 6.1 Summary of Current and Future Incremental Risks at Release Block H - Mound Facility

Construction Worker Incremental	Soil	Air	Ground Water Current	Ground Water Future	Sum of Soil, Air, and Ground Water Current	Sum of Soil, Air, and Ground Water Future
Non-Carcinogenic Hazard Index for Organics & Inorganics	4.0E-02	N/A	3.7E-02	1.6E+00	7.7E-02	1.7E+00
Carcinogenic Risks for Organics & Inorganics	4.7E-06	N/A	N/A	N/A	4.7E-06	4.7E-06
Carcinogenic Risks for Radionuclides	1.7E-05	2.0E-07	2.5E-06	2.9E-06	2.0E-05	2.3E-05
			Construction Worker			
			Overall HI		7.7E-02	1.7E+00
			Overall Risk		2.5E-05	2.8E-05

Table 6.2 Summary of Current and Future Background Risks at Release Block H - Mound Facility

Construction Worker Background	Soil	Air	Ground Water Current	Ground Water Future	Sum of Soil, Air, and Ground Water Current	Sum of Soil, Air, and Ground Water Future
Non-Carcinogenic Hazard Index for Organics & Inorganics	1.3E-01	N/A	9.6E-05	3.1E-02	1.3E-01	1.6E-01
Carcinogenic Risks for Organics & Inorganics	5.2E-06	N/A	N/A	N/A	5.2E-06	5.2E-06
Carcinogenic Risks for Radionuclides	2.3E-05	7.7E-09	5.1E-07	5.1E-07	2.3E-05	2.4E-05
			Construction Worker			
			Overall HI		1.3E-01	1.6E-01
			Overall Risk		2.8E-05	2.9E-05

Table 6.3 Summary of Current and Future Total Risks at Release Block H - Mound Facility

Construction Worker Total	Soil	Air	Ground Water Current	Ground Water Future	Sum of Soil, Air, and Ground Water Current	Sum of Soil, Air, and Ground Water Future
Non-Carcinogenic Hazard Index for Organics & Inorganics	1.7E-01	N/A	3.7E-02	1.7E+00	2.1E-01	1.9E+00
Carcinogenic Risks for Organics & Inorganics	9.9E-06	N/A	N/A	N/A	9.9E-06	9.9E-06
Carcinogenic Risks for Radionuclides	4.0E-05	2.1E-07	3.0E-06	3.4E-06	4.3E-05	4.7E-05
			Construction Worker			
			Overall HI		2.1E-01	1.9E+00
			Overall Risk		5.3E-05	5.7E-05

6.3.2.1 Non-Cancer Risks

Overall hazards across all pathways for soil + air + current groundwater, and for soil+ air + 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 H. Comprehensive Hazard Indices were also developed based on background and total exposures. See Tables 6.4, 6.5, and 6.6. Background exposure and hazards are minimal.

For current exposure conditions, the ingestion of arsenic and cadmium, for soil (1.8E-02) and groundwater (3.7E-02) respectively, dominate the HI (5.5E-02).

As seen previously, the primary difference between the calculated current and future groundwater hazards (3.7E-02 and 1.6E+00, respectively) is due to the modeled presence of chromium in future groundwater.

6.3.2.2 Cancer Risks

Cancer risks for the RB H site employee 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 exposures (above background). Carcinogenic risks to a hypothetical site employee working at RB H were then estimated. Overall risks were developed based on background and total exposures. See Tables 6.4, 6.5, and 6.6.

For organic and inorganic carcinogens, only the soil pathway contributes to the risk (4.3E-06) which is minimal.

For radionuclides, the soil and groundwater pathways make comparable contributions to the risk (4.2E-05 from soil, and 1.5E-05 from current groundwater, and 1.7E-05 from future groundwater). Much of the risk for this scenario is attributable to Ra-226 in the soil and Th-228 + daughters in groundwater.

Table 6.4 Summary of Current and Future Incremental Risks at Release Block H - Mound Facility

Site Employee Incremental	Soil	Air	Ground Water Current	Ground Water Future	Sum of Soil, Air, and Ground Water Current	Sum of Soil, Air, and Ground Water Future
Non-Carcinogenic Hazard Index for Organics & Inorganics	4.0E-03	N/A	3.7E-02	1.6E+00	4.1E-02	1.6E+00
Carcinogenic Risks for Organics & Inorganics	2.0E-06	N/A	N/A	N/A	2.0E-06	2.0E-06
Carcinogenic Risks for Radionuclides	1.8E-05	9.9E-07	1.3E-05	1.4E-05	3.2E-05	4.6E-05
			Site Employee			
			Overall HI		4.1E-02	1.6E+00
			Overall Risk		3.4E-05	4.8E-05

Table 6.5 Summary of Current and Future Background Risks at Release Block H - Mound Facility

Site Employee Background	Soil	Air	Ground Water Current	Ground Water Future	Sum of Soil, Air, and Ground Water Current	Sum of Soil, Air, and Ground Water Future
Non-Carcinogenic Hazard Index for Organics & Inorganics	1.4E-02	N/A	7.3E-05	3.1E-02	1.4E-02	4.5E-02
Carcinogenic Risks for Organics & Inorganics	2.3E-06	N/A	N/A	N/A	2.3E-06	2.3E-06
Carcinogenic Risks for Radionuclides	2.4E-05	3.9E-08	2.5E-06	2.5E-06	2.6E-05	2.9E-05
			Site Employee			
			Overall HI		1.4E-02	4.5E-02
			Overall Risk		2.8E-05	3.1E-05

Table 6.6 Summary of Current and Future Total Risks at Release Block H - Mound Facility

Site Employee Total	Soil	Air	Ground Water Current	Ground Water Future	Sum of Soil, Air, and Ground Water Current	Sum of Soil, Air, and Ground Water Future
Non-Carcinogenic Hazard Index for Organics & Inorganics	1.8E-02	N/A	3.7E-02	1.6E+00	5.5E-02	1.6E+00
Carcinogenic Risks for Organics & Inorganics	4.3E-06	N/A	N/A	N/A	4.3E-06	4.3E-06
Carcinogenic Risks for Radionuclides	4.2E-05	1.0E-06	1.5E-05	1.7E-05	5.8E-05	7.5E-05
			Site Employee			
			Overall HI		5.5E-02	1.6E+00
			Overall Risk		6.2E-05	7.9E-05

6.4 Conclusions

Cancer risks for RB H 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 H 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 H have not been evaluated for unrestricted release (e.g. residential use). Disposition of RB H 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 H. RB H is composed primarily of an asphalt paved parking lot with roads. There are no wetlands or surface waters located in RB H and no sensitive habitats. Therefore, DOE has determined, with concurrence from USEPA and OEPA that an ecological assessment for RB H is not necessary.

7. DESCRIPTIONS OF ALTERNATIVES

As documented in Section 6, the risk from both carcinogens and non-carcinogens from RB H 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 H, a remedy must be implemented to protect human heath and the environment into the future. Two alternatives were considered for RB H:

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 H. The objective of these institutional controls is to prevent an unacceptable risk to human health and the environment by restricting the use of RB H, including RB H soils, to that which is consistent with assumptions in the RB H 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 RB H in the future, the institutional controls to be adopted would:

- 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
- Prohibit removal of RB H soils from the DOE Mound property (as owned in 1998) boundary without approval from the Ohio Department of Health.

8. EVALUATION OF ALTERNATIVES

The USEPA 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 acceptable only for an industrial scenario. 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 RB H 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 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 RB H, "Maximum Contaminant Levels" or "MCLs" established under the Safe Drinking Water Act constitute chemical-specific ARARs and are listed in Appendix A. They apply to the bedrock groundwater beneath RB H. No evidence of any contamination above MCLs has been found in this ground water. Consequently, ARARs with respect to ground water 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 RB H, Ohio has identified two statutory provisions that describe site conditions that would prompt certain response actions. (See Appendix A). 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 A). Alternative 2 will comply with these requirements.

It should be noted that any onsite management of RB H soils, not associated with a CERCLA response action, in a manner inconsistent with State law or any disposition of RB H soils away from the Mound Superfund Site would be subject to applicable Ohio regulations, which are independently enforceable from 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 RB H.

Because this remedy will result in hazardous substances remaining in the RB H above levels that allow for unlimited use and unrestricted exposure, an annual review and report will be submitted to OEPA, ODH, and USEPA (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 USEPA, 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 RB H was accomplished previously on an individual PRS 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, USDOE 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, and the TPR, 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 to:

- 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
- Prohibit removal of RB H soils from the DOE Mound property (as owned in 1998) boundary without approval from the Ohio Department of Health.

The soils within RB H have not been evaluated for any use other than on-site industrial use. Any off-site disposition of RB H 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 May 1, 1999 to May 31, 1999. During this time, a public meeting will be held to discuss the 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

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.

Operable Unit 9 Site Scoping Report, Volume 3 - Radiological Site Survey, Final, June 1, 1993.

Operable Unit 9; Hydrogeologic Investigation: Bedrock Report, Technical Memorandum, Revision 0, January 1994.

Operable Unit 9; Hydrogeologic Investigation: Buried Valley Aquifer Report, Technical Memorandum, Revision 1, September 1994.

Operable Unit 9 Background Soils Investigation Soil Chemistry Report, Technical Memorandum, Revision 2, September 1994.

Operable Unit 5 New Property Remedial Investigation Report, Final, Revision 0, April, 1995.

Operable Unit 9 Hydrogeologic Investigation: Groundwater Sweeps Report, Technical Memorandum, April, 1995.

Other Soils Characterization Report, Volume I - Text. Final, Revision 0. May 1, 1995.

Operable Unit 5 Operational Area Phase I Investigation Non-AOC Field Reports, Volume I - Text. Final, Revision 0. June 1, 1995.

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Soil Gas Confirmation Sampling. Revision 0. April 1, 1996.

Residual Risk Evaluation, Release Block H, August 1997.

Technical Position Report in Support of the Release Block H Residual Risk Evaluation, Rev. 1 (Final Draft), April 1999.

The Mound 2000 Residual Risk Evaluation Methodology (RREM), Mound Plant, Final, Revision 0, January 6, 1997.

Workplan for Environmental Restoration at the Mound Plant, The Mound 2000 Approach, December 1998.

Risk-Based Guideline Values, Mound Plant, Miamisburg, Ohio, Final, Rev. 4, March 1997.

Appendix A

Listing of Applicable Relevant and Appropriate Requirements (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

Record of Decision for Release Block H, Mound Plant, Miamisburg, Ohio

FINAL

June 1999

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ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
BDP	Building Data Package
BVA	Buried Valley Aquifer
CERCLA	Comprehensive Environmental Response Compensation & Liability Act
COC	Chemical of Concern
DOE	Department of Energy
FFA	Federal Facilities Agreement
FOD	Frequency of Detection
GV	Guideline Value
HEAST	Health Effects Assessment Summary Table
HI	Hazard Index
HQ	Hazard Quotient
IDM	Investigative Derived Material
IRIS	Integrated Risk Information System
MEMP	Miamisburg Environmental Management Project
MMCIC	Miamisburg Mound Community Improvement Corporation

ACRONYMS (continued)

NCP	National Contingency Plan
NFA	No Further Assessment
NPL	National Priority List
OAC	Ohio Administrative Code
ODH	Ohio Department of Health
OEPA	Ohio Environmental Protection Agency
O & M	Operations and Maintenance
ORC	Ohio Revised Code
OSC	On-Scene Coordinator
OU	Operable Unit
pCi	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
SARA	Superfund Amendments and Reauthorization Act
SCM	Site Conceptual Model
SM/PP	Special Metallurgical/Plutonium Processing

ACRONYMS (continued)

US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

Record of Decision (ROD) for Release Block H, Mound Plant, Miamisburg, Ohio

This Record of Decision (ROD) documents the remedy selected for Release Block H of the Mound Plant, Miamisburg, Ohio. The ROD is organized in three sections: a declaration, a decision summary, and a responsiveness summary.

1.0 DECLARATION

This section summarizes the information presented in the ROD and includes the data certification sheet and authorizing signature page.

1.1 Site Name and Location

The U.S. Department of Energy (US DOE) Mound Plant (CERCLIS ID No. 04935) is located within the City of Miamisburg, in southern Montgomery County, Ohio. The Plant is approximately ten (10) miles southwest of Dayton and 45 miles north of Cincinnati. This ROD addresses Release Block (RB) H which is located in the northeast corner of the developed area of the plant.

1.2 Basis and Purpose

This decision document presents the selected remedy for Release Block H (RB H) of the Mound Plant. The remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Contingency Plan (NCP). Information used to select the remedy is contained in the Administrative Record file. The file is available for review at the Mound CERCLA Reading Room, Miamisburg Senior Adult Center, 305 Central Avenue, Miamisburg, Ohio.

The State of Ohio concurs with the selected remedy.

1.3 Site Assessment

As documented in the Residual Risk Evaluation (RRE) for RB H and the Technical Position Report in Support of the RB H RRE, the risks from carcinogens and non-carcinogens to current and future occupants of RB H were evaluated. In those analyses, the type of occupant was limited to an industrial use scenario and was represented by a construction worker and a site employee (office employee). Based on the RRE, the risks for current industrial use are within the acceptable range. However, in order to ensure that future use of the site conforms to the RRE assumptions, it was necessary to consider a remedy that would prevent the site from being used for non-industrial purposes.

As described below, the remedy will protect future occupants of RB H from the threat of contaminants in the groundwater, and will ensure that RB H soils are appropriately evaluated prior to any removal of RB H soils from the Mound Plant National Priority List (NPL) facility boundary.

1.4 Description of Selected Remedy

The selected remedy for RB H is institutional controls in the form of deed restrictions on future land use. DOE or its successors, as the lead agency for this ROD, has the responsibility to monitor, maintain and enforce these institutional controls. In order to maintain protection of human health and the environment at RB H in the future, the institutional controls to be adopted will:

- 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 taking response actions, including sampling and monitoring; and
- Prohibit removal of RB H soils from the DOE Mound property (as owned in 1998) boundary without approval from the Ohio Department of Health (ODH) and the Ohio Environmental Protection Agency (OEPA), or their successor agencies.

A copy of the deed is attached in Appendix A.

1.5 Statutory Determinations

The selected remedy for RB H is protective of human health and the environment,

complies with Federal and State requirements that are applicable or relevant and appropriate (ARAR), is cost-effective, and utilizes a permanent solution to the maximum extent practicable. Because this remedy will result in hazardous substances remaining in Release Block H above levels that allow for unlimited use and unrestricted exposure, DOE, in consultation with the U.S. Environmental Protection Agency (US EPA), OEPA and ODH, will review the remedial action each year to assure that human health and the environment are being protected by the remedial action being implemented. DOE reserves the right to petition the US EPA, OEPA, and ODH for a modification to the frequency established for conducting the effectiveness reviews.

1.6 ROD Data Certification Checklist

Based on a commitment made by the U.S. Environmental Protection Agency (US EPA) to the General Accounting Office, RODs must contain a checklist which certifies that key information regarding the selection of the remedy has been included in the ROD. Therefore, note that the following information is located in the Decision Summary (Section 2) of this ROD. Additional information on any of these topics can be found in the Administrative Record for Mound.

- chemicals of concern (COCs) and their respective concentrations,
- guideline levels for the COCs;
- risks represented by the COCs;
- current and future land and groundwater use assumptions used in the risk assessment and ROD;
- land and groundwater uses that will be available at the site as a result of the remedy;
- estimated cost of the remedy; and the
- decisive factor(s) that led to the selection of the remedy.

1.7 Authorizing Signatures and Support Agency Acceptance

This Record of Decision for Release Block H of the Mound Plant has been prepared by the DOE. Approval of the US EPA and OEPA is required and has been secured as documented below.

This ROD is authorized for implementation.

G. Leah Dever
Ohio Field Office Manager,
U. S. Department of Energy

Date

William E. Muno
Director, Superfund Division,
U. S. Environmental Protection Agency, Region V

Date

Christopher Jones
Director,
Ohio Environmental Protection Agency

Date

2.0 DECISION SUMMARY

This section provides an overview of the site and the alternatives evaluated. The selected remedy, and the basis for its selection, are also described.

2.1 Site Description

The DOE Mound Plant (CERCLIS ID No. 04935) is located within the city limits of Miamisburg, in southern Montgomery County, Ohio (Figure 2-1). 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 property is divided into nineteen "release blocks," which are contiguous tracts of property designated for transfer of ownership. These nineteen release blocks may be reconfigured to accommodate transfer of Mound property for economic development.

This ROD addresses Release Block (RB) H (Figure 2-2) which is located in the northeast corner of the developed area of the plant. The legal description of RB H is reproduced in Appendix B. RB H is generally bound to the south by the main plant entrance, to the east by an offsite community golf course, to the north by off-site residents, and to the west by a fenced parking lot.

There are no structures in RB H.

2.2 Site History and Enforcement Activities

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. DOE signed a Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Section 120 Federal Facility Agreement (FFA) with US EPA, effective October 1990. In 1993, this agreement was modified and expanded to include OEPA. DOE serves as the lead agency for CERCLA-related activities at Mound.

Figure 2-1. Regional Context of the Mound Plant

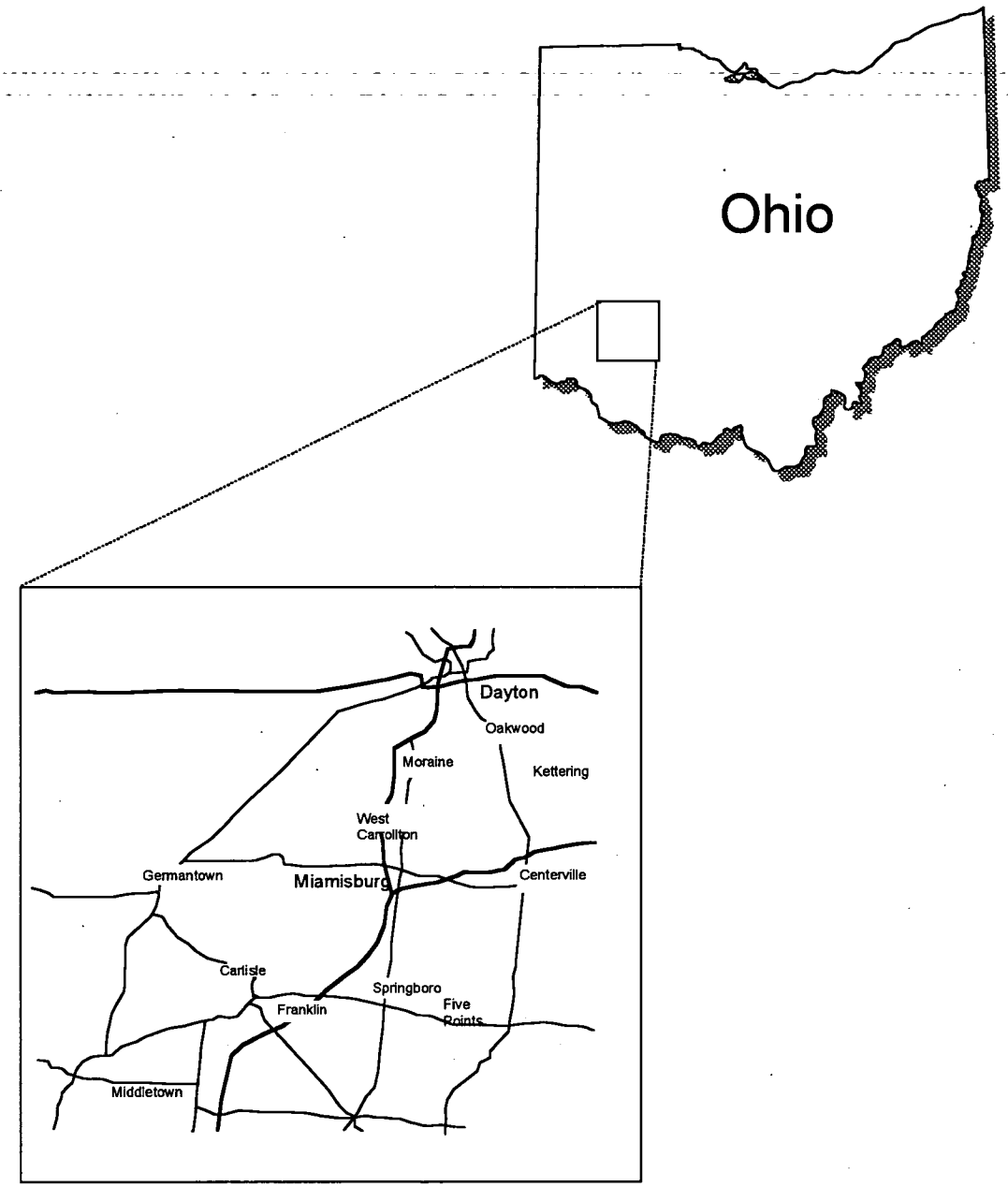
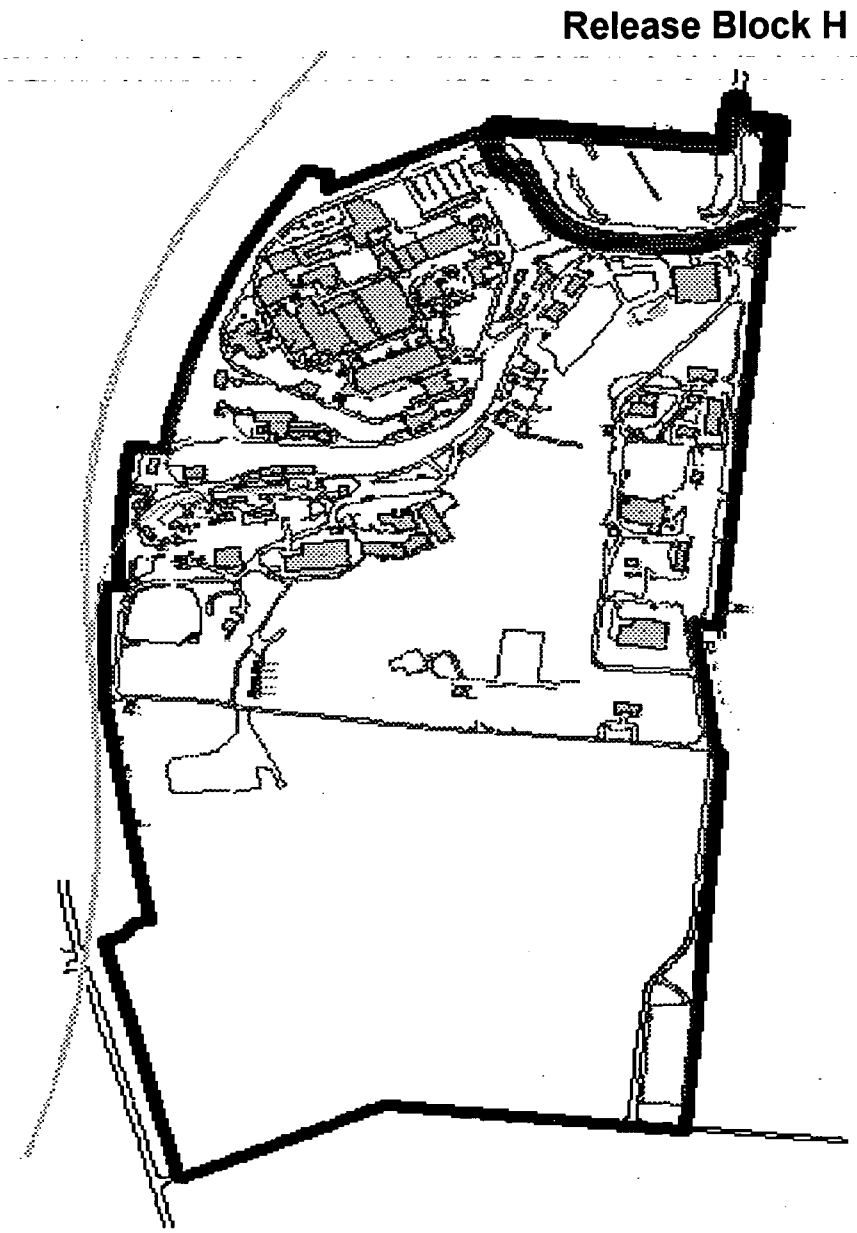


Figure 2-2. Location of Release Block H



DOE, US EPA, and OEPA had originally planned to address the Plant's environmental restoration issues under a set of Operable Units (OUs), each of which would include a number of Potential Release Sites (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, DOE and its regulators realized during a strategic review in 1995 that, for Mound, the OU approach was inefficient. 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. 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.

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 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 (RRE) is performed. The RRE forms part of the basis for determining what restrictions should be placed on the site.

2.3 Community Participation

Opportunities to comment on the No Further Assessment (NFA) decision for PRS 93 and the residual risk documents for RB H were provided. A listing of those opportunities is shown in Table 2-1.

Table 2-1. Public Comment Periods for Release Block H Documents

DOCUMENT (PRS/BUILDING)	COMMENT PERIOD (BEGIN)	COMMENT PERIOD (END)
93	3/18/96	4/1/96
RB H Residual Risk Evaluation	4/30/97	6/16/97
Technical Position Report in Support of the Release Block H Residual Risk Evaluation	5/5/99	6/5/99

The Proposed Plan for RB H was made available to the public on May 5, 1999. Copies were distributed to stakeholders and were placed in the Administrative Record file in the CERCLA Public Reading Room, Miamisburg Senior Adult Center, 305 Central Avenue, Miamisburg, Ohio. The notice of the availability of the Plan was published in the ***Miamisburg News*** on May 5, 1999. A public comment period was held from May 5, 1999 through June 5, 1999. In addition, a public meeting was held on May 18, 1999 to present the Proposed Plan. Representatives of DOE, US EPA, and the OEPA were present at the public meeting to answer questions regarding the proposed remedy. Responses to comments received during the comment period and public meeting are included in the Responsiveness Summary, which is Section 3 of this ROD.

2.4 Scope and Role of RB H

RB H lies within what was once called Operable Unit 2 (OU2). RB H includes one Potential Release Site (PRS) that has undergone previous investigation. Before transfer of a release block can be completed, all buildings and PRSs must be evaluated for protectiveness to human health and the environment for industrial reuse or remediated to be protective. Any residual risks associated with remaining

contamination in RB H have been evaluated and presented in the RB H Residual Risk Evaluation (RRE) (August, 1997) and its supplement "Technical Position Report in Support of the Release Block H Residual Risk Evaluation, April, 1999."

The PRS in RB H was identified on the basis of actual measurements of contaminants. The location of the PRS within RB H is shown in Figure 2-3; its description appears in Table 2-2. As shown in Table 2-2, the PRS was determined by the Core Team to require no further assessment, although sampling and monitoring of the seep at PRS 93 will continue.

2.5 Site Characteristics

2.5.1 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 H. 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."

2.5.2 Hydrogeologic Setting

There are two hydrogeologic regimes at 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 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)."

2.5.3 Available Data for Release Block H

The PRS within RB H has been evaluated by the Core Team. The following sections discuss the data relevant to RB H that are available from the general source documents and the Potential Release Site package.

2.5.3.1 Background Data

Soils. Background concentrations measure the amount of a chemical that is naturally occurring (like metals) or anthropogenic (man-made but, for purposes of evaluating background, 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 2.7 of the ROD. 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."

Figure 2-3. Location of PRS within RB H

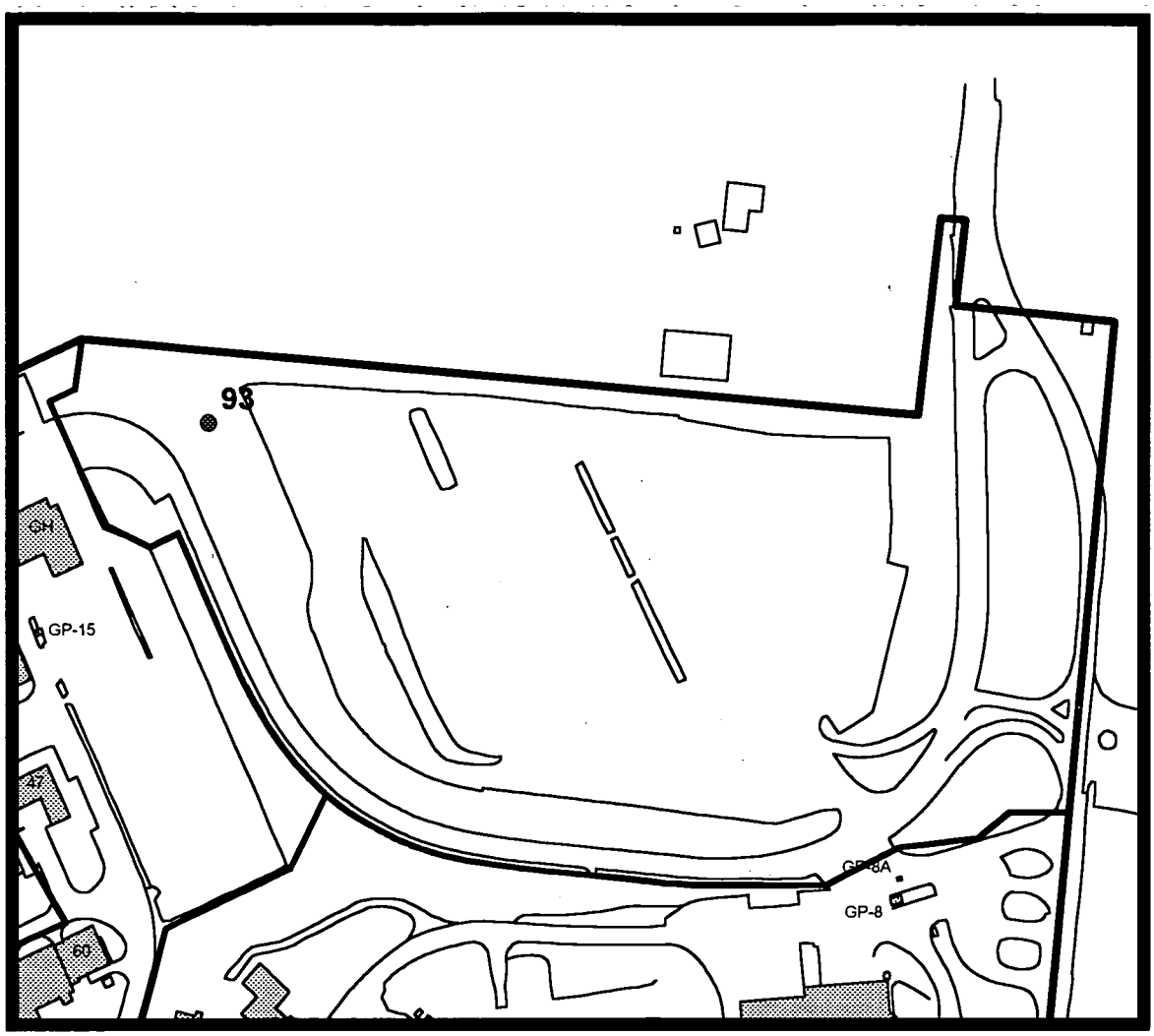


Table 2-2. Release Block H PRS and Core Team Conclusions

PRS/ BLDG	Reason for Identification	Core Team Decision	Close Out of PRS/BDP
93	Main Hill Seep #0603	Binned for No Further Assessment	Recommendation for NFA with continued monitoring signed by Core Team on 3/4/96.

2.5.3.2 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 H documents the specific groundwater data used to evaluate the current and future groundwater profile for RB H. Summaries of the contaminants detected in Mound Plant groundwater, and those projected to be present in Mound Plant groundwater in the future, are shown in Tables 2-3 and 2-4, respectively.

2.5.3.3 Soil 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 RB H.

Table 2-3. Current Mound Plant Groundwater Contaminants of Concern Based on the Plant Water Supply

Groundwater Constituent	Maximum concentration	Screening Concentration (either background or G.V.)[1]
ORGANICS (mg/L)		
1,1-Dichloroethene	0.0017	---
1,1,1-Trichloroethane	0.0018	0.0007[4]
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087	---
INORGANICS (mg/L)		
Cadmium	0.0077	0.051[2]
Copper	0.593	0.0012[4]
Lead	0.040	0.0101[4]
RADIONUCLIDES (pCi/L)		
Actinium-227	0.335	0.26[3]
Bismuth-210	0.39	---
Plutonium-239/240	2.0	0.125[4]
Thorium-228	2.17	0.69[3]
Tritium	7200	1485[4]
Uranium-234	8.14	0.792[4]
Uranium-238	8.25	0.688[4]

[1] - Guideline values (GVs) are decision-making tools for the Core Team. GVs help the Core Team determine if contaminants are present at levels that warrant evaluation.
[2] - Hazard Quotient for ingestion, dermal and inhalation. Decision made on 0.1xGV.
[3] - GV corresponds to a total risk of 10^{-6} for ingestion only.
[4] - Background value. When adequate numbers of measurements are available, background values are based on the 95th% upper tolerance limit.

Reference: "Technical Position Report in Support of the Release Block H Residual Risk Evaluation", Public Review Draft Rev 2, April, 1999.

Table 2-4. Future Mound Plant Groundwater Contaminants of Concern

Groundwater Constituent	Estimated Maximum concentration	Screening Concentration (either background or G.V.)[1]
ORGANICS (mg/L)		
1,1-Dichloroethene	0.0017	---
1,1,1-Trichloroethane	0.0065	0.0007[4]
1,1,2-Trichloro-1,2,2-trifluoroethane	0.0087	---
INORGANICS (mg/L)		
Beryllium	0.0001	0.000066[5]
Bismuth	0.0016	---
Cadmium	0.0077	0.051[2]
Chromium	0.4961	0.0061[4]
Cobalt	0.0039	---
Copper	0.5964	0.0012[4]
Lead	0.040	0.010[4]
Molybdenum	0.0096	0.0056[4]
RADIONUCLIDES (pCi/L)		
Actinium-227	0.355	0.26[3]
Bismuth-210	0.39	---
Plutonium-239/240	2.02	0.125[4]
Thorium-228	2.17	0.69[3]
Tritium	10427	1485[4]
Uranium-234	8.14	0.792[4]
Uranium-238	8.25	0.688[4]

[1] - Guideline values (GVs) are decision-making tools for the Core Team. GVs help the Core Team determine if contaminants are present at levels that warrant evaluation.
[2] - Hazard Quotient for ingestion, dermal and inhalation. Decision made on 0.1xGV.
[3] - GV corresponds to a total risk of 10^{-6} for ingestion only.
[4] - Background value. When adequate numbers of measurements are available, background values are based on the 95th% upper tolerance limit.
[5] - Total Risk 10^{-6} for ingestion, dermal and inhalation

Reference: "Technical Position Report in Support of the Release Block H Residual Risk Evaluation", Public Review Draft Rev 2, April, 1999.

Soil contaminant data for RB H 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. There is one PRS within RB H, PRS 93. PRS 93 was identified as a PRS because it is the site of Seep 0603 and other seeps showed elevated concentrations of tritium. Tritium was detected at PRS 93 at low concentrations, i.e., in the range of 1000-3000 pCi/L.

Soil was sampled at PRS 93. All radionuclide and other contaminant concentrations were in the range of background.

A summary of the contaminants detected in RB H soils is shown in Table 2-5.

2.6 Potential Future Uses for Mound

The Mound Plant will remain in industrial use into the future. This future use has been determined based upon agreement among DOE, US EPA, 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.

2.7 Summary of Site Risks

The human health risks for RB H were evaluated using the Residual Risk Evaluation Methodology (RREM) document developed for Mound. A residual risk evaluation (RRE) is a five-step process:

(1) identification of contaminants,

(2) exposure assessment,

(3) toxicity assessment,

(4) risk characterization, and

(5) evaluation of potential cumulative risks.

Table 2-5. Soil Contaminants of Concern for RB H

Soil Constituent	Maximum concentration Any Depth	Maximum concentration Shallow (<2' deep)	Screening Concentration (either Bkgd or G.V.)[1]
ORGANICS (mg/kg)			
Acenaphtene	0.18	0.18	
Acenaphthylene	0.7	0.7	
Aldrin	0.0031	0.0031	
Benzo(a)pyrene	1.115	1.115	0.41[2]
Benzo(g,h,i) perylene	1.0625	1.0625	
delta-BHC	0.00025	0.00025	
Carbazole	0.5875	0.5875	
alpha Chlordane	0.01	0.01	
gamma Chlordane	0.0074	0.0074	
4-chloro-3-methyl phenol	0.047	0.047	
Dibenzo(a,h)anthracene	0.78	0.78	0.41[2]
Dibenzofuran	1.035	1.035	
Fluorene	1.45	1.45	
Heptachlor epoxide	0.0022	0.0022	
2-Methylnaphthalene	0.92	0.92	
Naphthalene	2.625	2.625	
Phenanthrene	3.75	3.75	
1,1,2-Trichloro-1,2,2-trifluoroethane	0.002	0.002	
INORGANICS (mg/kg)			
Arsenic (total)	10.9	10.9	8.6[3]
Bismuth	58.6	58.6	
Copper (total)	26.4	22.1	26[3]
Lead (total)	163	163	48[3]
Lithium	40.2	19	26[3]
RADIONUCLIDES (pCi/g)			
Cesium-137	1.9	1.9	0.42[4]
Plutonium-238	56	56	0.13[3]
Plutonium-242	0.0143	0.0143	
Potassium-40	45.4	21	37[3]
Radium-226	3.15	3.15	0.13[4]

Note: Blanks indicate background or Guideline Value not available. The more restrictive GV was used to determine which contaminants were carried through the RRE.

[1] - Guideline values (GVs) are decision-making tools for the Core Team. GVs help the Core Team determine if contaminants are present at levels that warrant evaluation.

[2] - GV corresponds to a total risk of 10^{-6} for the ingestion pathway.

[3] - Background Value. When adequate numbers of measurements are available, background values are based on the 95% upper tolerance limit.

[4] - GV corresponds to a total risk 10^{-6} for the ingestion, inhalation and external pathways.

Reference: "Technical Position Report in Support of the Release Block H Residual Risk Evaluation", Public Review Draft Rev 2, April, 1999.

2.7.1 Identification of Contaminants

The contaminants of concern (COCs) for RB H were identified by reviewing all of the sampling data for the release block. Based on that review, contaminants were eliminated for further evaluation based on criteria established in the RREM. Specifically, only contaminants exceeding (1) background, (2) a base level of potential health concern, and (3) certain frequency of detection (FOD) criteria were carried through the RRE. The COCs established for RB H are listed in Tables 2-3, 2-4, and 2-5.

2.7.2 Exposure Assessment

The Site Conceptual Model (SCM) for Mound provides the basis for evaluating human exposure scenarios. Because DOE and its regulators and stakeholders agree that the future use of Release Block H will be industrial in nature, two receptor scenarios from the Mound SCM apply: a construction worker and a site employee. The routes of exposure applicable to these two receptors are shown in Figure 2-4. The significant pathways for RB H include ingestion of soil and groundwater.

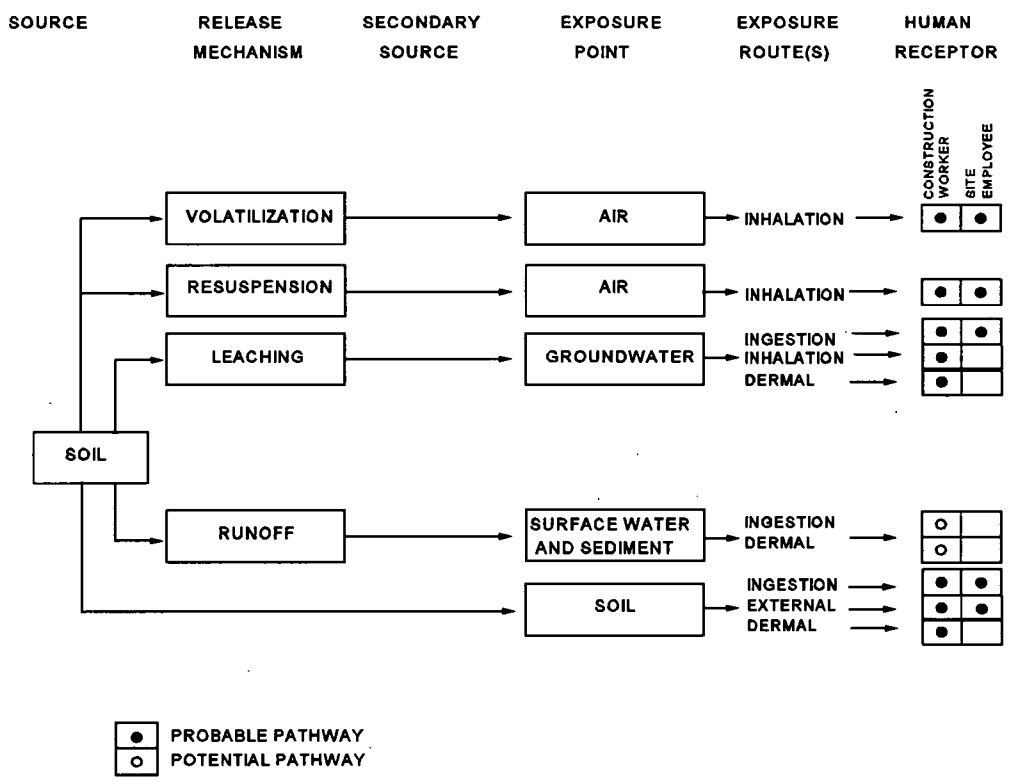
Using equations developed to support the SCM, exposures to specific concentrations of COCs are evaluated based on assuming intake rates for soil and groundwater. Once the intakes are estimated, the human health implications of those intakes are evaluated by reviewing toxicological data for the COCs.

For the special case of groundwater, the possible exposures to current and future COCs are evaluated. This approach ensures that the cumulative and long-term impacts of the COCs are adequately characterized.

2.7.3 Toxicity Assessment

The toxicological properties of each COC for RB H were evaluated by reviewing the Integrated Risk Information System (IRIS) and/or Health Effects Assessment Summary Table (HEAST) data for the COC. IRIS files provide no-observable effect levels and slope factors (for translating intake into cancer risk) for many of the chemicals encountered at Mound. HEAST provides slope factors for many of the radionuclides encountered at Mound. Based on the information collected from IRIS and HEAST, an adequate understanding of the toxicology of the RB H COCs has been developed.

Figure 2-4. Exposure Pathways for the Mound Site Conceptual Model



2.7.4 Risk Characterization

Pursuant to the RREM, risks are quantified for both carcinogenic and non-carcinogenic contaminants. The risk associated with the intake of a known or suspected carcinogen is reported in terms of the incremental lifetime cancer risk presented by that COC, as estimated using the appropriate slope factor and the amount of material ingested. Potential human health hazards from exposure to non-carcinogenic contaminants are evaluated by using a Hazard Quotient (HQ). The HQ is determined by the ratio of the intake of a COC to a reference dose or concentration for the COC that is believed to represent a no-observable effect level. The COC-specific HQs are then summed to provide an overall Hazard Index (HI). US EPA guidance sets a limit of 1.0 for the Comprehensive HI.

The risks and hazards associated with residual concentrations of COCs in RB H are shown in Table 2-6. As shown in the table, the overall risk values are in the acceptable range of 10^{-4} to 10^{-6}. The HIs for the future groundwater scenarios, however, are near or above the 1.0-limit. This is based on the bedrock groundwater contaminants flowing directly to the BVA that supplies drinking water for the plant. As a result, the selected remedy prohibits the use of bedrock groundwater. This institutional control, in the form of a deed restriction, will ensure that the residual risks associated with RB H remain acceptable.

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

2.7.5 Evaluation of Potential Cumulative Risks

For purposes of the RREM, risks resulting from contaminants that originate outside the release block under consideration are called cumulative risks. In general, cumulative risks are possible via air, surface water, and ground water. For Mound, cumulative risks from surface waters are not expected because, other than storm water drainage, there are no surface water bodies flowing through RB H from other release blocks. Groundwater and air are therefore the media of concern for cumulative risks.

Current groundwater. The Mound RREM accounts for cumulative groundwater risks by evaluating current and future groundwater contamination. Since all groundwater currently used at Mound is drawn from the production wells located onsite, the risk

posed by current groundwater contamination is equal to the risk resulting from exposure to contaminants found in the production wells. This risk is identical for all release blocks and represents the cumulative risk from contaminants that migrate to the production wells from all release blocks.

Future groundwater. The future risk from groundwater was estimated for RB H based on the assumption that contaminants found in bedrock will eventually migrate to the Mound Plant production well located in the BVA. A simple and extremely conservative flow model was used to estimate the concentrations as a function of time. These concentration estimates were reported in Table 2-4.

Air. The Mound RREM accounts for cumulative residual risk via the air pathway by using data collected in 1994 from the Mound Plant perimeter air sampling stations to bound the concentrations and therefore the risks from inhalation of radionuclides present in ambient air. These values are reported in the "Technical Position Report in Support of the Release Block H Residual Risk Evaluation" and are included in Table 2-6.

The HI and risk values presented in Table 2-6 for the current groundwater, future groundwater, and air scenarios are therefore believed to adequately bound the potential cumulative risk for RB H. The potential cumulative risk can be added to the risks from exposures to contaminants within the release block to provide a measure of overall risk. The risk values presented in Table 2-6 labeled "Sum of Soil, Air and Groundwater" are therefore believed to adequately bound the potential overall risk.

2.7.6 Ecological Risk Assessment

Based on the results of an ecological characterization of the Mound Plant (OU-9 Ecological Characterization, March, 1994) there are no endangered species or critical habitats of endangered species on RB H. In addition, RB H is composed entirely of a parking lot, roads, and mowed lawns. There are no wetlands or surface waters located in RB H and no sensitive habitats. Therefore, DOE has determined, with concurrence from US EPA and OEPA, that an ecological assessment for RB H is not necessary.

2.8 Remediation Objectives

The primary remediation objective for RB H is to ensure the residual risk associated with the release block is acceptable for the defined use scenario of industrial occupants.

Table 2-6. Current and Future Residual Risks for Release Block H

	Construction Worker					
	Soil	**Air**	**Groundwater Current**	**Groundwater Future**	**Sum of Soil, Air and Groundwater Current**	**Sum of Soil, Air and Groundwater Future**
Non-carcinogenic Hazard Index for Organics & Inorganics	4.0E-02	N/A	3.7E-02	1.6E+00	HI = 7.7E-02	HI = 1.7E+00
Carcinogenic Risks for Organics & Inorganics	4.7E-06	N/A	N/A	N/A	Risk = 4.7E-06	Risk = 4.7E-06
Carcinogenic Risks for Radionuclides	1.7E-05	2.0E-07	2.5E-06	2.9E-06	Risk = 2.0E-05	Risk = 2.3E-05
			Construction Worker Overall HI =		7.7E-02	1.7E+00
			Overall Risk =		2.5E-05	2.8E-05

	Site Employee					
	Soil	**Air**	**Groundwater Current**	**Groundwater Future**	**Sum of Soil, Air and Groundwater Current**	**Sum of Soil, Air and Groundwater Future**
Non-carcinogenic Hazard Index for Organics & Inorganics	4.0E-03	N/A	3.7E-02	1.6E+00	HI = 4.1E-02	HI = 1.6E+00
Carcinogenic Risks for Organics & Inorganics	2.0E-06	N/A	N/A	N/A	Risk = 2.0E-06	Risk = 2.0E-06
Carcinogenic Risks for Radionuclides	1.8E-05	9.9E-07	1.3E-05	1.4E-05	Risk = 3.2E-05	Risk = 4.6E-05
			Site Employee Overall HI =		4.1E-02	1.6E+00
			Overall Risk =		3.4E-05	4.8E-05

2.9 Description of Alternatives

As documented in Section 2.7, the risk from both carcinogens and non-carcinogens from RB H 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 H, a remedy must be implemented to protect human heath and the environment into the future. Two alternatives were considered for RB H; they are described below.

2.9.1 No Action

Regulations governing the Superfund program require that the "no action" alternative be evaluated at each site to establish a baseline for comparison. Under this alternative, DOE would take no action to prevent exposure to soil and groundwater contamination associated with RB H.

2.9.2 Institutional Controls

In this alternative, institutional controls in the form of deed restrictions on future land use would be placed on RB H. The objective of these institutional controls would be to prevent an unacceptable risk to human health and the environment by restricting the use of RB H, including RB H soils, to that which is consistent with assumptions in the RB H RRE. DOE or its successors would retain the right and responsibility to monitor, maintain, and enforce these institutional controls. In order to maintain protection for human health and the environment at RB H in the future, the institutional controls to be adopted would:

- 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 taking response actions, including sampling and monitoring; and
- Prohibit removal of RB H soils from the DOE Mound property (as owned in 1998) boundary without approval from ODH and OEPA , or their successor agencies.

2.10 Selected Remedy

2.10.1 Description

The selected remedy for RB H is institutional controls in the form of deed restrictions on future land use. The specific restrictions to be adopted are provided in the deed attached to this ROD as Appendix A. The objective of these restrictions is to:

- 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 taking response actions including sampling and monitoring; and
- Prohibit removal of RB H soils from the DOE Mound property (as owned in 1998) boundary without approval from ODH and OEPA , or their successor agencies.

DOE or its successors, as the lead agency for this ROD, has the responsibility to monitor, maintain and enforce these institutional controls. This responsibility includes the duty to conduct annual assessments of compliance with the deed restrictions and the duty to enforce the deed restrictions if any non-compliance is detected. The assessment and enforcement processes are outlined in Appendix C, which is intended to serve as a framework for implementation of operation and maintenance activities for the selected remedy. Within ninety (90) days of the date on which this ROD is signed, DOE shall submit to US EPA and Ohio EPA for their approval a formal proposal regarding operation and maintenance of the institutional controls. This proposal and the annual compliance assessments shall be considered primary documents under the Federal Facility Agreement. If DOE, US EPA and OEPA agree, the frequency of the compliance assessments can be changed at any time.

The soils within RB H have not been evaluated for any use other than on-site industrial use. Any off-site disposition of the RB H soil without proper handling, sampling, and management could create an unacceptable risk to off-site receptors. An objective of the preferred alternative is to prevent residual exposure to soils from RB H.

A copy of the deed is attached in Appendix A; this represents the remedy for RB H. DOE will develop an Operation and Maintenance Plan for the remedy. US EPA and OEPA have approval authority for this plan.

2.10.2 Estimated Costs

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.

2.10.3 Decisive Factors

The US EPA has developed threshold, balancing and modifying criteria to aid in the selection of the remedy. There are two (2) threshold criteria, five (5) balancing criteria and two (2) modifying criteria. Each is described below.

2.10.3.1 THRESHOLD CRITERIA - *Must be met for an alternative to be eligible for selection:*

(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 acceptable only for an industrial scenario. No evaluation was made of the risks posed by unrestricted use of the property. Deed restrictions are required as a mechanism to ensure the continued future use of RB H is limited to industrial purposes.

(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 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 RB H, "Maximum Contaminant Levels" or "MCLs" established under the Safe Drinking Water Act constitute chemical-specific ARARs and are listed in Appendix D. They apply to the bedrock ground water beneath RB H. No evidence of any contamination above MCLs has been found in this ground water. Consequently, ARARs with respect to ground water are deemed to have been met.

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., flood plains, wetlands, historic places, etc. For RB H, Ohio has identified two statutory provisions that describe site conditions that would prompt certain response actions. (See Appendix D). These provisions are similar to location-specific ARARs. The selected remedy 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. In this case, the remedy is an institutional control - deed restrictions. The ARARs are applicable State requirements concerning the recording of deeds. (See Appendix D). The selected remedy will comply with these requirements.

It should be noted that any onsite management of RB H soils, not associated

with a CERCLA response action, in a manner inconsistent with State law or any disposition of RB H soils away from the Mound Superfund Site would be subject to applicable Ohio regulations, which are independently enforceable from CERCLA.

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

(1) 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 H.

Because this remedy will result in hazardous substances remaining in the RB H above levels that allow for unlimited use and unrestricted exposure, an annual review and report will be submitted to OEPA, 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.

(2) 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.

(3) 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.

(4) 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.

(5) 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.

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

(1) 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 the selected remedy, Alternative 2, Institutional Controls.

(2) Community Acceptance

Based on input received during the public comment period and the public hearing, the community accepts and supports the selected remedy.

2.11 Statutory Determinations

The selected remedy for RB H is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate (ARAR), is cost-effective, and utilizes a permanent solution to the maximum extent practicable. Because this remedy will result in hazardous substances remaining in Release Block H above levels that allow for unlimited use and unrestricted exposure, DOE in consultation with US EPA, Ohio EPA and ODH will review the remedial action each year to assure that human health and the environment are being protected by the remedial action being implemented.

DOE reserves the right to petition the US EPA, OEPA, and ODH for a modification to the frequency established for conducting the effectiveness reviews.

2.12 Documentation of Significant Changes

Although this ROD has been signed, new information may be received or generated that could affect the implementation of the remedy. DOE, as the lead agency for this ROD, has the responsibility to evaluate the significance of any such new information. The type of documentation required for a post-ROD change depends on the nature of the change. Three categories of changes are recognized by the US EPA: non-significant, significant, and fundamental. Non-significant post-ROD changes may be documented using a memo to the Administrative Record file. Changes that significantly affect the ROD must be evaluated pursuant to CERCLA Section 117 and the NCP at 40 CFR 300.435(c)(2)(I). Fundamental changes typically require a revised Proposed Plan and an amendment to the ROD. Significant or fundamental changes to the ROD for Release Block H are not anticipated.

3.0 RESPONSIVENESS SUMMARY

This section of the ROD presents stakeholder concerns about RB H and explains how those concerns were addressed prior to issuance of the ROD.

During the public meeting on the Proposed Plan, one stakeholder provided a formal comment. During the public review period for the Proposed Plan, other stakeholders

provided additional comments. The Core Team responded to stakeholders by letter. The comments and responses are also presented here.

- **Comments Received during the Public Meeting held on the Proposed Plan for Release Block H**

Comment:
My name is Jeff Fischer. I see that there's an update on risk factors from IRIS. That's a good thing. There are several chemicals as well as radionuclides that have updated factors. That brings up the question, what impact does this have on earlier work that's been done in terms of calculations? Has this been looked at for other release blocks?

Response:
The impact of revised risk factors from IRIS and HEAST on earlier work has been evaluated. Release Block D was the only release block affected because it was the only release block with a completed residual risk evaluation. The "Technical Position Report in Support of the Release Block D Residual Risk Evaluation" (January, 1999) documented the impact of revisions in risk factors that occurred after the Residual Risk Evaluation was complete (December, 1996).

- **Comments on the Technical Position Report in Support of the Release Block H Residual Risk Evaluation and the Proposed Plan for Release Block H**

Comment:
Add RfD (Table 2-1) to the Acronym List.

Response:
RfD will be added to the Acronym List on the final TPR.

Comment:
Note that the daughter product of Thorium 232 is Radium 228, rather than Radium 226 (page 6 and page 8). Likewise, the eventual daughter product of Uranium 238 is Radium 226.

Response:
The original RRE incorrectly stated that radium-226 was the daughter of thorium-232. This was one of the drivers for using the TPR to document the risks from radium-226 and its daughters. Radium-226 risks are therefore accounted for in the risk values presented in the ROD. The final edition of the TPR has been reworded to clarify this point.

Comment:
It is my thinking that the risk factors (for radionuclides) from inhalation, ingestion, and external exposure should be totaled for a more accurate risk figure. Also, in the face of the additional risk from hazardous chemicals -- does each of the two categories not enhance the effect of the other?

Response:
The risk factors for radionuclides have been totaled for all pathways (see for example Tables 3-1a and 3-1b of the TPR). Overall cancer risks for radionuclides and chemicals have also been totaled (see for example Tables 6.1 and 6.2 of the Proposed Plan). The overall cancer risk and the overall hazard index (for chemicals that are not carcinogens), however, have not been totaled; there is no consensus method available for summing these different figures-of-merit which represent very different types of potential health effects. Similarly, there is no consensus method available for estimating the synergistic effects possibly associated with exposure to both radionuclides and chemicals.

Comment:
Genetic effects were not included in the risk calculations, as far as I could see. These may have been ruled out due to the two categories of persons considered in the calculations. However, should a genetic defect appear in any of their families, this is a painful experience should it happen within future generations.

Response:
The comment is correct in noting that genetic effects are not accounted for in the HEAST slope factors used to translate intake of, or external exposure to, radionuclides into risk. The slope factors account solely for the additional cancer risk potentially associated with ingestion, inhalation, or external exposure using a linear, non-threshold dose-response model. The IRIS slope factors used for chemical carcinogens are also subject to this limitation.

Comment:
The "Core Team" of representatives from DOE, US EPA, and OEPA evaluated the potential contamination problems and recommended "the appropriate response." My question is: were any citizens involved in determining that response? Would a meeting for those persons interested in reviewing the contamination problems and recommendations be feasible? A simple explanation of how the calculations were made would be helpful to me.

Response:
The Core Team welcomes the opportunity to meet with citizens and discuss the Mound 2000 process and its results. The community was an active participant in developing this process (Mound 2000) and helped determine points of direct involvement. The Residual Risk Evaluation Methodology and the Residual Risk Evaluation for Release Block H have gone through a public comment cycle and copies are in the CERCLA Public Reading Room. The process requires comments from the public on the PRS recommendations be responded to or incorporated as part of the remedy evaluation. DOE believes all comments have been resolved with the commenter and the documents, comments, and responses have been placed in the CERCLA Public Reading Room.

Comment:
Before considering the transfer of more parcels, I would like to know if any historical records or deeds were searched to determine whether or not some record exists which would encourage us to honor the Miami Indian culture in some way.

Response:
Archeological field surveys have been performed. In 1987, Wright State University conducted archeological survey of the acceptable portions of the South Property (RB A & B). Based on the results of the field work and a review of applicable literature, the survey team concluded that the South Property did not have the research potential to make it eligible for listing on the National Register of Historic Places. Subsequent correspondence from the Ohio Historic Preservation office reaffirmed that conclusion. A follow-up survey conducted in 1991 examined areas immediately adjacent to, but not including the South Property. Four historic sites were noted: a segment of the Miami-Erie Canal, a bridge remnant, a bridge, and a city well. None of these sites were judged to be eligible for the National Register of Historic Places.

Comment:
The estimate of $5000 as a fund to be used for the future monitoring of Parcel H seems to me to be an underestimation, since the cost of lab tests, etc., is substantial.

Response:
The referenced estimate of $5000 per year is the anticipated annual cost of maintaining deed restrictions and performing effectiveness reviews for USEPA and OEPA as described in the Proposed Plan. Any required future monitoring within this RB would be funded separately.

Comment:
The party which purchases Release Block H should commit, as well, when he/she transfers the site to another owner, to the transfer of all existing environmental reports provided by DOE. In addition, to the succeeding owners, all records should be filed with the City of Miamisburg Records of Deeds Office, the County Zoning Board, and the Ohio Records Offices and federal agencies so designated.

Response:
We share your concern for long term retention and dissemination of information about the site. The Federal Facility Agreement addresses document retention for at least 10 years after termination of the FFA. As the Mound project continues and approaches completion, we will revisit the issue of long term retention and dissemination of information to succeeding owners.

Comment:
We understand that a professional property survey has been completed for Release Block H. Will the complete legal description of Release Block H, with a thorough description of the property boundaries, be included in the Release Block H Record of Decision?

Response:
The complete legal description of Release Block H will be included in the Record of Decision as an Appendix.

Comment:
We wish to clarify the term "industrial use" or "industrial land use" as it appears in the Proposed Plan. The first sentence of Section 3.0, Exposure Assessment, of the Release Block H Residual Risk Evaluation (RRE) states that "[DOE], Ohio EPA, U.S. EPA, and the Mound Facility stakeholders have agreed that the future use of the Mound Plant property will be commercial/industrial use." The section then goes on to describe the two commercial/industrial exposure scenarios utilized in the RRE and defined in the Mound 2000 Residual Risk Evaluation Methodology as 1) a construction worker assumed to work on the property eight hours per day for 250 days per year over a five-year period, and 2) a site employee assumed to work for eight hours per day for 250 days per year over a 25-year period and who does not shower in water from a well on the property.

We assume, therefore, based on the foregoing scenarios, that the use of the term "industrial" in the Release Block H Proposed Plan refers to the risk exposure scenario evaluated for this property and is not restricted solely to the industrial land use category, but incorporates both commercial and industrial land uses. Are our assumptions correct?

Response:
Yes, your assumptions are correct. "Industrial" refers to the risk exposure scenario evaluated for the property. This incorporates both commercial and industrial land uses that are consistent with the restrictions placed on the deed and as described in the ROD.

Comment:
The fourth sentence of the second paragraph of Page 3 should read something line "Before transfer of a release block can be completed, all buildings and PRSs must be evaluated for protectiveness **to human health and the environment for industrial reuse** or be remediated to be protective." The word protectiveness is not defined at a previous point in the text.

Response:
This language has been incorporated into the appropriate section (2.4 Scope and Role of RB H) of the Record of Decision.

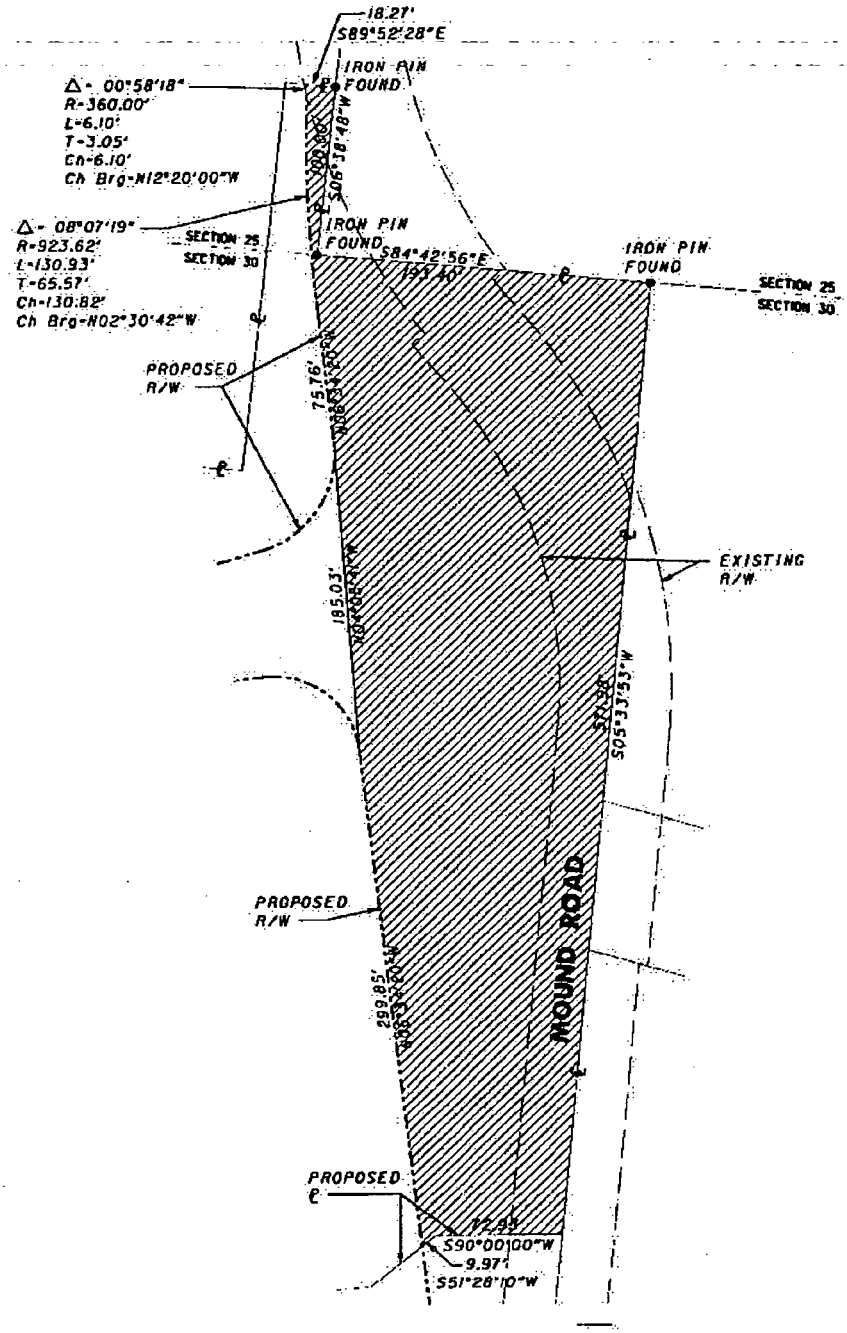
Comment:
A wedge of Release Block H property lies outside (east of) the Mound facility fence line along Mound Road, between the Mound entrance driveway and Mound Road itself, and one corner of property lies to the east of Mound Road. (Refer to Attachment A for a map of the wedge of Release Block H property and to Attachment B for a legal description.) MMCIC believes that the Miamisburg community would receive a benefit from an exclusion from the soil removal restriction for this wedge of property as described below.

Once MMCIC completes its proposed improvement along the section of Mound Road that includes this wedge of Block H property, MMCIC plans to dedicate the road to the City of Miamisburg. Any maintenance or improvements required for the road after that time will become the responsibility of the City. A soil removal restriction for this wedge of property along Mound Road will be extremely difficult to police once the road is dedicated to the City.

Historical information described in the Release Block H Proposed Plan confirms that no industrial, commercial, or research activities associated with the Mound facility operations ever took place on this portion of Release Block H.

In addition, MMCIC has reviewed the soil sample analytical data for the described wedge of property. The analytical data, which for the most part result from laboratory analyses for radionuclides, indicate concentrations that are either equal to the method detection limits (i.e., non-detects) or within the 10-5 Guideline Values for a residential scenario established for the respective compounds at the Mound facility. There are two exceptions to these observations: Cesium-137 detected at 0.6 pCi/g and Plutonium-238 detected at 26 pCi/g.

MMCIC there requests that, if necessary, a focused residential residual risk evaluation be performed to support an exclusion from the soil removal restriction for the described wedge of property in Release Block H.


18.27'
S89°52'28"E
IRON PIN FOUND
Δ= 00°58'18"
R=360.00'
L=6.10'
T=3.05'
Ch=6.10'
Ch Brg=N12°20'00"W
S06°38'48"W
Δ= 08°07'19"
R=923.62'
L=130.93'
T=65.57'
Ch=130.82'
Ch Brg=N02°30'42"W
SECTION 25
SECTION 30
IRON PIN FOUND
S84°42'56"E
IRON PIN FOUND
SECTION 25
SECTION 30
PROPOSED R/W
75.76'
N08°34'50"W
EXISTING R/W
185.03'
N08°08'41"W
S05°33'53"W
PROPOSED R/W
299.85'
N08°33'20"W
MOUND ROAD
PROPOSED ℄
72.94'
S90°00'00"W
9.97'
S51°28'10"W

ATTACHMENT B
DESCRIPTION FOR SOIL EXCLUSION AREA
1.886 ACRES

Situate in the County of Montgomery, in the State of Ohio and in the City of Miamisburg, part of Section 25, Town 1, Range 6 MRs and part of Section 30, Town 2, Range 5 MRs and being more particularly described as follows: **Commencing** at an iron pin found on the southerly projection of the centerline of Mound Road, said point also being the northeast corner of a 164.13 Acre tract of land as described in Deed Book 1246, Page 45 of the Deed Records of Montgomery County and being the **TRUE POINT OF BEGINNING**,

thence South 06° 38' 48" West, 100.00 feet to an iron pin found; thence South 84° 42' 56" East, 193.40 feet to an iron pin found; thence South 05° 33' 53" West, 571.98 feet to a point on the centerline of Mound Road; thence due West, 72.93 feet to a point; thence South 51° 28' 10" West, 9.97 feet to a point on the proposed westerly right-of-way of Mound Road; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 299.85 feet to a point; thence North 04° 05' 41" West, 185.03 feet to a point; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 75.76 feet to a point; thence along the proposed westerly right-of-way of Mound Road, on a curve to the right for a distance of 130.93 feet with a radius of 923.62 feet and a central angle of 08° 07' 19" and a chord distance of 130.82 feet and a chord bearing of North 02° 30' 42" West to a point; thence along the existing westerly right-of-way of Mound Road, on a non-tangent curve to the right for a distance of 6.10 feet with a radius of 360.00 feet and a central angle of 00° 58' 18" and a chord distance of 6.10 feet and a chord bearing of North 12° 20' 00" West to a point; thence South 89° 52' 28" East, 18.27 feet to the **POINT OF BEGINNING**.

Containing 82,149.70 square feet, 1.886 acres more or less, and subject to all legal highways, easements, and agreements of record.

Response:
To respond to this comment, it was necessary to review the soil data for the referenced "wedge". Based on that review, two contaminants of concern (COCs) were identified. A risk analysis was then performed using those two COCs. The analysis bounded the risks from the uncontrolled release of the "wedge" soil by assuming the soils were relocated to a residential area. The risk results were used to determine if the deed restriction was required to protect human health and the environment. Results and conclusions are summarized below.

Contaminants of concern. The data review confirmed that the plutonium-238 value of 26 pCi/g was the highest Pu-238 result reported in and around the "wedge". It is important to note that the value was generated using soil screening instruments that have a plutonium-238 detection limit of about 25 pCi/g. Therefore, actual Pu-238 concentrations in the area, as documented by measurements made with more sensitive instruments, were much lower ($\leq$ 3.9 pCi/g). However, in the interest of conservatism, the 26-pCi/g result was used to evaluate the residual risks potentially associated with exposure to Pu-238 in the soil. (Note that a 95% upper confidence level was not calculated as fewer than 20 Pu-238 results were available.)

The cesium-137 value of 0.6 pCi/g was also found to be an appropriate bounding concentration. The highest measured Cs-137 concentration was outside, but in proximity to, the boundaries of the wedge. For cesium, a 95% upper confidence level was not calculated as fewer than 20 cesium-137 results were available.

All other radionuclide results were at or below their respective background levels. Specifically, isotopes of radium, thorium, and uranium were detected, but in concentrations that did not warrant inclusion in this analysis.

Risk analysis. The analysis assumed an individual would incidentally consume and ingest soils from the wedge. The same individual was assumed to receive external exposure from the soil and to ingest additional radioactivity via transfer of the contaminants from the soil to produce grown in a home garden. The results of the risk analysis are shown in the following two tables.

Table 1. Release Block "H" Wedge Risk Analysis for Pu-238

Risk Calculations for Pu-238 Soil Inhalation, Soil Ingestion, External Exposure, and Consumption of Produce from a Home Garden
(Ref: Equation and parameter values from Risk-Based Guideline Values, March 1997)

Maximum Pu-238 Soil Concentration
26 pCi/g Concentration (Location SCR974 -- in the center of the RB H "wedge")

Slope Factors
2.95E-10 risk/pCi ingested
2.74E-08 risk/pCi inhaled
1.94E-11 risk/yr/pCi/g

Risk: Residential Soil Ingestion [redacted]

Risk = CS • EF • [(IRc*EDc)+(IRa*EDa)] • ING SF
CS = 26 pCi/g (CS = concentration in soil)
EF = 350 days/year (EF = exposure frequency)
IRc = 0.2 g/day (IRc = child ingestion rate)
EDc = 6 years (EDc = child exposure duration)
IRa = 0.1 g/day (IRa = adult ingestion rate)
EDa = 24 years (EDa = adult exposure duration)
ING SF = 2.95E-10 risk/pCi ingested

Risk = 9.66E-06

Risk: Residential Soil Inhalation [redacted]

Risk = CS * EF * ED * IR * (1/PEF) * INH SF * 1000 g/kg
CS = 26 pCi/g (CS = concentration in soil)
EF = 350 days/year (EF = exposure frequency)
ED = 30 years (ED = exposure duration)
IR = 20 m^3/day (IR = inhalation rate)
PEF = 4.28E+09 m^3/kg (PEF = particulate emission factor)
INH SF = 2.74E-08 risk/pCi inhaled

Risk = 3.50E-08

Risk: Residential External Exposure [redacted]

Risk = CS * ED * (1-SE) * TE *EXT SF
CS = 26 pCi/g
ED = 30 yr (ED = exposure duration)
SE = 0.2 unitless (SE = gamma shielding factor)
TE = 0.375 unitless (TE = gamma exposure time factor)
EXT SF = 1.94E-11 risk/yr/pCi/g (EXT SF = external slope factor)

Risk = 4.54E-09

Risk: Residential Home Garden [redacted]

Risk = CS • BV * IR * FI • EF • ED • ING SF
CS = 26 pCi/g (CS = concentration in soil)
BV = 5.0E-04 unitless (BV = soil-to-plant concentration factor for plutonium)
IR = 340 g/day (IR = produce ingestion rate)
FI = 0.36 unitless (FI = fraction of produce from home garden)
EF = 350 days/year (EF = exposure frequency)

ED = 30 years (ED = exposure duration)
ING SF = 2.95E-10 risk/pCi ingested (ING SF = ingestion slope factor)

Risk = 4.93E-06 [redacted]

Pu-238 Risk Summary for Residential Use of RB H Wedge Soil

	Risk
Soil ingestion	9.66E-06
Soil inhalation	3.50E-08
External exposure	4.54E-09
Home-grown produce	4.93E-06
Total	**1.46E-05**

Table 2. Release Block "H" Wedge Risk Analysis for Cs-137

Risk Calculations for Cs-137+D Soil Inhalation, Soil Ingestion, External Exposure, and Consumption of Produce from a Home Garden

(Ref: Equation and parameter values from Risk-Based Guideline Values, March 1997)

Cs-137 Soil Concentration

0.6 pCi/g	Maximum concentration (Location S0219 – just outside the RB H "wedge")
1.02 pCi/g	Total concentration (including background value of 0.42 pCi/g)

Slope Factors

3.16E-11 risk/pCi ingested
1.91E-11 risk/pCi inhaled
2.09E-06 risk/yr/pCi/g

Risk: Residential Soil Ingestion [redacted]

Risk = CS • EF • [(IRc*EDc)+(IRa*EDa)] * ING SF

CS =	1.02	pCi/g (CS = concentration in soil)
EF =	350	days/year (EF = exposure frequency)
IRc =	0.2	g/day (IRc = child ingestion rate)
EDc =	6	years (EDc = child exposure duration)
IRa =	0.1	g/day (IRa = adult ingestion rate)
EDa =	24	years (EDa = adult exposure duration)
ING SF =	3.16E-11	risk/pCi ingested

Risk = 4.06E-08

Risk: Residential Soil Inhalation [redacted]

Risk = CS * EF * ED * IR • (1/PEF) • INH SF • 1000 g/kg

CS =	1.02	pCi/g (CS = concentration in soil)
EF =	350	days/year (EF = exposure frequency)
ED =	30	years (ED = exposure duration)
IR =	20	m^3/day (IR = inhalation rate)
PEF =	4.28E+09	m^3/kg (PEF = particulate emission factor)
INH SF =	1.91E-11	risk/pCi inhaled

Risk = 9.56E-13

Risk: Residential External Exposure [redacted]

Risk = CS * ED * (1-SE) * TE *EXT SF

CS =	1.02	pCi/g
ED =	30	yr (ED = exposure duration)
SE =	0.2	unitless (SE = gamma shielding factor)
TE =	0.375	unitless (TE = gamma exposure time factor)
EXT SF =	2.09E-06	risk/yr/pCi/g (EXT SF = external slope factor)

Risk = 1.92E-05

Risk: Residential Home Garden [redacted]

Risk = CS • BV * IR * FI • EF • ED • ING SF

CS =	1.02	pCi/g (CS = concentration in soil)
BV =	4.0E-02	unitless (BV = soil-to-plant concentration factor for cesium)
IR =	340	g/day (IR = produce ingestion rate)
FI =	0.36	unitless (FI = fraction of produce from home garden)
EF =	350	days/year (EF = exposure frequency)
ED =	30	years (ED = exposure duration)
ING SF =	3.16E-11	risk/pCi ingested (ING SF = ingestion slope factor)

Risk = 1.66E-06 [redacted]

Cs-137 Risk Summary for Residential Use of RB H Wedge Soil

	Risk
Soil ingestion	4.06E-08
Soil inhalation	9.56E-13
External exposure	1.92E-05
Home-grown produce	1.66E-06
Total	**2.09E-05**

Results and conclusions. Based on the conservative exposure scenarios detailed above, the absence of a restriction on the movement of RB H "wedge" soils would not present an unacceptable risk to a member of the public. In addition, the RB H "wedge" was not used as a process area, is located outside the controlled (security fence) area, has had no reported releases, and has no anomalous locations identified by qualitative field instrumentation. Therefore, the DOE and the US and Ohio EPAs concur with the request from MMCIC to lift the restriction and the appropriate notations appear elsewhere in this ROD, however OEPA and ODH recommend that any surplus soils from this area be used or kept on the Mound property to eliminate any future concerns regarding disposition of soil.

4.0 ADMINISTRATIVE RECORD FILE REFERENCES

Information used to select the remedy is contained in the Administrative Record file. The file is available for review at the Mound CERCLA Reading Room, Miamisburg Senior Adult Center, 305 Central Avenue, Miamisburg, Ohio. The Administrative Record File references for RB H includes the following:

An Archaeological Survey of Portions ot the Mound Facility, Montgomery County, Ohio, Public Archaeology Report No. 18, Laboratory of Anthropology, Wright State University, December, 1987.

Literature Review Update and Archaeological Survey of the EG&G Mound Facility and Adjacent Areas, City of Miamisburg, Miami Township, Montgomery County, Ohio, April 16, 1991.

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

Operable Unit 9 Site Scoping Report, Volume 3 - Radiological Site Survey, Final, June 1, 1993.

Operable Unit 9; Hydrogeologic Investigation: Bedrock Report, Technical Memorandum, Revision 0, January 1994.

Operable Unit 9; Ecological Characterization; Technical Memorandum, Revision 0, March 1994.

Operable Unit 9; Hydrogeologic Investigation: Buried Valley Aquifer Report, Technical Memorandum, Revision 1, September 1994.

Operable Unit 9 Background Soils Investigation Soil Chemistry Report, Technical Memorandum, Revision 2, September 1994.

Operable Unit 9 Hydrogeologic Investigation: Groundwater Sweeps Report, Technical Memorandum, April, 1995.

Other Soils Characterization Report, Volume I - Text. Final, Revision 0. May 1, 1995.

Operable Unit 9 Regional Soils Investigation Report, Revision 2, August 1, 1995.

Potential Release Site Package, PRS #93, Final, Revision 2, November 1996.

Residual Risk Evaluation, Release Block H, August 1997.

The Mound 2000 Residual Risk Evaluation Methodology (RREM), Mound Plant, Final, Revision 0, January 6, 1997.

Workplan for Environmental Restoration at the Mound Plant, The Mound 2000 Approach, December 1998.

Memorandum, Randolph Tormey, Deputy Chief Counsel, Ohio Field Office, US DOE dated February 17, 1999 regarding Institutional Controls, Mound Facility, Miamisburg, Ohio.

Letter from Mr. Timothy J. Fischer, Remedial Project Manager, US EPA to Mr. Arthur Kleinrath, US DOE dated April, 1999, RE: Ecological Risk Assessment, Release Block H.

Letter from Mr. Brian Nickel, Mound Project Manager, Office of Federal Facilities and Oversight, OEPA to Mr. Oba Vincent, US DOE dated April, 1999, RE: DOE Mound Release Block H Ecological Assessment.

Technical Position Report In Support of the Release Block H Residual Risk Evaluation, Public Review Draft, Rev 2, April 1999.

Appendix A

Quitclaim Deed for RB H

QUITCLAIM DEED

The UNITED STATES OF AMERICA, acting by and through the Secretary of the Department of Energy (hereinafter sometimes called "Grantor"), under and pursuant to the authority of the Atomic Energy Act of 1954, Section 161 (g) (42 U.S.C. §2201(g), the covenants contained herein, and other good and valuable consideration, duly paid by the Miamisburg Mound Community Improvement Corporation, a non-profit corporation subsisting under the laws of Ohio and recognized by the Secretary of Energy as the agent for the community wherein the former Mound Facility is located (hereinafter sometimes called "Grantee"), the receipt of which is hereby acknowledged, hereby QUITCLAIMS unto Grantee its successors and assigns, subject to the reservations, covenants, and conditions hereinafter set forth, all of its right, title and interest, together with all improvements thereon and appurtenances thereto, in the following described premises, commonly known as Parcel H:

Situate in the State of Ohio, County of Montgomery, being in the City of Miamisburg, being part of Section 30, Range 5, Township 2, lying in the Miami Rivers Survey (M.R.S.), and being part of city lots numbered 2259 within the Corporation Limits of the City of Miamisburg, and being more particularly bounded and described with bearings referenced to the Ohio State Coordinate System, South Zone, as follows:

Beginning at a concrete monument, being the North East corner of Section 36 and the North West corner of Section 30, and being the point of beginning for the land herein described, thence S 5° 47' 45" W 130.89 feet to an iron pin being the TRUE POINT OF BEGINNING; thence S 85° 03' 12" E 1023.90 feet to a concrete monument, thence N 6° 54' 59" E 231.00 feet to a concrete monument, thence S 84° 36' 50" E 30.00 feet to a iron pin, thence S 6° 54' 54" W 100.00 feet to a iron pin, thence S 84° 36' 37" E 193.40 feet to a concrete monument, thence S 5° 34' 19" W 571.986 feet along the center line of Mound Road to a point, thence S 90° 0' 0" W 72.86 feet to a point, thence S 51° 28' 1.6" W 48.51 feet to a point, thence S 83° 32' 4" W 97.29 feet to a point, thence S 63° 48' 53" W 98.67 feet to a point, thence N 89° 55' 58" W 173.02 feet to a point, thence N 83° 49' 39" W 244.21 feet to a point, thence along the arc of a curve to the right having a radius of 360.67 feet for a distance of 353.12 feet to a point, thence N 25° 03' 02" W 214.48 feet to a point, thence S 64° 03' 10" W 37.94 feet to a point, thence N 64° 35' 31" W 56.61 feet to a point, thence N 25° 43' 03" W 160.76 feet to a point, thence N 65° 33' 00" E 35.05 feet to a point, thence N 5° 31' 01" E 57.67 feet to a iron pin being the true point of beginning containing 14.29 acres more or less, and subject to all legal highways and easements of record. Prior Deed Reference: Deed Book _____, Page __.

RESERVING UNTO Grantor, the United States Environmental Protection Agency (USEPA) and the State of Ohio, acting by and through the Director of the Ohio Environmental Protection Agency (OEPA) or the Ohio Department of Health (ODH), their successors and assigns, an easement to, upon or across the Premises in conjunction with the covenants of

Grantor and/or Grantee in paragraphs numbered 1.1-1.3, 3.2 and 3.3 of this Deed and as otherwise needed for purposes of any response action as defined under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, including but not limited to, environmental investigation or remedial action on the Premises or on property in the vicinity thereof, including the right of access to, and use of, to the extent permitted by applicable law, utilities at reasonable cost to Grantor. Grantee understands that any such response action will be conducted in a manner so as to attempt to minimize interfering with the ordinary and reasonable use of the Premises.

This Deed and conveyance is made and accepted without warranty of any kind, either express or implied, except for the warranty in paragraph 3.3 of this Deed, and is expressly made under and subject to all reservations, restrictions, rights, covenants, easements, licenses, and permits, whether or not of public record, to the extent that the same affect the Premises.

1. The parties hereto intend the following restrictions and covenants to run with the land and to be binding upon the Grantee and its successors, transferees, and assigns or any other person acquiring an interest in the Premises, for the benefit of Grantor, USEPA and the State of Ohio, acting by and through the Director of OEPA or ODH, their successors and assigns.

1.1 Excepting those soils **Commencing** at an iron pin found on the southerly projection of the centerline of Mound Road, said point also being the northeast corner of a 164.13 Acre tract of land as described in Deed Book 1246, Page 45 of the Deed Records of Montgomery County and being the **TRUE POINT OF BEGINNING**, thence South 06° 38' 48" West, 100.00 feet to an iron pin found; thence South 84° 42' 56" East, 193.40 feet to an iron pin found; thence South 05° 33' 53" West, 571.98 feet to a point on the centerline of Mound Road; thence due West, 72.93 feet to a point; thence South 51° 28' 10" West, 9.97 feet to a point on the proposed westerly right-of-way of Mound Road; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 299.85 feet to a point; thence North 04° 05' 41" West, 185.03 feet to a point; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 75.76 feet to a point; thence along the proposed westerly right-of-way of Mound Road, on a curve to the right for a distance of 130.93 feet with a radius of 923.62 feet and a central angle of 08° 07' 19" and a chord distance of 130.82 feet and a chord bearing of North 02° 30' 42" West to a point; thence along the existing westerly right-of-way of Mound Road, on a non-tangent curve to the right for a distance of 6.10 feet with a radius of 360.00 feet and a central angle of 00° 58' 18" and a chord distance of 6.10 feet and a chord bearing of North 12° 20' 00" West to a point; thence South 89° 52' 28" East, 18.27 feet to the **POINT OF BEGINNING**.

Containing 82,149.70 square feet, 1.886 acres more or less, and subject to all legal highways, easements, and agreements of record. Grantee covenants that any soil from the Premises shall not be placed on any property outside the boundaries of that described in instruments recorded at Deed Book **(1214, pages 10, 12, 15, 17 and 248; Deed Book 1215, page 347; Deed Book 1246, page 45; Deed Book 1258, pages 56 and 74; Deed Book 1256, page 179; Micro-Fiche 81-376A01; and Micro-Fiche**

81-323A11) of the Deed Records of Montgomery County, Ohio (and as illustrated in the CERCLA 120(h) Summary, Notices of Hazardous Substances Release Block H, Mound Plant, Miamisburg, Ohio dated _____, 1999) without prior written approval from ODH and OEPA, or successor agencies.

1.2 Grantee covenants not to use, or allow the use of, the Premises for any residential or farming activities, or any other activities which could result in the chronic exposure of children under eighteen years of age to soil or groundwater from the Premises. Restricted uses shall include, but not be limited to:

(1) single or multifamily dwellings or rental units;
(2) day care facilities;
(3) schools or other educational facilities for children under eighteen years of age; and
(4) community centers, playgrounds, or other recreational or religious facilities for children under eighteen years of age.

Grantor shall be contacted to resolve any questions which may arise as to whether a particular activity would be considered a restricted use.

1.3 Grantee covenants not to extract, consume, expose, or use in any way the groundwater underlying the premises without the prior written approval of the United States Environmental Protection Agency (Region V) and the OEPA.

2. The Grantor hereby grants to the State of Ohio and reserves and retains for itself, its successors and assigns an irrevocable, permanent, and continuing right to enforce the covenants of this Quitclaim Deed through proceedings at law or in equity, including resort to an action for specific performance, as against and at the expense of Grantee, its successors and assigns, including reasonable legal fees, and to prevent a violation of, or recover damages from a breach of, these covenants, or both. Any delay or forbearance in enforcement of said restrictions and covenants shall not be deemed to be a waiver thereof.

3. Pursuant to Section 120(h)(3) of the Comprehensive Environmental Response, Compensation and Liability Act of 1930, as amended (42 U.S.C. §9620(h)(3)), the following is notice of hazardous substances, the description of any remedial action taken, and a covenant concerning the Premises.

3.1 **Notice of Hazardous Substance**: Grantor has made a complete search of its files and records concerning the Premises. Those records indicate that the hazardous substances listed in Exhibit "B," attached hereto and made a part hereof, have been stored for one year or more or disposed of on the Premises and the dates that such storage/disposal took place.

3.2 **Description of Remedial Action Taken**:
Institutional Controls are established. The Institutional Controls are set forth as covenants in Sections 1.1, 1.2, and 1.3 of this Deed.

3.3 **Covenant:** Grantor covenants and warrants that all remedial action necessary for the protection of human health and the environment with respect to any hazardous substances remaining on the property has been taken, and any additional remedial action found to be necessary after the date of this Deed regarding hazardous substances existing prior to the date of this Deed shall be conducted by Grantor, provided, however, that the foregoing covenant shall not apply in any case in which the presence of hazardous substances on the property is due to the activities of Grantee, its successors, assigns, employees, invitees, or any other person subject to Grantee's control or direction.

4. Unless otherwise specified, all the covenants, conditions, and restrictions to this Deed shall be binding upon, and shall inure to the benefit of the assigns of Grantor and the successors and assigns of Grantee.

IN WITNESS WHEREOF, the United States of America, acting by and through its Secretary of the Department of Energy, has caused these presents to be executed this _____day of _____, 1999.

UNITED STATES OF AMERICA

_____

WITNESSETH:

_____

_____

State of Ohio)
County of Montgomery) SS.

Before me, a Notary Public in and for said State and County, appeared this _____ day of _____, 1999, _____, who acknowledged that she is the Manager of the Ohio Field Office for the United States Department of Energy, with full authority to execute the foregoing on behalf of the United States of America, and who acknowledged the above to be her signature and her free act and deed.

SEAL

_____

_____Notary Public

Appendix B

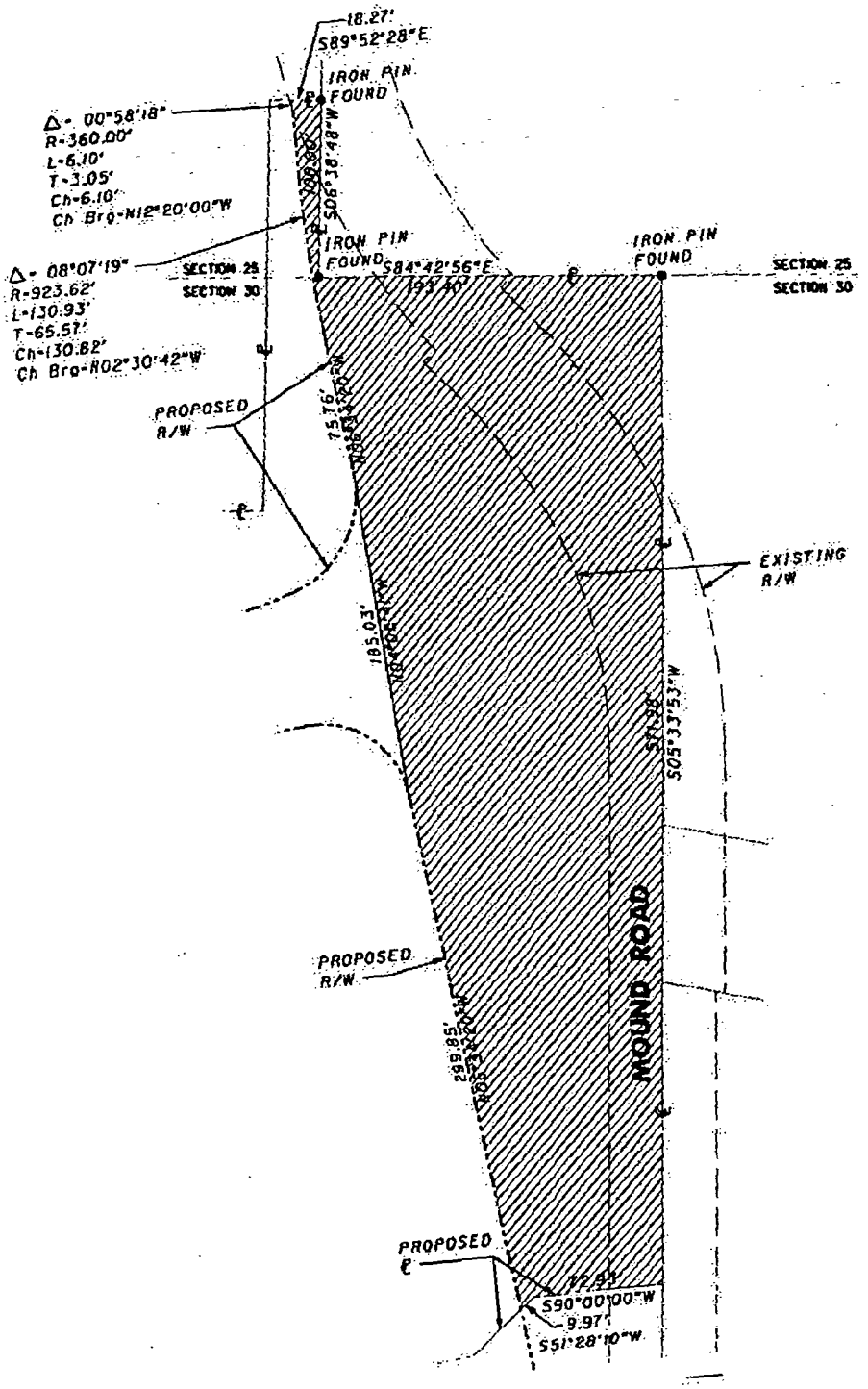
Legal Description of RB H

H "Wedge"

Situate in the County of Montgomery, in the State of Ohio and in the City of Miamisburg, part of Section 25, Town 1, Range 6 MRs and part of Section 30, Town 2, Range 5 MRs and being more particularly described as follows: **Commencing** at an iron pin found on the southerly projection of the centerline of Mound Road, said point also being the northeast corner of a 164.13 Acre tract of land as described in Deed Book 1246, Page 45 of the Deed Records of Montgomery County and being the **TRUE POINT OF BEGINNING,**

thence South 06° 38' 48" West, 100.00 feet to an iron pin found; thence South 84° 42' 56" East, 193.40 feet to an iron pin found; thence South 05° 33' 53" West, 571.98 feet to a point on the centerline of Mound Road; thence due West, 72.93 feet to a point; thence South 51° 28' 10" West, 9.97 feet to a point on the proposed westerly right-of-way of Mound Road; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 299.85 feet to a point; thence North 04° 05' 41" West, 185.03 feet to a point; thence along the proposed westerly right-of-way of Mound Road, North 06° 34' 20" West, 75.76 feet to a point; thence along the proposed westerly right-of-way of Mound Road, on a curve to the right for a distance of 130.93 feet with a radius of 923.62 feet and a central angle of 08° 07' 19" and a chord distance of 130.82 feet and a chord bearing of North 02° 30' 42" West to a point; thence along the existing westerly right-of-way of Mound Road, on a non-tangent curve to the right for a distance of 6.10 feet with a radius of 360.00 feet and a central angle of 00° 58' 18" and a chord distance of 6.10 feet and a chord bearing of North 12° 20' 00" West to a point; thence South 89° 52' 28" East, 18.27 feet to the **POINT OF BEGINNING.**

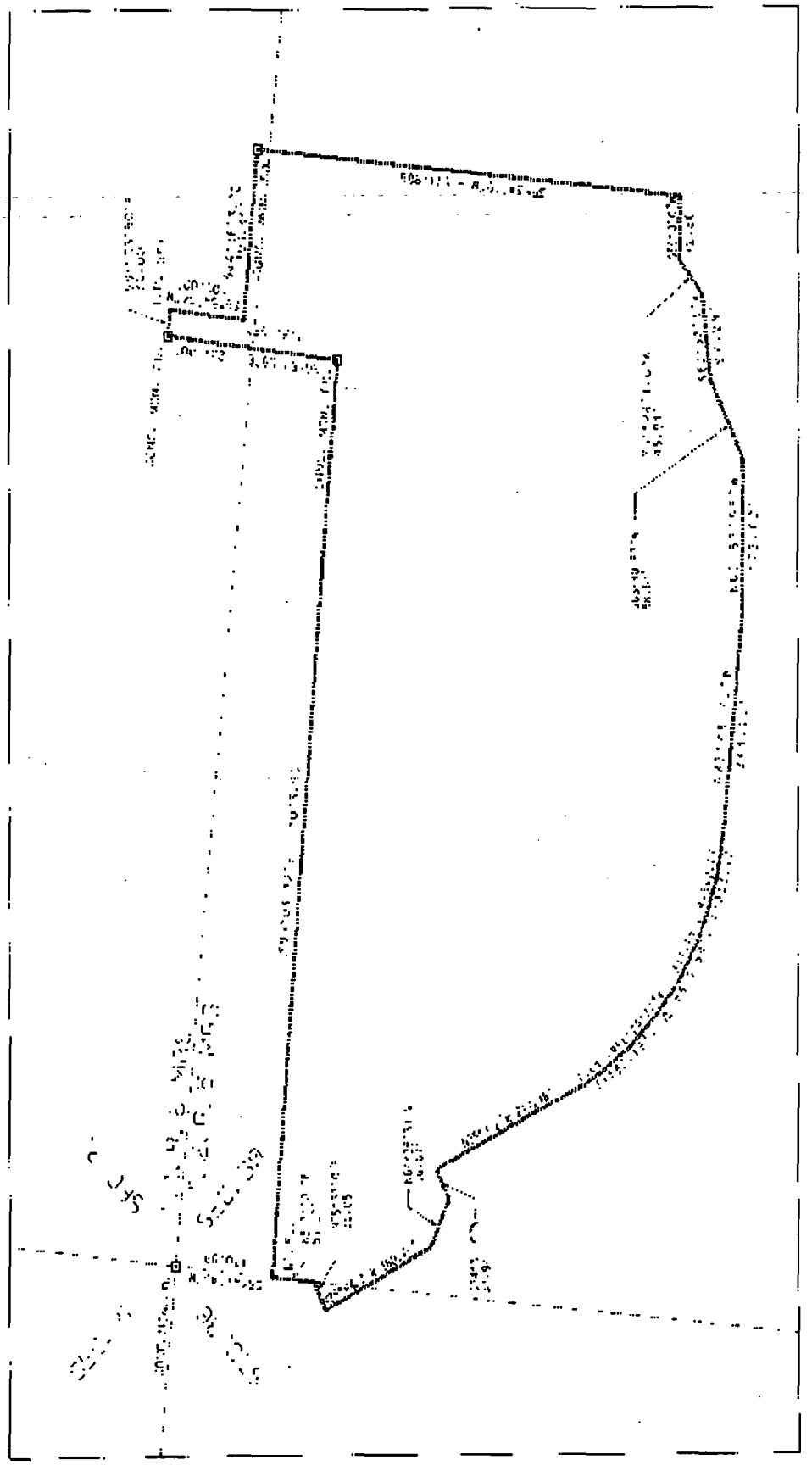
Containing 82,149.70 square feet, 1.886 acres more or less, and subject to all legal highways, easements, and agreements of record.


18.27'
S89°52'28"E
IRON PIN FOUND
Δ= 00°58'18"
R=360.00'
L=6.10'
T=3.05'
Ch=6.10'
Ch Brg=N12°20'00"W
S06°38'48"W
IRON PIN FOUND
Δ= 08°07'19"
R=923.62'
L=130.93'
T=65.57'
Ch=130.82'
Ch Brg=N02°30'42"W
SECTION 25
SECTION 30
S84°42'56"E
193.40'
IRON PIN FOUND
SECTION 25
SECTION 30
PROPOSED R/W
75.76'
N06°34'52"W
EXISTING R/W
185.03'
N10°40'04"W
57.38'
S05°33'53"W
MOUND ROAD
PROPOSED R/W
299.85'
N03°34'20"W
PROPOSED ℄
72.93'
S90°00'00"W
9.97'
S51°28'10"W

Release Block H

Situate in the State of Ohio, County of Montgomery, being in the City of Miamisburg, being part of Section 30, and Section 36, Range 5, Township 2, lying in the Miami Rivers Survey (M.R.S.), and being part of city lots numbered 2258 and 2259 within the Corporation Limits of the City of Miamisburg, and being more particularly bounded and described with bearings referenced to the Ohio State Coordinate System, South Zone, as follows:

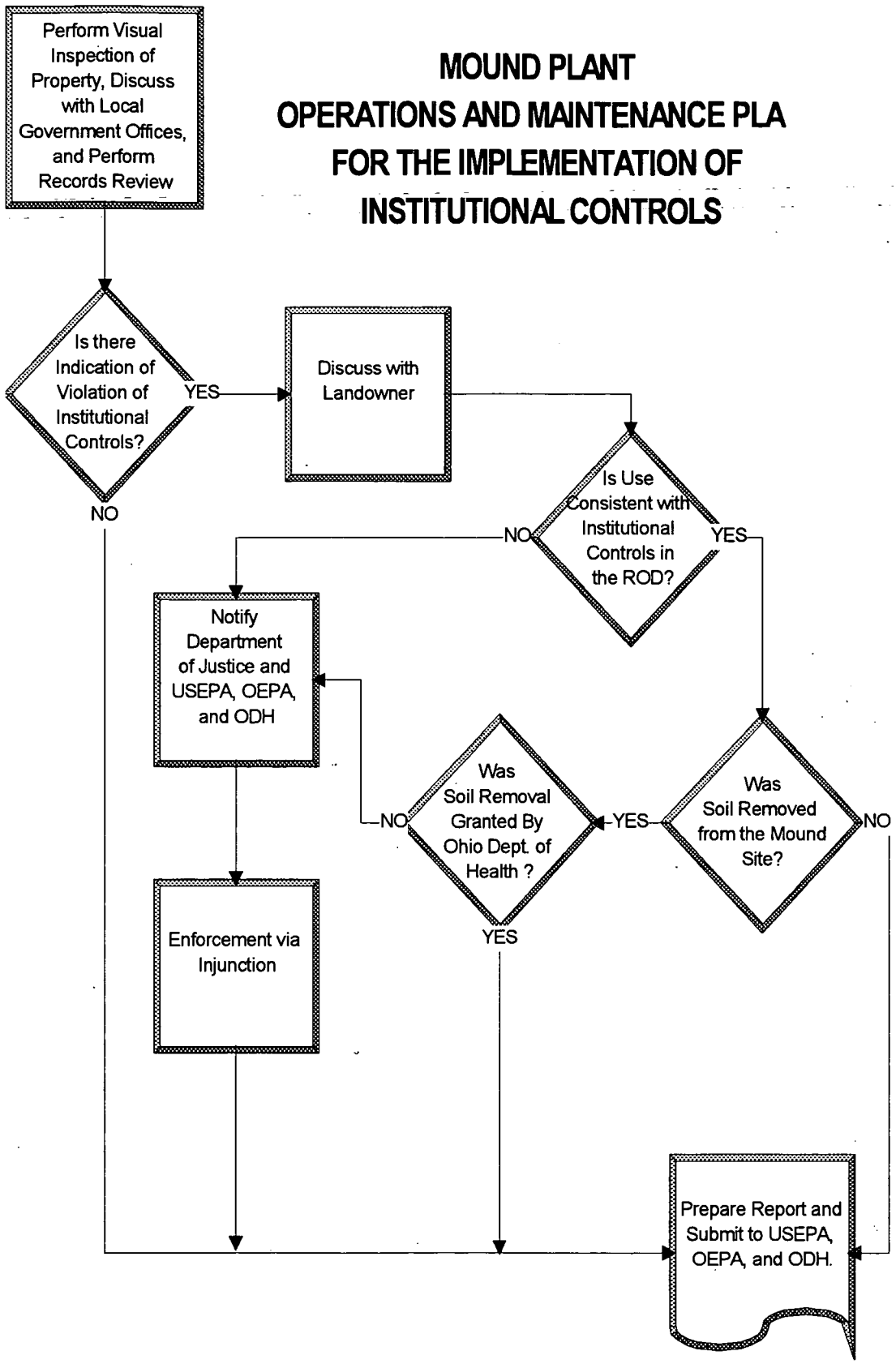
Beginning at a concrete monument, being the North East corner of Section 36 and the North West corner of Section 30, and being the point of beginning for the land herein described, thence S 5° 47′ 45″ W 130.89 feet to an iron pin being the TRUE POINT OF BEGINNING; thence S 85° 03′ 12″ E 1023.90 feet to a concrete monument, thence N 6° 54′ 59″ E 231.00 feet to a concrete monument, thence S 84° 36′ 50″ E 30.00 feet to a iron pin, thence S 6° 54′ 54″ W 100.00 feet to a iron pin, thence S 84° 36′ 37″ E 193.40 feet to a concrete monument, thence S 5° 34′ 19″ W 571.986 feet along the center line of Mound Road to a point, thence S 90° 0′ 0″ W 72.86 feet to a point, thence S 51° 28′ 1.6″ W 48.51 feet to a point, thence S 83° 32′ 4″ W 97.29 feet to a point, thence S 63° 48′ 53″ W 98.67 feet to a point, thence N 89° 55′ 58″ W 173.02 feet to a point, thence N 83° 49′ 39″ W 244.21 feet to a point, thence along the arc of a curve to the right having a radius of 360.67 feet for a distance of 353.12 feet to a point, thence N 25° 03′ 02″ W 214.48 feet to a point, thence S 64° 03′ 10″ W 37.94 feet to a point, thence N 64° 35′ 31″ W 56.61 feet to a point, thence N 25° 43′ 03″ W 160.76 feet to a point, thence N 65° 33′ 00″ E 35.05 feet to a point, thence N 5° 31′ 01″ E 57.67 feet to a iron pin being the true point of beginning containing 14.29 acres more or less, and subject to all legal highways and easements of record.



Appendix C

Mound Plant Operations and Maintenance Plan for the Implementation of Institutional Controls

MOUND PLANT
OPERATIONS AND MAINTENANCE PLA
FOR THE IMPLEMENTATION OF
INSTITUTIONAL CONTROLS



Appendix D

Listing of Applicable Relevant and Appropriate Requirements (ARARs)

Chemical Specific ARARs

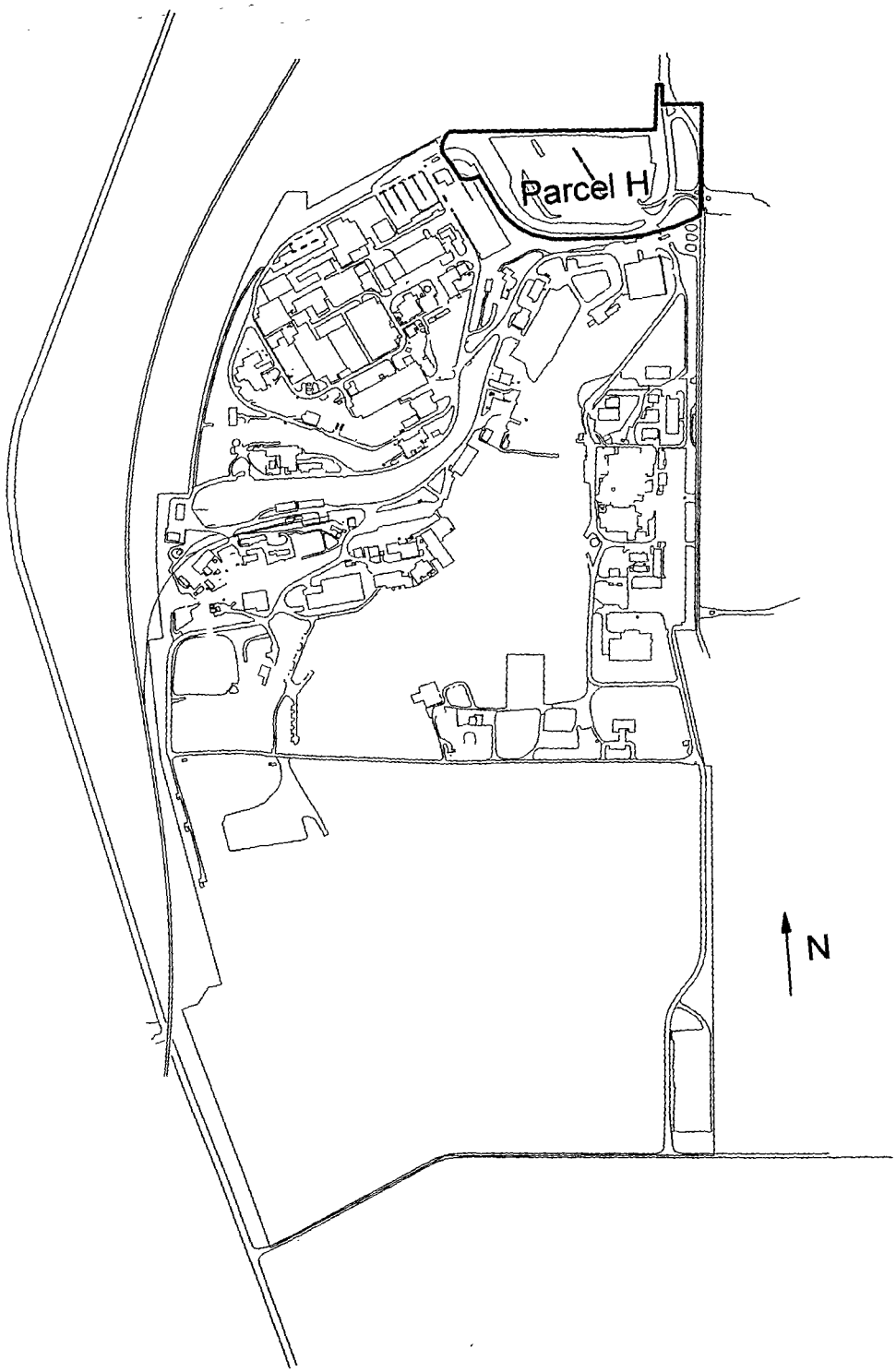
OAC 3745-81-11,	Maximum Contaminant Levels for Inorganic Chemicals
OAC 3745-81-12,	Maximum Contaminant Levels for Organic Chemicals
OAC 3745-81-13,	Maximum Contaminant Levels for Turbidity
OAC 3745-81-15,	Maximum Contaminant Levels for Radium 226, 228, Gross Alpha
OAC 3745-81-16,	Maximum Contaminant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

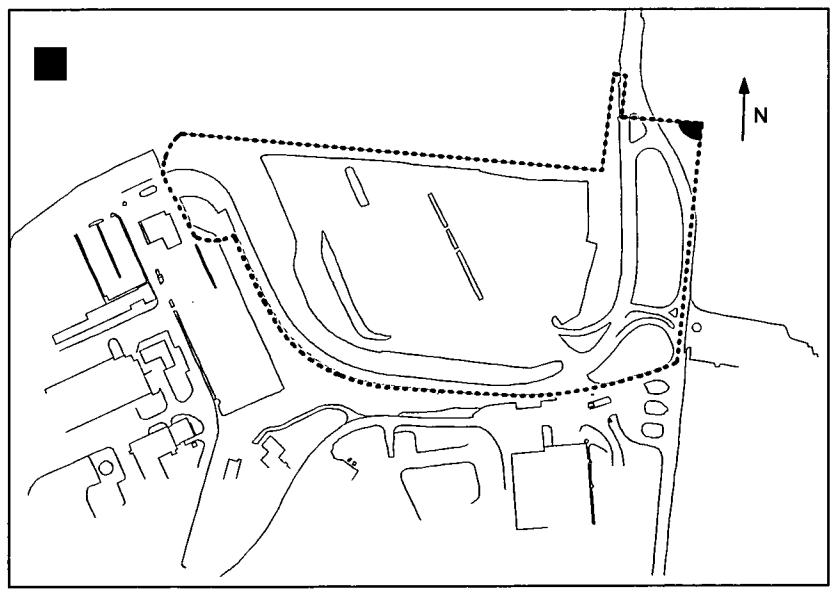
Location Specific ARARs

ORC 6111.03,	Protection of Waters of the State
ORC 3734.20,	Description of OEPA 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


Parcel H
N


N

PRS 99/100 Results

Parcel H Go! Decision

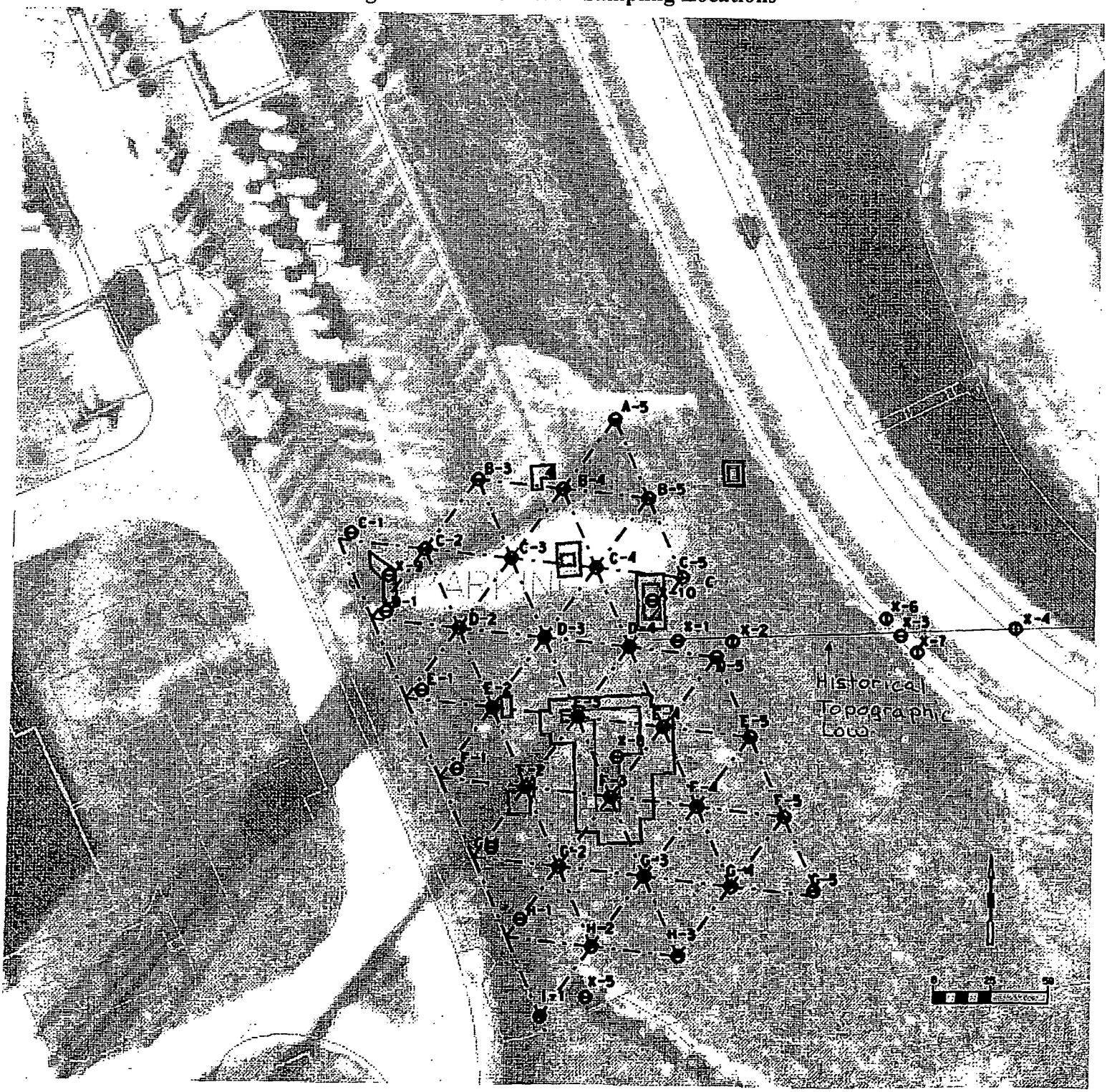
Chromium Results

- Mound Soil GV Cr(VI) = 1,100 mg/kg
  (GV tables 4a & 6a)
- Cr(VI) not in yet
- Total chrome results
  - All samples less than 25.7
  - Upper 95% UTL = 31

Plutonium Results (not decision critical)

- All results are Mound internal
  - external results still pending
- 106.9 pCi/g in X8
- All other results less than 28.1
  - all at/below MDA

Figure 3-1. PRS 99/100 Sampling Locations



X-3, X-4, X-6, X-7
OUT FOR RAD

	A	B	C	D
	PRS 99/100 Sampling Analysis			
		~ 0.1 = DETECTION LIMIT	MUST ALLOW MORE DIG	
	Site ID	Chromium MG/Kg	Pu-238 pCi/gm	
1	A5-04-000001	5.2	19.9	
2	A5-16-000002	13.3	19.5	
3	A5-16-000003	13.3	28.1	
4	A5-20-000004	10	24.4	
5	A5a-08-000005	10.7	19.9	
6	A5a-12-000006	13.3	23.4	
7	B5-05-000007	12.4	24.4	
8	B5-08-000008	9	15	
9	B5-12-000009	11	16.8	
10	B5-16-000010	15.2	17.6	
11	D5-08-000011	9.1	14.6	
12	D5-16-000012	17.9	23.5	
13	D5-16-000013	18	22.4	
14	D5-19-000014	15.4	18.1	
15	C5-08-000015w	2.3	22.7	
16	C5--12-000016	6.9	17.4	
17	C5--12-000017	10.8	13.1	
18	C5-16-000020	16.8	16.8	
19	C5-17-000021	12.8	20.5	
20	G4-04-000022	6.1	16.9	
21	G4-08-000023	6.7	11.9	
22	G4-12-000024	8.1	15.1	
23	G4-16-000025	7.7	18	
24	G4-19-000026	12.3	17.7	
25	E5a-08-000027	12.2	13.9	
26	E5a-12-000028	16.4	14.4	
27	E5A-12-000029	11.6	12.2	
28	E5a-16-000030	18	12.9	
29	E5a-20-000031	18	16.1	
30	F5a-04-000032	19.7	15.7	
31	F5a-08-000033	16.1	17.9	
32	F5a-12-000034	10.4	17.7	
33	F5--16-000035	13.5	11.8	
34	F5-20-000036	16.5	18.9	
35	G5-08-000037	7	14	
36	G5-16-000038w	9.1	18.8	
37	G5-12-000039	12.1	12.9	
38	G5-16-000040	7.9	14.1	

	A	B	C	D
43	G5-20-000041	10.9	10.9	
44	G5-22-000042	22.3	15.5	
45	F4-04-000043	20.4	15.7	
46	F4-08-000044	23.5	11.8	
47	F4-12-000045	16.9	14.8	
48	F4-16-000046	21.9	15.5	
49	F3-04-000047	16.9	11	
50	F3-08-000048	15.4	13.9	
51	F3-08-000049	12.8	13.1	
52	F3-12-000050	17.9	9.8	
53	F3-13-000051	21.1	16.1	
54	G2-04-000052	8.8	12.6	
55	G2-08-000053	9.8	10.2	
56	G2-12-000054	24	16.1	
57	H1-08-000055	6.9	15.6	
58	H1-12-000056	16	10.3	
59	G3-08-000057w	5	22.5	
60	G3-08-000058	16.8	16.2	
61	G3-12-000059	19	4	
62	G3-15-000060	16.5	9	
63	G3-15-000061	20.7	20.7	
64	H3-04-000062	10.3	12.4	
65	H3-08-000063	11.4	13.9	
66	H3-12-000064	15.9	16.2	
67	H3-16-000065	17.8	13.6	
68	H2-08-000066	20.2	17.1	
69	H2-12-000067	10.4	11.4	
70	I1-04-000068	12.1	14.5	
71	I1-08-000069	11.8	15.1	
72	I1-08-000070	12.9	12.7	
73	I1-12-000071	10	6	
74	I1-14-000072	14.4	17.6	
75	G1-04-000073	13.8	12	
76	G1-08-000074	13.9	15.8	
77	G1-10-000075	15.2	15.8	
78	F1-04-000076	5.3	12.4	
79	F1-08-000077	7.9	17	
80	F1-10-000078	9.1	18.5	
81	X4-04-000079w	6.2	15.1	
82	X4-04-000080	9.5	17.1	
83	X4-08-000081	8.5	16.4	
84	X4-12-000082	10.1	10.8	

	A	B	C	D
85	X4-15-000083	15	19.5	
86	X6-04-000084	12.5	17	
87	X3-04-000085	12.4	11.6	
88	X3-04-000086	8.4	18	
89	X3-05-000087	9.9	12.9	
90	X7-04-000088	23.9	14.2	
91	X7-07-000089	11.9	14.5	
92	X7-07-000090	17.4	13.3	
93	E1-04-000091	24.8	12.7	
94	E1-08-000092	25.7	16.5	
95	E2-04-000093	11	15.2	
96	E2-08-000094	13.3	11.3	
97	E2-09-000095	18.4	18.9	
98	F2-04-000096	17.7	15.6	
99	F2-08-000097	18.5	12.3	
100	F2-11-000098	22.3	16.4	
101	X2-04-000099w	0.6	20.3	
102	X2-04-000100	16.1	3.6	
103	X2-08-000101	15.2	13.1	
104	X2-08-000102	14.1	13.9	
105	X2-12-000103	17.8	14.5	
106	X2-16-000104	16.2	13.3	
107	X2-20-000105	19.5	17.5	
108	X8-08-000106	12.9	15.9	
109	D2-04-000107	11.6	13.4	
110	D2-08-000108	13.4	16.2	
111	D2-10-000109	19.5	16	
112	D2-10-000110	19.2	13.8	
113	C2-04-000111	15.3	15.8	
114	C2-06-000112	21.5	19.2	
115	C1-04-000113	20.5	13.6	
116	C1-07-000114	12	15.7	
117	D3-08-000115	11.9	16.2	
118	D3-12-000116	18.4	14	
119	D4-04-000117	15.1	16.6	
120	D4-08-000118	15.1	15.1	
121	D4-12-000119	11.6	14	
122	D4-15-000120	13.6	16.7	
123	D4-15-000121	13.7	16.7	
124	X1-04-000122	14.2	10.7	
125	X1-08-000123	12.4	15.2	
126	X1-12-000124	12.6	15.8	

	A	B	C	D
127	X1-16-000125	16	14.6	
128	C4-04-000126w	2.8	17.7	
129	C4-04-000127	11	18.4	
130	C4-08-000128	8.9	14	
131	C4-08-000129	11.2	15.8	
132	C4-12-000130	10.4	16.1	
133	B4-04-000131	13.3	13.2	
134	B4-08-000132	12.1	16.9	
135	B4-11-000133	13	20.1	
136	C3-04-000134	13.5	13.7	
137	C3-07-000135	11.3	14.5	
138	B3-04-000136	9.8	12.3	
139	B3-07-000137	11.3	15.7	
140	X5-04-000138	9	16.3	
141	X5-08-000139	18.9	18.3	
142	X9-04-000140	7.7	13.9	
143	X9-06-000141	20.2	16.6	
144	D1-08-000142	17.7	15.4	
145	D1-08-000143	19.6	14.2	
146	X10-04-000144w	2.3	19.4	
147	X10-04-000145	17.3	15.9	
148	X10-08-000146	14.8	12	
149	X10-12-000147	17.4	15.4	
150	X10-12-000148	15.5	14.8	
151	X10-16-000149	26	15.4	
152	X10-17-000150	16.2	18.1	
153	E3-04-000151	9.9	13.5	
154	E3-08-000152	13.1	10.1	
155	E3-12-000153	12.2	13.3	
156	E4-04-000154	21.2	15.7	
157	E4-08-000155	13	12.5	
158	E4-12-000156	19	15.7	
159	E4-12-000157	16.4	15.2	
160	E4-15-000158	14.9	14.3	
161	X8-12-000159		106.9	
162				
163				
164				
165				
166				
167				
168				

Roy F. Weston, Inc.
2566 Kohnle Drive
Miamisburg, Ohio 45342-3669
937-384-4200 • Fax 937-384-4201
www.rfweston.com

15 April 1999

Babcock & Wilcox of Ohio
Attn.: Linda Bauer
P.O. Box 3030
Miamisburg, Ohio 45343-3030

RE: Mound BOA 19499, PO 1999-00728
Data Review PRS 99/100 RFW WO: 01011-032-019

Dear Ms. Bauer:

WESTON has completed the review of the selected PRS 99/100 data per our proposal of 1 April 1999. A data review report was written for each analysis type (inorganic, hexavalent chromium, and radiological). Three copies of each these reports are attached with this letter. The results for several of the inorganic analytes were qualified estimated due to serial dilution results outside the acceptance range. No other qualifications were assigned to the data.

If you have any questions, please call me at (937) 384-4200.

Very truly yours,

ROY F. WESTON, INC.

Craig Stoll
Project Manager

Attachments

Cc: John Price w/o attachments
David Pratt w/o attachments

PROJECT:	Babcock and Wilcox of Ohio	**WESTON W.O. #:**	01011.032.019
TASK:	PRS 99/100	**DATE:**	April 6, 1999
LABORATORY:	Quanterra, Richland, WA		
FIELD BATCH:	NA		
LAB BATCH:	9902L060; 9902L090; 9902L122; 9902L148		
ANALYSIS:	Alpha Spectrometry (U, Th, Pu) and Gamma Spectrometry		

1. CASE SUMMARY

Ten (10) soils and a field blank (1) were selected for data review from PRS 99/100. Of these ten (10) samples only five (5) were submitted for radiological testing. These samples were collected from an area within PRS 99/100 that was selected to be turned over to the public. The review was performed to confirm that the sample results for this parcel of land were free of significant defects based on the laboratory quality control results. The samples that were reviewed are identified in the following table. These samples were received by the laboratory in good condition and the analyses were performed following the procedures in the Mound Methods Compendium (DOE. 1999).

Laboratory Identification	Field Identification	Location	Matrix	Date Collected
9CQV3C10	000079	Field Blank	Water	02-02-99
9CQV8110	000080	X4-04	Soil	02-03-99
9CQV8410	000084	X6-04	Soil	02-03-99
9CQV7R10	000088	X7-04	Soil	02-03-99
9CQV8210	000139	X5-04	Soil	02-09-99

2. DATA COMPLETENESS

The data packages contained all the information required to perform a data quality review.

3. SAMPLE HOLDING TIMES

There are no holding times established for radiological measurements. No qualifications were applied.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

4. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

a. Calibration

Data review does not include evaluation of raw calibration data. No qualifications were applied.

b. Laboratory Method Blanks

Radium-226 was detected in blank JCR0HN1X at a concentration of 0.211 pCi/g and an MDA of 0.156 pCi/g. Since the blank activity is less than 2 times the MDA, no data was qualified.

c. Laboratory Control Sample

No qualifications were applied on the basis of the laboratory control sample recoveries.

d. Matrix Spike/Matrix Spike Duplicate Recoveries

The matrix spike results associated with these samples were all within acceptance limits.

e. Compound Identification

The target analytes were identified properly.

f. Quantitation and Contract Required Reporting Limits (CRQL)

The target compound was properly quantitated in the samples and the laboratory reported to the required quantitation limit.

g. Laboratory Duplicates

The replicate analyses were non-detect. No qualifications were applied on the basis of these results.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

5. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

a. Field Duplicates

No field duplicates were analyzed.

b. Field Blanks

The field blank was non-detect. No qualifications were applied on the basis of the field blank data.

6. OVERALL ASSESSMENT OF THE DATA

The data are acceptable without qualification

7. REFERENCES

USEPA 1988. "Laboratory Data Validation - Functional Guidelines for Evaluation of Organic Analyses. "U.S. Environmental Protection Agency, Hazardous Site Evaluation Division. February 1988.

DOE. 1999. "Methods Compendium." Mound Environmental Management Program, U.S. Department of Energy, Miamisburg, OH. February 1999.

DOE 1993. Remedial Investigation/Feasibility Study, Operable Unit 9, Quality Assurance Project Plan. Mound Plant, Environmental Restoration Program, U.S. Department of Energy, Albuquerque Field Office, Albuquerque, New Mexico. March 1993.

USEPA 1983. "Methods of Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, EPA 600/4-79-020, March 1983.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

PROJECT:	Babcock and Wilcox of Ohio	**WESTON W.O. #:**	01011.032.019
TASK:	PRS 99/100	**DATE:**	April 6, 1999
LABORATORY:	Quanterra, Richland, WA		
FIELD BATCH:	NA		
LAB BATCH:	9902L060; 9902L090; 9902L122; 9902L148		
ANALYSIS:	Alpha Spectrometry (U, Th, Pu) and Gamma Spectrometry		

1. CASE SUMMARY

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9CQV8410	000084	X6-04	Soil	02-03-99
9CQV7R10	000088	X7-04	Soil	02-03-99
9CQV8210	000139	X5-04	Soil	02-09-99

2. DATA COMPLETENESS

The data packages contained all the information required to perform a data quality review.

3. SAMPLE HOLDING TIMES

There are no holding times established for radiological measurements. No qualifications were applied.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

4. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

a. Calibration

Data review does not include evaluation of raw calibration data. No qualifications were applied.

b. Laboratory Method Blanks

Radium-226 was detected in blank JCR0HN1X at a concentration of 0.211 pCi/g and an MDA of 0.156 pCi/g. Since the blank activity is less than 2 times the MDA, no data was qualified.

c. Laboratory Control Sample

No qualifications were applied on the basis of the laboratory control sample recoveries.

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The matrix spike results associated with these samples were all within acceptance limits.

e. Compound Identification

The target analytes were identified properly.

f. Quantitation and Contract Required Reporting Limits (CRQL)

The target compound was properly quantitated in the samples and the laboratory reported to the required quantitation limit.

g. Laboratory Duplicates

The replicate analyses were non-detect. No qualifications were applied on the basis of these results.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

5. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

a. Field Duplicates

No field duplicates were analyzed.

b. Field Blanks

The field blank was non-detect. No qualifications were applied on the basis of the field blank data.

6. OVERALL ASSESSMENT OF THE DATA

The data are acceptable without qualification

7. REFERENCES

USEPA 1988. "Laboratory Data Validation - Functional Guidelines for Evaluation of Organic Analyses. "U.S. Environmental Protection Agency, Hazardous Site Evaluation Division. February 1988.

DOE. 1999. "Methods Compendium." Mound Environmental Management Program, U.S. Department of Energy, Miamisburg, OH. February 1999.

DOE 1993. Remedial Investigation/Feasibility Study, Operable Unit 9, Quality Assurance Project Plan. Mound Plant, Environmental Restoration Program, U.S. Department of Energy, Albuquerque Field Office, Albuquerque, New Mexico. March 1993.

USEPA 1983. "Methods of Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, EPA 600/4-79-020, March 1983.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

PROJECT:	Babcock and Wilcox of Ohio	**WESTON W.O. #:**	01011.032.019
TASK:	PRS 99/100	**DATE:**	April 6, 1999
LABORATORY:	Quanterra, Richland, WA		
FIELD BATCH:	NA		
LAB BATCH:	9902L060; 9902L090; 9902L122; 9902L148		
ANALYSIS:	Alpha Spectrometry (U, Th, Pu) and Gamma Spectrometry		

1. CASE SUMMARY

Ten (10) soils and a field blank (1) were selected for data review from PRS 99/100. Of these ten (10) samples only five (5) were submitted for radiological testing. These samples were collected from an area within PRS 99/100 that was selected to be turned over to the public. The review was performed to confirm that the sample results for this parcel of land were free of significant defects based on the laboratory quality control results. The samples that were reviewed are identified in the following table. These samples were received by the laboratory in good condition and the analyses were performed following the procedures in the Mound Methods Compendium (DOE. 1999).

Laboratory Identification	Field Identification	Location	Matrix	Date Collected
9CQV3C10	000079	Field Blank	Water	02-02-99
9CQV8110	000080	X4-04	Soil	02-03-99
9CQV8410	000084	X6-04	Soil	02-03-99
9CQV7R10	000088	X7-04	Soil	02-03-99
9CQV8210	000139	X5-04	Soil	02-09-99

2. DATA COMPLETENESS

The data packages contained all the information required to perform a data quality review.

3. SAMPLE HOLDING TIMES

There are no holding times established for radiological measurements. No qualifications were applied.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

4. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

a. Calibration

Data review does not include evaluation of raw calibration data. No qualifications were applied.

b. Laboratory Method Blanks

Radium-226 was detected in blank JCR0HN1X at a concentration of 0.211 pCi/g and an MDA of 0.156 pCi/g. Since the blank activity is less than 2 times the MDA, no data was qualified.

c. Laboratory Control Sample

No qualifications were applied on the basis of the laboratory control sample recoveries.

d. Matrix Spike/Matrix Spike Duplicate Recoveries

The matrix spike results associated with these samples were all within acceptance limits.

e. Compound Identification

The target analytes were identified properly.

f. Quantitation and Contract Required Reporting Limits (CRQL)

The target compound was properly quantitated in the samples and the laboratory reported to the required quantitation limit.

g. Laboratory Duplicates

The replicate analyses were non-detect. No qualifications were applied on the basis of these results.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

5. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

a. Field Duplicates

No field duplicates were analyzed.

b. Field Blanks

The field blank was non-detect. No qualifications were applied on the basis of the field blank data.

6. OVERALL ASSESSMENT OF THE DATA

The data are acceptable without qualification

7. REFERENCES

USEPA 1988. "Laboratory Data Validation - Functional Guidelines for Evaluation of Organic Analyses. "U.S. Environmental Protection Agency, Hazardous Site Evaluation Division. February 1988.

DOE. 1999. "Methods Compendium." Mound Environmental Management Program, U.S. Department of Energy, Miamisburg, OH. February 1999.

DOE 1993. Remedial Investigation/Feasibility Study, Operable Unit 9, Quality Assurance Project Plan. Mound Plant, Environmental Restoration Program, U.S. Department of Energy, Albuquerque Field Office, Albuquerque, New Mexico. March 1993.

USEPA 1983. "Methods of Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, EPA 600/4-79-020, March 1983.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

PROJECT:	Babcock and Wilcox of Ohio	**WESTON W.O. #:**	01011.032.019
TASK:	PRS 99/100	**DATE:**	April 6, 1999
LABORATORY:	RECRA, Lionville, PA		
FIELD BATCH:	NA		
LAB BATCH:	9902L060; 9902L090; 9902L122; 9902L148		
ANALYSIS:	Hexavalent Chromium		

1. CASE SUMMARY

Ten (10) soils and a field blank (1) were selected for data review from PRS 99/100. These samples were collected from an area within PRS 99/100 that was selected to be turned over to the public. The review was performed to confirm that the sample results for this parcel of land were free of significant defects based on the laboratory control results. The samples that were reviewed are identified in the following table. These samples were received by the laboratory in good condition and the analyses were performed following the procedures in the Mound Methods Compendium (DOE. 1999).

Laboratory Identification	Field Identification	Location	Matrix	Date Collected
9902L060-013	000079	Field Blank	Water	02-02-99
9902L060-014	000080	X4-04	Soil	02-03-99
9902L060-015	000081	X4-08	Soil	02-03-99
9902L060-016	000082	X4-12	Soil	02-03-99
9902L060-017	000083	X4-15	Soil	02-03-99
9902L090-001	000084	X6-04	Soil	02-03-99
9902L090-005	000088	X7-04	Soil	02-03-99
9902L090-006	000089	X7-07	Soil	02-03-99
9902L090-007	000090	X7-07	Soil	02-03-99
9902L122-015	000138	X5-04	Soil	02-09-99
9902L148-001	000139	X5-04	Soil	02-09-99

2. DATA COMPLETENESS

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

The data packages contained all the information required to perform a data quality review.

3. SAMPLE HOLDING TIMES

The procedure in the Methods Compendium requires that hexavalent chromium samples be extracted within 14 days of collection.. Sample 000139 (9902L148-001) was prepared and analyzed 2 days past holding time.

4. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

a. Calibration

The minimum acceptable correlation coefficient for the hexavalent chromium calibration curve is 0.9995 in the Mound Method Compendium. The laboratory used a minimum acceptable coefficient of calibration of 0.995. All linear calibrations met the laboratory minimum coefficient requirement. A corrective action report was issued documenting that the Mound Methods Compendium requirement was too stringent and that the minimum coefficient should be 0.995. No qualifications were applied to the data.

The initial and continuing calibration verification results were acceptable for all of the samples.

b. Laboratory Method Blanks

No target parameters were detected in the method blanks or the continuing calibration blanks.

c. Laboratory Control Sample

The laboratory control sample recoveries were all within the acceptance criteria.

d. Matrix Spike/Matrix Spike Duplicate Recoveries

The matrix spike results associated with these samples were all within acceptance limits.

e. Compound Identification

The target analytes were identified properly.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

f. Quantitation and Contract Required Reporting Limits (CRQL)

The target compound was properly quantitated in the samples and the laboratory reported to the required quantitation limit.

5. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

a. Field Duplicates

Four (4) field duplicate pairs were evaluated. Three of the four pairs were reported as non-detect and the relative percent differences for these results could not be calculated. The relative percent difference result for the 4th pair was 200 percent. The high percent difference was the result of the analyte results at and near the reporting limit. No qualifications were applied on the basis of the field duplicate data.

b. Field Blanks

No target analytes were reported in the field blank data.

6. OVERALL ASSESSMENT OF THE DATA

The data are acceptable without qualification.

7. REFERENCES

USEPA 1988. "Laboratory Data Validation - Functional Guidelines for Evaluation of Organic Analyses."U.S. Environmental Protection Agency, Hazardous Site Evaluation Division. February 1988.

DOE 1993. Remedial Investigation/Feasibility Study, Operable Unit 9, Quality Assurance Project Plan. Mound Plant, Environmental Restoration Program, U.S. Department of Energy, Albuquerque Field Office, Albuquerque, New Mexico. March 1993.

DOE. 1999. "Methods Compendium." Mound Environmental Management Program, U.S. Department of Energy, Miamisburg, OH. February 1999.

USEPA 1983. "Methods of Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, EPA 600/4-79-020, March 1983.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

PROJECT:	Babcock and Wilcox of Ohio	**WESTON W.O. #:**	01011.032.019
TASK:	PRS 99/100	**DATE:**	April 6, 1999
LABORATORY:	RECRA, Lionville, PA		
FIELD BATCH:	NA		
LAB BATCH:	9902L060; 9902L090; 9902L122; 9902L148		
ANALYSIS:	Hexavalent Chromium		

1. CASE SUMMARY

Ten (10) soils and a field blank (1) were selected for data review from PRS 99/100. These samples were collected from an area within PRS 99/100 that was selected to be turned over to the public. The review was performed to confirm that the sample results for this parcel of land were free of significant defects based on the laboratory control results. The samples that were reviewed are identified in the following table. These samples were received by the laboratory in good condition and the analyses were performed following the procedures in the Mound Methods Compendium (DOE. 1999).

Laboratory Identification	Field Identification	Location	Matrix	Date Collected
9902L060-013	000079	Field Blank	Water	02-02-99
9902L060-014	000080	X4-04	Soil	02-03-99
9902L060-015	000081	X4-08	Soil	02-03-99
9902L060-016	000082	X4-12	Soil	02-03-99
9902L060-017	000083	X4-15	Soil	02-03-99
9902L090-001	000084	X6-04	Soil	02-03-99
9902L090-005	000088	X7-04	Soil	02-03-99
9902L090-006	000089	X7-07	Soil	02-03-99
9902L090-007	000090	X7-07	Soil	02-03-99
9902L122-015	000138	X5-04	Soil	02-09-99
9902L148-001	000139	X5-04	Soil	02-09-99

2. DATA COMPLETENESS

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

The data packages contained all the information required to perform a data quality review.

3. SAMPLE HOLDING TIMES

The procedure in the Methods Compendium requires that hexavalent chromium samples be extracted within 14 days of collection.. Sample 000139 (9902L148-001) was prepared and analyzed 2 days past holding time.

4. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

a. Calibration

The minimum acceptable correlation coefficient for the hexavalent chromium calibration curve is 0.9995 in the Mound Method Compendium. The laboratory used a minimum acceptable coefficient of calibration of 0.995. All linear calibrations met the laboratory minimum coefficient requirement. A corrective action report was issued documenting that the Mound Methods Compendium requirement was too stringent and that the minimum coefficient should be 0.995. No qualifications were applied to the data.

The initial and continuing calibration verification results were acceptable for all of the samples.

b. Laboratory Method Blanks

No target parameters were detected in the method blanks or the continuing calibration blanks.

c. Laboratory Control Sample

The laboratory control sample recoveries were all within the acceptance criteria.

d. Matrix Spike/Matrix Spike Duplicate Recoveries

The matrix spike results associated with these samples were all within acceptance limits.

e. Compound Identification

The target analytes were identified properly.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

f. Quantitation and Contract Required Reporting Limits (CRQL)

The target compound was properly quantitated in the samples and the laboratory reported to the required quantitation limit.

5. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

a. Field Duplicates

Four (4) field duplicate pairs were evaluated. Three of the four pairs were reported as non-detect and the relative percent differences for these results could not be calculated. The relative percent difference result for the 4th pair was 200 percent. The high percent difference was the result of the analyte results at and near the reporting limit. No qualifications were applied on the basis of the field duplicate data.

b. Field Blanks

No target analytes were reported in the field blank data.

6. OVERALL ASSESSMENT OF THE DATA

The data are acceptable without qualification.

7. REFERENCES

USEPA 1988. "Laboratory Data Validation - Functional Guidelines for Evaluation of Organic Analyses."U.S. Environmental Protection Agency, Hazardous Site Evaluation Division. February 1988.

DOE 1993. Remedial Investigation/Feasibility Study, Operable Unit 9, Quality Assurance Project Plan. Mound Plant, Environmental Restoration Program, U.S. Department of Energy, Albuquerque Field Office, Albuquerque, New Mexico. March 1993.

DOE. 1999. "Methods Compendium." Mound Environmental Management Program, U.S. Department of Energy, Miamisburg, OH. February 1999.

USEPA 1983. "Methods of Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, EPA 600/4-79-020, March 1983.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

PROJECT:	Babcock and Wilcox of Ohio	**WESTON W.O. #:**	01011.032.019
TASK:	PRS 99/100	**DATE:**	April 6, 1999
LABORATORY:	RECRA, Lionville, PA		
FIELD BATCH:	NA		
LAB BATCH:	9902L060; 9902L090; 9902L122; 9902L148		
ANALYSIS:	Hexavalent Chromium		

1. CASE SUMMARY

Ten (10) soils and a field blank (1) were selected for data review from PRS 99/100. These samples were collected from an area within PRS 99/100 that was selected to be turned over to the public. The review was performed to confirm that the sample results for this parcel of land were free of significant defects based on the laboratory control results. The samples that were reviewed are identified in the following table. These samples were received by the laboratory in good condition and the analyses were performed following the procedures in the Mound Methods Compendium (DOE. 1999).

Laboratory Identification	Field Identification	Location	Matrix	Date Collected
9902L060-013	000079	Field Blank	Water	02-02-99
9902L060-014	000080	X4-04	Soil	02-03-99
9902L060-015	000081	X4-08	Soil	02-03-99
9902L060-016	000082	X4-12	Soil	02-03-99
9902L060-017	000083	X4-15	Soil	02-03-99
9902L090-001	000084	X6-04	Soil	02-03-99
9902L090-005	000088	X7-04	Soil	02-03-99
9902L090-006	000089	X7-07	Soil	02-03-99
9902L090-007	000090	X7-07	Soil	02-03-99
9902L122-015	000138	X5-04	Soil	02-09-99
9902L148-001	000139	X5-04	Soil	02-09-99

2. DATA COMPLETENESS

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

The data packages contained all the information required to perform a data quality review.

3. SAMPLE HOLDING TIMES

The procedure in the Methods Compendium requires that hexavalent chromium samples be extracted within 14 days of collection.. Sample 000139 (9902L148-001) was prepared and analyzed 2 days past holding time.

4. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

a. Calibration

The minimum acceptable correlation coefficient for the hexavalent chromium calibration curve is 0.9995 in the Mound Method Compendium. The laboratory used a minimum acceptable coefficient of calibration of 0.995. All linear calibrations met the laboratory minimum coefficient requirement. A corrective action report was issued documenting that the Mound Methods Compendium requirement was too stringent and that the minimum coefficient should be 0.995. No qualifications were applied to the data.

The initial and continuing calibration verification results were acceptable for all of the samples.

b. Laboratory Method Blanks

No target parameters were detected in the method blanks or the continuing calibration blanks.

c. Laboratory Control Sample

The laboratory control sample recoveries were all within the acceptance criteria.

d. Matrix Spike/Matrix Spike Duplicate Recoveries

The matrix spike results associated with these samples were all within acceptance limits.

e. Compound Identification

The target analytes were identified properly.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

f. Quantitation and Contract Required Reporting Limits (CRQL)

The target compound was properly quantitated in the samples and the laboratory reported to the required quantitation limit.

5. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

a. Field Duplicates

Four (4) field duplicate pairs were evaluated. Three of the four pairs were reported as non-detect and the relative percent differences for these results could not be calculated. The relative percent difference result for the 4th pair was 200 percent. The high percent difference was the result of the analyte results at and near the reporting limit. No qualifications were applied on the basis of the field duplicate data.

b. Field Blanks

No target analytes were reported in the field blank data.

6. OVERALL ASSESSMENT OF THE DATA

The data are acceptable without qualification.

7. REFERENCES

USEPA 1988. "Laboratory Data Validation - Functional Guidelines for Evaluation of Organic Analyses."U.S. Environmental Protection Agency, Hazardous Site Evaluation Division. February 1988.

DOE 1993. Remedial Investigation/Feasibility Study, Operable Unit 9, Quality Assurance Project Plan. Mound Plant, Environmental Restoration Program, U.S. Department of Energy, Albuquerque Field Office, Albuquerque, New Mexico. March 1993.

DOE. 1999. "Methods Compendium." Mound Environmental Management Program, U.S. Department of Energy, Miamisburg, OH. February 1999.

USEPA 1983. "Methods of Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, EPA 600/4-79-020, March 1983.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

PROJECT:	Babcock and Wilcox of Ohio	**WESTON W.O. #:**	01011.032.019
TASK:	PRS 99/100	**DATE:**	April 6, 1999
LABORATORY:	RECRA, Lionville, PA		
FIELD BATCH:	NA		
LAB BATCH:	9902L060; 9902L090; 9902L122; 9902L148		
ANALYSIS:	Inorganic (Metals)		

1. CASE SUMMARY

Ten (10) soils and a field blank (1) were selected for data review from PRS 99/100. These samples were collected from an area within PRS 99/100 that was selected to be turned over to the public. The review was performed to confirm that the sample results for this parcel of land were free of significant defects based on the laboratory quality control results. The samples that were reviewed are identified in the following table. These samples were received by the laboratory in good condition and the analyses were performed following the procedures in the Mound Methods Compendium (DOE. 1999).

Laboratory Identification	Field Identification	Location	Matrix	Date Collected
9902L060-013	000079	Field Blank	Water	02-02-99
9902L060-014	000080	X4-04	Soil	02-03-99
9902L060-015	000081	X4-08	Soil	02-03-99
9902L060-016	000082	X4-12	Soil	02-03-99
9902L060-017	000083	X4-15	Soil	02-03-99
9902L090-001	000084	X6-04	Soil	02-03-99
9902L090-005	000088	X7-04	Soil	02-03-99
9902L090-006	000089	X7-07	Soil	02-03-99
9902L090-007	000090	X7-07	Soil	02-03-99
9902L122-015	000138	X5-04	Soil	02-09-99
9902L148-001	000139	X5-04	Soil	02-09-99

2. DATA COMPLETENESS

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

The data packages contained all the information required to perform a data quality review.

3. SAMPLE HOLDING TIMES

The procedure in the Methods Compendium requires that samples be extracted within 180 days of collection for the target analytes.

4. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

a. Calibration

The initial and continuing calibration verification results were acceptable for all of the samples.

b. Laboratory Method Blanks

No target parameters were detected in the method blanks or the continuing calibration blanks.

c. Laboratory Control Sample

The laboratory control sample recoveries were all within the acceptance criteria.

d. Matrix Spike/Matrix Spike Duplicate Recoveries

The matrix spike results associated with these samples were all within acceptance limits.

e. Compound Identification

The target analytes were identified properly.

f. Quantitation and Contract Required Reporting Limits (CRQL)

The target compound was properly quantitated in the samples and the laboratory reported to the required quantitation limit.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

g. Laboratory Duplicates

Analyte	Minimum RPD	Maximum RPD	Average
Cadmium	6	20.6	12.08
Chromium	12.2	54.3	29.6
Lead	1.9	55.1	19.35
Nickel	1	53	29.75

Method DV-005 from the Mound Methods Compendium, instructs that soil results associated with laboratory duplicate percent differences greater than 35% should be qualified estimated (J). Four duplicates were analyzed. The average was not greater than 35%. No qualifications were applied to the data.

h. Serial Dilution

The nickel results for samples 000138 and 000139 were qualified estimated (J) due to serial dilutions of 11.6% and 13.1%, respectively.

The chromium results, lead, and nickel results for samples 000084, 000088, 000089, and 000090 were qualified estimated due to serial dilution differences of 10.5%, 12.5%, and 11.6%, respectively.

5. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

a. Field Duplicates

Analyte	Minimum RPD	Maximum RPD	Average
Cadmium	3.64	23.7	12.03
Chromium	8.91	38.46	21.33
Lead	19.55	85.71	58.08
Nickel	12.66	48.59	25.53

Method DV-005 from the Mound Methods Compendium, instructs that soil results associated with field duplicate percent differences greater than 50% should be qualified estimated (J). Based on the table above, lead results were qualified estimated (J) in all associated soil samples.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

b. Field Blanks

Target analytes were detected in field blank in laboratory batches 9902L060, 9902L122, and 9902L148 below the CRDL. No qualification was assigned based on these contamination levels.

6. OVERALL ASSESSMENT OF THE DATA

Nickel results were qualified estimate in samples 000084, 000088, 000089, 000090, 000138, and 000139 due to the serial dilution results. Chromium and lead results were qualified estimated (J) in samples 000084, 000088, 000089, and 000090 also due to serial dilution results.

7. REFERENCES

USEPA 1988. "Laboratory Data Validation - Functional Guidelines for Evaluation of Organic Analyses."U.S. Environmental Protection Agency, Hazardous Site Evaluation Division. February 1988.

DOE. 1999. "Methods Compendium." Mound Environmental Management Program, U.S. Department of Energy, Miamisburg, OH. February 1999.

DOE 1993. Remedial Investigation/Feasibility Study, Operable Unit 9, Quality Assurance Project Plan. Mound Plant, Environmental Restoration Program, U.S. Department of Energy, Albuquerque Field Office, Albuquerque, New Mexico. March 1993.

USEPA 1983. "Methods of Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, EPA 600/4-79-020, March 1983.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

PROJECT:	Babcock and Wilcox of Ohio	**WESTON W.O. #:**	01011.032.019
TASK:	PRS 99/100	**DATE:**	April 6, 1999
LABORATORY:	RECRA, Lionville, PA		
FIELD BATCH:	NA		
LAB BATCH:	9902L060; 9902L090; 9902L122; 9902L148		
ANALYSIS:	Inorganic (Metals)		

1. CASE SUMMARY

Ten (10) soils and a field blank (1) were selected for data review from PRS 99/100. These samples were collected from an area within PRS 99/100 that was selected to be turned over to the public. The review was performed to confirm that the sample results for this parcel of land were free of significant defects based on the laboratory quality control results. The samples that were reviewed are identified in the following table. These samples were received by the laboratory in good condition and the analyses were performed following the procedures in the Mound Methods Compendium (DOE. 1999).

Laboratory Identification	Field Identification	Location	Matrix	Date Collected
9902L060-013	000079	Field Blank	Water	02-02-99
9902L060-014	000080	X4-04	Soil	02-03-99
9902L060-015	000081	X4-08	Soil	02-03-99
9902L060-016	000082	X4-12	Soil	02-03-99
9902L060-017	000083	X4-15	Soil	02-03-99
9902L090-001	000084	X6-04	Soil	02-03-99
9902L090-005	000088	X7-04	Soil	02-03-99
9902L090-006	000089	X7-07	Soil	02-03-99
9902L090-007	000090	X7-07	Soil	02-03-99
9902L122-015	000138	X5-04	Soil	02-09-99
9902L148-001	000139	X5-04	Soil	02-09-99

2. DATA COMPLETENESS

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

The data packages contained all the information required to perform a data quality review.

3. SAMPLE HOLDING TIMES

The procedure in the Methods Compendium requires that samples be extracted within 180 days of collection for the target analytes.

4. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

a. Calibration

The initial and continuing calibration verification results were acceptable for all of the samples.

b. Laboratory Method Blanks

No target parameters were detected in the method blanks or the continuing calibration blanks.

c. Laboratory Control Sample

The laboratory control sample recoveries were all within the acceptance criteria.

d. Matrix Spike/Matrix Spike Duplicate Recoveries

The matrix spike results associated with these samples were all within acceptance limits.

e. Compound Identification

The target analytes were identified properly.

f. Quantitation and Contract Required Reporting Limits (CRQL)

The target compound was properly quantitated in the samples and the laboratory reported to the required quantitation limit.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

g. Laboratory Duplicates

Analyte	Minimum RPD	Maximum RPD	Average
Cadmium	6	20.6	12.08
Chromium	12.2	54.3	29.6
Lead	1.9	55.1	19.35
Nickel	1	53	29.75

Method DV-005 from the Mound Methods Compendium, instructs that soil results associated with laboratory duplicate percent differences greater than 35% should be qualified estimated (J). Four duplicates were analyzed. The average was not greater than 35%. No qualifications were applied to the data.

h. Serial Dilution

The nickel results for samples 000138 and 000139 were qualified estimated (J) due to serial dilutions of 11.6% and 13.1%, respectively.

The chromium results, lead, and nickel results for samples 000084, 000088, 000089, and 000090 were qualified estimated due to serial dilution differences of 10.5%, 12.5%, and 11.6%, respectively.

5. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

a. Field Duplicates

Analyte	Minimum RPD	Maximum RPD	Average
Cadmium	3.64	23.7	12.03
Chromium	8.91	38.46	21.33
Lead	19.55	85.71	58.08
Nickel	12.66	48.59	25.53

Method DV-005 from the Mound Methods Compendium, instructs that soil results associated with field duplicate percent differences greater than 50% should be qualified estimated (J). Based on the table above, lead results were qualified estimated (J) in all associated soil samples.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

b. Field Blanks

Target analytes were detected in field blank in laboratory batches 9902L060, 9902L122, and 9902L148 below the CRDL. No qualification was assigned based on these contamination levels.

6. OVERALL ASSESSMENT OF THE DATA

Nickel results were qualified estimate in samples 000084, 000088, 000089, 000090, 000138, and 000139 due to the serial dilution results. Chromium and lead results were qualified estimated (J) in samples 000084, 000088, 000089, and 000090 also due to serial dilution results.

7. REFERENCES

USEPA 1988. "Laboratory Data Validation - Functional Guidelines for Evaluation of Organic Analyses."U.S. Environmental Protection Agency, Hazardous Site Evaluation Division. February 1988.

DOE. 1999. "Methods Compendium." Mound Environmental Management Program, U.S. Department of Energy, Miamisburg, OH. February 1999.

DOE 1993. Remedial Investigation/Feasibility Study, Operable Unit 9, Quality Assurance Project Plan. Mound Plant, Environmental Restoration Program, U.S. Department of Energy, Albuquerque Field Office, Albuquerque, New Mexico. March 1993.

USEPA 1983. "Methods of Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, EPA 600/4-79-020, March 1983.

WESTON Preparer: Craig Stoll Date: April 8, 1999

WESTON Reviewer: Date: 4/15/99

PROJECT:	Babcock and Wilcox of Ohio	**WESTON W.O. #:**	01011.032.019
TASK:	PRS 99/100	**DATE:**	April 6, 1999
LABORATORY:	RECRA, Lionville, PA		
FIELD BATCH:	NA		
LAB BATCH:	9902L060; 9902L090; 9902L122; 9902L148		
ANALYSIS:	Inorganic (Metals)		

1. CASE SUMMARY

Ten (10) soils and a field blank (1) were selected for data review from PRS 99/100. These samples were collected from an area within PRS 99/100 that was selected to be turned over to the public. The review was performed to confirm that the sample results for this parcel of land were free of significant defects based on the laboratory quality control results. The samples that were reviewed are identified in the following table. These samples were received by the laboratory in good condition and the analyses were performed following the procedures in the Mound Methods Compendium (DOE. 1999).

Laboratory Identification	Field Identification	Location	Matrix	Date Collected
9902L060-013	000079	Field Blank	Water	02-02-99
9902L060-014	000080	X4-04	Soil	02-03-99
9902L060-015	000081	X4-08	Soil	02-03-99
9902L060-016	000082	X4-12	Soil	02-03-99
9902L060-017	000083	X4-15	Soil	02-03-99
9902L090-001	000084	X6-04	Soil	02-03-99
9902L090-005	000088	X7-04	Soil	02-03-99
9902L090-006	000089	X7-07	Soil	02-03-99
9902L090-007	000090	X7-07	Soil	02-03-99
9902L122-015	000138	X5-04	Soil	02-09-99
9902L148-001	000139	X5-04	Soil	02-09-99

2. DATA COMPLETENESS

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The data packages contained all the information required to perform a data quality review.

3. SAMPLE HOLDING TIMES

The procedure in the Methods Compendium requires that samples be extracted within 180 days of collection for the target analytes.

4. RESULTS OF LABORATORY QUALITY CONTROL CHECKS

a. Calibration

The initial and continuing calibration verification results were acceptable for all of the samples.

b. Laboratory Method Blanks

No target parameters were detected in the method blanks or the continuing calibration blanks.

c. Laboratory Control Sample

The laboratory control sample recoveries were all within the acceptance criteria.

d. Matrix Spike/Matrix Spike Duplicate Recoveries

The matrix spike results associated with these samples were all within acceptance limits.

e. Compound Identification

The target analytes were identified properly.

f. Quantitation and Contract Required Reporting Limits (CRQL)

The target compound was properly quantitated in the samples and the laboratory reported to the required quantitation limit.

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g. Laboratory Duplicates

Analyte	Minimum RPD	Maximum RPD	Average
Cadmium	6	20.6	12.08
Chromium	12.2	54.3	29.6
Lead	1.9	55.1	19.35
Nickel	1	53	29.75

Method DV-005 from the Mound Methods Compendium, instructs that soil results associated with laboratory duplicate percent differences greater than 35% should be qualified estimated (J). Four duplicates were analyzed. The average was not greater than 35%. No qualifications were applied to the data.

h. Serial Dilution

The nickel results for samples 000138 and 000139 were qualified estimated (J) due to serial dilutions of 11.6% and 13.1%, respectively.

The chromium results, lead, and nickel results for samples 000084, 000088, 000089, and 000090 were qualified estimated due to serial dilution differences of 10.5%, 12.5%, and 11.6%, respectively.

5. RESULTS OF ASSOCIATED FIELD QUALITY CONTROL CHECKS

a. Field Duplicates

Analyte	Minimum RPD	Maximum RPD	Average
Cadmium	3.64	23.7	12.03
Chromium	8.91	38.46	21.33
Lead	19.55	85.71	58.08
Nickel	12.66	48.59	25.53

Method DV-005 from the Mound Methods Compendium, instructs that soil results associated with field duplicate percent differences greater than 50% should be qualified estimated (J). Based on the table above, lead results were qualified estimated (J) in all associated soil samples.

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b. Field Blanks

Target analytes were detected in field blank in laboratory batches 9902L060, 9902L122, and 9902L148 below the CRDL. No qualification was assigned based on these contamination levels.

6. OVERALL ASSESSMENT OF THE DATA

Nickel results were qualified estimate in samples 000084, 000088, 000089, 000090, 000138, and 000139 due to the serial dilution results. Chromium and lead results were qualified estimated (J) in samples 000084, 000088, 000089, and 000090 also due to serial dilution results.

7. REFERENCES

USEPA 1988. "Laboratory Data Validation - Functional Guidelines for Evaluation of Organic Analyses."U.S. Environmental Protection Agency, Hazardous Site Evaluation Division. February 1988.

DOE. 1999. "Methods Compendium." Mound Environmental Management Program, U.S. Department of Energy, Miamisburg, OH. February 1999.

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