250401 0406220004

BWX Technologies, Inc.
a McDermott company

BWXT of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ER-072/01
October 2, 2001

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

ATTENTION: Robert S. Rothman

SUBJECT: Contract No. DE-AC24-97OH20044
PARCEL 3 CERCLA DOCUMENTS – FINAL

REFERENCE: Statement of Work Requirement C.7.1e—Regulator Reports

Dear Mr. Provencher:

Rob Rothman of your office has approved the release to USEPA, OEPA, ODH, MMCIC, the administrative record, and the Public Reading Room of the Final version of the following documents for Parcel 3:

Human Health Residual Risk Evaluation (RRE)
Record of Decision (ROD)
Environmental Summary (ES)

If you have any questions regarding the documents, or if additional support is needed, please contact Dave Rakel at extension 4203.

Sincerely,

Monte A. Williams
Manager, Environmental Restoration

MAW/DAR:jdg

cc: Tim Fischer, USEPA, w/attachments (1-RRE, 5-ROD, 1-ES)
Brian Nickel, OEPA, w/attachments (1-RRE, 2-ROD, 1-ES)
Ruth Vandegrift, ODH, w/attachments (2-RRE, 2-ROD, 1-ES)
John Ebersole DOE/OH, w/1 of each attachment
Torrence Tracey DOE/HQ, w/1 of each attachment
Monte Williams 1 w/1 of each attachment
Dann Bird MMCIC w/attachments (2-RRE, 2-ROD, 1-ES)
Public Reading Room, w/5 of each attachment
Administrative Record, w/2 of each attachment
DCC

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Miamisburg, Ohio 45343-3030
(937) 865-4020

ER-071/01
October 1, 2001

10-01-01P01:36 RCVD
MIAMISBURG
LOG F-00002
CODE 6442.3

Mr. Rob Rothman, CERCLA Program Manager
Miamisburg Environmental Management Project
U. S. Department of Energy
P.O. Box 66
Miamisburg, OH 45353-0066

SUBJECT: Contract No. DE-AC24-97OH20044
PARCEL 3 CERCLA DOCUMENTS – FINAL

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

Dear Mr. Rothman:

BWXTO is pleased to provide Final versions of the following documents for Parcel 3:

Human Health Residual Risk Evaluation
Record of Decision
Environmental Summary.

With your approval, BWXTO will distribute copies of these documents to USEPA, OEPA, ODH, MMCIC, the administrative record, and the Public Reading Room. If you have any questions regarding the documents, or if additional support is needed, please contact Dave Rakel at extension 4203.

Sincerely,

Monte A. Williams
Manager, Environmental Restoration

MAW/DAR:jdg

Enclosures as stated

cc: DCC

Approved: 10-2-01
Robert S. Rothman
CERCLA Program Manager

State of Ohio Environmental Protection Agency

Southwest District Office

401 East Fifth Street
Dayton, Ohio 45402-2911

TELE: (937) 285-6357 FAX: (937) 285-6249

Bob Taft, Governor
Maureen O'Connor, Lt. Governor
Christopher Jones, Director

June 25, 2001

Mr. Rob Rothman
U.S. DOE MEMP
P.O. Box 66
1 Mound Road
Miamisburg, Ohio 45343-0066

Comments on Parcel 3 Record of Decision

Dear Mr. Rothman:

The Ohio Environmental Protection Agency has completed our review of the Parcel 3 Record of Decision, Draft, Revision 1, May 2001. Please refer to the attached comments on the document. Should there be any question concerning the above, please feel free to contact Jane O'Dell (937) 285-6066 or me at (937) 285-6468.

Sincerely,

Mr. Brian Nickel
OEPA/Mound Project Manager
Office of Federal Facilities Oversight

cc: Tim Fischer, USEPA Region V
D. Rakel, BWXTO

PARCEL 3 RECORD OF DECISION
MAY 20001 DRAFT, REV. 1
OHIO ENVIRONMENTAL PROTECTION AGENCY
COMMENTS
JUNE 22, 2001

GENERAL COMMENT

1. On April 16, 2001, US EPAs HEAST updated the radionuclide carcinogenicity slope factors. This update affects every radionuclide guideline value and risk level within Parcel 3. An assessment must be completed on each radionuclide guideline value for screening purposes. In addition, an assessment must be made of the change in the risk associated with the radionuclides that made it through the screening process.

SPECIFIC COMMENTS

2. Page 5, Section 2.1 Site Description – Change the second sentence in the second paragraph to end after the term "MMCIC." Start the third sentence with " Aside from Parcel 3, the six remaining..."

3. Page 6, Section 2.3 Community Participation – In the second paragraph, second sentence from the end of the paragraph, add the Ohio Department of Health to the list of representatives.

4. After Page 6, Table 2 – The Parcel 3 Proposed Plan lists the PRS 99 OSC report as signed by the Core Team on August 16, 2001. This ROD has the date of signature of 7/12/00. The OSC report does not have a date on the signature page. What is the correct date of the signatures on the PRS 99 OSC report?

5. After Page 6, Table 2 – Remove the "BDP" acronym from the column description on this PRS only table.

6. After Page 6, Table 3 – Spell out "BDP" within the column heading and add it to the acronym listing.

7. Page 9, Section 2.5.3.3 Soil Contamination Data – In the first full paragraph, please add the Further Assessment Data Report, PRS 99/100, Final, July 2000 as a data source.

8. Page 13, Section 2.7.5 Evaluation of Potential Cumulative Risks – Under the Future Ground Water section, remove the last sentence and replace it with the following "The constituents that contribute to the future ground water risk can be found on tables 6 and 7." The concentration estimates are actually in appendix B of the RRE.

9. Page 16, Section 2.10.3.1 Threshold Criteria – Under criteria 2, third paragraph, beginning with "Compliance with ARARs..." this paragraph should be changed to improve clarity. Specifically, it is non-compliance with ARARs that provides the basis for invoking a waiver.

10. Page 19, Section 3.0 Responsiveness Summary – The second sentence indicates that no formal comments were received in the public meeting held on May 17, 2001. It is our impression that the comments made by both James Bonfiglio and Dann Bird in the public meeting on May 17, 2001 were considered part of the public meeting and hence recorded as formal comments.

11. Page 22, Section 4 Administrative Record File References – Add the Further Assessment Data Report, PRS 99/100, Final, July 2000 to the list.

12. Appendix A, Quitclaim Deed for Parcel 3 – In the third paragraph, first sentence, please change "and easement" to "an easement".

13. Appendix A, Quitclaim Deed for Parcel 3 – The property boundary description recorded within the referenced deed book is documented in the fourth paragraph, section 1.1. The references in the Parcel 4 quitclaim deed have different deed book/micro fiche listings. Why would the two differ?

14. Appendix A, Quitclaim Deed for Parcel 3 – The restriction on ground water is missing from the quitclaim deed. The restriction should be listed as section 1.3 as in the Parcel 4 quit claim deed. Please insert this restriction within the deed.

15. Appendix A, Quitclaim Deed for Parcel 3 – Related to the missing section 1.3 listed in the above comment, the section (1.3) is referenced in paragraph three and section 3.2 of the quit claim deed.

PARCEL 3 RECORD OF DECISION
JULY 2001, DRAFT PROPOSED FINAL
OHIO ENVIRONMENTAL PROTECTION AGENCY
COMMENTS
JULY 19, 2001

SPECIFIC COMMENTS

1. Page ii, Table of Contents - Change the page reference on Figures 1 and 2 from "following page 5" to "following page 4".

2. Page 10, Section 2.5.3.3 Soil Contamination Data – In the last sentence, delete the word "detected" and place the term "risk evaluated" in front of contaminants.

3. Page 21, Section 3.0 Responsiveness Summary – Within the second "Response" on this page, the forth sentence, change the capitalization of "Any".

4. Page 24, Section 3.0 Responsiveness Summary – Bold the heading for the last paragraph "Comment from the Core Team".

5. After Page 24, Table 11 – The following comments are specific to the tables included in the Ohio EPA comment response that support Table 11.

- Within table 3, Site Employee, current and future soil, actinium 227+d should have screened through to be assessed in the risk evaluation. The new 10-6 guideline value is 0.51 pCi/g.

- On table 14, the oral slope factor for radium 228+d in ground water should be 1.04E-09 instead of 1.34E-09 as list on this table. The guideline value for radium 228+d in ground water for the construction worker should be 0.77 pCi/l and not 0.60 pCi/l as listed on table 9.

6. Appendix A Quitclaim Deed – The response to Ohio EPAs Parcel 3 ROD, Draft Revision 1 comment #13 regarding the property boundary description within the soil restriction covenant prompts a follow up request. To help in clarification, the Ohio EPA will be issuing a letter to DOE and MMCIC requesting a verification of the property boundary as described in section 1.1 of each quitclaim deed that has been transferred from DOE to MMCIC to date, including Parcel 3.

7. Appendix A Quitclaim Deed – In section 3, there is a reference to CERCLA. Please change the year of the CERCLA reference from "1930" to "1980".

Table 11: Incremental Residual Risk for Parcel 3 Using Revised Slope Factors

Scenario and Receptor	Media	Constituents	Pathway	Total Cancer Risk as reported in Public Review Draft of RRE	Total Cancer Risk using revised HEAST slope factors
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	**6.1E-06**	**5.8E-06**
			Inhalation of Dust	5.5E-09	7.0E-09
			Inhalation of VOCs	NA	NA
			External	6.9E-10	2.9E-07
		Soil Total Risk		**6.1E-06**	**6.1E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**2.1E-06**	**2.7E-06**
			Dermal Contact	NA	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**2.1E-06**	**2.7E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**9.6E-06**	**9.2E-06**
			Dermal Contact	**2.8E-04**	**2.0E-04**
			Inhalation While Showering	7.6E-08	4.5E-08
		Future Groundwater Total Risk		**2.9E-04**	**2.1E-04**
	Air*	Radiological	Inhalation	2.0E-07	2.0E-07
		Air Total Risk		2.0E-07	2.0E-07
	Cumulative Incremental Current Risk			**8.4E-06**	**9.0E-06**
	Cumulative Incremental Future Risk			**3.0E-04**	**2.2E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	**2.6E-06**	**2.4E-06**
			Inhalation of Dust	2.2E-08	2.9E-08
			Inhalation of VOCs	NA	NA
			External	6.2E-10	3.2E-07
		Soil Total Risk		**2.6E-06**	**2.7E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**2.0E-05**	**2.3E-05**
		Current Groundwater Total Risk		**2.0E-05**	**2.3E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.4E-05**	**4.9E-05**
		Future Groundwater Total Risk		**5.4E-05**	**4.9E-05**
	Air*	Radiological	Inhalation	9.9E-07	9.9E-07
		Air Total Risk		9.9E-07	9.9E-07
	Cumulative Incremental Current Risk			**2.4E-05**	**2.7E-05**
	Cumulative Incremental Future Risk			**5.8E-05**	**5.3E-05**

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

Numbers written as 1.0E-03 equal 1×10^{-3}

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

Table 11: Incremental Residual Risk for Parcel 3 Using Revised Slope Factors

Scenario and Receptor	Media	Constituents	Pathway	Total Cancer Risk as reported in Public Review Draft of RRE	Total Cancer Risk using revised HEAST slope factors
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	**6.1E-06**	**5.8E-06**
			Inhalation of Dust	5.5E-09	7.0E-09
			Inhalation of VOCs	NA	NA
			External	6.9E-10	2.9E-07
		Soil Total Risk		**6.1E-06**	**6.1E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**2.1E-06**	**2.7E-06**
			Dermal Contact	NA	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**2.1E-06**	**2.7E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**9.6E-06**	**9.2E-06**
			Dermal Contact	**2.8E-04**	**2.0E-04**
			Inhalation While Showering	7.6E-08	4.5E-08
		Future Groundwater Total Risk		**2.9E-04**	**2.1E-04**
	Air*	Radiological	Inhalation	2.0E-07	2.0E-07
		Air Total Risk		2.0E-07	2.0E-07
	Cumulative Incremental Current Risk			**8.4E-06**	**9.0E-06**
	Cumulative Incremental Future Risk			**3.0E-04**	**2.2E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	**2.6E-06**	**2.4E-06**
			Inhalation of Dust	2.2E-08	2.8E-08 → 2.9E-08
			Inhalation of VOCs	NA	NA
			External	6.2E-10	~~2.3E-09~~ 3.2E-07
		Soil Total Risk		**2.6E-06**	~~2.4E-06~~ 2.7E-06
	Groundwater (Current)	Chemical and Radiological	Ingestion	**2.0E-05**	**2.3E-05**
		Current Groundwater Total Risk		**2.0E-05**	**2.3E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.4E-05**	**4.9E-05**
		Future Groundwater Total Risk		**5.4E-05**	**4.9E-05**
	Air*	Radiological	Inhalation	9.9E-07	9.9E-07
		Air Total Risk		9.9E-07	9.9E-07
	Cumulative Incremental Current Risk			**2.4E-05**	~~2.6E-05~~ 2.7E-05
	Cumulative Incremental Future Risk			**5.8E-05**	~~5.2E-05~~ 5.3E-05

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

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

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

Table 35: Incremental Residual Risk for Parcel 3 Summary Table

Scenario and Receptor	Media	Constituents	Pathway	Total Noncancer HI	Total Cancer Risk
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	NA	**5.8E-06**
			Inhalation of Dust	NA	7.0E-09
			Inhalation of VOCs	NA	NA
			External	NA	2.9E-07
		Soil Total Risk		NA	**6.1E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.7E-06**
			Dermal Contact	1.9E-01	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**1.3E+00**	**2.7E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**4.9E+00**	**9.2E-06**
			Dermal Contact	4.6E-01	**2.0E-04**
			Inhalation While Showering	4.8E-04	4.5E-08
		Future Groundwater Total Risk		**5.3E+00**	**2.1E-04**
	Air*	Radiological	Inhalation	NA	2.0E-07
		Air Total Risk		NA	2.0E-07
	Cumulative Incremental Current Risk			**1.3E+00**	**9.0E-06**
	Cumulative Incremental Future Risk			**5.3E+00**	**2.2E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	NA	**2.4E-06** ok
			Inhalation of Dust	NA	2.8E-08 2.9E-8
			Inhalation of VOCs	NA	NA
			External	NA	~~2.3E-09~~ 3.2E-7
		Soil Total Risk		NA	~~**2.4E-06**~~ ~~2.4E-6~~ 2.7E-06
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.3E-05**
		Current Groundwater Total Risk		**1.1E+00**	**2.3E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**4.9E+00**	**4.9E-05**
		Future Groundwater Total Risk		**4.9E+00**	**4.9E-05**
	Air*	Radiological	Inhalation	NA	9.9E-07
		Air Total Risk		NA	9.9E-07
	Cumulative Incremental Current Risk			**1.1E+00**	**2.6E-05** 2.7E-05
	Cumulative Incremental Future Risk			**4.9E+00**	**5.2E-05** 5.3E-05

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

Numbers written as 1.0E-03 equal 1×10^{-3}

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

Table 34: Background Residual Risk for Parcel 3 Summary Table

Scenario and Receptor	Media	Constituents	Pathway	Total Noncancer HI	Total Cancer Risk
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	NA	2.1E-08
			Inhalation of Dust	NA	2.6E-11
			Inhalation of VOCs	NA	NA
			External	NA	9.6E-12
		Soil Total Risk		NA	2.1E-08
	Groundwater (Current)	Chemical and Radiological	Ingestion	1.4E-02	NA
			Dermal Contact	2.3E-03	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		1.7E-02	NA
	Groundwater (Future)	Chemical and Radiological	Ingestion	1.1E-01	**1.0E-06**
			Dermal Contact	7.2E-03	**4.6E-06**
			Inhalation While Showering	NA	9.7E-10
		Future Groundwater Total Risk		1.2E-01	**5.6E-06**
	Air*	Radiological	Inhalation	NA	7.7E-09
		Air Total Risk		NA	7.7E-09
	Cumulative Background Current Risk			1.7E-02	2.9E-08
	Cumulative Background Future Risk			1.2E-01	**5.6E-06**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	NA	1.1E-07
			Inhalation of Dust	NA	1.3E-10
			Inhalation of VOCs	NA	NA
			External	NA	1.1E-11
		Soil Total Risk		NA	1.1E-07
	Groundwater (Current)	Chemical and Radiological	Ingestion	1.4E-02	**1.9E-06**
		Current Groundwater Total Risk		1.4E-02	**1.9E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	1.1E-01	**5.2E-06**
		Future Groundwater Total Risk		1.1E-01	**5.2E-06**
	Air*	Radiological	Inhalation	NA	3.9E-08
		Air Total Risk		NA	3.9E-08
	Cumulative Background Current Risk			1.4E-02	**2.0E-06**
	Cumulative Background Future Risk			1.1E-01	**5.3E-06**

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

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

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

Table 33: Total Residual Risk for Parcel 3 Summary Table

Scenario and Receptor	Media	Constituents	Pathway	Total Noncancer HI	Total Cancer Risk
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	NA	**5.8E-06**
			Inhalation of Dust	NA	7.1E-09
			Inhalation of VOCs	NA	NA
			External	NA	2.9E-07
		Soil Total Risk		NA	**6.1E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.7E-06**
			Dermal Contact	1.9E-01	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**1.3E+00**	**2.7E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.0E+00**	**1.0E-05**
			Dermal Contact	4.7E-01	**2.1E-04**
			Inhalation While Showering	4.8E-04	4.6E-08
		Future Groundwater Total Risk		**5.5E+00**	**2.2E-04**
	Air*	Radiological	Inhalation	NA	2.1E-07
		Air Total Risk		NA	2.1E-07
	Cumulative Total Current Risk			**1.3E+00**	**9.0E-06**
	Cumulative Total Future Risk			**5.5E+00**	**2.3E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	NA	**2.4E-06** +6.9E-08 = 2.4E-06
			Inhalation of Dust	NA	2.8E-08 +1.16E-09 = 2.9E-09
			Inhalation of VOCs	NA	NA
			External	NA	2.8E-09 +3.17E-07 = 3.2E-07
		Soil Total Risk		NA	~~**2.4E-06**~~ 2.7E-06
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.5E-05**
		Current Groundwater Total Risk		**1.1E+00**	**2.5E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.0E+00**	**5.4E-05**
		Future Groundwater Total Risk		**5.0E+00**	**5.4E-05**
	Air*	Radiological	Inhalation	NA	**1.0E-06**
		Air Total Risk		NA	**1.0E-06**
	Cumulative Total Current Risk			**1.1E+00**	**2.8E-05** 2.9E-05
	Cumulative Total Future Risk			**5.0E+00**	**5.7E-05** 5.8E-05

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

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

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

Commercial/Office Worker - Soil/Sediment Exposure Pathway (Radionuclides)

Variables defined in Table 5.1.3 p110-111 RBGV Report 3/97

Equations listed in Table 5.1.3 p109 RBGV Report 3/97

Enter the following:

Series Ac-227+D

Oral Cancer Slope Factor	1.16E-09	risk/pCi
Inhalation Cancer Slope Factor	2.09E-07	risk/pCi
External Cancer Slope Factor	1.47E-06	risk/pCi

Cancer Slope Factors
HEAST Table 4

Series Segment		Ingestion	Inhalation	External Exp
Ac-227	Pb-207	1.16E-09	2.09E-07	1.47E-06
	Total	1.16E-09	2.09E-07	1.47E-06

Ingestion			
Exposure Point Concentration	CS_{ING}	1.90E-01	pCi/g
Exposure Duration 1	ED_1	25	yrs
Exposure Frequency	EF	250	days/yr
Oral Cancer Slope factor	SF_0	1.16E-09	risk/pCi
Conversion Factor 1	CF_1	0.001	g/mg
Ingestion rate - Soil	IR_{soil}	50	mg/day
Route Specific Cancer Risk - Oral	R_{ORAL}	6.89E-08	
Inhalation			
Inhalation Cancer Slope factor	SF_i	2.09E-07	risk/pCi
Conversion Factor 2	CF_2	1000	g/kg
Inhalation Rate	IR_{air}	20	m^3/day
Soil to Air Volatilization Factor	VF	1	m^3/kg
Particulate Emission Factor	PEF	4.28E+09	m^3/kg
Route Specific Cancer Risk - Inhalation	R_{inh}	1.16E-09	
External			
External Cancer Slope Factor	SF_e	1.47E-06	risk/pCi
Exposure Duration 2	ED_2	17.125	yrs
Gamma Shielding Factor	S_e	0.2	
Gamma Exposure Time factor	T_e	0.08	
Route Specific Cancer Risk - External	R_{ext}	3.19E-07	
Total			
	$Risk_{TOTAL}$	3.89E-07	

Total

No Bckgrd EPC

∴ also incremental.

Commercial/Office Worker - Soil/Sediment Exposure Pathway (Radionuclides)

Variables defined in Table 5.1.3 p110-111 RBGV Report 3/97

Equations listed in Table 5.1.3 p109 RBGV Report 3/97

Enter the following:

Series Pu-238

Oral Cancer Slope Factor	2.72E-10	risk/pCi
Inhalation Cancer Slope Factor	3.36E-08	risk/pCi
External Cancer Slope Factor	7.22E-11	risk/pCi

Cancer Slope Factors HEAST Table 4

Series Segment	Ingestion	Inhalation	External Exp
Pu-238	2.72E-10	3.36E-08	7.22E-11
Total	2.72E-10	3.36E-08	7.22E-11

Ingestion			
Exposure Point Concentration	CS_{ING}	2.82E+01	pCi/g
Exposure Duration 1	ED_1	25	yrs
Exposure Frequency	EF	250	days/yr
Oral Cancer Slope factor	SF_0	2.72E-10	risk/pCi
Conversion Factor 1	CF_1	0.001	g/mg
Ingestion rate - Soil	IR_{soil}	50	mg/day
Route Specific Cancer Risk - Oral	R_{ORAL}	2.40E-06	
Inhalation			
Inhalation Cancer Slope factor	SF_i	3.36E-08	risk/pCi
Conversion Factor 2	CF_2	1000	g/kg
Inhalation Rate	IR_{air}	20	m^3/day
Soil to Air Volatilization Factor	VF	1	m^3/kg
Particulate Emission Factor	PEF	4.28E+09	m^3/kg
Route Specific Cancer Risk - Inhalation	R_{inh}	2.77E-08	
External			
External Cancer Slope Factor	SF_e	7.22E-11	risk/pCi
Exposure Duration 2	ED_2	17.125	yrs
Gamma Shielding Factor	S_e	0.2	
Gamma Exposure Time factor	T_e	0.08	
Route Specific Cancer Risk - External	R_{ext}	2.32E-09	
Total			
	$Risk_{TOTAL}$	2.43E-06 ✓	Same as Table 18 value

RESPONSE TO OHIO ENVIRONMENTAL PROTECTION AGENCY
COMMENTS OF JUNE 22, 2001 ON
PARCEL 3 RECORD OF DECISION
MAY 20001 DRAFT, REV. 1

GENERAL COMMENT

1. On April 16, 2001, US EPAs HEAST updated the radionuclide carcinogenicity slope factors. This update affects every radionuclide guideline value and risk level within Parcel 3. An assessment must be completed on each radionuclide guideline value for screening purposes. In addition, an assessment must be made of the change in the risk associated with the radionuclides that made it through the screening process.
   Response
   RBGV were recalculated for radionuclides that screened out in the Public Review Draft of the RRE, but were close. The entire series of risk tables were redone with the April 16, 2001 slope factors for radionuclides in HEAST. The revised tables are included with this response. The revised risk values are not significantly different from these reported in the Public Review Draft.

SPECIFIC COMMENTS

2. Page 5, Section 2.1 Site Description – Change the second sentence in the second paragraph to end after the term "MMCIC." Start the third sentence with " Aside from Parcel 3, the six remaining..."
   Response
   The text was changed as requested.

3. Page 6, Section 2.3 Community Participation – In the second paragraph, second sentence from the end of the paragraph, add the Ohio Department of Health to the list of representatives.
   Response
   The text was changed as requested.

4. After Page 6, Table 2 – The Parcel 3 Proposed Plan lists the PRS 99 OSC report as signed by the Core Team on August 16, 2001. This ROD has the date of signature of 7/12/00. The OSC report does not have a date on the signature page. What is the correct date of the signatures on the PRS 99 OSC report?
   Response
   The minutes of the July 2000 Core Team Meeting indicate two members of the Core Team signed on July 12, 2000. The USEPA representative participated in that meeting by telephone and agreed to sign upon receipt. The final document was printed and "issued" after return of the signature page in August. The date that best represents the event referenced in the table is July 12, 2000.

5. After Page 6, Table 2 – Remove the "BDP" acronym from the column description on this PRS only table.
   Response
   The text was revised as requested.

6. After Page 6, Table 3 – Spell out "BDP" within the column heading and add it to the acronym listing.

Response
The text was changed as requested.

7. Page 9, Section 2.5.3.3 Soil Contamination Data – In the first full paragraph, please add the Further Assessment Data Report, PRS 99/100, Final, July 2000 as a data source.
   Response
   The Further Assessment Data Report, PRS 99/100, Final, July 2000 was added as a data source.

8. Page 13, Section 2.7.5 Evaluation of Potential Cumulative Risks – Under the Future Ground Water section, remove the last sentence and replace it with the following "The constituents that contribute to the future ground water risk can be found on tables 6 and 7." The concentration estimates are actually in appendix B of the RRE.
   Response
   The text was changed as rquested.

9. Page 16, Section 2.10.3.1 Threshold Criteria – Under criteria 2, third paragraph, beginning with "Compliance with ARARs..." this paragraph should be changed to improve clarity. Specifically, it is non-compliance with ARARs that provides the basis for invoking a waiver.
   Response
   The phrase "or provides the basis for invoking a waiver" was removed.

10. Page 19, Section 3.0 Responsiveness Summary – The second sentence indicates that no formal comments were received in the public meeting held on May 17, 2001. It is our impression that the comments made by both James Bonfiglio and Dann Bird in the public meeting on May 17, 2001 were considered part of the public meeting and hence recorded as formal comments.
    Response
    The text was changed to indicate formal comments were provided at the public meeting. There were no other commentors during the public review period.

11. Page 22, Section 4 Administrative Record File References – Add the Further Assessment Data Report, PRS 99/100, Final, July 2000 to the list.
    Response
    This report was added to the list.

12. Appendix A, Quitclaim Deed for Parcel 3 – In the third paragraph, first sentence, please change "and easement" to "an easement".
    Response
    The text was modified as requested.

13. Appendix A, Quitclaim Deed for Parcel 3 – The property boundary description recorded within the referenced deed book is documented in the fourth paragraph, section 1.1. The references in the Parcel 4 quitclaim deed have different deed book/micro fiche listings. Why would the two differ?
    Response
    This was an error in the Parcel 4 deed.

14. Appendix A, Quitclaim Deed for Parcel 3 – The restriction on ground water is missing from the quitclaim deed. The restriction should be listed as section 1.3 as in the Parcel 4 quit claim deed. Please insert this restriction within the deed.
    Response

This restriction has been inserted as section 1.3.

15. Appendix A, Quitclaim Deed for Parcel 3 – Related to the missing section 1.3 listed in the above comment, the section (1.3) is referenced in paragraph three and section 3.2 of the quit claim deed.
    Response
    Inserting section 1.3 (see comment 14) resolves this comment.

RESPONSE TO OHIO ENVIRONMENTAL PROTECTION AGENCY
COMMENTS OF JUNE 22, 2001 ON
PARCEL 3 RECORD OF DECISION
MAY 20001 DRAFT, REV. 1

TABLES FROM PARCEL 3 RESIDUAL RISK EVALUATION - PUBLIC REVIEW DRAFT
REVISED WITH UPDATED SLOPE FACTORS FROM HEAST

Table 1. Initial Identification of Current and Future Soil Constituents of Potential Concern for the Construction Worker Scenario in Parcel 3

Table 2. Final Identification of Current and Future Soil Constituents of Potential Concern for the Construction Worker Scenario in Parcel 3

Table 3. Initial Identification of Current and Future Soil Constituents of Potential Concern for the Site Employee Scenario in Parcel 3

Table 4. Final Identification of Current and Future Soil Constituents of Potential Concern for the Site Employee Scenario in Parcel 3

Table 5. Initial Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario

Table 6. Final Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario

Table 7. Initial Identification of Current Groundwater Constituents of Potential Concern for the Site Employee Scenario

Table 8. Final Identification of Current Groundwater Constituents of Potential Concern for the Site Employee Scenario

Table 9. Initial Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario

Table 10. Final Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario

Table 11. Initial Identification of Future Groundwater Constituents of Potential Concern for the Site Employee Scenario

Table 12. Final Identification of Future Groundwater Constituents of Potential Concern for the Site Employee Scenario

Table 14. Toxicity Criteria and other Physical Chemical Values (Supporting Tables 15-32)

Table 15. Total Residual Soil Risk for a Construction Worker in Parcel 3

Table 16. Background Residual Soil Risk for a Construction Worker in Parcel 3

Table 17. Incremental Residual Soil Risk for a Construction Worker in Parcel 3

Table 18. Total Residual Soil Risk for a Site Employee in Parcel 3

Table 19. Background Residual Soil Risk for a Site Employee in Parcel 3

Table 20. Incremental Residual Soil Risk for a Site Employee in Parcel 3

Table 21. Current Total Residual Groundwater Risk for the Construction Worker Scenario

Table 22. Current Background Residual Groundwater Risk for the Construction Worker Scenario

Table 23. Current Incremental Residual Groundwater Risk for the Construction Worker Scenario

Table 24. Current Total Residual Groundwater Risk for the Site Employee Scenario

Table 25. Current Background Residual Groundwater Risk for the Site Employee Scenario

Table 26. Current Incremental Residual Groundwater Risk for the Site Employee Scenario

Table 27. Future Total Residual Groundwater Risk for the Construction Worker Scenario

Table 28. Future Background Residual Groundwater Risk for the Construction Worker Scenario

Table 29. Future Incremental Residual Groundwater Risk for the Construction Worker Scenario

Table 30. Future Total Residual Groundwater Risk for the Site Employee Scenario

Table 31. Future Background Residual Groundwater Risk for the Site Employee Scenario

Table 32. Future Incremental Residual Groundwater Risk for the Site Employee Scenario

Table 33. Total Residual Risk for Parcel 3 Summary Table

Table 34. Background Residual Risk for Parcel 3 Summary Table

Table 35. Incremental Residual Risk for Parcel 3 Summary Table

Supplemental Tables

UPDATED HEAST TOXICITY VALUES FOR SOIL AND GROUNDWATER GVS

Soil Guideline Values for Construction Worker at DOE Mound

Soil Guideline Values for Site Employee DOE Mound

Supplemental Toxicity Criteria for Th-230 and Ra-228 with decay chain

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

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	Concentration Used for Screening	Background Value	Construction Worker Risk-Based GV	Reference Risk-Based GV	COPC?
Metals											
7440-43-9	Cadmium	0.09	0.75	mg/kg	G4 (16)	132-144	0.75	2.1	21.00	a	NO:2,3
7440-47-3	Chromium**	0.98	26.00	mg/kg	X10 (16)	150-297	26.00	20	63.90	a,e	NO:3
7439-92-1	Lead	3.60	41.70	mg/kg	X1 (8)	144-144	41.70	48			NO:2
7440-02-0	Nickel	4.10	64.10	mg/kg	D3 (12)	144-144	64.10	32	430.00	a	NO:3
Volatile Organic Compounds											
76-13-1	1,1,2 Trichloro-1,2,2-trifluoroethane	1.41	1.41	ug/kg	607 (0)	1-10	1.41		640000000.00	a, e	NO:3
78-93-3	2-Butanone	3.33	28.13	ug/kg	603 (0)	10-10	28.13		930000.00	b	NO:3
67-64-1	Acetone	12.59	142.36	ug/kg	603 (0)	9-10	142.36		2100000.00	a	NO:3
100-41-4	Ethylbenzene	18.01	18.01	ug/kg	602 (0)	1-10	18.01		48.00	b	NO:3
75-09-2	Methylene Chloride	8.07	20.24	ug/kg	602 (0)	10-10	20.24		100000.00	c	NO:3
79-34-5	Tetrachloroethene	2.94	2.94	ug/kg	602 (0)	1-10	2.94		210000.00	a	NO:3
108-88-3	Toluene	1.33	23.44	ug/kg	602 (0)	3-10	23.44		25000.00	b	NO:3
1330-20-7	Xylenes, Total	76.99	76.99	ug/kg	602 (0)	1-10	76.99		43000000.00	a	NO:3
Radionuclides											
7440-34-8	Actinium-227	0.07	0.54	pCi/g	PRS99/100	40-139	0.54		0.45	d	YES
14596-10-2	Americium-241	0.02	0.15	pCi/g	PRS99/100	8-166	0.15		4.95	d	NO:1
10045-97-3	Cesium-137	0.02	0.50	pCi/g	S011 (0)	54-165	0.50	0.42	0.46	d	YES
7440-48-4	Cobalt-60	0.02	0.06	pCi/g	PRS99/100	9-165	0.06		0.08	d	NO:3
14255-04-0	Lead-210 *	0.47	2.99	pCi/g	4459 (0)	70-145	2.99	1.2	1.65	d, e	YES
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	36-177	34.80	0.13	5.50	d	YES
13981-16-3	Plutonium-239/240	0.01	0.31	pCi/g	602 (0)	5-24	0.31	0.18	5.50	d	NO:3
13966-00-2	Potassium-40	3.70	31.20	pCi/g	601 (0)	24-24	31.20	37			NO:2
13982-63-3	Radium-226	0.40	3.53	pCi/g	4444 (0)	142-164	3.53	2	0.14	d	YES
14274-82-9	Thorium-228	0.44	0.95	pCi/g	D1 (8)	24-24	0.95	1.5	0.16	d, e	NO:2
14269-63-7	Thorium-230	0.40	10.10	pCi/g	X5 (8)	145-156	10.10	1.9		f	YES
7440-29-1	Thorium-232	0.17	4.47	pCi/g	C0004 (3)	155-175	4.47	1.4	0.10	d, e	YES
13966-29-5	Uranium-234	0.16	0.37	pCi/g	X5 (8)	13-13	0.37	1.1	37.50	d	NO:2,3
15117-96-1	Uranium-235	0.02	0.03	pCi/g	PRS99/100 (12)	2-13	0.03	0.11	3.35	d	NO:2,3
7440-61-1	Uranium-238	0.18	0.34	pCi/g	X5 (8)	13-13	0.34	1.2	0.12	d, e	NO:2

a= 1/10th HI for ingestion
b= 1/10th HI for ingestion + inhalation
c= 10^{-6} cancer risk for ingestion
d= 10^{-6} cancer risk for ingestion + inhalation + external

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

e = Risk-Based Guideline Values calculated using the methodology, equations, and parameters presented in Mound Screening GV 3/97, calculations presented in Appendix C
CAS= Chemical Abstract Service
COPC= Constituent of Potential Concern
GV= Mound Risk Based Guideline Value
** the chromium data set includes Cr-III and Cr-IV measurements
* Lead-210 background value is based upon its parent uranium-238 background value.

Table 2 Final Identification of Current and Future Soil Constituents of Potential Concern for the Construction Worker Scenario in Parcel 3 (Exposure Point Concentration Compared to Background Values)

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	95 Percent UCL	Concentration Used for Screening	Background Value	COPC for RRE
Radionuclides										
7440-34-8	**Actinium-227+D**	**0.07**	**0.54**	**pCi/g**	**PRS99/100**	**40-139**	**0.19**	**0.19**	**ND**	**YES**
10045-97-3	Cesium-137	0.02	0.50	pCi/g	S011 (0)	54-165	0.07	0.07	0.42	NO
14255-04-0	Lead-210*	0.47	2.99	pCi/g	4459 (0)	70-145	0.85	0.85	1.2	NO
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	36-177	67.20	34.80	0.13	YES
13982-63-3	Radium-226	0.40	3.53	pCi/g	4444 (0)	142-164	1.48	1.48	2	NO
14269-63-7	Thorium-230	0.40	10.10	pCi/g	X5 (8)	145-156	1.27	1.27	1.9	NO
7440-29-1	Thorium-232	0.17	4.47	pCi/g	C0004 (3)	155-175	0.75	0.75	1.4	NO

CAS = Chemical Abstract Service
COPC = Constituent of Potential Concern
ND = Not Detected
NO < Background
RRE = Residual Risk Evaluation
UCL = Upper Confidence Limit
* Lead-210 background value is based upon its parent Uranium-238 background value.

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

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	Concentration Used for Screening	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV	Initial COPC
Volatile Organic Compounds											
	1,1,2 Trichloro-1,2,2-trifluoroethane	1.41	1.41	ug/kg	607 (0)	1-10	1.41		6100000000.00	a, e	NO:3
78-93-3	2-Butanone	3.33	28.13	ug/kg	603 (0)	10-10	28.13		930000.00	b	NO:3
67-64-1	Acetone	12.59	142.36	ug/kg	603 (0)	9-10	142.36		20000000.00	a	NO:3
100-41-4	Ethylbenzene	18.01	18.01	ug/kg	602 (0)	1-10	18.01		48.00	b	NO:3
75-09-2	Methylene Chloride	8.07	20.24	ug/kg	602 (0)	10-10	20.24		100000.00	c	NO:3
79-34-5	Tetrachloroethane	2.94	2.94	ug/kg	602 (0)	1-10	2.94		2000000.00	b	NO:3
108-88-3	Toluene	1.32	23.44	ug/kg	602 (0)	3-10	23.44		25000.00	b	NO:3
1330-20-7	Xylenes, Total	76.90	76.90	ug/kg	602 (0)	1-10	76.90		410000000.00	a	NO:3
Radionuclides											
7440-34-8	Actinium-227	0.07	0.54	pCi/g	PRS99/100	40-139	0.54		1.10	d	NO:3
14596-10-2	Americium-241	0.02	0.15	pCi/g	PRS99/100	8-142	0.15		9.20	d	NO:3
10045-97-3	Cesium-137	0.02	0.50	pCi/g	S011 (0)	53-142	0.50	0.42	0.42	d	YES
7440-48-4	Cobalt-60	0.02	0.06	pCi/g	PRS99/100	9-142	0.06		**0.07**	d	NO:3
14255-04-0	Lead-210*	0.47	2.99	pCi/g	4459 (0)	70-145	2.99	1.2	**1.20**	d, e	**YES**
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	28-160	34.80	0.13	11.00	d	YES
PU-239/240	Plutonium-239/240	0.01	0.31	pCi/g	602 (0)	5-10	0.31	0.18	10.00	d	NO:3
13966-00-2	Potassium-40	16.80	31.20	pCi/g	601 (0)	10-10	31.20	37			NO:2
13982-63-3	Radium-226	0.40	3.53	pCi/g	4444 (0)	119-141	3.53	2	0.13	d	YES
14274-82-9	Thorium-228	0.60	0.82	pCi/g	601 (0)	10-10	0.82	1.5	0.13	d, e	NO:2
14269-63-7	Thorium-230	0.40	6.09	pCi/g	4442 (0)	131-142	6.09	1.9		f	YES
7440-29-1	Thorium-232	0.17	2.71	pCi/g	PRS99/100	139-158	2.71	1.4	0.09	d, e	YES

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

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

Table 4 Final Identification of Current and Future Soil Constituents of Potential Concern for the Site Employee Scenario in Parcel 3 (Exposure Point Concentration Compared to Background Values)

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	95 Percent UCL	Concentration Used for Screening (EPC)	Background Value	COPC for RRE
Radionuclides										
10045-97-3	Cesium-137	0.02	0.50	pCi/g	S011 (0)	53-142	0.05	0.05	0.42	NO
14255-04-0	**Lead-210+D***	**0.47**	**2.99**	**pCi/g**	**4459 (0)**	**70-145**	**0.84**	**0.84**	**1.2**	**NO**
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	28-160	28.20	28.20	0.13	YES
13982-63-3	Radium-226	0.40	3.53	pCi/g	4444 (0)	119-141	1.48	1.48	2	NO
14269-63-7	Thorium-230	0.40	6.09	pCi/g	4442 (0)	131-142	1.27	1.27	1.9	NO
7440-29-1	Thorium-232	0.17	2.71	pCi/g	PRS99/100	139-158	0.73	0.73	1.4	NO

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

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

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

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

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Concentration Used for Screening and Risk	Background Value	Construction Worker Risk-Based GV	Reference Risk-Based GV	Initial COPC
Radionuclides									
Actinium-227	0.50	0.50	pCi/L	1-10	0.50		1.30	c	NO:3
Americium-241	0.03	0.03	pCi/L	1-9	0.03	0.139	2.40	c	NO:2,3
Bismuth-210	0.11	0.39	pCi/L	2-19	0.39		110.00	c, f	NO:3
Plutonium-238	0.01	0.25	pCi/L	8-48	0.25	0.087	2.70	c	NO:3
Plutonium-239/240	0.002	2.00	pCi/L	6-20	2.00	0.125	5.926	c,f	NO:3
Radium-226	0.10	0.52	pCi/L	6-19	0.52	0.996	2.70	c	NO:2,3
Strontium-85	25.00	25.00	pCi/L	1-2	25.00		570.00	c, f	NO:3
Strontium-90	0.50	0.50	pCi/L	3-19	0.50	0.975	14.00	c	NO:2,3
Thorium-227	0.01	0.10	pCi/L	8-14	0.10		19.80	c, f	NO:3
Thorium-228	0.01	2.17	pCi/L	14-35	2.17	0.779	3.50	c, f	NO:3
Thorium-230	0.01	1.99	pCi/L	11-32	1.99		0.60	c, f	YES
Thorium-232	0.0025	0.10	pCi/L	8-33	0.10	0.314	1.60	c, f	NO:2,3
Tritium	110.00	7200.00	pCi/L	112-128	7200.00	1485.47	11000.00	e	NO:3
Uranium-233/234	0.17	0.36	pCi/L	30-30	0.36		18.00	c	NO:3
Uranium-234	0.20	8.14	pCi/L	14-19	8.14	0.792	18.00	c	NO:3
Uranium-235	0.10	2.30	pCi/L	23-43	2.30	0.814	17.00	c	NO:3
Uranium-238	0.13	8.25	pCi/L	41-48	8.25	0.688	0.56	c, f	YES

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

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

Table 6 Final Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Exposure Point Concentration Compared to Background Values)

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

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

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

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Concentration Used for Screening and Risk	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV	Initial COPC
Inorganics									
Aluminum	67.91	148.00	ug/L	7-29	148.00	37.523	10000.00	a,d	NO:3
Antimony	2.8	40.20	ug/L	5-29	40.20	0.578	4.10	a	YES
Barium	75	115.00	ug/L	27-29	115.00	310.209	720.00	a	NO:2,3
Cadmium	4.6	7.70	ug/L	6-32	7.70		5.10	a	YES
Calcium	94300	126000.00	ug/L	33-33	126000.00	111110.664			NO:4
Chromium (assume all is VI)	18.3	24.91	ug/L	6-32	24.91	6.076	31.00	b,d	NO:3
Copper	1.6	593.00	ug/L	22-32	593.00	1.167	410.00	a, d	YES
Iron	18.8	1890.00	ug/L	14-31	1890.00	4064.888			NO:2
Lead	3.4	40.00	ug/L	5-32	40.00	10.05			YES
Lithium	2.9	2.90	ug/L	4-10	2.90	55.7			NO:2
Magnesium	29100	39600.00	ug/L	32-32	39600.00	40428.111			NO:2
Manganese	2.8	224.00	ug/L	30-32	224.00	229.568	51.00	a	NO:2
Molybdenum	1.6	2.70	ug/L	5-10	2.70	5.597			NO:2
Nickel	2.1	27.10	ug/L	5-32	27.10	34.957	200.00	a	NO:2,3
Potassium	2390	3761.00	ug/L	27-33	3761.00	4461.063			NO:2
Selenium	1.5	1.50	ug/L	1-32	1.50				NO:1
Silver	16.9	24.20	ug/L	6-29	24.20		51.00	a	NO:3
Sodium	46600	84200.00	ug/L	32-32	84200.00	62425.563			NO:4
Thallium	2.4	2.40	ug/L	1-29	2.40				NO:1
Tin	8.7	8.70	ug/L	1-10	8.70	34.382			NO:2
Vanadium	3.9	14.60	ug/L	12-29	14.60	17.1	72.00	a	NO:2,3
Zinc	4.5	57.70	ug/L	10-32	57.70	119.6	3100.00	a	NO:2,3
Volatile Organic Compounds									
1,1,1-Trichloroethane	0.30	3.30	ug/L	79-193	3.30	0.668	360.00	a, d	NO:3
1,1,2 Trichloro-1,2,2-trifluoroethane	2.00	34.00	ug/L	13-18	34.00		310000.00	a, d	NO:3
1,1-Dichloroethane	2.50	3.50	ug/L	2-191	3.50		1000.00	a	NO:1
1,1-Dichloroethene	1.70	1.70	ug/L	1-193	1.70				NO:1
cis-1,2-Dichloroethene	0.47	4.00	ug/L	103-159	4.00	0.999	100.00	a, d	NO:3
trans-1,2-Dichloroethene	0.50	3.00	ug/L	8-195	3.00		200.00	a	NO:1
cis-1,3-Dichloropropene	0.50	1.20	ug/L	2-195	1.20				NO:1
2-Butanone	7.00	41.00	ug/L	3-12	41.00		6100.00	a	NO:3
Acetone	1.00	12.00	ug/L	6-12	12.00		1000.00	a	NO:3
Bromodichloromethane	2.20	3.70	ug/L	2-193	3.70		4.60	c	NO:1
Chloroform	0.50	5.40	ug/L	9-197	5.40	0.516	36.00	c	NO:1
Dichloromethane	3.00	13.00	ug/L	8-195	13.00		38.00	c	NO:1
Ethylbenzene	0.50	0.60	ug/L	2-197	0.60		1000.00	a	NO:1
Tetrachloroethene	0.15	2.20	ug/L	109-196	2.20		100.00	a	NO:3
Toluene	0.60	1.50	ug/L	4-197	1.50		2000.00	a	NO:1
Trichloroethene	0.47	5.90	ug/L	176-197	5.90		26.00	c	NO:3
Trichlorofluoromethane	2.20	2.50	ug/L	2-188	2.50		3100.00	a	NO:1
Xylenes, Total	0.60	3.60	ug/L	8-190	3.60		20000.00	a	NO:1

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

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Concentration Used for Screening and Risk	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV	Initial COPC
Radionuclides									
Actinium-227	0.50	0.50	pCi/L	1-10	0.50		0.26	c	YES
Americium-241	0.03	0.03	pCi/L	1-9	0.03	0.139	0.49	c	NO:2,3
Bismuth-210	0.11	0.39	pCi/L	2-19	0.39		22.00	c,d	NO:3
Plutonium-238	0.01	0.25	pCi/L	8-48	0.25	0.087	0.54	c	NO:3
Plutonium-239/240	0.00	2.00	pCi/L	6-20	2.00	0.125	0.51	c	YES
Radium-226	0.10	0.52	pCi/L	6-19	0.52	0.996	0.54	c	NO:2,3
Strontium-85	25.00	25.00	pCi/L	1-2	25.00		110.00	c,d	NO:3
Strontium-90	0.50	0.50	pCi/L	3-19	0.50	0.975	2.90	c	NO:2,3
Thorium-227	0.01	0.10	pCi/L	8-14	0.10		4.00	c,d	NO:3
Thorium-228	0.01	2.17	pCi/L	14-35	2.17	0.779	0.69	c,d	YES
Thorium-230	0.01	1.99	pCi/L	11-32	1.99			e	YES
Thorium-232	0.00	0.10	pCi/L	8-33	0.10	0.314	0.31	c,d	NO:2,3
Tritium	110.00	7200.00	pCi/L	112-128	7200.00	1485.47	2200.00	c	YES
Uranium-233/234	0.17	0.36	pCi/L	30-30	0.36		3.60	c	NO:3
Uranium-234	0.20	8.14	pCi/L	14-19	8.14	0.792	3.60	c	YES
Uranium-235	0.10	2.30	pCi/L	23-43	2.30	0.814	3.40	c	NO:3
Uranium-238	0.13	8.25	pCi/L	41-48	8.25	0.688	0.11	c,d	YES

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

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

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

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

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

Table 9 Initial Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Maximum Detected Concentration Compared to Background and Risk-Based Guideline Values)

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Construction Worker Risk-Based GV	Reference	COPC?
Inorganics										
Aluminum	20.1	31500.00	ug/L	107/ 115	6840.00	31500.00	37.523	10000.00	a, d	YES
Ammonia**	110	37500.00	ug/L	34/ 61	403.00	37500.00	162			NO:5
Antimony	0.35	41.60	ug/L	21/ 122	2.82	41.60	0.578	4.10	a	YES
Arsenic**	0.3	933.00	ug/L	26/ 114	11.80	933.00	32.997	3.10	a	YES
Barium	17.5	329.00	ug/L	112/ 114	130.00	329.00	310.209	710.00	a	NO:3
Beryllium**	0.03	2.30	ug/L	41/ 115	0.47	2.30		0.07	c	YES
Bismuth**	0.9	264.00	ug/L	23/ 103	23.20	264.00				YES
Boron**	110	110.00	ug/L	1/ 2	NC	110.00		900.00	a, d	NO:3
Cadmium	0.14	13.10	ug/L	11/ 124	0.75	13.10		5.10	a	YES
Calcium	116	1510000.00	ug/L	164/ 164	199000.00	1510000.00	111110.664			NO:4
Chloride**	8100	17700000.00	ug/L	74/ 74	908000.00	17700000.00	105821			NO:5
Chromium*	0.27	44800.00	ug/L	78/ 120	5010.00	44800.00	6.076	30.00	a, d	YES
Cobalt**	0.31	295.00	ug/L	46/ 115	18.50	295.00	1.032	600.00	a, d	NO:3
Copper	0.38	514.00	ug/L	81/ 117	26.80	514.00	1.167	400.00	a, d	YES
Cyanide**	5.5	14.20	ug/L	3/ 45	4790.00	14.20		200.00	a	NO:3
Dissolved Solids	499000	32500000.00	ug/L	47/ 47	2480.00	32500000.00				NO:4
Fluoride**	150	2400.00	ug/L	57/ 58	678.00	2400.00	419			NO:5
Iron	0.154	192000.00	ug/L	151/ 165	45400.00	192000.00	4064.888			NO:5
Lead**	0.4	32.00	ug/L	55/ 125	4.90	32.00	10.05			YES
Lithium	8.8	4280.00	ug/L	87/ 102	123.00	4280.00	55.7			YES
Magnesium	26.9	719000.00	ug/L	165/ 165	77500.00	719000.00	40428.111			NO:4
Manganese	0.037	3030.00	ug/L	155/ 165	737.00	3030.00	229.568	51.00	a	YES
Mercury**	0 1	1.40	ug/L	3/ 115	0.06	1.40		3.10	a	NO:1
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	474.00	5.597	50.00	a, d	YES
Nickel	1.2	11600 00	ug/L	82/ 120	749.00	11600.00	34 957	200.00	a	YES
Phosphate**	60	10100.00	ug/L	31/ 41	792.00	10100.00	231			NO:5
Potassium	2.12	214000.00	ug/L	150/ 164	15200.00	214000.00	4461.063			NO:4
Selenium	1.3	7.00	ug/L	10/ 112	1.78	7.00		50.00	a, d	NO:3
Silicon**	2230	12300 00	ug/L	6/ 6	NC	12300.00				NO:4
Silver	0.72	29.40	ug/L	7/ 115	1.24	29.40		51.00	a	NO:3
Sodium	68.2	7270000.00	ug/L	162/ 162	346000.00	7270000.00	62425.563			NO:4
Sulfate	5000	456000.00	ug/L	73/ 76	205.00	456000.00				NO:4
Thallium	3.1	6.90	ug/L	6/ 107	4.44	6.90		0.80	a,d	YES
Tin	1.4	357.20	ug/L	27/ 100	14.90	357.20	34.382	6000.00	a, d	NO:3
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	277.00	17.1	71.00	a	YES
Zinc	1.4	399.00	ug/L	78/ 117	47.10	399.00	119.6	3100.00	a	NO:3

Table 9 Initial Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario
(Maximum Detected Concentration Compared to Background and Risk-Based Guideline Values)

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Construction Worker Risk-Based GV	Reference	COPC?
Organic Compounds										
1,1,1-Trichloroethane	0.40	7.00	ug/L	20/ 238	0.67	7.00	0.668	180.00	a,d	NO:3
1,1,2 Trichloro-1,2,2-trifluoroethane	2.20	2.20	ug/L	1/ 118	1.08	2.20		250000.00	a,d	NO:1
1,1-Dichloroethane^^	2.00	2.00	ug/L	1/ 238	0.75	2.00		950.00	a	YES
cis-1,2-Dichloroethene	0.06	17.00	ug/L	48/148	1.61	17.00	0.999	100.00	a,d	NO:3
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	35.00				YES
trans-1,2-Dichloroethene	0.43	10.00	ug/L	13/217	0.76	10.00		200.00	b	NO:3
1,3-Dichlorobenzene**	1.50	1.50	ug/L	1/ 147	3.92	1.50				NO:1
2-Butanone	3.00	65.00	ug/L	14/ 106	6.48	65.00		5300.00	a	NO:3
4-Methylphenol	12.00	61.00	ug/L	2/ 71	6.05	61.00		48.00	a	NO:1
Acetone	1.00	17.00	ug/L	25/ 81	9.19	17.00		1000.00	a	NO:3
Alpha Chlordane**	0.01	0.069	ug/L	3/ 62	0.11	0.07				NO:1
Benzene**	2.50	2.50	ug/L	1/ 241	1.26	2.50		7.50	c	NO:1
Benzoic Acid**	1.00	890.00	ug/L	2/ 68	35.70	890.00		40000.00	a	NO:1
Bis(2-ethylhexyl)phthalate**	0.50	950.00	ug/L	16/ 72	17.20	950.00	8.41	12.00	c	NO:6
Carbon Tetrachloride**	1.50	1.50	ug/L	1/ 238	0.94	1.50		2.00	c	NO:1
Chloroform	0.50	0.70	ug/L	2/ 239	0.65	0.70	0.516	24.00	c	NO:1
Chloromethane**	3.40	3.40	ug/L	1/ 85	4.12	3.40				NO:1
Dibromomethane**	2.80	2.80	ug/L	1/ 182	1.01	2.80				NO:1
Dichloromethane	1.00	610.00	ug/L	41/ 239	3.28	610.00		38.00	c	YES
Di-n-butyl Phthalate**	0.50	3.00	ug/L	5/ 71	5.80	3.00		410.00	a	NO:6
Tetrachloroethene**	0.30	25.00	ug/L	55/ 247	3.37	25.00		12.00	a	YES
Toluene	0.50	8.00	ug/L	13/ 243	1.27	8.00		150.00	a	NO:3
Trichloroethene	0.44	46.00	ug/L	152/ 273	5.12	46.00		15.00	c	YES
Radionuclides										
Americium-241	0.6750	0.17	pCi/L	6/ 43	2.87	0.17	0.139	2.40	d	NO:3
Bismuth-210	0.12	0.26	pCi/L	2/ 55	7.99	0.26		110.00	d,e	NO:1
Gross Alpha**	1.03	1930.00	pCi/L	8/ 12	NC	1930.00				NO:4
Plutonium-238	0.012	1.870	pCi/L	8/ 60	0.15	1.87	0.087	2.70	d	NO:3
Plutonium-239/240	0.003	0.18	pCi/L	12/ 51	0.42	0.18	0.125	2.50	d	NO:3
Potassium-40**	129.000	258.00	pCi/L	3/ 61	133.00	258.00				NO:1
Radium-226	0.1260	39.47	pCi/L	43/ 59	2.34	39.47	0.996	2.70	d	YES
Radium-228+D**	1.50	1.50	pCi/L	1/ 1	NC	1.50		0.60	d,e	YES
Strontium-90	0.74	42.40	pCi/L	7/ 57	2.22	42.40	0.975	14.00	d	YES
Thorium-228 + D	0.02	8.50	pCi/L	39/ 54	90.70	8.50	0.779	3.50	d	YES
Thorium-230	0.0044	4.07	pCi/L	43/ 56	0.57	4.07				YES
Thorium-232 + D	0.0005	2.11	pCi/L	31/ 63	0.78	2.11	0.314	1.60	d,e	YES
Tritium	2.95	2816310.00	pCi/L	4440/4455	206000.00	2816310.00	1485.47	11000.00	c	YES
Uranium-233/234	0.154	0.928	pCi/L	4/ 4	NC	0.93		18.00	d	NO:3
Uranium-234	0.03	59.10	pCi/L	60/ 69	2.12	59.10	0.792	18.00	d	YES
Uranium-235	0.01	0.36	pCi/L	18/ 45	5.71	0.36	0.814	17.00	d	NO:2,3
Uranium-235/236**	0.04	0.05	pCi/L	2/ 26	0.10	0.05		17.00	d	NO:3
Uranium-238 + D	0.03	1.34	pCi/L	57/ 75	0.51	1.34	0.688	0.60	d,e	YES

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

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

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

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	COPC?
Inorganics								
Aluminum	20.1	31500.00	ug/L	107/ 115	6840.00	6840.00	37.523	YES
Antimony	0.35	41.60	ug/L	21/ 122	2.82	2.82	0.578	YES
Arsenic**	0.3	933.00	ug/L	26/ 114	11.80	11.80	32.997	NO
Beryllium**	0.03	2.30	ug/L	41/ 115	0.47	0.47		YES
Bismuth**	0.9	264.00	ug/L	23/ 103	23.20	23.20		YES
Cadmium	0.14	13.10	ug/L	11/ 124	0.75	0.75		YES
Chromium*	0.27	44800.00	ug/L	78/ 120	5010.00	5010.00	6.076	YES
Copper	0.38	514.00	ug/L	81/ 117	26.80	26.80	1.167	YES
Lead**	0.4	32.00	ug/L	55/ 125	4.90	4.90	10.05	NO
Lithium	8.8	4280.00	ug/L	87/ 102	123.00	123.00	55.7	YES
Manganese [a]	0.037	3030.00	ug/L	155/ 165	737.00	737.00	229.568	NO
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	32.50	5.597	YES
Nickel	1.2	11600.00	ug/L	82/ 120	749.00	749.00	34.957	YES
Thallium	3.1	6.90	ug/L	6/ 107	4.44	4.44		YES
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	33.00	17.1	YES
Organic Compounds								
1,1-Dichloroethane^^	2.00	2.00	ug/L	1/ 238	0.75	0.75		NO:1
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	6.61		YES
Dichloromethane	1.00	610.00	ug/L	41/ 239	3.28	3.28		YES
Tetrachloroethene**	0.30	25.00	ug/L	55/ 247	3.37	3.37		YES
Trichloroethene	0.44	46.00	ug/L	152/ 273	5.12	5.12		YES
Radionuclides								
Radium-226	0.1260	39.47	pCi/L	43/ 59	2.34	2.34	0.996	YES
Radium-228+D**	**1.50**	**1.50**	**pCi/L**	**1/ 1**	**NC**	**1.50**		**YES**
Strontium-90	0.74	42.40	pCi/L	7/ 57	2.22	2.22	0.975	YES
Thorium-228 + D	0.02	8.50	pCi/L	39/ 54	90.70	8.50	0.779	YES
Thorium-230	0.0044	4.07	pCi/L	43/ 56	0.57	0.57		YES
Thorium-232 + D [a]	0.0005	2.11	pCi/L	31/ 63	0.78	0.78	0.314	NO
Tritium	2.95	2816310.00	pCi/L	4440/4455	206000.00	206000.00	1485.47	YES
Uranium-234	0.03	59.10	pCi/L	60/ 69	2.12	2.12	0.792	YES
Uranium-238 + D	0.03	1.34	pCi/L	57/ 75	0.51	0.51	0.688	NO

a= Flow tube modeled manganese (179.2 ug/L) and thorium-232 (0.1747pCi/L) concentrations were below backgroud values and are screened out of the RRE
COPC= Constituent of Potential Concern
UCL= Upper Confidence Limit
* = Chromium conservatively assumed to be present in the hexavalent state.
** = Constituent detected in bedrock well, but not in production well
^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production wells analyses

Table 11 Initial Identification of Future Groundwater Constituents of Potential Concern for the Site Employee Scenario
(Maximum Detected Concentration Compared to Background and Risk-Based Guideline Values)

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV	COPC?
Inorganics										
Aluminum	20.1	31500.00	ug/L	107/ 115	6840.00	31500.00	37.523	10000.00	a,d	YES
*Ammonia***	110	37500.00	ug/L	34/ 61	4030.00	37500.00	162			NO:5
Antimony	0.35	41.60	ug/L	21/ 122	2.82	41.60	0.578	4.10	a	YES
Arsenic**	0.3	933.00	ug/L	26/ 114	11.80	933.00	37.295	3.10	a	YES
Barium	17.5	329.00	ug/L	112/ 114	130.00	329.00	310.209	720.00	a	NO:3
Beryllium**	0.03	2.30	ug/L	41/ 115	0.47	2.30		0.07	c	YES
Bismuth**	0.9	264.00	ug/L	23/ 103	23.20	264.00				YES
Boron**	110	110.00	ug/L	1/ 2	NC	110.00		920.00	a,d	NO:3
Cadmium	0.14	13.10	ug/L	11/ 124	0.75	13.10		5.10	a	YES
Calcium	116	1510000.00	ug/L	164/ 164	199000.00	1510000.00	111110.664			NO:4
Chloride**	8100	17700000.00	ug/L	74/ 74	908000.00	17700000.00	105821			NO:5
Chromium*	0.27	44800.00	ug/L	78/ 120	5010.00	44800.00	6.076	31.00	a,d	YES
Cobalt**	0.31	295.00	ug/L	46/ 115	18.50	295.00	1.032	610.00	a,d	NO:3
Copper	0.38	514.00	ug/L	81/ 117	26.80	514.00	1.167	410.00	a,d	YES
Cyanide**	5.5	14.20	ug/L	3/ 45	4.79	14.20		200.00	a	NO:3
Dissolved Solids	499000	32500000.00	ug/L	47/ 47	2480.00	32500000.00				NO:5
Fluoride**	150	2400.00	ug/L	57/ 58	678.00	2400.00	419			NO:5
Iron	0.154	192000.00	ug/L	151/ 165	45400.00	192000.00	4064.888			NO:4
Lead**	0.4	32.00	ug/L	55/ 125	4.90	32.00	10.05			YES
Lithium	8.8	4280.00	ug/L	87/ 102	123.00	4280.00	55.7			YES
Magnesium	26.9	719000.00	ug/L	165/ 165	77500.00	719000.00	40428.111			NO:4
Manganese	0.037	3030.00	ug/L	155/ 165	737.00	3030.00	229.568	51.00	a	YES
Mercury**	0.1	1.40	ug/L	3/ 115	0.06	1.40	na	3.10	a	NO:1
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	474.00	5.597	51.00	a,d	YES
Nickel	1.2	11600.00	ug/L	82/ 120	749.00	11600.00	34.957	200.00	a	YES
Phosphate**	60	10100.00	ug/L	31/ 41	792.00	10100.00	231			NO:5
Potassium	2.12	214000.00	ug/L	150/ 164	15200.00	214000.00	4461.063			NO:4
Selenium	1.3	7.00	ug/L	10/ 112	1.78	7.00		51.00	a,d	NO:3
Silicon**	2230	12300.00	ug/L	6/ 6	NC	12300.00				NO:4
Silver	0.72	29.40	ug/L	7/ 115	1.24	29.40		51.00	a	NO:3
Sodium	68.2	7270000.00	ug/L	162/ 162	346000.00	7270000.00	62425.563			NO:4
Sulfate	5000	456000.00	ug/L	73/ 76	205.00	456000.00		0.82	a	NO:5
Thallium	3.1	6.90	ug/L	6/ 107	4.44	6.90				YES
Tin	1.4	357.20	ug/L	27/ 100	14.90	357.20	34.382	6100.00	a,d	NO:3
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	277.00	17.1	72.00	a	YES
Zinc	1.4	399.00	ug/L	78/ 117	47.10	399.00	119.6	3100.00	a	NO:3

Table 11 Initial Identification of Future Groundwater Constituents of Potential Concern for the Site Employee Scenario
(Maximum Detected Concentration Compared to Background and Risk-Based Guideline Values)

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	Site Employee Risk-Based GV	Reference Risk-Based GV	COPC?
Organic Compounds										
1,1,1-Trichloroethane	0.40	7.00	ug/L	20/ 238	0 67	7.00	0.668	360.00	a,d	NO:3
1,1,2 Trichloro-1,2,2-trifluoroethane	2.20	2.20	ug/L	1/ 118	1.08	2.20				NO:1
1,1-Dichloroethane^^	2.00	2.00	ug/L	1/ 238	0.75	2.00		1000.00	a	NO:1
cis-1,2-Dichloroethene	0.06	17.00	ug/L	48/148	1.61	17.00	0.999	100.00	a,c	NO:3
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	35.00				YES
trans-1,2-Dichloroethene	0.43	10.00	ug/L	13/217	0.76	10.00		200.00	a	NO:3
1,3-Dichlorobenzene**	1.50	1.50	ug/L	1/ 147	3.92	1.50				NO:1
2-Butanone	3.00	65.00	ug/L	14/ 106	6.48	65.00		6100.00	a	NO:3
4-Methylphenol	12.00	61.00	ug/L	2/ 71	6.05	61.00		1000000	a	NO:1
Acetone	1.00	17.00	ug/L	25/ 81	9.19	17.00		1000.00	a	NO:3
Alpha Chlordane**	0.01	0.069	ug/L	3/ 62	0.11	0.07				NO:1
Benzene**	2.50	2.50	ug/L	1/ 241	1.26	2.50		9.90	c	NO:1
Benzoic Acid**	1.00	890.00	ug/L	2/ 68	35.70	890.00		8.20E+08	a	NO:1
Bis(2-ethylhexyl)phthalate**	0.50	950.00	ug/L	16/ 72	17.20	950.00	8.41	20.00	c	NO:6
Carbon Tetrachloride**	1.50	1.50	ug/L	1/ 238	0.94	1 50		2.20	c	NO:1
Chloroform	0.50	0.70	ug/L	2/ 239	0.65	0.70	0.516	47.00	c	NO:1
Chloromethane**	3.40	3.40	ug/L	1/ 85	4.12	3.40				NO:1
Dibromomethane**	2.80	2.80	ug/L	1/ 182	1.01	2.80				NO:1
Dichloromethane	1.00	610.00	ug/L	41/ 239	3.28	610.00		38.00	c	YES
Di-n-butyl Phthalate**	0.50	3 00	ug/L	5/ 71	5.80	3.00		1000.00	a	NO:3
Tetrachloroethene**	0.30	25 00	ug/L	55/ 247	3.37	25.00		100.00	a	NO:3
Toluene	0.50	8 00	ug/L	13/ 243	1.27	8.00		2000.00	a	NO:3
Trichloroethene	0.44	46.00	ug/L	152/ 273	5.12	46.00		26.00	c	YES
Radionuclides										
Americium-241	0.6750	0.17	pCi/L	6/ 43	2.87	0.17	0.139	0.49	c	NO:3
Bismuth-210	0.12	0.26	pCi/L	2/ 55	7.99	0.26				NO:1
Gross Alpha**	1.03	1930.00	pCi/L	8/ 12	NC	1930.00				NO:5
Plutonium-238	0.012	1.870	pCi/L	8/ 60	0.15	1.87	0.087	0.54	c	YES
Plutonium-239/240	0.003	0.18	pCi/L	12/ 51	0.42	0.18	0.125	0.51	c	NO:3
Potassium-40**	129.000	258.00	pCi/L	3/ 61	133.00	258.00				YES:2
Radium-226	0.1260	39.47	pCi/L	43/ 59	2.34	39.47	0.996	0.54	c	YES
Radium-228**	1.50	1.50	pCi/L	1/ 1	NC	1.50		0.33	c,d	YES
Strontium-90	0.74	42.40	pCi/L	7/ 57	2.22	42.40	0.975	2.90	c	YES
Thorium-228 + D	0.02	8.50	pCi/L	39/ 54	90.70	8.50	0.779	0.69	c	YES
Thorium-230	0.0044	4.07	pCi/L	43/ 56	0.57	4.07				YES
Thorium-232 + D	0.0005	2.11	pCi/L	31/ 63	0.78	2.11	0.314	0.31	c,d	YES
Tritium	2.95	2816310.00	pCi/L	4440/4455	206000.00	2816310.00	1485.47	2200.00	c	YES
Uranium-233/234	0.154	0.928	pCi/L	4/ 4	NC	0.93		3.60	c	NO:3
Uranium-234	0.03	59.10	pCi/L	60/ 69	2.12	59.10	0.792	3.60	c	YES
Uranium-235	0.01	0.36	pCi/L	18/ 45	5.71	0.36	0.814	3.40	c	NO:2,3
Uranium-235/236**	0.04	0.05	pCi/L	2/ 26	0 10	0.05		3.40	c	NO:3
Uranium-238 + D	0.03	1.34	pCi/L	57/ 75	0.51	1.34	0.688	0.11	c,d	YES

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

NO:1 - <5% Detects
NO:2 - <Background Value
NO:3 - < Risk-Based Guideline Value
NO:2,3 - <Background and Risk-Based Guideline Value
NO:4 - Essential Nutrient
NO:5 - General Water Quality Parameter
YES:2 - COPC in current groundwater, therefore, COPC in future groundwater
COPC= Constituent of Potential Concern

GV= Guideline Value

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

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value	COPC?
Inorganics								
Aluminum	20 1	31500.00	ug/L	107/ 115	6840.00	6840.00	37.523	YES
Antimony	0 35	41.60	ug/L	21/ 122	2.82	2.82	0.578	YES
Arsenic**	0.3	933.00	ug/L	26/ 114	11.80	11.80	32.997	NO
Beryllium**	0.03	2.30	ug/L	41/ 115	0.47	0.47		YES
Bismuth**	0.9	264.00	ug/L	23/ 103	23.20	23.20		YES
Cadmium	0.14	13.10	ug/L	11/ 124	0.75	0.75		YES
Chromium*	0.27	44800.00	ug/L	78/ 120	5010.00	5010.00	6.076	YES
Copper	0.38	514.00	ug/L	81/ 117	26.80	26.80	1.167	YES
Lead**	0.4	32.00	ug/L	55/ 125	4.90	4.90	10.05	NO
Lithium	8.8	4280.00	ug/L	87/ 102	123.00	123.00	55.7	YES
Manganese [a]	0.037	3030.00	ug/L	155/ 165	737.00	737.00	229.568	NO
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	32.50	5.597	YES
Nickel	1.2	11600.00	ug/L	82/ 120	749.00	749.00	34.957	YES
Thallium	3.1	6.90	ug/L	6/ 107	4.44	4.44		YES
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	33.00	17.1	YES
Organic Compounds								
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	6.61		YES
Dichloromethane	1.00	610.00	ug/L	41/ 239	3.28	3.28		YES
Trichloroethene	0.44	46.00	ug/L	152/ 273	5.12	5.12		YES
Radionuclides								
Plutonium-238	0.012	1 870	pCi/L	8/ 60	0.15	0 15	0.087	YES
Plutonium-239/240	0.003	0.18	pCi/L	12/ 51	0.42	0.18	0.125	YES:2
Radium-226	0.1260	39.47	pCi/L	43/ 59	2.34	2.34	0.996	YES
Radium-228**	1.50	1.50	pCi/L	1/ 1	NC	1.50		YES
Strontium-90	0.74	42.40	pCi/L	7/ 57	2.22	2.22	0.975	YES
Thorium-228 + D	0.02	8.50	pCi/L	39/ 54	90.70	8.50	0.779	YES
Thorium-230	0.0044	4.07	pCi/L	43/ 56	0.57	0.57		YES
Thorium-232 + D[a]	0.0005	2.11	pCi/L	31/ 63	0.78	0.78	0.314	NO
Tritium	2.95	2816310.00	pCi/L	4440/4455	206000.00	206000.00	1485.47	YES
Uranium-234	0.03	59.10	pCi/L	60/ 69	2.12	2.12	0.792	YES
Uranium-238 + D	0.03	1.34	pCi/L	57/ 75	0.51	0.51	0.688	NO

COPC= Constituent of Potential Concern
NC= 95% UCL not calculated, less than 20 samples in the data set
UCL= Upper confidence Limit
a= Flow tube modeled manganese (179.2 ug/L) and thorium-232 (0.1747pCi/L) concentrations were below backgroud values and are screened out of the RRE.
* = Chromium conservatively assumed to be present in the hexavalent state
** = Constituent detected in bedrock well, but not in production well
^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production wells analyses
YES:2 - Current groundwater COPC, therefore, future groundwater COPC

Table 14: Toxicity Criteria and other Physical Chemical Values (Supporting Tables 15-32)

Constituent	RfD (mg/kg/day) Oral RfDo		Adjusted RfDa	Inhalation RfDi		CSF (kg-day/mg) Oral CSFo		Adjusted CSFa	Inhalation CSFi		CSFex		GI Factor		Kp(cm/hr)	T (hr)	
VOCs																	
1,2-Dichloroethene	9.00E-03	b	9.00E-03	NA		NA		NA	NA		NA		1	d	1.00E-02	3.40E-01	e
Dichloromethane	6.00E-02	b	3.00E-02	8.60E-01	c	7.50E-03	b	1.50E-02	1.60E-03	c	NA		0.5	d	4.50E-03	6.90E-01	e
Tetrachloroethene	1.00E-02	b	5.00E-03	1.10E-01	a	5.20E-02	a	1.04E-01	2.00E-03	a	NA		0.5	d	4.80E-02	4.30E+00	e
Trichloroethene	6.00E-03		3.00E-03	6.00E-03		1.10E-02	a	2.20E-02	6.00E-03	a	NA		0.5	d	1.60E-02	1.30E+00	e
Metals																	
Aluminum	1.00E+00	a	NA	1.40E-03	a	NA		NA	NA		NA			d	1.00E-03		e
Antimony	4.00E-04	b	6.00E-05	NA		NA		NA	NA		NA		0.15	d	1.00E-03		e
Beryllium	2.00E-03	b	2.00E-05	5.71E-06	b	NA	b	NA	8.40E+00	b	NA		0.01	d	1.00E-03		e
Bismuth	NA		NA	NA		NA		NA	NA		NA				1.00E-03		e
Cadmium	5.00E-04	b	5.00E-06	NA	a	NA		NA	6.30E+00	b	NA		0.01	d	1.00E-03		e
Chromium VI	3.00E-03	b	7.50E-05	NA		NA		NA	2.90E+02	c	NA		0.025	d	1.00E-03		e
Copper	3.71E-02	c	NA	NA		NA		NA	NA		NA		NA	d	1.00E-03		e
Lithium	2.00E-03		NA	NA		NA		NA	NA		NA		NA		1.00E-03		e
Molybdenum	5.00E-03	c	NA	NA		NA		NA	NA		NA		NA	d	1.00E-03		e
Nickel	2.00E-02	b	8.00E-04	NA		NA		NA	NA		NA		0.04	d	1.00E-03		e
Thallium	8.00E-05	b	8.00E-05	NA		NA		NA	NA		NA		1	d	1.00E-03		e
Vanadium	7.00E-03	c	1.82E-04	NA		NA		NA	NA		NA		0.026	d	0.001		e
Radionuclides																	
Soil																	
Actinium-227+D	NA		NA	NA		1.16E-09	c	NAP	2.09E-07	c	1.47E-06	c	NA*		NA		
Plutonium-238	NA		NA	NA		2.72E-10	c	NAP	3.36E-08	c	7.22E-11	c	NA*		NA		
Water																	
Actinium-227+D	NA		NA	NA		4.86E-10	c	NAP	NAP		NAP		NA*		NA		
Plutonium-238	NA		NA	NA		1.31E-10	c	NAP	NAP		NAP		NA*		NA		
Plutonium-239/240	NA		NA	NA		1.35E-10	c	NAP	NAP		NAP		NA*		NA		
Radium-226+D	NA		NA	NA		3.86E-10	c	NAP	NAP		NAP		NA*		NA		
Radium-228+D	NA		NA	NA		1.34E-09	c	NAP	NAP		NAP						
Strontium-90	NA		NA	NA		5.59E-11	c	NAP	NAP		NAP						
Thorium-228+D	NA		NA	NA		3.00E-10	c	NAP	NAP		NAP		NA*		NA		
Thorium-230+D	NA		NA	NA		1.75E-09	c	NAP	NAP		NAP		NA*		NA		
Tritium	NA		NA	NA		5.07E-14	c	5.07E-14	5.62E-14	c	0.00E+00	c	1.00E+00	c	1.50E-05		
Uranium-234	NA		NA	NA		7.07E-11	c	NAP	NAP		NAP		NA*		NA		

NA= Not Available
NAP= Not Applicable Pathway
a=NCEA
b= IRIS
c=HEAST
d= GI values compiled by ORNL, DOE-OR/ERD site and presented on RAIS web page.
e=Dermal Exposure Assessment Principles and Applications, 1992, EPA/600/8-91/011B for Kp and lag time
NA* HEAST does not recommend adjusting CSFo for dermal

Table 15: Total Residual Soil Risk for a Construction Worker in Parcel 3

Constituent	EPC pCi/g	CANCER EFFECTS: Route-Specific Risk: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Cancer Risk Total	NON-CANCER EFFECTS: Route-Specific HQ: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Non-Cancer HI Total
Radionuclides													
Actinium-227+D	0.19	1.3E-07	NA	2.3E-10	NAP	2.9E-07	**4.2E-07**	NA	NA	NA	NAP	NA	NA
Plutonium-238	34.8	5.7E-06	NA	6.8E-09	NAP	2.6E-09	**5.7E-06**	NA	NA	NA	NAP	NA	NA
TOTAL		5.8E-06	NA	7.1E-09	NA	2.9E-07	**6.1E-06**	NA	NA	NA	NA	NA	NA

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/g: picocuries per gram
VOCs: volatile organic compounds
bold: Estimates that exceed acceptable thresholds

Table 16: Background Residual Soil Risk for a Construction Worker in Parcel 3

Constituent	EPC pCi/g	CANCER EFFECTS: Route-Specific Risk: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Cancer Risk Total	NON-CANCER EFFECTS: Route-Specific HQ: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Non-Cancer HI Total
Radionuclides													
Actinium-227+D		0.0E+00	NA	0.0E+00	NAP	0.0E+00	**0.0E+00**	NA	NA	NA	NAP	NA	NA
Plutonium-238	0.13	2.1E-08	NA	2.6E-11	NAP	9.6E-12	2.1E-08	NA	NA	NA	NAP	NA	NA
TOTAL		2.1E-08	NA	2.6E-11	NA	9.6E-12	2.1E-08	NA	NA	NA	NA	NA	NA

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/g: picocuries per gram
VOCs: volatile organic compounds

Table 17: Incremental Residual Soil Risk for Construction Worker in Parcel 3

Constituent	EPC pCi/g	CANCER EFFECTS: Route-Specific Risk: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Cancer Risk Total	NON-CANCER EFFECTS: Route-Specific HQ: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Non-Cancer HI Total
Radionuclides													
Actinium-227+D	**0.19**	1.3E-07	NA	2.3E-10	NAP	2.9E-07	**4.2E-07**	NA	NA	NA	NAP	NA	NA
Plutonium-238	34.67	5.7E-06	NA	6.8E-09	NAP	2.6E-09	**5.7E-06**	NA	NA	NA	NAP	NA	NA
TOTAL		5.8E-06	NA	7.0E-09	NA	2.9E-07	**6.1E-06**	NA	NA	NA	NA	NA	NA

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/g: picocuries per gram
VOCs: volatile organic compounds
bold: Estimates that exceed acceptable thresholds

Table 18: Total Residual Soil Risk for a Site Employee in Parcel 3

Constituent	EPC pCi/g	CANCER EFFECTS: Route-Specific Risk: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Cancer Risk Total	NON-CANCER EFFECTS: Route-Specific HQ: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Non-Cancer HI Total
Radionuclides													
Plutonium-238	28.2	2.4E-06	NA	2.8E-08	NAP	2.8E-09	**2.4E-06**	NA	NA	NA	NAP	NA	NA
TOTAL		2.4E-06	NA	2.8E-08	NA	2.8E-09	**2.4E-06**	NA	NA	NA	NA	NA	NA

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/g: picocuries per gram
VOCs: volatile organic compounds
bold: Estimates that exceed acceptable thresholds

Table 19: Background Residual Soil Risk for a Site Employee in Parcel 3

Constituent	EPC pCi/g	CANCER EFFECTS: Route-Specific Risk: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Cancer Risk Total	NON-CANCER EFFECTS: Route-Specific HQ: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Non-Cancer HI Total
Radionuclides													
Plutonium-238	0.13	1.1E-07	NA	1.3E-10	NAP	1.1E-11	1.1E-07	NA	NA	NA	NAP	NA	NA
TOTAL		1.1E-07	NA	1.3E-10	NA	1.1E-11	1.1E-07	NA	NA	NA	NA	NA	NA

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/g: picocuries per gram
VOCs: volatile organic compounds

Table 20: Incremental Residual Soil Risk for Site Employee in Parcel 3

Constituent	EPC pCi/g	CANCER EFFECTS: Route-Specific Risk: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Cancer Risk Total	NON-CANCER EFFECTS: Route-Specific HQ: Oral	Dermal	Inhalation Dust	Inhalation VOCs	External	Non-Cancer HI Total
Radionuclides													
Plutonium-238	28.07	2.4E-06	NA	2.8E-08	NAP	2.3E-09	**2.4E-06**	NA	NA	NA	NAP	NA	NA
TOTAL		2.4E-06	NA	2.8E-08	NA	2.3E-09	**2.4E-06**	NA	NA	NA	NA	NA	NA

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/g: picocuries per gram
VOCs: volatile organic compounds
bold: Estimates that exceed acceptable thresholds

Table 21: Current Total Residual Groundwater Risk for the Construction Worker Scenario

Constituent	Total EPC	CANCER EFFECTS					NON-CANCER EFFECTS			
		Route-Specific Risk				Cancer Risk Total	Route-Specific HQ			Non-Cancer HI Total
		Oral	Dermal	Inhalation $VOC_{(shower)}$	External		Oral	Dermal	Inhalation VOCs	
Metals	**mg/L**									
Antimony	0.0402	NA	NA	NAP		NA	9.8E-01	1.6E-01	NAP	**1.1E+00**
Cadmium	0.00525	NA	NA	NAP		NA	1.0E-01	3.3E-02	NAP	1.4E-01
Copper	0.0227	NA	NA	NAP		NA	5.6E-03	6.0E-05	NAP	5.6E-03
Radionuclides	**pCi/L**									
Thorium-230	1.25	2.7E-06	NA	NAP		**2.7E-06**	NA	NA	NAP	NAP
TOTAL		**2.7E-06**	NA	NA		**2.7E-06**	**1.1E+00**	1.9E-01	NA	**1.3E+00**

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
mg/L: milligrams per liter
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/L: picocuries per liter
VOCs: volatile organic compounds
bold: Estimates that exceed acceptable thresholds

Table 22: Current Background Residual Groundwater Risk for the Construction Worker Scenario

Constituent	Total EPC	CANCER EFFECTS: Route-Specific Risk: Oral	Dermal	Inhalation $VOC_{(shower)}$	Cancer Risk Total	NON-CANCER EFFECTS: Route-Specific HQ: Oral	Dermal	Inhalation VOCs	Non-Cancer HI Total
Metals	**mg/L**								
Antimony	0.000578	NA	NA	NAP	NA	1.4E-02	2.3E-03	NAP	1.6E-02
Cadmium		NA	NA	NAP	NA	NA	NA	NAP	NA
Copper	0.001167	NA	NA	NAP	NA	2.9E-04	3.1E-06	NAP	2.9E-04
Radionuclides	**pCi/L**								
Thorium-230		NA	NA	NAP	NA	NA	NA	NAP	NAP
TOTAL		NA	NA	NA	NA	1.4E-02	2.3E-03	NA	1.7E-02

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
mg/L: milligrams per liter
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/L: picocuries per liter
VOCs: volatile organic compounds

Table 23: Current Incremental Residual Groundwater Risk for the Construction Worker Scenario

Constituent	Total EPC	CANCER EFFECTS: Route-Specific Risk: Oral	Dermal	Inhalation $VOC_{(shower)}$	Cancer Risk Total	NON-CANCER EFFECTS: Route-Specific HQ: Oral	Dermal	Inhalation VOCs	Non-Cancer HI Total
Metals	**mg/L**								
Antimony	0.039622	NA	NA	NAP	NA	9.7E-01	1.6E-01	NAP	**1.1E+00**
Cadmium	0.00525	NA	NA	NAP	NA	1.0E-01	3.3E-02	NAP	1.4E-01
Copper	0.021533	NA	NA	NAP	NA	5.3E-03	5.7E-05	NAP	5.3E-03
Radionuclides	**pCi/L**								
Thorium-230	1.25	2.7E-06	NA	NAP	**2.7E-06**	NA	NA	NAP	NAP
TOTAL		**2.7E-06**	NA	NAP	**2.7E-06**	**1.1E+00**	1.9E-01	NAP	**1.3E+00**

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
mg/L: milligrams per liter
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/L: picocuries per liter
VOCs: volatile organic compounds
bold: Estimates that exceed acceptable thresholds

Table 24: Current Total Residual Groundwater Risk for the Site Employee Scenario

Constituent	Total EPC	CANCER EFFECTS Route-Specific Risk Oral	CANCER EFFECTS Risk Total	NON-CANCER EFFECTS Route-Specific HQ Oral	NON-CANCER EFFECTS Non-Cancer HI Total
Metals	**mg/L**				
Antimony	0.0402	NA	NA	9.8E-01	**9.8E-01**
Cadmium	0.00525	NA	NA	1.0E-01	1.0E-01
Copper	0.0227	NA	NA	5.6E-03	5.6E-03
Radionuclides	**pCi/L**				
Actinium-227+D	0.5	1.5E-06	**1.5E-06**	NA	NA
Plutonium-239/240	2	1.7E-06	**1.7E-06**	NA	NA
Thorium-228+D	2.17	4.1E-06	**4.1E-06**	NA	NA
Thorium-230+D	1.25	1.4E-05	**1.4E-05**	NA	NA
Uranium-234	8.14	3.6E-06	**3.6E-06**	NA	NA
TOTAL		**2.5E-05**	**2.5E-05**	**1.1E+00**	**1.1E+00**

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
mg/L: milligrams per liter
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/L: picocuries per liter
VOCs: volatile organic compounds
bold: Estimates that exceed acceptable thresholds

Table 25: Current Background Residual Groundwater Risk for the Site Employee Scenario

Constituent	Total EPC	CANCER EFFECTS Route-Specific Risk Oral	CANCER EFFECTS Route-Specific Risk Risk Total	NON-CANCER EFFECTS Route-Specific HQ Oral	NON-CANCER EFFECTS Non-Cancer HI Total
Metals	**mg/L**				
Antimony	0.000578	NA	NA	1.4E-02	1.4E-02
Cadmium		NA	NA	NA	NA
Copper	0.001167	NA	NA	2.9E-04	2.9E-04
Radionuclides	**pCi/L**				
Actinium-227+D		NA	NA	NA	NA
Plutonium-239/240	0.125	1.1E-07	1.1E-07	NA	NA
Thorium-228+D	0.779	1.5E-06	**1.5E-06**	NA	NA
Thorium-230+D		NA	NA	NA	NA
Uranium-234	0.792	3.5E-07	3.5E-07	NA	NA
TOTAL		**1.9E-06**	**1.9E-06**	1.4E-02	1.4E-02

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
mg/L: milligrams per liter
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/L: picocuries per liter
VOCs: volatile organic compounds
bold: Estimates that exceed acceptable thresholds

Table 26: Current Incremental Residual Groundwater Risk for the Site Employee Scenario

Constituent	Total EPC	CANCER EFFECTS Route-Specific Risk Oral	CANCER EFFECTS Risk Total	NON-CANCER EFFECTS Route-Specific HQ Oral	NON-CANCER EFFECTS Non-Cancer HI Total
Metals	**mg/L**				
Antimony	0.039622	NA	NA	9.7E-01	**9.7E-01**
Cadmium	0.00525	NA	NA	1.0E-01	1.0E-01
Copper	0.021533	NA	NA	5.7E-03	5.7E-03
Radionuclides	**pCi/L**				
Actinium-227+D	0.5	1.5E-06	**1.5E-06**	NA	NA
Plutonium-239/240	1.875	1.6E-06	**1.6E-06**	NA	NA
Thorium-228+D	1.391	2.6E-06	**2.6E-06**	NA	NA
Thorium-230+D	1.25	1.4E-05	**1.4E-05**	NA	NA
Uranium-234	7.348	3.2E-06	**3.2E-06**	NA	NA
TOTAL		**2.3E-05**	**2.3E-05**	**1.1E+00**	**1.1E+00**

EPC: Exposure point concentration
HI: Hazard Index
HQ: Hazard Quotient
mg/L: milligrams per liter
NA: Not available; insufficient toxicity data
NAP: Not applicable pathway
pCi/L: picocuries per liter
VOCs: volatile organic compounds
bold: Estimates that exceed acceptable thresholds

Table 27: Future Total Groundwater Risk for the Construction Worker Scenario

Constituent	Total	CANCER EFFECTS				NON-CANCER EFFECTS			
		Route-Specific Risk			Cancer Risk	Route-Specific HQ			Non-Cancer HI
		Oral	Dermal	Inhalation $VOC_{(shower)}$	Total	Oral	Dermal	Inhalation VOCs	Total
	EPC								
VOCs	**mg/L**								
1,2-Dichloroethene	0.0095	NA	NA	NA	NA	1.0E-02	1.3E-03	NA	1.2E-02
Dichloromethane	0.0156	8.2E-08	1.3E-08	1.2E-09	9.7E-08	2.5E-03	4.2E-04	1.2E-05	3.0E-03
Tetrachloroethene	0.0016	5.9E-08	2.6E-07	1.6E-10	3.1E-07	1.6E-03	6.9E-03	1.0E-05	8.5E-03
Trichloroethene	0.0040	3.1E-08	2.5E-08	1.2E-09	5.7E-08	6.5E-03	5.2E-03	4.6E-04	1.2E-02
Inorganics									
Aluminum	2.0617	NA	NA	NAP	NA	2.0E-02	NA	NAP	2.0E-02
Antimony	0.0436	NA	NA	NAP	NA	1.1E+00	2.3E-02	NAP	**1.1E+00**
Beryllium	0.0002	NA	NA	NAP	NA	9.3E-04	3.0E-04	NAP	1.2E-03
Bismuth	0.0098	NA	NA	NAP	NA	NA	NA	NAP	NA
Cadmium	0.0063	NA	NA	NAP	NA	1.2E-01	1.6E-02	NAP	1.4E-01
Chromium VI*	0.9540	NA	NA	NAP	NA	3.1E+00	4.0E-01	NAP	**3.5E+00**
Copper	0.0366	NA	NA	NAP	NA	9.7E-03	NA	NAP	9.7E-03
Lithium	0.1195	NA	NA	NAP	NA	5.8E-02	NA	NAP	5.8E-02
Molybdenum	0.0151	NA	NA	NAP	NA	2.9E-02	NA	NAP	2.9E-02
Nickel	0.1884	NA	NA	NAP	NA	9.2E-02	7.5E-03	NAP	1.0E-01
Thallium	0.0035	NA	NA	NAP	NA	4.3E-01	1.4E-03	NAP	4.3E-01
Vanadium	0.0252	NA	NA	NAP	NA	3.5E-02	4.4E-03	NAP	4.0E-02
Radionuclides	**pCi/L**								
Radium-226+D	1.6902	8.2E-07	NA	NAP	8.2E-07	NA	NA	NAP	NA
Radium-228+D	0.0154	2.6E-08	NA	NAP	2.6E-08	NA	NA	NAP	NA
Strontium-90	1.3177	9.2E-08	NA	NAP	9.2E-08	NA	NA	NAP	NA
Thorium-228	2.5351	9.5E-07	NA	NAP	9.5E-07	NA	NA	NAP	NA
Thorium-230+D	1.4261	3.1E-06	NA	NAP	**3.1E-06**	NA	NA	NAP	NA
Tritium	66806.3960	4.2E-06	2.1E-04	4.4E-08	**2.1E-04**	NA	NA	NAP	NA
Uranium-234	8.7303	7.7E-07	NA	NAP	7.7E-07	NA	NA	NAP	NA
TOTAL		**1.0E-05**	**2.1E-04**	4.6E-08	**2.2E-04**	**5.0E+00**	4.7E-01	4.8E-04	**5.5E+00**

bold - Estimates that exceed acceptable thresholds
EPC - Exposure Point Concentration
HI - Hazard Index
HQ - Hazard Quotient
mg/L - milligram per liter
NA - Not available; insufficient toxicity data.
NAP - Not applicable pathway; not a VOC
pCi/L - picocuries per liter
VOCs - volatile organic compounds
*Chromium was conservatively assumed to be in the hexavalent state

Table 28: Future Background Goundwater Risk for the Construction Worker Scenario

Constituent	Total EPC mg/L	CANCER EFFECTS Route-Specific Risk Oral	Dermal	Inhalation $VOC_{(shower)}$	Cancer Risk Total	NON-CANCER EFFECTS Route-Specific HQ Oral	Dermal	Inhalation VOCs	Non-Cancer HI Total
VOCs									
1,2-Dichloroethene		NA	NA	NA	NA	NA	NA	NA	NA
Dichloromethane		NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene		NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene		NA	NA	NA	NA	NA	NA	NA	NA
Inorganics									
Aluminum	0.037523	NA	NA	NAP	NA	3.7E-04	NA	NAP	3.7E-04
Antimony	0.000578	NA	NA	NAP	NA	1.4E-02	3.1E-04	NAP	1.4E-02
Beryllium		NA	NA	NAP	NA	NA	NA	NAP	NA
Bismuth		NA	NA	NAP	NA	NA	NA	NAP	NA
Cadmium		NA	NA	NAP	NA	NA	NA	NAP	NA
Chromium VI*	0.006076	NA	NA	NAP	NA	2.0E-02	2.6E-03	NAP	2.2E-02
Copper	0.001167	NA	NA	NAP	NA	3.1E-04	NA	NAP	3.1E-04
Lithium	0.055707	NA	NA	NAP	NA	2.7E-02	NA	NAP	2.7E-02
Molybdenum	0.005597	NA	NA	NAP	NA	1.1E-02	NA	NAP	1.1E-02
Nickel	0.034957	NA	NA	NAP	NA	1.7E-02	1.4E-03	NAP	1.8E-02
Thallium		NA	NA	NAP	NA	NA	NA	NAP	NA
Vanadium	0.017076	NA	NA	NAP	NA	2.4E-02	3.0E-03	NAP	2.7E-02
Radionuclides	pCi/L								
Radium-226+D	0.996	4.8E-07	NA	NAP	4.8E-07	NA	NA	NAP	NA
Radium-228+D		0.0E+00	NA	NAP	0.0E+00	NA	NA	NAP	NA
Strontium-90	0.975	6.8E-08	NA	NAP	6.8E-08	NA	NA	NAP	NA
Thorium-228	0.779	2.9E-07	NA	NAP	2.9E-07	NA	NA	NAP	NA
Thorium-230+D		NA	NA	NAP	NA	NA	NA	NAP	NA
Tritium	1485.473	9.4E-08	4.6E-06	9.7E-10	**4.7E-06**	NA	NA	NAP	NA
Uranium-234	0.792	7.0E-08	NA	NAP	7.0E-08	NA	NA	NAP	NA
TOTAL		**1.0E-06**	**4.6E-06**	9.7E-10	**5.6E-06**	1.1E-01	7.2E-03	0.0E+00	1.2E-01

bold - Estimates that exceed acceptable thresholds
EPC - Exposure Point Concentration
HI - Hazard Index
HQ - Hazard Quotient
mg/L - milligram per liter
NA - Not available; insufficient toxicity data
NAP - Not applicable pathway; not a VOC
pCi/L - picocuries per liter
VOCs - volatile organic compounds
*Chromium was conservatively assumed to be in the hexavalent state
NC - Not a suspected carcinogen

Table 29: Future Incremental Groundwater Risk for the Construction Worker Scenario

Constituent	Total EPC	CANCER EFFECTS: Route-Specific Risk: Oral	Dermal	Inhalation $VOC_{(shower)}$	Cancer Risk Total	NON-CANCER EFFECTS: Route-Specific HQ: Oral	Dermal	Inhalation VOCs	Non-Cancer HI Total
VOCs	mg/L								
1,2-Dichloroethene	0.0095	NA	NA	NA	NA	1.0E-02	1.3E-03	NA	1.2E-02
Dichloromethane	0.0156	8.2E-08	1.3E-08	1.2E-09	NA	2.5E-03	4.2E-04	1.2E-05	3.0E-03
Tetrachloroethene	0.0016	5.9E-08	2.6E-07	1.6E-10	3.1E-07	1.6E-03	6.9E-03	1.0E-05	8.5E-03
Trichloroethene	0.0040	3.1E-08	2.5E-08	1.2E-09	5.7E-08	6.5E-03	5.2E-03	4.6E-04	1.2E-02
Inorganics									
Aluminum	2.0242	NA	NA	NAP	NA	2.0E-02	NA	NAP	2.0E-02
Antimony	0.0430	NA	NA	NAP	NA	1.1E+00	2.3E-02	NAP	**1.1E+00**
Beryllium	0.0002	NA	NA	NAP	NA	9.3E-04	3.0E-04	NAP	1.2E-03
Bismuth	0.0098	NA	NA	NAP	NA	NA	NA	NAP	NA
Cadmium	0.0063	NA	NA	NAP	NA	1.2E-01	1.6E-02	NAP	1.4E-01
Chromium VI*	0.9479	NA	NA	NAP	NA	3.1E+00	4.0E-01	NAP	**3.5E+00**
Copper	0.0355	NA	NA	NAP	NA	9.4E-03	NA	NAP	9.4E-03
Lithium	0.0638	NA	NA	NAP	NA	3.1E-02	NA	NAP	3.1E-02
Molybdenum	0.0095	NA	NA	NAP	NA	1.9E-02	NA	NAP	1.9E-02
Nickel	0.1534	NA	NA	NAP	NA	7.5E-02	6.1E-03	NAP	8.1E-02
Thallium	0.0035	NA	NA	NAP	NA	4.3E-01	1.4E-03	NAP	4.3E-01
Vanadium	0.0082	NA	NA	NAP	NA	1.1E-02	1.4E-03	NAP	1.3E-02
Radionuclides	pCi/L								
Radium-226+D	0.6942	3.3E-07	NA	NAP	3.3E-07	NAP	NAP	NAP	NA
Radium-228+D	0.0154	2.6E-08	NA	NAP	2.6E-08	NAP	NAP	NAP	NA
Strontium-90	0.3427	2.4E-08	NA	NAP	2.4E-08	NAP	NAP	NAP	NA
Thorium-228	1.7561	6.6E-07	NA	NAP	6.6E-07	NAP	NAP	NAP	NA
Thorium-230+D	1.4261	3.1E-06	NA	NAP	**3.1E-06**	NAP	NAP	NAP	NA
Tritium	65320.9230	4.1E-06	2.0E-04	4.3E-08	**2.1E-04**	NA	NA	NAP	NA
Uranium-234	7.9383	7.0E-07	NA	NAP	7.0E-07	NAP	NAP	NAP	NA
TOTAL		**9.2E-06**	**2.0E-04**	4.5E-08	**2.1E-04**	**4.9E+00**	**4.6E-01**	**4.8E-04**	**5.3E+00**

bold - Estimates that exceed acceptable thresholds
EPC - Exposure Point Concentration
HI - Hazard Index
HQ - Hazard Quotient
mg/L - milligram per liter
NA - Not available; insufficient toxicity data
NAP - Not applicable pathway; not a VOC
pCi/L - picocuries per liter
VOCs - volatile organic compounds
*Chromium was conservatively assumed to be in the hexavalent state
NC - Not a suspected carcinogen

Table 30: Future Total Residual Groundwater Risk for Site Employee Scenario

Constituent	Total EPC mg/L	CANCER EFFECTS Route-Specific Risk Oral	CANCER EFFECTS Risk Total	NON-CANCER EFFECTS Route-Specific HQ Oral	NON-CANCER EFFECTS Non-Cancer HI Total
VOCs					
1,2-Dichloroethene	0.0095	NA	NA	1.0E-02	1.0E-02
Dichloromethane	0.0156	4.1E-07	4.1E-07	2.5E-03	2.5E-03
Trichloroethene	0.0040	1.5E-07	1.5E-07	6.5E-03	6.5E-03
Metals					
Aluminum	2.0617	NA	NA	2.0E-02	2.0E-02
Antimony	0.0436	NA	NA	1.1E+00	**1.1E+00**
Beryllium	0.0002	NA	NA	9.3E-04	9.3E-04
Bismuth	0.0098	NA	NA	NA	NA
Cadmium	0.0063	NA	NA	1.2E-01	1.2E-01
Chromium VI*	0.9540	NA	NA	3.1E+00	**3.1E+00**
Copper	0.0366	NA	NA	9.7E-03	9.7E-03
Lithium	0.1195	NA	NA	5.8E-02	5.8E-02
Molybdenum	0.0151	NA	NA	2.9E-02	2.9E-02
Nickel	0.1884	NA	NA	9.2E-02	9.2E-02
Thallium	0.0035	NA	NA	4.3E-01	4.3E-01
Vanadium	0.0252	NA	NA	3.5E-02	3.5E-02
Radionuclides	pCi/L				
Actinium-227+D**	0.5000	1.5E-06	**1.5E-06**	NA	NA
Plutonium-238	0.2901	2.4E-07	2.4E-07	NA	NA
Plutonium-239/240**	2.0914	1.8E-06	**1.8E-06**	NA	NA
Radium-226+D	1.6902	4.1E-06	**4.1E-06**	NA	NA
Radium-228+D	0.0154	1.3E-07	1.3E-07	NA	NA
Strontium-90	1.3177	4.6E-07	**4.6E-07**	NA	NA
Thorium-228+D	2.5351	4.8E-06	**4.8E-06**	NA	NA
Thorium-230+D	1.4261	1.6E-05	**1.6E-05**	NA	NA
Tritium	66806.3960	2.1E-05	**2.1E-05**	NA	NA
Uranium-234	8.7303	3.9E-06	**3.9E-06**	NA	NA
TOTAL		**5.4E-05**	**5.4E-05**	**5.0E+00**	**5.0E+00**

bold: Estimates that exceed acceptable thresholds
EPC: Exposure Point Concentration
HI: Hazard Index
HQ: Hazard Quotient
mg/L: milligram per liter
NA: Not available, insufficient toxicity data
pCi/L: picocuries per liter
VOCs: volatile organic compounds
* Chromium was conservatively assumed to be in the hexavalent state
** COPC for current groundwater, therefore, retained as future COPC

Table 31: Future Background Residual Groundwater Risk for Site Employee Scenario

Constituent	Total EPC	CANCER EFFECTS Route-Specific Risk Oral	CANCER EFFECTS Risk Total	NON-CANCER EFFECTS Route-Specific HQ Oral	NON-CANCER EFFECTS Non-Cancer HI Total
VOCs	**mg/L**				
1,2-Dichloroethene		NA	NA	NA	NA
Dichloromethane		NA	NA	NA	NA
Trichloroethene		NA	NA	NA	NA
Metals					
Aluminum	0.037523	NA	NA	3.7E-04	3.7E-04
Antimony	0.000578	NA	NA	1.4E-02	1.4E-02
Beryllium		NA	NA	NA	NA
Bismuth		NA	NA	NA	NA
Cadmium		NA	NA	NA	NA
Chromium VI*	0.006076	NA	NA	2.0E-02	2.0E-02
Copper	0.001167	NA	NA	3.1E-04	3.1E-04
Lithium	0.055707	NA	NA	2.7E-02	2.7E-02
Molybdenum	0.005597	NA	NA	1.1E-02	1.1E-02
Nickel	0.034957	NA	NA	1.7E-02	1.7E-02
Thallium		NA	NA	NA	NA
Vanadium	0.017076	NA	NA	2.4E-02	2.4E-02
Radionuclides	**pCi/L**				
Actinium-227+D**		NA	NA	NA	NA
Plutonium-238	0.087	7.1E-08	7.1E-08	NA	NA
Plutonium-239/240**	0.125	1.1E-07	1.1E-07	NA	NA
Radium-226+D	0.996	2.4E-06	**2.4E-06**	NA	NA
Radium-228+D		NA	NA	NA	NA
Strontium-90	0.975	3.4E-07	3.4E-07	NA	NA
Thorium-228+D	0.779	1.5E-06	**1.5E-06**	NA	NA
Thorium-230+D*		NA	NA	NA	NA
Tritium	1485.473	4.7E-07	4.7E-07	NA	NA
Uranium-234	0.792	3.5E-07	3.5E-07	NA	NA
TOTAL		**5.2E-06**	**5.2E-06**	1.1E-01	1.1E-01

bold: Estimates that exceed acceptable thresholds
EPC: Exposure Point Concentration
HI: Hazard Index
HQ: Hazard Quotient
mg/L: milligram per liter
NA: Not available; insufficient toxicity data
pCi/L: picocuries per liter
VOCs: volatile organic compounds
* Chromium was conservatively assumed to be in the hexavalent state
** COPC for current groundwater, therefore, retained as future COPC

Table 32: Future Incremental Residual Groundwater Risk for Site Employee Scenario

Constituent	Total EPC	CANCER EFFECTS Route-Specific Risk Oral	CANCER EFFECTS Route-Specific Risk Total	NON-CANCER EFFECTS Route-Specific HQ Oral	NON-CANCER EFFECTS Non-Cancer HI Total
VOCs	**mg/L**				
1,2-Dichloroethene	0.0095	NA	NA	1.0E-02	1.0E-02
Dichloromethane	0.0156	4.1E-07	4.1E-07	2.5E-03	2.5E-03
Trichloroethene	0.0040	1.5E-07	1.5E-07	6.5E-03	6.5E-03
Metals					
Aluminum	2.0242	NA	NA	2.0E-02	2.0E-02
Antimony	0.0430	NA	NA	1.1E+00	**1.1E+00**
Beryllium	0.0002	NA	NA	9.3E-04	9.3E-04
Bismuth	0.0098	NA	NA	NA	NA
Cadmium	0.0063	NA	NA	1.2E-01	1.2E-01
Chromium VI**	0.9479	NA	NA	3.1E+00	**3.1E+00**
Copper	0.0355	NA	NA	9.4E-03	9.4E-03
Lithium	0.0638	NA	NA	3.1E-02	3.1E-02
Molybdenum	0.0095	NA	NA	1.9E-02	1.9E-02
Nickel	0.1534	NA	NA	7.5E-02	7.5E-02
Thallium	0.0035	NA	NA	4.3E-01	4.3E-01
Vanadium	0.0082	NA	NA	1.1E-02	1.1E-02
Radionuclides	**pCi/L**				
Actinium-227+D**	0.5000	1.5E-06	**1.5E-06**	NA	NA
Plutonium-238	0.2031	1.7E-07	1.7E-07	NA	NA
Plutonium-239/240**	1.9664	1.7E-06	**1.7E-06**	NA	NA
Radium-226	0.6942	1.7E-06	**1.7E-06**	NA	NA
Radium-228+D	0.0154	1.3E-07	1.3E-07	NA	NA
Strontium-90	0.3427	1.2E-07	1.2E-07	NA	NA
Thorium-228	1.7561	3.3E-06	**3.3E-06**	NA	NA
Thorium-230+D	1.4261	1.6E-05	**1.6E-05**	NA	NA
Tritium	65320.9230	2.1E-05	**2.1E-05**	NA	NA
Uranium-234	7.9383	3.5E-06	**3.5E-06**	NA	NA
TOTAL		**4.9E-05**	**4.9E-05**	**4.9E+00**	**4.9E+00**

bold: Estimates that exceed acceptable thresholds
EPC: Exposure Point Concentration
HI: Hazard Index
HQ: Hazard Quotient
mg/L: milligram per liter
NA: Not available; insufficient toxicity data
pCi/L: picocuries per liter
VOCs: volatile organic compounds
* Chromium was conservatively assumed to be in the hexavalent state
** COPC for current groundwater, therefore, retained as future COPC

Table 33: Total Residual Risk for Parcel 3 Summary Table

Scenario and Receptor	Media	Constituents	Pathway	Total Noncancer HI	Total Cancer Risk
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	NA	**5.8E-06**
			Inhalation of Dust	NA	7.1E-09
			Inhalation of VOCs	NA	NA
			External	NA	2.9E-07
		Soil Total Risk		NA	**6.1E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.7E-06**
			Dermal Contact	1.9E-01	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**1.3E+00**	**2.7E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.0E+00**	**1.0E-05**
			Dermal Contact	4.7E-01	**2.1E-04**
			Inhalation While Showering	4.8E-04	4.6E-08
		Future Groundwater Total Risk		**5.5E+00**	**2.2E-04**
	Air*	Radiological	Inhalation	NA	2.1E-07
		Air Total Risk		NA	2.1E-07
	Cumulative Total Current Risk			**1.3E+00**	**9.0E-06**
	Cumulative Total Future Risk			**5.5E+00**	**2.3E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	NA	**2.4E-06**
			Inhalation of Dust	NA	2.8E-08
			Inhalation of VOCs	NA	NA
			External	NA	2.8E-09
		Soil Total Risk		NA	**2.4E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.5E-05**
		Current Groundwater Total Risk		**1.1E+00**	**2.5E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.0E+00**	**5.4E-05**
		Future Groundwater Total Risk		**5.0E+00**	**5.4E-05**
	Air*	Radiological	Inhalation	NA	**1.0E-06**
		Air Total Risk		NA	**1.0E-06**
	Cumulative Total Current Risk			**1.1E+00**	**2.8E-05**
	Cumulative Total Future Risk			**5.0E+00**	**5.7E-05**

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

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

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

Table 34: Background Residual Risk for Parcel 3 Summary Table

Scenario and Receptor	Media	Constituents	Pathway	Total Noncancer HI	Total Cancer Risk
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	NA	2.1E-08
			Inhalation of Dust	NA	2.6E-11
			Inhalation of VOCs	NA	NA
			External	NA	9.6E-12
		Soil Total Risk		NA	2.1E-08
	Groundwater (Current)	Chemical and Radiological	Ingestion	1.4E-02	NA
			Dermal Contact	2.3E-03	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		1.7E-02	NA
	Groundwater (Future)	Chemical and Radiological	Ingestion	1.1E-01	**1.0E-06**
			Dermal Contact	7.2E-03	**4.6E-06**
			Inhalation While Showering	NA	9.7E-10
		Future Groundwater Total Risk		1.2E-01	**5.6E-06**
	Air*	Radiological	Inhalation	NA	7.7E-09
		Air Total Risk		NA	7.7E-09
	Cumulative Background Current Risk			1.7E-02	2.9E-08
	Cumulative Background Future Risk			1.2E-01	**5.6E-06**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	NA	1.1E-07
			Inhalation of Dust	NA	1.3E-10
			Inhalation of VOCs	NA	NA
			External	NA	1.1E-11
		Soil Total Risk		NA	1.1E-07
	Groundwater (Current)	Chemical and Radiological	Ingestion	1.4E-02	**1.9E-06**
		Current Groundwater Total Risk		1.4E-02	**1.9E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	1.1E-01	**5.2E-06**
		Future Groundwater Total Risk		1.1E-01	**5.2E-06**
	Air*	Radiological	Inhalation	NA	3.9E-08
		Air Total Risk		NA	3.9E-08
	Cumulative Background Current Risk			1.4E-02	**2.0E-06**
	Cumulative Background Future Risk			1.1E-01	**5.3E-06**

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

Table 35: Incremental Residual Risk for Parcel 3 Summary Table

Scenario and Receptor	Media	Constituents	Pathway	Total Noncancer HI	Total Cancer Risk
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	NA	**5.8E-06**
			Inhalation of Dust	NA	7.0E-09
			Inhalation of VOCs	NA	NA
			External	NA	2.9E-07
		Soil Total Risk		NA	**6.1E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.7E-06**
			Dermal Contact	1.9E-01	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**1.3E+00**	**2.7E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**4.9E+00**	**9.2E-06**
			Dermal Contact	4.6E-01	**2.0E-04**
			Inhalation While Showering	4.8E-04	4.5E-08
		Future Groundwater Total Risk		**5.3E+00**	**2.1E-04**
	Air*	Radiological	Inhalation	NA	2.0E-07
		Air Total Risk		NA	2.0E-07
	Cumulative Incremental Current Risk			**1.3E+00**	**9.0E-06**
	Cumulative Incremental Future Risk			**5.3E+00**	**2.2E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	NA	**2.4E-06**
			Inhalation of Dust	NA	2.8E-08
			Inhalation of VOCs	NA	NA
			External	NA	2.3E-09
		Soil Total Risk		NA	**2.4E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**1.1E+00**	**2.3E-05**
		Current Groundwater Total Risk		**1.1E+00**	**2.3E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**4.9E+00**	**4.9E-05**
		Future Groundwater Total Risk		**4.9E+00**	**4.9E-05**
	Air*	Radiological	Inhalation	NA	9.9E-07
		Air Total Risk		NA	9.9E-07
	Cumulative Incremental Current Risk			**1.1E+00**	**2.6E-05**
	Cumulative Incremental Future Risk			**4.9E+00**	**5.2E-05**

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

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

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

UPDATED HEAST TOXICITY VALUES FOR SOIL AND GROUNDWATER GVS

Constituent	RfD (mg/kg/day) Oral	RfD (mg/kg/day) Adjusted	RfD (mg/kg/day) Inhalation	CSF (kg-day/mg) Oral	CSF (kg-day/mg) Adjusted	CSF (kg-day/mg) Inhalation	External
Radionuclides							
Soil							
Actinium-227+D	NA	NA	NA	1.16E-09		2.09E-07	1.47E-06
Cobalt-60	NA	NA	NA	4.03E-11		3.58E-11	1.24E-05
Lead-210 +D	NA	NA	NA	2.66E-09		1.39E-08	4.21E-09
Water							
Plutonium-239/240	NA	NA	NA	1.35E-10		NAP	NAP
Radium-228+D	NA	NA	NA	1.34E-09		NAP	NAP

NA= Not Applicable
NAP= Not Applicable Pathway

Ra-228 +D was calculated by including the Ra-228+D and Th-228+D toxicity criteria

Radium-228+D	Radium-228+D	1.04E-09	5.23E-09	4.53E-06
	Thorium-228+D	3.00E-10	1.43E-07	7.76E-06
	total	1.3E-09	1.5E-07	1.23E-05

Soil Guideline Values for Construction Worker at DOE Mound

Constituent	GV	CANCER EFFECTS				NON-CANCER EFFECTS			1/10 HI
		Route-Specific RRSs (pCi/g)			Cancer	Route-Specific RRSs (pCi/g)		Non-Cancer	
		Ingestion	Inhalation	External	Effects PRG	Ingestion	Inhalation	Effects PRG	
	pCi/g	(RRSo)c	(RRSi)c	(RRSex)c	RRSc	(RRSo)nc	(RRSi)nc	RRSnc	
Radionuclides									
Actinium-227+D	**4.5E-01**	1.4E+00	8.2E+02	6.6E-01	4.53E-01	NA	NA	NA	NA
Cobalt-60	**7.8E-02**	4.1E+01	4.8E+06	7.8E-02	7.83E-02	NA	NA	NA	NA

*	All detected chromium is conservatively assumed to be chromium VI.
mg/kg	Milligram per kilogram.
NA	Not available; insufficient toxicity data.
NC	Not a suspected carcinogen.
RRS	Risk Reduction Standard for soil (mg/kg).

Soil Guideline Values for Site Employee DOE Mound

Constituent	GV	CANCER EFFECTS				NON-CANCER EFFECTS			1/10 HI
		Route-Specific RRSs (pCi/g)			Cancer	Route-Specific RRSs (pCi/g)		Non-Cancer	
		Ingestion	Inhalation	External	Effects PRG	Ingestion	Inhalation	Effects PRG	
	pCi/g	(RRSo)c	(RRSi)c	(RRSex)c	RRSc	(RRSo)nc	(RRSi)nc	RRSnc	
Radionuclides									
Cobalt-60	**7.1E-02**	7.9E+01	9.6E+05	7.1E-02	7.06E-02	NA	NA	NA	NA
Lead-210 +D	**1.2E+00**	1.2E+00	2.5E+03	2.1E+02	1.20E+00	NA	NA	NA	NA

*	All detected chromium is conservatively assumed to be chromium VI.
mg/kg	Milligram per kilogram.
NA	Not available; insufficient toxicity data.
NC	Not a suspected carcinogen.
RRS	Risk Reduction Standard for soil (mg/kg).

Supplemental Toxicity Criteria for Th-230 and Ra-228 with decay chain

Water Toxicity Criteria

Thorium-230	CSF oral
Th-230 + D	9.10E-11
Ra-226	3.86E-10
Pd-210+D	1.27E-09
Total	1.75E-09

Radium-228+D	CSF oral
Radium-228+D	1.04E-09
Thorium-228+D	3.00E-10
Total	1.3E-09

For these two radionucides the other pathways are not applicable in water

PARCEL 3 RECORD OF DECISION
JULY 2001, DRAFT PROPOSED FINAL
OHIO ENVIRONMENTAL PROTECTION AGENCY
COMMENTS
JULY 19, 2001

SPECIFIC COMMENTS

1. Page ii, Table of Contents - Change the page reference on Figures 1 and 2 from "following page 5" to "following page 4".

2. Page 10, Section 2.5.3.3 Soil Contamination Data – In the last sentence, delete the word "detected" and place the term "risk evaluated" in front of contaminants.

3. Page 21, Section 3.0 Responsiveness Summary – Within the second "Response" on this page, the forth sentence, change the capitalization of "Any".

4. Page 24, Section 3.0 Responsiveness Summary – Bold the heading for the last paragraph "Comment from the Core Team".

5. After Page 24, Table 11 – The following comments are specific to the tables included in the Ohio EPA comment response that support Table 11.

- Within table 3, Site Employee, current and future soil, actinium 227+d should have screened through to be assessed in the risk evaluation. The new 10-6 guideline value is 0.51 pCi/g.

- On table 14, the oral slope factor for radium 228+d in ground water should be 1.04E-09 instead of 1.34E-09 as list on this table. The guideline value for radium 228+d in ground water for the construction worker should be 0.77 pCi/l and not 0.60 pCi/l as listed on table 9.

6. Appendix A Quitclaim Deed – The response to Ohio EPAs Parcel 3 ROD, Draft Revision 1 comment #13 regarding the property boundary description within the soil restriction covenant prompts a follow up request. To help in clarification, the Ohio EPA will be issuing a letter to DOE and MMCIC requesting a verification of the property boundary as described in section 1.1 of each quitclaim deed that has been transferred from DOE to MMCIC to date, including Parcel 3.

7. Appendix A Quitclaim Deed – In section 3, there is a reference to CERCLA. Please change the year of the CERCLA reference from "1930" to "1980".

BWX Technologies, Inc.
a McDermott company

BWXT of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ER-006/01
July 12, 2001

01-TC/07-12

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

ATTENTION: Robert S. Rothman

SUBJECT: Contract No. DE-AC24-97OH20044
PARCEL 3 RECORD OF DECISION – DRAFT PROPOSED FINAL

REFERENCE: Statement of Work Requirement C.7.1d—Regulator Data Requests

Dear Mr. Provencher:

Rob Rothman from your office has approved the release of the Parcel 3 Record of Decision - Draft Proposed Final to the regulators for their review. Also included are responses to comments received from the regulators from the previous version of the Record of Decision.

If you or members of your staff have any questions regarding the document, or if additional support is needed, please contact Dave Rakel at extension 4203.

Sincerely,

Monte A. Williams
Project Manager, Environmental Restoration

MAW/DAR:jdg

Enclosures

cc: Tim Fischer, USEPA, (1) w/attachments
Brian Nickel, OEPA, (2) w/attachments
Ruth Vandegrift, ODH, (1) w/attachments
Frank Schmaltz, DOE/MEMP, (1) w/attachments
Dave Rakel, BWXT of Ohio, (1) w/attachments
Karen Arthur, BWXT of Ohio, (1) w/attachments
Monte Williams, BWXT of Ohio, (2) w/attachment
DCC

OhioEPA

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Bob Taft, Governor
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July 19, 2001

Mr. Rob Rothman
U.S. DOE MEMP
P.O. Box 66
1 Mound Road
Miamisburg, Ohio 45343-0066

Comments on Parcel 3 Record of Decision

Dear Mr. Rothman:

The Ohio Environmental Protection Agency has completed our review of the Parcel 3 Record of Decision, Draft Proposed Final, July 2001. Please refer to the attached comments on the document. Should there be any question concerning the above, please feel free to contact Jane O'Dell (937) 285-6066 or me at (937) 285-6468.

Sincerely,

Mr. Brian Nickel
OEPA/Mound Project Manager
Office of Federal Facilities Oversight

cc: Tim Fischer, USEPA Region V
D. Rakel, BWXTO

PARCEL 3 RECORD OF DECISION
JULY 2001, DRAFT PROPOSED FINAL
OHIO ENVIRONMENTAL PROTECTION AGENCY
COMMENTS
JULY 19, 2001

SPECIFIC COMMENTS

1. Page ii, Table of Contents - Change the page reference on Figures 1 and 2 from "following page 5" to "following page 4".

2. Page 10, Section 2.5.3.3 Soil Contamination Data – In the last sentence, delete the word "detected" and place the term "risk evaluated" in front of contaminants.

3. Page 21, Section 3.0 Responsiveness Summary – Within the second "Response" on this page, the forth sentence, change the capitalization of "Any".

4. Page 24, Section 3.0 Responsiveness Summary – Bold the heading for the last paragraph "Comment from the Core Team".

5. After Page 24, Table 11 – The following comments are specific to the tables included in the Ohio EPA comment response that support Table 11.

- Within table 3, Site Employee, current and future soil, actinium 227+d should have screened through to be assessed in the risk evaluation. The new 10-6 guideline value is 0.51 pCi/g.

- On table 14, the oral slope factor for radium 228+d in ground water should be 1.04E-09 instead of 1.34E-09 as list on this table. The guideline value for radium 228+d in ground water for the construction worker should be 0.77 pCi/l and not 0.60 pCi/l as listed on table 9.

6. Appendix A Quitclaim Deed – The response to Ohio EPAs Parcel 3 ROD, Draft Revision 1 comment #13 regarding the property boundary description within the soil restriction covenant prompts a follow up request. To help in clarification, the Ohio EPA will be issuing a letter to DOE and MMCIC requesting a verification of the property boundary as described in section 1.1 of each quitclaim deed that has been transferred from DOE to MMCIC to date, including Parcel 3.

7. Appendix A Quitclaim Deed – In section 3, there is a reference to CERCLA. Please change the year of the CERCLA reference from "1930" to "1980".

BWX Technologies, Inc.
a McDermott company

BWXT of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ESC-169/00
November 1, 2000

00-TC/11-01

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
PARCEL 3 RECORD OF DECISION - DRAFT

REFERENCE: Statement of Work Requirement C 7.1d -- Regulator Data Requests

Dear Mr. Provencher:

Attached is the Draft Record of Decision for Parcel 3. The release of this document to USEPA, OEPA, ODH for review concurrent with DOE has been authorized by Frank Schmaltz of MEMP.

If you or members of your staff have any questions regarding the document, or if additional support is needed, please contact Dave Rakel at extension 4203.

Sincerely,

JSStapleton

Jeffrey S. Stapleton
Manager, Environmental Safeguards & Compliance

JSS/nmg

Enclosures as stated

cc: Tim Fischer, USEPA, (2) w/attachments
Dave Meredith, TechLaw, (1) w/attachments
Brian Nickel, OEPA, (2) w/attachments
Ruth Vandegrift, ODH, (1) w/attachments
Frank Schmaltz, MEMP, (2) w/attachments
John Krueger, BWXT of Ohio, (1) w/attachments
Monte Williams, BWXT of Ohio, (1) w/attachments
DCC

Record of Decision for Parcel 3, Mound Plant, Miamisburg, Ohio

DRAFT

September 2000

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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 Parcel 3, Mound Plant, Miamisburg, Ohio

This Record of Decision (ROD) documents the remedy selected for Parcel 3 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 Parcel 3 which is located on the northern border of the developed area of the plant.

1.2 Basis and Purpose

This decision document presents the selected remedy for Parcel 3 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 Parcel 3, the risks from

carcinogens and non-carcinogens to current and future occupants of Parcel 3 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 Parcel 3 from the threat of contaminants in the groundwater, and will ensure that Parcel 3 soils are appropriately evaluated prior to any removal of Parcel 3 soils from the Mound Plant National Priority List (NPL) facility boundary.

1.4 Description of Selected Remedy

The selected remedy for Parcel 3 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 Parcel 3 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 Parcel 3 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 Parcel 3 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 Parcel 3 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 Parcel 3 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.

_____ _____

Susan Brechbill — Date
Ohio Field Office Manager,
U. S. Department of Energy

_____ _____

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

_____ _____

Christopher Jones — Date
Director,
Ohio Environmental Protection Agency

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 several parcels which are contiguous tracts of property designated for transfer of ownership. These parcels may be reconfigured to accommodate transfer of Mound property for economic development.

This ROD addresses Parcel 3 (Figure 2-2) which is located on the northern border of the developed area of the plant. The legal description of Parcel 3 is reproduced in Appendix A. Parcel 3 is generally bound to the south and west by the main plant, to the north by off-site residences, and to the east by a fenced parking lot.

There are two structures in Parcel 3.

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

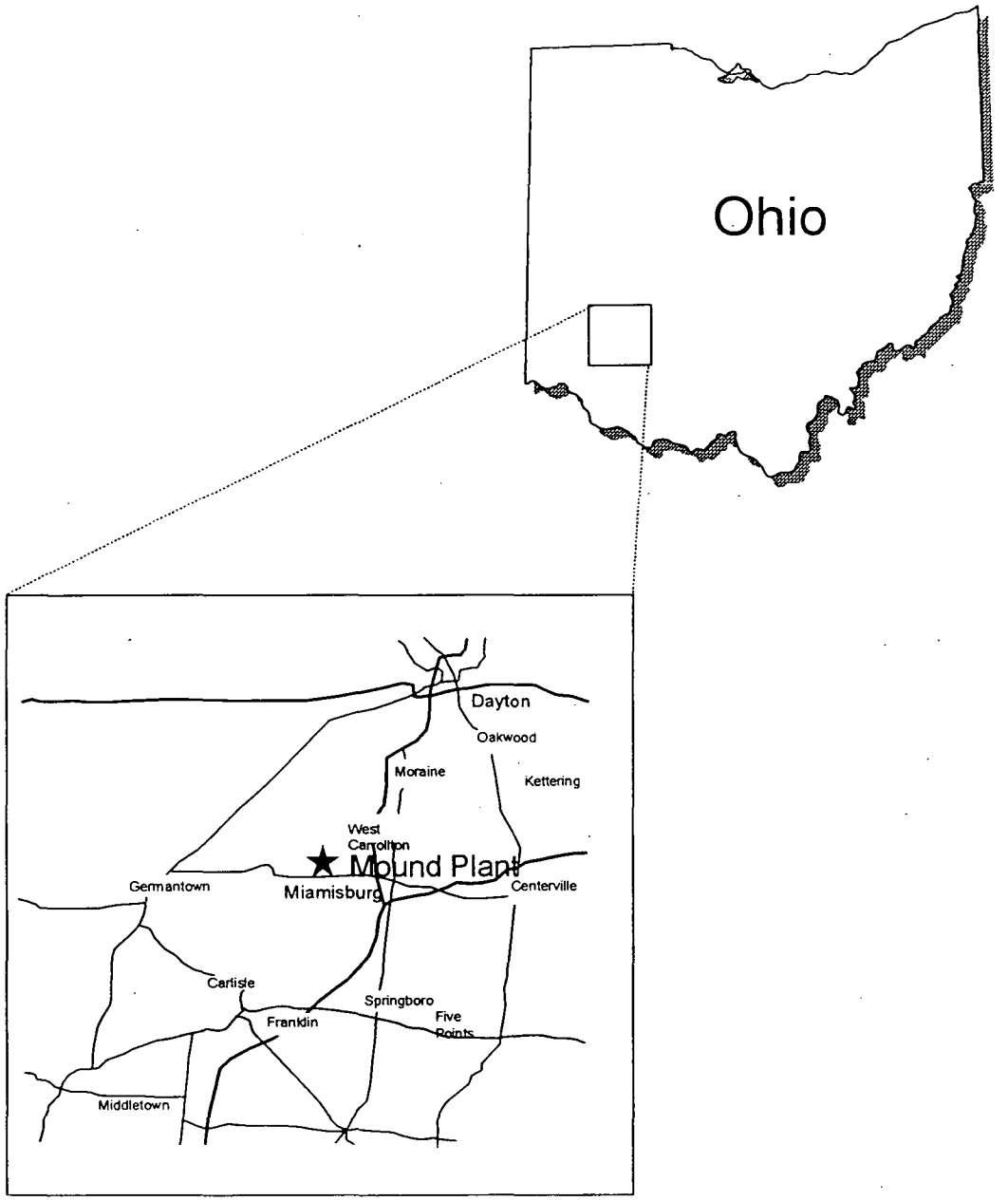
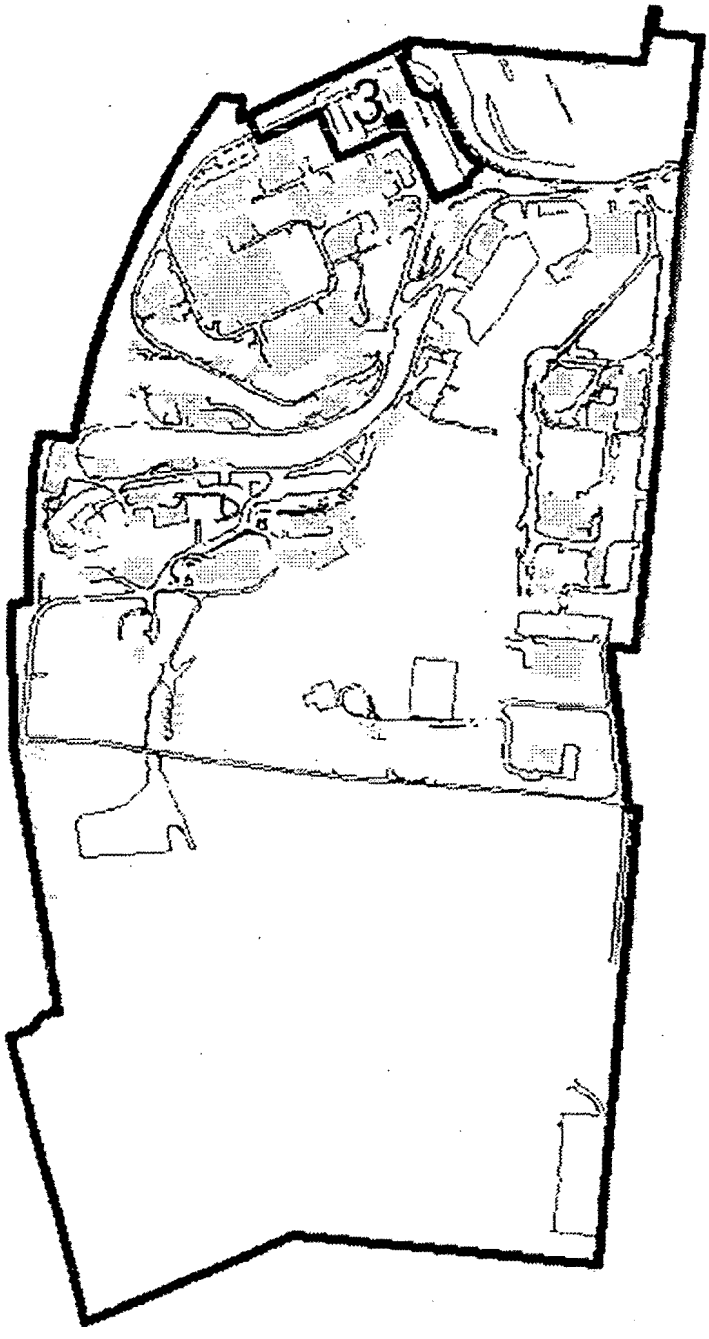


Figure 2-2. Location of Parcel 3



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), 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) decisions for PRSs 100 and 241 and buildings GH and GP-1 were provided. The Residual Risk Evalaution for Parcel 3 was also available for public comment. A listing of those opportunities is shown in Table 2-1.

Table 2-1. Public Comment Periods for Parcel 3 Documents

DOCUMENT (PRS/BUILDING)	COMMENT PERIOD (BEGIN)	COMMENT PERIOD (END)
100	8/23/00	9/25/00
241	6/17/97	7/18/97
GH	3/17/97	4/17/97
GP-1	3/17/97	4/17/97
Parcel 3 Residual Risk Evaluation	TBD	TBD

The *Proposed Plan for Parcel 3* was made available to the public on Day X, 2000. 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 Day X, 2000. A public comment period was held from Day X, 2000 through Day X, 2000. In addition, a public meeting was held on Day X, 2000 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 Parcel 3

Parcel 3 lies within what was once called Operable Unit 2 (OU2). There are two structures in Parcel 3. Parcel 3 includes Potential Release Sites (PRSs) that have

undergone previous investigations. 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 Parcel 3 have been evaluated and presented in the Parcel 3 Residual Risk Evaluation (RRE).

The PRSs in Parcel 3 were identified on the basis of historical information and actual measurements of contaminants. The location of the PRSs within Parcel 3 is shown in Figure 2-3. A description of the PRSs appears in Table 2-2. As shown in Table 2-2, the PRSs were determined by the Core Team to require no further assessment.

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 Parcel 3. 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 Parcel 3

The PRSs within Parcel 3 have been evaluated by the Core Team. The following sections discuss the data relevant to Parcel 3 that are available from the general source documents and the Potential Release Site 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 and are documented in reports *Operable Unit 9 Background Soils Investigation Soil Chemistry Report* (September, 1994) and *Operable Unit 9, Regional Soils Investigation Report* (August, 1995).

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

Figure 2-3. Location of PRSs within Parcel 3

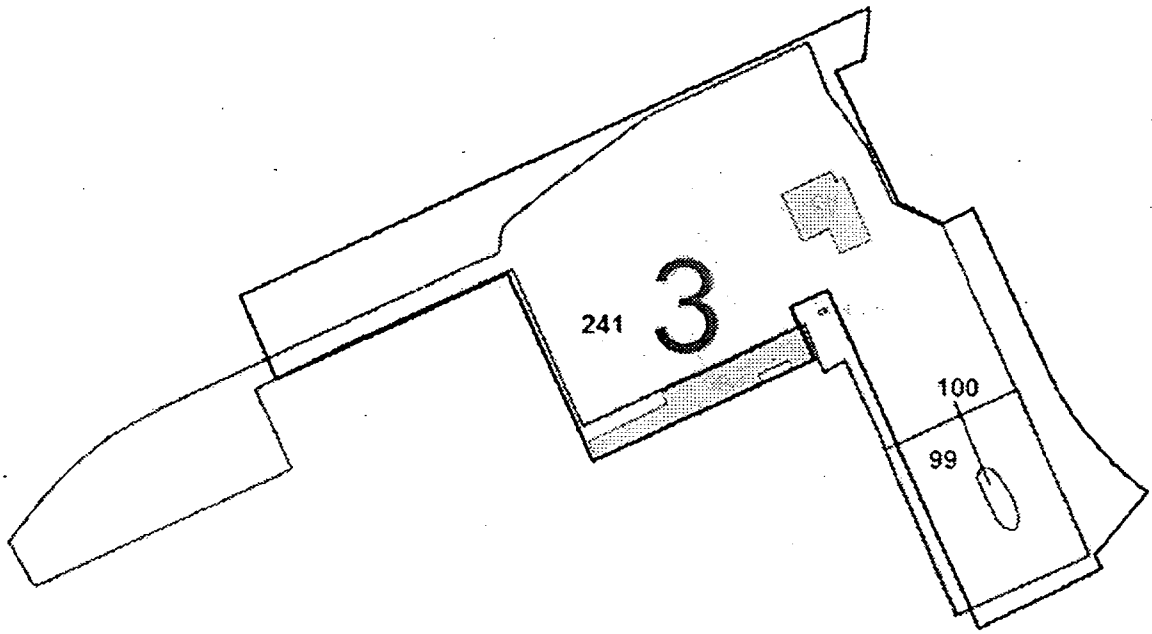


Table 2-2. Parcel 3 PRS and Building Core Team Conclusions

PRS/ BLDG	Reason for Identification	Core Team Decision	Close Out of PRS/BDP
99	Reported disposal of drums containing sand contaminated with polonium-210, cobalt-60, and cesium-137	Removal Action conducted in August, 1999	OSC Report signed by Core Team on 7/12/00.
100	Reported disposal of neutralized chromium plating bath solution and process tank	Binned for NFA	Recommendation for NFA signed by Core Team on 8/16/00.
241	Several positive soil gas detections during Mound Plant Soil Gas and Geophysical Investigation (Reconnaissance Sampling Report - Soil Gas and Geophysical Investigations Mound Plant and SM/PP Hill, February 1993)	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 5/13/97.
GH	Office	NFA	Recommendation for NFA signed by Core team on 2/9/99.
GP-1	Guard force headquarters	NFA	Recommendation for NFA signed by Core Team on 2/9/99.

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. Appendix A of the RRE for Parcel 3 documents the specific groundwater data used to evaluate the current and future groundwater profile for Parcel 3. 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 through 2-6.

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 Parcel 3.

Table 2.3 Identification of Constituents of Potential Concern for the Construction Worker Scenario in Current Groundwater for Parcel 3

Chemical	CAS Number	Maximum Concentration	Construction Worker Risk-Based GV
Inorganics (ug/L)			
Aluminum	7429-90-5	148.00	0
Antimony	7440-36-0	40.20	4.1
Cadmium	7440-43-9	7.70	5.1 [2]
Copper	7440-50-8	593.00	0
Organics (ug/L)			
1,1,1-trichloroethane	71-55-6	3.30	
1,1,2 trichloro-1,2,2-trifluoroethane	76-13-1	34.00	
1,2-cis-Dichloroethene	156-59-2	4.00	
Radionuclides (pCi/l)			
Bismuth-210	13982-38-2	0.39	
Thorium-227		0.10	

Table 2.4 Identification of Constituents of Potential Concern for the Site Worker Scenario in Current Groundwater for Parcel 3

Chemical	CAS Number	Maximum Concentration	Site Employee Risk-Based GV
Inorganics (ug/L)			
Aluminum	7429-90-5	148.00	
Antimony	7440-36-0	40.20	4.10
Cadmium	7440-43-9	7.70	5.1 [2]
Copper	7440-50-8	593.00	
Organics (ug/L)			
1,1,1-trichloroethane	71-55-6	3.30	
1,1,2 trichloro-1,2,2-trifluoroethane	76-13-1	34.00	
1,2-cis-Dichloroethene	156-59-2	4.00	
Radionuclides (pCi/L)			
Actinium-227	14952-40-0	0.50	0.26 [1]
Bismuth-210	13982-38-2	0.39	
Plutonium-239/240	13981-16-3/15117-48-3	2.00	0.51
Thorium-227		0.10	
Thorium-228	14274-82-9	2.17	0.69 [1]

Table 2.5 Identification of Future Constituants of Potential Concern for the Construction Worker in Groundwater Sceened with Combined production Well and Modeled Bedrock Data

Chemical	CAS Number	Maximum Future Concentration for Screening	Construction Worker Risk-Based GV
Inorganics (ug/L)			
Aluminum	7429-90-5	1592.56	0
Antimony	7440-36-0	45.38	4.1
Beryllium**	7440-41-7	0.09	6.60E-02
Bismuth**	7440-69-9	7.44	
Boron**		33.29	
Cadmium	7440-43-9	8.91	5.1
Chromium	7440-47-3	5652.40	51
Cobalt**	10198-40-0	37.06	
Copper	7440-50-8	667.49	0
Lead**	7439-92-1	45.08	
Lithium	7439-93-2	616.37	0
Manganese	7439-96-5	524.22	51
Molybdenum	7439-96-5	62.24	0
Nickel	7440-02-0	1484.22	200
Selenium		0.42	
Thallium	7440-28-0	8.68	0
Tin	7440-31-5	53.57	0
Organics (ug/L)			
1,1,1-trichloroethane	71-55-6	4.02	
1,2-cis-Dichloroethene	156-59-2	8.53	
1,2-Dichloroethene**	540-59-0	21.02	
Alpha Chlordane**		0.01	
Carbon Tetrachloride**		34.79	2.00
Chloroform	67-66-3	8.29	
Radionuclides (pCi/L)			
Bismuth-210	13982-38-2	0.45	
Plutonium-239/240	13981-16-3/15117-48-3	2.16	2.50
Radium-226	13982-63-3	5.48	2.70
Thorium-228	14274-82-9	3.24	3.50
Tritium	10028-17-8	9613.03	11000.00
Uranium-234	13966-29-5	8.50	18.00
Uranium-238	7440-61-1	8.45	13.00

Table 2.6 Identification of Future Constituants of Potential Concern for the Site Worker in Groundwater Sceened with Combined production Well and Modeled Bedrock Data

Chemical	CAS Number	Maximum Future Concentration for Screening	Site Employee Risk-Based GV	
Inorganics (ug/L)				
Aluminum	7429-90-5	1592.56		
Antimony	7440-36-0	45.38	4.10	
Beryllium**	7440-41-7	0.09	6.70E-02	
Bismuth**	7440-69-9	7.44		
Boron**		33.29		
Cadmium	7440-43-9	8.91	5.10	
Chromium	7440-47-3	5652.40	51.00	
Cobalt**	10198-40-0	37.06		
Copper	7440-50-8	667.49		
Lead**	7439-92-1	45.08		
Lithium	7439-93-2	616.37		
Manganese	7439-96-5	524.22	51.00	
Molybdenum	7439-96-5	62.24		
Nickel	7440-02-0	1484.22	200.00	
Selenium		0.42		
Thallium	7440-28-0	8.68		
Tin	7440-31-5	53.57		
Organics (ug/L)				
1,1,1-trichloroethane	71-55-6	4.02		
1,1,2 trichloro-1,2,2-trifluoroethane*	156-59-2	34.42		COC current production
1,2-cis-Dichloroethene	156-59-2	8.53		?
1,2-Dichloroethene**	540-59-0	21.02		
Alpha Chlordane**		0.01		
Carbon Tetrachloride**		34.79	2.20	
Chloroform	67-66-3	8.29		
Radionuclides (pCi/L)				
Actinium-227*	14952-40-0	0.53	0.26	COC current production
Bismuth-210	13982-38-2	0.45		
Plutonium-239/240	13981-16-3/15117-48-3	2.16	0.51	
Radium-226	13982-63-3	5.48	0.54	
Thorium-227*		0.06		COC current production

Soil contaminant data for Parcel 3 collected prior to the Mound 2000 process are documented in a number of DOE reports. These references include:

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

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

In the Mound 2000 process, radionuclide and chemical contaminants were studied on a PRS basis. There are three PRSs within Parcel 3; PRS 99, PRS 100, and PRS 241. PRS 241 is the result of several soil gas detections by the Soil Gas Survey and Geophysical Investigation (*Soil Gas Survey and Geophysical Investigation - Reconnaissance Sampling Report*, (February, 1993)). PRS 241 includes the northwest parking lots, including the parking lots east of OSE Building, south of GH building and the parking lot north of A Building. No operations are known to have been performed in the parking lots. The items reportedly included in the fill material on which the parking lot south of GH is located prompted the identification of PRS 99 and 100. The Radiological Site Survey Project (*OU-9 Site Scoping Report, Vol. 3 - Radiological Site Survey*, Final, (June, 1993)) observed Plutonium-238, Thorium, Tritium, Cesium-137, and Radium-226 below Risk Based Guideline Criteria. The reconnaissance soil gas sampling detected trichloroethene (TCE) at 8 ppb and toluene at 255 ppb. Both are below Risk Based Guideline Criteria.

PRS 99, also known as Area 6 or WD Building Filter Cleaning Waste, is a trench in the parking lot south of GH Building. It was believed to contain drums of Polonium-210 contaminated sand resulting from the sandblast cleaning of the WD building sand filters. It was thought that the sand may also be contaminated with Cobalt-60 and Cesium-137. In February 1999, 137 samples were collected from 46 borings in the parking lot south of GH Building to include PRS 99. One sample displayed an elevated concentration of Plutonium-238 (106 pCi/g). A trenching investigation yielded evidence of greater contamination (up to 839 pCi/g of Plutonium-238). A Removal Action was performed which resulted in Plutonium-238 concentrations below the 55 pCi/g Risk Based Guideline Value (*PRS 99 OSC Report*, July 2000).

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

A summary of the contaminants detected in Parcel 3 soils is shown in Tables 2-7 and 2-8.

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 Parcel 3 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 2.7 Identification of Constituents of Potential Concern for the Construction Worker Scenario in Parcel 3

Chemical	CAS Number	Maximum Concentration	Location of Maximum Concentration	Background Value	Construction Worker Risk-Based GV
Inorganics					
None					
Organics					
None					
Radionuclides (pCi/g)					
Plutonium-238	13981-16-3	34.80	602 (0)	0.13	5.50

Table 2.8 Identification of Constituents of Potential Concern for the Site Worker Scenario in Parcel 3

Chemical	CAS Number	Maximum Concentration	Location of Maximum Concentration (depth in ft)	Background Value	Site Employee Risk-Based GV
Inorganics					
None					
Organics					
None					
Radionuclides (pCi/g)					
Plutonium-238	13981-16-3	34.80	602 (0)	0.13	11.00

2.7.1 Identification of Contaminants

The contaminants of concern (COCs) for Parcel 3 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 Parcel 3 are listed in Tables 2-3 through 2-8.

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 Parcel 3 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 Parcel 3 include ingestion of soil and groundwater.

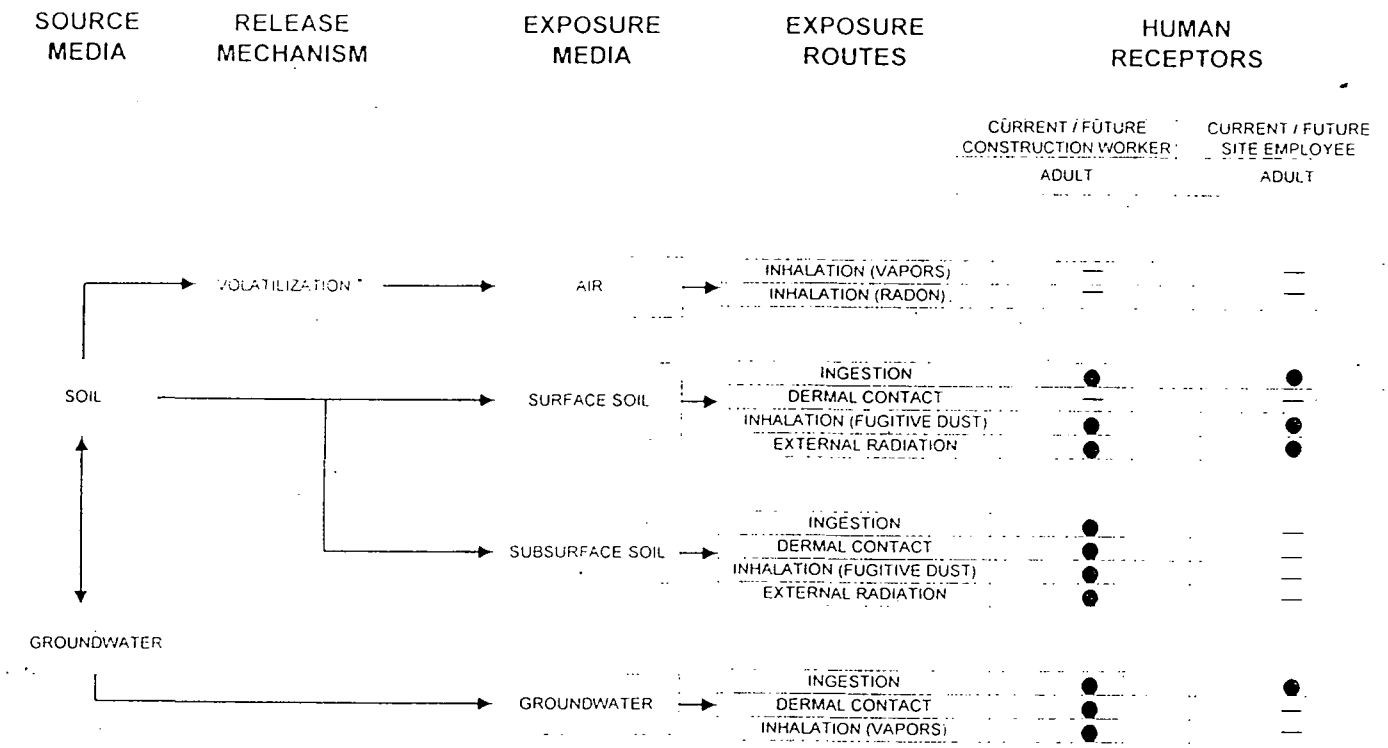
Using equations developed to support the SCM, exposures to specific concentrations of COCs are evaluated based on assuming intake rates for soil and groundwater. Once the intakes are estimated, the human health implications of those intakes are evaluated by reviewing toxicological data for the COCs.

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 Parcel 3 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 Parcel 3 COCs has been developed.

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



● COMPLETE PATHWAY EVALUATED QUANTITATIVELY

COMPLETE PATHWAY EVALUATED QUALITATIVELY

— INCOMPLETE PATHWAY, NOT EVALUATED

* NO VOLATILE COPCs IN AREA

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 Parcel 3 are shown in Table 2-9. 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 Parcel 3 remain acceptable.

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

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 Parcel 3 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 Parcel 3 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 Tables 2-5 and 2-6.

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*, Final, Revision 1 (April, 1999) and are included in Table 2-9.

The HI and risk values presented in Table 2-9 for the current groundwater, future groundwater, and air scenarios are therefore believed to adequately bound the potential cumulative risk for Parcel 3. 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 2-9 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 Pacel 3. In addition, Parcel 3 is composed entirely of a parking lot, roads, and mowed lawns. There are no wetlands or surface waters located in Parcel 3 and no sensitive habitats. Therefore, DOE has determined, with concurrence from US EPA and OEPA, that an ecological assessment for Parcel 3 is not necessary (letter US EPA to DOE, (March 9, 2000) and letter OEPA to DOE, (March 30, 2000)).

2.8 Remediation Objectives

The primary remediation objective for Parcel 3 is to ensure the residual risk associated with the release block is acceptable for the defined use scenario of industrial occupants.

Table 2-9. Current and Future Residual Risks for Parcel 3

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	N/A	N/A	1.4	23	1.4	23
Carcinogenic Risks for Organics & Inorganics	N/A	N/A	$1.6x10^{-6}$	$1.9x10^{-3}$	$1.6x10^{-6}$	$1.9x10^{-3}$
Carcinogenic Risks for Radionuclides	$6.1x10^{-6}$	$2x10^{-7}$	$8.7x10^{-9}$	$7.3x10^{-9}$	$6.31x10^{-6}$	$6.31x10^{-6}$
			Construction Worker			
			Overall HI		1.4	23
			Overall Risk		$6.3x10^{-6}$	$1.9x10^{-3}$

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	N/A	N/A	1.1	7.2	1.1	7.2
Carcinogenic Risks for Organics & Inorganics	N/A	N/A	$0x10^{0}$	$1.6x10^{-5}$	$0x10^{0}$	$1.6x10^{-5}$
Carcinogenic Risks for Radionuclides	$2.6x10^{-6}$	$1.0x10^{-6}$	$9.1x10^{-6}$	$3.0x10^{-5}$	$1.27x10^{-5}$	$3.36x10^{-5}$
			Site Employee			
			Overall HI		1.1	7.2
			Overall Risk		$1.27x10^{-5}$	$4.96x10^{-5}$

2.9 Description of Alternatives

As documented in Section 2.7, the risk from both carcinogens and non-carcinogens from Parcel 3 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 Parcel 3, a remedy must be implemented to protect human heath and the environment into the future. Two alternatives were considered for Parcel 3; 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 Parcel 3.

2.9.2 Institutional Controls

In this alternative, institutional controls in the form of deed restrictions on future land use would be placed on Parcel 3. The objective of these institutional controls would be to prevent an unacceptable risk to human health and the environment by restricting the use of Parcel 3, including Parcel 3 soils, to that which is consistent with assumptions in the Parcel 3 RRE.. DOE or its successors would retain the right and responsibility to monitor, maintain, and enforce these institutional controls. In order to maintain protection for human health and the environment at Parcel 3 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 Parcel 3 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 Parcel 3 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 Parcel 3 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 B, 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 Parcel 3 have not been evaluated for any use other than on-site industrial use. Any off-site disposition of the Parcel 3 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 Parcel 3.

A copy of the deed is attached in Appendix A; this represents the remedy for Parcel 3. 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 Parcel 3 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 Parcel 3, "Maximum Contaminant Levels" or "MCLs" established under the Safe Drinking Water Act constitute chemical-specific ARARs and are listed in Appendix C. They apply to the bedrock ground water beneath Parcel 3. 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 Parcel 3, Ohio has identified two statutory provisions that describe site conditions that would prompt certain response actions. (See Appendix C). 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 C). The selected remedy will comply with these requirements.

It should be noted that any onsite management of Parcel 3 soils, not associated with a CERCLA response action, in a manner inconsistent with State law or any disposition of Parcel 3 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 Parcel 3.

Because this remedy will result in hazardous substances remaining in the Parcel 3 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 Parcel 3 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 Parcel 3 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

After 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 Parcel 3 are not anticipated.

3.0 RESPONSIVENESS SUMMARY

This section of the ROD presents stakeholder concerns about Parcel 3 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 Parcel 3**

Comment:

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:

CERCLA Section 120 Federal Facilities Agreement (FFA) with USEPA, October, 1990

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, 1993.

CERCLA Section 120 Federal Facilities Agreement (FFA) with USEPA and Ohio EPA, August, 1993.

Reconnaissance Sampling Report - Soil Gas and Geophysical Investigations Mound Plant and SM/PP Hill, February, 1993.

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

Operable Unit 9, Ecological Characterization Report, Technical Memorandum, Rev 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 5 New Property Remedial Investigation Report, Final, Revision 0, April, 1995.

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

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

Residual Risk Evaluation, Release Block D, Final, December, 1996.

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

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

PRS 241 Package, August, 1997.

Residual Risk Evaluation, Parcel 3, August 1997.

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

Technical Position Report in Support of the Release Block D RRE, Final, January 1999.

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

Technical Position Report in Support of the Parcel 3 Residual Risk Evaluation, Rev. 1 (Final Draft), April, 1999.

GH Building Data Package, July, 1999.

GP-1 Building Data Package, July, 1999.

Letter from Mr. Timothy J. Fischer, Remedial Project Manager, US EPA to Mr. Arthur Kleinrath, US DOE dated March 9, 2000, RE: Ecological Risk Assessment, Parcel 3.

Letter from Mr. Brian Nickel, Mound Project Manager, Office of Federal Facilities and Oversight, OEPA to Mr. Arthur Kleinrath, US DOE dated March 30, 2000, RE: DOE Mound Parcel 3 Ecological Assessment.

On-Scene Coordinator Report, PRS 99, July 2000.

PRS 100 Package, TBP.

PRS 99 Action Memo, Engineering Evaluation, Cost Analysis, TBP.

Residual Risk Evaluation, Parcel 3, TBP

Miamisburg Mound Comprehensive Reuse Plan, MMCIC, 1997 and Addendum 1999.

Appendix A

Quitclaim Deed for Parcel 3

DRAFT

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)), in consideration of 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 real property (hereinafter the Premises), commonly known as Parcel 3:

Situate in the State of Ohio, County of Montgomery and being parts of City of Miamisburg Lot Numbered 2259 and 2290, also being part of Sections 30, Fractional Town 2, Range 5 East M.R.S. and Fractional Section 36, Fractional Town 2, Range 5 East M.R.S. and being a portion previously conveyed to USA as described in Deed Book 1246, Page 45 and also being a portion previously conveyed to USA as described in Deed Book 1214, Page 12 and also being a portion previously conveyed to USA as described in Deed Book 1256, Page 179 containing 5.581 acres, more or less, and being more fully described in Exhibit A attached hereto and incorporated herein.

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 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 July 26, 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 _____, 2000.

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 _____, 2000, _____, 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

QUITCLAIM DEED

EXHIBIT A

for
Mound Parcel Three
containing
5.581 Acres

May 4, 2000

Situate in the State of Ohio, County of Montgomery and being parts of City of Miamisburg Lot Numbered 2259 and 2290, also being part of Sections 30, Fractional Town 2, Range 5 East M.R.S. and Fractional Section 36, Fractional Town 2, Range 5 East M.R.S. and being a portion previously conveyed to USA as described in Deed Book 1246, Page 45 and also being a portion previously conveyed to USA as described in Deed Book 1214, Page 12 and also being a portion previously conveyed to USA as described in Deed Book 1256, Page 179 and being more particularly described as follows:

COMMENCING at a Concrete Monument Found (Top Broken Off) at the Northwest corner of the Northwest Quarter of Section 30 said Monument also being the Northeast corner of a 2.90 Acre tract of land conveyed to Robert P. Heist as described in Deed MF 74-0526-C09, ***THENCE*** with the West line of said Heist Lands, ***South 05° 45′ 57″ West for a distance of 130.89 feet to a 1″ Iron Pipe Found Pinched*** at the Southwest corner of said Heist Lands and the Northwest corner of a 14.288 Acre tract conveyed to the Miamisburg Community Corporation as described in Deed MF 99-852-E11 and the ***TRUE POINT OF BEGINNING*** of the herein described tract;

THENCE with the West line of said Miamisburg Community Corporation lands the next seven calls:

1) THENCE, South 05° 29′ 16″ West for a distance of 57.67 feet to a 5/8″ Rebar Found with cap (LeRoy);

2) THENCE, South 65° 31′ 15″ West for a distance of 35.05 feet to a 5/8″ Rebar Found with cap (LeRoy);

3) THENCE, South 25° 44′ 48″ East for a distance of 160.76 feet to a 5/8″ Rebar Found with cap (LeRoy);

4) THENCE, South 64° 37′ 16″ East for a distance of 56.61 feet to a 5/8″ Rebar Found with cap (LeRoy);

5) THENCE, North 64° 01′ 25″ East for a distance of 37.94 feet to a 5/8″ Rebar Found with cap (LeRoy);

6) THENCE, South 25° 04′47″ East for a distance of 194.43 feet to a 5/8″ Rebar Found with cap (LeRoy);

7) THENCE on a Curve to the Left with a Radius of 360.67 feet, a Arc Length of 180.89 feet, a Delta Angle of 28° 44′ 12″, with a Chord Bearing of South 39° 26′ 53″ East and a Chord Distance of 179.00 feet to a 5/8″ Rebar Set;

THENCE on a new division line through said USA lands, *South 40° 10′ 27″ West for a distance of 91.34 feet to a Cross Notch Set;*

THENCE continuing on a new division line through said USA lands, *South 23° 57′ 22″ East for a distance of 17.73 feet to a 3 inch Existing Steel Fence Corner Found;*

THENCE continuing on a new division line through said USA lands, *South 64° 21′ 58″ West for a distance of 99.96 feet to a Mag Nail Set;*

THENCE continuing on a new division line through said USA lands, *North 50° 48′ 40″ West for a distance of 23.44 feet to a Mag Nail Set;*

THENCE continuing on a new division line through said USA lands, *South 65° 58′ 19″ West for a distance of 39.91 feet to Cross Notch Set;*

THENCE continuing on a new division line through said USA lands, *North 24° 24′ 48″ West for a distance of 308.00 feet to a 6 inch Existing Steel Fence Corner Found;*

THENCE continuing on a new division line through said USA lands, *North 59° 05′ 44″ East for a distance of 2.80 feet to a 6 inch Existing Steel Fence Corner Found;*

THENCE continuing on a new division line through said USA lands, *North 20° 40′ 57″ West for a distance of 10.55 feet to a Cross Notch Set;*

THENCE continuing on a new division line through said USA lands, *South 67° 51′ 08″ West for a distance of 3.37 feet to a Cross Notch Set;*

THENCE continuing on a new division line through said USA lands, ***North 24° 33′ 12″ West for a distance of 30.35 feet to a 6 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***North 50° 32′ 22″ West for a distance of 26.56 feet to a Mag Nail Set,*** passing a RR Spike Set at 8.09 feet on the West line of said Section 30;

THENCE continuing on a new division line through said USA lands, ***North 31° 01′ 18″ West for a distance of 13.93 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands, ***South 65° 08′ 57″ West for a distance of 7.98 feet to a Mag Nail Set;***
THENCE continuing on a new division line through said USA lands, ***South 23° 06′ 46″ East for a distance of 13.85 feet to a 4 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***South 63° 53′ 40″ West for a distance of 26.73 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***South 24° 54′ 44″ East for a distance of 45.10 feet to a Cross Notch Set*** on the Easterly extension of the Southerly line of an existing one story brick building named GS1;

THENCE continuing on a new division line through said USA lands and with the Southerly line of said GS1 building, ***South 65° 11′ 32″ West for a distance of 268.32 feet to a 5/8″ Rebar Set,*** passing the Southeasterly corner of said GS1 building at 62.6 feet and the Southwesterly corner of said GS1 building at 263.43 feet;

THENCE continuing on a new division line through said USA lands, ***North 24° 25′ 19″ West for a distance of 229.01 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands and with an existing fenceline, ***South 65° 33′ 23″ West for a distance of 284.61 feet to a Mini RR Spike Set in a 4 foot wide Concrete Walk at the Joint;***

THENCE continuing on a new division line through said USA lands,

North 24° 23′31″ West for a distance of 104.08 feet to a5/8″ Rebar Set on the South line of lands conveyed to the City of Miamisburg as described in Deed Book 594, Page 410, witness a Concrete Monument Found Bearing South 65° 36′ 29″ East at a distance of 38.74 feet;

THENCE with the South line of said City of Miamisburg lands, ***North 65° 36′ 29″ East for a distance of 770.61 feet BACK TO THE TRUE POINT OF BEGINNING.***

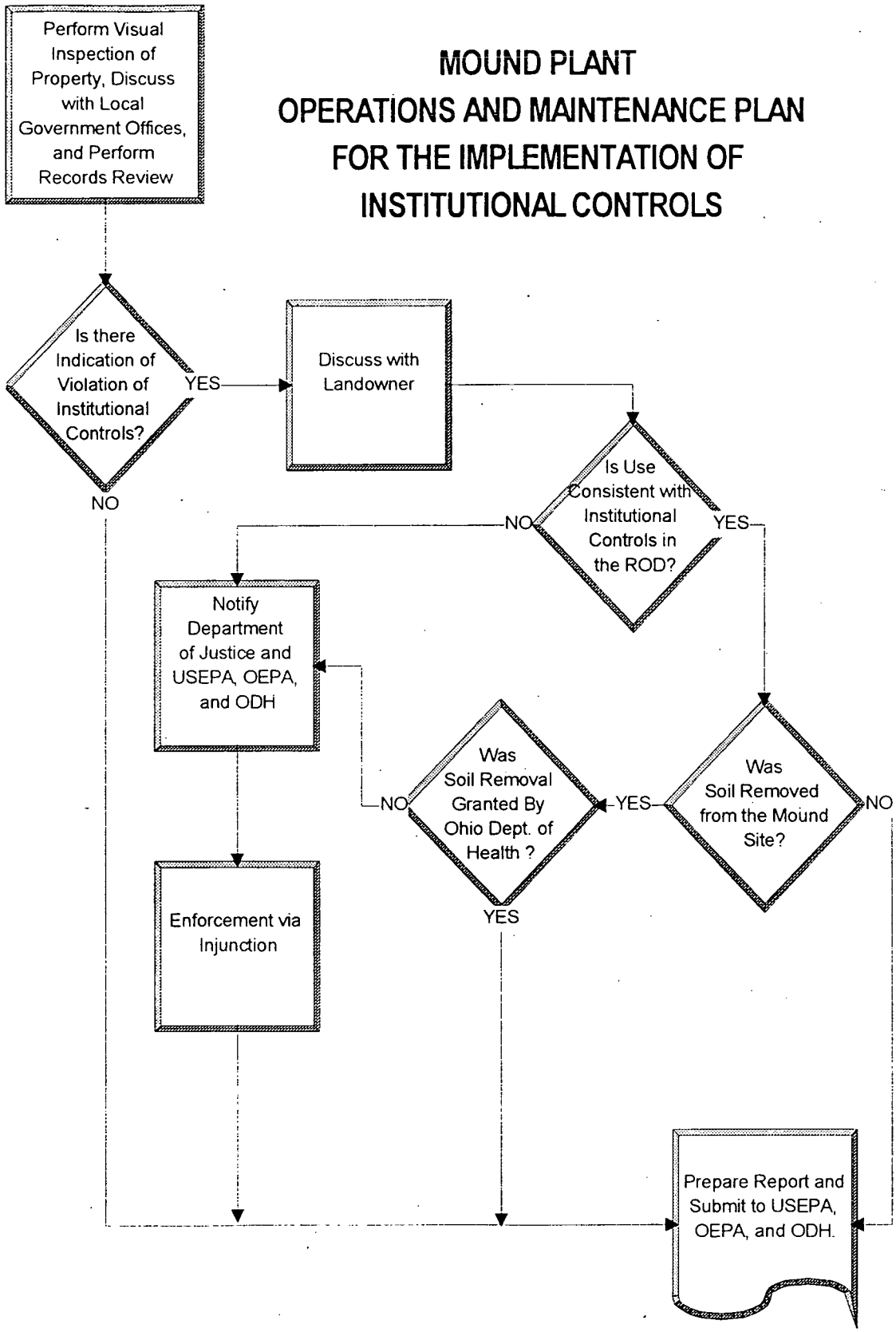
Said property contains 5.581 Acres more or less with 1.992 Acres more or less in Section 30 and 3.589 Acres more or less in Fractional Section 36. North based on State Plane Coordinates, Ohio South Zone taken from a survey performed by Lockwood, Jones and Beals dated 06-01-82 and referenced to Deed MF 99-852-E11: Note bearing South 25° 04′ 47″ East with a distance of 194.43 feet. This description is based on an actual field survey performed by HLS Surveyors and Engineers under the direct supervision of William C. LeRoy PS, Ohio Lic. No. 7664 and dated May, 2000. Subject to all Easements, Highways, Covenants and Restrictions.

_____
William C. LeRoy PS
Ohio Lic. No. 7664
KY. Lic. No. 3516

Appendix B

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

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



Appendix C

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

Page Redacted

Contains Proprietary Information

From: David Rakel
To: INTERNET:epa.state.oh.us:Brian:Nickel, DOE_OH.MOUN...
Date: 9/13/00 5:24pm
Subject: Parcel 3 ROD & Environmental Summary

Attached are the Draft versions of the Parcel 3 ROD and Environmental Summary. These documents were written using the risk information in the Parcel 3 RRE Draft Rev 3 (August 17, 2000). The groundwater risk information is being revised.

Please call me with any questions or concerns about these documents.

Dave

CC: DOE_OH.MOUND.Vincent Oba, KRUEJW, WILLMA, STAPJS

REVIEW TRANSMITTAL SHEET

FROM: D. Rakel DATE: 9/12/00

PHONE: MAIL:

RETURN WITH COMMENTS BY:

COPIES OF REVIEW TRANSMITTAL SHEET ONLY TO:

P-3 ROD Draft Rev 0 9/00
Also to Frank Schmally 9/12

DOCUMENTS ATTACHED & INSTRUCTIONS

Jeff & Floyd

Your first look at a ROD. The contaminants of concern, especially groundwater, are subject to change as the RRE is completed.

DR

TO:

REVIEW TEAM(AS APPLICABLE)	
REVIEW AREA	REVIEWER

REVIEWER'S RECOMMENDED ACTION

- [ ] Approved
- [ ] Approved as noted- Resubmission not required
- [ ] Reviewed- Please Note Comments & Respond*
- [ ] Rejected-See Comment Sheet*

Reviewed By: (Signature)

Date:

INSTRUCTIONS TO REVIEWER:
*Specific comments or questions requiring a response must be listed on Page 2 of this form or be attached.

**NO RESPONSE REQUIRED. Previous review noted resubmission not required. (Routed w/out attachments.)

Record of Decision for Parcel 3, Mound Plant, Miamisburg, Ohio

DRAFT (Rev. 1)

October 2000

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APPENDIX C Applicable Relevant and Appropriate Requirements For Parcel 3 . . . . . C-1

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
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

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 Parcel 3, Mound Plant, Miamisburg, Ohio

This Record of Decision (ROD) documents the remedy selected for Parcel 3 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 Parcel 3 which is located on the northern border of the developed area of the plant.

1.2 Basis and Purpose

This decision document presents the selected remedy for Parcel 3 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 Parcel 3, the risks from

carcinogens and non-carcinogens to current and future occupants of Parcel 3 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 Parcel 3 from the threat of contaminants in the groundwater, and will ensure that Parcel 3 soils are appropriately evaluated prior to any removal of Parcel 3 soils from the Mound Plant National Priority List (NPL) facility boundary (as owned in 1998).

1.4 Description of Selected Remedy

The selected remedy for Parcel 3 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 Parcel 3 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 Parcel 3 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 Parcel 3 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 Parcel 3 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 effectiveness of 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 Parcel 3 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.

Susan Brechbill 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 several parcels which are contiguous tracts of property designated for transfer of ownership. These parcels may be reconfigured to accommodate transfer of Mound property for economic development.

This ROD addresses Parcel 3 (Figure 2-2) which is located on the northern border of the developed area of the plant. The legal description of Parcel 3 is reproduced in Appendix A. Parcel 3 is generally bound to the south and west by the main plant, to the north by off-site residences, and to the east by a fenced parking lot.

There are two structures in Parcel 3; GH and GP-1.

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

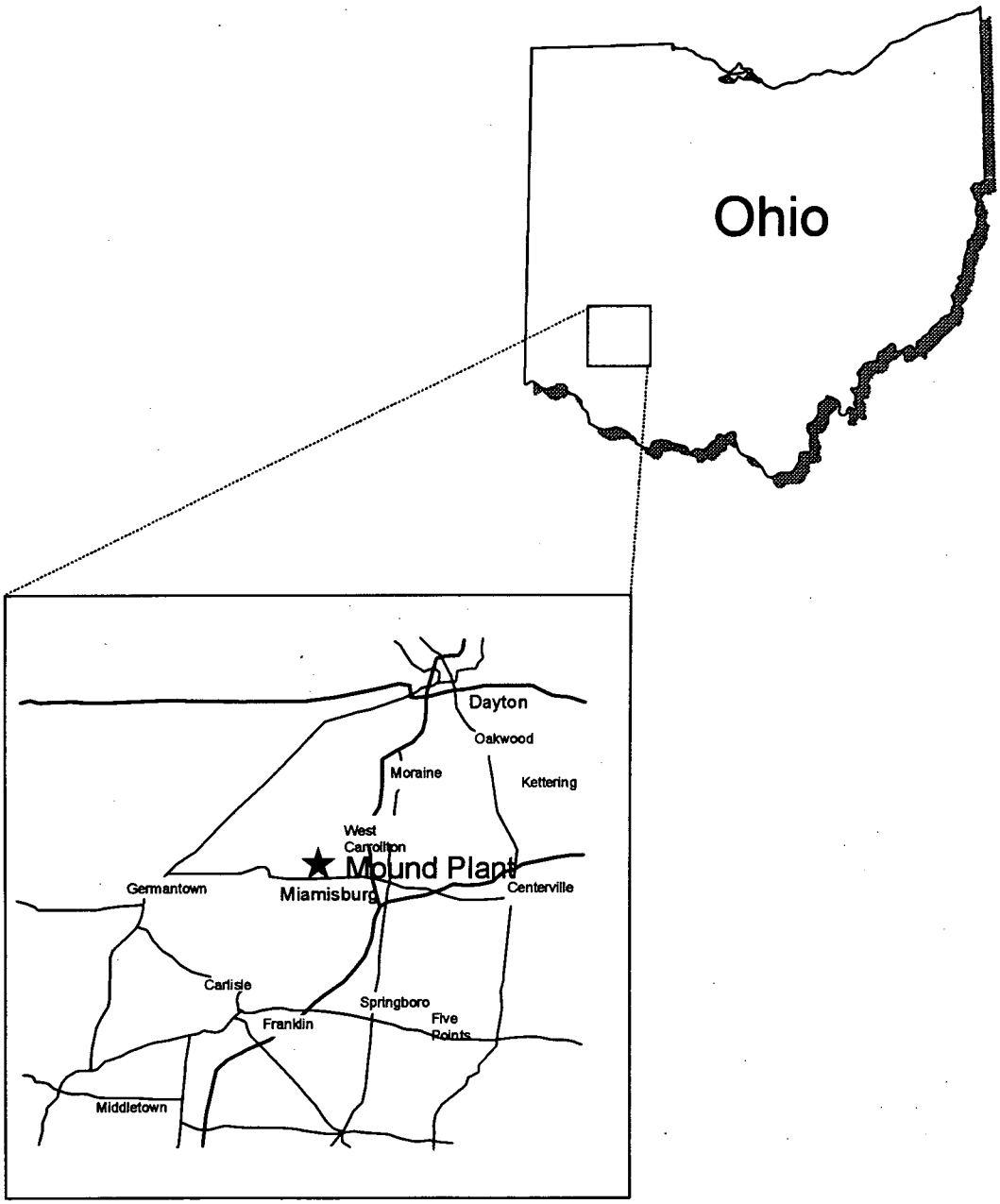
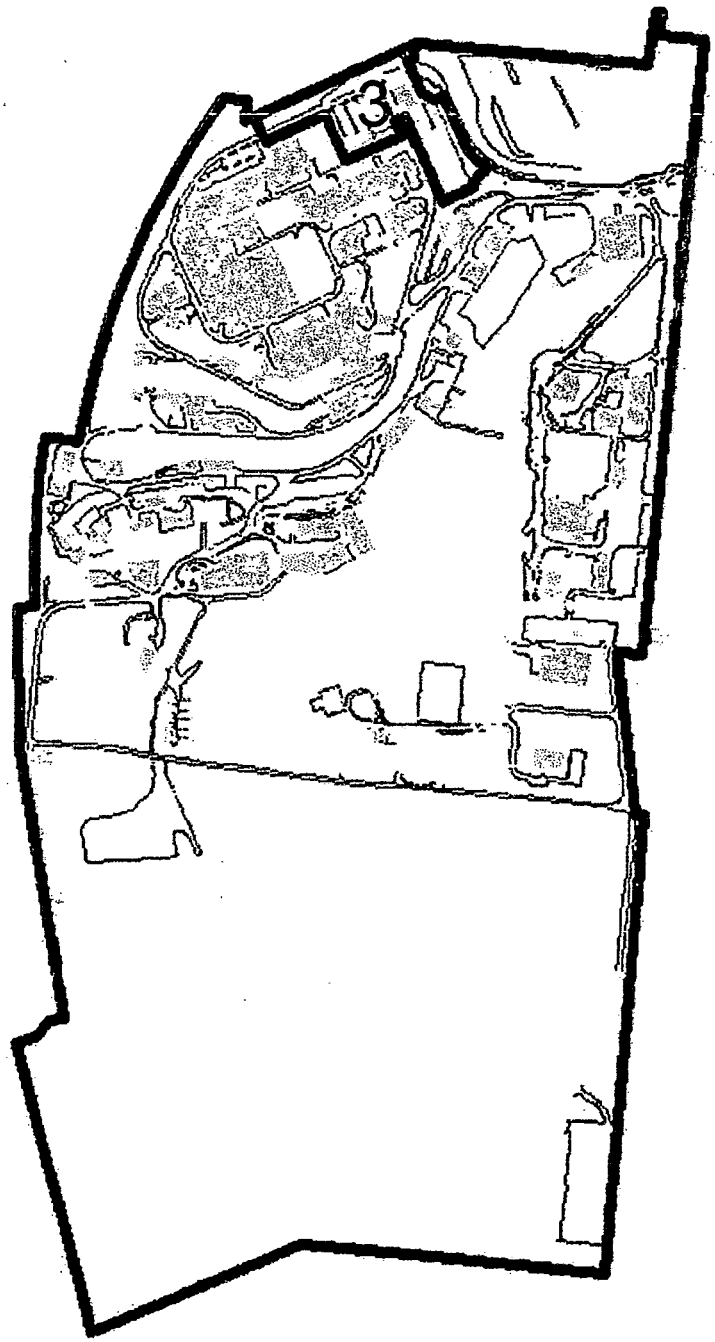


Figure 2-2. Location of Parcel 3



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), a location of known or suspected contamination. 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 and the environment 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), 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) decisions for PRSs 100 and 241 and buildings GH and GP-1 were provided. The Residual Risk Evalaution for Parcel 3 was also available for public comment. A listing of those opportunities is shown in Table 2-1.

Table 2-1. Public Comment Periods for Parcel 3 Documents

DOCUMENT (PRS/BUILDING)	COMMENT PERIOD (BEGIN)	COMMENT PERIOD (END)
99/100	8/23/00	9/25/00
241	6/17/97	7/18/97
GH	3/17/97	4/17/97
GP-1	3/17/97	4/17/97
Parcel 3 Residual Risk Evaluation	TBD	TBD

The *Proposed Plan for Parcel 3* was made available to the public on Day X, 2000. 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 Day X, 2000. A public comment period was held from Day X, 2000 through Day X, 2000. In addition, a public meeting was held on Day X, 2000 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 Parcel 3

Parcel 3 lies within what was once called Operable Unit 2 (OU2). There are two structures in Parcel 3. Parcel 3 includes Potential Release Sites (PRSs) that have

undergone previous investigations. 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 Parcel 3 have been evaluated and presented in the Parcel 3 Residual Risk Evaluation (RRE).

The PRSs in Parcel 3 were identified on the basis of historical information and actual measurements of contaminants. The location of the PRSs within Parcel 3 is shown in Figure 2-3. A description of the PRSs appears in Table 2-2. As shown in Table 2-2, the PRSs and remaining buildings in Parcel 3 were determined by the Core Team to require no further assessment.

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 Parcel 3. 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 Parcel 3

The PRSs within Parcel 3 have been evaluated by the Core Team. The following sections discuss the data relevant to Parcel 3 that are available from the general source documents and the Potential Release Site 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 and are documented in reports *Operable Unit 9 Background Soils Investigation Soil Chemistry Report* (September, 1994) and *Operable Unit 9, Regional Soils Investigation Report* (August, 1995).

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

Figure 2-3. Location of PRSs within Parcel 3

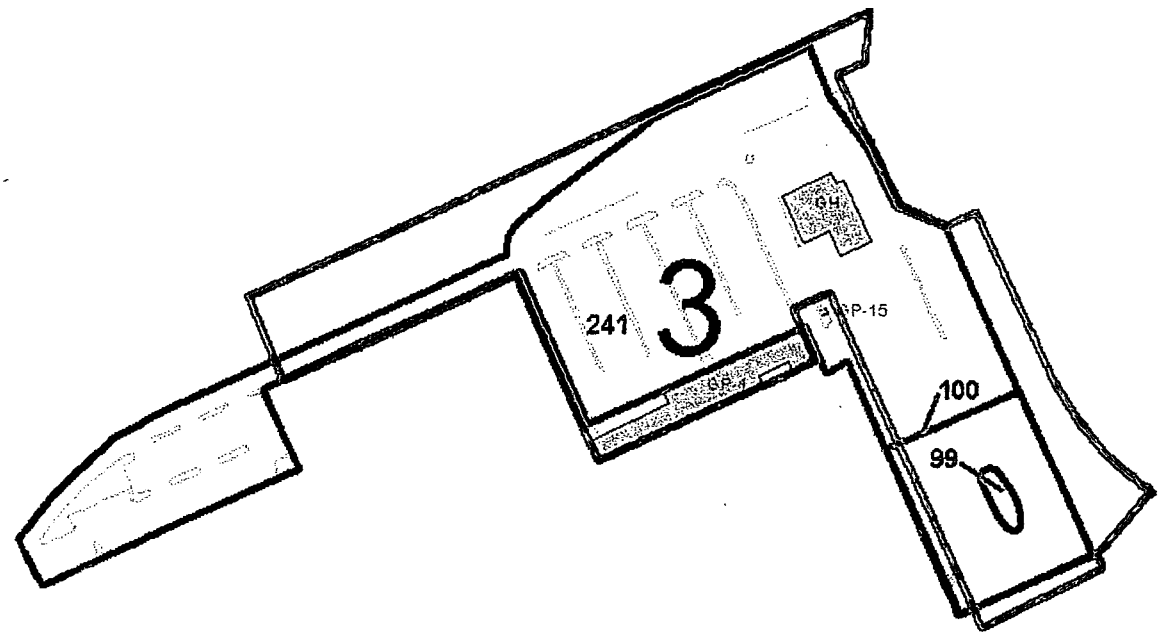


Table 2-2. Parcel 3 PRS and Building Core Team Conclusions

PRS/ BLDG*	Reason for Identification	Core Team Decision	Close Out of PRS/BDP
99	Reported disposal of drums containing sand contaminated with polonium-210, cobalt-60, and cesium-137	Removal Action conducted in August, 1999	OSC Report signed by Core Team on 7/12/00.
100	Reported disposal of neutralized chromium plating bath solution and process tank	Binned for NFA	Recommendation for NFA signed by Core Team on 8/16/00.
241	Several positive soil gas detections during Mound Plant Soil Gas and Geophysical Investigation (Reconnaissance Sampling Report - Soil Gas and Geophysical Investigations Mound Plant and SM/PP Hill, February 1993)	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 5/13/97.
GH	Office	NFA	Recommendation for NFA signed by Core team on 2/9/99.
GP-1	Guard force headquarters	NFA	Recommendation for NFA signed by Core Team on 2/9/99.

* Buildings remaining in Parcel 3

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. Appendix A of the RRE for Parcel 3 documents the specific groundwater data used to evaluate the current and future groundwater profile for Parcel 3. Summaries of the contaminants detected in Mound Plant groundwater, and those projected to potentially be present in Mound Plant groundwater in the future, are shown in Tables 2-3 through 2-6.

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 Parcel 3.

Table 2.3 Identification of Constituents of Potential Concern for the Construction Worker Scenario in Current Groundwater for Parcel 3

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	95 Percent UCL	Concentration Used for Screening and Risk	Background Value
Inorganics							
Antimony	2.8	40.20	ug/L	5-29	80.30	40.20	0.578
Cadmium	4.6	7.70	ug/L	6-32	5.25	5.25	
Copper	1.6	593.00	ug/L	22-32	57.40	57.40	1.167

Table 2.4 Identification of Constituents of Potential Concern for the Site Worker Scenario in Current Groundwater for Parcel 3

Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	95 Percent UCL	Concentration Used for Screening and Risk	Background Value
Inorganics							
Antimony	2.8	40.20	ug/L	5-29	80.30	40.20	0.578
Cadmium	4.6	7.70	ug/L	6-32	5.25	5.25	
Copper	1.6	593.00	ug/L	22-32	57.40	57.40	1.167
Radionuclides							
Actinium-227	0.50	0.50	pCi/L	1-10	NC	0.50	
Plutonium-239/240	0.00	2.00	pCi/L	6-20	8.87	2.00	0.125
Thorium-228	0.01	2.17	pCi/L	14-35	105.00	2.17	0.779
Uranium-234	0.20	8.14	pCi/L	14-19	NC	8.14	0.792

NC= 95% UCL not calculated, less than 20 samples in the data set.

Table 2.5 Identification of Future Constituants of Potential Concern for the Construction Worker in Groundwater Sceened with Combined Production Well and Modeled Bedrock Data

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value
Inorganics							
Aluminum	3.5	31500.00	ug/L	107/ 115	6840.00	6840.00	37.523
Antimony	0.22	41.60	ug/L	21/ 122	2.82	2.82	0.578
Beryllium**	0.02	2.30	ug/L	41/ 115	0.47	0.47	
Bismuth**	0.09	264.00	ug/L	23/ 103	23.20	23.20	
Cadmium	0.1	13.10	ug/L	11/ 124	0.75	0.75	
Chromium	0.15	44800.00	ug/L	78/ 120	5010.00	5010.00	6.076
Copper	0.3	514.00	ug/L	81/ 117	26.80	26.80	1.167
Lithium	2.6	4280.00	ug/L	87/ 102	123.00	123.00	55.7
Manganese	0.037	3030.00	ug/L	155/ 165	737.00	737.00	229.568
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	32.50	5.597
Nickel	1.1	6600.00	ug/L	82/ 120	749.00	749.00	34.957
Selenium	0.7	100.00	ug/L	10/ 112	1.78	1.78	
Thallium	0.9	22.00	ug/L	6/ 107	4.44	4.44	
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	33.00	17.1
Volatiles & Organic Compounds							
1,2-cis-Dichloroethene	0.12	17.00	ug/L	48/ 148	1.61	1.61	0.999
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	6.61	
Tetrachloroethene**	0.30	25.00	ug/L	55/ 247	3.37	3.37	
Trichloroethene	1.20	46.00	ug/L	152/ 273	5.12	5.12	
Americium-241	0.0045	30.90	pCi/L	6/ 43	2.87	2.87	0.139
Radium-226	0.1260	39.47	pCi/L	43/ 59	2.34	2.34	0.996
Strontium-90	0.39	42.40	pCi/L	7/ 57	2.22	2.22	0.975
Thorium-228	0.02	2440.00	pCi/L	39/ 54	90.70	90.70	0.779
Tritium	421.00	2816310.00	pCi/L	4440/4455	206000.00	206000.00	1485.47
Uranium-234	0.03	67.10	pCi/L	60/ 69	2.12	2.12	0.792
Uranium-235	0.02	50.30	pCi/L	18/ 45	5.71	5.71	0.814

**Constituent detected in bedrock well, but no in production well

Table 2.6 Identification of Future Constituants of Potential Concern for the Site Worker in Groundwater Sceened with Combined Production Well and Modeled Bedrock Data

Chemical	Minimum Concentration In Bedrock Wells	Maximum Concentration In Bedrock Wells	Units	Detection Frequency In Bedrock Wells	95 Percent UCL	Concentration Used for Screening	Background Value
Inorganics							
Aluminum	3.5	31500.00	ug/L	107/ 115	6840.00	6840.00	37.523
Antimony	0.22	41.60	ug/L	21/ 122	2.82	2.82	0.578
Chromium	0.15	44800.00	ug/L	78/ 120	5010.00	5010.00	6.076
Cobalt**	0.18	295.00	ug/L	46/ 115	18.50	18.50	1.032
Copper	0.3	514.00	ug/L	81/ 117	26.80	26.80	1.167
Lithium	2.6	4280.00	ug/L	87/ 102	123.00	123.00	55.7
Manganese	0.037	3030.00	ug/L	155/ 165	737.00	737.00	229.568
Molybdenum	0.79	474.00	ug/L	51/ 98	32.50	32.50	5.597
Nickel	1.1	6600.00	ug/L	82/ 120	749.00	749.00	34.957
Vanadium	0.15	277.00	ug/L	65/ 115	33.00	33.00	17.1
Volatiles & Organic Compounds							
1,2-cis-Dichloroethene	0.12	17.00	ug/L	48/ 148	1.61	1.61	0.999
1,2-Dichloroethene**	1.00	35.00	ug/L	13/ 38	6.61	6.61	
Trichloroethene	1.20	46.00	ug/L	152/ 273	5.12	5.12	
Americium-241	0.0045	30.90	pCi/L	6/ 43	2.87	2.87	0.139
Plutonium-239/240	0.020	1.00	pCi/L	12/ 51	0.42	0.42	0.125
Radium-226	0.1260	39.47	pCi/L	43/ 59	2.34	2.34	0.996
Strontium-90	0.39	42.40	pCi/L	7/ 57	2.22	2.22	0.975
Thorium-228	0.02	2440.00	pCi/L	39/ 54	90.70	90.70	0.779
Tritium	421.00	2816310.00	pCi/L	4440/4455	206000.00	206000.00	1485.47
Uranium-234	0.03	67.10	pCi/L	60/ 69	2.12	2.12	0.792
Uranium-235	0.02	50.30	pCi/L	18/ 45	5.71	5.71	0.814

**Constituent detected in bedrock well, but no in production well

Soil contaminant data for Parcel 3 collected prior to the Mound 2000 process are documented in a number of DOE reports. These references include:

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

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

In the Mound 2000 process, radionuclide and chemical contaminants were studied on a PRS basis. There are three PRSs within Parcel 3; PRS 99, PRS 100, and PRS 241. PRS 241 is the result of several soil gas detections by the Soil Gas Survey and Geophysical Investigation (*Soil Gas Survey and Geophysical Investigation - Reconnaissance Sampling Report,* (February, 1993)). PRS 241 includes the northwest parking lots, including the parking lots east of OSE Building, south of GH building and the parking lot north of A Building. No operations are known to have been performed in the parking lots. The items reportedly included in the fill material on which the parking lot south of GH is located prompted the identification of PRS 99 and 100. The Radiological Site Survey Project (*OU-9 Site Scoping Report, Vol. 3 - Radiological Site Survey*, Final, (June, 1993)) observed Plutonium-238, Thorium, Tritium, Cesium-137, and Radium-226 below Risk Based Guideline Criteria. The reconnaissance soil gas sampling detected trichloroethene (TCE) at 8 ppb (parts per billion or 1 in 1,000,000,000) and toluene at 255 ppb. Both are below Risk Based Guideline Criteria.

PRS 99, also known as Area 6 or WD Building Filter Cleaning Waste, is a trench in the parking lot south of GH Building. It was believed to contain drums of Polonium-210 contaminated sand resulting from the sandblast cleaning of the WD building sand filters. It was thought that the sand may also be contaminated with Cobalt-60 and Cesium-137. In February 1999, 137 samples were collected from 46 borings in the parking lot south of GH Building to include PRS 99. One sample displayed an elevated concentration of Plutonium-238 (106 pCi/g). A trenching investigation yielded evidence of greater contamination (up to 839 pCi/g of Plutonium-238). A Removal Action was performed which resulted in residual Plutonium-238 concentrations below the 55 pCi/g Risk Based Guideline Value (*PRS 99 OSC Report*, July 2000).

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

A summary of the contaminants detected in Parcel 3 soils is shown in Tables 2-7 and 2-8.

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.

2.7 Summary of Site Risks

The human health risks for Parcel 3 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 2.7 Identification of Soil Constituents of Potential Concern for the Construction Worker Scenario in Parcel 3

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	95 Percent UCL	Concentration Used for Screening	Background Value
Radionuclides									
14255-04-0	Lead-210	0.47	2.99	pCi/g	4459 (0)	70-145	0.85	0.85	NA
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	36-177	67.20	34.80	0.13

NA = Not Available

Table 2.8 Identification of Soil Constituents of Potential Concern for the Site Worker Scenario in Parcel 3

CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration (depth in ft)	Detection Frequency	95 Percent UCL	Concentration Used for Screening	Background Value
Radionuclides									
13981-16-3	Plutonium-238	0.02	34.80	pCi/g	602 (0)	28-160	28.20	28.20	0.13

2.7.1 Identification of Contaminants

The contaminants of concern (COCs) for Parcel 3 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 Parcel 3 are listed in Tables 2-3 through 2-8.

2.7.2 Exposure Assessment

The Site Conceptual Model (SCM) for Mound provides the basis for evaluating human exposure scenarios. The SCM for Mound was defined in the RREM. Because DOE and its regulators and stakeholders agree that the future use of Parcel 3 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 Parcel 3 include ingestion of soil and groundwater.

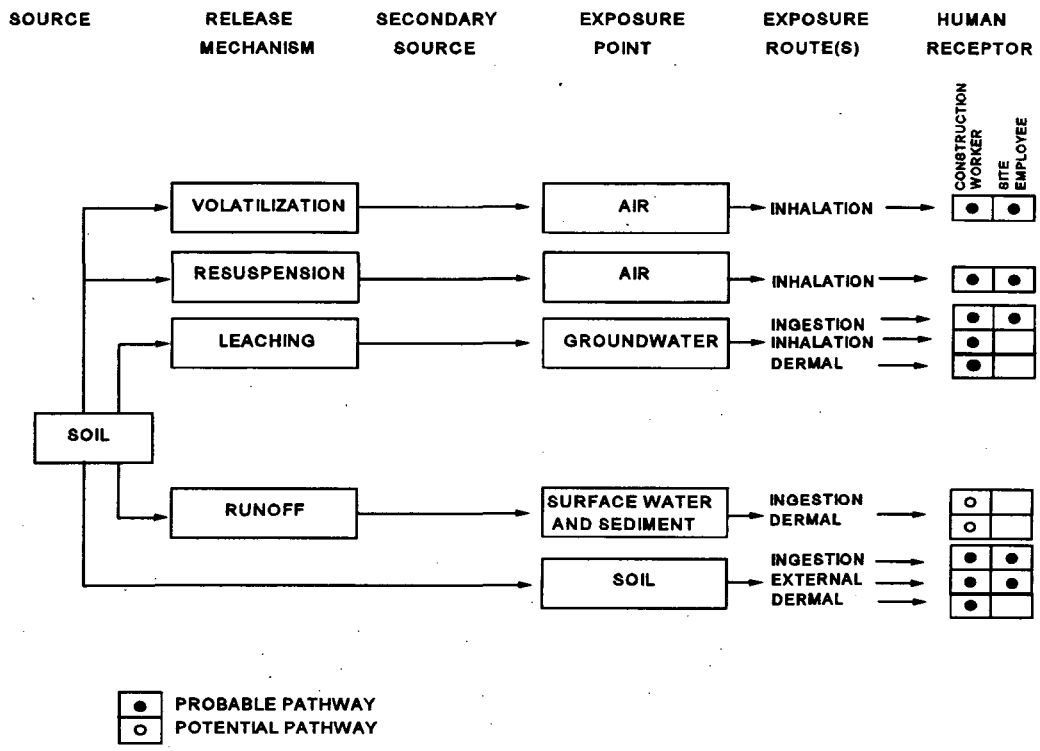
Using equations developed to support the SCM, exposures to specific concentrations of COCs are evaluated based on assuming intake rates for soil and groundwater. Once the intakes are estimated, the human health implications of those intakes are evaluated by reviewing toxicological data for the COCs.

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 Parcel 3 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 Parcel 3 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. The acceptable risk range as defined by CERCLA and the NCP is 10^{-4} to 10^{-6}. 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 incremental risks and hazards associated with residual concentrations of COCs in Parcel 3 are shown in Table 2-9. The incremental risks for the current Construction Worker (8×10^{-6}), current Site Employee (1×10^{-5}), and future Site Employee (5×10^{-5}) are within the acceptable risk range. The risk for the future Construction Worker (1×10^{-2}) exceeds this range. The HI for the current Construction Worker (1.4) and current Site Employee (1.1) exceed the limit (1). These values (as detailed in Section 6 of the RRE) are due to a single suspect measurement and are believed to overestimate the HI for these scenarios. The HI for the future Construction Worker (14) and future Site Employee (5.3) exceed the limit (1). The future risk and HI values in excess of the standards are due to the predicted future ground water contaminants. The ground water model is very conserative and likely overestimates the potential future ground water contaminants. Nevertheless, 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 Parcel 3 remain acceptable.

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

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 Parcel 3 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 Parcel 3 based on the assumption that contaminants found in bedrock will eventually migrate to the Mound Plant production wells 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 Tables 2-5 and 2-6.

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 D Residual Risk Evaluation*, Final, (January, 1999) and are included in Table 2-9.

The HI and risk values presented in Table 2-9 for the current groundwater, future groundwater, and air scenarios are therefore believed to adequately bound the potential cumulative risk for Parcel 3. 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 2-9 labeled "Sum of Soil, Air and Groundwater" are therefore believed to adequately bound the potential overall risk.

Table 2-9. Current and Future Residual Risks for Parcel 3

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	N/A	N/A	1.3	14	1.4	14
Carcinogenic Risks for Organics & Inorganics	N/A	N/A	$1.6x10^{-6}$	$1.4x10^{-2}$	$1.6x10^{-6}$	$1.4x10^{-2}$
Carcinogenic Risks for Radionuclides	$6.7x10^{-6}$	$2x10^{-7}$	N/A	$3.2x10^{-4}$	$6.9x10^{-6}$	$3.3x10^{-4}$
			Construction Worker			
			Overall HI		1.4	14
			Overall Risk		$8.5x10^{-6}$	$1.4x10^{-2}$

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	N/A	N/A	1.1	5.3	1.1	5.3
Carcinogenic Risks for Organics & Inorganics	N/A	N/A	0	$1.5x10^{-6}$	0	$1.5x10^{-6}$
Carcinogenic Risks for Radionuclides	$2.6x10^{-6}$	$1.0x10^{-6}$	$8x10^{-6}$	$4.6x10^{-5}$	$1.2x10^{-5}$	$5x10^{-5}$
			Site Employee			
			Overall HI		1.1	5.3
			Overall Risk		$1.2x10^{-5}$	$5.2x10^{-5}$

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 Parcel 3. In addition, Parcel 3 is composed entirely of parking lots, roads, two buildings and mowed lawns. There are no wetlands or surface waters located in Parcel 3 and no sensitive habitats. Therefore, DOE has determined, with concurrence from US EPA and OEPA, that an ecological assessment for Parcel 3 is not necessary (letter US EPA to DOE, (March 9, 2000) and letter OEPA to DOE, (March 30, 2000)).

2.8 Remediation Objectives

The primary remediation objective for Parcel 3 is to ensure the residual risk associated with the release block is acceptable for the defined use scenario of industrial occupants.

2.9 Description of Alternatives

As documented in Section 2.7, the risk from both carcinogens and non-carcinogens from Parcel 3 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 Parcel 3, a remedy must be implemented to protect human heath and the environment into the future. Two alternatives were considered for Parcel 3; 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 Parcel 3.

2.9.2 Institutional Controls

In this alternative, institutional controls in the form of deed restrictions on future land use would be placed on Parcel 3. The objective of these institutional controls would be to prevent an unacceptable risk to human health and the environment by

restricting the use of Parcel 3, including Parcel 3 soils, to that which is consistent with assumptions in the Parcel 3 RRE. DOE or its successors would retain the right and responsibility to monitor, maintain, and enforce these institutional controls. In order to maintain protection for human health and the environment at Parcel 3 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 Parcel 3 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 Parcel 3 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 Parcel 3 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 B, 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 Parcel 3 have not been evaluated for any use other than on-site industrial use. Any off-site disposition of the Parcel 3 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 Parcel 3.

A copy of the deed is attached in Appendix A; this represents the remedy for Parcel 3. 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 Parcel 3 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 Parcel 3, "Maximum Contaminant Levels" or "MCLs" established under the Safe Drinking Water Act constitute chemical-specific ARARs and are listed in Appendix C. They apply to the bedrock ground water beneath Parcel 3. 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 Parcel 3, Ohio has identified two statutory provisions that describe site conditions that would prompt certain response actions. (See Appendix C). 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 C). The selected remedy will comply with these requirements.

It should be noted that any onsite management of Parcel 3 soils, not associated with a CERCLA response action, in a manner inconsistent with State law or any disposition of Parcel 3 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 Parcel 3.

Because this remedy will result in hazardous substances remaining in Parcel 3 above levels that allow for unlimited use and unrestricted exposure, an annual review and report will be submitted to OEPA,

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. The selected remedy, 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. The selected remedy, 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 Parcel 3 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 Parcel 3 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

After 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 Parcel 3 are not anticipated.

3.0 RESPONSIVENESS SUMMARY

This section of the ROD presents stakeholder concerns about Parcel 3 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 Parcel 3**

Comment:

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:

CERCLA Section 120 Federal Facilities Agreement (FFA) with USEPA, October, 1990

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, 1993.

CERCLA Section 120 Federal Facilities Agreement (FFA) with USEPA and Ohio EPA, August, 1993.

Reconnaissance Sampling Report - Soil Gas and Geophysical Investigations Mound Plant and SM/PP Hill, February, 1993.

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

Operable Unit 9, Ecological Characterization Report, Technical Memorandum, Rev 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 5 New Property Remedial Investigation Report, Final, Revision 0, April, 1995.

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

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

Residual Risk Evaluation, Release Block D, Final, December, 1996.

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

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

PRS 241 Package, August, 1997.

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

Technical Position Report in Support of the Release Block D RRE, Final, January 1999.

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

GH Building Data Package, July, 1999.

GP-1 Building Data Package, July, 1999.

Letter from Mr. Timothy J. Fischer, Remedial Project Manager, US EPA to Mr. Arthur Kleinrath, US DOE dated March 9, 2000, RE: Ecological Risk Assessment, Parcel 3.

Letter from Mr. Brian Nickel, Mound Project Manager, Office of Federal Facilities and Oversight, OEPA to Mr. Arthur Kleinrath, US DOE dated March 30, 2000, RE: DOE Mound Parcel 3 Ecological Assessment.

On-Scene Coordinator Report, PRS 99, July 2000.

PRS 100 Package, August 2000.

PRS 99 Action Memo, Engineering Evaluation, Cost Analysis, October 2000.

Residual Risk Evaluation, Parcel 3, Final, TBP.

Miamisburg Mound Comprehensive Reuse Plan, MMCIC, 1997 and Addendum 1999.

Appendix A

Quitclaim Deed for Parcel 3

DRAFT

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)), in consideration of 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 real property (hereinafter the Premises), commonly known as Parcel 3:

Situate in the State of Ohio, County of Montgomery and being parts of City of Miamisburg Lot Numbered 2259 and 2290, also being part of Sections 30, Fractional Town 2, Range 5 East M.R.S. and Fractional Section 36, Fractional Town 2, Range 5 East M.R.S. and being a portion previously conveyed to USA as described in Deed Book 1246, Page 45 and also being a portion previously conveyed to USA as described in Deed Book 1214, Page 12 and also being a portion previously conveyed to USA as described in Deed Book 1256, Page 179 containing 5.581 acres, more or less, and being more fully described in Exhibit A attached hereto and incorporated herein.

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 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 July 26, 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 _____, 2000.

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 _____, 2000, _____, 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

QUITCLAIM DEED

EXHIBIT A

for
Mound Parcel Three
containing
5.581 Acres

May 4, 2000

Situate in the State of Ohio, County of Montgomery and being parts of City of Miamisburg Lot Numbered 2259 and 2290, also being part of Sections 30, Fractional Town 2, Range 5 East M.R.S. and Fractional Section 36, Fractional Town 2, Range 5 East M.R.S. and being a portion previously conveyed to USA as described in Deed Book 1246, Page 45 and also being a portion previously conveyed to USA as described in Deed Book 1214, Page 12 and also being a portion previously conveyed to USA as described in Deed Book 1256, Page 179 and being more particularly described as follows:

COMMENCING at a Concrete Monument Found (Top Broken Off) at the Northwest corner of the Northwest Quarter of Section 30 said Monument also being the Northeast corner of a 2.90 Acre tract of land conveyed to Robert P. Heist as described in Deed MF 74-0526-C09, ***THENCE*** with the West line of said Heist Lands, ***South 05° 45′ 57″ West for a distance of 130.89 feet to a 1″ Iron Pipe Found Pinched*** at the Southwest corner of said Heist Lands and the Northwest corner of a 14.288 Acre tract conveyed to the Miamisburg Community Corporation as described in Deed MF 99-852-E11 and the ***TRUE POINT OF BEGINNING*** of the herein described tract;

THENCE with the West line of said Miamisburg Community Corporation lands the next seven calls:

1) THENCE, South 05° 29′ 16″ West for a distance of 57.67 feet to a 5/8″ Rebar Found with cap (LeRoy);

2) THENCE, South 65° 31′ 15″ West for a distance of 35.05 feet to a 5/8″ Rebar Found with cap (LeRoy);

3) THENCE, South 25° 44′ 48″ East for a distance of 160.76 feet to a 5/8″ Rebar Found with cap (LeRoy);

4) THENCE, South 64° 37′ 16″ East for a distance of 56.61 feet to a 5/8″ Rebar Found with cap (LeRoy);

5) THENCE, North 64° 01′ 25″ East for a distance of 37.94 feet to a 5/8″ Rebar Found with cap (LeRoy);

6) THENCE, South 25° 04′47″ East for a distance of 194.43 feet to a 5/8″ Rebar Found with cap (LeRoy);

7) THENCE on a Curve to the Left with a Radius of 360.67 feet, a Arc Length of 180.89 feet, a Delta Angle of 28° 44′ 12″, with a Chord Bearing of South 39° 26′ 53″ East and a Chord Distance of 179.00 feet to a 5/8″ Rebar Set;

THENCE on a new division line through said USA lands, *South 40° 10′ 27″ West for a distance of 91.34 feet to a Cross Notch Set;*

THENCE continuing on a new division line through said USA lands, *South 23° 57′ 22″ East for a distance of 17.73 feet to a 3 inch Existing Steel Fence Corner Found;*

THENCE continuing on a new division line through said USA lands, *South 64° 21′ 58″ West for a distance of 99.96 feet to a Mag Nail Set;*

THENCE continuing on a new division line through said USA lands, *North 50° 48′ 40″ West for a distance of 23.44 feet to a Mag Nail Set;*

THENCE continuing on a new division line through said USA lands, *South 65° 58′ 19″ West for a distance of 39.91 feet to Cross Notch Set;*

THENCE continuing on a new division line through said USA lands, *North 24° 24′ 48″ West for a distance of 308.00 feet to a 6 inch Existing Steel Fence Corner Found;*

THENCE continuing on a new division line through said USA lands, *North 59° 05′ 44″ East for a distance of 2.80 feet to a 6 inch Existing Steel Fence Corner Found;*

THENCE continuing on a new division line through said USA lands, *North 20° 40′ 57″ West for a distance of 10.55 feet to a Cross Notch Set;*

THENCE continuing on a new division line through said USA lands, *South 67° 51′ 08″ West for a distance of 3.37 feet to a Cross Notch Set;*

THENCE continuing on a new division line through said USA lands, ***North 24° 33′ 12″ West for a distance of 30.35 feet to a 6 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***North 50° 32′ 22″ West for a distance of 26.56 feet to a Mag Nail Set,*** passing a RR Spike Set at 8.09 feet on the West line of said Section 30;

THENCE continuing on a new division line through said USA lands, ***North 31° 01′ 18″ West for a distance of 13.93 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands, ***South 65° 08′ 57″ West for a distance of 7.98 feet to a Mag Nail Set;***
THENCE continuing on a new division line through said USA lands, ***South 23° 06′ 46″ East for a distance of 13.85 feet to a 4 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***South 63° 53′ 40″ West for a distance of 26.73 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***South 24° 54′ 44″ East for a distance of 45.10 feet to a Cross Notch Set*** on the Easterly extension of the Southerly line of an existing one story brick building named GS1;

THENCE continuing on a new division line through said USA lands and with the Southerly line of said GS1 building, ***South 65° 11′ 32″ West for a distance of 268.32 feet to a 5/8″ Rebar Set,*** passing the Southeasterly corner of said GS1 building at 62.6 feet and the Southwesterly corner of said GS1 building at 263.43 feet;

THENCE continuing on a new division line through said USA lands, ***North 24° 25′ 19″ West for a distance of 229.01 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands and with an existing fenceline, ***South 65° 33′ 23″ West for a distance of 284.61 feet to a Mini RR Spike Set in a 4 foot wide Concrete Walk at the Joint;***

THENCE continuing on a new division line through said USA lands,

North 24° 23′31″ West for a distance of 104.08 feet to a5/8″ Rebar Set on the South line of lands conveyed to the City of Miamisburg as described in Deed Book 594, Page 410, witness a Concrete Monument Found Bearing South 65° 36′ 29″ East at a distance of 38.74 feet;

THENCE with the South line of said City of Miamisburg lands, ***North 65° 36′ 29″ East for a distance of 770.61 feet BACK TO THE TRUE POINT OF BEGINNING.***

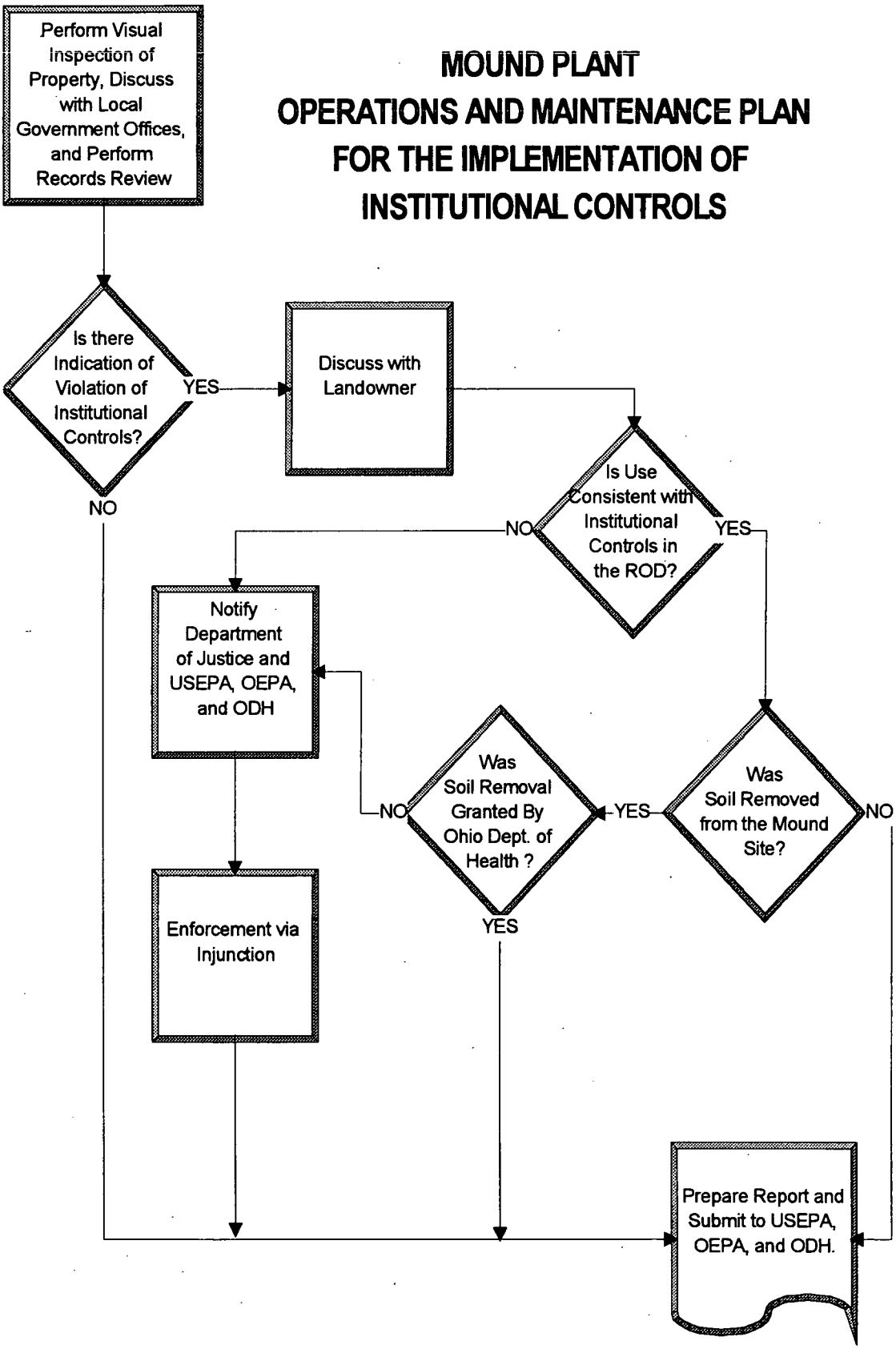
Said property contains 5.581 Acres more or less with 1.992 Acres more or less in Section 30 and 3.589 Acres more or less in Fractional Section 36. North based on State Plane Coordinates, Ohio South Zone taken from a survey performed by Lockwood, Jones and Beals dated 06-01-82 and referenced to Deed MF 99-852-E11: Note bearing South 25° 04′ 47″ East with a distance of 194.43 feet. This description is based on an actual field survey performed by HLS Surveyors and Engineers under the direct supervision of William C. LeRoy PS, Ohio Lic. No. 7664 and dated May, 2000. Subject to all Easements, Highways, Covenants and Restrictions.

_____
William C. LeRoy PS
Ohio Lic. No. 7664
KY. Lic. No. 3516

Appendix B

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

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



Appendix C

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

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Contains Proprietary Information

Parcel 3

Record of Decision

Mound Plant
Miamisburg, Ohio

DRAFT PROPOSED FINAL

JULY 2001

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APPENDIX B Mound Plant O&M Plan for the Implementation of Institutional Controls

APPENDIX C ARARs for Parcel 3

APPENDIX D Memorandum to file

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
COPC	Constituent of Potential Concern
CSM	Conceptual Site Model
DOE	Department of Energy
FFA	Federal Facilities Agreement
FOD	frequency of detection
HEAST	Health Effects Assessment Summary Table
HI	Hazard Index
HQ	Hazard Quotient
HTO	tritium oxide
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
MEMP	Miamisburg Environmental Management Project
MMCIC	Miamisburg Mound Community Improvement Corporation
Mn	manganese
NCP	National Contingency Plan
NFA	No Further Assessment
NPL	National Priority List
ODH	Ohio Department of Health
OEPA	Ohio Environmental Protection Agency
O & M	Operations and Maintenance
OSC	On-Scene Coordinator
OU	Operable Unit
PRS	Potential Release Site
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
SDWA	Safe Drinking Water Act

SM/PP	Special Metallurgical/Plutonium Processing
TCE	trichloroethene(ethylene)
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
WD	Waste Disposal

This Record of Decision (ROD) documents the remedy selected for Parcel 3 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 checklist 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 located approximately 10 miles southwest of Dayton and 45 miles north of Cincinnati. This ROD addresses Parcel 3, which is located on the northern border of the plant.

1.2 BASIS AND PURPOSE

This decision document presents the selected remedy for Parcel 3 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 *Parcel 3 Residual Risk Evaluation* (RRE), *Public Review Draft* (April 2001), the risks from carcinogens and non-carcinogens to current and future occupants of Parcel 3 were evaluated. In those analyses, land use was limited to industrial/commercial use scenario and the type of occupant was limited to and represented by a construction worker and a site employee (office employee). Based on the RRE, the incremental risks from potential exposure to residual carcinogenic contaminants for current industrial/commercial use are within the acceptable range. The incremental carcinogenic risks for future industrial/commercial use are within the acceptable risk range for the site employee scenario, but exceed the acceptable range for the construction worker scenario. Non-carcinogenic hazards for current and future industrial/commercial use exceed the target Hazard Index (HI) of one. All exceedances are due to potential exposure to groundwater. 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/commercial purposes.

As described below, the remedy, and other legislative measures (such as compliance with the Safe Drinking Water Act (SDWA)), will protect future occupants of Parcel 3 from the threat of contaminants in the groundwater. The remedy will ensure that Parcel 3 soils are appropriately evaluated prior to any removal of Parcel 3 soils from the Mound Plant National Priority List (NPL) facility boundary (as owned in 1998).

1.4 DESCRIPTION OF SELECTED REMEDY

The selected remedy for Parcel 3 is institutional controls in the form of deed restrictions on future land and groundwater 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 Parcel 3 in the future, the institutional controls to be adopted will ensure:

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

A copy of the deed is included as Appendix A.

1.5 STATUTORY DETERMINATIONS

The selected remedy for Parcel 3 is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate, is cost-effective, and utilizes a permanent solution to the maximum extent practicable. Because this remedy will result in hazardous substances remaining in Parcel 3 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 effectiveness of 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 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 Parcel 3 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.

Susan Brechbill 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

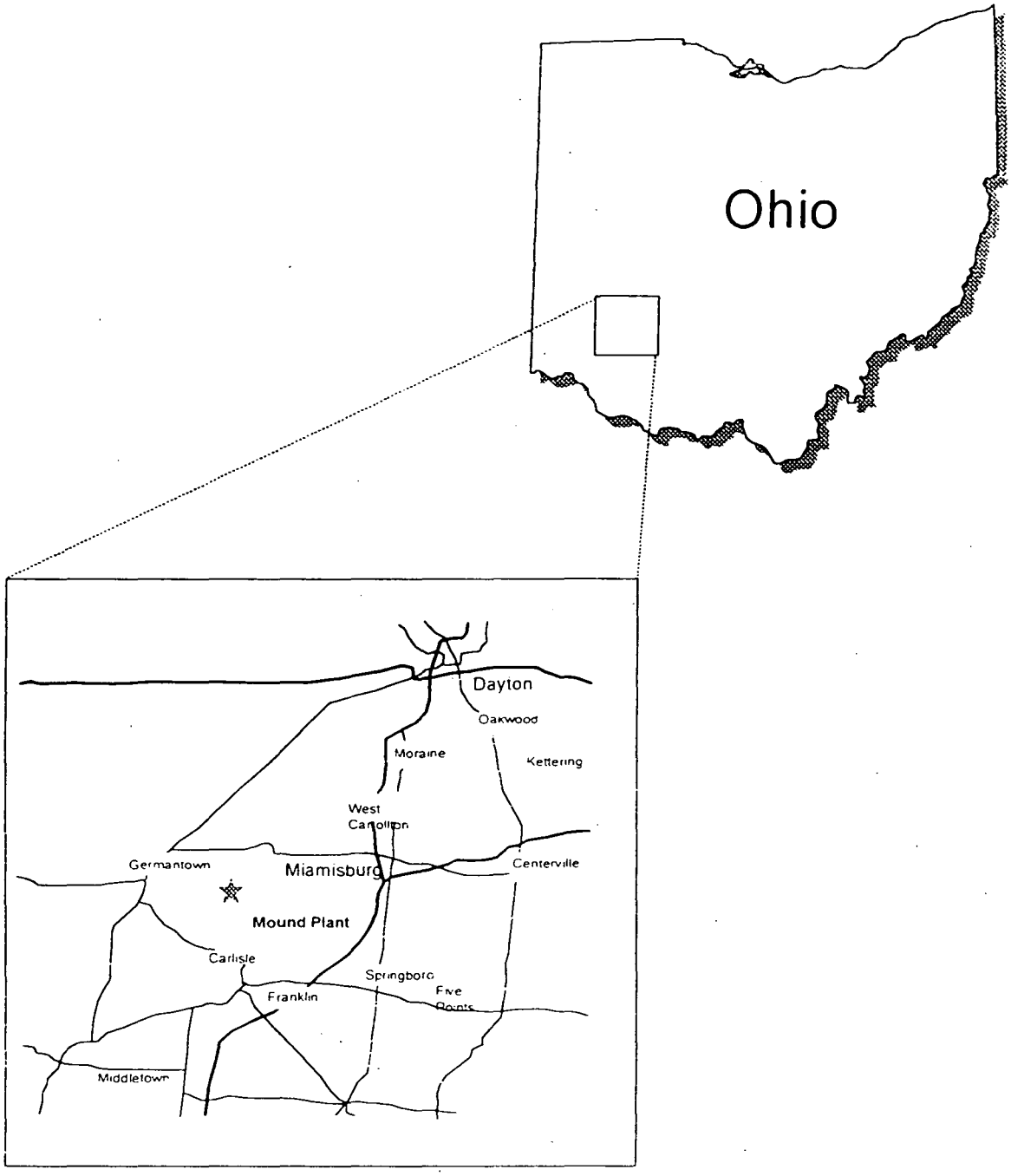


Figure 1: Regional Context of the Mound Plant

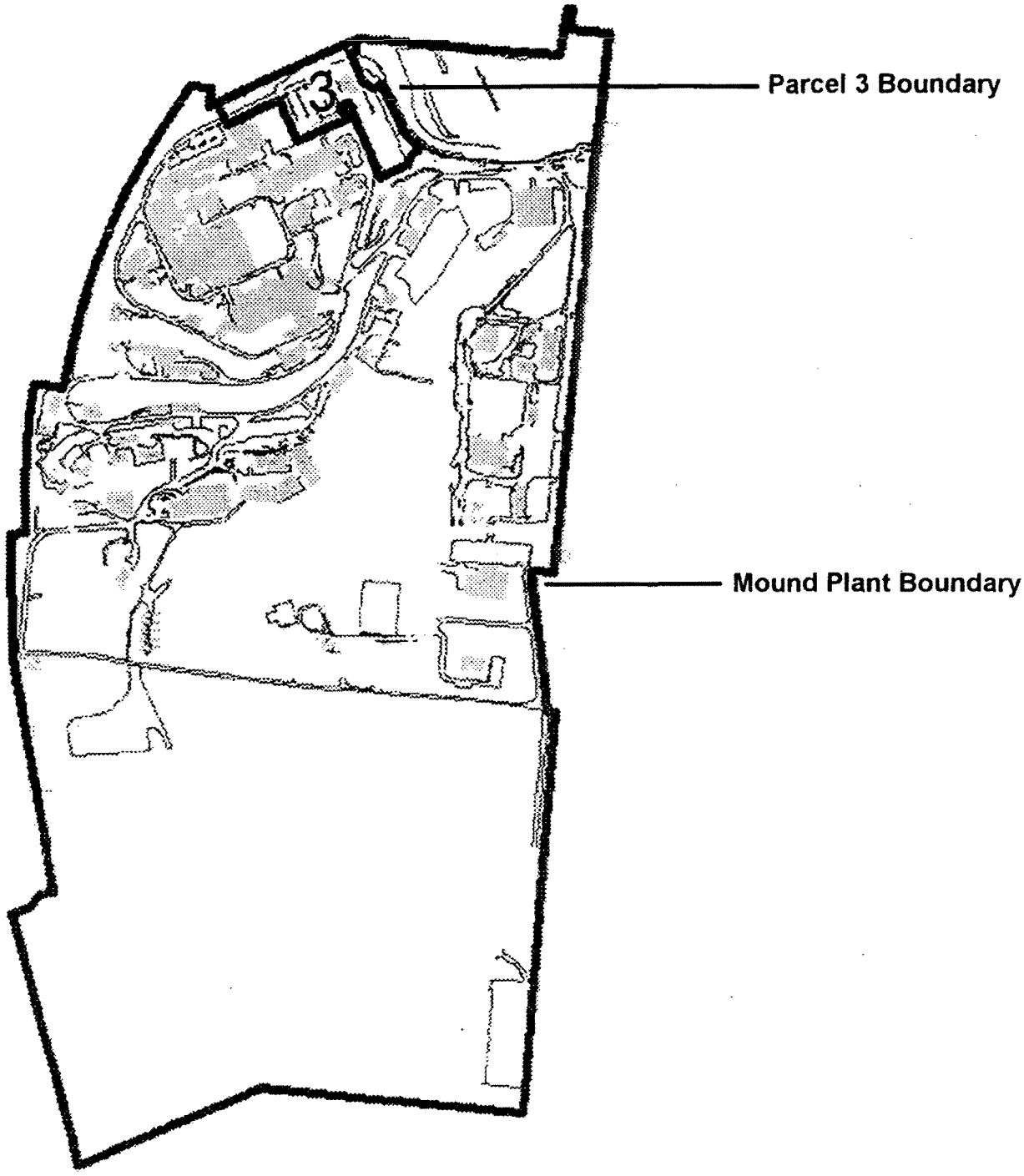


Figure 2: Location of Parcel 3

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 1). The Mound Plant is located approximately 10 miles southwest of Dayton and 45 miles north of Cincinnati. Miamisburg is predominantly a residential community with supportive commercial facilities and industrial development. The adjacent upland areas are used primarily for residences and agriculture or are undeveloped open spaces.

The Mound property is divided into ten parcels that are contiguous tracts of property designated for transfer of ownership. Three parcels have been transferred to MMCIC. Aside from Parcel 3, the six remaining parcels may be reconfigured to accommodate transfer of Mound property for economic development.

This ROD addresses Parcel 3 which is located on the northern border of the plant (Figure 2). The legal description of Parcel 3 is reproduced in Exhibit A of Appendix A. Parcel 3 is generally bound to the south and west by the plant proper, to the north by offsite residences, and to the east by the parking lot (Release Block H) transferred to Miamisburg Mound Community Improvement Corporation (MMCIC).

There are two structures in Parcel 3.

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 NPL on November 21, 1989. DOE signed a 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.

DOE, US EPA, and OEPA had originally planned to address the Mound Plant's environmental restoration issues under a set of Operable Units (OUs), each of which would include a number of Potential Release Sites (PRSs), a location of known or suspected contamination. For each OU, the site would follow the traditional CERCLA process: a Remedial Investigation/Feasibility Study (RI/FS), followed by a 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 RRE is conducted to ensure the conditions at the parcel do not pose an unacceptable risk to human health and the environment when the parcel is used for industrial/commercial purposes. This process was named the Mound 2000 Process. DOE and its regulators pursued this approach with the understanding that US

EPA and OEPA reserve all rights to enforce all provisions of the FFA and participation in the Mound 2000 Process does not constitute a waiver of US EPA and OEPA rights to enforce the FFA.

The Mound 2000 Process established a Core Team consisting of representatives of the Miamisburg Environmental Management Project (MEMP) of DOE, US EPA, and OEPA. The Core Team evaluates each of the PRSs and recommends the appropriate response. The Core Team uses process knowledge, site visits, and existing data to determine whether or not any action is warranted concerning each PRS. If a decision cannot be made, the Core Team identifies specific information needed to make a decision (e.g., data collection, investigations). The Core Team also receives input from technical experts as well as the general public and/or public interest groups. Thus, all stakeholders have the opportunity to express their opinions or suggestions involving each PRS. The details of this process are explained in the *Work Plan for Environmental Restoration of the DOE Mound Site, The Mound 2000 Approach, Final, Revision 0* (February 1999).

The Mound 2000 Residual Risk Evaluation Methodology (RREM), Final, Revision 0 (January 1997) was developed as a framework for evaluating human health risks associated with residual levels of contamination. The RREM is applied to a parcel once necessary remediation has been completed, and the remaining PRSs or buildings in the parcel have been designated as No Further Assessment (NFA). Once these environmental concerns have been adequately addressed by the Core Team, a RRE is performed. The RRE forms part of the basis for determining what restrictions should be placed on the parcel.

2.3 COMMUNITY PARTICIPATION

Opportunities to comment on the NFA decisions for PRSs 100 and 241 and Buildings GP-1 and GH were provided. The Action Memorandum for PRS 99, the Parcel 3 Residual Risk Evaluation, and Parcel 3 Proposed Plan were also made available for public comment. A listing of those documents and their comment periods is shown in Table 1.

The Parcel 3 Proposed Plan was made available to the public on April 24, 2001. 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 April 25, 2001. A public comment period was held from April 24, 2001 through May 24, 2001. In addition, a public meeting was held on May 17, 2001 to present the Proposed Plan. Representatives of DOE, OEPA, and ODH 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 PARCEL 3

Parcel 3 lies within what was once called Operable Unit 2 (OU2). There are two structures in Parcel 3. There are three PRSs in Parcel 3. Two of the PRSs have undergone previous investigations; the third was the subject of a removal action. Before transfer of a parcel can

Table 1: Public Comment Periods for Parcel 3 Documents

DOCUMENT	COMMENT PERIOD (BEGIN)	COMMENT PERIOD (END)
PRS 99 Action Memo	May 3, 2000	June 3, 2000
PRS 100 Data Package	August 23, 2000	September 25, 2000
PRS 241 Data Package	June 17, 1997	July 18, 1997
GH Building Data Package	March 17, 1999	April 17, 1999
GP-1 Building Data Package	March 17, 1999	April 17, 1999
Parcel 3 Residual Risk Evaluation	April 24, 2001	May 24, 2001
Parcel 3 Proposed Plan	April 24, 2001	May 24, 2001

Table 2: Parcel 3 PRSs and Core Team Conclusions

PRS	Reason for Identification	Core Team Decision	Close Out of PRS
99	Reported disposal of drums containing sand contaminated with polonium-210, cobalt-60, and cesium-137	Removal Action conducted in August, 1999	OSC Report signed by Core Team on 7/12/00.
100	Reported disposal of neutralized chromium plating bath solution and process tank	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 8/16/00.
241	Several positive soil gas detections during Mound Plant Soil Gas and Geophysical Investigation (Reconnaissance Sampling Report - Soil Gas and Geophysical Investigations Mound Plant and SM/PP Hill, February 1993)	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 5/13/97.

Table 3: Parcel 3 Buildings and Core Team Conclusions

Building	Description	Core Team Decision	Close Out of Building Data Package
GH	Office	Binned for No Further Assessment	Recommendation for NFA signed by Core team on 2/9/99.
GP-1	Guard force headquarters	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 2/9/99.

be completed, all buildings and PRSs must be evaluated for protectiveness or remediated to be protective. The status of the PRSs in Parcel 3 is summarized in Table 2. The status of the buildings in Parcel 3 is summarized in Table 3. Any residual risks associated with remaining contamination in Parcel 3 have been evaluated and are presented in the *Parcel 3 Residual Risk Evaluation, Public Review Draft* (April 2001).

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

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 Parcel 3. The limestone beds range from two to six inches in thickness and the shale layers are commonly five to eight feet thick.

Pleistocene age (less than about two million years old) glacial deposits at 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 form 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 *Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan, Final* (May 1992), the *Operable Unit 9; Hydrogeologic Investigation: Buried Valley Aquifer Report, Technical*

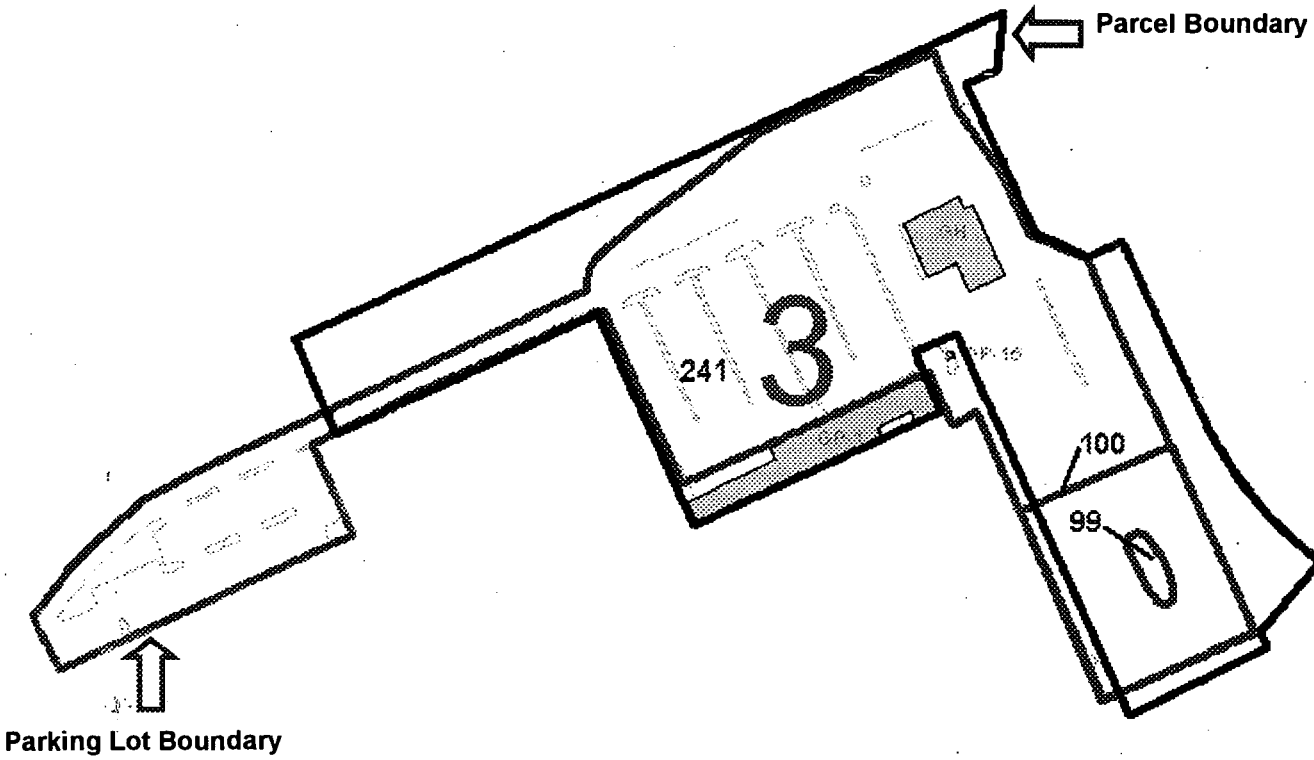


Figure 3 PRSs and Buildings within Parcel 3

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 Parcel 3

The PRSs within Parcel 3 have been evaluated by the Core Team and deemed NFA. The following sections discuss the data relevant to Parcel 3 that are available from the general source documents and the PRS Packages.

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 and are documented in reports titled *Operable Unit 9 Background Soils Investigation Soil Chemistry Report, Technical Memorandum, Revision 2* (September 1994) and *Operable Unit 9 Regional Soils Investigation Report , Revision 2* (August 1995).

Groundwater. Background concentrations for groundwater were developed from two sources of data. For the BVA, background values were reported in *Operable Unit 9 Hydrogeologic Investigation: Groundwater Sweeps Report, Technical Memorandum* (April 1995). Background concentrations for bedrock groundwater were reported *OU5 New Property Remedial Investigation Report, Final, Revision 0* (February 1996).

2.5.3.2 Groundwater Contaminant Data

Groundwater data consist of water analyses of the Mound production wells screened within the BVA, 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. Appendix B of the RRE for Parcel 3 documents the specific groundwater data analyses used to evaluate the future groundwater profile for Parcel 3. Summaries of the contaminants detected in Mound Plant groundwater, and those projected to be potentially present in Mound Plant groundwater in the future, are shown in Tables 4 through 7.

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

Table 4**: Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario

(Exposure Point Concentration Compared to Background Values)

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

COPC= Constituent of Potential Concern
EPC= Exposure Point Concentration, minimum of 95% UCL or maximum detected concentration
NO <Background Value
RRE= Residual Risk Evaluation
UCL= Upper Confidence Limit
** Originally published as Table 6 of the Parcel 3 RRE

Table 5**: Identification of Current Groundwater Constituents of Potential Concern for the Site Employee Scenario

(Exposure Point Concentration Compared to Background Values)

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

COPC= Constituent of Potential Concern
EPC= minimum of 95% UCL or maximum detected concentration
NC= Not calculated, fewer than 20 samples in the data set
NO <Background Value
RRE= Residual Risk Evaluation
UCL= Upper Confidence Limit
** Originally published as Table 8 of the Parcel 3 RRE

Table 6***: Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario

(Bedrock 95% UCL or Maximum Detected Concentration Compared to Background Values)

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

NO:1 = Flow tube modeled manganese (179.2 ug/L) and thorium-232 (0.1747pCi/L) concentrations were below backgroud values and are screened out of the RRE.
COPC= Constituent of Potential Concern
UCL= Upper Confidence Limit
* = Chromium conservatively assumed to be present in the hexavalent state.
** = Constituent detected in bedrock well, but not in production well
^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production wells analyses
*** Originally published as Table 10 of the Parcel 3 RRE

Table 7***: Identification of Future Groundwater Constituents of Potential Concern for the Site Employee Scenario

(Bedrock 95% UCL or Maximum Detected Concentration Compared to Background Values)

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

COPC= Constituent of Potential Concern

NC= 95% UCL not calculated, less than 20 samples in the data set.

UCL= Upper confidence Limit

NO:1 = Future groundwater concentrations (modeled bedrock plus current concentrations) for manganese (179.2 ug/L) and thorium-232 (0.1747 pCi/L) are below background values and are screened out of the RRE.

* = Chromium conservatively assumed to be present in the hexavalent state.

** = Constituent detected in bedrock well, but not in production well

^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production wells analyses

YES:2 - Current groundwater COPC, therefore, future groundwater COPC

*** Originally published as Table 12 of the Parcel 3 RRE

of ambient conditions on field measurements. Due to these limitations, field screening data were not used for any calculations in the RRE for Parcel 3.

Soil contaminant data collected for Parcel 3 are documented in a number of DOE reports. These references include:

- *Operable Unit 9 Regional Soils Investigation Report, Revision 2* (August 1995) (provides a regional soil description without including impacts from Mound operations),
- *Operable Unit 9 Site Scoping Report, Volume 3 - Radiological Site Survey, Final* (June 1993) (a compendium of existing data), and
- *Further Assessment Data Report, PRS 99/100, Final,* (July 2000) (a compendium of data obtained during further assessment sampling at PRS 99/100).

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

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

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

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

PRS 99, also known as Area 6 or WD Building Filter Cleaning Waste, is a former trench in the parking lot south of GH Building. It was believed to contain drums of polonium-210 contaminated sand resulting from the sandblast cleaning of the WD Building sand filters. It was thought that the sand may also be contaminated with cobalt-60 and cesium-137. In February 1999, 137 samples were collected from 46 borings in the parking lot south of GH Building to include PRS 99. One sample displayed an elevated concentration of plutonium-238 (120 pCi/g by onsite gamma-ray spectrometry, 297 pCi/g by offsite isotopic analysis).

A trenching investigation yielded evidence of greater contamination (up to 839 pCi/g of plutonium-238). A removal action was performed and subsequent verification sampling documented remaining plutonium-238 concentrations below the 55 pCi/g Risk-Based Guideline Value (*On-Scene Coordinator (OSC) Report, PRS 99, Removal Action, Final* (August 2000)).

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

A summary of the contaminants detected in Parcel 3 soils is shown in Tables 8 and 9.

2.5.3.4 Building Contaminant Data

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

2.5.3.5 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), plutonium-238, and plutonium-239/240 reported in the *Residual Risk Evaluation, Release Block D, Final, Revision 0* (December 1996) were reviewed and found to require no update or changes. It was observed, however, that the site employee risk calculations did not include an adjustment factor to account for the time spent indoors. While this approach is inconsistent with that applied to analogous outdoor pathways, it is conservative in nature.

2.6 POTENTIAL FUTURE USES FOR MOUND

The Mound Plant will remain in industrial/commercial 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 MMCIC and is currently codified in the City of Miamisburg Zoning Ordinance.

2.7 SUMMARY OF SITE RISKS

Table 8**: Identification of Current and Future Soil Constituents of Potential Concern for the Construction Worker Scenario

(Exposure Point Concentration Compared to Background Values)

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

CAS = Chemical Abstract Service
COPC = Constituent of Potential Concern
NO < Background
RRE = Residual Risk Evaluation
UCL = Upper Confidence Limit
* Lead-210 background value is based upon its parent Uranium-238 background value.
** Originally published as Table 2 of the Parcel 3 RRE

Table 9**: Identification of Current and Future Soil Constituents of Potential Concern for the Site Employee Scenario

(Exposure Point Concentration Compared to Background Values)

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

CAS - Chemical Abstract Service
COPC - Constituent of Potential Concern
EPC - Exposure Point Concentration
NO <Background Value
UCL - Upper Confidence Limit
RRE - Residual Risk Evaluation
** Originally published as Table 4 of the Parcel 3 RRE

The human health risks for Parcel 3 were evaluated using the RREM document developed for Mound. A 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.

2.7.1 Identification of Contaminants

The constituents of potential concern (COPCs) for Parcel 3 were identified by reviewing all of the sampling data for the parcel. 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 contaminants of concern established for Parcel 3 are listed in Tables 4 through 9.

2.7.2 Exposure Assessment

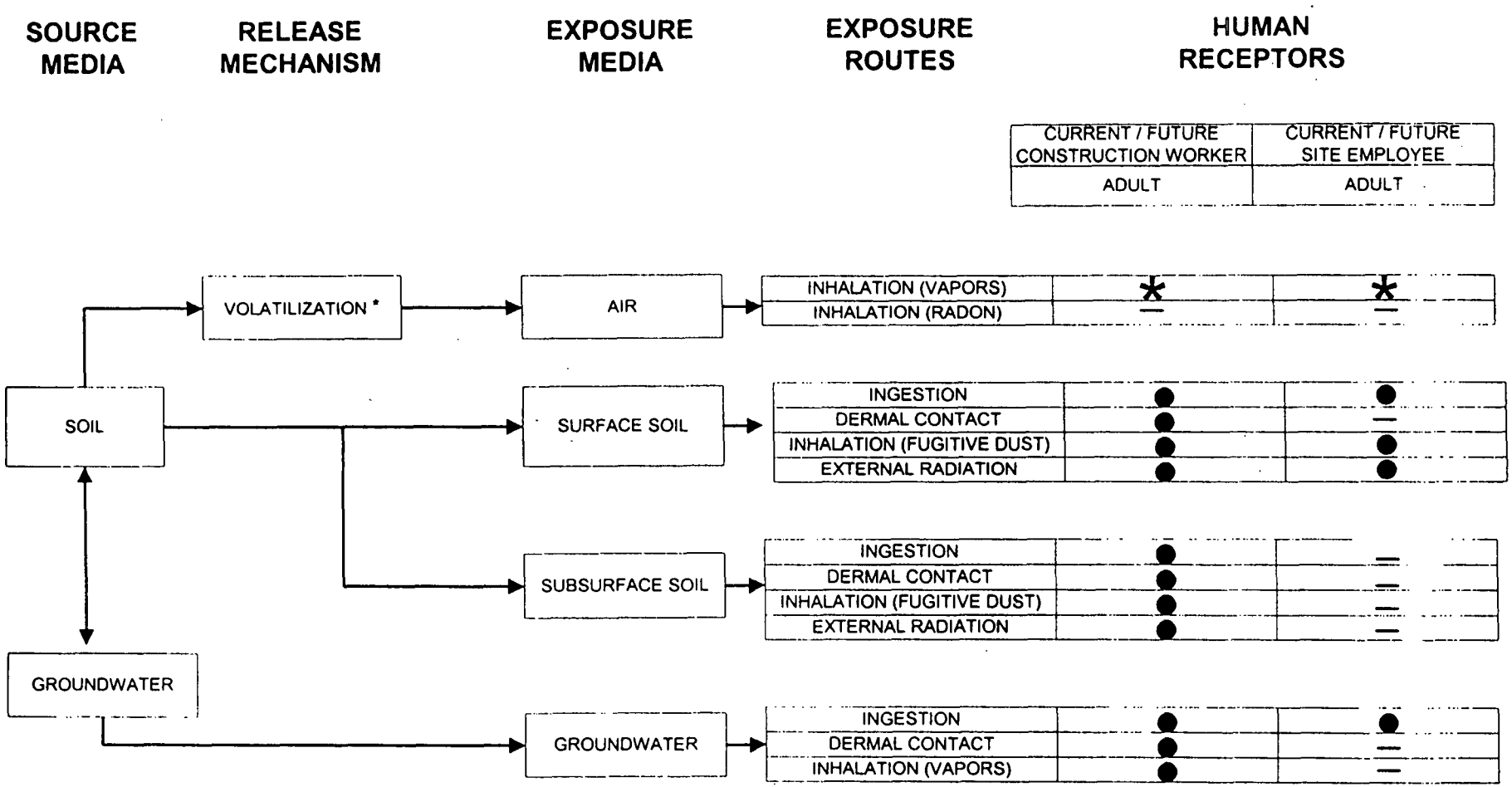
The Conceptual Site Model (CSM) for Mound provides the basis for evaluating human exposure scenarios. The CSM for Mound was defined in the RREM. Because DOE and its regulators and stakeholders agree that the future use of Parcel 3 will be industrial/commercial in nature, two receptor scenarios from the Mound CSM apply: a construction worker and a site employee. The routes of exposure applicable to these two receptors are shown in Figure 4. The significant pathways for potential exposure in Parcel 3 include ingestion of groundwater and dermal contact with groundwater (construction worker scenario only) from the BVA extraction point, currently the Mound production wells.

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

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

2.7.3 Toxicity Assessment

The toxicological properties of each contaminant of concern for Parcel 3 were evaluated by reviewing the Integrated Risk Information System (IRIS) and/or Health Effects Assessment Summary Table (HEAST) data for the contaminant of concern. 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



● COMPLETE PATHWAY EVALUATED QUANTITATIVELY

○ COMPLETE PATHWAY EVALUATED QUALITATIVELY

— INCOMPLETE PATHWAY, NOT EVALUATED

* NO VOLATILE COPCs IN AREA

Figure 4: Mound Conceptual Site Model for the Parcel 3 RRE

many of the radionuclides encountered at Mound. Based on the information collected from IRIS and HEAST, an adequate understanding of the toxicology of the Parcel 3 contaminants of concern has been developed.

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 contaminant of concern, as estimated using the appropriate slope factor and the amount of material available for uptake. The acceptable risk range as defined by CERCLA and the NCP is 10^{-4} to 10^{-6} (one human in ten-thousand to one human in one-million incremental cancer incidence). 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 contaminant of concern to a reference dose or concentration for the contaminant of concern that is believed to represent a no-observable effect level. The specific HQ for each contaminant of concern is then summed to provide an overall HI. US EPA guidance sets a limit of 1.0 for the comprehensive HI.

The incremental carcinogenic risks and hazards associated with residual concentrations of contaminants of concern in Parcel 3 are shown in Table 10. The incremental carcinogenic risks for the current Construction Worker (8.4×10^{-6}) and current Site Employee (2.4×10^{-5}) are within the acceptable risk range. The incremental carcinogenic risk for the future Construction Worker (3.0×10^{-4}) exceeds this range. The incremental carcinogenic risk for the future Site Employee (5.8×10^{-5}) is within the acceptable risk range. The HI for the current Construction Worker (1.3) and current Site Employee (1.1) exceed the limit (1). These values (as detailed in Section 6 of the RRE) are due to a single suspect measurement and are believed to overestimate the HI for these scenarios. The HI for the future Construction Worker (5.3) and future Site Employee (4.9) exceed the limit (1). The future risk and HI values in excess of the standards are due to the predicted future groundwater contaminants. The groundwater model is very conservative and likely overestimates the potential future groundwater contaminants at the BVA extraction point, currently the Mound production wells.

Regular compliance monitoring will ensure that production well concentrations are acceptable (SDWA) and that the residual risks associated with Parcel 3 remain acceptable. This monitoring will be conducted until the Mound site is connected to the Miamisburg municipal water supply, as currently planned.

Currently, there is no contamination detected above MCLs in the groundwater underlying Parcel 3. Consequently, all ARARs with respect to groundwater at Parcel 3 are currently being met. However, to prevent a future unacceptable exposure to groundwater due to potential migration from other areas of the Mound Plant, a prohibition on the installation of wells at Parcel 3 is being required as part of this remedy.

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

Table 10**: Incremental Residual Risk for Parcel 3 Summary Table

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

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

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

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

** Originally published as Table 35 of the Parcel 3 RRE

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/parcel under consideration are called cumulative risks. In general, cumulative risks are possible via air, surface water, and groundwater. For Mound, cumulative risks from surface waters are not expected because, other than stormwater drainage and some groundwater seeps present year-round, there are no surface water bodies such as ponds or streams flowing through Parcel 3 from other areas. 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/parcels and represents the cumulative risk from contaminants that migrate to the production wells from all release blocks/parcels.

Future groundwater. The future risk from groundwater was estimated for Parcel 3 based on the assumption that contaminants found in bedrock will eventually migrate to the Mound Plant production wells located in the BVA. A simple and conservative flow model was used to estimate the concentrations as a function of time. The constituents that contribute to the future groundwater risk can be found in Tables 6 and 7.

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 D Residual Risk Evaluation, Final* (January 1999) and are included in Table 10.

The HI and risk values presented in Table 10 for the current groundwater, future groundwater, and air scenarios are therefore believed to adequately bound the potential cumulative risk for Parcel 3. 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 10 labeled "Current and Future Incremental Residual Risks for Parcel 3" 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 (*Operable Unit 9 Ecological Characterization Report, Technical Memorandum, Revision 0* (March 1994)), there are no endangered species or critical habitats of endangered species on Parcel 3. Parcel 3 is composed primarily of an asphalt paved parking lot, roads, and two buildings. There are no wetlands or surface waters located in Parcel 3 and no sensitive habitats. Therefore, DOE has determined, with concurrence from US EPA and OEPA that an

ecological assessment for Parcel 3 is not necessary (letter US EPA to DOE, (March 9, 2000) and letter OEPA to DOE, (March 30, 2000)).

2.8 REMEDIATION OBJECTIVES

The primary remediation objective for Parcel 3 is to ensure that the residual risk associated with the parcel is acceptable for the defined use scenario of industrial/commercial occupants.

2.9 DESCRIPTION OF ALTERNATIVES

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

2.9.2 Institutional Controls

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

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

2.10 SELECTED REMEDY

2.10.1 Description

The selected remedy for Parcel 3 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 deed restrictions include:

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

DOE or its successors, as the lead agency for this ROD, have 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 is part of the Operations and Maintenance (O&M) Plan and is outlined in Appendix B, which is intended to serve as a framework for implementation of operation and maintenance activities for the selected remedy. Within 90 days of the date on which this ROD is signed, DOE shall submit to US EPA and OEPA 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 Facilities Agreement. If DOE, US EPA, and OEPA agree, the frequency of the compliance assessments can be changed at any time.

The soils within Parcel 3 have not been evaluated for any use other than on-site industrial/commercial use. Any off-site disposition of the Parcel 3 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 Parcel 3.

A copy of the deed is attached in Appendix A; this represents the remedy for Parcel 3. DOE will develop an O&M 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 threshold criteria, five balancing criteria and two modifying criteria. Each is described below.

2.10.3.1 Threshold Criteria - *Must be met for an alternative to be eligible for selection:*

Criteria 1: Overall protection of human health and the environment

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

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 that 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.

ARARs are of several types: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are usually health or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. For Parcel 3, MCLs established under the SDWA constitute chemical-specific ARARs and are listed in Appendix C. They apply to the groundwater beneath Parcel 3. Currently, there are no contaminants

detected above MCLs in the groundwater underlying Parcel 3. Consequently, ARARs with respect to groundwater are met by Alternative 1 (no action), and the selected remedy (institutional controls). However, to prevent a future unacceptable exposure to groundwater due to potential migration from other areas of Mound Plant, a prohibition on the installation of wells at Parcel 3 is being required as part of this remedy.

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 Parcel 3, Ohio has identified two statutory provisions that describe site conditions that would prompt certain response actions. (See Appendix C). These provisions are similar to location-specific ARARs. The selected remedy (institutional controls) 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 selected remedy is an institutional control in the form of deed restrictions. The ARARs are applicable State requirements concerning the recording of deeds. (See Appendix C). The selected remedy will comply with these requirements.

In addition to the institutional control prohibiting soil removal, it should be noted that any onsite management of Parcel 3 soils, not associated with a CERCLA response action, in a manner inconsistent with State law or any disposition of Parcel 3 soils away from the Mound Superfund Site boundary (as defined in 1998) 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:*

Criteria 3: Long-term effectiveness and permanence

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

Because this remedy will result in hazardous substances remaining in Parcel 3 above levels that allow for unlimited use and unrestricted exposure, an annual review and report will be submitted to OEPA, 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.

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.

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. The selected remedy, Institutional Controls, provides this assurance.

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 (see Appendix D memorandum to file from Randolph Tormey, Deputy Chief Counsel, Ohio Field Office, USDOE dated February 17, 1999). Since Alternative 1 involves no action, there is no time or cost required for implementation. The selected remedy, Institutional Controls, is expected to require approximately one month and minimal cost to implement.

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 the selected remedy (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:

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 the selected remedy, Alternative 2, Institutional Controls.

Criteria 9: 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 is Alternative 2. Institutional controls in the form of deed restrictions for Parcel 3 are protective of human health and the environment, comply with Federal and State requirements that are applicable or relevant and appropriate, are cost-effective, and utilize a permanent solution to the maximum extent practicable. Because this remedy will result in hazardous substances remaining in Parcel 3 above levels that allow for unlimited use and unrestricted exposure, DOE in consultation with 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.

2.12 DOCUMENTATION OF SIGNIFICANT CHANGES

Although this ROD will be signed and finalized, 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 Parcel 3 are not anticipated.

3.0 RESPONSIVENESS SUMMARY

This section of the ROD presents stakeholder concerns about Parcel 3 and explains how those concerns were addressed prior to issuance of the ROD. Formal comments

were received from two individuals during the public meeting held on May 17, 2001, No other stakeholders provided comments during the public review period for the proposed plan. The Core Team responded to stakeholder concerns by letter. Comments and responses are presented below.

Comments on the Parcel 3 Proposed Plan and Residual Risk Evaluation from James D. Bonfiglio, MESH Advisor

These two "Public Review Drafts" were received by this observer at the 5/11/01 MAC/MRC meetings. Basically parcel 3 is comprised of 3 PRS's (99, 100, 241) an 2 buildings (GH & GP-1). If one accepts the reporting data given, then my previous report written 4/2001 covering PRS 99&100 is still valid. For a refresher, "PRS 99 required a removal action since plutonium-238 exceeded the guideline value of 55pCi/g. Onsite a 120pCi/g level was found while offsite a reading of 297 pCi/g resulted." Since the PRS 99 location has been reported as "remediation completed" the high plutonium-238 offsite level seems to be remaining. I did not find any mention of this again. There are multiple reports which have been issued on PRS 99 including the two above in which PRS 99 resides. As I continue to say, these reports could be more concise, user/reader friendly and organized in such a way that understanding them would be much improved. To that end and with other objectives I will meet with DOE staff and others at the Mound on May 16, 2001.

Response:

The Proposed Plan (Public Review Draft, page 11) reads "...PRS99. One sample displayed an elevated concentration of plutonium-238 (120pCi/g by on-site gamma-ray spectrometry, 297 pCi/g by off-site isotopic analysis). A trenching investigation yielded evidence of greater contamination (up to 839 pCi/g of plutonium-238). A removal action was performed and subsequent verification sampling documented remaining plutonium-238 concentrations below the 55 pCi/g Risk Based Guideline Value (*On-Scene Coordinator (OSC) Report, PRS 99, Removal Action, Final,* (August 2000))." "Off-site" indicates the measurement was performed off-site. No samples were taken from "off-site" locations as part of the PRS 99/100 Further Assessment of the PRS 99 Removal Action.

Comment (continued)

Concerning Parcel 3, "residual risks" and "Proposed Plan" documents can be summarized as follows: <u>WARNING: DO NOT EVER USE P-3 GROUNDWATER!</u>

- PRS 99, of the listed PRSs & buildings, provides the risks of concern in Parcel 3.
- A CERCLA removal action followed for PRS 99.
- Residual risks with Parcel 3 including toxicity and exposure assessments were made. Risks include carcinogenic (cancer) & hazard index data for non-carcinogenic substances.
- Potential exposure/use of groundwater poses future cancer risks due to tritium.

Antimony presence in groundwater, if ingested, also is a hazard. A higher hazard index for groundwater is shown when hexavalent chromium, antimony & thallium are combined.

- Presence of plutonium 238 and thorium 230 in the groundwater, in addition to tritium poses a cancer risk.
- On page 20 of the 4/2001 Proposed Parcel 3 Plan, a simple but critical statement states "The future groundwater risks presented will be managed to be protective of human and environmental health". On page 21 of the Plan" deed restrictions" are given as the controls to do so. These deed restrictions include the following:
- Maintenance of industrial/commercial use (add only!)
- Prohibition against residential use (how can adjacent private property be prohibited from using/drilling for common and probably contaminated groundwater?)

Response:

These two deed restrictions address the future land use; only industrial/commercial, not residential. This Residual Risk Evaluation was prepared according to the Residual Risk Evaluation Methodology (RREM). This methodology focuses on the risks within the parcel. According to the Mound 2000 Work Plan, off-site risk will be addressed in the off-site or final Record of Decision and its supporting Risk Evaluation. Although this evaluation is some years in the future, the off-site population has not been forgotten. Mound's effluent monitoring and environmental surveillance continues, is reported to the public via the Annual Site Environmental Monitoring Report and other means, and will continue until the end of the Exit Project. The environmental surveillance program involves sample collection and analysis of ambient air, regional water supplies, sediments, on-site and off-site groundwater, and foodstuffs.

Comment (continued)

- Site access for federal & state agencies for the purpose of sampling & monitoring. (Then what?)

Response:

The results of the monitoring will be evaluated and reported. The details of monitoring, evaluating, and reporting with respect to institutional controls are developed in the O&M Plan for the transferred parcels. The Post Closure Stewardship Committee, which includes representatives of MMCIC and the public, is developing the approach to monitoring after DOE departs the site. According to Section 120(h)(4)(D)(i) of CERCLA, Any additional response action or corrective action found to be necessary after the date of sale or transfer shall be conducted by DOE or its successor(s).

Comment (continued)

- Prohibition against the removal of Parcel 3 soils from the DOE Mound Property (as

owned in 1998) boundary without approval from the Ohio Department of Health and the OEPA. (I recommend addition to this of the Miamisburg community or groups with a stake!)

Response:

It is appropriate to name the Ohio Department of Health and the Ohio Environmental Protection Agency in the ROD. These institutions can be expected to be present to address the question of soil removal if it comes at some future date. These institutions are also aware of and responsive to stakeholder input and would be expected to involve the appropriate stakeholder groups. If/when the question of moving soil is raised, it could be that the appropriate stakeholder group is one that does not exist today.

Comment (continued)

The added comments will be presented during the May 17, 2001 Public Meeting to discuss the Proposed Plan.

Since exposures for both future "construction workers" and "site employees" to groundwater contaminants is a major concern, what safeguards and liabilities will be in place and what groups will be financially responsible for future problems?

Response:

DOE or its successors have the responsibility to monitor, maintain and enforce the 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. In addition, a long term groundwater monitoring program is being evaluated as part of Long Term Stewardship. New information may be received or generated that could affect the implementation of the remedy. DOE as lead agency, has the responsibility to evaluate the significance of any such new information. New information that is determined to effect a fundamental change in the remedy could result in an amended ROD and revised remedy.

Comment (continued)

These two reports, as a common objective observed in all the reports (about 20) reviewed so far, seem to emphasize the "rose" while minimizing the "thorns". The good data is easy to find while that which exceeds guidelines values, risk values above acceptable levels which includes carcinogens and non-carcinogenic hazard indices is almost hidden. Parcel 3 is not a pristine piece of property! The deed restrictions alone will not minimize human and environmental health concerns, a detailed and ongoing checks & balances enforcement scheme will be needed and must be included or I predict "Murphy's Law" will be invoked! As I read the section 5.2.3 "Overall Summary of Risk Results" and 6.0 "Uncertainty in the Risk Assessment" I felt like one who just found out that he wandered into a large area of quicksand! These 2 sections are in the

Parcel 3 Residual Risk Evaluation April 2001 Draft and begin on page 32. As noted also in Tables 33 through 35, the large number of so called "bolded values exceeding the cancer risk of 10^{-6} or non-cancer hazard index greater than 1" is enlightening and very alarming. I certainly would have second thoughts about becoming either a site employee or construction worker.

On page 38 of the Residual Risk Parcel 3 Evaluation, Section 6.5 Conclusions states in part the following: "The residual risk in Parcel 3 exceeds the acceptable risk range and is primarily driven by the conservative groundwater analysis." To quote a TV lawyer, on behalf of his client, he constantly states "Your honor I'm not comfortable with that." As with Parcel 3, I too am not comfortable with the risks remaining or an enforceable well controlled plan to prevent future exposures to construction & site workers and we must do better than this!

Response:

Parcel 3 is not pristine. The data set (thousands of measurement results) used for the risk evaluation was provided with the RRE. Risk results for both receptors were summarized in three tables to provide context and consistency of presentation. Risk results from 10^{-4} to 10^{-6}, although acceptable, were also printed in bold (as were he unacceptable risks). Although some risk and hazard results exceed the acceptable values, the cause of this exceedance is understood and the remedy (institutional controls) prevents this mode of exposure. Where overall risk (or hazard) exceeds acceptable levels, the exceedance is driven by exposure to groundwater and is due to the conservative nature of the groundwater analysis. The groundwater model does not take into account natural physical and chemical processes such as dilution, dispersion, adsorption, and soil properties that would reduce contaminant levels of groundwater from the bedrock aquifer that may migrate to the Buried Valley Aquifer. As a result, the future groundwater exposure point concentration (EPC) is biased high and is conservative. In addition, to the conservative nature of the groundwater model, conservative decisions were made concerning the data set and toxicity factors. For example, the maximum detected concentration of antimony (a single measurement) from a data set that spans approximately seventeen years is used as the EPC. Using the next highest measurement instead lowers the hazard index due to antimony for the construction worker scenario from 1.3 to 0.4, which is well below the acceptable threshold. Chromium, which is a driver for future groundwater risk, was assumed to be present only in its most toxic form (hexavalent). These assumptions are likely to result in an overestimation of groundwater risk. Given the conservative nature of the Residual Risk Evaluation and the associated uncertainties, the risks presented in the RRE represent the upper-bound plausible limit of risks (worst case scenario). Based on the protective measures presented in the Proposed Plan for Parcel 3 and the conservative nature of the RRE, the future groundwater risks presented will be managed to be protective of human and environmental health.

Comments on the Parcel 3 Proposed Plan and Residual Risk Evaluation from Dann Bird, MMCIC Planning Manager

Substantive Comment

MMCIC acknowledges that the residual risk calculated for a hypothetical construction worker and site worker in Release Parcel 3 exceed the acceptable risk thresholds or ranges for some exposure media, exposure pathways, and/or routes of exposure, given the assumptions incorporated into the Mound 2000 Residual Risk Evaluation Methodology (DOE, January 1997). These exceedances include the incremental and total non-carcinogenic hazards for the current and future construction worker, current and future site employee, which exceed a Hazard Index of one due to potential exposure to groundwater. In addition, the incremental excess lifetime cancer risk for the future construction worker scenario (3.0×10^{-4}) exceeds the acceptable risk range (10^{-4} to 10^{-6}). These risk exceedances are driven by the exposure to groundwater risk calculation.

MMCIC understands that the conservative assumptions incorporated into Mound's groundwater risk model will overestimate risk. These assumptions (that natural attenuation physical and chemical processes are not included in the calculation of the input groundwater concentration term, the use of the maximum detected value (from as much as seventeen year's work of data), and the assumption that certain contaminants (such as chromium) are present in only their most toxic form) are intended to be conservative and were all accepted and commented upon during the public review period of the *Residual Risk Evaluation Methodology*. With this in mind, MMCIC understands that the actual groundwater risks are likely to be lower and accepts that the proposed action for Parcel 3, namely institutional controls that will bar the use of groundwater at the Mound facility, will be protective of human health and the environment under an industrial/commercial exposure scenario.

Response:

No response needed.

ERRATA

The second sentence of the second complete paragraph on page viii of the RRE Executive Summary should read "Total, background, and incremental risks for the site employee..." rather than "Total, background, and incremental risks for the construction worker..."

Response:

The comment is correct. The text will be changed in the Final version of the RRE.

Comment from the Core Team

During the development of the Residual Risk Evaluation for Parcel 3, revised slope factors for radionuclides were released by HEAST. The risk calculations for Parcel 3 were recomputed using the revised slope factors. The results are not significantly different from the risks published in the Public Review Draft (see Table 11). The preferred alternative identified in the Proposed Plan is not affected by this development.

Table 11: Incremental Residual Risk for Parcel 3 Using Revised Slope Factors

Scenario and Receptor	Media	Constituents	Pathway	Total Cancer Risk as reported in Public Review Draft of RRE	Total Cancer Risk using revised HEAST slope factors
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	**6.1E-06**	**5.8E-06**
			Inhalation of Dust	5.5E-09	7.0E-09
			Inhalation of VOCs	NA	NA
			External	6.9E-10	2.9E-07
		Soil Total Risk		**6.1E-06**	**6.1E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**2.1E-06**	**2.7E-06**
			Dermal Contact	NA	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**2.1E-06**	**2.7E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**9.6E-06**	**9.2E-06**
			Dermal Contact	**2.8E-04**	**2.0E-04**
			Inhalation While Showering	7.6E-08	4.5E-08
		Future Groundwater Total Risk		**2.9E-04**	**2.1E-04**
	Air*	Radiological	Inhalation	2.0E-07	2.0E-07
		Air Total Risk		2.0E-07	2.0E-07
	Cumulative Incremental Current Risk			**8.4E-06**	**9.0E-06**
	Cumulative Incremental Future Risk			**3.0E-04**	**2.2E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	**2.6E-06**	**2.4E-06**
			Inhalation of Dust	2.2E-08	2.8E-08
			Inhalation of VOCs	NA	NA
			External	6.2E-10	2.3E-09
		Soil Total Risk		**2.6E-06**	**2.4E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**2.0E-05**	**2.3E-05**
		Current Groundwater Total Risk		**2.0E-05**	**2.3E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.4E-05**	**4.9E-05**
		Future Groundwater Total Risk		**5.4E-05**	**4.9E-05**
	Air*	Radiological	Inhalation	9.9E-07	9.9E-07
		Air Total Risk		9.9E-07	9.9E-07
	Cumulative Incremental Current Risk			**2.4E-05**	**2.6E-05**
	Cumulative Incremental Future Risk			**5.8E-05**	**5.2E-05**

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

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

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

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 Parcel 3 include the following:

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 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, February 1996.

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

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

Residual Risk Evaluation, Release Block D, Final, Revision 0, December 1996.

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

Work Plan for Environmental Restoration of the DOE Mound Site, The Mound 2000 Approach, Final, Revision 0, February 1999.

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

Parcel 3 Residual Risk Evaluation, Public Review Draft, April 2001.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 120 Federal Facility Agreement, August 1993.

Operable Unit 9 Surface Water and Sediment Report, Technical Memo, Revision 2,

September 1996.

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

Parcel 3 Proposed Plan, Public Review Draft, April 2001.

Technical Position Report in Support of the Release Block D Residual Risk Evaluation, Final, January 1999.

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

Reconnaissance Sampling Report; Soil Gas Survey and Geophysical Investigations; Mound Plant Main Hill and SM/PP Hill; Final, Revision 2, February 1993.

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

GH Building Data Package, July 1999.

GP-1 Building Data Package, July 1999.

PRS 100 Package, August 2000.

PRS 241 Package, August 1997.

PRS 99 Action Memo, Engineering Evaluation, Cost Analysis, Final, October 2000.

Further Assessment Data Report, PRS 99/100, Final, July 2000.

APPENDIX A

Quit Claim Deed for Parcel 3

QUIT CLAIM 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) (42U.S.C. §2201(g)), in consideration of 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 QUIT CLAIMS 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 real property (hereinafter the "Premises), commonly known as Parcel 3:

Situated in the State of Ohio, County of Montgomery and being parts of City of Miamisburg Lot Number 2259 and 2290, also being part of Sections 30, Fractional Town 2, Range 5 East M.R.S. and Fractional Section 36, Fractional Town 2, Range 5 East M.R.S. and being a portion previously conveyed to USA as described in Deed Book 1246, Page 45 and also being a portion previously conveyed to USA as described in Deed Book 1214, Page 12 and also being a portion previously conveyed to USA as described in Deed Book 1256, Page 179 containing 5.581 acres, more or less, and being more fully described in Exhibit A attached hereto and incorporated herein.

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 expressed 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 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 3, Mound Plant, Miamisburg, Ohio dated_____ without prior written permission 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 multi family 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 _____, 2001.

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 _____, 2001, _____, who acknowledged that she is the Manager of the Ohio Field Office for the Unites States Department of Energy, with full authority to execute the foregoing on behalf of the Unites States of America, and who acknowledged the above to be her signature and her free act and deed.

SEAL

_____
Notary Public

APPENDIX A, Exhibit A

Legal Description of Parcel 3

Exhibit "A"
for
Mound Parcel Three
containing
5.581 Acres

May 4, 2000

Situate in the State of Ohio, County of Montgomery and being parts of City of Miamisburg Lot Numbered 2259 and 2290, also being part of Sections 30, Fractional Town 2, Range 5 East M.R.S. and Fractional Section 36, Fractional Town 2, Range 5 East M.R.S. and being a portion previously conveyed to USA as described in Deed Book 1246, Page 45 and also being a portion previously conveyed to USA as described in Deed Book 1214, Page 12 and also being a portion previously conveyed to USA as described in Deed Book 1256, Page 179 and being more particularly described as follows:

COMMENCING at a Concrete Monument Found (Top Broken Off) at the Northwest corner of the Northwest Quarter of Section 30 said Monument also being the Northeast corner of a 2.90 Acre tract of land conveyed to Robert P. Heist as described in Deed MF 74-0526-C09, *THENCE* with the West line of said Heist Lands, ***South 05° 45' 57" West for a distance of 130.89 feet to a 1" Iron Pipe Found Pinched*** at the Southwest corner of said Heist Lands and the Northwest corner of a 14.288 Acre tract conveyed to the Miamisburg Community Corporation as described in Deed MF 99-852-E11 and the ***TRUE POINT OF BEGINNING*** of the herein described tract;

THENCE with the West line of said Miamisburg Community Corporation lands the next seven calls:

> ***1) THENCE, South 05° 29' 16" West for a distance of 57.67 feet to a 5/8" Rebar Found with cap (LeRoy);***
>
> ***2) THENCE, South 65° 31' 15" West for a distance of 35.05 feet to a 5/8" Rebar Found with cap (LeRoy);***
>
> ***3) THENCE, South 25° 44' 48" East for a distance of 160.76 feet to a 5/8" Rebar Found with cap (LeRoy);***
>
> ***4) THENCE, South 64° 37' 16" East for a distance of 56.61 feet to a 5/8" Rebar Found with cap (LeRoy);***

5) THENCE, North 64° 01' 25" East for a distance of 37.94 feet to a 5/8" Rebar Found with cap (LeRoy);

6) THENCE, South 25° 04'47" East for a distance of 194.43 feet to a 5/8" Rebar Found with cap (LeRoy);

7) THENCE on a Curve to the Left with a Radius of 360.67 feet, a Arc Length of 180.89 feet, a Delta Angle of 28° 44' 12", with a Chord Bearing of South 39° 26' 53" East and a Chord Distance of 179.00 feet to a 5/8" Rebar Set;

THENCE on a new division line through said USA lands, ***South 40° 10' 27" West for a distance of 91.34 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***South 23° 57' 22" East for a distance of 17.73 feet to a 3 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***South 64° 21' 58" West for a distance of 99.96 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands, ***North 50° 48' 40" West for a distance of 23.44 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands, ***South 65° 58' 19" West for a distance of 39.91 feet to Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***North 24° 24' 48" West for a distance of 308.00 feet to a 6 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***North 59° 05' 44" East for a distance of 2.80 feet to a 6 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***North 20° 40' 57" West for a distance of 10.55 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***South 67° 51' 08" West for a distance of 3.37 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***North 24° 33' 12" West for a distance of 30.35 feet to a 6 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***North 50° 32' 22" West for a distance of 26.56 feet to a Mag Nail Set,*** passing a RR Spike Set at 8.09 feet on the West line of said Section 30;

THENCE continuing on a new division line through said USA lands, ***North 31° 01' 18" West for a distance of 13.93 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands, ***South 65° 08' 57" West for a distance of 7.98 feet to a Mag Nail Set;***
THENCE continuing on a new division line through said USA lands, ***South 23° 06' 46" East for a distance of 13.85 feet to a 4 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***South 63° 53' 40" West for a distance of 26.73 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***South 24° 54' 44" East for a distance of 45.10 feet to a Cross Notch Set*** on the Easterly extension of the Southerly line of an existing one story brick building named GS1;

THENCE continuing on a new division line through said USA lands and with the Southerly line of said GS1 building, ***South 65° 11' 32" West for a distance of 268.32 feet to a 5/8" Rebar Set***, passing the Southeasterly corner of said GS1 building at 62.6 feet and the Southwesterly corner of said GS1 building at 263.43 feet;

THENCE continuing on a new division line through said USA lands, ***North 24° 25' 19" West for a distance of 229.01 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands and with an existing fenceline, ***South 65° 33' 23" West for a distance of 284.61 feet to a Mini RR Spike Set in a 4 foot wide Concrete Walk at the Joint;***

THENCE continuing on a new division line through said USA lands, ***North 24° 23'31" West for a distance of 104.08 feet to a5/8" Rebar Set*** on the South line of lands conveyed to the City of Miamisburg as described in Deed Book 594, Page 410, witness a Concrete Monument Found Bearing South 65° 36' 29" East at a distance of 38.74 feet;

THENCE with the South line of said City of Miamisburg lands, ***North 65° 36' 29" East for a distance of 770.61 feet BACK TO THE TRUE POINT OF BEGINNING.***

Said property contains 5.581 Acres more or less with 1.992 Acres more or less in Section 30 and 3.589 Acres more or less in Fractional Section 36. North based on State Plane Coordinates, Ohio South Zone taken from a survey performed by Lockwood, Jones and Beals dated 06-01-82 and referenced to Deed MF 99-852-E11: Note bearing South 25° 04' 47" East with a distance of 194.43 feet. This description is based on an actual field survey performed by HLS Surveyors and Engineers under the direct supervision of William C. LeRoy PS, Ohio Lic. No. 7664 and dated May, 2000. Subject to all Easements, Highways, Covenants and Restrictions.

STATE OF OHIO
WILLIAM C. LEROY 7664
REGISTERED PROFESSIONAL SURVEYOR

6-05-00

William C. LeRoy PS
Ohio Lic. No. 7664
KY. Lic. No. 3516

JOSEPH LITVIN P.E., P.S.
COUNTY ENGINEER
MONTGOMERY COUNTY DAYTON, OHIO
DESCRIPTION CHECKED AND APPROVED
BY EAM DATE 6/6/00

Mound Parcel 3.doc

SECTION 30 & 36, FRAC. TOWN 2, RANGE 5 M.R.S.
MIAMISBURG, MONTGOMERY CO., OHIO
PART OF CITY OF MIAMISBURG LOT NUMBER 2259
&
PART OF CITY OF MIAMISBURG LOT NUMBER 2290

BEARING BASIS ESTABLISHED ON STATE PLANE COORDINATES SOUTH ZONE, STATE OF OHIO
NOTE: SURVEY REFERENCE No. 4

GRAPHIC SCALE: 1"=40'
MAY, 2000

LEGEND:

CITY OF MIAMISBURG
DB 594 PG 40

N 63°36'39" E 170.00'

FIRE P.K.

EXISTING FENCE

S 63°33'23" W 294.08'

NEW DIVISION
TOTAL 5.581 ACRES
SECTION 36 - 5.589 ACRES

MIAMISBURG COMMUNITY CORPORATION
DEED INT. No. 98052-01

U.S.A.
DB 594, PG 43

5.581 ACRES
PLAT OF SURVEY
FOR
"MOUND PARCEL 3"
LOCATED IN
SECTIONS 30 (5.992 Ac.) & FRAC. 36 (5.589 Ac.)
FRAC. TOWN 2, RANGE 5 M.R.S.
CITY OF MIAMISBURG
MONTGOMERY COUNTY, OHIO
PART CITY OF MIAMISBURG LOT No. 2259
&
PART CITY OF MIAMISBURG LOT No. 2290

CURVE TABLE

NUMBER	LENGTH	DELTA ANGLE	RADIUS	CHORD DIRECTION	CHORD LENGTH
C1	180.89	28°44'12"	360.57	S 39°16'33" E	179.00

LINE TABLE

NUMBER	DIRECTION	DISTANCE
L1	S 23°57'22" E	17.73'
L2	N 30°48'40" W	23.44'
L3	N 59°05'44" E	2.80'
L4	N 20°40'57" W	10.55'
L5	S 67°9'06" W	3.37'
L6	N 24°33'12" W	10.35'
L7	N 30°32'22" W	26.56'
L8	N 3°01'18" W	13.93'
L9	S 63°36'[illegible]" W	7.98'
L10	S 23°06'46" E	13.85'
L11	S 63°53'40" W	26.77'

S 63°36'39" W 144.32'

1 STORY BRICK BUILDING 1939

BUILDING CORNER 30' BOUNDARY LINE

BUILDING CORNER ON BOUNDARY LINE @ 0.26

CONCRETE BLOCK

CROSS SECTION

6' STEEL FENCE POSTS

U.S.A.
DB 594, PG B
PART CITY OF MIAMISBURG
LOT No. 2290

ACREAGE SECTION 30 - 1.992 ACRES

MIAMISBURG COMMUNITY CORPORATION
DEED INT. No. 98052-01

U.S.A.
DB 594, PG C
PART CITY OF MIAMISBURG
LOT No. 2259

S 42°40'27" E 94.47'

S 64°40'27" E 37.94'

S 42°40'27" E 94.47'

N 47°14'40" W 206.09'

EXISTING FENCE

S 63°36'39" W 38.97'

S 64°39'38" W 98.98'

6' STEEL FENCE POSTS

CROSS SECTION

Reference Documents

1. All Bearings Shown on Plat of Survey
2. Survey 63-68
3. Survey of Parcel "A" by H.L.S. Surveyors, dated August, 1988
4. State Plane Coord. Drawing by L.A.S., dated 5-4-88 Project No. 3-4

Certification: This Boundary Survey was prepared in accordance with Chapter 4733-37 of the Ohio Administrative Code. I Certify that this Plat of Survey was made under my direct supervision and is based on an actual field survey.

STATE OF OHIO
WILLIAM C. LEROY
No. 7864
REGISTERED PROFESSIONAL SURVEYOR

WILLIAM C. LEROY, REGISTERED PROFESSIONAL SURVEYOR
No. 7864, STATE OF OHIO

5-17-00
DATE THIS PLAT ISSUED

Surveyors Note

1. Foundations, Especially agree with Property Lines, unless otherwise shown.
2. All Pipes Set are 5/8" Dia. X 30" Long and have a Yellow Plastic Cap Marked "Leroy 7864".
3. All Improvements found are in good condition unless otherwise shown.
4. No Buildings or Other Improvements were located during this survey, unless otherwise shown on plat.

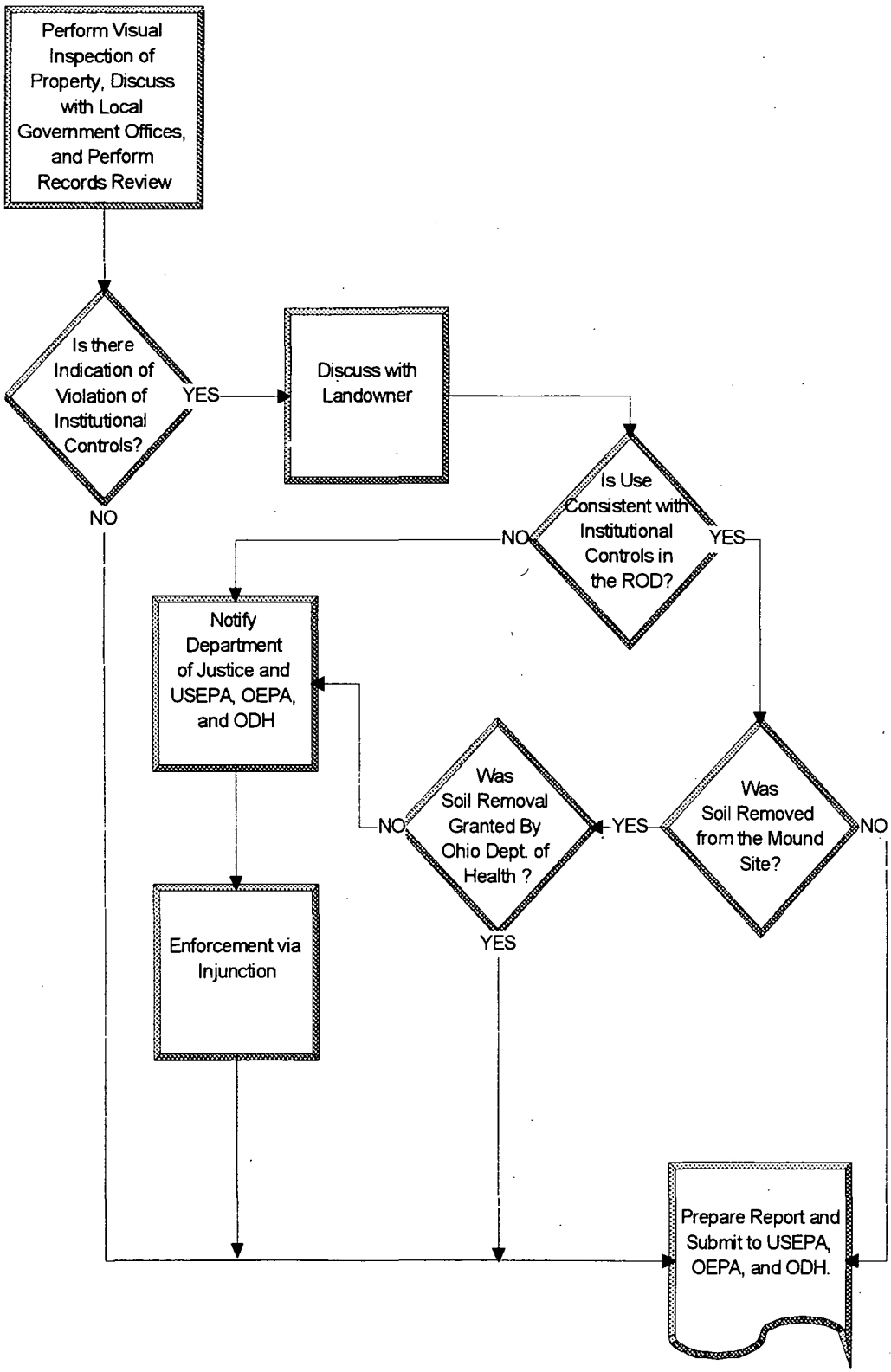
PREPARED BY: LTP

H L S
Surveyors & Engineers
3939 VANCO LANE, VANDALIA, OH. (937) 443-9400

APPENDIX B

Mound Plant O&M Plan for the Implementation of Institutional Controls

Mound Plant O&M Plan for the Implementation of Institutional Controls



APPENDIX C

ARARs for Parcel 3

Appendix C

ARARs for Parcel 3

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

APPENDIX D

Memorandum to file

MEMORANDUM

Date: 2/17/99
To: File
From: Randolph Tormey, Deputy Chief Counsel, Ohio Field Office, US DOE
Subject: Institutional Controls, Mound Facility, Miamisburg, Ohio

A question has arisen as to the validity and method of enforcement of restrictive covenants ("institutional controls") in deeds of conveyance for real property at the DOE Mound Facility, Miamisburg, Ohio. Currently in question are restrictive covenants to be placed upon a portion of the real property known as "Parcel D" as follows:

> "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 the Ohio EPA or ODH, their successors and assigns.
>
> 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 D, Mound Plant, Miamisburg, Ohio dated January, 1999) without prior written approval from the Ohio Department of Health (ODH), or a successor agency.
>
> 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.
>
> 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 Ohio Environmental Protection Agency."

Under Ohio law there is no uniform or standard manner to encumber property since there are as many valid reasons for restricting the use of property as there are means to effect those purposes. Recordation of the

restrictions with the county recorder for the county in which the land is situated is generally required for the restrictions to be enforced so as to provide knowledge of their existence. While all courts disfavor restrictions upon the free use of land, Ohio law provides that "courts must enforce a restriction where it is clearly and unambiguously found in a covenant." Brooks v. Orshoski, 1998 WL 484560 (Oh App. 6 Dist.) In general, the court will "construe the language of the restriction by giving it its common and ordinary meaning, and read the restrictive covenants as a whole to ascertain the intent of the creator." Id. This states the basic rule followed by courts in Ohio. It also seems that restrictive covenants are viewed more favorably when they serve some public purpose. The above covenants seem to be of this nature. Based upon the case law in Ohio, the above-stated restrictive covenants are in a form that is acceptable in Ohio and should be enforced by the courts in this state.

Ohio Revised Code (ORC) § 5301.25(A) provides "All ... instruments of writing properly executed for the conveyance or encumbrance of lands ... shall be recorded in the office of the county recorder of the county in which the premises are situated..." Further, Note 2 under this section mentions that "Proper recording of instrument serves as constructive notice of interest or encumbrance to all who claim through or under grantor by whom such deed was executed," citing Thames v. Asia's Janitorial Service, Inc., (Lucas 1992) 81 Oh App. 3d 579, 611 N.E. 2d 948, motion overruled 65 Ohio State 3d 1458. Furthermore, under ORC § 5301.48 to have "marketable record title" a landowner must have an unbroken chain of title of record for forty years or more. This places upon the buyer of property the need to search the record title for at least the past 40 years, which typically reveals any "cloud" on the title. Of course, the above-mentioned covenants would be such a cloud and would be noted by the subsequent buyer. In a subsequent sale that buyer would then place the covenants in the following deed thereby perpetuating this notice. It should be noted that the lack of a cloud for the forty-year period would normally eliminate the restriction, except under ORC § 5301.53(G) any right, title or interest of the United States may not be extinguished in this manner. This indicates that the restrictive covenants will run with the land and will be enforced against any property owner who takes the property through a deed in the chain of title from DOE.

Enforcement of the restrictive covenants would be through an injunctive action which could be brought by any party for whose benefit the restrictions were put in place. Brooks v. Orshoski, 1998 WL 484560 (Ohio App. 6 Dist.), Meisse v. Family Recreation Club, Inc., 1998 WL 70503 (Ohio App. 2 Dist.). Obviously the governmental agencies mentioned in the draft deed for Parcel D would be such a party, however it is also conceivable that any other party intended as the beneficiary of the restrictive covenants could likewise bring an action for enforcement. In view of the public purposes served by the above-mentioned covenants this class of persons could be quite large. As the grantor creating the restrictive covenants, the United States would likely take the lead in their enforcement, probably through the Department of Justice or the local US Attorney's office.

Based upon the foregoing, I conclude that restrictive covenants (institutional controls) are enforced by the courts of Ohio, particularly when they serve a public purpose. The covenants suggested would run with the land and recordation would assure notice of their existence. They are typically enforced through an injunctive action by any party intended to be a beneficiary of the restrictions. In this case, most likely by the United States.

Randy Torney

Parcel 3

Record of Decision

Mound Plant
Miamisburg, Ohio

FINAL

SEPTEMBER 2001

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(continued)

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ACRONYMS

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
COPC	Constituent of Potential Concern
CSM	Conceptual Site Model
DOE	Department of Energy
FFA	Federal Facilities Agreement
FOD	frequency of detection
HEAST	Health Effects Assessment Summary Table
HI	Hazard Index
HQ	Hazard Quotient
HTO	tritium oxide
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
MEMP	Miamisburg Environmental Management Project
MMCIC	Miamisburg Mound Community Improvement Corporation
Mn	manganese
NCP	National Contingency Plan
NFA	No Further Assessment
NPL	National Priority List
ODH	Ohio Department of Health
OEPA	Ohio Environmental Protection Agency
O & M	Operations and Maintenance
OSC	On-Scene Coordinator
OU	Operable Unit
PRS	Potential Release Site
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
SDWA	Safe Drinking Water Act

SM/PP	Special Metallurgical/Plutonium Processing
TCE	trichloroethene(ethylene)
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
WD	Waste Disposal

This Record of Decision (ROD) documents the remedy selected for Parcel 3 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 checklist 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 located approximately 10 miles southwest of Dayton and 45 miles north of Cincinnati. This ROD addresses Parcel 3, which is located on the northern border of the plant.

1.2 BASIS AND PURPOSE

This decision document presents the selected remedy for Parcel 3 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 *Parcel 3 Residual Risk Evaluation* (RRE), *Public Review Draft* (April 2001), the risks from carcinogens and non-carcinogens to current and future occupants of Parcel 3 were evaluated. In those analyses, land use was limited to industrial/commercial use scenario and the type of occupant was limited to and represented by a construction worker and a site employee (office employee). Based on the RRE, the incremental risks from potential exposure to residual carcinogenic contaminants for current industrial/commercial use are within the acceptable range. The incremental carcinogenic risks for future industrial/commercial use are within the acceptable risk range for the site employee scenario, but exceed the acceptable range for the construction worker scenario. Non-carcinogenic hazards for current and future industrial/commercial use exceed the target Hazard Index (HI) of one. All exceedances are due to potential exposure to groundwater. 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/commercial purposes.

As described below, the remedy, and other legislative measures (such as compliance with the Safe Drinking Water Act (SDWA)), will protect future occupants of Parcel 3 from the threat of contaminants in the groundwater. The remedy will ensure that Parcel 3 soils are appropriately evaluated prior to any removal of Parcel 3 soils from the Mound Plant National Priority List (NPL) facility boundary (as owned in 1998).

1.4 DESCRIPTION OF SELECTED REMEDY

The selected remedy for Parcel 3 is institutional controls in the form of deed restrictions on future land and groundwater 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 Parcel 3 in the future, the institutional controls to be adopted will ensure:

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

A copy of the deed is included as Appendix A.

1.5 STATUTORY DETERMINATIONS

The selected remedy for Parcel 3 is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate, is cost-effective, and utilizes a permanent solution to the maximum extent practicable. Because this remedy will result in hazardous substances remaining in Parcel 3 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 effectiveness of 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 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 Parcel 3 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.

Susan Brechbill — July 24, 2001

Susan Brechbill
Ohio Field Office Manager,
U. S. Department of Energy

Date

Cynthia L. Carney for — 8/17/01

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

Date

Christopher Jones — 8-28-01

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 1). The Mound Plant is located approximately 10 miles southwest of Dayton and 45 miles north of Cincinnati. Miamisburg is predominantly a residential community with supportive commercial facilities and industrial development. The adjacent upland areas are used primarily for residences and agriculture or are undeveloped open spaces.

The Mound property is divided into ten parcels that are contiguous tracts of property designated for transfer of ownership. Three parcels have been transferred to MMCIC. Aside from Parcel 3, the six remaining parcels may be reconfigured to accommodate transfer of Mound property for economic development.

This ROD addresses Parcel 3 which is located on the northern border of the plant (Figure 2). The legal description of Parcel 3 is reproduced in Exhibit A of Appendix A. Parcel 3 is generally bound to the south and west by the plant proper, to the north by offsite residences, and to the east by the parking lot (Release Block H) transferred to Miamisburg Mound Community Improvement Corporation (MMCIC).

There are two structures in Parcel 3.

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 NPL on November 21, 1989. DOE signed a 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.

DOE, US EPA, and OEPA had originally planned to address the Mound Plant's environmental restoration issues under a set of Operable Units (OUs), each of which would include a number of Potential Release Sites (PRSs), a location of known or suspected contamination. For each OU, the site would follow the traditional CERCLA process: a Remedial Investigation/Feasibility Study (RI/FS), followed by a 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 RRE is conducted to ensure the conditions at the parcel do not pose an unacceptable risk to human health and the environment when the parcel is used for industrial/commercial purposes. This process was named the Mound 2000 Process. DOE

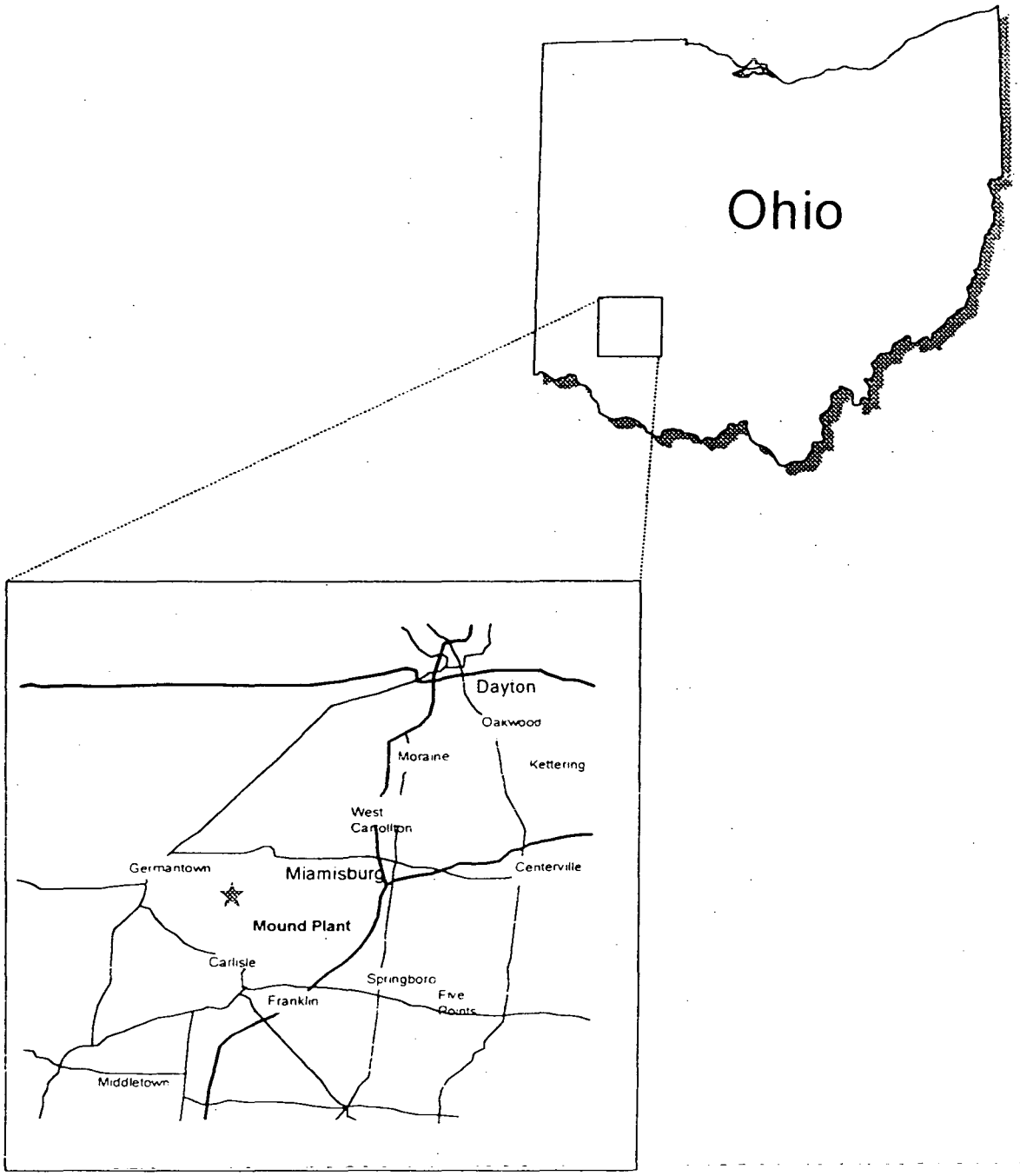


Figure 1: Regional Context of the Mound Plant

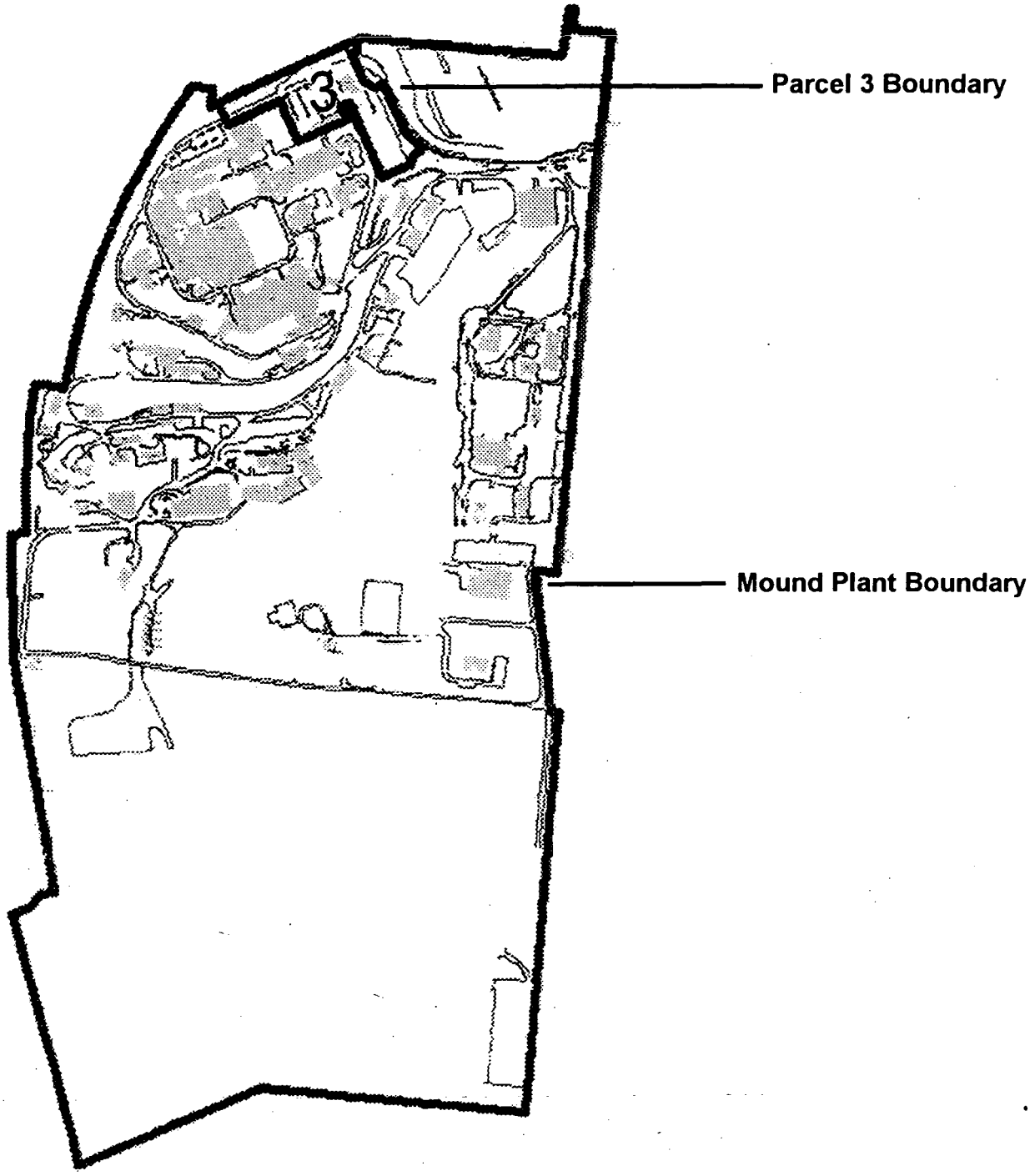


Figure 2: Location of Parcel 3

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 PRSs and recommends the appropriate response. The Core Team uses process knowledge, site visits, and existing data to determine whether or not any action is warranted concerning each PRS. If a decision cannot be made, the Core Team identifies specific information needed to make a decision (e.g., data collection, investigations). The Core Team also receives input from technical experts as well as the general public and/or public interest groups. Thus, all stakeholders have the opportunity to express their opinions or suggestions involving each PRS. The details of this process are explained in the *Work Plan for Environmental Restoration of the DOE Mound Site, The Mound 2000 Approach, Final, Revision 0* (February 1999).

The Mound 2000 Residual Risk Evaluation Methodology (RREM), Final, Revision 0 (January 1997) was developed as a framework for evaluating human health risks associated with residual levels of contamination. The RREM is applied to a parcel once necessary remediation has been completed, and the remaining PRSs or buildings in the parcel have been designated as No Further Assessment (NFA). Once these environmental concerns have been adequately addressed by the Core Team, a RRE is performed. The RRE forms part of the basis for determining what restrictions should be placed on the parcel.

2.3 COMMUNITY PARTICIPATION

Opportunities to comment on the NFA decisions for PRSs 100 and 241 and Buildings GP-1 and GH were provided. The Action Memorandum for PRS 99, the Parcel 3 Residual Risk Evaluation, and Parcel 3 Proposed Plan were also made available for public comment. A listing of those documents and their comment periods is shown in Table 1.

The Parcel 3 Proposed Plan was made available to the public on April 24, 2001. 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 April 25, 2001. A public comment period was held from April 24, 2001 through May 24, 2001. In addition, a public meeting was held on May 17, 2001 to present the Proposed Plan. Representatives of DOE, OEPA, and ODH 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 PARCEL 3

Parcel 3 lies within what was once called Operable Unit 2 (OU2). There are two structures in Parcel 3. There are three PRSs in Parcel 3. Two of the PRSs have undergone previous investigations; the third was the subject of a removal action. Before transfer of a parcel can

Table 1: Public Comment Periods for Parcel 3 Documents

DOCUMENT	COMMENT PERIOD (BEGIN)	COMMENT PERIOD (END)
PRS 99 Action Memo	May 3, 2000	June 3, 2000
PRS 100 Data Package	August 23, 2000	September 25, 2000
PRS 241 Data Package	June 17, 1997	July 18, 1997
GH Building Data Package	March 17, 1999	April 17, 1999
GP-1 Building Data Package	March 17, 1999	April 17, 1999
Parcel 3 Residual Risk Evaluation	April 24, 2001	May 24, 2001
Parcel 3 Proposed Plan	April 24, 2001	May 24, 2001

Table 2: Parcel 3 PRSs and Core Team Conclusions

PRS	Reason for Identification	Core Team Decision	Close Out of PRS
99	Reported disposal of drums containing sand contaminated with polonium-210, cobalt-60, and cesium-137	Removal Action conducted in August, 1999	OSC Report signed by Core Team on 7/12/00.
100	Reported disposal of neutralized chromium plating bath solution and process tank	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 8/16/00.
241	Several positive soil gas detections during Mound Plant Soil Gas and Geophysical Investigation (Reconnaissance Sampling Report - Soil Gas and Geophysical Investigations Mound Plant and SM/PP Hill, February 1993)	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 5/13/97.

Table 3: Parcel 3 Buildings and Core Team Conclusions

Building	Description	Core Team Decision	Close Out of Building Data Package
GH	Office	Binned for No Further Assessment	Recommendation for NFA signed by Core team on 2/9/99.
GP-1	Guard force headquarters	Binned for No Further Assessment	Recommendation for NFA signed by Core Team on 2/9/99.

be completed, all buildings and PRSs must be evaluated for protectiveness or remediated to be protective. The status of the PRSs in Parcel 3 is summarized in Table 2. The status of the buildings in Parcel 3 is summarized in Table 3. Any residual risks associated with remaining contamination in Parcel 3 have been evaluated and are presented in the *Parcel 3 Residual Risk Evaluation, Public Review Draft* (April 2001).

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

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 Parcel 3. The limestone beds range from two to six inches in thickness and the shale layers are commonly five to eight feet thick.

Pleistocene age (less than about two million years old) glacial deposits at 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 form 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 *Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan, Final* (May 1992),

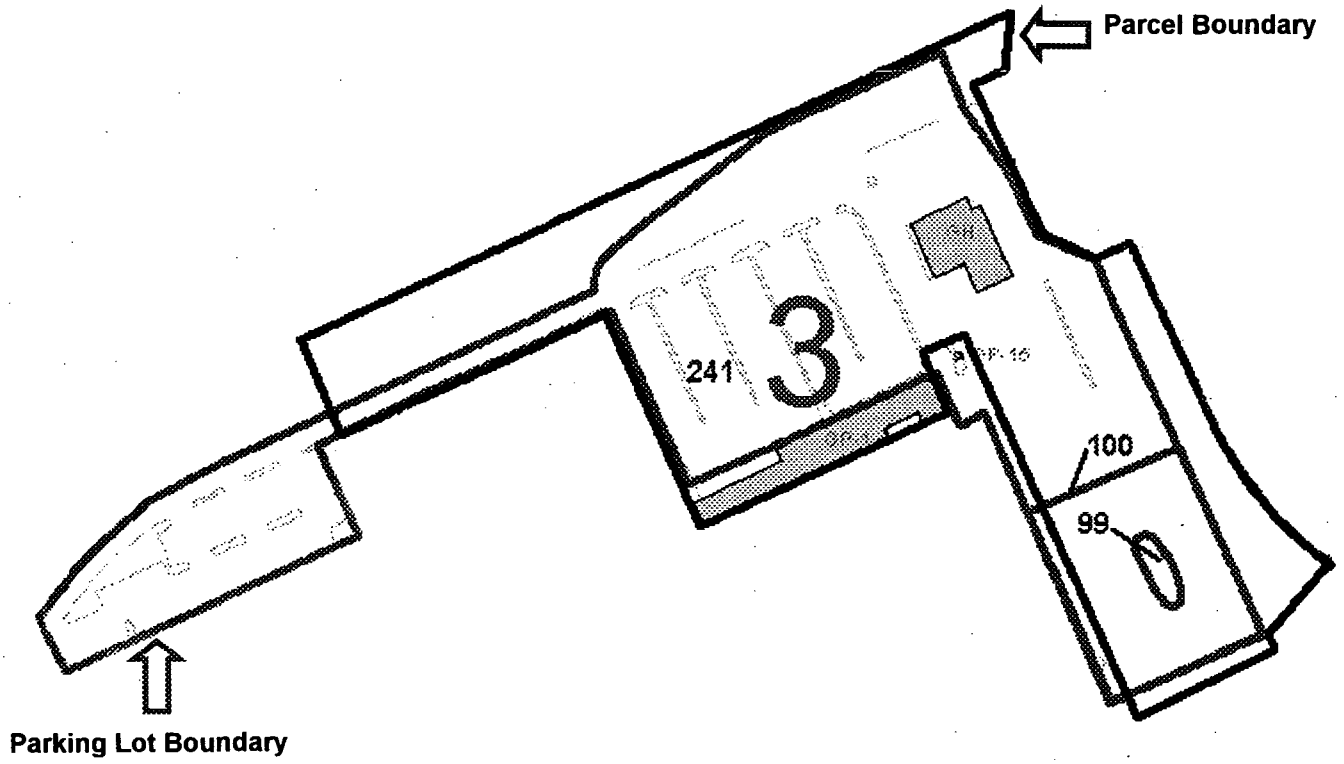


Figure 3 PRSs and Buildings within Parcel 3

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 Parcel 3

The PRSs within Parcel 3 have been evaluated by the Core Team and deemed NFA. The following sections discuss the data relevant to Parcel 3 that are available from the general source documents and the PRS Packages.

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 and are documented in reports titled *Operable Unit 9 Background Soils Investigation Soil Chemistry Report, Technical Memorandum, Revision 2* (September 1994) and *Operable Unit 9 Regional Soils Investigation Report , Revision 2* (August 1995).

Groundwater. Background concentrations for groundwater were developed from two sources of data. For the BVA, background values were reported in *Operable Unit 9 Hydrogeologic Investigation: Groundwater Sweeps Report, Technical Memorandum* (April 1995). Background concentrations for bedrock groundwater were reported *OU5 New Property Remedial Investigation Report, Final, Revision 0* (February 1996).

2.5.3.2 Groundwater Contaminant Data

Groundwater data consist of water analyses of the Mound production wells screened within the BVA, 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. Appendix B of the RRE for Parcel 3 documents the specific groundwater data analyses used to evaluate the future groundwater profile for Parcel 3. Summaries of the contaminants detected in Mound Plant groundwater, and those projected to be potentially present in Mound Plant groundwater in the future, are shown in Tables 4 through 7.

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

Table 4**: Identification of Current Groundwater Constituents of Potential Concern for the Construction Worker Scenario

(Exposure Point Concentration Compared to Background Values)

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

COPC= Constituent of Potential Concern
EPC= Exposure Point Concentration, minimum of 95% UCL or maximum detected concentration
NO <Background Value
RRE= Residual Risk Evaluation
UCL= Upper Confidence Limit
** Originally published as Table 6 of the Parcel 3 RRE

Table 5**: Identification of Current Groundwater Constituents of Potential Concern for the Site Employee Scenario

(Exposure Point Concentration Compared to Background Values)

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

COPC= Constituent of Potential Concern
EPC= minimum of 95% UCL or maximum detected concentration
NC= Not calculated, fewer than 20 samples in the data set
NO <Background Value
RRE= Residual Risk Evaluation
UCL= Upper Confidence Limit
** Originally published as Table 8 of the Parcel 3 RRE

Table 6***: Identification of Future Groundwater Constituents of Potential Concern for the Construction Worker Scenario

(Bedrock 95% UCL or Maximum Detected Concentration Compared to Background Values)

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

NO:1 = Flow tube modeled manganese (179.2 ug/L) and thorium-232 (0.1747pCi/L) concentrations were below backgroud values and are screened out of the RRE.
COPC= Constituent of Potential Concern
UCL= Upper Confidence Limit
* = Chromium conservatively assumed to be present in the hexavalent state.
** = Constituent detected in bedrock well, but not in production well
^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production wells analyses
*** Originally published as Table 10 of the Parcel 3 RRE

Table 7***: Identification of Future Groundwater Constituents of Potential Concern for the Site Employee Scenario

(Bedrock 95% UCL or Maximum Detected Concentration Compared to Background Values)

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

COPC= Constituent of Potential Concern

NC= 95% UCL not calculated, less than 20 samples in the data set.

UCL= Upper confidence Limit

NO:1 = Future groundwater concentrations (modeled bedrock plus current concentrations) for manganese (179.2 ug/L) and thorium-232 (0.1747 pCi/L) are below background values and are screened out of the RRE.

* = Chromium conservatively assumed to be present in the hexavalent state.

** = Constituent detected in bedrock well, but not in production well

^^ = Constituent detected in production well, not in bedrock wells; reported frequency of detection based on production wells analyses

YES:2 - Current groundwater COPC, therefore, future groundwater COPC

*** Originally published as Table 12 of the Parcel 3 RRE

preparation does not occur, and the measuring instruments are less precise. The field screening techniques are the least accurate due to instrument limitations and the effects of ambient conditions on field measurements. Due to these limitations, field screening data were not used for any calculations in the RRE for Parcel 3.

Soil contaminant data collected for Parcel 3 are documented in a number of DOE reports. These references include:

- *Operable Unit 9 Regional Soils Investigation Report, Revision 2* (August 1995) (provides a regional soil description without including impacts from Mound operations),
- *Operable Unit 9 Site Scoping Report, Volume 3 - Radiological Site Survey, Final* (June 1993) (a compendium of existing data), and
- *Further Assessment Data Report, PRS 99/100, Final,* (July 2000) (a compendium of data obtained during further assessment sampling at PRS 99/100).

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

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

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

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

PRS 99, also known as Area 6 or WD Building Filter Cleaning Waste, is a former trench in the parking lot south of GH Building. It was believed to contain drums of polonium-210 contaminated sand resulting from the sandblast cleaning of the WD Building sand filters. It was thought that the sand may also be contaminated with cobalt-60 and cesium-137. In

February 1999, 137 samples were collected from 46 borings in the parking lot south of GH Building to include PRS 99. One sample displayed an elevated concentration of plutonium-238 (120 pCi/g by onsite gamma-ray spectrometry, 297 pCi/g by offsite isotopic analysis). A trenching investigation yielded evidence of greater contamination (up to 839 pCi/g of plutonium-238). A removal action was performed and subsequent verification sampling documented remaining plutonium-238 concentrations below the 55 pCi/g Risk-Based Guideline Value (*On-Scene Coordinator (OSC) Report, PRS 99, Removal Action, Final* (August 2000)).

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

A summary of the risk evaluated in Parcel 3 soils is shown in Tables 8 and 9.

2.5.3.4 Building Contaminant Data

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

2.5.3.5 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), plutonium-238, and plutonium-239/240 reported in the *Residual Risk Evaluation, Release Block D, Final, Revision 0* (December 1996) were reviewed and found to require no update or changes. It was observed, however, that the site employee risk calculations did not include an adjustment factor to account for the time spent indoors. While this approach is inconsistent with that applied to analogous outdoor pathways, it is conservative in nature.

2.6 POTENTIAL FUTURE USES FOR MOUND

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

Table 8**: Identification of Current and Future Soil Constituents of Potential Concern for the Construction Worker Scenario

(Exposure Point Concentration Compared to Background Values)

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

CAS = Chemical Abstract Service
COPC = Constituent of Potential Concern
NO < Background
RRE = Residual Risk Evaluation
UCL = Upper Confidence Limit
* Lead-210 background value is based upon its parent Uranium-238 background value.
** Originally published as Table 2 of the Parcel 3 RRE

Table 9**: Identification of Current and Future Soil Constituents of Potential Concern for the Site Employee Scenario

(Exposure Point Concentration Compared to Background Values)

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

CAS - Chemical Abstract Service
COPC - Constituent of Potential Concern
EPC - Exposure Point Concentration
NO <Background Value
UCL - Upper Confidence Limit
RRE - Residual Risk Evaluation
** Originally published as Table 4 of the Parcel 3 RRE

stakeholders. This land use is reflected in the Mound Comprehensive Reuse Plan of the MMCIC and is currently codified in the City of Miamisburg Zoning Ordinance.

2.7 SUMMARY OF SITE RISKS

The human health risks for Parcel 3 were evaluated using the RREM document developed for Mound. A 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.

2.7.1 Identification of Contaminants

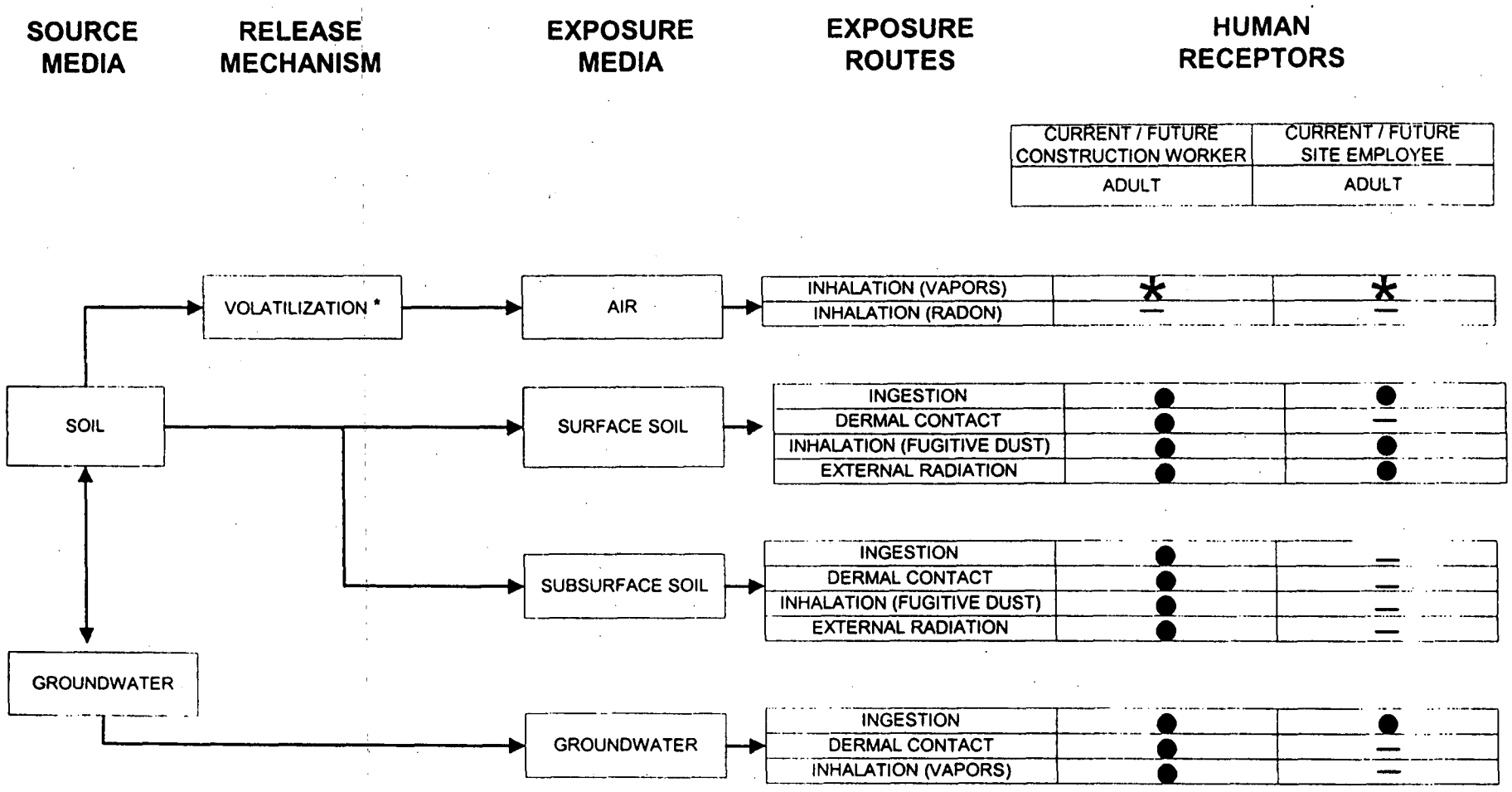
The constituents of potential concern (COPCs) for Parcel 3 were identified by reviewing all of the sampling data for the parcel. Based on that review, contaminants were eliminated for further evaluation based on criteria established in the RREM. Specifically, only contaminants exceeding (1) background, (2) a base level of potential health concern, and (3) certain frequency of detection (FOD) criteria were carried through the RRE. The contaminants of concern established for Parcel 3 are listed in Tables 4 through 9.

2.7.2 Exposure Assessment

The Conceptual Site Model (CSM) for Mound provides the basis for evaluating human exposure scenarios. The CSM for Mound was defined in the RREM. Because DOE and its regulators and stakeholders agree that the future use of Parcel 3 will be industrial/commercial in nature, two receptor scenarios from the Mound CSM apply: a construction worker and a site employee. The routes of exposure applicable to these two receptors are shown in Figure 4. The significant pathways for potential exposure in Parcel 3 include ingestion of groundwater and dermal contact with groundwater (construction worker scenario only) from the BVA extraction point, currently the Mound production wells.

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

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



● COMPLETE PATHWAY EVALUATED QUANTITATIVELY

○ COMPLETE PATHWAY EVALUATED QUALITATIVELY

— INCOMPLETE PATHWAY, NOT EVALUATED

* NO VOLATILE COPCs IN AREA

Figure 4: Mound Conceptual Site Model for the Parcel 3 RRE

2.7.3 Toxicity Assessment

The toxicological properties of each contaminant of concern for Parcel 3 were evaluated by reviewing the Integrated Risk Information System (IRIS) and/or Health Effects Assessment Summary Table (HEAST) data for the contaminant of concern. 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 Parcel 3 contaminants of concern has been developed.

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 contaminant of concern, as estimated using the appropriate slope factor and the amount of material available for uptake. The acceptable risk range as defined by CERCLA and the NCP is 10^{-4} to 10^{-6} (one human in ten-thousand to one human in one-million incremental cancer incidence). 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 contaminant of concern to a reference dose or concentration for the contaminant of concern that is believed to represent a no-observable effect level. The specific HQ for each contaminant of concern is then summed to provide an overall HI. US EPA guidance sets a limit of 1.0 for the comprehensive HI.

The incremental carcinogenic risks and hazards associated with residual concentrations of contaminants of concern in Parcel 3 are shown in Table 10. The incremental carcinogenic risks for the current Construction Worker (8.4×10^{-6}) and current Site Employee (2.4×10^{-5}) are within the acceptable risk range. The incremental carcinogenic risk for the future Construction Worker (3.0×10^{-4}) exceeds this range. The incremental carcinogenic risk for the future Site Employee (5.8×10^{-5}) is within the acceptable risk range. The HI for the current Construction Worker (1.3) and current Site Employee (1.1) exceed the limit (1). These values (as detailed in Section 6 of the RRE) are due to a single suspect measurement and are believed to overestimate the HI for these scenarios. The HI for the future Construction Worker (5.3) and future Site Employee (4.9) exceed the limit (1). The future risk and HI values in excess of the standards are due to the predicted future groundwater contaminants. The groundwater model is very conservative and likely overestimates the potential future groundwater contaminants at the BVA extraction point, currently the Mound production wells.

Regular compliance monitoring will ensure that production well concentrations are acceptable (SDWA) and that the residual risks associated with Parcel 3 remain acceptable. This monitoring will be conducted until the Mound site is connected to the Miamisburg municipal water supply, as currently planned.

Currently, there is no contamination detected above MCLs in the groundwater underlying

Table 10**: Incremental Residual Risk for Parcel 3 Summary Table

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

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

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

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

** Originally published as Table 35 of the Parcel 3 RRE

Parcel 3. Consequently, all ARARs with respect to groundwater at Parcel 3 are currently being met. However, to prevent a future unacceptable exposure to groundwater due to potential migration from other areas of the Mound Plant, a prohibition on the installation of wells at Parcel 3 is being required as part of this remedy.

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

2.7.5 Evaluation of Potential Cumulative Risks

For purposes of the RREM, risks resulting from contaminants that originate outside the release block/parcel under consideration are called cumulative risks. In general, cumulative risks are possible via air, surface water, and groundwater. For Mound, cumulative risks from surface waters are not expected because, other than stormwater drainage and some groundwater seeps present year-round, there are no surface water bodies such as ponds or streams flowing through Parcel 3 from other areas. 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/parcels and represents the cumulative risk from contaminants that migrate to the production wells from all release blocks/parcels.

Future groundwater. The future risk from groundwater was estimated for Parcel 3 based on the assumption that contaminants found in bedrock will eventually migrate to the Mound Plant production wells located in the BVA. A simple and conservative flow model was used to estimate the concentrations as a function of time. The constituents that contribute to the future groundwater risk can be found in Tables 6 and 7.

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 D Residual Risk Evaluation, Final* (January 1999) and are included in Table 10.

The HI and risk values presented in Table 10 for the current groundwater, future groundwater, and air scenarios are therefore believed to adequately bound the potential cumulative risk for Parcel 3. 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 10 labeled "Current and Future Incremental Residual Risks for Parcel 3" 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 (*Operable Unit 9 Ecological Characterization Report, Technical Memorandum, Revision 0* (March 1994)), there are no endangered species or critical habitats of endangered species on Parcel 3. Parcel 3 is composed primarily of an asphalt paved parking lot, roads, and two buildings. There are no wetlands or surface waters located in Parcel 3 and no sensitive habitats. Therefore, DOE has determined, with concurrence from US EPA and OEPA that an ecological assessment for Parcel 3 is not necessary (letter US EPA to DOE, (March 9, 2000) and letter OEPA to DOE, (March 30, 2000)).

2.8 REMEDIATION OBJECTIVES

The primary remediation objective for Parcel 3 is to ensure that the residual risk associated with the parcel is acceptable for the defined use scenario of industrial/commercial occupants.

2.9 DESCRIPTION OF ALTERNATIVES

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

2.9.2 Institutional Controls

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

- Maintenance of industrial/commercial land use;
- Prohibition against residential use;
- Prohibition against the use of groundwater;

- Site access for federal and state agencies for the purpose of sampling and monitoring; and
- Prohibition against removal of Parcel 3 soils from the DOE Mound property (as owned in 1998) boundary without approval from ODH and OEPA.

2.10 SELECTED REMEDY

2.10.1 Description

The selected remedy for Parcel 3 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 deed restrictions include:

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

DOE or its successors, as the lead agency for this ROD, have 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 is part of the Operations and Maintenance (O&M) Plan and is outlined in Appendix B, which is intended to serve as a framework for implementation of operation and maintenance activities for the selected remedy. Within 90 days of the date on which this ROD is signed, DOE shall submit to US EPA and OEPA 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 Facilities Agreement. If DOE, US EPA, and OEPA agree, the frequency of the compliance assessments can be changed at any time.

The soils within Parcel 3 have not been evaluated for any use other than on-site industrial/commercial use. Any off-site disposition of the Parcel 3 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 Parcel 3.

A copy of the deed is attached in Appendix A; this represents the remedy for Parcel 3. DOE will develop an O&M 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 threshold criteria, five balancing criteria and two modifying criteria. Each is described below.

2.10.3.1 Threshold Criteria - *Must be met for an alternative to be eligible for selection:*

Criteria 1: Overall protection of human health and the environment

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

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 that 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.

ARARs are of several types: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are usually health or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. For Parcel 3, MCLs established under the SDWA constitute chemical-specific ARARs and are listed in Appendix C. They apply to the groundwater beneath Parcel 3. Currently, there are no contaminants detected above MCLs in the groundwater underlying Parcel 3. Consequently, ARARs with respect to groundwater are met by Alternative 1 (no action), and the selected remedy (institutional controls). However, to prevent a future unacceptable exposure to groundwater due to potential migration from other areas of Mound Plant, a prohibition on the installation of wells at Parcel 3 is being required as part of this remedy.

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 Parcel 3, Ohio has identified two statutory provisions that describe site conditions that would prompt certain response actions. (See Appendix C). These provisions are similar to location-specific ARARs. The selected remedy (institutional controls) 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 selected remedy is an institutional control in the form of deed restrictions. The ARARs are applicable State requirements concerning the recording of deeds. (See Appendix C). The selected remedy will comply with these requirements.

In addition to the institutional control prohibiting soil removal, it should be noted that any onsite management of Parcel 3 soils, not associated with a CERCLA response action, in a manner inconsistent with State law or any disposition of Parcel 3 soils away from the Mound Superfund Site boundary (as defined in 1998) 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:*

Criteria 3: Long-term effectiveness and permanence

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

Because this remedy will result in hazardous substances remaining in Parcel 3 above levels that allow for unlimited use and unrestricted exposure, an annual review and report will be submitted to OEPA, 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.

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.

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. The selected remedy, Institutional Controls, provides this assurance.

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 (see Appendix D memorandum to file from Randolph Tormey, Deputy Chief Counsel, Ohio Field Office, USDOE dated February 17, 1999). Since Alternative 1 involves no action, there is no time or cost required for implementation. The selected remedy, Institutional Controls, is expected to require approximately one month and minimal cost to implement.

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 the selected remedy (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*:

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 the selected remedy, Alternative 2, Institutional Controls.

Criteria 9: 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 is Alternative 2. Institutional controls in the form of deed restrictions for Parcel 3 are protective of human health and the environment, comply with Federal and State requirements that are applicable or relevant and appropriate, are cost-effective, and utilize a permanent solution to the maximum extent practicable. Because this remedy will result in hazardous substances remaining in Parcel 3 above levels that allow for unlimited use and unrestricted exposure, DOE in consultation with 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.

2.12 DOCUMENTATION OF SIGNIFICANT CHANGES

Although this ROD will be signed and finalized, 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 Parcel 3 are not anticipated.

3.0 RESPONSIVENESS SUMMARY

This section of the ROD presents stakeholder concerns about Parcel 3 and explains how those concerns were addressed prior to issuance of the ROD. Formal comments were received from two individuals during the public meeting held on May 17, 2001, No other stakeholders provided comments during the public review period for the proposed plan. The Core Team responded to stakeholder concerns by letter. Comments and responses are presented below.

Comments on the Parcel 3 Proposed Plan and Residual Risk Evaluation from James D. Bonfiglio, MESH Advisor

These two "Public Review Drafts" were received by this observer at the 5/11/01 MAC/MRC meetings. Basically parcel 3 is comprised of 3 PRS's (99, 100, 241) an 2 buildings (GH & GP-1). If one accepts the reporting data given, then my previous report written 4/2001 covering PRS 99&100 is still valid. For a refresher, "PRS 99 required a removal action since plutonium-238 exceeded the guideline value of 55pCi/g. Onsite a 120pCi/g level was found while offsite a reading of 297 pCi/g resulted." Since the PRS 99 location has been reported as "remediation completed" the high plutonium-238 offsite level seems to be remaining. I did not find any mention of this again. There are multiple reports which have been issued on PRS 99 including the two above in which PRS 99 resides. As I continue to say, these reports could be more concise, user/reader friendly and organized in such a way that understanding them would be much improved. To that end and with other objectives I will meet with DOE staff and others at the Mound on May 16, 2001.

Response:

The Proposed Plan (Public Review Draft, page 11) reads "...PRS99. One sample displayed an elevated concentration of plutonium-238 (120pCi/g by on-site gamma-ray spectrometry, 297 pCi/g by off-site isotopic analysis). A trenching investigation yielded evidence of greater contamination (up to 839 pCi/g of plutonium-238). A removal action

was performed and subsequent verification sampling documented remaining plutonium-238 concentrations below the 55 pCi/g Risk Based Guideline Value (*On-Scene Coordinator (OSC) Report, PRS 99, Removal Action, Final,* (August 2000))." "Off-site" indicates the measurement was performed off-site. No samples were taken from "off-site" locations as part of the PRS 99/100 Further Assessment of the PRS 99 Removal Action.

Comment (continued)

Concerning Parcel 3, "residual risks" and "Proposed Plan" documents can be summarized as follows: WARNING: DO NOT EVER USE P-3 GROUNDWATER!

- PRS 99, of the listed PRSs & buildings, provides the risks of concern in Parcel 3.
- A CERCLA removal action followed for PRS 99.
- Residual risks with Parcel 3 including toxicity and exposure assessments were made. Risks include carcinogenic (cancer) & hazard index data for non-carcinogenic substances.
- Potential exposure/use of groundwater poses future cancer risks due to tritium. Antimony presence in groundwater, if ingested, also is a hazard. A higher hazard index for groundwater is shown when hexavalent chromium, antimony & thallium are combined.
- Presence of plutonium 238 and thorium 230 in the groundwater, in addition to tritium poses a cancer risk.
- On page 20 of the 4/2001 Proposed Parcel 3 Plan, a simple but critical statement states "The future groundwater risks presented will be managed to be protective of human and environmental health". On page 21 of the Plan" deed restrictions" are given as the controls to do so. These deed restrictions include the following:
- Maintenance of industrial/commercial use (add only!)
- Prohibition against residential use (how can adjacent private property be prohibited from using/drilling for common and probably contaminated groundwater?)

Response:

These two deed restrictions address the future land use; only industrial/commercial, not residential. This Residual Risk Evaluation was prepared according to the Residual Risk Evaluation Methodology (RREM). This methodology focuses on the risks within the parcel. According to the Mound 2000 Work Plan, off-site risk will be addressed in the off-site or final Record of Decision and its supporting Risk Evaluation. Although this evaluation is some years in the future, the off-site population has not been forgotten. Mound's effluent monitoring and environmental surveillance continues, is reported to the public via the Annual Site Environmental Monitoring Report and other means, and will continue until the end of the Exit Project. The environmental surveillance program involves sample collection and analysis of ambient air, regional water supplies, sediments, on-site and off-site groundwater, and foodstuffs.

Comment (continued)

- Site access for federal & state agencies for the purpose of sampling & monitoring. (Then what?)

Response:

The results of the monitoring will be evaluated and reported. The details of monitoring, evaluating, and reporting with respect to institutional controls are developed in the O&M Plan for the transferred parcels. The Post Closure Stewardship Working Group, which includes representatives of MMCIC and the public, is developing the approach to monitoring after DOE departs the site. According to Section 120(h)(4)(D)(i) of CERCLA, any additional response action or corrective action found to be necessary after the date of sale or transfer shall be conducted by DOE or its successor(s).

Comment (continued)

- Prohibition against the removal of Parcel 3 soils from the DOE Mound Property (as owned in 1998) boundary without approval from the Ohio Department of Health and the OEPA. (I recommend addition to this of the Miamisburg community or groups with a stake!)

Response:

It is appropriate to name the Ohio Department of Health and the Ohio Environmental Protection Agency in the ROD. These institutions can be expected to be present to address the question of soil removal if it comes at some future date. These institutions are also aware of and responsive to stakeholder input and would be expected to involve the appropriate stakeholder groups. If/when the question of moving soil is raised, it could be that the appropriate stakeholder group is one that does not exist today.

Comment (continued)

The added comments will be presented during the May 17, 2001 Public Meeting to discuss the Proposed Plan.

Since exposures for both future "construction workers" and "site employees" to groundwater contaminants is a major concern, what safeguards and liabilities will be in place and what groups will be financially responsible for future problems?

Response:

DOE or its successors have the responsibility to monitor, maintain and enforce the 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. In addition, a long term groundwater

monitoring program is being evaluated as part of Long Term Stewardship. New information may be received or generated that could affect the implementation of the remedy. DOE as lead agency, has the responsibility to evaluate the significance of any such new information. New information that is determined to effect a fundamental change in the remedy could result in an amended ROD and revised remedy.

Comment (continued)

These two reports, as a common objective observed in all the reports (about 20) reviewed so far, seem to emphasize the "rose" while minimizing the "thorns". The good data is easy to find while that which exceeds guidelines values, risk values above acceptable levels which includes carcinogens and non-carcinogenic hazard indices is almost hidden. Parcel 3 is not a pristine piece of property! The deed restrictions alone will not minimize human and environmental health concerns, a detailed and ongoing checks & balances enforcement scheme will be needed and must be included or I predict "Murphy's Law" will be invoked! As I read the section 5.2.3 "Overall Summary of Risk Results" and 6.0 "Uncertainty in the Risk Assessment" I felt like one who just found out that he wandered into a large area of quicksand! These 2 sections are in the Parcel 3 Residual Risk Evaluation April 2001 Draft and begin on page 32. As noted also in Tables 33 through 35, the large number of so called "bolded values exceeding the cancer risk of 10^{-6} or non-cancer hazard index greater than 1" is enlightening and very alarming. I certainly would have second thoughts about becoming either a site employee or construction worker.

On page 38 of the Residual Risk Parcel 3 Evaluation, Section 6.5 Conclusions states in part the following: "The residual risk in Parcel 3 exceeds the acceptable risk range and is primarily driven by the conservative groundwater analysis." To quote a TV lawyer, on behalf of his client, he constantly states "Your honor I'm not comfortable with that." As with Parcel 3, I too am not comfortable with the risks remaining or an enforceable well controlled plan to prevent future exposures to construction & site workers and we must do better than this!

Response:

Parcel 3 is not pristine. The data set (thousands of measurement results) used for the risk evaluation was provided with the RRE. Risk results for both receptors were summarized in three tables to provide context and consistency of presentation. Risk results from 10^{-4} to 10^{-6}, although acceptable, were also printed in bold (as were he unacceptable risks). Although some risk and hazard results exceed the acceptable values, the cause of this exceedance is understood and the remedy (institutional controls) prevents this mode of exposure. Where overall risk (or hazard) exceeds acceptable levels, the exceedance is driven by exposure to groundwater and is due to the conservative nature of the groundwater analysis. The groundwater model does not take into account natural physical and chemical processes such as dilution, dispersion, adsorption, and soil properties that would reduce contaminant levels of groundwater from the bedrock aquifer that may migrate to the Buried Valley Aquifer. As a result, the

future groundwater exposure point concentration (EPC) is biased high and is conservative. In addition, to the conservative nature of the groundwater model, conservative decisions were made concerning the data set and toxicity factors. For example, the maximum detected concentration of antimony (a single measurement) from a data set that spans approximately seventeen years is used as the EPC. Using the next highest measurement instead lowers the hazard index due to antimony for the construction worker scenario from 1.3 to 0.4, which is well below the acceptable threshold. Chromium, which is a driver for future groundwater risk, was assumed to be present only in its most toxic form (hexavalent). These assumptions are likely to result in an overestimation of groundwater risk. Given the conservative nature of the Residual Risk Evaluation and the associated uncertainties, the risks presented in the RRE represent the upper-bound plausible limit of risks (worst case scenario). Based on the protective measures presented in the Proposed Plan for Parcel 3 and the conservative nature of the RRE, the future groundwater risks presented will be managed to be protective of human and environmental health.

Comments on the Parcel 3 Proposed Plan and Residual Risk Evaluation from Dann Bird, MMCIC Planning Manager

Substantive Comment

MMCIC acknowledges that the residual risk calculated for a hypothetical construction worker and site worker in Release Parcel 3 exceed the acceptable risk thresholds or ranges for some exposure media, exposure pathways, and/or routes of exposure, given the assumptions incorporated into the Mound 2000 Residual Risk Evaluation Methodology (DOE, January 1997). These exceedances include the incremental and total non-carcinogenic hazards for the current and future construction worker, current and future site employee, which exceed a Hazard Index of one due to potential exposure to groundwater. In addition, the incremental excess lifetime cancer risk for the future construction worker scenario (3.0×10^{-4}) exceeds the acceptable risk range (10^{-4} to 10^{-6}). These risk exceedances are driven by the exposure to groundwater risk calculation.

MMCIC understands that the conservative assumptions incorporated into Mound's groundwater risk model will overestimate risk. These assumptions (that natural attenuation physical and chemical processes are not included in the calculation of the input groundwater concentration term, the use of the maximum detected value (from as much as seventeen year's work of data), and the assumption that certain contaminants (such as chromium) are present in only their most toxic form) are intended to be conservative and were all accepted and commented upon during the public review period of the *Residual Risk Evaluation Methodology*. With this in mind, MMCIC understands that the actual groundwater risks are likely to be lower and accepts that the proposed action for Parcel 3, namely institutional controls that will bar the use of groundwater at the Mound facility, will be protective of human health and the environment under an industrial/commercial exposure scenario.

Response:

No response needed.

ERRATA
The second sentence of the second complete paragraph on page viii of the RRE Executive Summary should read "Total, background, and incremental risks for the site employee..." rather than "Total, background, and incremental risks for the construction worker..."

Response:
The comment is correct. The text will be changed in the Final version of the RRE.

Comment from the Core Team
During the development of the Residual Risk Evaluation for Parcel 3, revised slope factors for radionuclides were released by HEAST. The risk calculations for Parcel 3 were recomputed using the revised slope factors. The results are not significantly different from the risks published in the Public Review Draft (see Table 11). The preferred alternative identified in the Proposed Plan is not affected by this development.

Table 11: Incremental Residual Risk for Parcel 3 Using Revised Slope Factors

Scenario and Receptor	Media	Constituents	Pathway	Total Cancer Risk as reported in Public Review Draft of RRE	Total Cancer Risk using revised HEAST slope factors
Construction Worker Scenario	Soil (all sample depths) (Current/Future)	Chemical and Radiological	Ingestion	**6.1E-06**	**5.8E-06**
			Inhalation of Dust	5.5E-09	7.0E-09
			Inhalation of VOCs	NA	NA
			External	6.9E-10	2.9E-07
		Soil Total Risk		**6.1E-06**	**6.1E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**2.1E-06**	**2.7E-06**
			Dermal Contact	NA	NA
			Inhalation While Showering	NA	NA
		Current Groundwater Total Risk		**2.1E-06**	**2.7E-06**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**9.6E-06**	**9.2E-06**
			Dermal Contact	**2.8E-04**	**2.0E-04**
			Inhalation While Showering	7.6E-08	4.5E-08
		Future Groundwater Total Risk		**2.9E-04**	**2.1E-04**
	Air*	Radiological	Inhalation	2.0E-07	2.0E-07
		Air Total Risk		2.0E-07	2.0E-07
	Cumulative Incremental Current Risk			**8.4E-06**	**9.0E-06**
	Cumulative Incremental Future Risk			**3.0E-04**	**2.2E-04**
Site Employee Scenario	Soil (0-2 ft bls) (Current/Future)	Chemical and Radiological	Ingestion	**2.6E-06**	**2.4E-06**
			Inhalation of Dust	2.2E-08	2.9E-08
			Inhalation of VOCs	NA	NA
			External	6.2E-10	3.2E-07
		Soil Total Risk		**2.6E-06**	**2.7E-06**
	Groundwater (Current)	Chemical and Radiological	Ingestion	**2.0E-05**	**2.3E-05**
		Current Groundwater Total Risk		**2.0E-05**	**2.3E-05**
	Groundwater (Future)	Chemical and Radiological	Ingestion	**5.4E-05**	**4.9E-05**
		Future Groundwater Total Risk		**5.4E-05**	**4.9E-05**
	Air*	Radiological	Inhalation	9.9E-07	9.9E-07
		Air Total Risk		9.9E-07	9.9E-07
	Cumulative Incremental Current Risk			**2.4E-05**	**2.7E-05**
	Cumulative Incremental Future Risk			**5.8E-05**	**5.3E-05**

NA - Not applicable

*RRE values for air were brought forward from the Technical Position Report for Release Blocks D and H. (DOE 1999)

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

bolded values exceed cancer risk of 10^{-6} or non cancer HI greater than 1

bls - below land surface

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 Parcel 3 include the following:

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 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, February 1996.

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

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

Residual Risk Evaluation, Release Block D, Final, Revision 0, December 1996.

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

Work Plan for Environmental Restoration of the DOE Mound Site, The Mound 2000 Approach, Final, Revision 0, February 1999.

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

Parcel 3 Residual Risk Evaluation, Public Review Draft, April 2001.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 120 Federal Facility Agreement, August 1993.

Operable Unit 9 Surface Water and Sediment Report, Technical Memo, Revision 2, September 1996.

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

Parcel 3 Proposed Plan, Public Review Draft, April 2001.

Technical Position Report in Support of the Release Block D Residual Risk Evaluation, Final, January 1999.

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

Reconnaissance Sampling Report; Soil Gas Survey and Geophysical Investigations; Mound Plant Main Hill and SM/PP Hill; Final, Revision 2, February 1993.

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

GH Building Data Package, July 1999.

GP-1 Building Data Package, July 1999.

PRS 100 Package, August 2000.

PRS 241 Package, August 1997.

PRS 99 Action Memo, Engineering Evaluation, Cost Analysis, Final, October 2000.

Further Assessment Data Report, PRS 99/100, Final, July 2000.

APPENDIX A

Quit Claim Deed for Parcel 3

QUIT CLAIM 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) (42U.S.C. §2201(g)), in consideration of 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 QUIT CLAIMS 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 real property (hereinafter the "Premises), commonly known as Parcel 3:

Situated in the State of Ohio, County of Montgomery and being parts of City of Miamisburg Lot Number 2259 and 2290, also being part of Sections 30, Fractional Town 2, Range 5 East M.R.S. and Fractional Section 36, Fractional Town 2, Range 5 East M.R.S. and being a portion previously conveyed to USA as described in Deed Book 1246, Page 45 and also being a portion previously conveyed to USA as described in Deed Book 1214, Page 12 and also being a portion previously conveyed to USA as described in Deed Book 1256, Page 179 containing 5.581 acres, more or less, and being more fully described in Exhibit A attached hereto and incorporated herein.

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 expressed 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 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 Parcel 3 Environmental Summary, Notices of Hazardous Substances, Mound Plant, Miamisburg, Ohio dated_____ without prior written permission 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 multi family 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 1980, 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 _____, 2001.

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 _____, 2001, _____, who acknowledged that she is the Manager of the Ohio Field Office for the Unites States Department of Energy, with full authority to execute the foregoing on behalf of the Unites States of America, and who acknowledged the above to be her signature and her free act and deed.

SEAL

_____
Notary Public

APPENDIX A, Exhibit A

Legal Description of Parcel 3

Exhibit "A"
for
Mound Parcel Three
containing
5.581 Acres

May 4, 2000

Situate in the State of Ohio, County of Montgomery and being parts of City of Miamisburg Lot Numbered 2259 and 2290, also being part of Sections 30, Fractional Town 2, Range 5 East M.R.S. and Fractional Section 36, Fractional Town 2, Range 5 East M.R.S. and being a portion previously conveyed to USA as described in Deed Book 1246, Page 45 and also being a portion previously conveyed to USA as described in Deed Book 1214, Page 12 and also being a portion previously conveyed to USA as described in Deed Book 1256, Page 179 and being more particularly described as follows:

COMMENCING at a Concrete Monument Found (Top Broken Off) at the Northwest corner of the Northwest Quarter of Section 30 said Monument also being the Northeast corner of a 2.90 Acre tract of land conveyed to Robert P. Heist as described in Deed MF 74-0526-C09, *THENCE* with the West line of said Heist Lands, ***South 05° 45' 57" West for a distance of 130.89 feet to a 1" Iron Pipe Found Pinched*** at the Southwest corner of said Heist Lands and the Northwest corner of a 14.288 Acre tract conveyed to the Miamisburg Community Corporation as described in Deed MF 99-852-E11 and the ***TRUE POINT OF BEGINNING*** of the herein described tract;

THENCE with the West line of said Miamisburg Community Corporation lands the next seven calls:

> ***1) THENCE, South 05° 29' 16" West for a distance of 57.67 feet to a 5/8" Rebar Found with cap (LeRoy);***
>
> ***2) THENCE, South 65° 31' 15" West for a distance of 35.05 feet to a 5/8" Rebar Found with cap (LeRoy);***
>
> ***3) THENCE, South 25° 44' 48" East for a distance of 160.76 feet to a 5/8" Rebar Found with cap (LeRoy);***
>
> ***4) THENCE, South 64° 37' 16" East for a distance of 56.61 feet to a 5/8" Rebar Found with cap (LeRoy);***

5) THENCE, North 64° 01' 25" East for a distance of 37.94 feet to a 5/8" Rebar Found with cap (LeRoy);

6) THENCE, South 25° 04'47" East for a distance of 194.43 feet to a 5/8" Rebar Found with cap (LeRoy);

7) THENCE on a Curve to the Left with a Radius of 360.67 feet, a Arc Length of 180.89 feet, a Delta Angle of 28° 44' 12", with a Chord Bearing of South 39° 26' 53" East and a Chord Distance of 179.00 feet to a 5/8" Rebar Set;

THENCE on a new division line through said USA lands, ***South 40° 10' 27" West for a distance of 91.34 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***South 23° 57' 22" East for a distance of 17.73 feet to a 3 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***South 64° 21' 58" West for a distance of 99.96 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands, ***North 50° 48' 40" West for a distance of 23.44 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands, ***South 65° 58' 19" West for a distance of 39.91 feet to Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***North 24° 24' 48" West for a distance of 308.00 feet to a 6 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***North 59° 05' 44" East for a distance of 2.80 feet to a 6 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***North 20° 40' 57" West for a distance of 10.55 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***South 67° 51' 08" West for a distance of 3.37 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***North 24° 33' 12" West for a distance of 30.35 feet to a 6 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***North 50° 32' 22" West for a distance of 26.56 feet to a Mag Nail Set,*** passing a RR Spike Set at 8.09 feet on the West line of said Section 30;

THENCE continuing on a new division line through said USA lands, ***North 31° 01' 18" West for a distance of 13.93 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands, ***South 65° 08' 57" West for a distance of 7.98 feet to a Mag Nail Set;***
THENCE continuing on a new division line through said USA lands, ***South 23° 06' 46" East for a distance of 13.85 feet to a 4 inch Existing Steel Fence Corner Found;***

THENCE continuing on a new division line through said USA lands, ***South 63° 53' 40" West for a distance of 26.73 feet to a Cross Notch Set;***

THENCE continuing on a new division line through said USA lands, ***South 24° 54' 44" East for a distance of 45.10 feet to a Cross Notch Set*** on the Easterly extension of the Southerly line of an existing one story brick building named GS1;

THENCE continuing on a new division line through said USA lands and with the Southerly line of said GS1 building, ***South 65° 11' 32" West for a distance of 268.32 feet to a 5/8" Rebar Set***, passing the Southeasterly corner of said GS1 building at 62.6 feet and the Southwesterly corner of said GS1 building at 263.43 feet;

THENCE continuing on a new division line through said USA lands, ***North 24° 25' 19" West for a distance of 229.01 feet to a Mag Nail Set;***

THENCE continuing on a new division line through said USA lands and with an existing fenceline, ***South 65° 33' 23" West for a distance of 284.61 feet to a Mini RR Spike Set in a 4 foot wide Concrete Walk at the Joint;***

THENCE continuing on a new division line through said USA lands, ***North 24° 23'31" West for a distance of 104.08 feet to a5/8" Rebar Set*** on the South line of lands conveyed to the City of Miamisburg as described in Deed Book 594, Page 410, witness a Concrete Monument Found Bearing South 65° 36' 29" East at a distance of 38.74 feet;

THENCE with the South line of said City of Miamisburg lands, ***North 65° 36' 29" East for a distance of 770.61 feet BACK TO THE TRUE POINT OF BEGINNING.***

Said property contains 5.581 Acres more or less with 1.992 Acres more or less in Section 30 and 3.589 Acres more or less in Fractional Section 36. North based on State Plane Coordinates, Ohio South Zone taken from a survey performed by Lockwood, Jones and Beals dated 06-01-82 and referenced to Deed MF 99-852-E11: Note bearing South 25° 04' 47" East with a distance of 194.43 feet. This description is based on an actual field survey performed by HLS Surveyors and Engineers under the direct supervision of William C. LeRoy PS, Ohio Lic. No. 7664 and dated May, 2000. Subject to all Easements, Highways, Covenants and Restrictions.

STATE OF OHIO
WILLIAM C. LEROY 7664
REGISTERED PROFESSIONAL SURVEYOR

6-05-00

William C. LeRoy PS
Ohio Lic. No. 7664
KY. Lic. No. 3516

JOSEPH LITVIN P.E., P.S.
COUNTY ENGINEER
MONTGOMERY COUNTY DAYTON, OHIO
DESCRIPTION CHECKED AND APPROVED
BY CAM DATE 6/6/00

Mound Parcel 3.doc

SECTION 30 & 36, FRAC. TOWN 2, RANGE 5 M.R.S.
MIAMISBURG, MONTGOMERY CO., OHIO
PART OF CITY OF MIAMISBURG LOT NUMBER 2259
&
PART OF CITY OF MIAMISBURG LOT NUMBER 2290

BEARING BASIS ESTABLISHED ON STATE PLANE COORDINATES SOUTH ZONE, STATE OF OHIO
NOTE: SURVEY REFERENCE No. 4

GRAPHIC SCALE 1" = 40'
MAY, 2000

LEGEND:

CURVE TABLE

NUMBER	LENGTH	DELTA ANGLE	RADIUS	CHORD	BEARING	CHORD LENGTH
C	180.89	28°44'41"	360.67	S 39°[illegible]'53" E		179.00

LINE TABLE

NUMBER	DIRECTION	DISTANCE
L1	S 73°37'22" E	17.73'
L2	N 50°48'40" W	23.44'
L3	N 39°05'44" E	2.80'
L4	N 70°40'53" W	10.55'
L5	S 67°9'08" W	3.37'
L6	N 84°13'12" W	10.35'
L7	N 30°37'22" W	26.36'
L8	N 3°0'16" W	13.93'
L9	S 63°26'[illegible]" W	7.98'
L10	S 27°06'46" E	13.85'
L11	S 63°53'40" W	26.77'

CITY OF MIAMISBURG
DB 594, PG. 40

N 63°36'39" E 770.08'

COMMENCEMENT POINT

FIND P.K.N.

S 63°37'23" W 204.08'

NEW DIVISION
TOTAL 5.581 ACRES
SECTION 36 - 3.589 ACRES

MIAMISBURG COMMUNITY CORPORATION
DEED WT. No. 99052-E9

U.S.A.
DB 594, PG. 43

S 64°09'23" E
37.94'

EXISTING FENCE

1 STORY
BRICK BUILDING
1930

S 63°37'23" W 248.23'

BUILDING CORNER
ON BOUNDARY LINE

CONCRETE
W/ WIRE

CROSS WATCH

6" STEEL FENCE POST

U.S.A.
DB 594, PG. 8
PART CITY OF MIAMISBURG
LOT No. 2290

ACREAGE SECTION 30 1.992 ACRES

14.288 AC.
MIAMISBURG COMMUNITY CORPORATION
DEED WT. No. 99052-E9

U.S.A.
DB 594, PG. C
PART CITY OF MIAMISBURG
LOT No. 2259

S 64°09'23" W 16.34'

S 63°36'39" W

5.581 ACRES
PLAT OF SURVEY
FOR
"MOUND PARCEL 3"

LOCATED IN
SECTIONS 30 (1.992 Ac.) & FRAC. 36 (3.589 Ac.)
FRAC. TOWN 2, RANGE 5 M.R.S.
CITY OF MIAMISBURG
MONTGOMERY COUNTY, OHIO
PART CITY OF MIAMISBURG LOT No. 2259
&
PART CITY OF MIAMISBURG LOT No. 2290

Reference Documents

1. All Deeds Shown on Plat of Survey
2. Survey 93-48
3. Survey of Parcel "A" by H.L. Surveyors & Engineers, dated August, 1994
4. State Plane Coordinate Property Line Survey, dated 11-18-99, Project No. 1-97

Surveyors Note

1. Transition Boundary agrees with Property Lines, unless otherwise shown.
2. All Rebar Set are 5/8" Dia. x 30" Long and have a Yellow Plastic Cap Marked "LeRoy, Reg#".
3. All measurements based on a good transition unless otherwise shown.
4. No Buildings or other improvements were located during this survey unless otherwise shown on plat.

Certification: This Boundary Survey was prepared in accordance with Chapter 4733-37 of the Ohio Administrative Code. I Certify that this Plat of Survey was made under my direct supervision and is based on an actual field survey.

STATE OF OHIO
WILLIAM C. LEROY
7884
REGISTERED PROFESSIONAL SURVEYOR

WILLIAM C. LEROY, REGISTERED PROFESSIONAL SURVEYOR
No. 7884, STATE OF OHIO

9-05-00
DATE THIS PLAT ISSUED

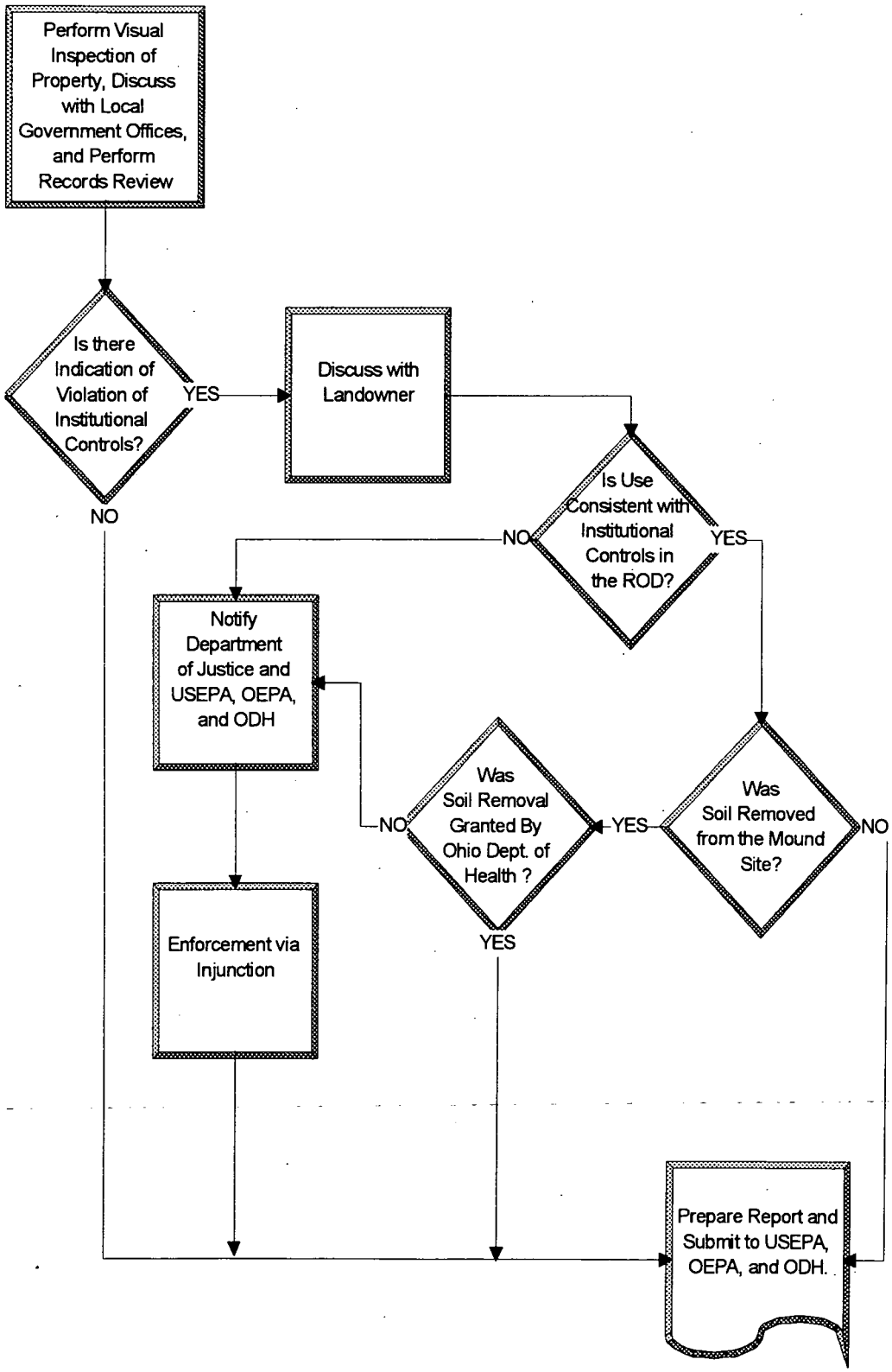
PREPARED BY: LTP

HLS
Surveyors & Engineers
3939 YANCO LANE, VANDALIA, OH. (937) 603-2400

APPENDIX B

Mound Plant O&M Plan for the Implementation of Institutional Controls

Mound Plant O&M Plan for the Implementation of Institutional Controls



APPENDIX C

ARARs for Parcel 3

Appendix C

ARARs for Parcel 3

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

APPENDIX D

Memorandum to file

MEMORANDUM

Date: 2/17/99
To: File
From: Randolph Tormey, Deputy Chief Counsel, Ohio Field Office, US DOE
Subject: Institutional Controls, Mound Facility, Miamisburg, Ohio

A question has arisen as to the validity and method of enforcement of restrictive covenants ("institutional controls") in deeds of conveyance for real property at the DOE Mound Facility, Miamisburg, Ohio. Currently in question are restrictive covenants to be placed upon a portion of the real property known as "Parcel D" as follows:

> "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 the Ohio EPA or ODH, their successors and assigns.
>
> 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 D, Mound Plant, Miamisburg, Ohio dated January, 1999) without prior written approval from the Ohio Department of Health (ODH), or a successor agency.
>
> 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.
>
> 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 Ohio Environmental Protection Agency."

Under Ohio law there is no uniform or standard manner to encumber property since there are as many valid reasons for restricting the use of property as there are means to effect those purposes. Recordation of the

restrictions with the county recorder for the county in which the land is situated is generally required for the restrictions to be enforced so as to provide knowledge of their existence. While all courts disfavor restrictions upon the free use of land, Ohio law provides that "courts must enforce a restriction where it is clearly and unambiguously found in a covenant." Brooks v. Orshoski, 1998 WL 484560 (Oh App. 6 Dist.) In general, the court will "construe the language of the restriction by giving it its common and ordinary meaning, and read the restrictive covenants as a whole to ascertain the intent of the creator." Id. This states the basic rule followed by courts in Ohio. It also seems that restrictive covenants are viewed more favorably when they serve some public purpose. The above covenants seem to be of this nature. Based upon the case law in Ohio, the above-stated restrictive covenants are in a form that is acceptable in Ohio and should be enforced by the courts in this state.

Ohio Revised Code (ORC) § 5301.25(A) provides "All ... instruments of writing properly executed for the conveyance or encumbrance of lands ... shall be recorded in the office of the county recorder of the county in which the premises are situated..." Further, Note 2 under this section mentions that "Proper recording of instrument serves as constructive notice of interest or encumbrance to all who claim through or under grantor by whom such deed was executed," citing Thames v. Asia's Janitorial Service, Inc., (Lucas 1992) 81 Oh App. 3d 579, 611 N.E. 2d 948, motion overruled 65 Ohio State 3d 1458. Furthermore, under ORC § 5301.48 to have "marketable record title" a landowner must have an unbroken chain of title of record for forty years or more. This places upon the buyer of property the need to search the record title for at least the past 40 years, which typically reveals any "cloud" on the title. Of course, the above-mentioned covenants would be such a cloud and would be noted by the subsequent buyer. In a subsequent sale that buyer would then place the covenants in the following deed thereby perpetuating this notice. It should be noted that the lack of a cloud for the forty-year period would normally eliminate the restriction, except under ORC § 5301.53(G) any right, title or interest of the United States may not be extinguished in this manner. This indicates that the restrictive covenants will run with the land and will be enforced against any property owner who takes the property through a deed in the chain of title from DOE.

Enforcement of the restrictive covenants would be through an injunctive action which could be brought by any party for whose benefit the restrictions were put in place. Brooks v. Orshoski, 1998 WL 484560 (Ohio App. 6 Dist.), Meisse v. Family Recreation Club, Inc., 1998 WL 70503 (Ohio App. 2 Dist.). Obviously the governmental agencies mentioned in the draft deed for Parcel D would be such a party, however it is also conceivable that any other party intended as the beneficiary of the restrictive covenants could likewise bring an action for enforcement. In view of the public purposes served by the above-mentioned covenants this class of persons could be quite large. As the grantor creating the restrictive covenants, the United States would likely take the lead in their enforcement, probably through the Department of Justice or the local US Attorney's office.

Based upon the foregoing, I conclude that restrictive covenants (institutional controls) are enforced by the courts of Ohio, particularly when they serve a public purpose. The covenants suggested would run with the land and recordation would assure notice of their existence. They are typically enforced through an injunctive action by any party intended to be a beneficiary of the restrictions. In this case, most likely by the United States.

Randy Torney