Department of Energy
Carlsbad Area Office
P. O. Box 3090
Carlsbad, New Mexico 88221

RECEIVED
NOV 25 1996

November 22, 1996

Mr. Steve Zappe
New Mexico Environment Department
Hazardous and Radioactive Materials Bureau
2044 A Galisteo St.
Santa Fe, New Mexico 87505

Subject: Final Voluntary Release Assessment/Corrective Action Report

Dear Mr. Zappe:

This letter transmits the Final Voluntary Release Assessment/Corrective Action (RA/CA) Report for 16 Solid Waste Management Units (SWMUs) at the Waste Isolation Pilot Plant.

This Final Voluntary RA/CA Report documents the results of release assessment sampling at 11 SWMUs (SWMU Nos. 001g, 001h, 001j, 001k, 001L, 001m, 001n, 001s, 001t, 001x, and 004a). Analytical results for release assessment samples collected at these SWMUs demonstrates that total metals concentrations measured in the 11 SWMUs are equivalent to measured soil background concentrations and are well below applicable Subpart S action levels. In addition, no volatile organic compounds (VOCs) were detected in any of the 11 SWMUs, and VOC laboratory method reporting limits are also below applicable Subpart S action levels. Although some metals results were qualified as estimated during data validation, no results were rejected, and data quality is sufficient to demonstrate that concentrations of total metals within the SWMUs are well below the Subpart S levels. Additionally, this report provides information to our request for No Further Action at the Brinderson and Construction Landfill SWMUs, and to support our request for approval of proposed corrective actions at three other SWMUs (the Badger Unit Drill Pad, the Cotton Baby Drill Pad, and the DOE-1 Drill Pad).

If you have any questions, or if you would like to discuss the attached results, please contact me at (505) 234-7452.

Sincerely,

C. A. Snider
Compliance Engineer

Printed on recycled paper

961114

Enclosure

cc w/enclosure:
R. Casanova, EPA VI
B. Kraus, EEG

cc w/o enclosure:
P. Kilgore, CAO
L. Frank-Supka, WID
K. Day, WID
C&C File

DOE/WIPP 96-2209

Final Voluntary Release Assessment/ Corrective Action Report

November 12, 1996

Waste Isolation Pilot Plant
Carlsbad, New Mexico

RECEIVED
APR 03 1997
OSTI

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

MASTER

Processing and final preparation of this report was performed by the Waste Isolation Pilot Plant Management and Operating Contractor for the U. S. Department of Energy under Contract No. DE-ACO4-86AL31950.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

This document has been reproduced directly from the best possible copy.
It is available to DOE and DOE contractors at the following addresses:

Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831

Prices available from (615) 576-8401

Available to the public from the
National Technical Information Services
U. S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

RECEIVED
APR 03 1997
OSTI

Processing and final preparation of this report was performed by the Waste Isolation Pilot Plant Management and Operating Contractor for the U.S. Department of Energy under Contract No. DE-ACO4-86AL31950.

TABLE OF CONTENTS

LIST OF FIGURES v

LIST OF TABLES vi

EXECUTIVE SUMMARY 1

1.0 INTRODUCTION 5

1.1 Scope of the Final Voluntary Release Assessment/Corrective Action Report . . 5
1.2 Technical Approach for Sampling and Analysis 6
1.2.1 Rationale for the Selection of Target Analytes at Mudpit SWMUs 9
1.2.2 Rationale for Selection of Target Analytes for the Portacamp Area (SWMU 004a) 9
1.2.3 Analytical Methods 9
1.2.4 Field Sampling and Quality Assurance 14
1.2.5 Laboratory Data Quality Assurance and Data Validation 14
1.3 Geology and Hydrogeology in the Vicinity of the WIPP 15
1.3.1 Surface Formations 18
1.3.2 The Dewey Lake Formation 18
1.3.3 Infiltration at the WIPP Site 20
1.4 Background and Action Levels for Evaluation of Analytical Results 20
1.4.1 Estimation of Site Background Concentrations 20
1.4.2 Identification of Applicable Action Levels 20
1.4.3 Applicability of Assumptions Contained in Proposed Subpart S and the EPA Region III RBC Tables 24

2.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001j 26

2.1 Location of SWMU 001j 26
2.2 Geology and Hydrogeology in the Area of SWMU 001j 26
2.3 Sampling and Analytical Program 27
2.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 27
2.5 Proposed Corrective Actions at SWMU 001j 29

3.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001m 32

3.1 Location of SWMU 001m 32
3.2 Geology and Hydrogeology in the Area of SWMU 001m 32
3.3 Sampling and Analysis Program 33
3.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 34
3.5 Proposed Corrective Actions at SWMU 001m 34

4.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001t 38

4.1 Location of SWMU 001t 38
4.2 Geology and Hydrogeology in the Area of SWMU 001t 38
4.3 Sampling and Analysis Program 40
4.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 40
4.5 Proposed Corrective Actions at SWMU 001t 40

5.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001n 44

5.1 Location of SWMU 001n 44
5.2 Geology and Hydrogeology in the Area of SWMU 001n 44
5.3 Sampling and Analysis Program 45
5.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 45
5.5 Proposed Corrective Actions at SWMU 001n 47

6.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001x 49

6.1 Location of SWMU 001x 49
6.2 Geology and Hydrogeology in the Area of SWMU 001x 49
6.3 Sampling and Analysis Program 50
6.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 50
6.5 Proposed Corrective Actions at SWMU 001x 52

7.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001g 55

7.1 Location of SWMU 001g 55
7.2 Geology and Hydrogeology in the Area of SWMU 001g 56
7.3 Sampling and Analysis Program 56
7.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 57
7.5 Proposed Corrective Actions at SWMU 001g 57

8.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001k 61

8.1 Location of SWMU 001k 61
8.2 Geology and Hydrogeology in the Area of SWMU 001k 61
8.3 Sampling and Analysis Program 62
8.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 62
8.5 Proposed Corrective Actions at SWMU 001k 65

9.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001h 66

9.1 Location of SWMU 001h 66
9.2 Geology and Hydrogeology in the Area of SWMU 001h 66
9.3 Sampling and Analysis Program 67
9.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 69
9.5 Proposed Corrective Actions at SWMU 001h 69

10.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001L 72

10.1 Location of SWMU 001L 72
10.2 Geology and Hydrogeology in the Area of SWMU 001L 73
10.3 Sampling and Analysis Program 74
10.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 74
10.5 Proposed Corrective Actions at SWMU 001L 76

11.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001s 78

11.1 Location of SWMU 001s 78
11.2 Geology and Hydrogeology in the Area of SWMU 001s 78
11.3 Sampling and Analysis Program 79
11.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels 80
11.5 Proposed Corrective Actions at SWMU 001s 83

12.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 004a 84

12.1 Location of SWMU 004a 84
12.2 Waste Management at the Portacamp Area 85
12.3 Geology and Hydrogeology in the Area of SWMU 004a 85
12.4 Sampling and Analysis Program 85
12.5 Comparison of Analytical Results to Background and Applicable EPA Action Levels 86
12.6 Proposed Corrective Actions at SWMU 004a 86

13.0 REQUEST FOR A DETERMINATION OF NO FURTHER ACTION AT SWMUs 003a AND 003b 90

13.1 Request for Additional Information on SWMUs 003a and 003b 90
13.2 SWMU 003a (Brinderson Landfill) 90
13.3 SWMU 003b (Construction Landfill) 91
13.4 Justification for a Determination that No Further Action is Required at SWMUs 003a and 003b 91
13.5 DOE Management of the Brinderson and Construction Landfills 93
13.6 Proposed Corrective Actions at SWMUs 003a and 003b 96

14.0 IDENTIFICATION OF CORRECTIVE ACTIONS AT SWMUs 001o, 001p AND 001q 96

14.1 Response to Request for Additional Information 96
14.2 Summary of Existing Data 97
14.3 Appropriateness of Corrective Action 102
14.4 Summary of Proposed Corrective Actions 103

REFERENCES 104

Appendix A EPA Region III Risk-Based Concentration Table, January 1996 - June 1996 . . . . . A-1
Appendix B Final Soil TCLP and Total Analytical Results, Voluntary Release Assessment B-1
Appendix C Results of NMED Release Assessment Duplicate Samples Collected at SWMU 001g C-1
Appendix D Letter from BLM and Telephone Log of Conversation with the NMED, Carlsbad Office, Regarding Agency Inspections of the Brinderson and Construction Landfills D-1
Appendix E Construction Debris Disposal Forms for the WIPP Construction Landfill (1988 - 1996) E-1

LIST OF FIGURES

Figure 1.1 Approximate Location of SWMUs Where Voluntary Release Assessments Have Been Completed

Figure 1.2 Generalized Stratigraphic Cross Section of the WIPP Vicinity

Figure 1.3 Site Geologic Column of the WIPP Vicinity

Figure 2.1 Sample Location Map for SWMU 001j (P-3)

Figure 3.1 Sample Location Map for SWMU 001m (P-6)

Figure 4.1 Sample Location Map for SWMU 001t (IMC-374)

Figure 5.1 Sample Location Map for SWMU 001n (P-15)

Figure 6.1 Sample Location Map for SWMU 001x (WIPP-13)

Figure 7.1 Sample Location Map for SWMU 001g (H-14 and P-1)

Figure 8.1 Sample Location Map for SWMU 001k (P-4)

Figure 9.1 Sample Location Map for SWMU 001h (H-15 and P-2)

Figure 10.1 Sample Location Map for SWMU 001L (WIPP-12 and P-5)

Figure 11.1 Sample Location Map for SWMU 001s (ERDA-9)

Figure 12.1 Sample Location Map for SWMU 004a (Portacamp Area)

Figure 13.1 Photographs of the Active Construction Landfill

Figure 13.2 Photographs of Closed and Reclaimed Portion of the Construction Landfill

Figure 14.1 RFA Sample Location Map for SWMU 001o (Badger Unit)

Figure 14.2 RFA Sample Location Map for SWMU 001p (Cotton Baby)

Figure 14.3 RFA Sample Location Map for SWMU 001q (DOE-1)

LIST OF TABLES

Table 1.1 List of Target Analytes Used in Release Assessment Sampling at Mudpit/Drill Pad SWMUs

Table 1.2 Target Analytes and EPA Analytical Methods for Characterizing the Portacamp Storage Areas (SWMU 004a)

Table 1.3 Summary of Total Metals Concentrations in Background/Upgradient Soil Samples Collected During the Voluntary Release Assessment Program

Table 1.4 Summary of Available Action Levels Applicable to the WIPP Voluntary Release Assessment

Table 2.1 Comparison of Total Metals Results to Action Levels, SWMU 001j, Mudpit P-3

Table 3.1 Comparison of Total Metals Results to Action Levels, SWMU 001m, Mudpit P-6

Table 4.1 Comparison of Total Metals Results to Action Levels, SWMU 001t, Mudpit IMC-374

Table 5.1 Comparison of Total Metals Results to Action Levels, SWMU 001n, Mudpit P-15

Table 6.1 Comparison of Total Metals Results to Action Levels, SWMU 001x, WIPP-13

Table 7.1 Comparison of Total Metals Results to Action Levels, SWMU 001g

Table 8.1 Comparison of Total Metals Results to Action Levels, SWMU 001k, Mudpit P-4

Table 9.1 Comparison of Total Metals Results to Action Levels, SWMU 001h

Table 10.1 Comparison of Total Metals Results to Action Levels, SWMU 001L

Table 11.1 Comparison of Total Metals Results to Action Levels, SWMU 001s, ERDA-9

Table 12.1 Comparison of Total Metals Results to Action Levels, SWMU 004a, Portacamp

Table 14.1 Comparison of Total Metals Results to Action Levels, SWMU Proposed for Corrective Action and Closure

EXECUTIVE SUMMARY

The U.S. Department of Energy, Carlsbad Area Office (DOE-CAO) has completed a voluntary release assessment sampling program at selected Solid Waste Management Units (SWMUs) at the Waste Isolation Pilot Plant (WIPP). This Voluntary Release Assessment/Corrective Action (RA/CA) report has been prepared for final submittal to the Environmental Protection Agency (EPA) Region VI, Hazardous Waste Management Division and the New Mexico Environment Department (NMED) Hazardous and Radioactive Materials Bureau to describe the results of voluntary release assessment sampling and proposed corrective actions at the SWMU sites.

The Voluntary RA/CA Program is intended to be the first phase in implementing the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and corrective action process at the WIPP. Data generated as part of this sampling program are intended to update the RCRA Facility Assessment (RFA) for the WIPP *(Assessment of Solid Waste Management Units at the Waste Isolation Pilot Plant), NMED/DOE/AIP 94/1)*. This Final Voluntary RA/CA Report documents the results of release assessment sampling at 11 SWMUs identified in the RFA. With this submittal, DOE formally requests a No Further Action determination for these SWMUs. Additionally, this report provides information to support DOE's request for No Further Action at the Brinderson and Construction Landfill SWMUs, and to support DOE's request for approval of proposed corrective actions at three other SWMUs (the Badger Unit Drill Pad, the Cotton Baby Drill Pad, and the DOE-1 Drill Pad). This information is provided to document the results of the Voluntary RA/CA activities described in the *Voluntary Release Assessment/Corrective Action Work Plan (Work Plan, DOE/WIPP Draft 2115)* submitted to the EPA and NMED in August 1995.

SWMUs Sampled During the Voluntary RA/CA

During the RA/CA sampling program, soil samples were collected within and surrounding the 11 SWMUs listed below:

- SWMU 001g (H-14/P-1 Drill Pad)
- SWMU 001h (H-15/P-2 Drill Pad)
- SWMU 001j (P-3 Mudpit)
- SWMU 001k (P-4 Drill Pad)
- SWMU 001L (WIPP-12/P-5 Drill Pad)
- SWMU 001m (P-6 Drill Pad)
- SWMU 001n (P-15 Drill Pad)
- SWMU 001s (ERDA 9 Drill Pad)
- SWMU 001t (IMC 374 Drill Pad)
- SWMU 001x (WIPP-13 Drill Pad)
- SWMU 004a (Portacamp Storage Area)

At the above SWMUs, soil samples were collected from areas of expected release and analyzed for lists of organic and metal parameters identified by DOE based on

historical site use. Soil samples were analyzed for total constituent concentrations as well as leachable constituent concentrations according to the EPA toxicity characteristic leaching procedure (TCLP).

The analytical results revealed detections of some target metals by total constituent analyses. In addition, TCLP analysis results indicated that none of these detected metals were leachable from the SWMUs above applicable TCLP action levels presented in *40 CFR 261*. The detected concentrations of total metals at the SWMUs were generally consistent with measured background concentrations. Applicable action level criteria were invariably below those proposed in *40 CFR § 264.514 FR Vol. 55, No. 145, VI(D), p. 30813* (i.e., the proposed Subpart S rule) and in the April 19, 1996, *EPA Region III Risk-Based Concentration Table, January - June 1996.* Therefore, no potential for releases of hazardous constituents was indicated.

Based on the analytical data collected during the voluntary RA/CA program, the DOE-CAO formally requests that a determination of No Further Action be granted for the 11 sampled SWMU sites. Since the EPA's intent is to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for these SWMUs prior to the issuance of the RCRA Part B Permit for the WIPP. Any delay in the issuance of No Further Action determination may require the DOE to submit a Class III permit modification to remove these SWMUs from the list of sites requiring evaluation under the RFI process. This type of permit modification represents an unreasonable expense to remove sites with no potential to impact human health or the environment. If this determination is supported by both the EPA and NMED, these sites will be replanted with native vegetation, in accordance with the *WIPP Land Management Plan (DOE/WIPP 93-004)* guidelines.

Landfill SWMUs Identified for No Further Action Determination

The *Work Plan* included a formal request for No Further Action at two landfill SWMUs identified in the RFA, the Brinderson Landfill (SWMU 003a) and the Construction Landfill (SWMU 003b). In a letter dated December 19, 1995, the EPA provided comments on the *Work Plan* and requested additional information to support a No Further Action determination for these SWMUs, such as interviews, historical records, site inspections, site surveys, and operating logs. DOE compiled the information for inclusion in this Final Voluntary RA/CA Report. The records indicate that only disposal of materials that were expressly allowed under the Bureau of Land Management (BLM) Land Use Permits and WIPP Procedure WP06-108, *Construction Landfill Operation* were placed in these landfills. These SWMUs, therefore, do not pose a threat to human health and the environment.

Based on the new information provided in this Final Voluntary RA/CA Report and historical information contained in the *Work Plan*, the DOE requests a Determination of No Further Action be issued for both the Brinderson Landfill and Construction Landfill. Because it is the EPA's intent to encourage voluntary corrective actions, the DOE requests that a No Further Action determination be issued prior to the issuance of the

RCRA Part B Permit. If this determination is supported by both the EPA and NMED, the closed portion of the Construction Landfill site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan, DOE/WIPP 93-004, January 1996.*

This request is supported by several statements made in the proposed Subpart S regulations. In the preamble of the proposed Subpart S regulations, the EPA recognizes that releases or potential releases from SWMUs may be regulated under other permitting authority. As described in Section VI(B)(2) of proposed 40 CFR Part 264.501, "... EPA does not intend to utilize Section 3004(u) corrective action authority to supervise or routinely re-evaluate such permitted releases." Additionally, although proposed 40 CFR Part 264.514, "Determination of No Further Action," normally applies to releases from permitted facilities where remedial investigations have shown that releases are nonexistent or do not pose a threat to human health or the environment, the situation at the WIPP is slightly different. The WIPP RFA did not address the status of permits and administrative controls that existed to manage the Brinderson and Construction Landfills. These permits and administrative controls document that there have been no releases of regulated constituents from these units.

Mudpit SWMUs Identified for Corrective Actions

The *Work Plan* proposed corrective actions at three additional mudpit SWMUs identified in the RFA, the Badger Unit Drill Pad (SWMU 001o), the Cotton Baby Drill Pad (SWMU 001p), and the DOE-1 Drill Pad (SWMU 001q). The *Work Plan* states that sufficient data for these sites had been generated during the RFA, and the plan proposed capping-in-place with a compacted caliche cap for each SWMU. In a letter dated December 19, 1995, EPA provided comments on the *Work Plan* and requested additional information to support the corrective actions proposed for these SWMUs, including further demonstration of the effectiveness, reliability, implementability, and cost-effectiveness of the proposed capping remedy. DOE has compiled such information for inclusion in the Final Voluntary RA/CA Report.

Data collected by both NMED and DOE during the RFA indicate that no sources or releases of hazardous constituents above applicable Subpart S action levels exist at SWMUs 001o, 001p, and 001q. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 5, No. 145, p. 30875,* there are no releases of hazardous waste (including hazardous constituents) from these SWMUs that pose a threat to human health or the environment, <u>even without a corrective action</u>. Nevertheless, DOE proposed corrective actions in the *Work Plan* to assure no migration of hazardous constituents occur from these sites.

The proposed caps will effectively eliminate the already minimal potential for contaminant migration from these sites due to the low permeability of the compacted caliche material, in combination with the low infiltration rate at the WIPP site (estimated at <0.5 inches per year) and the depth to groundwater (estimated at 180 feet or more). Capping-in-place with low-permeability material is a well demonstrated containment technology that can be implemented in a short time with readily available materials and

can be reliably maintained. The proposed caliche caps are expected to be more easily installed and cost-effective than other remedies involving removal and placement of SWMU wastes.

Because EPA expressed its intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that the proposed corrective actions be granted for SWMUs 001o, 001p, and 001q prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, the capped sites will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004).* The capping and replanting of SWMUs 001o, 001p, and 001q will be completed by DOE within one year following approval from the EPA and NMED.

FINAL VOLUNTARY RELEASE ASSESSMENT/ CORRECTIVE ACTION REPORT

1.0 INTRODUCTION

The DOE-CAO has completed a voluntary release assessment sampling program at selected SWMUs at the WIPP. The DOE-CAO is the owner and operator of the WIPP. Westinghouse Electric Corporation, Waste Isolation Division (WID) is the management and operating contractor for the DOE at the site. For the purpose of clarity, any reference to the DOE throughout this release assessment report refers to both the DOE-CAO and Westinghouse-WID operations at WIPP.

The voluntary RA/CA program is intended to be the first phase in implementing the RFI and corrective action process at the WIPP. Data generated as part of this program are intended to amend the RFA for the WIPP (*Assessment of Solid Waste Management Units at the Waste Isolation Pilot Plant, NMED/DOE/AIP 94/1*). This Final Data Summary Report has been prepared for submittal to the EPA Region VI, Hazardous Waste Management Division and the NMED Hazardous and Radioactive Materials Bureau to describe the results of release assessment sampling and identify proposed corrective actions.

1.1 Scope of the Final Voluntary Release Assessment/Corrective Action Report

The *Voluntary Release Assessment/Corrective Action Work Plan (DOE/WIPP Draft-2115)*, hereafter referred to as the *Work Plan*, was developed by the DOE to describe the voluntary release assessment sampling protocols and propose corrective actions at the 16 SWMUs identified in Chapter J of the *Resource Conservation and Recovery Act Part B Permit Application: Waste Isolation Pilot Plant (DOE/WIPP 91-005, Revision 6)*. The relative location of the 16 SWMUs at the WIPP is provided in Figure 1.1. In the *Work Plan*, the DOE committed to completing release assessment sampling at 11 of these SWMUs, initiating corrective actions at three, and requesting a formal determination of no further action at the two remaining SWMUs. The SWMUs proposed for sampling under the voluntary release assessment program in the *Work Plan* are listed below:

- SWMU 001g (H-14/P-1 Drill Pad)
- SWMU 001h (H-15/P-2 Drill Pad)
- SWMU 001j (P-3 Mudpit)
- SWMU 001k (P-4 Drill Pad)
- SWMU 001L (WIPP-12/P-5 Drill Pad)
- SWMU 001m (P-6 Drill Pad)
- SWMU 001n (P-15 Drill Pad)
- SWMU 001s (ERDA 9 Drill Pad)
- SWMU 001t (IMC 374 Drill Pad)

- SWMU 001x (WIPP-13 Drill Pad)
- SWMU 004a (Portacamp Storage Area)

SWMUs proposed for corrective actions in the Plan are:

- SWMU 001o (Badger Unit Drill Pad)
- SWMU 001p (Cotton Baby Drill Pad)
- SWMU 001q (DOE -1 Drill Pad)

SWMUs formally proposed for "No Further Action" are:

- SWMU 003a (Brinderson Landfill)
- SWMU 003b (Construction Landfill)

Meetings were held with EPA and NMED personnel in February, August, and September 1995, to review the *Work Plan* and obtain approval of sampling protocols. The objectives and technical approach for the release assessment sampling program were reviewed and verbally approved by both EPA and NMED prior to completion of the SWMU sampling. The EPA subsequently provided written concurrence with DOE's release assessment sampling program in a December 19, 1995, letter that contained formal review of and comment on the *Work Plan*. EPA's letter also requested additional information to support the corrective actions and "No Further Action" status proposed for the five SWMUs not included in the release assessment sampling program.

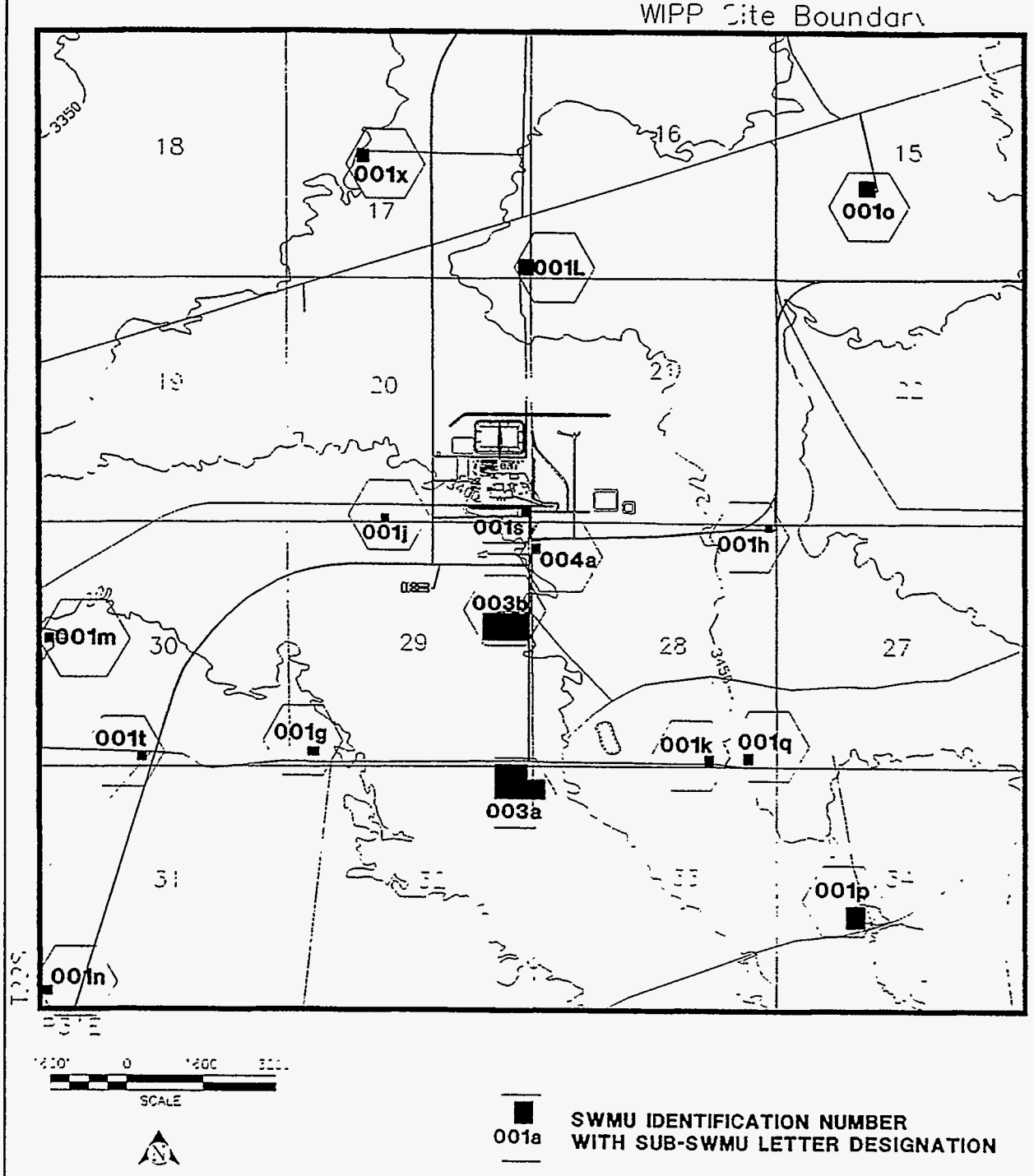
This Final Voluntary RA/CA Report documents the results obtained for the 11 SWMUs designated for release assessment sampling. In addition, this report contains additional information to support the corrective actions and "No Further Action" status proposed by DOE for the five SWMUs not included in the release assessment sampling. General information applicable to the investigation of the 11 sampled SWMUs, is provided in the introduction section of this report. Release assessment analytical results as well as historical data are used in subsequent sections of this report to evaluate the potential for releases and develop appropriate voluntary corrective actions, if any, required for each SWMU. The data compiled in the Voluntary RA/CA program are applied to focus on plausible concerns and expedite cleanup decisions as defined in the preamble of the Proposed Subpart S Rule, *Federal Register, Vol. 55, No. 145; July 27, 1990; 308033.*

1.2 Technical Approach for Sampling and Analysis

A detailed description of sampling methods and quality assurance protocols used to complete assessment sampling are described in the *Work Plan*. Personnel utilized the sampling and analytical protocols that are described in the *WIPP Site Effluent and Hazardous Materials Sampling Plan*, WP02-EM2, Rev. 0. Analytical and quality assurance (QA) protocols applied during the release assessment sampling are further defined in the *Quality Assurance Project Plan for WIPP Site Effluent and Hazardous*

FIGURE 1.1

LOCATION OF SWMUs WHERE VOLUNTARY RELEASE ASSESSMENTS HAVE BEEN COMPLETED



Materials Sampling, WP02-EM1, Rev. 0. WP02-EM2 and WP02-EM1 were developed in accordance with the sampling, analytical, and quality assurance/quality control (QA/QC) practices defined in *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, SW-846.*

Guidance for establishing sample locations at each SWMU is contained in the *RCRA Facility Investigation (RFI) Guidance, Development of an RFI Work Plan and General Considerations for RCRA Facility Investigations (Vol. 1), EPA 530/SW-89-031, May 1989.* The DOE utilized a judgmental sampling method to characterize each SWMU. The methodology was selected because site layout or unit characteristics, such as mudpit locations, indicated where potential contamination exists. In program review meetings, EPA, NMED, and DOE staff evaluated proposed sampling locations and approved the DOE's proposal to limit the first round of RFI release assessment samples to soils media. This determination was based on discussions in the RFA, which state that soil is the only media that has the potential to be impacted by releases at individual SWMUs.

The specific approach for soil sampling at each of the identified SWMUs is described in the *Work Plan.* Sample locations and depths are also summarized for each SWMU in the subsequent chapters of this report. EPA and NMED concurrence with the DOE's sampling approach was provided in EPA's letter to DOE dated December 19, 1995. DOE conducted two rounds of soil sampling at the approved sample locations. One round was conducted in the summer of 1995 and involved the collection of soil samples for initial characterization by the TCLP. A second round of sampling at these locations was conducted in summer 1996 and involved the collection of soil samples for total constituent analyses. The constituent analyses data were collected at agency request to support the TCLP data collected in the initial sampling.

The rationale for selecting locations and sample depths at each SWMU during the voluntary release assessment sampling was based on an evaluation of the SWMU site and historical information contained the RFA. Based on this information, DOE identified multiple appropriate sample locations within each SWMU. At each sample location, analytical samples were generally collected from soil borings at a depth of 12 to 24 inches below ground surface, the depth where the highest concentrations of potential hazardous constituents were anticipated. Samples were also collected from greater depths in each boring to evaluate potential constituent migration.

DOE collected soil boring samples outside of each SWMU to establish metals concentrations in the area. Per agency request, such samples were collected from locations that were topographically upgradient and downgradient of each SWMU. These samples were collected from undisturbed locations adjacent to the SWMU area at the same horizons as the SWMU samples. Samples collected outside each SWMU in nontopographically downgradient of the SWMU were considered by DOE to represent background soil composition. A discussion of background metals concentrations is included in Section 1.4.1.

1.2.1 Rationale for the Selection of Target Analytes at Mudpit SWMUs

Ten of the 11 SWMUs designated for sample collection during the voluntary release assessment were mudpits from drilling operations. Information contained in the RFA, as well as in drill logs and geologic reports, were used to establish the following list of potential waste streams at these SWMUs:

- attapulgite drill gel (salt bentonite gel)
- bentonite gel
- diesel fuel
- gear grease/gear lubricants
- hydraulic fluids
- hydrochloric acid (20% solution)
- lignite
- meta-trifluorobenzoic acid
- metal cuttings
- motor oil
- portland cement
- sodium and potassium chloride saturated brine
- starch
- soda ash
- sodium hydroxide

Based on the review of Material Safety Data Sheets for each of these potential waste streams, the DOE developed, and the agencies approved, a list of target analytes for the ten mudpits designated for sampling in the *Work Plan*. Because drilling additives (i.e. drill mud, gear lubricants, and diesel fuel) have a limited potential to contain or generate hazardous constituents, the list of target analytes has been limited. A list of target analytes used in release assessment sampling at mudpit pad SWMUs is provided in Table 1.1.

1.2.2 Rationale for Selection of Target Analytes for the Portacamp Area (SWMU 004a)

The only nonmudpit SWMU designated for sampling during the voluntary release assessment was SWMU 004a, the portacamp area. Because both nonhazardous and hazardous materials and wastes have been historically stored in the portacamp area, a broad range of target analytes was selected for release assessment samples collected at this SWMU. Table 1.2 lists target analytes for the portacamp area.

1.2.3 Analytical Methods

In addition to presenting the target analytes for the voluntary release assessment sampling, Tables 1.1 and 1.2 reference the analytical methods from EPA SW-846 that were used to analyze the SWMU soil samples. Prior to analysis, the soil samples were extracted at the laboratory using one of two general protocols. Samples from the initial

TABLE 1.1

TARGET ANALYTES AND EPA ANALYTICAL METHODS FOR CHARACTERIZING THE PORTACAMP STORAGE AREAS (SWMU 004a)

Parameter	EPA Analytical Method
Inorganic Analytes	
Arsenic	6010A or 7060A
Barium	6010A
Cadmium	6010A
Chromium	6010A
Lead	6010A or 7421
Mercury	7470A/7471A
Thallium	6010A
Organic Analytes	
Benzene	8260A
Chloroform	8260A
1,2 Dichloroethane	8260A
Ethylbenzene	8260A
Toluene	8260A
1,1,1-Trichloroethane	8260A
Vinyl Chloride	8260A
Xylenes	8260A

TABLE 1.2

TARGET ANALYTES AND EPA ANALYTICAL METHODS FOR CHARACTERIZING THE PORTACAMP STORAGE AREAS (SWMU 004a)

Parameter	EPA Analytical Method (or equivalent)
Arsenic***	6010A or 7060A
Barium***	6010A
Cadmium***	6010A
Chromium***	6010A
Lead***	6010A or 7421
Mercury***	7470A/7471A
Nickel***	6010A
Selenium***	6010A or 7740
Silver***	6010A
Thallium***	6010A
Acetone*	8260A
Benzene*	8260A
Bromoform*	8260A
n-Butyl alcohol*	8015A (modified)
Carbon tetrachloride*	8260A
Chlorobenzene*	8260A
Chloroform*	8260A
Cresols	8270A
Cyclohexane*	8260A
Cyclohexanone	8260A
o-Dichlorobenzene*	8270A
p-Dichlorobenzene*	8270A

TABLE 1.2

TARGET ANALYTES AND EPA ANALYTICAL METHODS FOR CHARACTERIZING THE PORTACAMP STORAGE AREAS (SWMU 004a)

Parameter	EPA Analytical Method (or equivalent)
1,1-Dichloroethane*	8260A
1,2 Dichloroethane*	8260A
1,1-Dichloroethene*	8260A
cis-1,2-Dichloroethene*	8260A
2,4-Dinitrotoluene**	8270A
2-Ethoxyethanol*	8015A (modified)
Ethyl acetate*	8260A
Ethylbenzene*	8260A
Hexachloroethane**	8270A
Isobutanol*	8015A (modified)
Methanol*	8015A (modified)
Methylene Chloride*	8260A
Methyl ethyl ketone*	8260A
4-Methyl-2-pentanone*	8260A
Nitrobenzene**	8270A
Polychlorinated biphenyls (PCBs)	8080A
Pyridine**	8270A
1,1,2,2-Tetrachloroethane*	8260A
Tetrachloroethylene*	8260A
Toluene*	8260A
1,1,1-Trichloroethane*	8260A
1,1,2-Trichloroethane*	8260A
Trichloroethylene*	8260A

TABLE 1.2

TARGET ANALYTES AND EPA ANALYTICAL METHODS FOR CHARACTERIZING THE PORTACAMP STORAGE AREAS (SWMU 004a)

Parameter	EPA Analytical Method (or equivalent)
Trichlorofluoromethane*	8260A
1,1,2-Trichloro-1,2,2-Trifluoroethane*	8260A
Vinyl Chloride*	8260A
Xylenes*	8260A

* Volatile
** Semivolatile
*** Metal

sampling round in summer 1995 were sampled by the TCLP protocol (EPA Method 1311) established in EPA SW-846. The TCLP extracts generated from the soil samples were then analyzed for the parameters listed in Tables 1.1 and 1.2. The TCLP analyses were performed by DOE to assess whether or not the SWMU soil possessed the toxicity characteristic of a hazardous waste, and if the soil contained leachable concentrations of hazardous constituents that could pose a threat to groundwater.

Soil samples collected in the second sampling event in summer 1996 were analyzed for total concentrations of the metal and organic constituents listed in Tables 1.1 and 1.2. Sample extraction methods from EPA SW-846 that were used by the program laboratories for total analyses included Method 3050A for metals, Method 3005 for volatile organics, and Method 3540 for semivolatile organics. Totals analyses were obtained at agency request to support the earlier TCLP data and allow assessments of risk and exposure for migration pathways other than leaching/percolation to groundwater at the SWMUs of interest.

1.2.4 Field Sampling and Quality Assurance

The generalized protocol for soil sample collection at the SWMU sites was as follows. A tractor-mounted power-auger was used to drill an 8-inch diameter borehole to the appropriate sampling depths for each SWMU. A stainless steel tube sampler was used to collect a core sample at each depth. Metal constituent samples were transferred to 1 liter (1000 ml) clear glass bottles with teflon lined lids for shipment to the laboratory. Volatile organic constituent samples were transferred to 4-ounce (125 ml) clear glass bottles with welded septum lids. Semivolatile organic constituent samples (collected only at SWMU 004a) were transferred to 8-ounce (250 ml) clear glass bottles.

Field QC samples such as duplicate samples, field blanks, and equipment rinseate samples were collected by the sampling team and documented in the sampling logbook. Field QC samples were collected and managed in accordance with Section 3.3.1 of the *Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling (WP02-EM1)*, and Section 3.3 of the *WIPP Site Effluent and Hazardous Materials Sampling Plan (WP02-EM2)*. Field QC sample results for the voluntary release assessment program are included with the soil sample analytical results presented in Appendix B.

1.2.5 Laboratory Data Quality Assurance and Data Validation

Soil sample and field QC sample analyses were completed in accordance with EPA SW-846 analytical protocols. Halliburton NUS Laboratories was the contract analytical laboratory for the voluntary release assessment sampling. The specific protocols used by the laboratory for sample analyses and QA/QC are established in the *Halliburton NUS Laboratories General QA Plan (Halliburton NUS, 1995)* and in the laboratory's standard operating procedures for sample analysis.

An independent data quality review was completed by Harding Lawson Associates (HLA) Engineering and Environmental Services. HLA developed and implemented a

procedure (HLA, 1996) to perform QA/QC reviews of laboratory data packages in accordance with the data quality requirements described in SW-846, the laboratory's QA plan, and applicable control criteria established in *EPA National Functional Guidelines for Organic and Inorganic Data Review (February 1994)*.

HLA applied data qualifiers to the release assessment analytical results based on the findings of the data validation, and these qualifiers are presented with the analytical results in subsequent sections of this report. Laboratory QC problems that resulted in the qualification of analytical data included:

- the occurrence of metals in extraction fluid blanks for TCLP analysis
- matrix spike/matrix spike duplicate recoveries for total metals analyses that were slightly outside the EPA functional guideline control limits of 75-125 percent
- laboratory control sample recoveries for total metals that were slightly outside of EPA functional guideline control limits of 80 to 120 percent

These QC problems were considered minor by HLA and did not effect the overall usability of the analytical results. Laboratory QC problems resulting in qualification of specific soil analytical results are described in greater detail in subsequent sections of this report, and in HLA's completed Data Review Forms for the voluntary release assessment sampling, which were provided to EPA and NMED under separate cover. No data were qualified based on field QC sample results.

1.3 Geology and Hydrogeology in the Vicinity of the WIPP

The stratigraphy of the WIPP facility is shown in Figure 1.2 and the site geologic formations in Figure 1.3. The geology at the WIPP is characterized by four primary stratigraphic sequences. The first sequence includes recent surface deposits, the Mescalero Caliche formation, and the Gatuna and Santa Rosa formations. The second sequence is the Dewey Lake formation. The third sequence is the Rustler formation, which is made up of five individual stratigraphic members. The fourth region includes the three members of the Salado formation.

The Culebra Dolomite member of the Rustler Formation is the water-bearing unit of greatest interest at the WIPP site. It is recognized as a persistent and productive hydrogeologic unit in the region, and has been the focus of performance assessment studies for the WIPP repository (see Chapter D of the *WIPP RCRA Part B Permit Application*). Although it possesses high relative permeability, the WIPP RFA did not consider the Culebra to be a significant migration or exposure pathway for SWMU constituents due to the depth to the member (410 to 850 feet below ground surface). In addition, overlying aquitards at the WIPP site in the Rustler and Dewey Lake formations possess low vertical transmissivities/hydraulic conductivities. Water quality in the Culebra is generally low, and there are no livestock or domestic wells completed in the Culebra formation within the WIPP Land Withdrawal area.

FIGURE 1.2

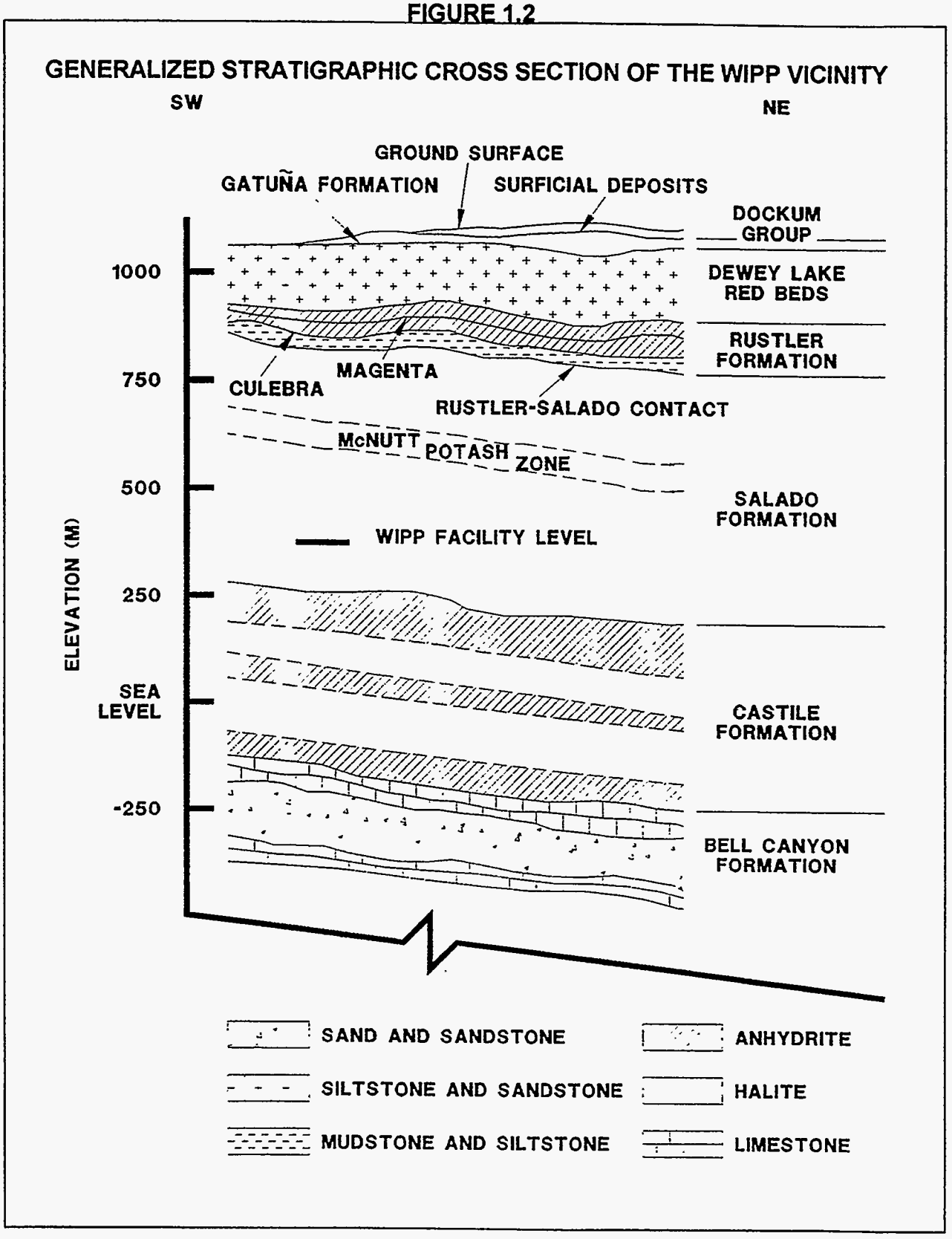

GENERALIZED STRATIGRAPHIC CROSS SECTION OF THE WIPP VICINITY
SW
NE
GROUND SURFACE
GATUÑA FORMATION
SURFICIAL DEPOSITS
DOCKUM GROUP
DEWEY LAKE RED BEDS
RUSTLER FORMATION
MAGENTA
CULEBRA
RUSTLER-SALADO CONTACT
McNUTT POTASH ZONE
SALADO FORMATION
WIPP FACILITY LEVEL
CASTILE FORMATION
BELL CANYON FORMATION
ELEVATION (M)
1000
750
500
250
SEA LEVEL
-250
SAND AND SANDSTONE
SILTSTONE AND SANDSTONE
MUDSTONE AND SILTSTONE
ANHYDRITE
HALITE
LIMESTONE

FIGURE 1.3

SITE GEOLOGIC COLUMN OF THE WIPP VICINITY

SYSTEM	SERIES	GROUP	FORMATION	MEMBER
RECENT	RECENT		SURFICIAL DEPOSITS	
QUATERNARY	PLEISTOCENE		MESCALERO CALICHE	
			GATUNA	
TERTIARY	MID-PLIOCENE		OGALLALA	
TRIASSIC		DOCKUM	SANTA ROSA	
PERMIAN	OCHOAN		DEWEY LAKE	
			RUSTLER	Forty-niner
				Magenta Dolomite
				Tamarisk
				Culebra Dolomite
				Unnamed
			SALADO	Upper
				McNutt Potash Zone
				Lower
			CASTILE	
	GUADALUPIAN	DELAWARE MOUNTAIN	BELL CANYON	
			CHERRY CANYON	
			BRUSHY CANYON	

Because the SWMUs are surface units, a brief description of the regional geology and individual surface strata is included in this report. The examination of only the near-surface geology at each SWMU site is based on information contained in Section 4.0 of the WIPP RFA. In Section 4.0 of the RFA, NMED described the potential for a release to groundwater sources in the vicinity of most SWMUs as low-to-moderately-low, based on the depth to groundwater and the relative low permeability of the Dewey Lake formation, the shallowest potential water bearing zone at each of these SWMU sites. (A detailed description of the geology and hydrogeology at the WIPP is contained in Chapter D of the *WIPP RCRA Part B Permit Application*, Chapter 2 of the WIPP *Project Technical Baseline* Document, and Section 3.3 of the *WIPP RFA*.)

1.3.1 Surface Formations

The uppermost stratigraphic formations are made up of Quaternary and Triassic Age surface and near-surface strata. These formations consists of recent surface deposits, the Mescalero Caliche formation, and the Gatuna and Santa Rosa formations. The uppermost formation consists of fine-to-medium grained eolian sands that are typically ~10 feet thick within the site boundaries. Soil development is poor, and the overall permeability in this unit is high.

The Mescalero Caliche underlies surface dune sands and is generally less than 10 feet thick in the site area. Sands and gravels in the Mescalero Caliche are characteristically well cemented with a chalky-to-finely crystalline matrix of calcium carbonate. The caliche forms a continuous, impermeable barrier over much of the site; however, the Mescalero Caliche may be locally thin or absent in some areas of the WIPP facility.

The Gatuna formation occurs as a discontinuous deposit of friable, poorly sorted, pale, reddish brown silty sandstone, with localized mudstone and gravelly beds. The rock generally occurs as the most shallow formation on the western side of the WIPP site, where the thickness and distribution of the formation is variable and erratic. Representative thicknesses at the site range from about 10 to 30 feet. Measurements of hydraulic conductivity in the Gatuna formation encountered in foundation boreholes at the WIPP facility range from 7.8×10^{-6} meters per second (m/s) to 1.0×10^{-8} m/s.

Triassic Santa Rosa formation overlays the Dewey Lake Beds over the eastern half of the WIPP site. Mercer (1983) describes the formation as "a sequence of well-indurated, cemented, fine-to-coarse grain sandstone with interbeds of siltstone and mudstone." The formation ranges in thickness from over 200 feet to the northeast to less than 50 feet near the area of the WIPP repository. West of the repository itself, the Santa Rosa formation is essentially absent, and the Gatuna formation lies directly over the Dewey Lake formation.

1.3.2 The Dewey Lake Formation

The *WIPP Project Technical Baseline, Section 2.1.3.6*, identifies three main sources of geologic information on the Dewey Lake formation in the vicinity of the WIPP. Miller

(1955, 1966) studied the petrology of the unit. Schiel (1988, 1994) evaluated outcrops in the vicinity of the site and interpreted geophysical logs of the unit in southeastern New Mexico and west Texas. Holt and Powers (1990) described in detail the Dewey Lake formation at the WIPP air intake shaft.

The Dewey Lake formation is characterized as a deltaic sequence of alternating, thinly bedded siltstone and mudstone with lenticular interbeds of fine-to-coarse grained sandstone. The formation, approximately 500 feet thick in the site area, dips gently to the east and thins to the west, where it is also found at relatively shallow depths. The Dewey Lake formation occurs at a depth of 20 to 40 feet at the south end of the site. This general trend continues south of the WIPP site boundary. Data indicate that the Dewey Lake is found at moderate depths (70 to 100 feet) along the central axis of the site and occurs between 130 to 220 feet along the eastern site boundary.

Hydrogeologic investigations at and near the WIPP site have not identified a continuous zone of saturation within the Dewey Lake. Where saturated conditions exist in the formation, they are generally in perched or semiperched water tables, and their occurrence is localized. Mercer (1983) and D'Appolonia (1982/b) contend that groundwater occurs perched or semiperched in lenticular sands in the upper Dewey Lake, and suggest that surface recharge may occur where local geologic conditions permit.

The Dewey Lake contains a productive zone of saturation, probably under water table conditions, in the southwestern to south-central portion of the WIPP site and south of the site. Several wells operated by the J.C. Mills Ranch south of the WIPP site produce sufficient quantities of water from the Dewey Lake to supply livestock. Short-term production rates of 25 to 30 gallons per minute (5.7 to 6.8 cubic meters per hour) were observed in boreholes P-9, WQSP-6, and WQSP-6a inside the southwestern site boundary (see Appendix D6 of the *WIPP RCRA Part B Permit Application, DOE/WIPP 91-005, Revision 6*). The productive zone in this area is typically found in the middle of the Dewey Lake formation, 180 to 265 feet (55 to 85 meters) below ground surface and appears to derive much of its transmissivity from open fractures. Where present, the saturated zone may be perched or simply underlain by less transmissive rock. Fractures below the productive zone tend to be completely filled with gypsum. Open fractures and/or moist (but not fully saturated) conditions have been observed at similar depths north of the zone of saturation, at the H-2 and H-3 boreholes. The Dewey Lake has not produced water within the WIPP shafts or in boreholes in the immediate vicinity of the panels.

Packer-permeability tests indicate that hydraulic conductivities range from 2.5×10^{-6} m/s to 1.0×10^{-8} m/s in the Dewey Lake formation. The porosity of the Dewey Lake was measured as part of testing at the H-19 hydropad. Four samples taken above the gypsum-sealed region had measured effective porosities of 14.9 to 24.8 percent. Four samples taken from within the gypsum-sealed region had porosities from 3.5 to 11.6 percent.

1.3.3 Infiltration at the WIPP Site

The infiltration and percolation rates of meteoric water at the WIPP facility have been investigated for the BLM. At least 96 percent of precipitation is lost due to evapotranspiration. On average, the annual amount of infiltration is estimated at less than 0.5 inches (1.3 cm) per year and may, for many years, be essentially nonexistent (see Appendix D6 of the *WIPP RCRA Part B Permit Application, DOE/WIPP 91-005, Revision 6*).

1.4 Background and Action Levels for Evaluation of Analytical Results

1.4.1 Estimation of Site Background Concentrations

Because metals are included in the list of target analytes for the voluntary release assessment, establishment of site background concentrations is important in assessing the potential impact of the SWMU sites on the surrounding environment. Background and/or upgradient soil samples were collected at each SWMU site sampled, and are included in the discussions of analytical results for each SWMU as presented in subsequent chapters of this report. In addition, DOE pooled the background sample analysis results to better assess general background metals concentrations across the WIPP site. The total metals results for these samples are summarized in Table 1.3.

1.4.2 Identification of Applicable Action Levels

The proposed Subpart S rule *(40 CFR § 264.521(d), Vol. 55, No. 145, VI(D), p. 30870)* establishes criteria for selecting and calculating action levels for soils. Action level concentrations proposed in Subpart S assume a chronic exposure through consumption of soil media contaminated with hazardous constituents. Criteria and methodologies for establishing soil action levels can be found in Appendices A and E, respectively, of the proposed Subpart S rule. To evaluate analytical results from the voluntary release assessment sampling, DOE calculated applicable action levels using the approach outlined in the proposed Subpart S rule and the most recent toxicological criteria contained in EPA's Integrated Risk Information System database. These values, presented in Table 1.4, are used in this report for evaluation of the soil sample results obtained for the SWMUs sites.

Table 1.4 presents a Subpart S action level of 6 mg/kg for thallium, which is below the method reporting limit of 20 mg/kg attained by the contract laboratory for total thallium analysis. Although the method reporting limit is slightly higher than the action level, DOE notes that only isolated detections of thallium were observed in release assessment samples, and results reported from SWMU soil samples were equivalent to background concentrations. These data indicate that thallium is not a constituent of potential concern at the SWMU sites sampled during the voluntary release assessment program.

Table 1.3. Summary of Total Metals Concentrations in Background/Upgradient Soil Samples Collected During the Voluntary Release Assessment Program

	Background Concentration (mg/kg) [1] [2] [3]				
Metal Analyte	Maximum	Minimum	Average	Standard Deviation	Number of Samples
Nominal 12-24 inches bgs					
Total Arsenic (As)	1.5 J	0.15 U	0.8	0.38	14
Total Barium (Ba)	120	10	32	36	14
Total Cadmium (Cd)	0.7 J	0.25 U	0.3	0.1	14
Total Chromium (Cr)	26	1 UJ	5	6	14
Total Lead (Pb)	2.8 J	1.2	1.8	0.44	14
Total Mercury (Hg)	0.06	0.01 U	0.02	0.01	14
Total Nickel (Ni)	1 U	1 U			1
Total Selenium (Se)	0.2 U	0.2 U			1
Total Silver (Ag)	0.5 U	0.5 U			1
Total Thallium (Tl)	30	10 U	11	5	14
Nominal 60-72 inches bgs					
Total Arsenic (As)	2 J	0.5 J	1	0.5	14
Total Barium (Ba)	62	10 J	25	15	14
Total Cadmium (Cd)	1.8	0.25 U	0.38	0.41	14
Total Chromium (Cr)	7	2	5	1	14
Total Lead (Pb)	5.4 J	1.2	2.4	1.2	14
Total Mercury (Hg)	0.04	0.01 U	0.02	0.01	14
Total Nickel (Ni)	1 U	1 U			1
Total Selenium (Se)	0.2 U	0.2 U			1
Total Silver (Ag)	0.5 U	0.5 U			1
Total Thallium (Tl)	10 U	10 U	10	0	14

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value
3) Concentrations reported with U or UJ qualifiers represent one-half of the laboratory reporting limit.

Table 1.4. Summary of Available Action Levels Applicable to the WIPP Voluntary Release Assessment

Target Analyte	Proposed Subpart S Level (mg/kg)	EPA Region III Level, Soil Ingestion, Industrial (mg/kg)	TCLP Regulatory Level (mg/L)
Metals			
Arsenic	20	610	5
Barium	6000	140000	100
Cadmium	80	1000	1
Chromium III (Chromium VI)	(400)	1000000 (10000)	5.0 (Total)
Lead	400[a]		5
Mercury	20	610	0.2
Thallium	6[b]		
Additional Metals for SWMU # 004a (Portacamp)			
Nickel	2000	41000	
Selenium	400	10000	1
Silver	400	10000	5
Volatiles			
1,1,1-Trichloroethane	7000	72000	
1,2-Dichloroethane	8	63	0.5
Benzene	20	200	0.5
Chloroform	100	940	6
Ethyl benzene	8000	200000	
Toluene	20000	410000	
Vinyl chloride	1	3	0.2
Xylenes	200000	1000000	
Additional Volatiles for SWMU # 004a (Portacamp)			
1,1,2,2-Tetrachloroethane	40	29	
1,1,2-Trichloro-1,2,2-trifluoroethane	30	1000000	
1,1,2-Trichloroethane	100	100	
1,1-Dichloroethane	8000	200000	
1,1-Dichloroethene	10	9.5	0.7
2-Butanone (Methyl ethyl ketone)	50000	1000000	200
4-Methyl-2-pentanone (Methyl isobutyl ketone)	6000	160000	
Acetone	8000	200000	
Carbon tetrachloride	5	44	0.5
Chlorobenzene	2000	41000	100
cis-1,2-Dichloroethene	800	20000	
Cyclohexane			
Cyclohexanone	400000	1000000	

Table 1.4. Summary of Available Action Levels Applicable to the WIPP Voluntary Release Assessment (continued)

Target Analyte	Proposed Subpart S Level (mg/kg)	EPA Region III Level, Soil Ingestion, Industrial (mg/kg)	TCLP Regulatory Level (mg/L)
Ethyl acetate	70000	1000000	
Methylene chloride	90	760	
Tetrachloroethene	10	110	0.7
Tribromomethane (Bromoform)	90	720	
Trichloroethene	60	520	0.5
Trichlorofluoromethane	24000	610000	
2-Ethoxyethanol		820000	
Isobutanol (2-Butanol)	20000	610000	
Methanol	40000	1000000	
n-Butanol	8040		
Semivolatiies			
1,2-Dichlorobenzene	7200	180000	
1,4-Dichlorobenzene	300	240	7.5
2,4,5-Trichlorophenol	8000	200000	400
2,4,6-Trichlorophenol	40	520	2
2,4-Dinitrotoluene	200	4100	0.13
2-Methylphenol (o-cresol)	4000	100000	200
3-Methylphenol (m-cresol)	4000	100000	200
4-Methylphenol (p-cresol)	400	10000	200
Hexachlorobenzene	1	3.6	0.13
Hexachlorobutadiene	90	73	
Hexachloroethane	500	410	3
Nitrobenzene	1400	1000	2
Pentachlorophenol	10	48	100
Pyridine	80	2000	5
PCBs	0.09 [c]	0.74 [c]	
PCB-1221	0.1		
PCB-1232	0.1		
PCB-1242/1016	0.1	140	
PCB-1248	0.1		
PCB-1254	2	41	
PCB-1260	0.1		

mg/kg Milligrams per kilogram
mg/L Milligrams per liter

(a) No action levels are included in proposed Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
(b) Thallium as thallium chloride
(c) PCBs not broken down in HWIR (1000 ppm listed as general value).

As part of the assessment of the constituent action levels, the DOE has also evaluated risk-based criteria developed by the EPA Region III office of Technical and Program Support. Toxicologists working with EPA Region III developed the *EPA Region III Risk-Based Concentration (RBC) Table* to screen sites not yet on the National Priority List, respond rapidly to citizen inquires, and spot-check formal baseline risk assessments. Region III distributes this table and associated guidance to all interested parties on a semiannual basis. The specific RBC table consulted by DOE in this assessment is the table published for the period January to June 1996. A complete copy of the January to June 1996, *EPA Region III Risk Based Concentration (RBC) Table* and associated guidance information is attached as Appendix A to this report.

The DOE believes that the *EPA Region III Risk-Based Concentration Table* are appropriate for consideration in evaluating the analytical data collected during the voluntary release assessment sampling. In using the EPA Region III RBC tables, the DOE specifically applied the RBCs for soil ingestion from an industrial land use, and these values are included in Table 1.4. Table 1.4 also includes the TCLP regulatory levels established in 40 CFR 261 for evaluation of TCLP data collected at the SWMU sites.

1.4.3 Applicability of Assumptions Contained in Proposed Subpart S and the EPA Region III RBC Tables

In applying the above action levels, DOE noted several assumptions contained in proposed Subpart S and the Region III RBC tables for assessing action levels that are not applicable to the SWMUs described in this summary report. First, the soil action levels presented in Appendix A of proposed Subpart S and the EPA Region III RBCs assume that shallow soils in the vicinity of a SWMU site will ultimately be developed for residential or industrial use. Second, this model also assumes that soils will be ingested over a long period of time creating a long-term or chronic health risk. All of the SWMUs at the WIPP are located within the WIPP Land Withdrawal Area. Congress withdrew these areas from all types of land use except Transuranic (TRU) waste management and historical land uses such as hunting and livestock grazing. The WIPP land withdrawal effectively precludes residential land use for posterity and eliminates a long-term direct ingestion pathway. Ingestion due to human consumption of livestock or game animals, as well as ingestion/inhalation of soil from airborne pathways, will be effectively eliminated by the implementation of reclamation activities that will cover SWMU sites with topsoil and replant them with native vegetation. Therefore, proposed Subpart S and EPA Region III RBCs should be considered highly conservative action levels for the assessment of SWMU sampling results.

DOE also notes that the "bright line" concentrations proposed by EPA on April 4, 1996, under the Hazardous Waste Identification Rule (HWIR), fall between the Subpart S and EPA Region III RBC action levels *(Federal Register, Vol. 61, No. 83, 18779)*. The proposed rule establishes two new regulatory regimes for the management of contaminated media that would otherwise be subject to RCRA Subtitle C. Constituent specific concentrations below the "bright line" would be eligible to exit from Subtitle C regulation if EPA or the state determines that the media does not contain waste that

presents a hazard. If this rule is promulgated by EPA, management requirements for contaminated media determined not to contain hazardous waste would be accelerated and streamlined. The HWIR "bright line" concentrations would remove one level of conservatism in the proposed Subpart S action levels, and potentially represent the future action levels for SWMUs such as those discussed in this document.

2.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001j

2.1 Location of SWMU 001j

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001j, and describes the proposed corrective actions at this location. SWMU 001j is located in the southeast quarter of the southeast quarter of the southwest quarter of Section 20, Township 22 South, Range 31 East. Pennsylvania Drilling Company drilled the P-3 borehole in August 1976 as part of a 21-well U.S. Geological Survey (USGS) resource evaluation program to investigate the potash resources in the Salado formation. The mudpit constructed for the drilling of the P-3 potash exploration well is SWMU 001j. Drilling fluids used at the P-3 site include saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite).

2.2 Geology and Hydrogeology in the Area of SWMU 001j

The USGS lithology logs identify the near-surface deposits at the SWMU 001j as shallow fine-to-medium grained eolian sands that overlay Mescalero Caliche and Gatuna formations. Underlying the Gatuna formation is the Dewey Lake formation.

The sampling team logbook describes the surface sands as reddish medium-to-fine grained sands intermixed with white calcite or caliche pebbles and vegetative debris. No continuous caliche layer was identified during the sampling visit. In contrast, the USGS P-3 lithology logs indicate that caliche was encountered from a depth of 5 to 10 feet. The Mescalero Caliche is characteristically well-cemented with a chalky-to-finely crystalline matrix of calcium carbonate. Based on surface excavations in the vicinity of the P-3 mudpit area, it is assumed that the Mescalero Caliche is invoked as a continuous, impermeable barrier at this site.

The RFA describes soil development at this location as poor, and the release potential for soils in the immediate vicinity of SWMU 001j as high. However, the RFA describes the groundwater migration potential at this site as relatively low. The shallowest potential water bearing formation beneath the P-3 mudpit area is the Dewey Lake formation. At the P-3 borehole, the upper extent of Dewey Lake formation is 41 feet below surface, and the formation is 417 feet thick. Drilling logs indicate that no groundwater or formation moisture was noted in the Dewey Lake formation.

Drilling logs from the H-1 and H-2 boreholes, which were air drilled, identified minor zones of moisture at approximately 185 feet; however, short-term tests to determine fluid yield indicated negligible flow *(TME 3059, 1980)*. Lithology logs from the boring of the WIPP Air Intake Shaft (AIS) document that cuttings from the AIS were moist. Localized surface recharge is also supported by observations during detailed geologic logging of the air intake shaft *(Holt and Powers, 1990; DOE/WIPP 90-051)*. Recent meteoric rainwater is offered as one explanation for the occurrence of moisture and wet units described down to 165 feet below the surface in the AIS. The H-1, H-2, and AIS shaft are all located within 1500 feet of the P-3 borehole. The WIPP RFA also

documents that subsurface logs indicate that the top of the Dewey Lake formation at the SWMU 001j location is relatively impermeable.

Once drilling of the P-3 borehole was completed, the hole was plugged to surface. During the trip out of the hole, the casing stuck and 336 feet of 4 ½ inch casing was left in the hole from a depth of 490 to 826 feet. The hole was plugged back to the surface using 500 gallons of mud flush in advance of 210 sacks of 50 percent Pozmix "A" and 50 percent class "C" cement, 2 percent gel and 19.4 pounds salt per sack. One joint of 3.5-inch outside diameter casing was set into the soft cement and cut off 1 foot above the ground level to mark the hole. This method of plugging effectively sealed the borehole and eliminated any potential migration of surface constituents to the Culebra Dolomite water bearing zones 640 feet below the surface.

2.3 Sampling and Analytical Program

During the sampling visits to the P-3 mudpit, the sampling team located a single rectangular mudpit on the south central part of the drill pad. The P-3 well pad is heavily vegetated, and no discolored soil or liner material were identified during sampling activities. During the summer 1995 sampling event, a total of 16 soil boring samples and ten associated QA/QC samples were collected for TCLP analysis to assess the potential for release of hazardous constituents from the SWMU 001j mudpit. During the summer 1996 sampling event, 12 soil boring samples and two associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001j mudpit.

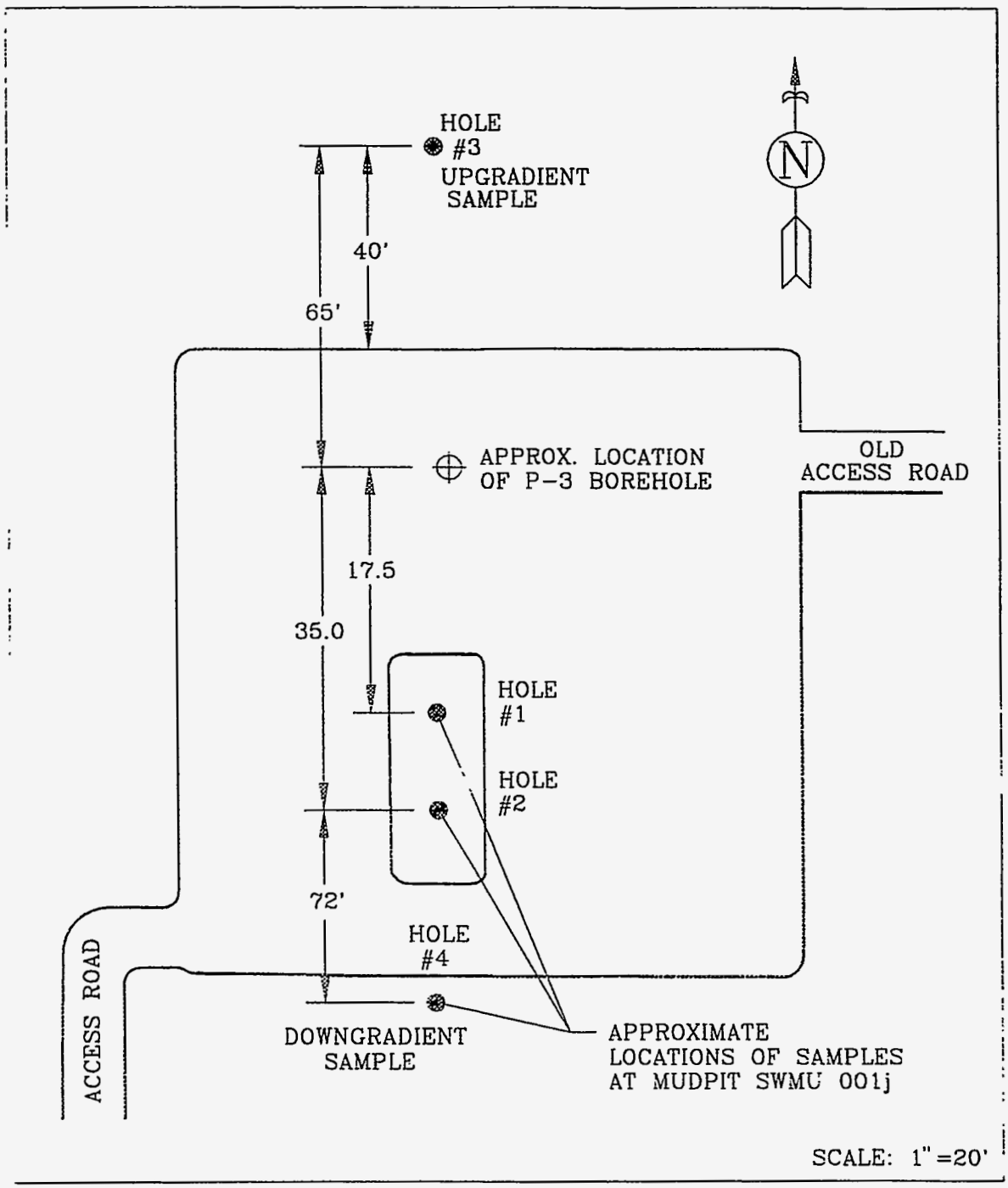
The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001j site and historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to evaluate the maximum vertical extent of potential constituent migration. Figure 2.1 is a sample location map showing locations and measurements between sample locations at SWMU 001j.

2.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A table of validated analytical results for the soil samples collected from SWMU 001j is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001j by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR §261* (see Table 1.4). The analytical results obtained for SWMU 001j also display no detections of target Volatile Organic Compounds (VOCs) in either the totals or the TCLP analyses. The method reporting limits obtained by the program laboratory are well below the applicable action levels for VOCs (Table 1.4).

FIGURE 2.1

SAMPLE LOCATION MAP FOR SWMU 001j (P-3)



The total metals results for SWMU 001j are summarized in Table 2.1. For each sample depth, Table 2.1 presents the maximum total concentration measured within the SWMU for each metal, and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 2.1 demonstrate that total metals concentrations measured in SWMU 001j are generally consistent with background concentrations (Tables 1.3 and 2.1). Detected concentrations are well below the applicable proposed action levels.

DOE re-analyzed selected soil samples from SWMU 001j to increase the defensibility of the release assessment results. During the initial sampling in summer 1995, the TCLP analytical concentration for lead was consistently reported at the established TCLP method reporting limit of 0.5 mg/l. Upon receipt of the initial analytical results, the contract laboratory was contacted and a randomly selected group of samples was re-analyzed for lead to achieve a lower detection limit. Analytical results for all of these re-analyzed samples showed TCLP concentrations of < 0.05 mg/l for lead. This concentration is below the maximum contaminant level (MCL) for lead of 0.05 mg/l established in Appendix A of the proposed Subpart S rule. Selected samples from SWMU 001j were also re-analyzed for thallium. These re-analyses verified sample nondetections for thallium at a lower reporting limit of 0.2 mg/l.

2.5 Proposed Corrective Actions at SWMU 001j

Table 2.1 shows that detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001j. In addition, the concentrations of detected metals within SWMU 001j are generally consistent with measured metals background concentrations (Tables 1.3 and 2.1). The depth to Culebra formation groundwater below SWMU 001j is at least 640 feet, and it is estimated that less than 0.5 inch of precipitation per year infiltrates the underlying strata. The potential for metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals is minimal to nonexistent.

The results of the voluntary release assessment indicate that no hazardous constituents exist in SWMU 001j above the action levels and that no release of hazardous constituents has occurred. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001j. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU

Table 2.1. Comparison of Total Metals Results to Action Levels
SWMU 001j, Mudpit P-3

Metal Analyte	Background Concentration (mg/kg) [1][2][7]	Maximum SWMU Concentration (mg/kg) [1][3][7]	Subpart S Level (mg/kg) [4]
12-24 inches bgs			
Total Arsenic (As)	0.5	0.8	20
Total Barium (Ba)	17	34	6000
Total Cadmium (Cd)	0.5 U	0.5 U	80
Total Chromium (Cr)	26	22	400
Total Lead (Pb)	1.5	2.1	400 [5]
Total Mercury (Hg)	0.03	0.06	20
Total Thallium (Tl)	20 U	20 U	6 [6]
60-72 inches bgs			
Total Arsenic (As)	0.6	1.2	20
Total Barium (Ba)	20	32	6000
Total Cadmium (Cd)	0.5 U	0.5 U	80
Total Chromium (Cr)	5	5	400
Total Lead (Pb)	2	2.6	400 [5]
Total Mercury (Hg)	0.03 U	0.06	20
Total Thallium (Tl)	20 U	20 U	6 [6]

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in Hole 3.
3) Maximum concentration measured in soil samples collected from within Mudpit P-3 (Holes 1 and 2).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value

001j prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

3.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001m

3.1 Location of SWMU 001m

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001m and describes the proposed corrective actions at this location. SWMU 001m is located in the southwest quarter of the southwest quarter of the northwest quarter of Section 30, Township 22 South, Range 31 East. Boyles Brothers Drilling Company drilled the P-6 potash exploration well in September 1976 (*USGS, 1978*). SWMU 001m is the abandoned mudpit generated by the drilling of the P-6 exploration well. As with other USGS potash resource evaluation boreholes, diesel fuel may have been used in the drilling fluid, along with saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite). Access to this site is difficult because the access roads and the surface of the site has been rough graded. The edges of the mudpit are not easily distinguished, so information from visual site inspection portion of the WIPP RFA was used to survey the location of the P-6 mudpit.

3.2 Geology and Hydrogeology in the Area of SWMU 001m

The USGS lithology logs describe the near surface geology at the P-6 borehole as approximately 8 feet of fine-to-medium grained unconsolidated Holocene soils and eolian sands (*USGS, 1978*). Underlying the Holocene sands are 10 feet of Pleistocene Gatuna formation. The RFA describes the soil development at this location as poor, and the release potential as high for soils in the immediate vicinity of SWMU 001m. There is no description of a caliche formation in the drilling logs for the P-6 borehole.

The Gatuna formation overlays the Dewey Lake formation at this site. The Dewey Lake formation is the shallowest potential water-bearing formation beneath the P-6 mudpit area. Driller's logs indicate that the Dewey Lake formation is relatively shallow at this location. The top of the Dewey Lake formation is 18 feet below the surface, and the formation is approximately 339 feet thick. The RFA describes the groundwater migration potential at SWMU 001m as moderate relative to other SWMU locations at the WIPP. This description is based on the shallow depth of the Dewey Lake formation and the proximity of the SWMU site to the western boundary of the WIPP site. In the RFA, the NMED expressed concern that a water well could be located outside of the WIPP land withdrawal area, immediately adjacent to SWMU 001m. Although the 001m SWMU site is located approximately 200 feet from the western site boundary, regional geology and the lack of water in adjacent boreholes significantly reduces the probability that a water well would be located just outside the WIPP land withdrawal area in the vicinity of the SWMU 001m.

Subsurface drilling logs suggest that the top of the Dewey Lake may be relatively impermeable at this location, and it is unlikely that perched or semiperched water bearing zones exist at this location. However, logs from the P-6 borehole do not describe contact with water-bearing strata in the Dewey Lake formation. Additionally, no moisture was described in the drill cuttings. Because air-foam circulation was not

used to drill the P-6 well, moisture containing cuttings may not have been logged by drilling crews.

The H-2 and H-14/P-1 boreholes are the closest drill holes to the P-6 well site. The H-2 borehole is located approximately 8,500 feet east-northeast of the SWMU 001m site. The H-2 borehole was air foam drilled, and drilling logs indicate that minor zones of moisture were recorded at a depth of approximately 185 feet. Short-term pump tests conducted at the H-2 well to determine fluid yield identified negligible flow *(TME 3059, 1980).*

The H-14/P-1 boreholes are located approximately 7,500 feet southeast of the SWMU 001m site. Drilling logs from both the H-14 and the P-2 indicate that no water was encountered during the drilling of either borehole. The RFA states that a short-term hydraulic test was conducted in the H-14 borehole, and testing concluded that the presence or absence of a water table at this site remains undetermined *(Beauheim, 1987b).* The lack of documented water-bearing zones in adjacent wells further supports a position that regional groundwater does not exist in the vicinity of SWMU 001m.

Once drilling of the P-6 borehole was completed, all casing was removed and the hole was plugged to surface using a 500-gallon mud flush ahead of 260 sacks of 50 percent Pozmix "A", containing 50 percent class "C" cement, 2 percent gel and 19.4 pounds salt per sack. One joint of 3.5-inch outside diameter casing was set in soft cement and cutoff 1 foot above the ground level to mark the hole. This method of plugging effectively sealed the borehole and eliminated any potential migration of surface constituents to the Culebra Dolomite water-bearing zone 537 feet below the surface.

3.3 Sampling and Analysis Program

During the sampling visits to the SWMU 001m, the sampling team located a large, single, rectangular mudpit measuring approximately 32 feet by 65 feet. The mudpit is located on the south edge of P-6 drill pad. The P-6 well pad is unvegetated, and no discolored soil or liner material were identified during sampling activities. The lack of vegetation at this site may be the result of caliche materials laid down to construct the P-6 drill pad. Once compacted, these areas lack soil nutrients and inhibit plant germination.

During the summer 1995 sampling at SWMU 001m, a total of 16 soil boring samples and six associated QA/QC samples were collected for TCLP analysis to assess the potential for release of hazardous constituents from the SWMU 001m mudpit. During the summer 1996 sampling event, 12 soil boring samples and two associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001m mudpit.

The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001m site and

historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to evaluate the maximum vertical extent of potential constituent migration. Figure 3.1 is a map showing sample locations and measurements between locations at SWMU 001m.

3.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 001m is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001m by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 1.4). The analytical results obtained for SWMU 001m also display no detections of target VOCs in either the totals or the TCLP analyses. The method reporting limits obtained by the program laboratory are well below the applicable action levels for VOCs (Table 1.4).

The total metals results for SWMU 001m are summarized in Table 3.1. For each sample depth, Table 3.1 presents the maximum total concentration measured within the SWMU for each metal, and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 3.1 demonstrate that total concentrations of metals measured in SWMU 001m are generally consistent with background concentrations. All measured metal concentrations within SWMU 001m are well below the applicable proposed action levels.

3.5 Proposed Corrective Actions at SWMU 001m

Detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001m. In addition, the concentrations of detected metals within SWMU 001m are generally consistent with measured metals background concentrations (Tables 1.3 and 3.1). The depth to Culebra formation groundwater below SWMU 001m is at least 537 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater, therefore, is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to non-existent.

The results of the voluntary release assessment indicate that no hazardous constituents exist in SWMU 001m above the action levels and that no release of hazardous constituents has occurred. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human

FIGURE 3.1

SAMPLE LOCATION MAP FOR SWMU 001m (P-6)

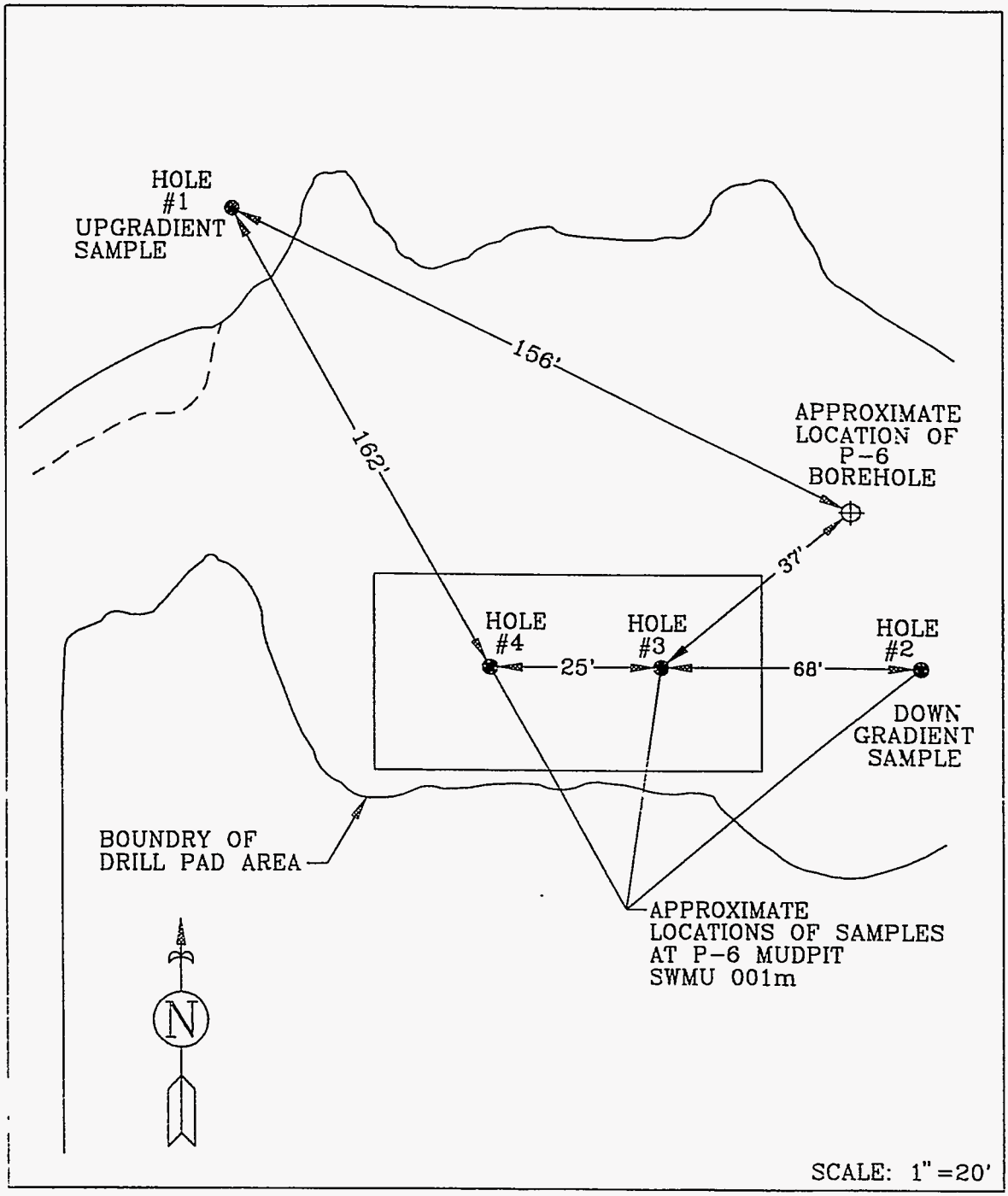


Table 3.1. Comparison of Total Metals Results to Action Levels
SWMU 001m, Mudpit P-6

Metal Analyte	Background Concentration (mg/kg) [1][2][7]	Maximum SWMU Concentration (mg/kg) [1][3][7]	Subpart S Level (mg/kg) [4]
12-24 inches bgs			
Total Arsenic (As)	0.4 J [8]	0.6 J [8]	20
Total Barium (Ba)	11 J [9]	24 J [9]	6000
Total Cadmium (Cd)	0.5 UJ [9]	0.5 UJ [9]	80
Total Chromium (Cr)	2 UJ [9]	3 J [9]	400
Total Lead (Pb)	1.3	1.6	400 [5]
Total Mercury (Hg)	0.03 U	0.05	20
Total Thallium (Tl)	20 U	20 U	6 [6]
60-72 inches bgs			
Total Arsenic (As)	0.5 J [8]	1 J [8]	20
Total Barium (Ba)	10 J [9]	83 J [9]	6000
Total Cadmium (Cd)	0.5 UJ [9]	0.5 UJ [9]	40
Total Chromium (Cr)	4 J [9]	6 J [9]	400
Total Lead (Pb)	1.2	1.8	400 [5]
Total Mercury (Hg)	0.03 U	0.04	20
Total Thallium (Tl)	20 U	20 U	6 [6]

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in Hole 1.
3) Maximum concentration measured in soil samples collected from within Mudpit P-6 (Holes 3 and 4).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value
8) The matrix spike (MS) recoveries were slightly below EPA control criteria of 75 percent.
9) The laboratory control spike (LCS) recoveries were slightly below EPA control criteria of 80 percent.

health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001m. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU 001m prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

4.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001t

4.1 Location of SWMU 001t

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001t, and describes the proposed corrective actions at this location. SWMU 001t is located in the southeast quarter of the southeast quarter of the southwest quarter of Section 30, Township 22 South, Range 31 East. The abandoned mudpit from the drilling of borehole number 374 by the International Minerals and Chemical Corporation (IMC, 1965) makes up the SWMU 001t site. A limited number of historical records have been located for the IMC-374 potash exploration borehole. The IMC-374 exploration borehole was drilled by Boyles Brothers Drilling Company in April 1965. The total depth of the hole was 1,149 feet. Drilling fluids that may have been used to complete the IMC-374 borehole include: saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite).

The IMC-374 drill pad has been extensively graded and regraded since the mudpit was closed in 1965. During the sampling visit the sampling team surveyed the location of the drill pad based on information contained in the WIPP RFA. Visual inspections indicated that the mudpit area is located in a hummocky, sandy area along the west side of the drill pad. The mudpit area measures approximately 15 feet by 70 feet. No mudpit liners were encountered during the boring of sampling sites. An area of slightly stained soil, originally referenced in the RFA was not evident during the sampling visit, and may have resulted from a precipitation event prior to the RFA site visit. The RFA noted that a used oil filter was located on the north side of the pad. This used oil filter has since been removed by WIPP personnel.

4.2 Geology and Hydrogeology in the Area of SWMU 001t

The RFA indicated that no substantive records were located for the IMC-374 borehole. The RFA field inspection revealed that stressed vegetation at SWMU 001t may be related to localized grading down to the subsurface caliche. DOE sampling personnel believe that stressed vegetation at this site is due to the compaction of caliche materials used to construct the 374 drill pad. The drill pad has been compacted and regraded several times reducing the volume of top soil at the site and inhibiting plant germination. The RFA described the release potential to surface soils at this site as high because the pad appears to sit directly on caliche. This suggests that the mudpit bottom may be founded in a relatively thin Pleistocene Gatuna sandstone at this location. The RFA further states that no drilling logs are available to confirm this interpretation.

In January 1996, drilling records describing the surface geology at this site were obtained from IMC. These logs describe the upper surface formation as Holocene sands characterized as 90 percent brown sand and 10 percent caliche. This zone extends from the ground surface to 20 feet in depth. Drilling at this site was completed using a rotary rock bit, and the drilling logs did not provide a good description of subsurface formations. No continuous caliche layer was identified in the top 5 feet of

strata during the drilling of sample boreholes in the mudpit area and at background sample locations. Exploration drill logs indicate that a relatively thin zone of Pleistocene Gatuna siltstone/sandstone underlay surface sands from 20 feet below surface to a depth of 40 feet. The Dewey Lake formation underlay the Gatuna formation from a depth of 41 feet below surface to a depth of 305 feet.

Although drilling logs and sampling activities did not clearly describe a continuous caliche formation at the IMC-374 borehole, a continuous zone of Mescalero Caliche formation has been identified at an excavation in the vicinity of the SWMU 001t site. In February 1995, WIPP spill response personnel responded to a spill of approximately 200 gallons of diesel fuel that occurred when an oil field service truck rolled over on the WIPP South Access Road. This spill occurred approximately 250 feet south of SWMU 001t. During the excavation of diesel-contaminated surface soils, the spill response team encountered a continuous caliche zone approximately 12 feet below surface. Excavation of the site revealed that the spilled diesel fuel filtered through the top 12 feet of medium-to-fine grained surface sands. DOE and NMED personnel removed the contaminated sands, and excavated into the caliche layer approximately 2 feet. Analytical data from this cleanup indicated that diesel contamination was confined to the top 12 inches of the caliche layer, and that the caliche layer at this location effectively halted any vertical migration of the diesel spill.

Drilling logs from the IMC-374 potash exploration hole do not indicate that water or moisture was encountered during drilling. Once drilling of the IMC-374 borehole was completed, the hole was plugged to the surface using both cement and drilling mud. The hole was cased with 4-inch outside diameter casing from the surface to 714 feet. The hole was cemented in four intervals. The first interval was from the bottom of the hole to 714 feet below surface. The second cementing interval went from 714 feet to 470 feet below surface. Drilling logs indicate that while pulling casing and cementing the hole, the casing twisted off at a depth of 437 feet. The casing was left in the hole from 437 feet to 714 feet. Drilling mud was used to seal the third cementing interval, plugging the hole from 470 feet to 20 feet below surface. The final cementing interval plugged the hole from 20 feet to surface. No information is provided in drilling logs describing the type or mixture of cement or drill mud used to plug the IMC-374 borehole.

The RFA recommended that further site investigations be completed at SWMU 001t because of its relative location to the site boundary, the possible proximity to the northern fringe of the Dewey Lake Perched water zone, and concern that diesel fuel was used as a drilling additive. Although drill logs do not clearly define the thickness of caliche layers in the IMC-374 borehole, excavation in the area clearly describes a continuous and relatively impervious caliche zone in the near vicinity. Casing and plugging of the hole effectively mitigated any potential migratory pathway down the borehole. Drilling logs do not indicate water in near-surface formations, and geologic data contained in the RFA describe the groundwater release potential as moderate-to-low relative to other locations on-site. The RFA further describes the potential for migration of surface constituents to the Culebra Dolomite aquifer (530 feet below the surface) as not credible.

4.3 Sampling and Analysis Program

During the summer 1995 sampling event at SWMU 001t, a total of 20 soil boring samples and six associated QA/QC samples were collected for TCLP analysis to assess the potential for release of hazardous constituents from the SWMU 001t mudpit. Soil sampling locations at the SWMU were sampled again in summer 1996. During the summer 1996 sampling event, 12 soil boring samples and two associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001t mudpit.

The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001t site and historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to evaluate the maximum vertical extent of potential constituent migration. Figure 4.1 is a site map showing sample locations and measurements between sample locations at SWMU 001t.

4.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 001t is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001t by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 1.4). The analytical results obtained for SWMU 001t also display no detections of target VOCs in either the totals or the TCLP analyses. The method reporting limits obtained by the program laboratory are well below the applicable action levels for VOCs (Table 1.4).

The total metals results for SWMU 001t are summarized in Table 4.1. For each sample depth, Table 4.1 presents the maximum total concentration measured within the SWMU for each metal and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 4.1 demonstrate that total metals concentrations measured in SWMU 001t are generally consistent with background concentrations (Tables 1.3 and 4.1). Detected concentrations are well below the applicable proposed action levels.

4.5 Proposed Corrective Actions at SWMU 001t

Detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001t. In addition, the concentrations of

FIGURE 4.1

SAMPLE LOCATION MAP FOR SWMU 001t (IMC-374)

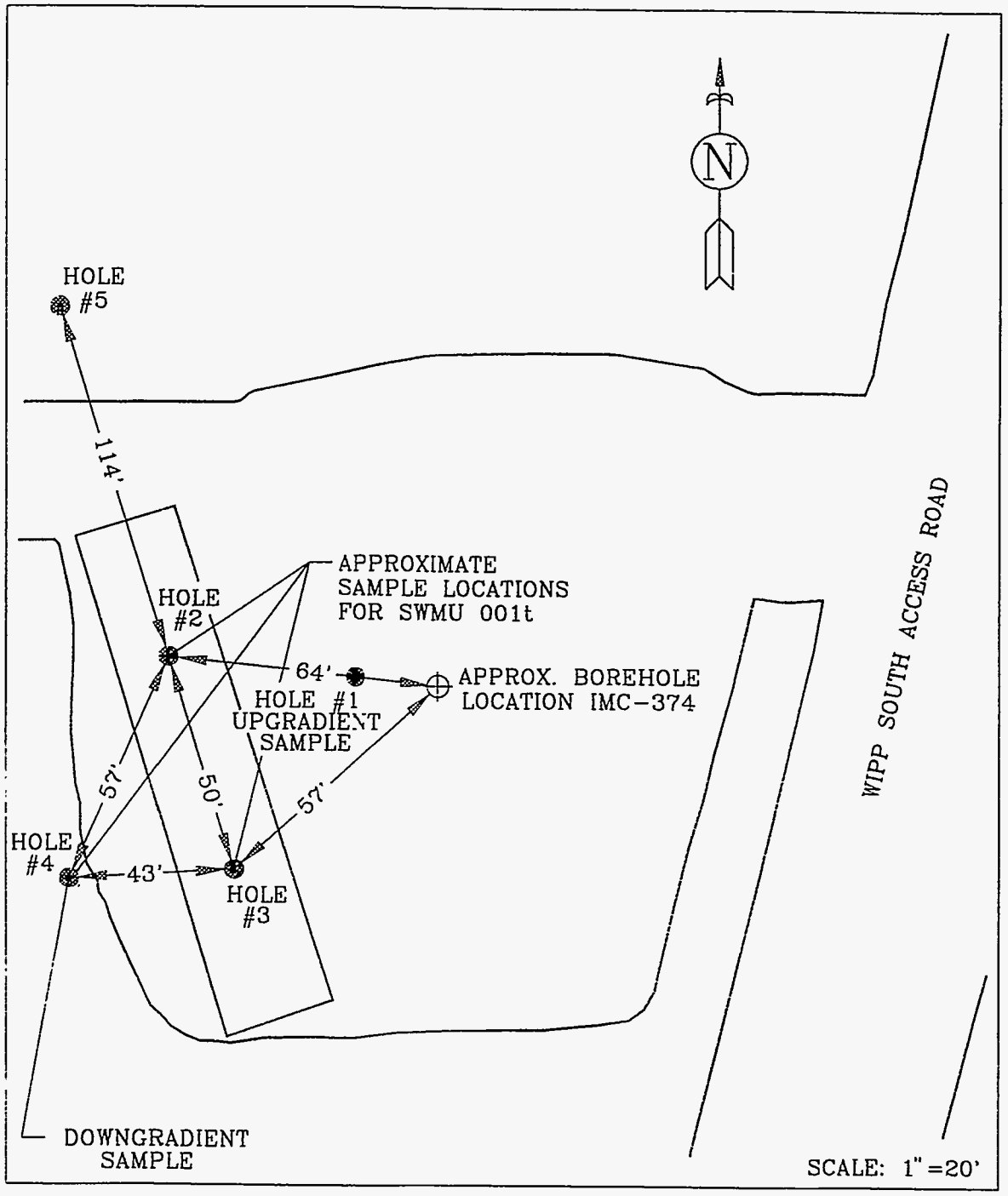


Table 4.1. Comparison of Total Metals Results to Action Levels
SWMU 001t, Mudpit IMC 374

Metal Analyte	Background Concentration (mg/kg) [1][2][7]	Maximum SWMU Concentration (mg/kg) [1][3][7]	Subpart S Level (mg/kg) [4]
12-24 inches bgs			
Total Arsenic (As)	0.5	0.7	20
Total Barium (Ba)	10	16	6000
Total Cadmium (Cd)	0.5 U	0.5 U	80
Total Chromium (Cr)	4	4	400
Total Lead (Pb)	1.5	1.6	400 [5]
Total Mercury (Hg)	0.02 UJ [8]	0.02 UJ [8]	20
Total Thallium (Tl)	20 UJ [9]	20 UJ [9]	6 [6]
60-72 inches bgs			
Total Arsenic (As)	0.6	0.8	20
Total Barium (Ba)	15	16	6000
Total Cadmium (Cd)	0.5 U	0.5 U	80
Total Chromium (Cr)	5	5	400
Total Lead (Pb)	1.6	1.7	400 [5]
Total Mercury (Hg)	0.02 UJ [8]	0.02 UJ [8]	20
Total Thallium (Tl)	20 UJ [9]	20 UJ [9]	6 [6]

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in Hole 1.
3) Maximum concentration measured in soil samples collected from within Mudpit IMC 374 (Holes 2 and 3).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value
8) The laboratory control spike (LCS) recoveries were slightly below EPA control criteria of 80 percent.
9) The laboratory failed to spike the matrix spike sample with thallium. Therefore, no matrix spike recovery data were available and the associated investigation results were qualified as estimated.

detected metals within SWMU 001t are generally consistent with measured metals background concentrations (Tables 1.3 and 4.1). The depth to Culebra formation groundwater below SWMU 001t is at least 530 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to non-existent.

The results of the voluntary release assessment indicate that no hazardous constituents exist in SWMU 001t above the action levels and that no release of hazardous constituents has occurred. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001t. Thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU 001t prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

5.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001n

5.1 Location of SWMU 001n

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001n and describes the proposed corrective actions at this location. SWMU 001n is located in the southwest quarter of the southwest quarter of the southwest quarter of Section 31, Township 22 South, Range 31 East. Boyles Brothers Drilling Company drilled the USGS P-15 borehole in October 1976 as part of a 21-well USGS resource evaluation program to investigate the potash resources in the Salado formation *(USGS, 1978)*. The mudpit constructed for the drilling of the P-15 potash exploration well is SWMU 001n. As with other USGS potash test boreholes, the drilling fluids used at the P-15 site include saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite). USGS reports indicate that the P-15 borehole was drilled with air to a depth of 405 feet. The use of air drilling greatly increased the drillers' ability to detect the presence of shallow groundwater in the borehole. The well was recompleted in 1979 to a depth of 1,465 feet.

5.2 Geology and Hydrogeology in the Area of SWMU 001n

The USGS lithology logs identify the near-surface deposits at SWMU 001n as shallow, fine-to-medium grained Holocene soils and eolian sands that are about 11 feet thick, underlain by the Gatuna formation, which is approximately 21 feet thick *(USGS, 1978)*. The Dewey Lake formation is approximately 199 feet thick in the P-15 borehole.

The RFA describes soil development at this location as poor, and the release potential for soils in the immediate vicinity of SWMU 001n as high. The Dewey Lake formation is located approximately 32 feet below the surface of the SWMU 001n mudpit. Constituent migration potential to groundwater at this site is moderate relative to other SWMU locations. The RFA describes groundwater in the Ranch and Barn Wells at a depth of 225 feet, and suggests that there could be a groundwater connection between the SWMU 001n and the Ranch and Barn wells. Although this connection is possible, it is extremely unlikely. Evaluation of water-bearing strata in the Dewey Lake formation suggests that perched or semiperched saturation zones are very localized. The P-15 borehole is located more than 8,000 feet north and east of the Ranch and Barn wells; therefore, a hydrologic connection is very improbable. As discussed previously, the USGS drill reports indicate that the P-15 borehole was drilled with air to a depth of 405 feet, and no water or wet cuttings were encountered.

The use of air drilling greatly increased the drillers' ability to detect the presence of shallow groundwater in the borehole. Migration of surface constituents to the Culebra Dolomite aquifer 413 feet below surface is not credible.

Once drilling of the P-15 borehole was completed, the hole was cemented from 1,465 feet to a depth 660 feet. This cementing process included 500 gallons of mud flush ahead of 75 sacks of 50 percent Pozmix "A", containing 50 percent class "C" cement, 2 percent gel, and 19.4 pounds salt per sack. Drill rods were pulled to 600 feet and

excess cement was circulated from the hole. The hole was then cased with 4.5-inch casing. The casing was perforated with 72 holes from a depth of 532 feet to 556 feet. The annular space around the casing was cemented to the surface, and the casing cut off 1 foot above the surface. A 2-inch bull plug with a screw-on retainer cap was welded to the top of the casing.

5.3 Sampling and Analysis Program

During sampling visits, the sampling team used location data contained in the RFA to survey the location of the P-15 mudpit. The sampling team marked a single rectangular mudpit approximately 10 feet wide and 20 feet long on the northeastern edge of the drill pad. The P-15 well pad is heavily vegetated, and no discolored soil or liner material was identified during sampling activities.

During the summer 1995 sampling event at SWMU 001n, a total of 16 soil boring samples and eight associated QA/QC samples were collected for TCLP analysis to assess the potential for release of hazardous constituents from the SWMU 001n mudpit. Soil sampling locations at the SWMU were sampled again in summer 1996. During the summer 1996 sampling, 12 soil boring samples and two associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001n mudpit.

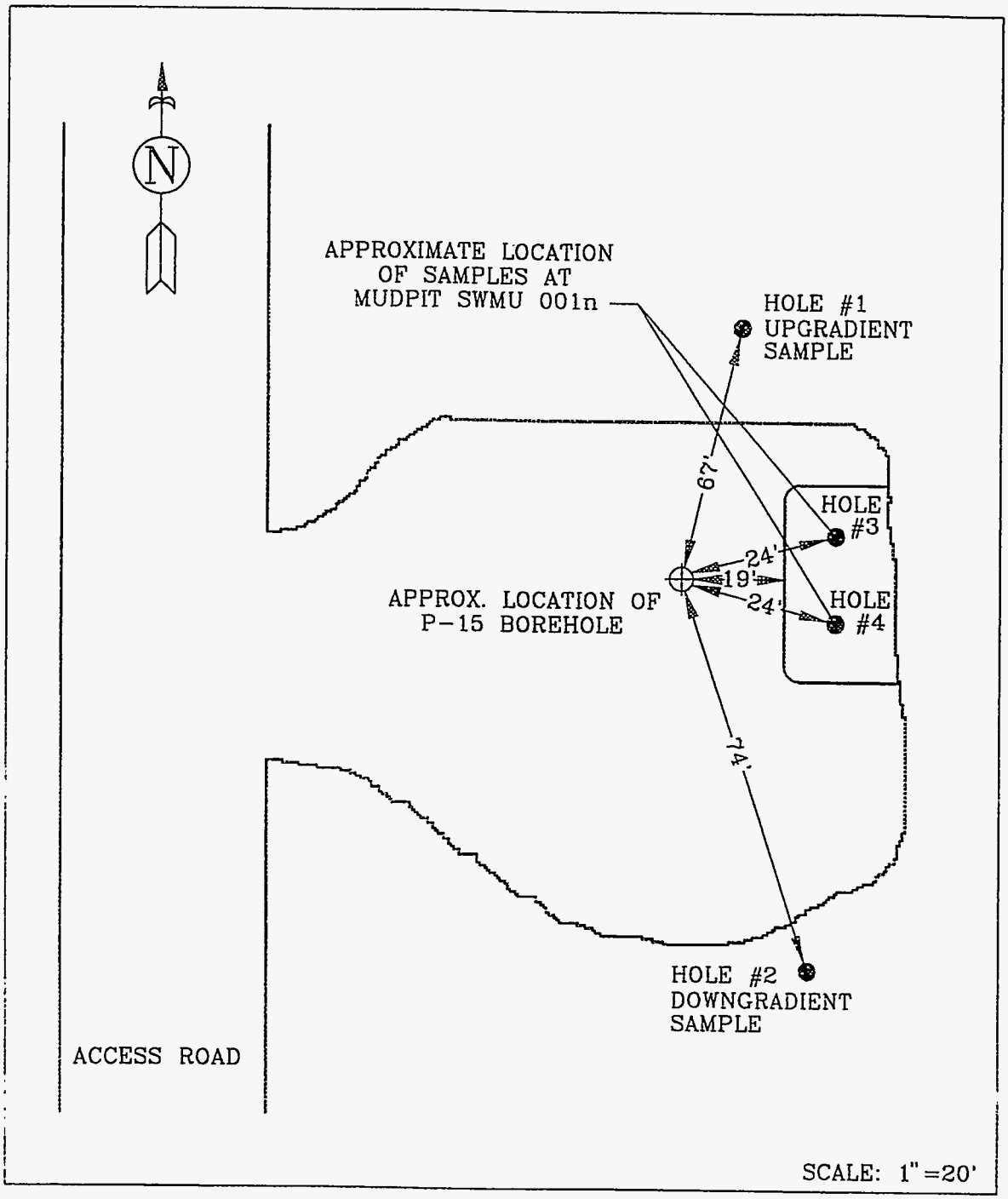
The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001n site and historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to evaluate the maximum vertical extent of potential constituent migration. Figure 5.1 is a site map showing sample locations and measurements between sample locations at SWMU 001n.

5.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 001n is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001n by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 1.4). The analytical results obtained for SWMU 001n also display no detections of target VOCs in either the totals or the TCLP analyses. The method reporting limits obtained by the program laboratory are well below the applicable action levels for VOCs (Table 1.4).

FIGURE 5.1

SAMPLE LOCATION MAP FOR SWMU 001n (P-15)



The total metals results for SWMU 001n are summarized in Table 5.1. For each sample depth, Table 5.1 presents the maximum total concentration measured within the SWMU for each metal, and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 5.1 demonstrate that total metals concentrations measured in SWMU 001n are generally consistent with background concentrations (Tables 1.3 and 5.1). Detected concentrations within SWMU 001m are well below the applicable proposed action levels.

5.5 Proposed Corrective Actions at SWMU 001n

Detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001n. In addition, the concentrations of detected metals within SWMU 001n are generally consistent with measured metals background concentrations (Tables 1.3 and 5.1). The depth to Culebra formation groundwater below SWMU 001n is at least 413 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to non-existent.

The results of the voluntary release assessment indicate that no hazardous constituents exist in SWMU 001n above the action levels and that no release of hazardous constituents has occurred. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001n. Thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU 001n prior to the issuance of the RCRA Part B Permit for the WIPP. If a No Further Action is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

Table 5.1. Comparison of Total Metals Results to Action Levels
SWMU 001n, Mudpit P-15

Metal Analyte	Background Concentration (mg/kg) (1)(2)(7)	Maximum SWMU Concentration (mg/kg) (1)(3)(7)	Subpart S Level (mg/kg) (4)
12-24 inches bgs			
Total Arsenic (As)	0.6	0.8	20
Total Barium (Ba)	13	110	6000
Total Cadmium (Cd)	0.5 U	0.5 U	80
Total Chromium (Cr)	4	7	400
Total Lead (Pb)	1.2	2	400 (5)
Total Mercury (Hg)	0.02 UJ (8)	0.02 UJ (8)	20
Total Thallium (Tl)	20 UJ (9)	20 UJ (9)	6 (6)
60-72 inches bgs			
Total Arsenic (As)	0.8	1	20
Total Barium (Ba)	16	42	6000
Total Cadmium (Cd)	1.8	0.5 U	80
Total Chromium (Cr)	5	6	400
Total Lead (Pb)	1.4	2.6	400 (5)
Total Mercury (Hg)	0.02 UJ (8)	0.02 UJ (8)	20
Total Thallium (Tl)	20 UJ (9)	20 UJ (9)	6 (6)

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in Hole 1.
3) Maximum concentration measured in soil samples collected from within Mudpit P-15 (Holes 3 and 4).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value
8) The laboratory control spike (LCS) recoveries were slightly below EPA control criteria of 80 percent.
9) The laboratory failed to spike the matrix spike sample with thallium. Therefore, no matrix spike recovery data were available and the associated investigative results were qualified as estimated.

6.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001x

6.1 Location of SWMU 001x

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001x and describes the proposed corrective actions at this location. SWMU 001x is located in the northwest quarter of the northeast quarter of the southwest quarter of Section 17, Township 22 South, Range 31 East. Pennsylvania Drilling Company began drilling the WIPP-13 borehole in July 1978. The borehole was drilled to a depth of 1,025 feet to the upper part of the Salado formation in 1978, and later deepened to 3,860 feet in 1979. The borehole was later plugged in 1985 below the Culebra to create a monitoring well *(Caufmann et al., 1990; D'Appolonia, 1982a; Stensrud et al, 1987).* Records indicate that salt-based drilling fluid was used during initial drilling and a brine-gel mixture was used for later reaming and deepening of the hole in 1979 *(D'Appolonia, 1982a; Stensrud et al, 1987).* Additionally, 8,600 liters of a 20 percent concentration hydrochloric acid solution was used in 1986 to complete the well for monitoring purposes *(Caufmann et al., 1990).* Aerial photographs from 1986 show no evidence for reopening of the mudpits during this time period.

6.2 Geology and Hydrogeology in the Area of SWMU 001x

The stratigraphic summary for borehole WIPP-13 contained in the *Basic Data Report for Drillhole WIPP-13 (SAND79-0273)* identifies the near surface geology at SWMU 001x as approximately 13 feet of Holocene sands and soil. The Mescalero Caliche formation occurs at this location from 6 feet to 12 feet in depth. No consolidated caliche layer was encountered during the release assessment sampling visit, however, poorly sorted caliche cobble was intermixed with reddish surface sands and soils. Triassic Age Santa Rosa sandstones underlay the Gatuna formation at this site. Quaternary Aged Gatuna formation sandstones occur from 13 to 39 feet, and the Santa Rosa sandstones continue down to 66 feet in depth. The Dewey Lake formation in the WIPP-13 borehole extends from 66 feet below surface down to 517 feet in depth.

The RFA identifies the migration potential to groundwater at this location as low relative to other locations on site. Although drillers would have had difficulty detecting water in the Dewey Lake formation due to the type drilling fluids used, it is unlikely the Dewey Lake formation contains groundwater this far north of the WIPP site. Drilling logs do not reference contact with water-bearing strata or the presence of moist cuttings while drilling through the Dewey Lake formation. Migration of surface constituents to the Culebra Dolomite aquifer 700 feet below surface is not credible.

Once drilling of the WIPP-13 borehole was completed in 1978, the entire 8-inch borehole was filled with salt-based drilling mud. In 1979, the well was reamed to a 12.25 inch open hole diameter. The hole was then cased and cemented with 9.75 inch casing, to the upper part of the Salado formation at a depth of 1,025 feet. The hole was then deepened to a depth of 3,850 feet in the Castile formation. WIPP-13 was left filled with a brine-gel drilling fluid and capped at the surface. In 1985, the hole was

acidified after a retrievable bridge plug was set in the casing at a depth of approximately 740 feet. The casing was then perforated between 702 feet and 727 feet. This portion of the hole was capped at the surface and the hole left open for water level monitoring.

6.3 Sampling and Analysis Program

During the sampling visits to the SWMU 001x, the sampling team located a single mudpit complex that measures approximately 100 feet wide and 120 feet long. The mudpit area is sunken approximately 1.5 feet below the surface grade of the pad. No vegetation is growing on the mudpit area, and the soil in the mudpit is a dark grey color. Black plastic liners protrude through the surface and delineate the mudpits. A white plastic liner material was encountered while collecting both samples in the mudpit area. Plastic liner material was encountered at a depth of approximately 22 inches. Soil in both these holes had a moist clay texture and had a mild petroleum odor. Samples collected at the 60 to 72 inch depth did not have a petroleum odor.

During the summer 1995 sampling event at SWMU 001x, a total of 16 soil boring samples and eight associated QA/QC samples were collected for TCLP analysis to assess the potential for release of hazardous constituents from the SWMU 001x mudpit. Soil sampling locations at the SWMU were sampled again in summer 1996. During the summer 1996 sampling, 12 soil boring samples and two associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001x mudpit.

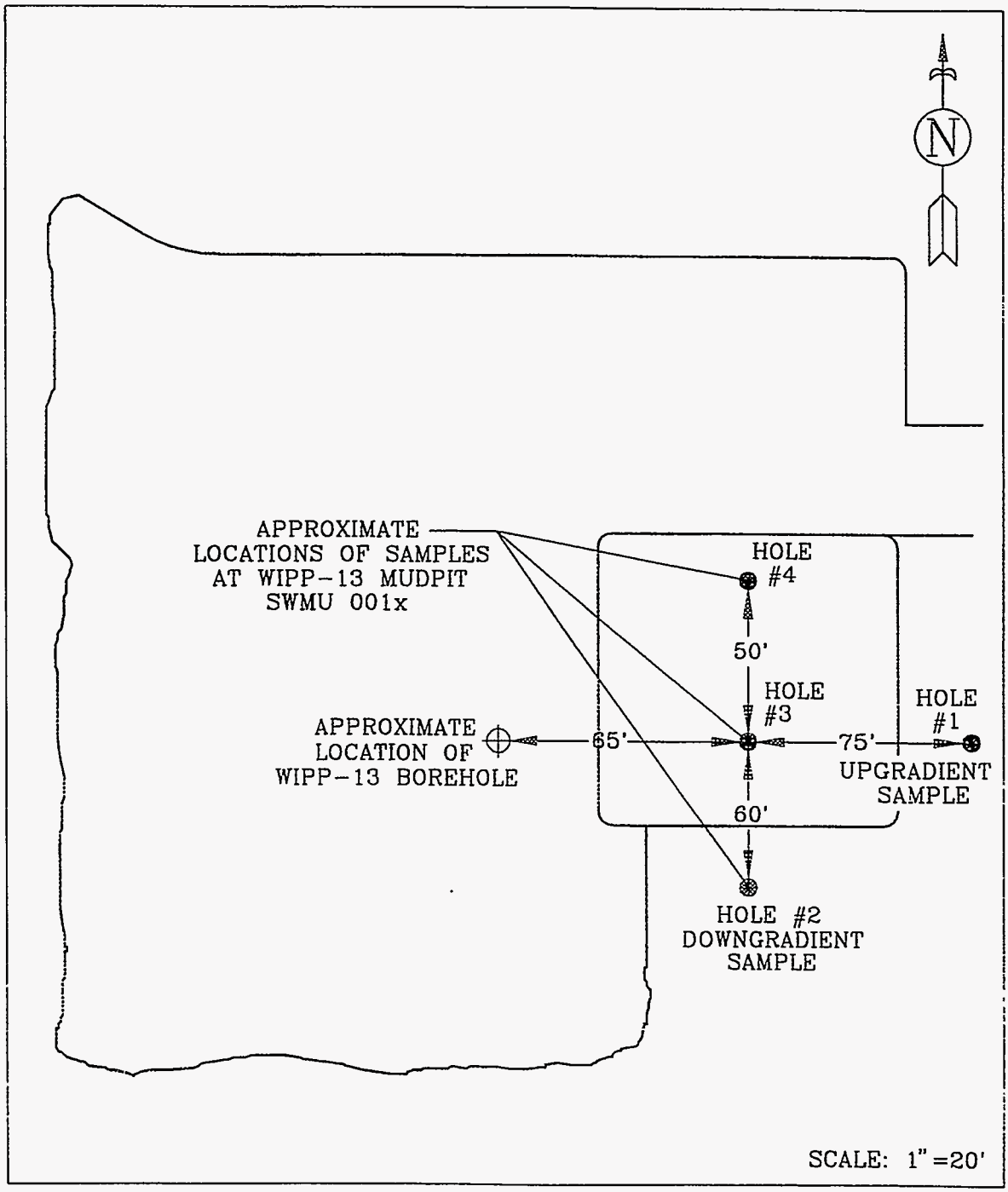
The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001x site and historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to quantify the maximum vertical extent of potential constituent migration. Figure 6.1 is a site map showing sample locations and measurements between sample locations at SWMU 001x.

6.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 001x is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001x by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 1.4). The analytical results obtained for SWMU 001x also display no detections of target VOCs in either the totals or the TCLP analyses. Although elevated reporting limits were obtained for some samples due to matrix

FIGURE 6.1

SAMPLE LOCATION MAP FOR SWMU 001x (WIPP-13)



interferences, the method reporting limits obtained by the program laboratory are generally well below the applicable action levels for VOCs (Table 1.4).

The total metals results for SWMU 001x are summarized in Table 6.1. For each sample depth, Table 6.1 presents the maximum total concentration measured within the SWMU for each metal, and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 6.1 demonstrate that total metals concentrations of barium and lead measured in SWMU 001x may be somewhat elevated relative to background concentrations. However, detected concentrations within the SWMU are below the applicable proposed action levels.

DOE performed re-analyses of selected soil samples from SWMU 001x to increase the defensibility of the release assessment results. During the initial summer 1995 sampling, the TCLP analytical concentration for lead was consistently reported at the established TCLP method reporting limit of 0.5 mg/l. Upon receipt of the initial analytical results, the contract laboratory was contacted and a randomly selected group of samples was re-analyzed for lead to achieve a lower detection limit. Analytical results for all of these re-analyzed samples showed TCLP concentrations of <0.05 mg/l for lead. This concentration is below the MCL for lead of 0.05 mg/l established in Appendix A of the proposed Subpart S rule. Selected samples from SWMU 001x were also re-analyzed for thallium. These re-analyses verified sample nondetections for thallium at a lower reporting limit of 0.2 mg/l.

6.5 Proposed Corrective Actions at SWMU 001x

Table 6.1 shows that detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001x. With the possible exception of barium and lead, the concentrations of detected metals within SWMU 001x are generally consistent with measured metals background concentrations (Tables 1.3 and 6.1). The depth to Culebra formation groundwater below SWMU 001x is at least 700 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to non-existent.

The results of the voluntary release assessment indicate that no hazardous constituents, including barium and lead, exist in SWMU 001x above the action levels. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001x. Thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Table 6.1. Comparison of Total Metals Results to Action Levels
SWMU 001x, WIPP-13

Metal Analyte	Background Concentration (mg/kg) [1][2][7]	Maximum SWMU Concentration (mg/kg) [1][3][7]	Subpart S Level (mg/kg) [4]
12-24 inches bgs			
Total Arsenic (As)	0.3 U	1	20
Total Barium (Ba)	10	3800	6000
Total Cadmium (Cd)	0.5 U	0.6	80
Total Chromium (Cr)	3	36	400
Total Lead (Pb)	1.6	270	400 [5]
Total Mercury (Hg)	0.03 U	0.03 U	20
Total Thallium (Tl)	20 U	20 U	6 [6]
60-72 inches bgs			
Total Arsenic (As)	0.6	1.2	20
Total Barium (Ba)	12	680	6000
Total Cadmium (Cd)	0.5	0.5 U	80
Total Chromium (Cr)	4	10	400
Total Lead (Pb)	1.5	5	400 [5]
Total Mercury (Hg)	0.03 U	0.03 U	20
Total Thallium (Tl)	20 U	20 U	6 [6]

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in Hole 1.
3) Maximum concentration measured in soil samples collected from within WIPP-13 (Holes 3 and 4).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):

J Result should be considered an estimated value
U Analyte was not detected; value is the method reporting limit
UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU 001x prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

7.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001g

7.1 Location of SWMU 001g

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001g, and describes the proposed corrective actions at this location. SWMU 001g is located in the southwest quarter of the southwest quarter of the southwest quarter of Section 29, Township 22 South, Range 31 East. The abandoned mudpits from the drilling of the P-1 and H-14 boreholes make up the SWMU 001g site. The P-1 potash exploration borehole was drilled by Pennsylvania Drilling Company in August 1976. The total depth of the P-1 borehole was 1,591 feet. The H-14 borehole was drilled in October 1986 to provide a Culebra Dolomite monitoring well in the southwest quadrant of the WIPP site. The H-14 monitoring well was drilled to a total depth of 589 feet. The H-14 well was originally drilled using a 7.875-inch rock bit to a depth of 533 feet, 12 feet above the Culebra formation. The original borehole was hydrologically tested in the Dewey Lake and Rustler formations. A 5.5-inch casing was set in the hole and cemented to the surface. A 4.5-inch hole was then cored through the cement and then continued to a depth of 574 feet. After a series of drill stem tests in the Culebra formation, the corehole was reamed to 4.75 inches and deepened to a final depth of 589 feet.

Drilling fluids that may have been used to complete both the P-1 and H-14 borehole include saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite). Diesel fuel was added to a mixture of saturated sodium and potassium chloride brine, starch and salt gel, and attapulgite to reduce the degree of dissolution of the Salado formation during drilling operations for P-1 *(Stensrud et al, 1987)*. A 70 to 30 mixture of cement slurry and salt with 2 percent bentonitic gel was used for the plug. An organic tracer (meta-trifluorobenzoic acid 10 mg/l) was added to freshwater at H-14 to measure contamination of the Culebra member from the drilling process. Approximately 4,620 gallons of traced drilling fluid were lost to the member, representing about 80 to 90 percent of the recirculated drilling fluid *(Stensrud et al, 1987)*.

The drill pad where the P-1 and H-14 boreholes are located has been extensively graded and regraded. The H-14 well site has been used as a monitoring well since it was drilled in 1986. As described in the RFA, the H-14 mudpit was located and verified from the aerial photographs. The H-14 mudpit is located on the north side of the drill pad area adjacent to the H-14 borehole. The H-14 mudpit measures 30 feet wide and 100 feet long. The area of the mudpit is delineated by disturbed soils covered with rock fragments.

Based on information contained in the RFA, the sampling team surveyed the location of the P-1 mudpit. The P-1 mudpit is located in the middle of the SWMU 001g drill pad. The mudpit area is approximately 25 feet wide and 37 feet long. The mudpit area is identified by a slightly discolored, sunken area 50 feet south of H-14 borehole and adjacent to the P-1 borehole. No plastic liners were observed on the surface at either mudpit location.

7.2 Geology and Hydrogeology in the Area of SWMU 001g

The USGS lithology logs identify the near-surface deposits at SWMU 001g as shallow fine-to-medium grained eolian sands and Mescalero Caliche from the surface to 10 feet in depth. Although the sampling team did not encounter consolidated caliche during the sampling visits, drilling logs identify a white-to-very-pale red caliche intermixed with fine sand grains. The Gatuna formation at SWMU 001g is approximately 30 feet thick and is made up of very fine grained, reddish-brown Pleistocene sandstone *(USGS, 1978)*. Underlying the Gatuna formation is the Dewey Lake formation. The Dewey Lake formation in the P-1 and H-14 boreholes is approximately 318 feet thick.

The RFA describes the migration potential to groundwater at SWMU 001g as low-to-moderate relative to other locations at the site. Drilling logs from the P-1 borehole indicate a zone of increased permeability at 175 feet, suggesting that air foam was not used. WIPP Hydrologic Data Report #5 documents that very little water was encountered during a pump test in the Dewey Lake in H-14; however, Beauheim (1987a) identifies 327.5 to 356.0 feet below the surface as the zone isolated for the hydraulic test. The pump test at H-14 did not indicate the presence or absence of groundwater at this location. Migration of surface constituents to the Culebra Dolomite aquifer 540 feet below surface is not credible.

Once drilling of the P-1 borehole was completed, the hole was cemented from the bottom of the hole at 1,591 feet to the surface. This cementing process included 500 gallons of mud flush ahead of 215 sacks of 50 percent Pozmix "A", containing 50 percent class "C" cement, 2 percent gel and 19.4 pounds salt per sack. One joint of 3.5-inch casing was set in the soft cement and cut off 1 foot above the ground surface to mark the hole.

As described previously, the H-14 borehole was originally drilled using a 7.875-inch rock bit to a depth of 533 feet. The original borehole was hydrologically tested in the Dewey Lake and Rustler formations. A 5.5-inch casing was set in the hole and cemented to the surface. A 4.5-inch hole was cored through the cement and continued to a depth of 574 feet. After a series of drill stem tests in the Culebra formation, the corehole was reamed to 4.75 inches and deepened to a final depth of 589 feet. The H-14 borehole was capped with a locking cap and remains in use as a Culebra formation water level monitoring well.

7.3 Sampling and Analysis Program

During the summer 1995 sampling event, 24 soil samples and four associated QA/QC samples were collected to characterize the vertical and horizontal extent of any potential release from the SWMU 001g. The DOE collected 12 soil boring samples from the P-1 mudpit area and 12 soil boring samples from the H-14 site. The NMED - DOE/WIPP Oversight Bureau collected an equal number of split samples at SWMU 001g. Because the split sampling data generated by NMED - DOE/WIPP Oversight Bureau consistently had a higher method detection limit, these data were only used as

a reference to ensure that no data anomalies were identified. Analytical data collected by the NMED - DOE/WIPP Oversight Bureau are provided in Appendix C.

The SWMU 001g soil sampling locations were sampled again in summer 1996. During the summer 1996 sampling event, 20 soil boring samples and four associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001g mudpit.

The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001g site and historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to evaluate the maximum vertical extent of potential constituent migration. Figure 7.1 is a site map showing sample locations and measurements between sample locations at SWMU 001g.

7.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 001g is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001g by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 1.4). The analytical results obtained for SWMU 001g also display no detections of target VOCs in either the totals or the TCLP analyses. The method reporting limits obtained by the program laboratory are well below the applicable action levels for VOCs (Table 1.4).

The total metals results for SWMU 001g are summarized in Table 7.1. For each sample depth, Table 7.1 presents the maximum total concentration measured within the SWMU for each metal, and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 7.1 demonstrate that total metals concentrations measured in SWMU 001g are generally consistent with background concentrations (Tables 1.3 and 7.1). With the exception of thallium at H-14, detected concentrations are well below the applicable proposed action levels. Although the detected thallium concentration is greater than the Subpart S action level, the concentration is consistent with background concentrations measured during the release assessment program (see Table 1.3).

7.5 Proposed Corrective Actions at SWMU 001g

Detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001g, with the exception of thallium at

FIGURE 7.1

SAMPLE LOCATION MAP FOR SWMU 001g (H-14 & P-1)

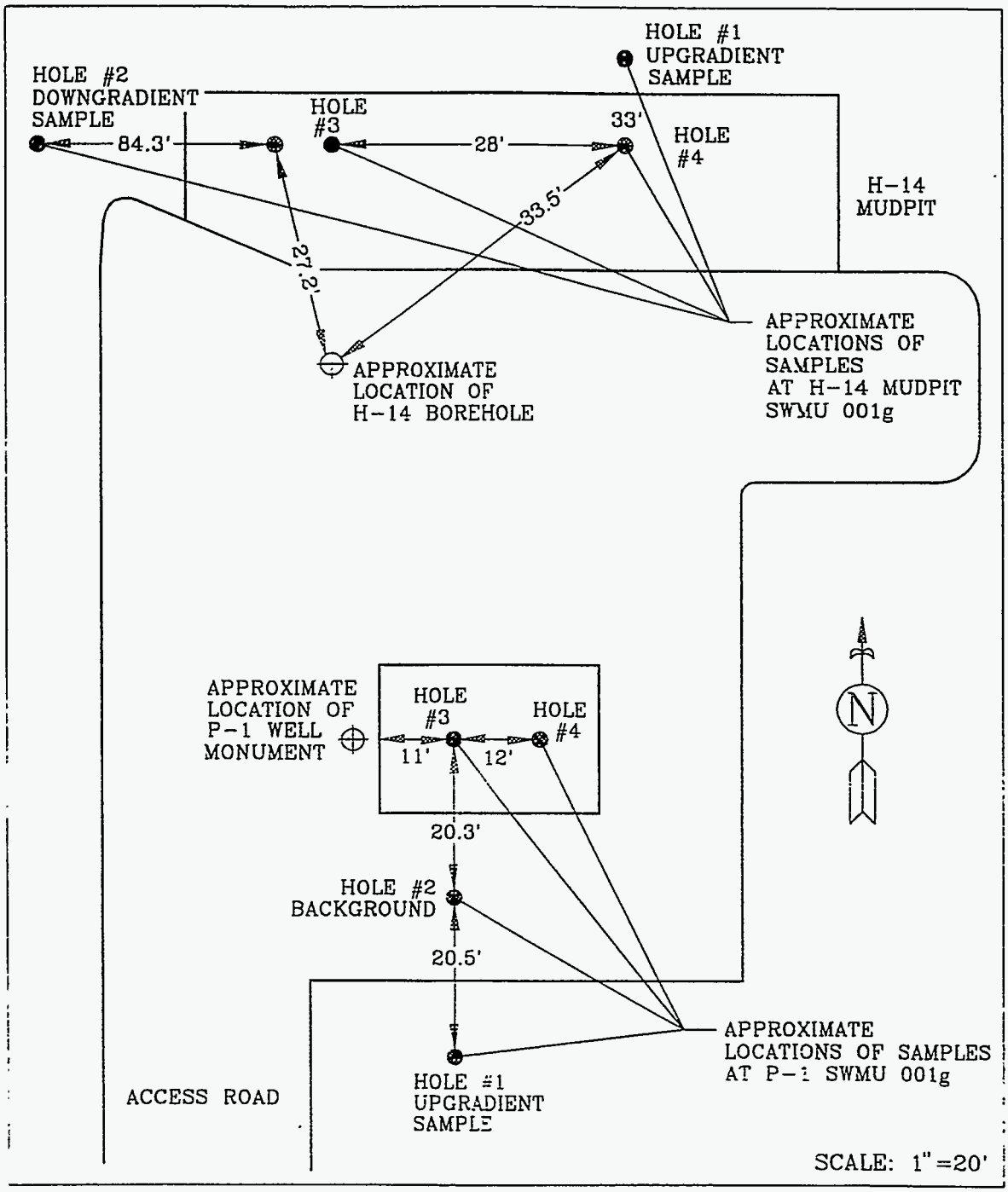


Table 7.1. Comparison of Total Metals Results to Action Levels, SWMU 001g

Metal Analyte	SWMU 001g, H-14 Background Concentration (mg/kg) [1][2][7]	SWMU 001g, H-14 Maximum SWMU Concentration (mg/kg) [1][3][7]	SWMU 001g, H-14 Subpart S Level (mg/kg) [4]	SWMU 001g, Mudpit P-1 Background Concentration (mg/kg) [1][2][7]	SWMU 001g, Mudpit P-1 Maximum SWMU Concentration (mg/kg) [1][3][7]	SWMU 001g, Mudpit P-1 Subpart S Level (mg/kg) [4]
12-24 inches bgs						
Total Arsenic (As)	0.9 J [8]	1.2 J [8]	20	1 J [8]	0.9 J [8]	20
Total Barium (Ba)	15	22	6000	35	17	6000
Total Cadmium (Cd)	0.7 J [8]	0.5 UJ [8]	80	0.5 UJ [8]	0.5 UJ [8]	80
Total Chromium (Cr)	3	6	400	5	4	400
Total Lead (Pb)	1.9 J [10]	3.4 J [10]	400 [5]	2.1 J [10]	3.2 J [10]	400 [5]
Total Mercury (Hg)	0.02 UJ [8][9]	0.02 U	20	0.02 U	0.02 U	20
Total Thallium (Tl)	20 U	20	6 [6]	20 U	20 U	6 [6]
60-72 inches bgs						
Total Arsenic (As)	2 J [8]	2.3 J [8]	20	1.8 J [8]	1.5 J [8]	20
Total Barium (Ba)	26	34	6000	52	71	6000
Total Cadmium (Cd)	0.5 UJ [8]	0.5 UJ [8]	80	0.5 UJ [8]	0.5 UJ [8]	80
Total Chromium (Cr)	7	7	400	2	4	400
Total Lead (Pb)	2.7 J [10]	3.4 J [10]	400 [5]	3.8 J [10]	2.4 J [10]	400 [5]
Total Mercury (Hg)	0.02 UJ [8][9]	0.04 J [8][9]	20	0.04	0.02 U	20
Total Thallium (Tl)	20 U	20 U	6 [6]	20 U	20 U	6 [6]

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in upgradient holes (Hole 1) for the H-14 and P-1 Mudpits.
3) Maximum concentration measured in soil samples collected from within Mudpit H-14 (Holes 3 and 4) and Mudpit P-1 (Hole 3).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value
8) The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were slightly below EPA control criteria of 75 percent.
9) The laboratory control spike (LCS) recoveries were slightly below EPA control criteria of 80 percent.
10) The MS recoveries were above EPA control criteria of 125%.

H-14. In addition, the concentrations of detected metals within SWMU 001g, including thallium at H-14, are generally consistent with measured metals background concentrations (Tables 1.3 and 7.1). The depth to Culebra formation groundwater below SWMU 001g is at least 540 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to non-existent.

The results of the voluntary release assessment indicate that no hazardous constituents exist in SWMU 001g above both background and the action levels, and further, no release of hazardous constituents has occurred. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001g. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that after appropriate public agency review and approval, a No Further Action determination be granted for SWMU 001g, prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

8.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001k

8.1 Location of SWMU 001k

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001k, and describes the proposed corrective actions at this location. SWMU 001t is located in the southeast quarter of the southwest quarter of the southeast quarter of Section 28, Township 22 South, Range 31 East. The abandoned mudpit from the drilling of the P-4 borehole makes up the SWMU 001k site. The P-4 borehole was drilled by Boyles Brothers Drilling Company in August and September 1976. The total depth of the hole was 1,858 feet. Drilling fluids that may have been used to complete the P-4 borehole include saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite). WIPP Hydrologic Data Report #5 suggests that at least some of these USGS resource evaluation boreholes added diesel fuel to the drilling fluid to reduce the degree of dissolution of the Salado formation. Air foam was used beginning at a depth of 958 feet and continued until the hole was completed to maintain circulation and help remove cuttings from the hole.

The P-4 drill pad has been extensively graded and regraded since the mudpit was closed in 1976. During the sampling visit the sampling team surveyed in the P-4 mudpit based on information contained in the RFA. The P-4 mudpit is located in a hummocky sand dune area on the west side of the SWMU 001k drill pad. The mudpit area sits at approximately a 45-degree angle to the P-4 drill pad and is approximately 15 feet wide and 70 feet long. No discolored soil or plastic liners were evident during the sampling visit. Mixed, uncompacted soil, broken caliche, and red sandstone on the surface suggest extensive grading along the west side of the drill pad.

8.2 Geology and Hydrogeology in the Area of SWMU 001k

The USGS lithology logs for the P-4 borehole identify the surface strata at SWMU 001k as a 5 to 8 foot zone of fine grained dune sands that overlays a Triassic Aged Santa Rosa sandstone formation. The Santa Rosa sandstone in this area is approximately 81 feet thick. The Permian Aged Dewey Lake formation is located directly below the Santa Rosa sandstone.

The RFA identifies the release potential to soils at SWMU 001k as high due to the fine grained eolian sands and the shallow contact with the Santa Rosa sandstone formation. The RFA goes on to identify the groundwater migration potential at SWMU 001k as low relative to other locations on site. No groundwater is noted in drillers' logs during air foam circulation between 99 feet and 609 feet below the land surface, suggesting no groundwater occurs in the Dewey Lake formation at this location. Subsurface logs also indicate that the top of the Dewey Lake formation would be relatively impermeable at this location. Migration of surface constituents to the Culebra Dolomite aquifer 775 feet below surface is not credible.

Once drilling of the P-4 borehole was completed, it was cemented from the bottom of the borehole at 1,858 feet to the surface. All casing was removed, and a 500-gallon

flush of drill mud was proceeded with 250 sacks of 50 percent Pozmix "A", containing 50 percent class "C" cement, 2 percent gel, and 19.4 pounds salt per sack. One joint of 3.5-inch casing was set in the soft cement and cut off 1 foot above the surface to mark the hole.

8.3 Sampling and Analysis Program

During the summer 1995 sampling event at SWMU 001k, a total of 12 soil boring samples and four associated QA/QC samples were collected for TCLP analysis to assess the potential for release of hazardous constituents from the SWMU 001k mudpit. Soil sampling locations at the SWMU were sampled again in summer 1996. During the summer 1996 sampling event, 12 soil boring samples and two associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001k mudpit.

The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001k site and historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to quantify the maximum vertical extent of potential constituent migration. Figure 8.1 is a site map showing sample locations and measurements between sample locations at SWMU 001k.

8.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 001k is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001k by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 1.4). The analytical results obtained for SWMU 001k also display no detections of target VOCs in either the totals or the TCLP analyses. The method reporting limits obtained by the program laboratory are well below the applicable action levels for VOCs (Table 1.4).

The total metals results for SWMU 001k are summarized in Table 8.1. For each sample depth, Table 8.1 presents the maximum total concentration measured within the SWMU for each metal, and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 8.1 demonstrate that total metals concentrations measured in SWMU 001k are generally consistent with background concentrations (Tables 1.3 and 8.1). Detected concentrations are well below the applicable proposed action levels.

FIGURE 8.1

SAMPLE LOCATION MAP FOR SWMU 001k (P-4)

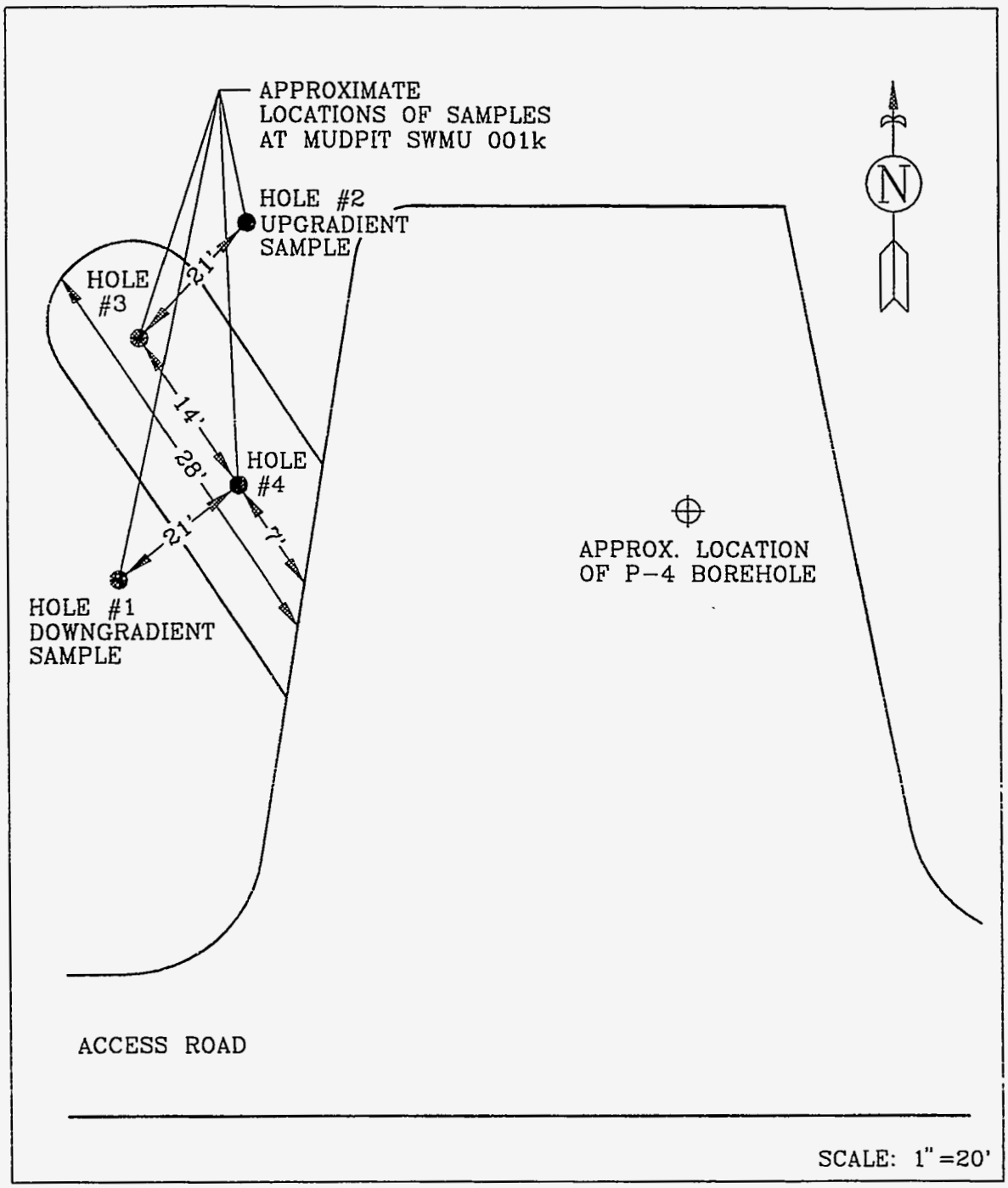


Table 8.1. Comparison of Total Metals Results to Action Levels
SWMU 001k, Mudpit P-4

Metal Analyte	Background Concentration (mg/kg) [1][2][7]	Maximum SWMU Concentration (mg/kg) [1][3][7]	Subpart S Level (mg/kg) [4]
12-24 inches bgs			
Total Arsenic (As)	0.6 J[8][9]	0.5 J[8][9]	20
Total Barium (Ba)	15 J[9]	13 J[9]	6000
Total Cadmium (Cd)	0.5 UJ[9]	0.5 J[9]	80
Total Chromium (Cr)	4 J[9]	4 J[9]	400
Total Lead (Pb)	1.4	1.2	400[5]
Total Mercury (Hg)	0.06	0.03 U	20
Total Thallium (Tl)	20.0 U	20.0 U	6[6]
60-72 inches bgs			
Total Arsenic (As)	0.7 J[8][9]	0.6 J[8][9]	20
Total Barium (Ba)	19 J[9]	14 J[9]	6000
Total Cadmium (Cd)	0.5 UJ[9]	0.5 UJ[9]	80
Total Chromium (Cr)	4 J[9]	3 J[9]	400
Total Lead (Pb)	1.4	1.3	400[5]
Total Mercury (Hg)	0.03 U	0.05	20
Total Thallium (Tl)	20.0 U	20.0 U	6[6]

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in upgradient Hole 2.
3) Maximum concentration measured in soil samples collected from within Mudpit P-4 (Holes 3 and 4).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value
8) The matrix spike (MS) recoveries were slightly below EPA control criteria of 75 percent.
9) The laboratory control spike (LCS) recoveries were slightly below EPA control criteria of 80 percent.

8.5 Proposed Corrective Actions at SWMU 001k

Detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001k. In addition, the concentrations of detected metals within SWMU 001k are generally consistent with measured metals background concentrations (Tables 1.3 and 8.1). The depth to Culebra formation groundwater below SWMU 001k is at least 775 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to non-existent.

The results of the voluntary release assessment indicate that no hazardous constituents exist in SWMU 001k above the action levels and that no release of hazardous constituents has occurred. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001k. Thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU 001k prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

9.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001h

9.1 Location of SWMU 001h

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001h and describes the proposed corrective actions at this location. SWMU 001h is located in the northeast quarter of the northeast quarter of the northeast quarter of Section 28, Township 22 South, Range 31 East. H-15 was drilled in 1986 to conduct a series of water quality evaluations and to develop a database of Culbera formation water levels. Boyles Brothers Drilling Company drilled the USGS P-2 borehole in September 1976 as part of a 21-well USGS resource evaluation program to investigate the potash resources in the Salado formation (*USGS, 1978*).

USGS drilling logs indicate that air foam was used for P-2. Saturated sodium and potassium chloride brine with starch and salt gel (attapulgite) were also used to complete the P-2 borehole. As with P-1 borehole, diesel fuel may have been added to inhibit dissolution of the Salado *(Stensrud et al, 1987)*. Saturated brine and "traced" freshwater are listed as drilling fluid constituents in the H-15 borehole data report. A 70 to 30 mixture of cement slurry and salt with 2 percent bentonitic gel was used for the plug. Meta-trifluorobenzoic acid (2 mg/l) was added to measure borehole and aquifer contamination of the Culebra from the drilling process. Approximately 1,336 gallons of traced drilling fluid were lost to the formation, representing about 75 percent of the drilling fluid used *(Stensrud et al, 1987)*.

SWMU 001h consists of the mudpits constructed for the drilling of the P-2 potash exploration well and the H-15 Culebra test well. The H-15 test well was drilled to a total depth of 1,895 feet. After setting 20 feet of 7-inch casing, a 5.875-inch rotary borehole was drilled to 1,038 feet below land surface. A 4.5-inch casing liner was installed and the hole was deepened to 1,500 feet using a 3.94-inch rotary drill bit. The hole was drilled to the final depth of 1,895 feet using a 3.94-inch core bit.

9.2 Geology and Hydrogeology in the Area of SWMU 001h

The USGS lithology logs identify the near-surface deposits at SWMU 001h as shallow, fine-to-medium grained Holocene soils and eolian sands that are about 10 feet thick. The Gatuna formation at SWMU 001h is approximately 20 feet thick (USGS, 1978). The Gatuna formation is a poorly sorted zone of sandstone and calcareous cement that overlays the Santa Rosa sandstone formation. The Santa Rosa sandstone formation at this site is approximately 126 feet thick and is composed of pale reddish-brown, medium-to-fine grained sandstones containing approximately 5 percent caliche. The Santa Rosa sandstone sits directly on top of the Dewey Lake formation. The Dewey Lake formation is approximately 526 feet thick in the P-2 borehole.

The RFA describes soil development at this location as poor, and the release potential for soils in the immediate vicinity of SWMU 001h as high. This observation suggests

that surficial units in this area may display greater permeability than other sites underlain by well-cemented caliche.

The groundwater migration potential at SWMU 001h is low relative to other locations on site. The Dewey Lake formation at this location is not water-bearing. The use of air foam during the drilling of the P-2 borehole greatly increased the driller's ability to detect the presence of shallow groundwater in the borehole. USGS drilling logs indicate that no water was encountered during drilling. Constituent migration to the Dewey Lake formation or to the Culebra Dolomite aquifer 860 feet below surface is not credible.

Once drilling of the P-2 borehole was completed, all casing was retrieved and the hole was cemented from the bottom of the hole to the surface. After drilling of the H-15 borehole was completed, all casing was removed and the hole was cemented to the surface and abandoned.

9.3 Sampling and Analysis Program

During sampling visits, the sampling team used information contained in the RFA to survey the location of the H-15 and P-2 mudpits. The H-15 mudpit is a rectangular mudpit approximately 18 feet wide and 55 feet long, located approximately 18 feet east of the H-15 well cap and in the northeast corner of the P-2 drill pad area.

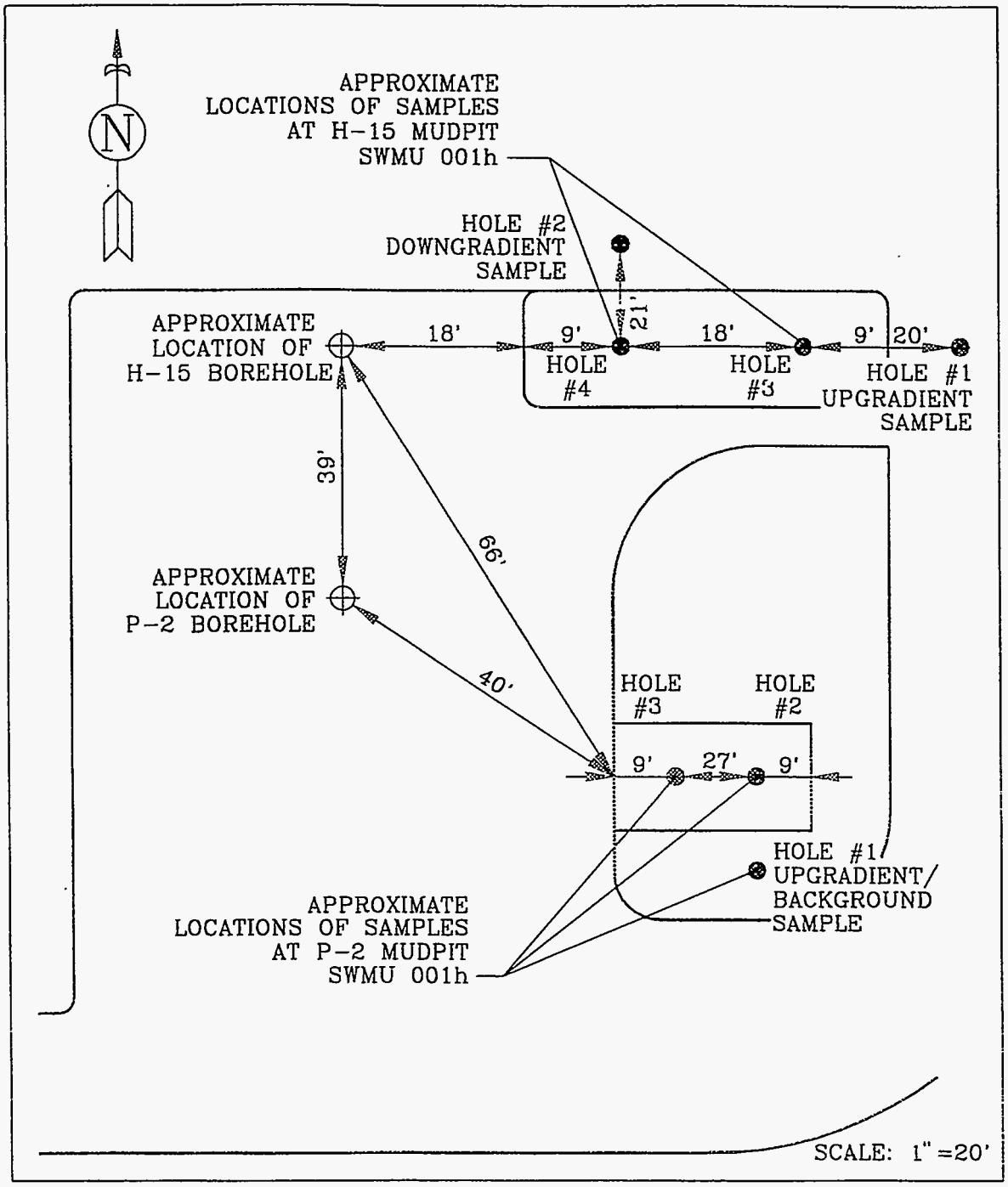
The P-2 mudpit is located approximately 40 feet southeast of the P-2 wellhead, on the eastern edge of the P-2 well pad. The P-2 mudpit is approximately 20 feet wide and 35 feet long. The P-2 well pad is unvegetated and covered with compacted caliche. No discolored soil or liner materials were identified during sampling activities.

During the summer 1995 sampling event at SWMU 001h, a total of 22 soil boring samples and four associated QA/QC samples were collected for TCLP analysis to assess the potential for release of hazardous constituents from SWMU 001h. Soil sampling locations at the SWMU were sampled again in summer 1996. During the summer 1996 sampling event, 22 soil boring samples and four associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001h mudpits.

The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001h site and historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to evaluate the maximum vertical extent of potential constituent migration. Figure 9.1 is a site map showing sample locations and measurements between sample locations at SWMU 001h.

FIGURE 9.1

SAMPLE LOCATION MAP FOR SWMU 001h (H-15 & P-2)



9.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 001h is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001h by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 1.4). The analytical results obtained for SWMU 001h also display no detections of target VOCs in either the totals or the TCLP analyses. The method reporting limits obtained by the program laboratory are well below the applicable action levels for VOCs (Table 1.4).

The total metals results for SWMU 001h are summarized in Table 9.1. For each sample depth, Table 9.1 presents the maximum total concentration measured within the SWMU for each metal, and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 9.1 demonstrate that total metals concentrations measured in SWMU 001h are generally consistent with background concentrations (Tables 1.3 and 9.1). All detected metals concentrations within SWMU 001h are well below the applicable proposed action levels.

DOE performed re-analyses of selected soil samples from SWMU 001h to increase the defensibility of the release assessment results. During the initial sampling event in summer 1995, the TCLP analytical concentration for lead was consistently reported at the established TCLP method reporting limit of 0.5 mg/l. Upon receipt of the initial analytical results, the contract laboratory was contacted and a randomly selected group of samples was re-analyzed for lead to achieve a lower detection limit. Analytical results for all of these re-analyzed samples showed TCLP concentrations of <0.05 mg/l for lead. This concentration is below the MCL for lead of 0.05 mg/l established in Appendix A of the proposed Subpart S rule. Selected samples from SWMU 001h were also re-analyzed for thallium. These re-analyses verified sample nondetections for thallium at a lower reporting limit of 0.2 mg/l.

9.5 Proposed Corrective Actions at SWMU 001h

Detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001h. In addition, the concentrations of detected metals within SWMU 001h are generally consistent with measured metals background concentrations (Tables 1.3 and 9.1). The depth to Culebra formation groundwater below SWMU 001h is at least 860 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to non-existent.

Table 9.1. Comparison of Total Metals Results to Action Levels, SWMU 001h

Metal Analyte	SWMU 001h, H-15 Background Concentration (mg/kg) [1][2][7]	SWMU 001h, H-15 Maximum SWMU Concentration (mg/kg) [1][3][7]	SWMU 001h, H-15 Subpart S Level (mg/kg) [4]	SWMU 001h, Mudpit P-2 Background Concentration (mg/kg) [1][2][7]	SWMU 001h, Mudpit P-2 Maximum SWMU Concentration (mg/kg) [1][3][7]	SWMU 001h, Mudpit P-2 Subpart S Level (mg/kg) [4]
12-24 inches bgs						
Total Arsenic (As)	0.9	1	20	0.8	1.3	20
Total Barium (Ba)	21	26	6000	19	69	6000
Total Cadmium (Cd)	0.5 U	0.5	80	0.5 U	0.5 U	80
Total Chromium (Cr)	4	5	400	6	5	400
Total Lead (Pb)	2.8 J[8]	2.2 J[8]	400 [5]	2.1	2.3	400 [5]
Total Mercury (Hg)	0.03 U	0.03 U	20	0.03 U	0.03 U	20
Total Thallium (Tl)	20 U	20 U	6 [6]	20 U	20 U	6 [6]
60-72 inches bgs						
Total Arsenic (As)	1.7	2.2	20	1.4	1.9	20
Total Barium (Ba)	33	140	6000	28	150	6000
Total Cadmium (Cd)	0.5 U	0.5 U	80	0.5 U	0.5 U	80
Total Chromium (Cr)	5	7	400	6	6	400
Total Lead (Pb)	2.9 J[8]	3.1 J[8]	400 [5]	2.6	6.5	400 [5]
Total Mercury (Hg)	0.03	0.03 U	20	0.03 U	0.03 U	20
Total Thallium (Tl)	20 U	20 U	6 [6]	20 U	20 U	6 [6]

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in upgradient holes (Hole 1) at the H-15 and P-2 Mudpits.
3) Maximum concentration measured in soil samples collected from within Mudpit H-15 (Holes 3 and 4) and Mudpit P-2 (Holes 2 and 3).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value
8) The laboratory control sample (LCS) recoveries were slightly below EPA control criteria of 80 percent.

The results of the voluntary release assessment indicates that no hazardous constituents exist in SWMU 001h above the action levels and that no release of hazardous constituents has occurred. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001h. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU 001h prior to the issuance of the RCRA Part B Permit for the WIPP. If a No Further Action is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

10.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001L

10.1 Location of SWMU 001L

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001L and describes the proposed corrective actions at this location. SWMU 001L is located in the southeast quarter of the southeast quarter of the southeast quarter of Section 17, Township 22 South, Range 31 East. SWMU 001L is made up of the mudpit complex developed for the drilling of the WIPP-12 exploration borehole and the mudpit constructed to support the drilling of the P-5 potash exploration borehole.

Pennsylvania Drilling Company drilled P-5 in 1976. Limited data is available for the P-5 drill site. It is reasonably assumed that similar drilling fluid mixtures were used at this site as are known to have been used at other potash evaluation boreholes. These drilling additives include: saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite); and diesel fuel to reduce salt dissolution.

WIPP-12 was drilled on the P-5 well pad in 1978 and deepened in 1981 and 1982 to investigate lithologic and stratigraphic details of the Salado and Castile formations. WIPP-12 was drilled to a total depth of 3,928 feet. The *WIPP-12 Borehole Data Report* and *Sandia National Laboratory Report (SAND88-7014)* indicate that several types of drilling fluids were used to drill WIPP-12. A salt-based drilling mud was used to a depth of 1,000 feet; a 10-pounds/gallon mix of starch, soda ash, and caustic soda (NaOH for pH control) was used between 1,000 and 2,773 feet; and a brine-salt gel (attapulgite) mixture was used to 3,927 feet. A sodium hydroxide-based weighing agent was added to control the flow from a pressurized brine encountered at 3,011 feet below the surface. In reference to WIPP-12 drilling fluid, DOE/WIPP 92-007 also suggests that an organic material (lignite) and a density-increasing material such as barite may have been used.

The WIPP-12/P-5 well pad is the largest mudpit complex at the WIPP site. Linear dark bands of soil and stressed or sparse vegetation delineate the mudpit location. During the sampling visit the sampling team reported that the mudpit areas were rough graded, exposing a mixture of surface sands and caliche material. The hummocky surface probably accounts for sparse vegetative growth in the area of the WIPP-12 mudpit complex. The area around the P-5 mudpit is made up of compacted caliche and there is essentially no vegetative growth on the P-5 drill pad.

Reports by *D'Appolonia Consulting Engineers (1982a)* indicate that 2.5 million gallons of brine outflow from the Castile were pumped to shallow "reserve pits." DOE/WIPP 92-007 states that the WIPP-12 reserve/mudpit pit complex was filled in 1987. The majority of this site is covered with crushed and compacted caliche.

10.2 Geology and Hydrogeology in the Area of SWMU 001L

The stratigraphic summary for borehole WIPP-12 is contained in the *Basic Data Report for Drillhole WIPP-12* (SAND82-2336). Lithologic data for the P-5 borehole is contained in the USGS open file report (USGS, 1978) Both reports identify the near-surface geology at SWMU 001h as approximately 13 to 16 feet of recent surface deposits (sands and soil). The Mescalero Caliche formation at this site ranges in thickness from 16 feet to 19 feet in depth. The Triassic Age Santa Rosa sandstone formation underlies the Gatuna formation at this site. Quaternary Aged Gatuna formation sandstones occur from 19 to 29 feet, and the Santa Rosa sandstone formation continues to approximately 167 feet in depth. The Dewey Lake formation in the WIPP-12 borehole extends from 167 feet below surface to approximately 640 feet in depth.

The RFA identifies the release potential to surface soils in the area of SWMU 001L as high, but further identifies the migration potential to groundwater at this location as low, relative to other locations on site. Drilling logs do not reference contact with water-bearing strata or the presence of moist cuttings while drilling through the Dewey Lake formation. Regional hydrogeologic studies indicate that the Dewey Lake formation is less likely to contain water as far north as the WIPP-12 well site. Migration of surface constituents to the Culebra Dolomite aquifer 804 feet below surface is not credible.

Once drilling of the P-5 borehole was completed in 1976, the entire length of the borehole was plugged with cement. The hole was abandoned in 1976, and 568 feet of 4.5-inch casing was abandoned in the hole from a depth from 435 to 1,003 feet below the surface.

The WIPP-12 was initially developed in 1978 as a water monitoring well. The well was drilled and reamed to a 12.25-inch diameter down to a depth of 1,003 feet. A 9.625-inch casing was set and the casing and annular space was cemented from 1,002 feet to the surface. The hole was then cored and reamed to a diameter of 7.875 inches to a total depth of 2,785 feet.

The *WIPP-12 Borehole Data Report* and *Sandia National Laboratory Hydrologic Data Report #5 (SAND87-7125)* describe, how in 1981, the WIPP-12 borehole was deepened to a depth of 3,927.5 feet to investigate the geology of the Castile formations. The borehole was deepened using a 7.875-inch rotary bit until a pressurized brine reservoir was encountered at a depth of 3,107 feet. The hole was then core drilled using a 6-inch diameter core bit to a depth of 3,927.5 feet.

In June 1983, the upper portion of the WIPP-12 borehole was isolated from the brine reservoir with the installation of a nonretrievable bridge plug. The borehole plug consists of a bridge plug set in the Castile formation from 3,000 to 3,005 feet. The bridge plug was then capped with 27 feet of sand. A 189-foot cement plug was then placed on top of the sand *(D'Appolonia, 1983)*. Once the bridge plug was in place, a 12.25-inch locking well cap was welded on the top of the casing, and the WIPP-12 borehole was converted to a Culebra formation water level monitoring well.

10.3 Sampling and Analysis Program

During the sampling visit to the SWMU 001L, the sampling team located and sampled both the P-5 mudpit and the large WIPP-12 mudpit complex. The P-5 mudpit is located approximately 45 feet south of the P-5 borehole. The P-5 mudpit is approximately 18 feet wide and 60 feet long.

The large WIPP-12 mudpit complex is made up of four individual mudpits located on the eastern site of the drill pad. This site is characterized by hummocky, dark bands of fill material that form the berms separating four distinct rectangular mudpits. The four mudpits run in a north/south direction and are approximately 330 by 75 feet, 360 by 40 feet, 360 by 36 feet, and 330 by 75 feet, respectively. Based on information contained in Hydrologic Data Summary Report #5, the DOE determined that the type of drilling fluids discharged into each of four of the WIPP-12 mudpits are similar in nature. Therefore, representative samples were collected from two of the four WIPP-12 mudpits.

During the summer 1995 sampling at SWMU 001L, a total of 20 soil boring samples and four associated QA/QC samples were collected for TCLP analysis to assess the potential for release of hazardous constituents from SWMU 001L. Soil sampling locations at the SWMU were sampled again in summer 1996. During the summer 1996 sampling, 20 soil boring samples and four associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001L mudpits.

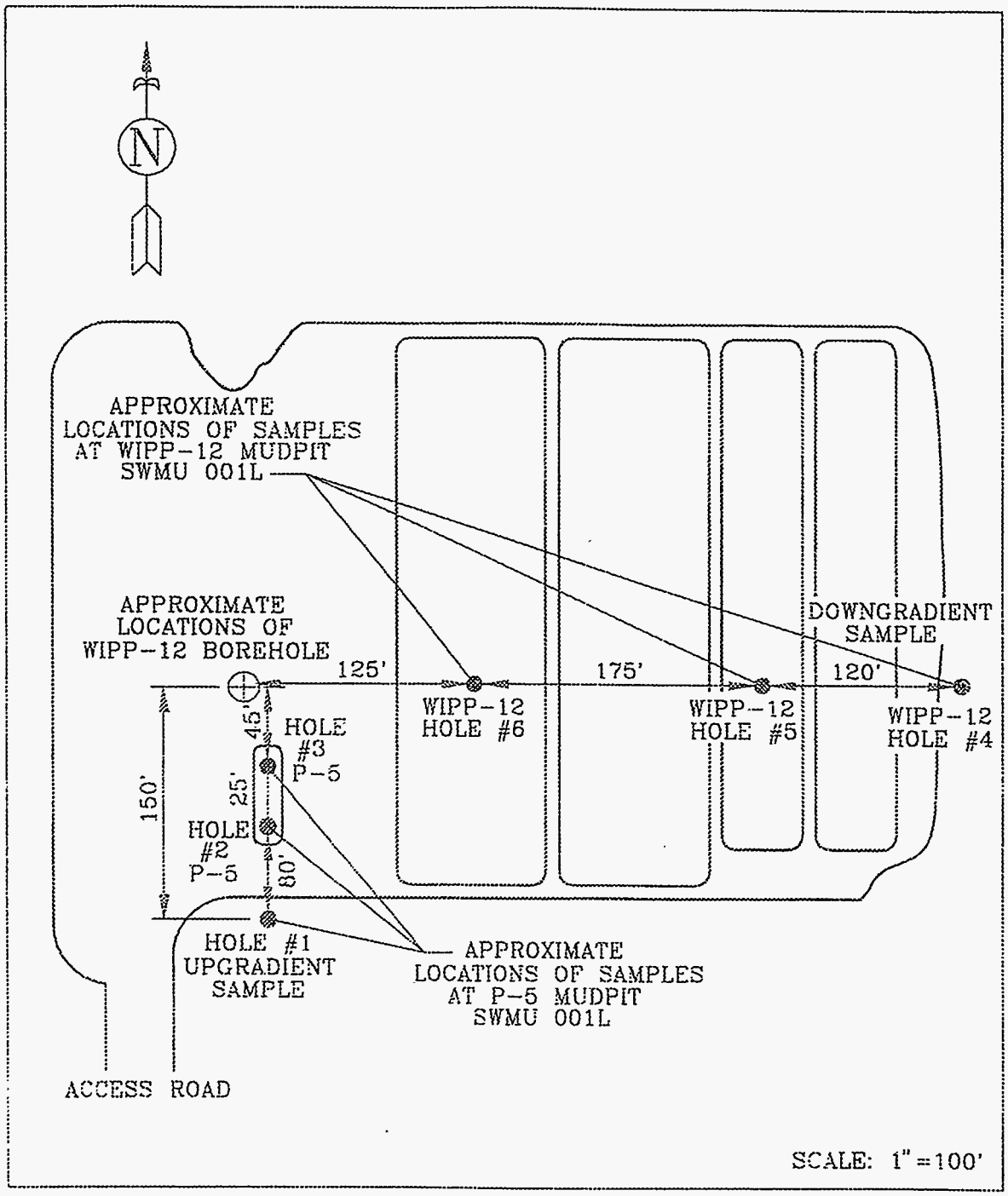
The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001L site and historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to evaluate the maximum vertical extent of potential constituent migration. Figure 10.1 is a site map showing sample locations and measurements between sample locations at SWMU 001L.

10.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 001L is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001L by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 1.4). The analytical results obtained for SWMU 001L also display no detections of target VOCs in either the totals or the TCLP analyses. The method reporting limits obtained by the program laboratory are well below the applicable action levels for VOCs (Table 1.4).

FIGURE 10.1

SAMPLE LOCATION MAP FOR SWMU 001L (WIPP-12 & P-5)



The total metals results for SWMU 001L are summarized in Table 10.1. For each sample depth, Table 10.1 presents the maximum total concentration measured within the SWMU for each metal, and compares this maximum value to the upgradient/background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 10.1 demonstrate that, with the exception of barium, total metals concentrations measured in SWMU 001L are generally consistent with background concentrations (Tables 1.3 and 10.1). All detected metals concentrations within SWMU 001L, including barium, are well below the applicable proposed action levels.

10.5 Proposed Corrective Actions at SWMU 001L

Detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001L. With the possible exception of barium, the concentrations of detected metals within SWMU 001L are generally consistent with measured metals background concentrations (Tables 1.3 and 10.1). The depth to Culebra formation groundwater below SWMU 001L is at least 804 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to non-existent.

The results of the voluntary release assessment indicate that no hazardous constituents, including barium, exist in SWMU 001L that are above the action levels. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001L. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU 001L prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

Table 10.1. Comparison of Total Metals Results to Action Levels, SWMU 001L

Metal Analyte	SWMU 001L, Mudpit P-5 Background Concentration (mg/kg) (1)(2)(7)	SWMU 001L, Mudpit P-5 Maximum SWMU Concentration (mg/kg) (1)(3)(7)	SWMU 001L, Mudpit P-5 Subpart S Level (mg/kg) (4)	SWMU 001L, WIPP-12 Background Concentration (mg/kg) (1)(2)(7)	SWMU 001L, WIPP-12 Maximum SWMU Concentration (mg/kg) (1)(3)(7)	SWMU 001L, WIPP-12 Subpart S Level (mg/kg) (4)
12-24 inches bgs						
Total Arsenic (As)	1.5 J(8)	2.3 J(8)	20	1.5 J(8)	1.3 J(8)	20
Total Barium (Ba)	120	490	6000	120	1700	6000
Total Cadmium (Cd)	0.5 UJ(8)	0.5 UJ(8)	80	0.5 UJ(8)	0.5 UJ(8)	80
Total Chromium (Cr)	3	7	400	3	6	400
Total Lead (Pb)	2.2 J(10)	4.2 J(10)	400 (5)	2.2 J(9)	2.2 J(9)	400 (5)
Total Mercury (Hg)	0.02 U	0.02 U	20	0.02 U	0.02 U	20
Total Thallium (Tl)	20 U	20 U	6(6)	20 U	20 U	6 (6)
60-72 inches bgs						
Total Arsenic (As)	0.9 J(8)	2.5 J(8)	20	0.9 J(8)	1.4 J(8)	20
Total Barium (Ba)	62	400	6000	62	860	6000
Total Cadmium (Cd)	0.5 UJ(8)	0.5 UJ(8)	80	0.5 UJ(8)	0.5 UJ(8)	80
Total Chromium (Cr)	4	6	400	4	5	40
Total Lead (Pb)	3.6 J(8)	5.1 J(8)	400 (5)	3.6 J(9)	1.8 J(9)	400 (5)
Total Mercury (Hg)	0.03	0.02 U	20	0.03	0.02 U	20
Total Thallium (Tl)	20 U	20 U	6 (6)	20 U	20 U	6 (6)

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in Hole 1 (Mudpit P-5).
3) Maximum concentration measured in soil samples collected from within Mudpit P-5 (Holes 2 and 3) and WIPP-12 (Holes 5 and 6).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value
8) The matrix spike (MS) recoveries were slightly below EPA control criteria of 75 percent.
9) The laboratory control spike (LCS) recoveries were slightly below EPA control criteria of 80 percent.
10) The MS recoveries were above EPA control criteria of 125%

11.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001s

11.1 Location of SWMU 001s

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 001s, and describes the proposed corrective actions at this location. SWMU 001s is located in the southeast quarter of the southeast quarter of the southeast quarter of Section 20, Township 22 South, Range 31 East. The abandoned mudpits from the drilling of the ERDA-9 borehole comprise the 001s SWMU site. The ERDA-9 was drilled in 1976 by Sonora Drilling Company and International Diamond Coring, Inc., to a total depth of 2,889 feet.

ERDA-9 was the first WIPP exploratory borehole to test salt beds for the proposed disposal of TRU wastes at what became the WIPP site. The WIPP Hydrologic Data Report #5 states that salt-based drilling fluids were used for the first 1,033 feet. The well was then deepened to 2,877 feet using an oil-emulsion drilling mud composed of diesel fuel, water, EZ MUD liquid emulsifier GELTONE viscofier, and calcium chloride. *Sandia Report SAND79-0270* indicates that an earthen emergency pit was constructed to support the closed-mud circulation system. This same report notes that a discolored rectangular zone was observed just to the north-northwest of the wellhead indicating that the emergency pit was used. The feature measured approximately 50 feet by 145 feet.

The ERDA-9 borehole was recompleted in October 1986, as a Culebra observation well. Recompletion work involved cutting the 7-inch casing in ERDA-9 at a depth of 980 feet with an explosive charge and removing the casing from the borehole. A 7-inch retrievable bridge plug was then installed inside the 10.75-inch casing at 760 feet from the top of the wellhead. The well was then flushed with approximately 13,200 gallons of fresh water, followed by 6,340 gallons of a 0.27 mg/l solution of MilChem-MD detergent-type degreaser (*Caufmann, et al. 1990*). A 1986 INTERA/Sandia National Laboratories memorandum documents that all detergent-laden rinse solutions were collected in surface fractionation tanks and transported to an off-site disposal facility.

The ERDA-9 mudpit area is transected by the south WIPP security fence. During the sampling, the team found no evidence of the ERDA-9 mudpit and used information contained in the WIPP RFA to survey the mudpit location. The rectangular discolored zone identified in 1982 aerial photographs is now partially covered by a railroad embankment and the compacted caliche used in the construction of the site. The drill pad where the ERDA-9 borehole and associated mudpit are located have been extensively graded and regraded.

11.2 Geology and Hydrogeology in the Area of SWMU 001s

The lithology logs contained in the Basic Data Report for Drillhole ERDA-9 *(SAND79-0270)* identify the near-surface deposits at the SWMU 001s as unconsolidated, light brown, very fine grained eolian sands. These recent surface deposits (sands) overlay the Mescalero Caliche formation and extend from the surface

to 10 feet in depth. The Mescalero Caliche is well consolidated at this site and extends from 22 to 27 feet. Although the sampling team did not encounter consolidated caliche during the sampling, excavation of an National Pollutant Discharge Elimination System (NPDES) storm water collection basin, approximately 120 feet south east of the mudpit area, confirmed the extent of the caliche zone at this site. During the excavation of the retention basin, tracked dozers equipped with rippers were needed to penetrate the caliche formation.

The Gatuna formation at SWMU 001s is approximately 27 feet thick. Lithology logs describe the Gatuna formation at this site as very-fine-to-fine grained, reddish-brown calcareous Pleistocene sandstone (SAND79-0270). The Gatuna formation in the ERDA-9 borehole extends to a depth of 57 feet below surface and overlays the Santa Rosa sandstone formation. The Santa Rosa formation is approximately 9 feet thick at this location. Underlying the Santa Rosa sandstone formation is the Dewey Lake formation. The Dewey Lake formation in the ERDA-9 borehole is approximately 487 feet thick.

The RFA describes the release potential to near-surface formations at SWMU 001s as high. However, the ERDA-9 Borehole Data Report describes 10 feet of sand and fill with 5 feet of chalky caliche underlain by Gatuna formation. Although surface sands are extremely permeable, excavation in the area indicates that the Mescalero Caliche formation at this site forms a good barrier to potential infiltration of constituents from the surface. Three minor spills of oil and diesel fuel created by the storage of earth moving equipment were discovered on a pad adjacent to the ERDA-9 drill pad during the excavation of the NPDES storm water retention basin. Examination and analysis of these spill sites during the excavation indicated that the caliche zone effectively stopped the vertical migration of spilled materials.

The migration potential to groundwater at this site is low relative to other WIPP locations. The Dewey Lake formation does not exhibit prodigious groundwater flow at this location, and migration of surface constituents to the Culebra Dolomite aquifer (approximately 880 feet below the surface) is not credible.

Once drilling of the ERDA-9 borehole was completed, the 10.75-inch casing was then perforated between 705 feet and 728 feet within the Culebra Dolomite formation. The ERDA-9 well has been used as a water level monitoring well since the October 1986 recompletion.

11.3 Sampling and Analysis Program

The long axis of the ERDA-9 mudpit runs parallel to the south WIPP security fence and the railroad spur. The area sampled is approximately 15 feet south of the railroad embankment and approximately 3 feet inside the south security fence. No plastic liners were observed during the sampling of the ERDA-9 mudpit.

During the summer 1995 sampling at SWMU 001s, a total of 12 soil boring samples and four associated QA/QC samples were collected for TCLP analysis to assess the

potential for release of hazardous constituents from the SWMU 001s mudpit. Soil sampling locations at the SWMU were sampled again in summer 1996. During the summer 1996 sampling event, 12 soil boring samples and two associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from the SWMU 001s mudpits.

During the summer 1995 sampling event, the joint NMED collected a split sample from every soil sample collected by DOE at SWMU 001s. The NMED archived the samples collected at SWMU 001s awaiting the results of DOE sampling. Because no anomalies were identified in the samples collected by the DOE, the NMED chose not to analyze the split samples collected at SWMU 001s.

The rationale for selecting sample depths at mudpits during the voluntary release assessment sampling was based on an evaluation of the SWMU 001s site and historical information contained in the RFA. Organic and metals samples collected in the mudpit area at the 12 to 24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60 to 72 inch depth were used to evaluate the maximum vertical extent of potential constituent migration. Figure 11.1 is a site map showing sample locations and measurements between sample locations at SWMU 001s.

11.4 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 001s is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 001s by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 1.4). The analytical results obtained for SWMU 001s also display no detections of target VOCs in either the totals or the TCLP analyses. The method reporting limits obtained by the program laboratory are well below the applicable action levels for VOCs (Table 1.4).

The total metals results for SWMU 001s are summarized in Table 11.1. For each sample depth, Table 11.1 presents the maximum total concentration measured within the SWMU for individual metal, and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. The data presented in Table 11.1 demonstrate that total metals concentrations measured in SWMU 001s are generally consistent with background concentrations (Tables 1.3 and 11.1). Detected metals concentrations are well below the applicable proposed action levels.

FIGURE 11.1

SAMPLE LOCATION MAP FOR SWMU 001s (ERDA-9)

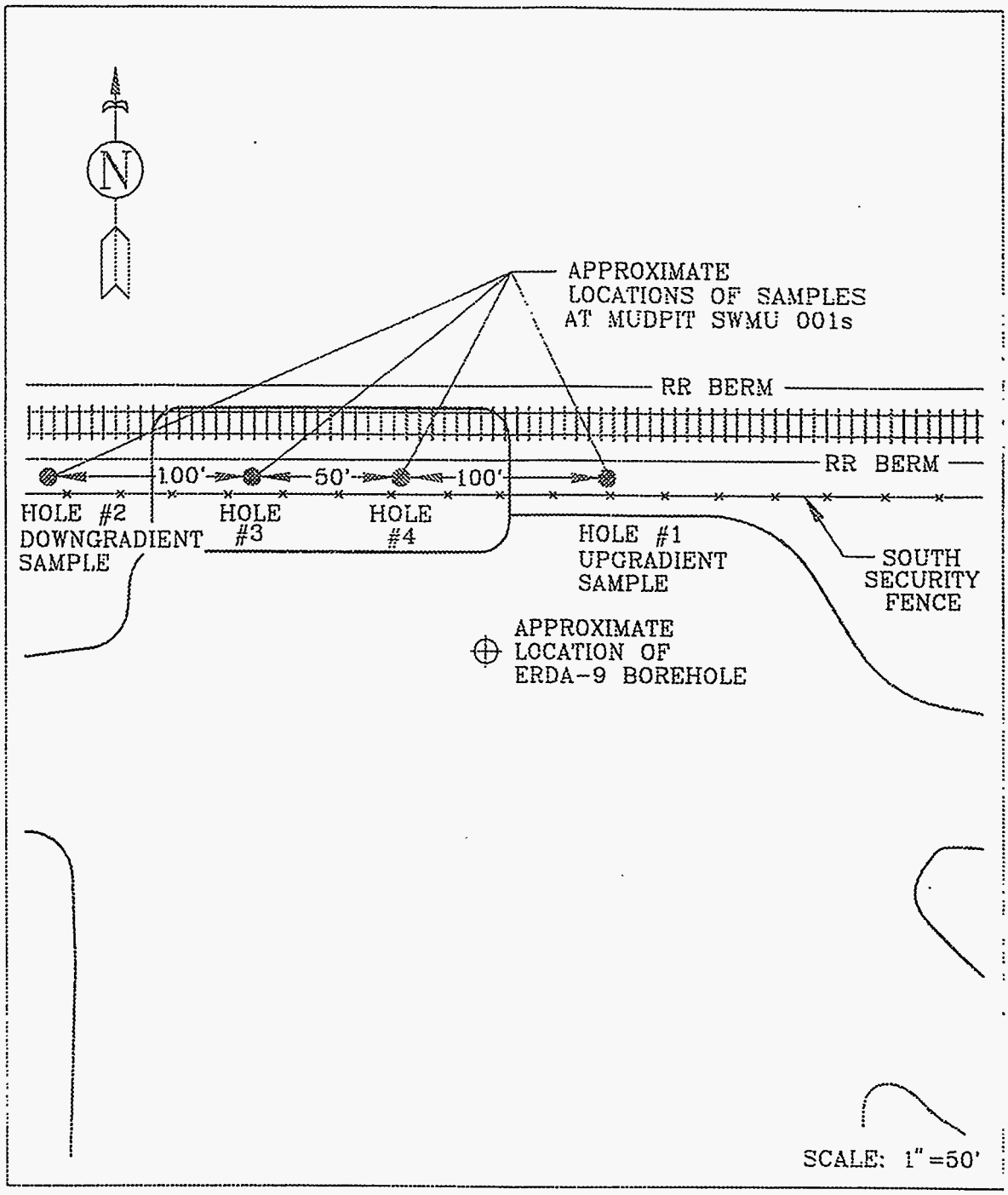


Table 11.1. Comparison of Total Metals Results to Action Levels SWMU 001s ERDA-9

Metal Analyte	Background Concentration (mg/kg) [1][2][7]	Maximum SWMU Concentration (mg/kg) [1][3][7]	Subpart S Level (mg/kg) [4]
12-24 inches bgs			
Total Arsenic (As)	1.4 J[8][9]	1.1 J[8]	20
Total Barium (Ba)	110 J[9]	71	6000
Total Cadmium (Cd)	0.5 UJ[9]	0.6 J[9]	80
Total Chromium (Cr)	4 J[9]	8	400
Total Lead (Pb)	1.9	2.1	400 [5]
Total Mercury (Hg)	0.03	0.03 U	20
Total Thallium (Tl)	20 U	20 U	6 [6]
60-72 inches bgs			
Total Arsenic (As)	0.5 J[8]	0.6 J[3]	20
Total Barium (Ba)	15 J[9]	19	6000
Total Cadmium (Cd)	0.5 U	0.5 U	80
Total Chromium (Cr)	4	3	400
Total Lead (Pb)	1.8	1.4	400 [5]
Total Mercury (Hg)	0.03 U	0.03 U	20
Total Thallium (Tl)	20 U	20 U	6 [6]

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in upgradient Hole 1.
3) Maximum concentration measured in soil samples collected from within ERDA-9 (Holes 3 and 4).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):
   - J Result should be considered an estimated value
   - U Analyte was not detected; value is the method reporting limit
   - UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value
8) The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were slightly below EPA control criteria of 75 percent.
9) The laboratory control spike (LCS) recoveries were slightly below EPA control criteria of 80 percent.

11.5 Proposed Corrective Actions at SWMU 001s

Detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 001s. In addition, the concentrations of detected metals within SWMU 001s are generally consistent with measured metals background concentrations (Tables 1.3 and 11.1). The depth to Culebra formation groundwater below SWMU 001s is at least 880 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to non-existent.

The results of the voluntary release assessment indicate that no hazardous constituents exist in SWMU 001s above the action levels and that no release of hazardous constituents has occurred. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 001s. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU 001s, prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

12.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 004a

12.1 Location of SWMU 004a

This section of the Final Voluntary RA/CA Report documents the results of release assessment sampling at SWMU 004a, the Portacamp Storage Area, and describes the proposed corrective actions at this location. The Portacamp Storage Area is an active materials storage area located in the east half of the northeast quarter of the northeast quarter of Section 29, Township 22 South, Range 31 East. The Portacamp Storage Area is primarily designed to store new parts and materials such as drums, pipe, and equipment. The portacamp is also used to store and manage used hydraulic oil, used motor oil, used antifreeze, and discontinued oils prior to recycling or disposal at off-site facilities.

The 300 by 300 foot storage complex is surrounded by a locked, eight-foot chain link fence. This complex is also divided into two separately managed areas divided by an eight-foot, chain link fence. The west side of the portacamp area is managed by WID, and the east side is managed by Sandia National Laboratories (SNL). Access to each area is limited to WID and SNL materials control personnel, and the area is regularly patrolled by WIPP security.

The west side of the WID portacamp area contains a 100-foot long by 20-foot wide by 14-foot high open-sided metal shed located in the southwest corner of the compound. Stored beneath this shed are new hazardous waste handling containers; operational and maintenance equipment; an electric transformer substation; and used oils and lubricants. Beginning in 1995, all used oils scheduled for recycling at an off-site facility were stored on spill control pallets under this metal shelter.

The southern half of the WID portacamp area is used to store construction and maintenance materials such as steel stock, pipe, fencing materials, and mining timbers. The north central area was historically used as a holding area for nonhazardous waste waters and non-RCRA regulated oils awaiting appropriate disposal or reclamation. Labeled nonhazardous waste drums were historically stored on wooden pallets, which sat directly on the caliche pad. The site inspection revealed four small areas of surface discoloration on the caliche pad in and around the empty nonhazardous waste drum storage area. Digging in the area of the stained soil indicates that soil discoloration is confined to the top 6 to 8 inches of caliche, and the largest stain is approximately 3 feet in diameter.

The SNL portacamp area contains water well drilling materials and supplies, office equipment, air conditioning and mobile compressors, electric cable, and other construction and maintenance supplies used to support SNL's activities. Concrete and grout materials are stored on pallets on the south end of the SNL portacamp. Adjacent to the gate at the north end are a series of buildings that contain various electrical equipment and supplies, as well as laboratory equipment. One potential issue observed by NMED personnel during the RFA site inspection was a Styrofoam box containing a gallon of concentrated nitric acid and 3 quarts of concentrated

hydrochloric acid. The containers were in the original, unopened shipping boxes. There was no indication of leakage, and both containers of acid were safely removed and transported to an off-site disposal facility. There is no visual evidence of a release in or around the buildings or on the caliche pad.

12.2 Waste Management at the Portacamp Area

Equipment and nonhazardous and hazardous materials and wastes have been managed in the portacamp area since 1976. Although the RFA states that RCRA waste management did not begin at the WIPP until the *RCRA Compliance Manual*, DOE/WIPP WP02-6/7, was issued in 1991, the WIPP actually began formalized management of hazardous materials and hazardous wastes in 1988. This program was established with the issuance of the *WIPP Non-Radioactive Hazardous Waste Management*, DOE/WIPP WP02-601. In 1991, RCRA compliance procedures and plans were formalized into the WIPP *RCRA Compliance Manual.* WIPP spill response activities were proceduralized in 1988, with the issuance of the *WIPP Environmental Incident Reporting*, DOE/WIPP WP02-506. These two procedures provided specific guidance for the management of hazardous wastes generated at the WIPP, as well as the identifying spill response and spill remediation requirements at the site.

Beginning in 1991, all RCRA regulated materials were managed in the WIPP Hazardous Waste Storage Area (Building 474-B). Used oil that contains one or more hazardous constituents is managed at the Hazardous Waste Staging Area located in Building 474-B.

12.3 Geology and Hydrogeology in the Area of SWMU 004a

No drilling or geologic characterization studies have been completed in the immediate area of the portacamp storage area. However, a significant number of geologic and hydrogeologic assessments have been completed in the WIPP repository area. The portacamp storage area is located approximately 800 feet south of the ERDA-9 borehole and the south security fence. Because of the proximity of the portacamp area to ERDA-9 borehole, Section 11.2 of this report contains a geologic and hydrogeologic summary that is applicable to the portacamp storage area.

12.4 Sampling and Analysis Program

During the summer 1995 sampling event at SWMU 004a, a total of 26 soil boring samples and six associated QA/QC samples were collected for TCLP analysis to assess the potential for release of hazardous constituents from the SWMU. Soil sampling locations at the SWMU were sampled again in summer 1996. During the summer 1996 sampling event, 26 soil boring samples and two associated QA/QC samples were collected for total constituent analysis to further characterize the vertical and horizontal extent of any potential release of hazardous constituents from SWMU 004a.

Figure 12.1 is a site map showing sample locations and measurements between sample locations at SWMU 004a. Samples were collected in the WID portacamp area as well as in the SNL portacamp area. Sampling at the WID portacamp and SNL portacamp areas focused on both current and historic waste and material storage areas. Sampling in the SNL portacamp area also focused on the area where drilling additives are stored.

Grab samples were collected from the top 48 inches of the compacted caliche surface. Samples were collected from the 12 to 24 inch depth to characterize the area of maximum potential contamination at Portacamp Area. The samples collected from a 36 to 48-inch depth were designed to characterize the vertical extent of any potential release onto the compacted caliche storage pad. As described in the *Release Assessment Work Plan*, additional samples would be collected if stained soils were visible at the 48-inch sampling depth. During the portacamp area sampling visit, no stained or discolored soils were encountered.

12.5 Comparison of Analytical Results to Background and Applicable EPA Action Levels

A complete table of validated analytical results for the soil samples collected from SWMU 004a is included in Appendix B. The table shows that concentrations of some target metal analytes were detected at SWMU 004a by total metals analyses. However, TCLP analysis results indicated that none of these detected metals were leachable from the SWMU soil above applicable TCLP action levels presented in *40 CFR § 261* (see Table 4.1). The analytical results obtained for SWMU 004a also display no detections of target organics in the TCLP analyses, and only one target organic analyte, methanol, was detected in the totals analyses. The maximum detection of methanol, 200 mg/kg, is well below the EPA Region III Industrial Risk-Based Concentration of 1,000,000 mg/kg (Table 1.4).

The total metals results for SWMU 004a are summarized in Table 12.1. For each sample depth, Table 12.1 presents the maximum total concentration measured within the SWMU for each metal, and compares this maximum value to the background concentration measured near the SWMU and to the applicable Subpart S action level from Table 1.4. With the possible exceptions of chromium and nickel, the data presented in Table 12.1 demonstrate that total metals concentrations measured in SWMU 004a are generally consistent with background concentrations (Tables 1.3 and 12.1). Detected total metals concentrations within the SWMU are well below available proposed action levels.

12.6 Proposed Corrective Actions at SWMU 004a

Detected concentrations of metals in the source and release areas are all below Subpart S risk-based action levels at SWMU 004a. With the possible exceptions of chromium and nickel, the concentrations of detected metals within SWMU 004a are generally consistent with measured metals background concentrations (Tables 1.3 and 12.1). The depth to Culebra formation groundwater near SWMU 004a is at least

FIGURE 12.1

SAMPLE LOCATION MAP FOR SWMU 004a (PORTACAMP STORAGE AREA)

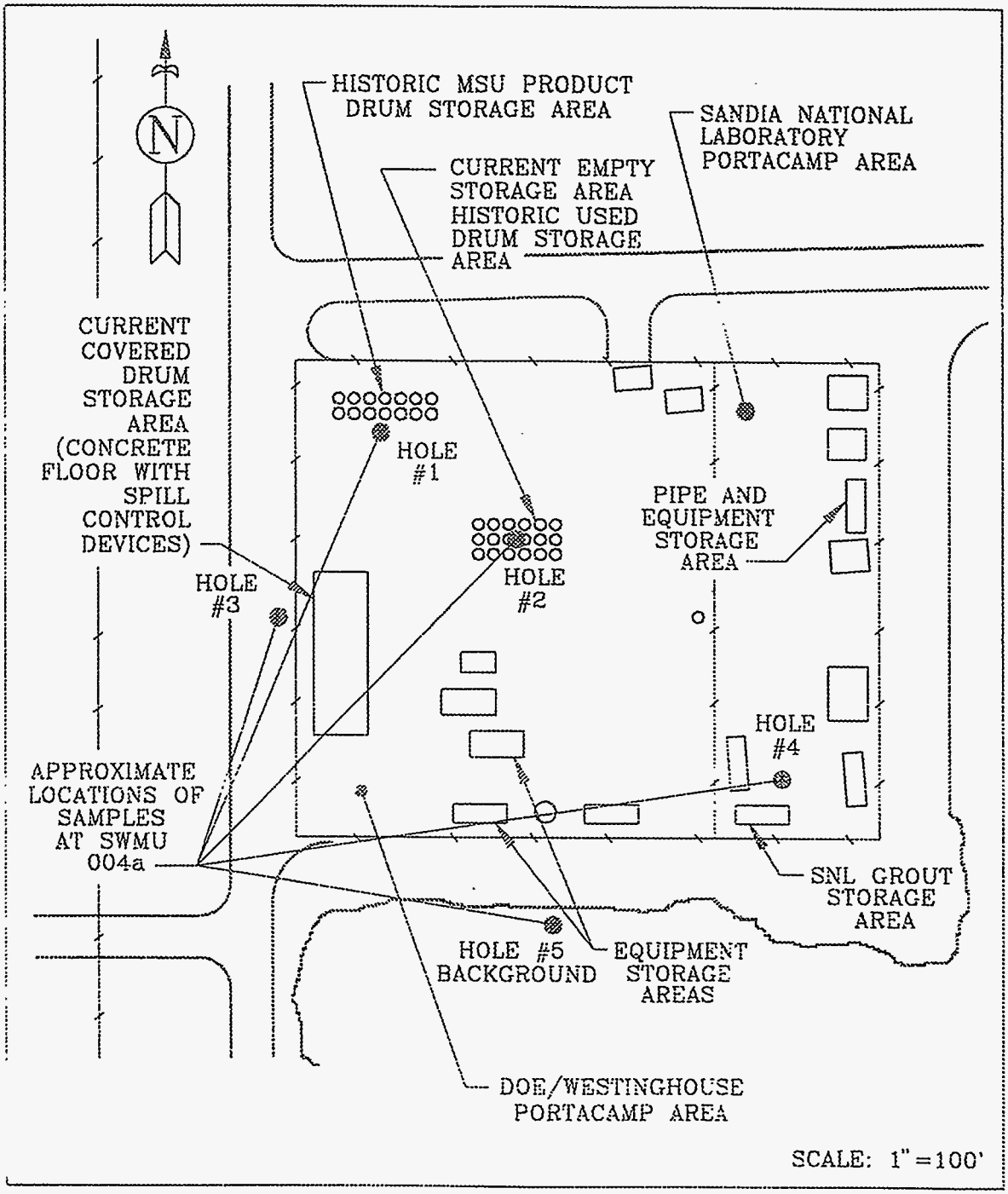


Table 12.1. Comparison of Total Metals Results to Action Levels SWMU 004a, Portacamp

Metal Analyte	Background Concentration (mg/kg) [1][2][7]	Maximum SWMU Concentration (mg/kg) [1][3][7]	Subpart S Level (mg/kg) [4]
12-24 inches bgs			
Total Arsenic (As)	0.7 J [8]	0.7 J [8]	20
Total Barium (Ba)	14	59	6000
Total Cadmium (Cd)	0.5 U	0.5 U	80
Total Chromium (Cr)	2	140	400
Total Lead (Pb)	1.4	4.2	400 [5]
Total Mercury (Hg)	0.03 U	0.03 U	20
Total Nickel (Ni)	2 U	66	2000
Total Selenium (Se)	0.4 U	0.5 U	400
Total Silver (Ag)	1 U	1 U	200
Total Thallium (Tl)	30	20 U	6 [6]
36-48 inches bgs			
Total Arsenic (As)	0.7 J [8]	1.1 J [8]	20
Total Barium (Ba)	14	43	6000
Total Cadmium (Cd)	0.5 U	0.5 U	80
Total Chromium (Cr)	4	120	400
Total Lead (Pb)	1.5	4.8	400 [5]
Total Mercury (Hg)	0.03 U	0.03 U	20
Total Nickel (Ni)	2 U	54	2000
Total Selenium (Se)	0.4 U	0.4 U	400
Total Silver (Ag)	1 U	1 U	200
Total Thallium (Tl)	20 U	20 U	6 [6]

mg/kg Milligrams per kilogram
bgs Below ground surface

1) Results are presented in mg/kg, wet weight.
2) Background upgradient soil concentrations as measured in Hole 5.
3) Maximum concentration measured in soil samples collected from within the Portacamp (Holes 1, 2, 3, and 4).
4) Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol.55, No. 145, IV A Systemic Toxicants, p. 30871.
5) No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
6) Thallium as thallium chloride.
7) The following data qualifiers are used as defined in the US EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):

   J Result should be considered an estimated value
   U Analyte was not detected; value is the method reporting limit
   UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value

8) The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were slightly below EPA control criteria of 75 percent.

880 feet, and it is estimated that less than 0.5 inches of precipitation per year infiltrates the underlying strata. The potential for these metals to migrate to groundwater is extremely low. Furthermore, because the land has been withdrawn from public use and the potential for intrusive activities is low, the potential exposure of human receptors to metals in the SWMU is minimal to nonexistent.

The results of the voluntary release assessment indicate that no hazardous constituents, including chromium and nickel, exist in SWMU 004a above the action levels. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from this SWMU that pose a threat to human health or the environment. Consequently, no additional RFI assessments or further actions are required for SWMU 004a.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that a No Further Action determination be granted for SWMU 004a prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*.

13.0 REQUEST FOR A DETERMINATION OF NO FURTHER ACTION AT SWMUs 003a AND 003b

13.1 Request for Additional Information on SWMUs 003a and 003b

At a meeting held on August 8, 1995, the DOE provided copies of the *Voluntary Release Assessment/Corrective Action Work Plan for Solid Waste Management Units Located at the Waste Isolation Pilot Plant (WIPP), DOE/WIPP Draft 2115*, to the EPA. The NMED participated in the August 8, 1995, meeting by teleconference to discuss the release assessment work plan. Copies of the *Release Assessment Work Plan* were provided to the NMED at a meeting held in Santa Fe, New Mexico, on September 1, 1995. In Chapter 10.0 of the *Release Assessment Work Plan*, the DOE requested a formal determination that No Further Action was required at these sites. This request was based on information presented in the work plan to document that the Brinderson and Construction Landfills had been permitted and closed in accordance with the requirements of the BLM operating permits and that No Further Action was required at these sites.

On December 19, 1995, the EPA submitted a letter providing formal comments on the *Release Assessment Work Plan.* On pages 3 and 4 of this letter, the EPA requested additional information such as interviews, historical records, site inspections, site surveys, operating logs, and possibly assessment sampling to support a request for No Further Action at these site. The EPA also requested that the DOE demonstrate that no hazardous waste or hazardous constituents were placed in the Brinderson Landfill prior to the facility being permitted by the BLM. Additionally, the EPA stated that the NMED was working to develop a guidance document for making No Further Action determinations.

This section of the Final Release Assessment/Corrective Action Report will provide a brief history of the permitting activities associated with each site, and provide additional information to support the DOE's request for a No Further Action determination at these sites.

13.2 SWMU 003a (Brinderson Landfill)

On January 14, 1985, the BLM approved a Land Use Permit Application submitted by the DOE-Albuquerque Office to convert an existing caliche pit into a landfill. The Brinderson Landfill is located at the intersection of the northeast quarter of the northeast quarter of Section 32 and the northwest quarter of the northwest quarter of Section 33, Township 22 South, Range 31 East.

The Brinderson Landfill was used to accumulate and dispose of construction debris such as concrete and scrap lumber. The Brinderson Landfill received monthly inspections by BLM hazardous material specialists to ensure that the landfill area was managed, and eventually closed, in accordance with permit conditions. The Brinderson

Landfill was officially closed on August 15, 1989, after final inspection and approval by BLM hazardous material and realty specialists.

13.3 SWMU 003b (Construction Landfill)

On February 9, 1987, the BLM approved a Land Use Permit Application NM-067-LUP-237 to construct a new landfill for the disposal of construction debris at the WIPP. The Construction Landfill was built because the Brinderson Landfill was scheduled to be closed. The WIPP Construction Landfill is located at the north half of the northeast quarter of Section 29, Township 22 South, Range 31 East.

The Construction Landfill historically was made of two pit areas. Both pits were designed to accumulate and dispose of construction debris such as concrete and scrap lumber. The primary pit was closed and reclaimed in accordance with the permit requirements on February 15, 1990. The smaller secondary pit on the northwest side of the landfill area remains operational and is managed in accordance with WID procedure, *Construction Landfill Operations Procedure*, WP06-108. This procedure provides administrative controls to limit the disposal of materials at the Construction Landfill to construction debris.

The facility was inspected on a monthly basis during operations by BLM hazardous material and realty personnel to ensure that materials disposed of met the criteria of the permit (e.g., construction debris only).

13.4 Justification for a Determination that No Further Action is Required at SWMUs 003a and 003b

This section of the Final Voluntary RA/CA Report discusses the DOE's rational for requesting a formal determination that No Further Action is required for both the Brinderson Landfill (SWMU 003a) and WIPP Construction Site Landfill (SWMU 003b). This request is based on information collected during voluntary release assessment activities as well as a summary of information not originally provided in the WIPP RFA.

After submittal of the *Release Assessment Work Plan* to the EPA and NMED, the DOE initiated a review of both DOE, BLM, and NMED landfill management records. The DOE also conducted interviews with both BLM and NMED personnel responsible for inspecting the Brinderson and WIPP Construction Landfills. The information gathered demonstrates that no hazardous wastes or hazardous constituents were disposed of in the landfills and therefore supported the original request of No Further Action.

As described in Chapter 10 of *Voluntary Release Assessment/Corrective Action Work Plan*, the RFA does not disclose that both landfills were managed by the DOE in accordance with specific BLM permit conditions. The RFA does not describe the administrative controls such as limitations on the type of materials that could be disposed at the facility, and/or monthly inspections and reclamation/closure requirements established in the land use permits.

In the preamble of the proposed Subpart S regulations, the EPA recognizes that releases or potential releases from SWMUs may be regulated under other permitting authority. As described in Section VI(B)(2) of proposed 40 CFR Part 264.501, "... EPA does not intend to utilize section 3004(u) corrective action authority to supervise or routinely re-evaluate such permitted releases." This section goes on to state, "However, in the course of investigating RCRA facilities for corrective action purposes, EPA may find situations where permitted releases from SWMUs have created threats to human health and the environment."

On December 7, 1995, the DOE conducted a meeting with Mr. J. R. Goodbar, the BLM realty specialist responsible for the development of the Brinderson and WIPP Construction Landfill permits and the primary person responsible for completing quarterly inspections of both sites. Three primary questions arose: (1) Were you aware of any debris, trash, or wastes in the caliche pit that was to be permitted as the Brinderson Landfill? (2) During your inspections, did you ever witness any disposal of materials not allowed under the provisions of the permits for the WIPP Construction or Brinderson Landfills? (3) Are you aware of any dumping of materials by persons not associated with WIPP operations in either of these landfill sites?

In the interview, Mr. Goodbar informed the DOE that no additional permit or inspection records beyond those provided to the DOE in May 1995 had been located. These records were provided in Appendix 2 and Appendix 3 of the *Voluntary Release Assessment/Corrective Action Work Plan*. Mr. Goodbar went on to state that prior to the drafting the Land Use Permits for the Brinderson Landfill, BLM personnel inspected the site. The results of this inspection showed that two abandoned car bodies were located in the BLM's caliche pit. He went on to state a provision of the WIPP Brinderson Landfill permit required that both car bodies be buried in a trench in the caliche pit, prior to the disposal of any construction debris at the site. Mr. Goodbar stated that there was no other evidence of disposal by non-WIPP personnel. During his numerous inspections, Mr. Goodbar stated that there was no evidence of the disposal of any materials disallowed under the Land Use Permit (e.g., construction debris).

On December 8, 1995, Mr. Goodbar submitted a letter to the DOE discussing his role as permit inspector and documenting that during his inspections he witnessed that only construction debris was disposed in the Brinderson and WIPP Construction Landfills (see Appendix D).

In early December 1995, the DOE contacted Mr. J. R. Smith, an environmentalist with the NMED in the Carlsbad Office, to request copies of records associated with inspections or permits for the WIPP Brinderson and WIPP Construction Landfills. On December 7, 1995, Mr. Smith was telephoned to ascertain if he had located any inspection records. The DOE was informed that files in both the Carlsbad and Roswell offices were reviewed, and no inspection records were located. Mr. Smith was then asked similar questions to those posed to Mr. Goodbar about his role in supporting the BLM with inspections of the Brinderson and WIPP Construction Landfill.

Mr. Smith explained that he had participated in a few inspections with Mr. Goodbar of the BLM. He stated that the NMED went on these inspections to review BLM operations and clarified that he was transferred to a different position with the NMED, so he did not participate in very many inspections. He also stated that the BLM had regulatory authority over this type of landfill operation and did not identify any problems during his inspections of either site. In closing, Mr. Smith suggested that the DOE contact Mr. Goodbar for additional information about these sites (the telephone log of this conversation is in Appendix D).

Information described in the permits and operating logs for both the Brinderson and WIPP Construction Landfills document that any potential releases from these facilities were managed under the provisions of the individual BLM permit. As described in the interviews with agency personnel, BLM administrative controls, such as monthly inspections and closure documentation, demonstrate that no potential threat to human health or the environment exists.

Permit closure documentation for both landfills indicates that, at the time of closure, the landfills were on BLM-managed property and were closed in accordance with BLM permit requirements. This position is further supported by the fact that the BLM hazardous materials specialist inspected both facilities on a monthly basis and verified that only materials allowed under the BLM Land Use Permits were disposed in these landfills. Any potential release from these SWMUs does not present a threat to human health and the environment. The DOE assumed operation and management of the remaining pit when the Land Use Permit expired on February 9, 1990. No additional permits were required to continue operation of the Construction Landfill because the facility is exempted from permitting requirements under Section 108 of the *New Mexico Solid Waste Management Regulations (EIB/SWMR-4)*.

13.5 DOE Management of the Brinderson and Construction Landfills

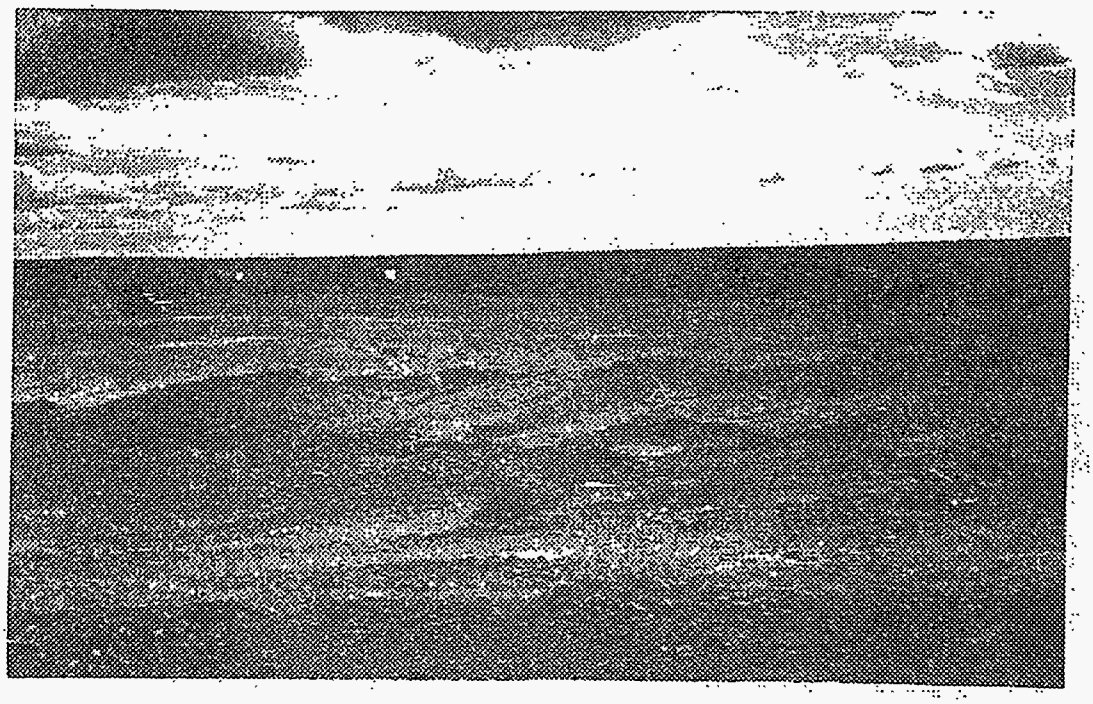
DOE records regarding the management of the Construction Landfill area date back to February 1988. As discussed in the *Release Assessment Work Plan*, the DOE has operated the Construction Landfill in accordance with WIPP Procedure WP06-108, *Construction Landfill Operation*. Photographs showing the active Construction Landfill are provided in Figure 13.1. Photographs showing the reclamation of the closed portion of the Construction Landfill are provided in Figure 13.2. The operation of the WIPP Construction Landfill is the responsibility of the WID Hazardous Waste Management Section. The Construction Landfill operations procedure requires that any generator of construction debris submit, and have approved, a Construction Debris Disposal Form. This form requires that the waste generator document the type and volume of debris destined for the landfill. WID hazardous waste management personnel then review the disposal request form, inspect the debris material, sign, and maintain all disposal records. Hazardous waste operations personnel also conduct periodic inspections of the landfill area. Similarly, the WIPP Environmental Compliance and Support section conducts audits and inspections of the facility and associated disposal files. Additionally, berms and erosion protection at the facility are inspected on a quarterly basis as part of WIPP NPDES storm water permit compliance

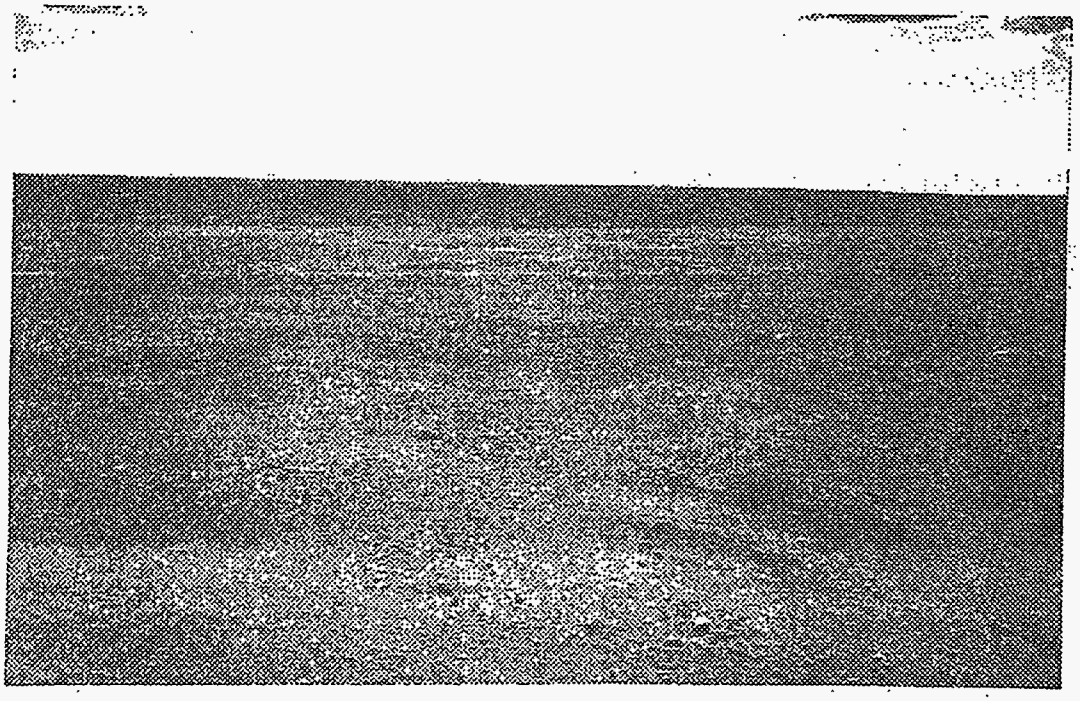
FIGURE 13.1

PHOTOGRAPHS OF THE ACTIVE CONSTRUCTION LANDFILL

FIGURE 13.2

PHOTOGRAPHS OF THE CLOSED AND RECLAIMED PORTION OF THE CONSTRUCTION LANDFILL





requirements. Copies of the Construction Debris Disposal Request Forms generated at the facility since February 1988 are contained in Appendix E.

13.6 Proposed Corrective Actions at SWMUs 003a and 003b

Based on the new information provided in this Final Voluntary RA/CA Report and historical information contained in the *Release Assessment Corrective Action Work Plan*, the DOE requests a Determination of No Further Action be issued for both the Brinderson Landfill (SWMU 003a) and WIPP Construction Landfill (SWMU 003b). Because it is the EPA's intent to encourage voluntary corrective actions, the DOE requests that a No Further Action determination be issued prior to the issuance of the RCRA Part B Permit. If this determination is supported by both the EPA and NMED, the closed portion of the Construction Landfill site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan*, DOE/WIPP 93-004, January 1996.

This request is supported by several statements made in the proposed Subpart S regulations. In the preamble of the proposed Subpart S regulations, where the EPA recognizes that releases or potential releases from SWMUs may be regulated under other permitting authority. As described in Section VI(B)(2) of proposed 40 CFR Part 264.501, "... EPA does not intend to utilize Section 3004(u) corrective action authority to supervise or routinely re-evaluate such permitted releases." Additionally, although proposed 40 CFR Part 264.514, "Determination of No Further Action," normally applies to releases from permitted facilities where remedial investigations have shown that releases are nonexistent or do not pose a threat to human health or the environment, the situation at the WIPP is slightly different. The WIPP RFA did not address the status of permits and administrative controls that existed to manage the Brinderson and Construction Landfills. These permits and administrative controls document that there have been no releases of regulated constituents from these units.

14.0 IDENTIFICATION OF CORRECTIVE ACTIONS AT SWMUs 001o, 001p AND 001q

14.1 Response to EPA Request for Additional Information

In the *Work Plan*, DOE identified three SWMUs that would not be sampled during the voluntary RA/CA program. They are:

- Badger Unit Drill Pad (SWMU 001o)
- Cotton Baby Drill Pad (SWMU 001p)
- DOE-1 Drill Pad (SWMU 001q)

Based on data collected during the RFA, DOE concluded that sufficient data existed for these three SWMUs to define the potential for release of site constituents. Data from the RFA indicate that there is minimal risk associated with these sites. DOE also concluded that the costs for further release sampling were comparable to the costs associated with the proposed corrective action. The most cost-effective actions for these sites are the proposed barriers. For these reasons, DOE proposed to implement corrective actions for these three SWMUs, rather than including them in the voluntary RA/CA program. The corrective action proposed for each site will assure no migration of site constituents.

Section VI (3) of the proposed Subpart S rule provides guidance for completing voluntary corrective actions. Section VI (3) states that "...an owner/operator may take a wide range of remedial type activities at RCRA-permitted facilities without triggering the need for formal approval by the Agency or modification of the permit. Such activities include, for example, treatment, storage, or disposal of any nonhazardous solid wastes; excavation of hazardous wastes for disposal off-site; less-than-90 day storage or treatment of hazardous wastes in tanks; and treatment of contaminated groundwater in an exempt waste water treatment unit."

On December 19, 1995, the EPA submitted a letter providing formal comments on the *Work Plan*. On pages 3 and 4 of this letter, the EPA requested additional information regarding the implementation of corrective actions at SWMUs 001o, 001p, and 001q to demonstrate that there will be no migration of hazardous constituents from these units after corrective action and closure at levels that could present a hazard to human health and the environment. The EPA also requested that the DOE elaborate on the following remedy selection factors applicable to each site: long-term reliability and effectiveness; reduction of toxicity, mobility, or volume; short-term effectiveness, implementability; and cost.

In response to EPA's letter to DOE of December 19, 1995, this section of the Final Release Assessment/Corrective Action Report provides a summary of data collected at SWMUs 001o, 001p, and 001q, and additional information to demonstrate the effectiveness and appropriateness of the remedy proposed for these sites.

14.2 Summary of Existing Data

Site descriptions for SWMUs 001o, 001p, and 001q are presented in the *Work Plan* and additional information is presented in the RFA. SWMUs 001o and 001p are both mudpits associated with wildcat petroleum exploration wells drilled in the 1970s. SWMU 001q is another mudpit that is associated with an exploratory boring drilled in 1982 to collect stratigraphic, structural, and hydrogeologic data for the WIPP site.

Soil boring samples were collected from all three SWMUs in sampling events associated with the RFA. Figures 14.1, 14.2, and 14.3 depict mudpit dimensions and the RFA sampling locations for SWMUs 001o, 001p, and 001q, respectively. At each location, NMED drilled a borehole and collected soil samples for analysis from within and below the mudpit. For confirmation purposes, DOE drilled a second, co-located borehole at each location and collected analytical samples from the same horizons.

The total metals results from the RFA sampling events are summarized for SWMUs 001o, 001p, and 001q in Table 14.1. For each sample depth, Table 14.1 presents the maximum total concentration measured within each SWMU for each metal, and compares this maximum value to the range of WIPP background metals concentrations measured during the voluntary release assessment sampling (Table 1.3). A total of 14 background or upgradient samples were collected at the SWMUs included in the voluntary RA/CA. The pooled analysis results for these background samples presented in Table 14.1, demonstrate that the total metals concentrations measured at SWMUs 001o, 001p, and 001q are generally consistent with background concentrations measured at other SWMUs.

Applicable Subpart S action levels for total metals are also included in Table 14.1. The analytical results demonstrate that detected concentrations at these three SWMUs are well below the applicable action levels for metals.

With respect to organic constituents, the RFA stated that results obtained by NMED at SWMUs 001o, 001p, and 001q were inconclusive due to elevated reporting limits and a lack of definitive confirmation data. In comparison, reporting limits obtained by DOE for organic constituents in the co-located samples were generally two or more orders of magnitude below the NMED reporting limits. Organic constituents detected in the DOE soil samples from the three SWMUs included halogenated VOCs, (e.g., chloroform, chlorinated ethanes/ethenes, and chlorinated benzenes), and BTEX constituents (benzene, toluene, ethylbenzene, and xylenes). Maximum concentrations measured within and below the SWMUs were less than 30 parts per billion for both the VOC and BTEX parameters. In comparison, review of Table 1.3 reveals that proposed Subpart S action levels for VOC and BTEX constituents are in the part per million (mg/kg) range. The maximum concentrations measured for these constituents in SWMUs 001, 001p, and 001q are two orders of magnitude or more below the proposed Subpart S levels.

The results obtained by both NMED and DOE during the RFA indicate that no sources or releases of hazardous constituents exist at SWMUs 001o, 001p, and 001q that are above applicable risk-based action levels. Furthermore, the low concentrations

FIGURE 14.1

RFA SAMPLE LOCATION MAP FOR SWMU 001o (BADGER UNIT)

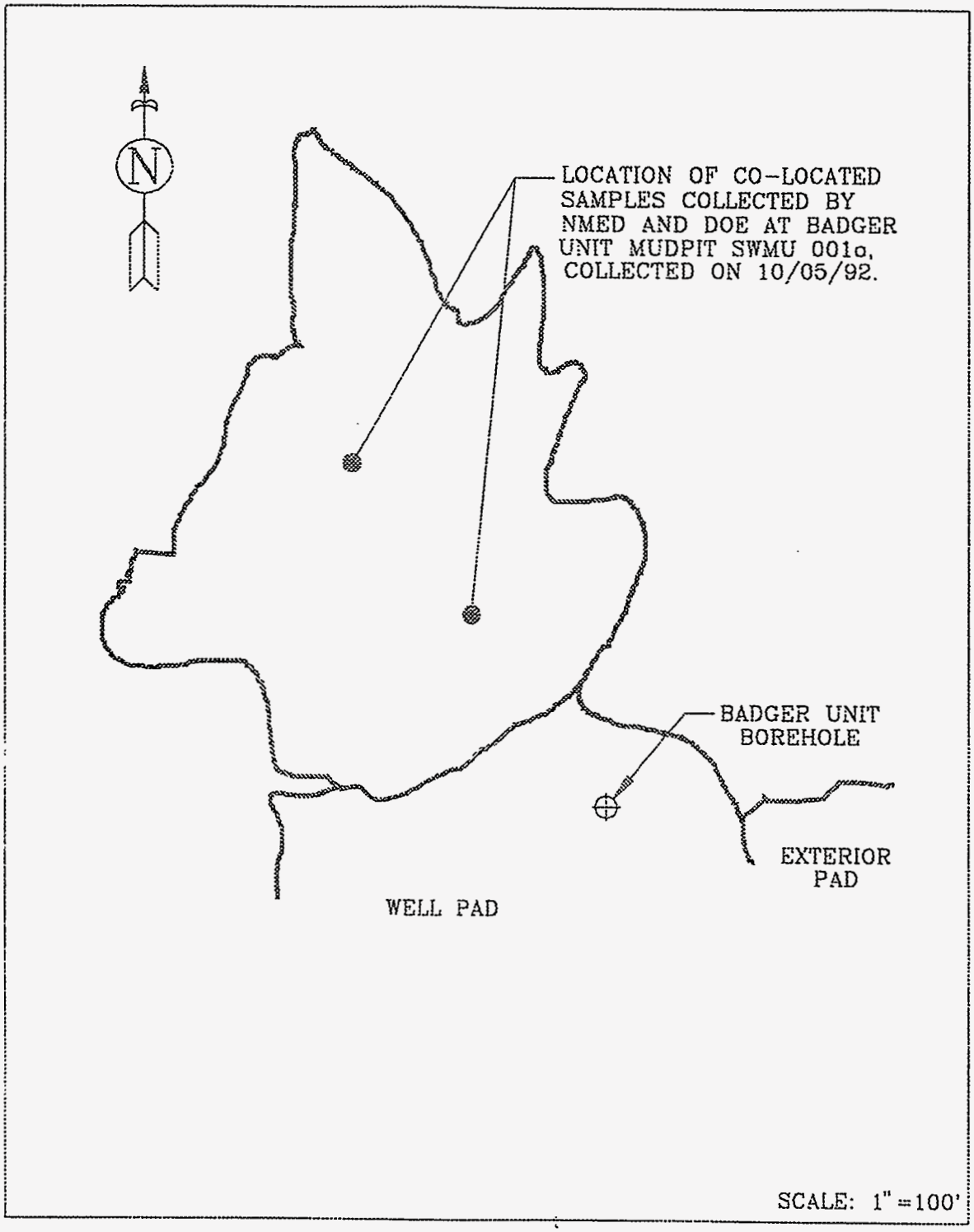


FIGURE 14.2

RFA SAMPLE LOCATION MAP FOR SWMU 001p (COTTON BABY)

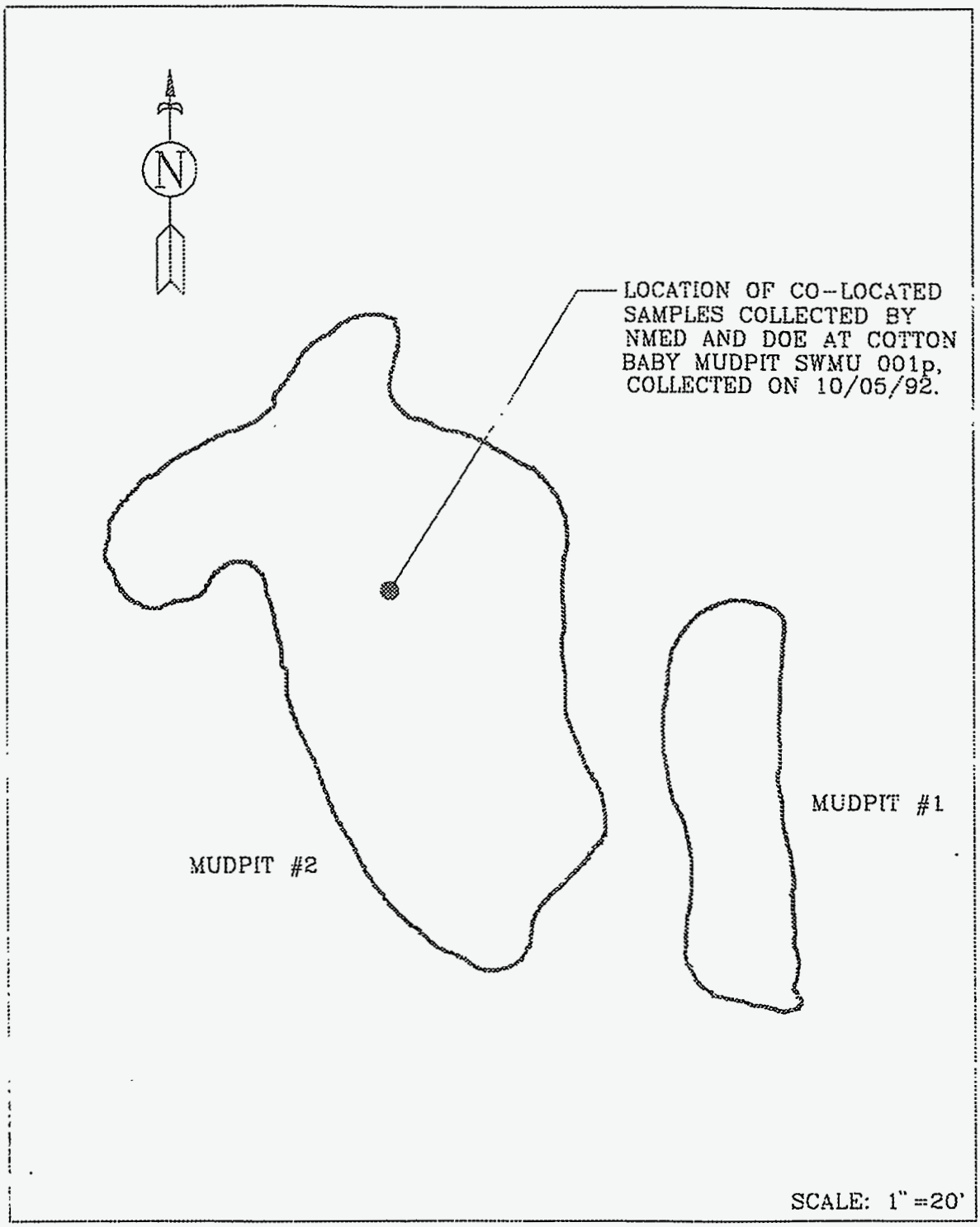


FIGURE 14.3

RFA SAMPLE LOCATION MAP FOR SWMU 001p (DOE-1)

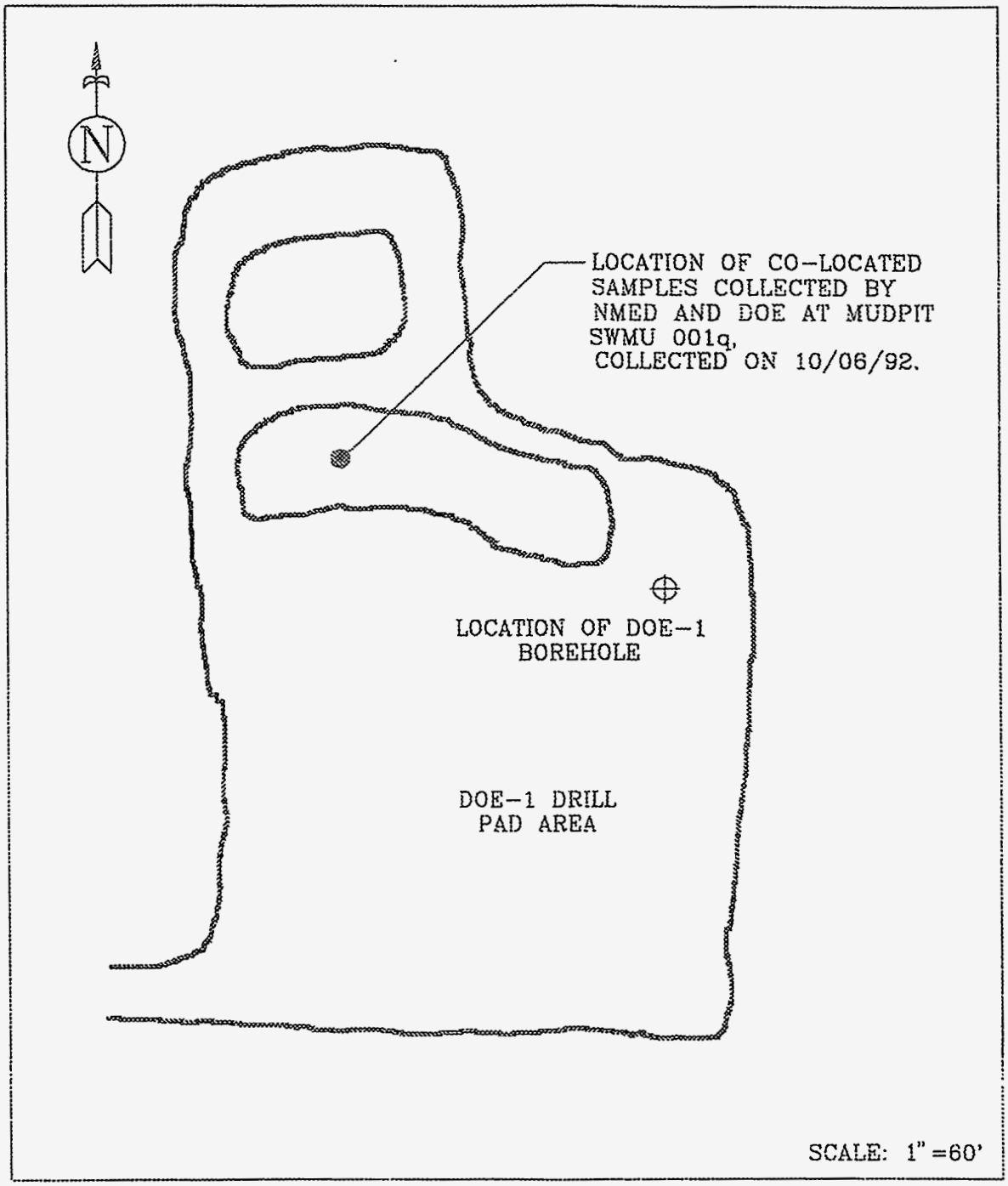


Table 14.1. Comparison of Total Metals Results to Action Levels, SWMUs Proposed for Corrective Action and Closure

Metal Analyte	Background Minimum Concentration (mg/kg)[1,6]	Background Maximum Concentration (mg/kg)[1,6]	Maximum Badger Unit Concentration (mg/kg)[2]	Maximum Cotton Baby Unit Concentration (mg/kg)[2]	Maximum DOE-1 Concentration (mg/kg)[2]	Subpart S Level (mg/kg)[3]
12-24 inches bgs						
Total Arsenic (As)	0.15 U	1.5 J	2.3	2.1	1.1	20
Total Barium (Ba)	10	120	72	43	120	6000
Total Cadmium (Cd)	0 25 U	0.7 J	0.5 U	0.5 U	0.5 U	80
Total Chromium (Cr)	1 UJ	26	15	18	43	400
Total Lead (Pb)	1 2	2.8 J	51	200	12	400[4]
Total Mercury (Hg)	0.01 U	0.06	0.1 U	NA	NA	20
Total Nickel (Ni)	1 U	1 U	10	13	7	2000
Total Selenium (Se)	0.2 U	0.2 U	10 U	NA	NA	400
Total Silver (Ag)	0.5 U	0.5 U	1 U	NA	NA	200
Total Thallium (Tl)	10 U	30	NA	NA	NA	6[5]
60-90 inches bgs[7]						
Total Arsenic (As)	0.5 J	2 J	10 U	0.77	2.8	20
Total Barium (Ba)	10 J	62	22	21	69	6000
Total Cadmium (Cd)	0.25 UJ	1.8	0.5 U	0.5 U	0.5 U	80
Total Chromium (Cr)	2	7	80	60	53	400
Total Lead (Pb)	1.2 J	5.4 J	5 U	5 U	6	400[4]
Total Mercury (Hg)	0.01 U	0.04	NA	NA	NA	20
Total Nickel (Ni)	1 U	1 U	4	3	10	2000
Total Selenium (Se)	0.2 U	0.2 U	NA	NA	NA	4000
Total Silver (Ag)	0.5 U	0.5 U	NA	NA	NA	200
Total Thallium (Tl)	10 U	10 U	NA	NA	NA	6[5]

mg/kg milligrams per kilogram
bgs below ground surface

[1]Background upgradient soil concentrations as presented in Table 1.3. The concentration ranges presented include the concentrations measured in background samples during the RFA.
[2]Maximum concentration measured in soil samples collected from within the SWMU, as obtained from the *Voluntary RA/CA Work Plan for Solid Waste Management Units* (DOE/WIPP draft 2115), August 1995.
[3]Action levels updated using the most recent toxicological criteria contained in the EPA Integrated Risk Information System (IRIS) database and the equations contained in Appendix E of proposed 40 CFR 264.521(d), FR Vol. 55, No. 145, IV A Systemic Toxicants, p. 30871.
[4]No action levels are included in Subpart S for lead. The action level of 400 mg/kg included in the table is the residential soil cleanup level recommended by the EPA Office of Solid Waste.
[5]Thallium as thallium chloride.
[6]The following data qualifiers are used as defined in the EPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994):

- J Result should be considered an estimated value.
- U Analyte was not detected; value is the method reporting limit.
- UJ Analyte was not detected; however, the reporting limit presented should be considered an estimated value

[7]Sampling depths for release assessment samples varied within this range for the different SWMUs and sampling events.

measured indicate that future releases of concern are unlikely. Based on the criteria provided in proposed *40 CFR 264.514 FR Vol. 55, No. 145, p. 30875*, there are no releases of hazardous waste (including hazardous constituents) from these SWMUs that pose a threat to human health or the environment, even without corrective action. Thousands of similar mudpits exist immediately outside the WIPP boundary that have a greater human exposure potential, and the regulations do not require additional actions at these sites.

14.3 Appropriateness of Proposed Corrective Action

Despite the minimal risk associated with SWMUs 001o, 001p, and 001q, DOE proposed corrective actions in the *Work Plan* to assure no migration of hazardous constituents occur from these sites. The remedy proposed by DOE involved the capping of each SWMU with 6 to 18 inches of compacted caliche fill that would extend beyond the lateral extent of each SWMU. The caps would be covered with 6 to 12 inches of top soil and seeded with native vegetation.

The proposed caliche caps will provide a cost-effective barrier that can be implemented immediately and will essentially eliminate the already minimal potential for contaminant migration at SWMUs 001o, 001p, and 001q. The appropriateness of the caliche cap remedy is supported by the following:

- Hydraulic conductivity tests on the caliche cap materials have measured mean permeability rates of 2.9×10^{-7} m/s for the envisioned cap. This low permeability is similar to that of the Mescalero Caliche formation.

- Infiltration at the WIPP site is extremely low. Investigations by BLM indicate that at least 96 percent of precipitation is lost from evapotranspiration and that average infiltration is less than 0.5 inches per year. Infiltration over many years may be essentially nonexistent. When coupled with the low permeability of the proposed cap, the probability of contaminant migration by infiltration is extremely low.

- Migration of contaminants to documented groundwater in the Culebra formation, at 400 to 500 feet below ground surface, is not credible even in the absence of corrective action. At SWMUs 001p and 001q, located in the south and south-central portions of the WIPP site, groundwater may occur in the Dewey Lake formation. However, the existence of Dewey Lake groundwater has not been conclusively demonstrated at these locations, and Dewey Lake wells at the southern WIPP site boundary produce from depths of 180 to 265 feet. Migration of contaminants from SWMUs 001p and 001q to Dewey Lake groundwater is, therefore, also unlikely, particularly after corrective action and closure, given the low infiltration rate at the site and the low permeability of the proposed cap.

Based on these considerations, the potential for migration of contaminants from SWMUs 001o, 001p, and 001q to human or environmental receptors is low and would

be further reduced by the proposed cap. Although the capping-in-place remedy will not reduce the toxicity or volume of the mudpit constituents, these constituents will be effectively immobilized.

Capping-in-place is anticipated to be more readily implementable and cost-effective than alternative remedies. Unlike other remedies involving excavation and removal, capping-in-place will not increase the volume of waste. Removal and placement of these wastes in a commercial landfill may also increase the potential for release of SWMU constituents and, therefore, represents greater potential liability for DOE.

Capping-in-place with low-permeability materials is a well-demonstrated containment technology that can be implemented within a short time and can be reliably maintained thereafter. The proposed capping materials are readily available, and implementation is expected to pose no significant safety threats.

The short-term and long-term reliability of low-permeability soil caps have been demonstrated at numerous other sites with greater potential for release and migration of contaminants. The reliability of the caliche caps will be assured by DOE through proper design and maintenance. Erosion will be controlled by the slope and design of the cap, and cap integrity will be verified by periodic inspection. During the periodic inspections, deep-rooted vegetation that may affect the integrity of the cap will be identified and removed. Evidence of burrowing animals will also be identified and the animals will be controlled, if necessary. Areas where the cap is compromised by erosion, vegetation, animals, or other activity will be repaired with compacted caliche.

14.4 Summary of Proposed Corrective Actions

Analytical results from the RFA indicate that the potential for migration of constituents from SWMUs 001o, 001p, and 001q is low. Furthermore, because the WIPP Land Withdrawal Act withdrew the WIPP site from public use and the potential for future intrusive activities is low, the potential for exposure of SWMU constituents to human receptors is minimal. DOE believes that based on the above discussion, capping-in-place with a caliche cap is an appropriate corrective action to assure no migration or exposure from these SWMUs. This technology is expected to demonstrate greater overall reliability, implementability, and cost-effectiveness relative to alternative remedies.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that the proposed corrective actions be granted for SWMUs 001o, 001p and 001q prior to the issuance of the RCRA Part B Permit for the WIPP. If this determination is supported by both the EPA and NMED, the capped sites will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE/WIPP 93-004)*. The capping and replanting of SWMUs 001o, 001p, and 001q will be completed by DOE within one year following approval from the EPA and NMED.

REFERENCES

Beauheim, R. L., 1987b; *Interpretations of Single-Well Hydraulic Tests Conducted At and Near the Waste Isolation Pilot Plant Site*, 1983-1987. SAND87-0039, Albuquerque, NM; Sandia National Laboratories.

Caufmann, T.L., LaVenue, A.M., and McCord, J.P., 1990, *Groundwater Flow Modeling of the Culebra Dolomite*: Sandia National Laboratories Report SAND89-7068, v. 2, Appendices A-H.

Code of Federal Regulations, 40 CFR 261; 45 FR 33073; May 1980; amended at 48 FR 14293, April 1983.

Code of Federal Regulations, 40 CFR 264.514; 46 FR 7678, January 1981.

Code of Federal Regulations, 40 CFR 264.501; 46 FR 7678, January 1981.

Davies P.B, 1989, *Variable-density Groundwater Flow and Paleohydrology in the Waste Isolation Pilot Plant (WIPP) Region, Southeastern New Mexico*, U.S. Geological Survey, Open-File Report 88-490, p. 139.

D'Appolonia Consulting Engineers, 1982a, Basic data report for deepening of drillhole WIPP-13 (Waste Isolation Pilot Plant): Sandia National Laboratories Report SAND82-1880

D'Appolonia Consulting Engineers, 1982b, *Basic Data Report for Drillhole WIPP-12 (Waste Isolation Pilot Plant)*, Sandia National Laboratories Report SAND82-2336.

DOE-CAO 95-2043, May 31, 1995, *No-Migration Variance Petition for the Waste Isolation Pilot Plant* (DOE-CAO-95-2043)

DOE/WIPP Draft 2115, *Voluntary Release Assessment/Corrective Action Work Plan for Solid Waste Management Units Located at the Waste Isolation Pilot Plant (WIPP)*.

DOE/WIPP WP02-EM1, 1994, *Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling Plan*, Rev.0

DOE/WIPP WP02-EM2, *WIPP Site Effluent and Hazardous Materials Sampling Plan*, Rev. 0.

DOE/WIPP, WP02-506, *Waste Isolation Pilot Plant, Environmental Incident Reporting*, 1988.

DOE/WIPP WP02-6/7, 1991; *Waste Isolation Pilot Plant, RCRA Compliance Manual.*

DOE/WIPP WP02-601, *Waste Isolation Pilot Plant, Non-Radioactive Hazardous Waste Management.*

DOE/WIPP WP06-108, 1991, Procedure WP06-108, *Construction Landfill Operations*, Waste Isolation Pilot Plant/Controlled Document, Rev. 1.

DOE/WIPP 91-005, 1996, *Waste Isolation Pilot Plant Resource Conservation and Recovery Act Part B Permit Application*, Rev. 6.

DOE/WIPP 91-005, 1993, *Resource Conservation and Recovery Act Part B Permit Application: Waste Isolation Pilot Plant*, Rev. 5.

DOE/WIPP 93-004, January 1996, *Waste Isolation Pilot Plant WIPP Land Management Plan.*

EPA, *Corrective Actions for Solid Waste Management Units at Hazardous Waste Management Facilities*, Proposed Rule, Federal Register, Vol. 55, No. 145, July 27, 1990.

EPA, 1994, EPA 520-R-94-004, *Final RCRA Corrective Action Plan*, OSWER Directive 9902.3-2A.

EPA, QA/G-41994, *Guidance for the Data Quality Objectives Process.*

EPA, May 1989. EPA 530/SW-89-031, *RCRA Facility Investigation (RFI) Guidance, Development of an RFI Work Plan and General Considerations for RCRA Facility Investigations*, (Vol. 1).

EPA, *EPA Region III Risk-Based Concentration Table, January-June 1996*, EPA Region III Office of RCRA Technical & Program Support Branch (3HW70).

EPA, 1994, *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods*, SW-846.

Federal Regulations, Vol. 55, No. 145; July 1990, 308033.

Halliburton NUS Laboratory, *Halliburton NUS Laboratory General Quality Assurance Plan.* March 10, 1995.

Harding Lawson Associates, *Final Data Validation Procedure, Voluntary Release Assessment (VRA) Program,* WIPP Release Assessment/Corrective Action Program, February 12, 1996.

Holt, R.M., and Powers, D.W., 1990, *Geologic Mapping of the Air Intake Shaft at the Waste Isolation Pilot Plant*, DOE/WIPP 90-051, U.S. Department of Energy, Carlsbad, NM.

International Minerals and Chemical Corporation, *Log of Prospect Well, IMC-374,* page 1, April 1965.

Lappin, A.R., Hunter, R.L., Graber, D.P., and Davies P.B., eds. 1989, *Systems Analysis Long-Term Radionuclide Transport and Dose Assessments, Waste Isolation Pilot Plant (WIPP), Southeastern New Mexico: Sandia National Laboratories Report SAND89-0462.*

Mercer, J.W., 1983, *Geohydrology of the Proposed Waste Isolation Pilot Plant Site, Los Medanos Area, Southeastern New Mexico*, U.S. Geological Survey, Water-Resources Investigations Report 83-4016, p. 178.

Miller, D. N., 1955. *Petrology of the Pierce Canyon Formation, Delaware Basin, Texas and New Mexico*, PhD. Thesis, University of Texas, Austin.

Miller, D. N., 1966. *Petrology of the Pierce Canyon Red Beds, Delaware Basin, Texas and New Mexico*, American Association of Petroleum Geologists Bulletin, Vol. 80, pp. 283-307.

New Mexico Solid Waste Management Regulations (EIB/SWMR-4).

NMED/DOE/AIP 94/1, 1993, *Assessment of Solid Waste Management Units at the Waste Isolation Pilot Plant*, the WIPP RCRA Facility Assessment (RFA).

Powers, D. W., Weart, W. D.; *Basic Data for Drillhole ERDA 9*, Waste Isolation Pilot Plant, Sandia National Laboratories, SAND79-0273.

Powers; D. W., Weart, W. D.; *Basic Data Report for Drillhole WIPP-13*, Sandia National Laboratories, 1979.

Schiel, K. A., 1988. *The Dewey Lake Formation: End Stage Deposit of a Peripheral Foreland Basin*, M.S. Thesis, University of Texas at El Paso, TX, p. 181.

Schiel, K. A., 1994. *A New Look at the Age, Depositional Environment and Paleogeographic Setting of the Dewey Lake Formation (Late Permian)*, West Texas Geological Society Bulletin, Vol. 33, No. 9, pp. 5-13.

Stensrud, W. A.; *Basic Data Report for Drillhole ERDA 9*, Waste Isolation Pilot Plant, Sandia National Laboratories, 1993; SAND 79-0270.

Stensrud, W. A., Bame, M. A., Lantz, K. D., LaVenue, A. M., Palmer, J. B., Saunier, Jr., G. J.; *WIPP Hydrology Program, Hydrologic Data Report # 5*, 1987, Waste Isolation Pilot Plant: Sandia National Laboratories Report SAND87-7125.

Stensrud, W. A., Bame, M. A., Lantz, K. D., Palmer, J. B., and Saulnier, Jr., G. J.; *Waste Isolation Pilot Plant, Hydrology Program*, Sandia National Laboratories, SAND88-7014.

APPENDIX A

EPA REGION III RISK-BASED CONCENTRATION TABLE
JANUARY 1996 - JUNE 1996

This document has been reproduced directly from the best possible copy.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III
841 Chestnut Street
Philadelphia, Pennsylvania 19107

April 19, 1996

SUBJECT: Risk-Based Concentration Table, January-June 1996

FROM: Roy L. Smith, Ph.D.
Office of RCRA
Technical & Program Support Branch (3HW70)

TO: RBC Table mailing list

Attached is the EPA Region III risk-based concentration (RBC) table, which we distribute semiannually to all interested parties.

IMPORTANT MESSAGE

EPA Region III's Internet website now includes two versions of the RBC Table. (These can be found at **http://www.epa.gov/reg3hwmd/riskmenu.htm?=Risk+Guidance.** *Once there, I suggest you set a bookmark to ease future access.) One version can be browsed on-line, and a second (identical) version in .ZIP format can be quickly downloaded. The cover memo and background information are also included in both formats.*

We strongly encourage all RBC table users having Internet access to obtain the table electronically rather than on paper. In this way, users can access the most current RBC table immediately in a form that can be used directly for comparisons with data or risk estimates. This distribution method will also save hundreds of pounds of paper per year and cost substantially less.

CONTENTS, USES, AND LIMITATIONS OF THE RBC TABLE

The table contains reference doses and carcinogenic potency slopes (obtained from IRIS through April 1, 1996, HEAST through May 1995, the EPA-NCEA Superfund Health Risk Technical Support Center, and other EPA sources) for nearly 600 chemicals. These toxicity constants have been combined with "standard" exposure scenarios to calculate RBCs--chemical concentrations corresponding to fixed levels of risk (*i.e.*, a hazard quotient of one, or lifetime cancer risk of 10^{-6}, whichever occurs at a lower concentration) in water, air, fish tissue, and soil.

The RBC table also includes soil screening levels (SSLs) for protection of groundwater and air. Most SSLs were obtained directly from EPA/OSWER's proposed SSL guidance document, to which we have added some additional SSLs based on the same methodology. Sources of SSLs are noted in the table. SSLs incorporate the same exposure assumptions as

RBCs, plus additional assumptions needed for inter-media extrapolation. SSLs are therefore distinct from RBCs, and should be used only in the framework proposed in the OSWER document (available from NTIS as document numbers 9355.4-1, PB95-965530, or EPA540/R-94/105).

The Region III toxicologists use RBCs to screen sites not yet on the NPL, respond rapidly to citizen inquiries, and spot-check formal baseline risk assessments. The background materials provide the complete basis for all the calculations, with the intent of showing users exactly how the RBCs were developed. Simply put, RBCs are risk assessments run in reverse. For a single contaminant in a single medium, under standard default exposure assumptions, the RBC corresponds to the target risk or hazard quotient.

RBCs also have several important limitations. Specifically excluded from consideration are (1) transfers from soil to air and groundwater, and (2) cumulative risk from multiple contaminants or media. Also, the toxicity information in the table has been assembled by hand, and (despite extensive checking and years of use) may contain errors. It's advisable to cross-check before relying on any RfDs or CPSs in the table. If you find any errors, please send me a note.

Many users want to know if the risk-based concentrations can be used as valid no-action levels or cleanup levels, especially for soils. The answer is a bit complex. First, it is important to realize that the RBC table does not constitute regulation or guidance, and should not be viewed as a substitute for a site-specific risk assessment. For sites where:

1. A single medium is contaminated;

2. A single contaminant contributes nearly all of the health risk;

3. Volatilization or leaching of that contaminant from soil is expected not to be significant;

4. The exposure scenarios used in the RBC table are appropriate for the site;

5. The fixed risk levels used in the RBC table are appropriate for the site; and

6. Risk to ecological receptors is expected not to be significant;

the risk-based concentrations would probably be protective as no-action levels or cleanup goals. However, to the extent that a site deviates from this description, as most do, the RBCs would not necessarily be appropriate.

To summarize, the table should generally not be used to (1) set cleanup or no-action levels at CERCLA sites or RCRA Corrective Action sites, (2) substitute for EPA guidance for preparing baseline risk assessments, or (3) determine if a waste is hazardous under RCRA.

ANSWERS TO FREQUENTLY ASKED QUESTIONS

To help you better understand the RBC table, here are answers to our most often-asked questions:

1. How can the age-adjusted inhalation factor (11.66) be less than the inhalation rate for either a child (12) or an adult (20)?

Age-adjusted factors are not intake rates, but rather partial calculations which have different units than intake rates do. The fact that these partial calculations have values similar to intake rates is really coincidental, an artifact of the similar magnitude of years of exposure and time-averaged body weight.

2. Why does arsenic appear in the RBC table separately as a carcinogen and a non-carcinogen, while other contaminants do not?

Arsenic is double-entered to ensure that the risk assessor realizes that non-carcinogenic concerns are significant for arsenic. Otherwise, one might be tempted to accept a 1e-4 risk (43 ppm in residential soil), when the oral reference dose would be exceeded at 23 ppm.

Also, EPA has a little-known risk management policy for arsenic (dating from 1988) that suggests that arsenic-related cancer risks of up to 1e-3 can be accepted because the cancers are squamous cell carcinomas with a low mortality rate. Thus, non-carcinogenic RBCs represent an important limitation on acceptable arsenic concentrations.

3. Many contaminants have no inhaled reference dose or carcinogenic potency slope in IRIS, yet these numbers appear in the RBC table with IRIS given as the source. Where did the numbers come from?

Most inhaled reference doses and potency slopes in the RBC table are converted from reference concentrations and unit risk values which do appear in IRIS. These conversions assume 70-kg persons inhaling 20 m^3/d. For example, the inhalation unit risk for arsenic (4.3e-3 risk per $\mu g/m^3$) is divided by 20 m^3/d and multiplied by 70 kg times 1000 μg/mg, yielding a CPSi of 15.1 risk per mg/kg/d.

4. Why does the RBC table base soil RBCs for cadmium and manganese on reference doses that apply only to drinking water?

The RBC table's use of the drinking water RfDs for cadmium and manganese reflects (1) the limited space available in the already-crowded table, and (2) the intended use of the table as a screening tool rather than a source of cleanup levels (thereby making false positives acceptable). For a formal risk assessment, Region III would use the food RfDs for soil ingestion.

At this time, only two substances (as far as we know) have distinct oral RfDs for water and food--cadmium and manganese. Adding the two food RfDs to the table would require an entire column, which would be about 99.9% blank. The table has become so crowded that it

would be difficult to accommodate another column. Also, we've given this problem a relatively low priority because the table's primary purpose is to identify environmental problems needing further study. RBCs were never intended for uncritical use as cleanup levels, merely to identify potential problems which need a closer look.

5. What is the source of the child's inhalation rate of 12 m3/d?

The calculation comes from basic physiology. It's a scaling of the mass-specific 20 m3/d rate for adults from a body mass of 70 kg to 15 kg, using the two-thirds power of mass, as follows:

Let: IRcm = mass-specific child inhalation rate (m3/kg/d)
IRc = child inhalation rate (m3/d)

20 m3/d ÷ 70kg = 0.286 m3/kg/d (mass-specific adult inhalation rate)

$0.286 \text{ m3/kg/d} \times (70^{.67}) = (\text{IRcm}) \times (15^{.67})$

$\text{IRcm} = (0.286) \times (70^{.67}) \div (15^{.67}) = 0.286 \times 2.807 = 0.803 \text{ m3/kg/d}$

IRc = IRcm x 15kg = 0.803 m3/kg/d x 15kg = 12.04 m3/d

A short (but algebraically equivalent) way to do the conversion:

$20 \times (15 \div 70)^{.333} = 11.97$ (different from, but actually more correct than, 12.04 because of rounding error in calculating by the long form).

6. Can the oral RfDs in the RBC table be applied to dermal exposure?

Not directly. EPA's Office of Research and Development is working on dermal RfDs for some substances, but has not yet produced any final values. When dermal RfDs do appear, they will undoubtedly be based on absorbed dose rather than administered dose. Oral RfDs are (usually) based on administered dose and therefore tacitly include a GI absorption factor. Thus, any use of oral RfDs in dermal risk calculations would have to involve removing this absorption factor.

*7. The exposure variables table in the RBC background document lists the averaging time for non-carcinogens as "ED*365". What does that mean?*

ED is exposure duration, in years, and '*' is the computer-ese symbol for multiplication. Multiplying ED by 365 simply converts the duration to days. In fact, the ED term is included in both the numerator and denominator of the RBC algorithms for non-cancer risk, canceling it altogether. We expressed the algorithm this way to allow users to realize this. The total exposure is really adjusted only by EF (days exposed per year) divided by 365. (Note that this explanation applies to non-carcinogenic risk only; for carcinogens, exposure is pro-rated over the number of days in a 70-year life span.)

8. Why is inorganic lead not included in the RBC table?

The reason that lead is missing from the RBC table is simple, and fundamental: EPA has no reference dose or potency slope for inorganic lead, so it wasn't possible to calculate risk-based concentrations. EPA considers lead a special case because:

(1) Lead is ubiquitous in all media, so human exposure comes from multiple sources. Comparing single-medium exposures with a reference dose would be misleading.

(2) If EPA did develop a reference dose for lead by the same methods other reference doses, we would probably find that most people already exceed it. Since EPA already knows this and is moving aggressively to lower lead releases nationally, such findings at individual sites would be irrelevant and unduly alarming.

(3) EPA decided to take a new approach to distinguish important lead exposures from trivial ones. EPA developed a computer model (the IEUBK model) which predicts children's blood lead concentrations using lead levels in various media as inputs. The idea is to evaluate a child's entire environment, and reduce lead exposures in the most cost-effective way. –

On the practical side, there are several EPA policies on lead which effectively substitute for RBCs. The EPA Office of Solid Waste has released a detailed directive on risk assessment and cleanup of residential soil lead. The directive recommends that soil lead levels less than 400 ppm be considered safe for residential use. Above that level, the document suggests collecting certain types of data and modeling children's blood lead with the IEUBK model. For the purposes of the RBC table, the *de facto* residential soil number would be 400 mg/kg. For water, we suggest 15 ppb (from the national EPA Action Level), and for air, the National Ambient Air Quality Standard.

9. Where did the potency slopes for carcinogenic PAHs come from?

The source of the potency slopes for PAHs is "Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons," Final Draft, EPA Environmental Criteria and Assessment Office, Cincinnati, OH. It's available from NTIS as document number ECAO-CIN-842 (March, 1993). The slopes are expressed in terms of order-of-magnitude equivalence factors relating the compounds to benzo[a]pyrene; we have converted these TEQs to potency slopes to fit the format of the table.

10. May I please have a copy of the January 1991 RBC table?

We're sorry, but no. The RBC table doesn't represent regulation or guidance, so past issues have no legal importance. Each time we update the table we destroy all obsolete copies, electronic and paper. We do this to ensure that only one set of RBCs, the one based on current information, exists at any time.

11. I've noticed that some soil RBCs are one million parts per million. Since some of these substances are liquids, that's obviously ridiculous. What is that basis for these

calculations?

A soil RBC of one million parts per million means that no amount of the contaminant in soil will cause a receptor to exceed the oral reference dose by incidental ingestion of soil. In fact, some contaminants would have RBCs of more than one million ppm, but the algorithms cap concentrations at 100%. The reason we retain these admittedly impossible numbers is to let users see that the contaminant is not a threat via soil ingestion.

However, it's important to realize that the RBC calculations do not consider the potential of soil contaminants to leach to groundwater or escape to air by volatilization or dust entrainment. To consider these inter-media transfers, it's necessary to either monitor air and groundwater, or to use a mathematical model. Measured or modeled air and groundwater concentrations should then be compared to the RBCs for air and tap water.

We have begun to incorporate inter-media transfers into the RBC table in the form of soil screening levels (SSLs). However, EPA Headquarters has proposed only about a hundred SSLs so far, so the list is still rather short.

12. Please elaborate on the meaning of the 'W' source code in the table.

The "W" code means that a reference dose or potency slope for a contaminant is currently not present on either IRIS or HEAST, but that it once was present on either IRIS or HEAST and was removed. Such withdrawal usually indicates that consensus on the number no longer exists among EPA scientists, but not that EPA believes the contaminant to be unimportant. Older versions of the RBC table had separate codes for IRIS and HEAST withdrawals, but we changed to a single code for both because, after all, it hardly matters.

We retain withdrawn numbers in the table because we still need to deal with these contaminants during the sometimes very long delays before replacement numbers are ready. We take the position that for the purpose of screening an obsolete RBC is better than none at all. The 'W' code should serve as a clear warning that before making any serious decision involving that contaminant you will need to develop an interim value based on current scientific understanding.

If you are assessing risks at a site where a major contaminant is coded "W," consider working with your Regional EPA risk assessor to develop a current toxicity constant. If the site is being studied under CERCLA, the EPA-NCEA Regional Technical Support group may be able to assist.

13. Can I get copies of supporting documents for interim toxicity constants which are coded "E" in the RBC table?

Unfortunately, Region 3 does not have a complete set of supporting documents. The EPA-NCEA Superfund Health Risk Technical Support Center prepares these interim toxicity constants in response to site-specific requests from Regional risk assessors, and sends the documentation only to the requestor. The RBC tables contain only the interim values (those with "E" codes) that we've either requested ourselves or otherwise obtained copies of. There may

be many more interim values of which we are unaware. Also, we don't receive automatic updates when NCEA revisits a contaminant, so it's likely that some interim values in the RBC table are obsolete.

It has been NCEA's policy to deny requests for documentation of interim toxicity constants. Although Region 3 has sometimes provided this documentation on request, for the above-stated reasons we have no assurance that the assessments, or even the interim numbers, are current. We've decided to discontinue distributing information that may be misleading. If an "E"-coded contaminant is a major risk contributor at your site, we strongly suggest that you work with EPA to develop an up-to-date reference dose or slope factor.

CHANGES IN THIS ISSUE OF THE RBC TABLE

New or revised EPA toxicity constants are now marked with "**" before the contaminant name. This is to help users quickly pick out substances with new RBCs. Formerly these contaminants were printed in underlined boldface type that copied badly. A new basis code, "M" for MCL, has been added to the upper right corner of each page. This code denotes soil screening levels for groundwater protection that are based on EPA Maximum Contaminant Levels.

If you have a question about the RBC Table, please call the Superfund Technical Support Section at 215-566-3041 (please note this new number). Please limit your questions to general RBC issues; if you have a question about applying RBCs to a site, please contact the EPA Regional Office handling the project. Thanks for your help and cooperation and we hope that the RBC Table continues to be a useful resource.

I have one last announcement--I'll be leaving Region III at the end of May, 1996. As a result, I'll no longer be able to answer your questions about the RBC table. However, Region III will continue to distribute and support the table, and other Regional toxicologists will be available to help you. Thank you all for your interest and support; it's been a privilege working with all of you.

Attachment

EPA Region III Risk-Based Concentration Table

Background Information

Roy L. Smith, Ph.D.
Toxicologist
April 19, 1996

Development of Risk-Based Concentrations

General

Separate carcinogenic and non-carcinogenic risk-based concentrations were calculated for each compound for each pathway. The concentration in the table is the lower of the two, rounded to two significant figures. The following terms and values were used in the calculations:

Exposure variables	Value	Symbol
General:		
Carcinogenic potency slope oral (risk per mg/kg/d):	*	CPSo
Carcinogenic potency slope inhaled (risk per mg/kg/d):	*	CPSi
Reference dose oral (mg/kg/d):	*	RfDo
Reference dose inhaled (mg/kg/d):	*	RfDi
Target cancer risk:	1e-06	TR
Target hazard quotient:	1	THQ
Body weight, adult (kg):	70	BWa
Body weight, age 1-6 (kg):	15	BWc
Averaging time carcinogens (d):	25550	ATc
Averaging time non-carcinogens (d):	ED*365	ATn
Inhalation, adult (m3/d):	20	IRAa
Inhalation, child (m3/d):	12	IRAc
Inhalation factor, age-adjusted (m3-y/kg-d):	11.66	IFAadj
Tap water ingestion, adult (L/d):	2	IRWa
Tap water ingestion, age 1-6 (L/d):	1	IRWc
Tap water ingestion factor, age-adjusted (L-y/kg-d):	1.09	IFWadj
Fish ingestion (g/d):	54	IRF
Soil ingestion, adult (mg/d):	100	IRSa
Soil ingestion, age 1-6 (mg/d):	200	IRSc
Soil ingestion factor, age adjusted (mg-y/kg-d):	114.29	IFSadj
Residential:		
Exposure frequency (d/y):	350	EFr
Exposure duration, total (y):	30	EDtot
Exposure duration, age 1-6 (y):	6	EDc
Volatilization factor (L/m3):	0.5	K
Occupational:		

Exposure variables	Value	Symbol
Exposure frequency (d/y):	250	EFo
Exposure duration (y):	25	EDo
Fraction of contaminated soil ingested (unitless)	0.5	FC

*: Contaminant-specific toxicological constants. The priority among sources of toxicological constants was as follows: (1) IRIS, (2) HEAST, (3) HEAST alternative method, (4) EPA-NCEA Superfund Health Risk Technical Support Center, (5) withdrawn from IRIS or HEAST, and (6) other EPA documents. Each source was used only if numbers from higher-priority sources were unavailable. The EPA Superfund Health Risk Technical Support Center, part of the EPA National Center for Environmental Assessment in Cincinnati, develops provisional RfDs and CPSs on request for contaminants not in IRIS or HEAST. These provisional values are labeled "E = EPA-NCEA provisional" in the table. It is possible they may be obsolete. If one of the "E" constants is important to a Superfund risk assessment, consider requesting, through a Regional risk assessor, a new provisional value.

Age-adjusted factors

Because contact rates with tap water, ambient air, and residential soil are different for children and adults, carcinogenic risks during the first 30 years of life were calculated using age-adjusted factors. These factors approximated the integrated exposure from birth until age 30 by combining contact rates, body weights, and exposure durations for two age groups - small children and adults. The age-adjusted factor for soil was obtained from RAGS IB; the others were developed by analogy.

Air inhalation

$$IFAadj\ \frac{m^3 \cdot y}{kg \cdot d} = \frac{EDc \cdot IRAc}{BWc} + \frac{(EDtot - EDc) \cdot IRAa}{BWa}$$

Tap water ingestion

$$IFWadj\ \frac{L \cdot y}{kg \cdot d} = \frac{EDc \cdot IRWc}{BWc} + \frac{(EDtot - EDc) \cdot IRWa}{BWa}$$

Soil ingestion

$$IFSadj\ \frac{mg \cdot y}{kg \cdot d} = \frac{EDc \cdot IRSc}{BWc} + \frac{(EDtot - EDc) \cdot IRSa}{BWa}$$

Residential water

Volatilization terms were calculated only for compounds with a mark in the "VOC" column. Compounds having a Henry's Law constant greater than 10^{-5} were considered volatile. The list may be incomplete, but is unlikely to include false positives. The equations and the volatilization factor (K, above) were obtained from RAGS IB. Oral potency slopes and reference doses were used for both oral and inhaled exposures for volatile compounds lacking inhalation values. Inhaled potency slopes were substituted for unavailable oral potency slopes only for volatile compounds; inhaled RfDs were substituted for unavailable oral RfDs for both volatile and non-volatile compounds. RBCs for carcinogens were based on combined childhood and adult exposure; for non-carcinogens RBCs were based on adult exposure.

Carcinogens

$$RBC\ \frac{\mu g}{L} = \frac{TR \cdot ATc \cdot 1000\frac{\mu g}{mg}}{EFr \cdot ([K \cdot IFAadj \cdot CPSi] + [IFWadj \cdot CPSo])}$$

Non-carcinogens

$$RBC\ \frac{\mu g}{L} = \frac{THQ \cdot BWa \cdot ATn \cdot 1000\frac{\mu g}{mg}}{EFr \cdot EDtot \cdot \left(\frac{K \cdot IRAa}{RfDi} + \frac{IRWa}{RfDo}\right)}$$

Ambient air

Oral potency slopes and references were used where inhalation values were not available. RBCs for carcinogens were based on combined childhood and adult exposure; for non-carcinogens RBCs were based on adult exposure.

Carcinogens

$$RBC\ \frac{\mu g}{m^3} = \frac{TR \cdot ATc \cdot 1000\frac{\mu g}{mg}}{EFr \cdot IFAadj \cdot CPSi}$$

Non-carcinogens

$$RBC\ \frac{\mu g}{m^3} = \frac{THQ \cdot RfDi \cdot BWa \cdot ATn \cdot 1000\frac{\mu g}{mg}}{EFr \cdot EDtot \cdot IRAa}$$

Edible fish

All RBCs were based on adult exposure.

Carcinogens

$$RBC\ \frac{mg}{kg} = \frac{TR \cdot BWa \cdot ATc}{EFr \cdot EDtot \cdot \frac{IRF}{1000\frac{g}{kg}} \cdot CPSo}$$

Non-carcinogens

$$RBC\ \frac{mg}{kg} = \frac{THQ \cdot RfDo \cdot BWa \cdot ATn}{EFr \cdot EDtot \cdot \frac{IRF}{1000\frac{g}{kg}}}$$

Commercial/industrial soil ingestion

RBCs were based on adult occupational exposure, including an assumption that only 50% of total soil ingestion is work-related.

Carcinogens

$$RBC\ \frac{mg}{kg} = \frac{TR \cdot BWa \cdot ATc}{EFo \cdot EDo \cdot \frac{IRSa}{10^6\ \frac{mg}{kg}} \cdot FC \cdot CPSo}$$

Non-carcinogens

$$RBC\ \frac{mg}{kg} = \frac{THQ \cdot RfDo \cdot BWa \cdot ATn}{EFo \cdot EDo \cdot \frac{IRSa}{10^6\ \frac{mg}{kg}} \cdot FC}$$

Residential soil ingestion

RBCs for carcinogens were based on combined childhood and adult exposure; RBCs for non-carcinogens were based on childhood exposure only.

Carcinogens

$$RBC\ \frac{mg}{kg} = \frac{TR \cdot ATc}{EFr \cdot \frac{IFSadj}{10^6\ \frac{mg}{kg}} \cdot CPSo}$$

Non-carcinogens

$$RBC\ \frac{mg}{kg} = \frac{THQ \cdot RfDo \cdot BWc \cdot ATn}{EFr \cdot EDc \cdot \frac{IRSc}{10^6\ \frac{mg}{kg}}}$$

Development of Soil Screening Levels

General

In December 1994 the EPA Office of Solid Waste and Emergency Response proposed Soil Screening Guidance (Document 9355.4-1, PB95-963530, EPA540/R-94/101, available through NTIS at 703-487-4650). This draft document provides (1) a framework in which soil screening levels are to be used, (2) a detailed methodology for calculating soil screening levels, and (3) soil screening levels for 107 substances. (Note: EPA released an updated draft of this document in early 1996. We have decided to wait until the SSL guidance is final before changing the RBC table.)

Consistent with this new guidance, the risk-based concentration table now includes two columns of generic soil screening levels (SSLs). OSWER's 107 proposed soil screening levels have been added verbatim. In addition, the proposed SSL methodology has been used to calculate soil screening levels for more substances, which are also included in the new table. The table clearly distinguishes the OSWER SSLs from the "unofficial" ones.

These SSLs provide reasonable maximum estimates of transfers of contaminants from soil to

other media. One column contains soil concentrations protective of groundwater quality; the other contains soil concentrations protective of air quality. "Protective" is defined in the same terms as the risk-based concentrations for tap water and air -- that residential contact scenarios will yield a fixed upper bound risk of 10^{-6} or a fixed hazard quotient of 1 (whichever occurs at the lower concentration).

OSWER's SSLs should be used only within the framework proposed in the guidance document. The additional SSLs included in the RBC table are intended for the same uses (although they obviously carry less weight than the formally proposed numbers).

The SSLs are based on the following assumptions:

Input variables	Value	Symbol*
Surface soil moisture content (g/g)	0.1	W_s
Vadose zone soil moisture content (kg/kg)	0.2	W_v
Surface soil bulk density (g/cm^3)	1.5	ρ_{bs}
Vadose zone soil bulk density (kg/L)	1.5	ρ_{bv}
Surface soil particle density (g/cm^3)	2.65	ρ_{ss}
Vadose zone soil particle density (g/cm^3)	2.65	ρ_{sv}
Total surface soil porosity (L pore /L soil)	0.43	N_s
Total vadose zone soil porosity (L pore/L soil)	0.43	N_v
Air-filled surface soil porosity (L air/L soil)	0.28	θ_{as}
Water-filled surface soil porosity (L water/L soil)	0.15	θ_{ws}
Air-filled vadose zone soil porosity (L air/L soil)	0.13	θ_{av}
Water-filled vadose zone soil porosity (L water/L soil)	0.30	θ_{wv}
Organic carbon fraction of surface soil (g/g)	0.006	FOC_s
Organic carbon fraction of vadose zone soil (g/g)	0.002	FOC_v
Dispersion factor for 0.5 acres (g/m^{2}s per kg/m^3)	35.1	Q/C
Particulate emission factor (m^3/kg)	6.79e+08	PEF
Exposure interval (s)	9.50e+08	T
Dilution-attenuation factor (unitless)	10	DAF

*: Symbols were adjusted, variables were rearranged, and derived and chemical-specific variables were omitted for simplicity and clarity. Presentation of the input variables in a single table using the same terms as in the OSWER SSL document would have been confusing. The terms used here are generally similar to OSWER's, and can easily be compared with the SSL guidance document.

With two exceptions described in the following section, SSL calculations were based on the same algorithms presented in the OSWER draft SSL guidance document. For details of the calculations (and for general background information on SSLs), I strongly recommend consulting that document. The "unofficial" SSLs were developed under the following conditions:

Soil Screening Levels for Inhalation

Inhaled reference doses and potency slopes were used if available. If inhalation values were not available, oral RfDs and potency slopes were substituted. SSLs were calculated only for substances for which aqueous solubility, Koc, Henry's Law constant, and diffusivity in air were available. SSLs were calculated only for substances for which a volatilization factor could be calculated. This was done because OSWER's large proposed particulate emission factor rendered it pointless to estimate SSLs for particulate emissions alone. The final calculated SSL shown in the RBC table is the smaller of the risk-based SSL and the soil saturation concentration. All calculated SSLs were rounded to 2 significant figures.

The OSWER risk algorithms for inhalation were revised in order to be consistent with the rest of the RBC table. Only calculated SSLs were affected by this; SSLs proposed by OSWER are presented verbatim. Calculated SSLs for inhalation of carcinogens were based on an integrated lifetime exposure rather than adult exposure. SSLs for inhalation of noncarcinogens were based on adult exposure for 350 days per year rather than 365 days per year. The following algorithms were used to calculate inhalation SSLs:

Carcinogens

$$SSL\ \frac{mg}{kg} = \frac{TR \cdot ATc}{EFr \cdot IFAadj \cdot \left(\frac{1}{VF} + \frac{1}{PEF}\right) \cdot CPSi}$$

Non-carcinogens

$$SSL\ \frac{mg}{kg} = \frac{THQ \cdot BWa \cdot ATn \cdot RfDi}{EFr \cdot EDtot \cdot IRAa \cdot \left(\frac{1}{VF} + \frac{1}{PEF}\right)}$$

Soil Screening Levels for Groundwater Use

All algorithms were as proposed by OSWER. MCLs were used as target groundwater concentrations if available. If MCLs were unavailable the risk-based concentration in the "tap water" column of the RBC table was used as the target groundwater concentration. All SSLs for groundwater are based on a dilution-attenuation factor (DAF) of 10. Since these SSLs scale linearly with DAF, the SSLs for DAF=1 would be ten times lower. They were omitted to conserve space. All groundwater SSLs were rounded to 2 significant figures and capped at unity.

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Acephate	30560191	4.00E-03 i		8.70E-03 i			7.7 c	0.72 c	0.36 c	660 c	73 c		
Acetaldehyde	75070		2.57E-03 i		7.70E-03 i		94 n	0.81 c					
Acetochlor	34256821	2.00E-02 i					730 n	73 n	27 n	41000 n	1600 n		
Acetone	67641	1.00E-01 i					3700 n	370 n	140 n	200000 n	7800 n	62000 e	8 e
Acetone cyanohydrin	75865	7.00E-02 n	4.00E-02 A				2600 n	150 n	95 n	140000 n	5500 n		
Acetonitrile	75078	6.00E-03 i	1.43E-02 A				220 n	52 n	8.1 n	12000 n	470 n		
Acetophenone	98862	1.00E-01 i	5.71E-06 w			O	0.042 n	0.021 n	140 n	200000 n	7800 n		
Acifluorfen	62476599	1.30E-02 i					470 n	47 n	18 n	27000 n	1000 n		
Acrolein	107028	2.00E-02 n	5.71E-06 i				730 n	0.021 n	27 n	41000 n	1600 n		
Acrylamide	79061	2.00E-04 i		4.50E+00 i	4.55E+00 i		0.015 c	0.0014 c	0.0007 c	1.3 c	0.14 c		
Acrylic acid	79107	5.00E-01 i	2.86E-04 i				18000 n	1 n	680 n	1E+06 n	39000 n		
Acrylonitrile	107131	1.00E-03 n	5.71E-04 i	5.40E-01 i	2.38E-01 i		0.12 c	0.026 c	0.0058 c	11 c	1.2 c		
Alachlor	15972608	1.00E-02 i		8.00E-02 n			0.84 c	0.078 c	0.039 c	72 c	8 c		
Alar	1596845	1.50E-01 i					5500 n	550 n	200 n	310000 n	12000 n		
Aldicarb	116063	1.00E-03 i					37 n	3.7 n	1.4 n	2000 n	78 n	570 e	0.036 e
Aldicarb sulfone	1646884	1.00E-03 i					37 n	3.7 n	1.4 n	2000 n	78 n		
Aldrin	309002	3.00E-05 i		1.70E+01 i	1.71E+01 i		0.004 c	0.00037 c	0.00019 c	0.34 c	0.038 c	0.5 e	0.005 e
Ally	74223646	2.50E-01 i					9100 n	910 n	340 n	510000 n	20000 n		
Allyl alcohol	107186	5.00E-03 i					180 n	18 n	6.8 n	10000 n	390 n		
Allyl chloride	107051	5.00E-02 w	2.86E-04 i				1800 n	1 n	68 n	100000 n	3900 n		
Aluminum	7429905	1.00E+00 e					37000 n	3700 n	1400 n	1E+06 n	78000 n		
Aluminum phosphide	20859738	4.00E-04 i					15 n	1.5 n	0.54 n	820 n	31 n		
Amdro	67485294	3.00E-04 i					11 n	1.1 n	0.41 n	610 n	23 n		
Ametryn	834128	9.00E-03 i					330 n	33 n	12 n	18000 n	700 n		
m-Aminophenol	591275	7.00E-02 n					2600 n	260 n	95 n	140000 n	5500 n		
4-Aminopyridine	504245	2.00E-05 n					0.73 n	0.073 n	0.027 n	41 n	1.6 n		
Amitraz	33089611	2.50E-03 i					91 n	9.1 n	3.4 n	5100 n	200 n		
Ammonia	7664417		2.86E-02 i				1000 n	100 n					
Ammonium sulfamate	7773060	2.00E-01 i					7300 n	730 n	270 n	410000 n	16000 n		
Aniline	62533		2.86E-04 i	5.70E-03 i			10 n	1 n	0.55 c	1000 c	110 c	45 n	0.031 n
Antimony and compounds	7440360	4.00E-04 i					15 n	1.5 n	0.54 n	820 n	31 n		
Antimony pentoxide	1314609	5.00E-04 n					18 n	1.8 n	0.68 n	1000 n	39 n		
Antimony potassium tartrate	304610	9.00E-04 n					33 n	3.3 n	1.2 n	1800 n	70 n		
Antimony tetroxide	1332316	4.00E-04 n					15 n	1.5 n	0.54 n	820 n	31 n		
Antimony trioxide	1309644	4.00E-04 n					15 n	1.5 n	0.54 n	820 n	31 n		
Apollo	74115245	1.30E-02 i					470 n	47 n	18 n	27000 n	1000 n		
Aramite	140578	5.00E-02 n		2.50E-02 i	2.49E-02 i		2.7 c	0.25 c	0.13 c	230 c	26 c		
Arsenic	7440382	3.00E-04 i					11 n	1.1 n	0.41 n	610 n	23 n	380 e	15 e
Arsenic (as carcinogen)	7440382			1.50E+00 i	1.51E+01 i		0.045 c	0.00041 c	0.0021 c	3.8 c	0.43 c	380 e	15 e

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Arsine	7784421		1.43E-05 I				0.52 N	0.052 N					
Assure	76578148	9.00E-03 I					330 N	33 N	12 N	18000 N	700 N		
Asulam	3337711	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Atrazine	1912249	3.50E-02 I		2.22E-01 H			0.3 C	0.028 C	0.014 C	26 C	2.9 C		
Avermectin B1	65195553	4.00E-04 I					15 N	1.5 N	0.54 N	820 N	31 N		
Azobenzene	103333			1.10E-01 I	1.08E-01 I		0.61 C	0.058 C	0.029 C	52 C	5.8 C		
Barium and compounds	7440393	7.00E-02 I	1.43E-04 A				2600 N	0.52 N	95 N	140000 N	5500 N	350000 E	32 E
Baygon	114261	4.00E-03 I					150 N	15 N	5.4 N	8200 N	310 N		
Bayleton	43121433	3.00E-02 I					1100 N	110 N	41 N	61000 N	2300 N		
Baythroid	68359375	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Benefin	1861401	3.00E-01 I					11000 N	1100 N	410 N	610000 N	23000 N		
Benomyl	17804352	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Bentazon	25057890	2.50E-03 I					91 N	9.1 N	3.4 N	5100 N	200 N		
Benzaldehyde	100527	1.00E-01 I				O	610 N	370 N	140 N	200000 N	7800 N		
Benzene	71432		1.71E-03 E	2.90E-02 I	2.90E-02 I	O	0.36 C	0.22 C	0.11 C	200 C	22 C	0.5 E	0.02 E
Benzenethiol	108985	1.00E-05 H					0.37 N	0.037 N	0.014 N	20 N	0.78 N		
Benzidine	92875	3.00E-03 I		2.30E+02 I	2.35E+02 I		0.00029 C	0.00003 C	0.00001 C	0.025 C	0.0028 C	1.3 C	1.100E-06 C
Benzoic acid	65850	4.00E+00 I					150000 N	15000 N	5400 N	1E+06 N	310000 N	320 E	280 E
Benzotrichloride	98077			1.30E+01 I			0.0052 C	0.00048 C	0.00024 C	0.44 C	0.049 C	0.012 C	0.000073 C
Benzyl alcohol	100516	3.00E-01 H					11000 N	1100 N	410 N	610000 N	23000 N		
Benzyl chloride	100447			1.70E-01 I		O	0.062 C	0.037 C	0.019 C	34 C	3.8 C	0.5 C	0.00036 C
Beryllium and compounds	7440417	5.00E-03 I		4.30E+00 I	8.40E+00 I		0.016 C	0.00075 C	0.00073 C	1.3 C	0.15 C	690 E	180 E
Bidrin	141662	1.00E-04 I					3.7 N	0.37 N	0.14 N	200 N	7.8 N		
Biphenthrin (Talstar)	82657043	1.50E-02 I					550 N	55 N	20 N	31000 N	1200 N		
1,1-Biphenyl	92524	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N	9000 E	110 E
Bis(2-chloroethyl)ether	111444			1.10E+00 I	1.16E+00 I	O	0.0092 C	0.0054 C	0.0029 C	5.2 C	0.58 C	0.3 E	0.0003 E
Bis(2-chloroisopropyl)ether	39638329	4.00E-02 I		7.00E-02 H	3.50E-02 H	O	0.26 C	0.18 C	0.045 C	82 C	9.1 C		
Bis(chloromethyl)ether	542881			2.20E+02 I	2.17E+02 I	O	0.00005 C	0.00003 C	0.00001 C	0.026 C	0.0029 C	0.00004 C	1.000E-07 C
Bis(2-chloro-1-methylethyl)ether				7.00E-02 W	7.00E-02 W		0.96 C	0.089 C	0.045 C	82 C	9.1 C		
Bis(2-ethylhexyl)phthalate (DEHP)	117817	2.00E-02 I		1.40E-02 I			4.8 C	0.45 C	0.23 C	410 C	46 C	210 E	11 E
Bisphenol A	80057	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Boron (and borates)	7440428	9.00E-02 I	5.71E-03 H				3300 N	21 N	120 N	180000 N	7000 N		
Boron trifluoride	7637072		2.00E-04 H				7.3 N	0.73 N					
Bromodichloromethane	75274	2.00E-02 I		6.20E-02 I		O	0.17 C	0.1 C	0.051 C	92 C	10 C	1800 E	0.3 E
Bromoethene	593602				1.10E-01 H	O	0.096 C	0.057 C					
Bromoform (tribromomethane)	75252	2.00E-02 I		7.90E-03 I	3.85E-03 I	O	2.4 C	1.6 C	0.4 C	720 C	81 C	46 E	0.5 E
Bromomethane	74839	1.40E-03 I	1.43E-03 I			O	8.7 N	5.2 N	1.9 N	2900 N	110 N	2 E	0.1 E
4-Bromophenyl phenyl ether	101553	5.80E-02 O					2100 N	210 N	78 N	120000 N	4500 N		
Bromophos	2104963	5.00E-03 H					180 N	18 N	6.8 N	10000 N	390 N		

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Bromoxynil	1689845	2.00E-02 i					730 N	73 N	27 N	41000 N	1600 N		
Bromoxynil octanoate	1689992	2.00E-02 i					730 N	73 N	27 N	41000 N	1600 N		
1,3-Butadiene	106990				9.80E-01 i	☒	0.011 c	0.0064 c				0.0013 c	0.000072 c
1-Butanol	71363	1.00E-01 i					3700 N	370 N	140 N	200000 N	7800 N	9700 e	8 e
Butyl benzyl phthalate	85687	2.00E-01 i					7300 N	730 N	270 N	410000 N	16000 N	530 e	68 e
Butylate	2008415	5.00E-02 i					1800 N	180 N	68 N	100000 N	3900 N		
sec-Butylbenzene	135988	1.00E-02 e				☒	61 N	37 N	14 N	20000 N	780 N	80 e	0.27 e
tert-Butylbenzene	104518	1.00E-02 e				☒	61 N	37 N	14 N	20000 N	780 N		0.27 e
Butylphthalyl butylglycolate	85701	1.00E+00 i					37000 N	3700 N	1400 N	1E+06 N	78000 N		
Cacodylic acid	75605	3.00E-03 N					110 N	11 N	4.1 N	6100 N	230 N		
Cadmium and compounds	7440439	5.00E-04 i	5.71E-05 W		6.30E+00 i		18 N	0.00099 c	0.68 N	1000 N	39 N	920 e	6 e
Caprolactam	105602	5.00E-01 i					18000 N	1800 N	680 N	1E+06 N	39000 N		
Captafol	2425061	2.00E-03 i		8.60E-03 N			7.8 c	0.73 c	0.37 c	670 c	74 c		
Captan	133062	1.30E-01 i		3.50E-03 N			19 c	1.8 c	0.9 c	1600 c	180 c		
Carbaryl	63252	1.00E-01 i					3700 N	370 N	140 N	200000 N	7800 N	0.34 e	23 e
Carbofuran	1563662	5.00E-03 i					180 N	18 N	6.8 N	10000 N	390 N		
Carbon disulfide	75150	1.00E-01 i	2.00E-01 i			☒	1000 N	730 N	140 N	200000 N	7800 N	11 e	14 e
Carbon tetrachloride	56235	7.00E-04 i	5.71E-04 e	1.30E-01 i	5.25E-02 i	☒	0.16 c	0.12 c	0.024 c	44 c	4.9 c	0.2 e	0.03 e
Carbosulfan	55285148	1.00E-02 i					370 N	37 N	14 N	20000 N	780 N		
Carboxin	5234684	1.00E-01 i					3700 N	370 N	140 N	200000 N	7800 N		
Chloral	75876	2.00E-03 i					73 N	7.3 N	2.7 N	4100 N	160 N		
Chloramben	133904	1.50E-02 i					550 N	55 N	20 N	31000 N	1200 N		
Chloranil	118752			4.03E-01 N			0.17 c	0.016 c	0.0078 c	14 c	1.6 c		
Chlordane	57749	6.00E-05 i		1.30E+00 i	1.29E+00 i		0.052 c	0.0049 c	0.0024 c	4.4 c	0.49 c	10 e	2 e
Chlorimuron-ethyl	90982324	2.00E-02 i					730 N	73 N	27 N	41000 N	1600 N		
Chlorine	7782505	1.00E-01 i					3700 N	370 N	140 N	200000 N	7800 N		
Chlorine dioxide	10049044		5.71E-05 i				2.1 N	0.21 N					
Chloroacetaldehyde	107200	6.90E-03 o					250 N	25 N	9.3 N	14000 N	540 N		
Chloroacetic acid	79118	2.00E-03 N					73 N	7.3 N	2.7 N	4100 N	160 N		
2-Chloroacetophenone	532274		8.57E-06 i				0.31 N	0.031 N					
4-Chloroaniline	106478	4.00E-03 i					150 N	15 N	5.4 N	8200 N	310 N	1200 e	0.3 e
Chlorobenzene	108907	2.00E-02 i	5.71E-03 A			☒	39 N	21 N	27 N	41000 N	1600 N	94 e	0.6 e
Chlorobenzilate	510156	2.00E-02 i		2.70E-01 N	2.70E-01 N		0.25 c	0.023 c	0.012 c	21 c	2.4 c		
p-Chlorobenzoic acid	74113	2.00E-01 N					7300 N	730 N	270 N	410000 N	16000 N		
4-Chlorobenzotrifluoride	98566	2.00E-02 N					730 N	73 N	27 N	41000 N	1600 N	86 N	7.5 N
2-Chloro-1,3-butadiene	126998	2.00E-02 A	2.00E-03 N			☒	14 N	7.3 N	27 N	41000 N	1600 N		
1-Chlorobutane	109693	4.00E-01 N				☒	2400 N	1500 N	540 N	820000 N	31000 N		
Chlorodibromomethane	124481	2.00E-02 i		8.40E-02 i		☒	0.13 c	0.075 c	0.038 c	68 c	7.6 c	1900 e	0.2 e
1-Chloro-1,1-difluoroethane	75683		1.43E+01 i			☒	87000 N	57000 N					

Sources: I=IRIS H HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Chlorodifluoromethane	75456		1.43e+01 i			☒	87000 n	52000 n					
Chloroethane	75003	4.00E-01 a	2.86E+00 i			☒	8600 n	10000 n	540 n	820000 n	31000 n	2600 a	33 n
2-Chloroethyl vinyl ether	110758	2.50E-02 o				☒	150 n	91 n	34 n	51000 n	2000 n		
Chloroform	67663	1.00E-02 i		6.10E-03 i	8.05E-02 i	☒	0.15 c	0.078 c	0.52 c	940 c	100 c	0.2 a	0.3 a
Chloromethane	74873			1.30E-02 n	6.30E-03 n	☒	1.4 c	0.99 c	0.24 c	440 c	49 c	0.063 c	0.0066 c
4-Chloro-2,2-methylaniline hydrochloride	3165933			4.60E-01 n			0.15 c	0.014 c	0.0069 c	12 c	1.4 c		
4-Chloro-2-methylaniline	95692			5.80E-01 n			0.12 c	0.011 c	0.0054 c	9.9 c	1.1 c		
beta-Chloronaphthalene	91587	8.00E-02 i					2900 n	290 n	110 n	160000 n	6300 n	2.8 a	140 n
o-Chloronitrobenzene	88733			2.50E-02 n		☒	0.42 c	0.25 c	0.13 c	230 c	26 c		
p-Chloronitrobenzene	100005			1.80E-02 n		☒	0.59 c	0.35 c	0.18 c	320 c	35 c		
2-Chlorophenol	95578	5.00E-03 i					180 n	18 n	6.8 n	10000 n	390 n	53000 a	2 a
2-Chloropropane	75296		2.86E-02 n			☒	170 n	100 n				22 n	0.64 n
Chlorothalonil	1897456	1.50E-02 i		1.10E-02 n			6.1 c	0.57 c	0.29 c	520 c	58 c		
o-Chlorotoluene	95498	2.00E-02 i				☒	120 n	73 n	27 n	41000 n	1600 n	1200 n	5.6 n
Chlorpropham	101213	2.00E-01 i					7300 n	730 n	270 n	410000 n	16000 n		
Chlorpyrifos	2921882	3.00E-03 i					110 n	11 n	4.1 n	6100 n	230 n		
Chlorpyrifos-methyl	5598130	1.00E-02 n					370 n	37 n	14 n	20000 n	780 n		
Chlorsulfuron	64902723	5.00E-02 i					1800 n	180 n	68 n	100000 n	3900 n		
Chlorthiophos	60238564	8.00E-04 h					29 n	2.9 n	1.1 n	1600 n	63 n		
Chromium III and compounds	16065831	1.00E+00 i	5.71E-07 w				37000 n	0.0021 n	1400 n	1E+06 n	78000 n		
Chromium VI and compounds	18540299	5.00E-03 i			4.20E+01 i		180 n	0.00015 c	6.8 n	10000 n	390 n	140 a	19 a
Coal tar	8001589				2.20E+00 w			0.0028 c					
Cobalt	7440484	6.00E-02 a					2200 n	220 n	81 n	120000 n	4700 n		
Coke Oven Emissions	8007452				2.17E+00 i			0.0029 c					
Copper and compounds	7440508	4.00E-02 a					1500 n	150 n	54 n	82000 n	3100 n		
Crotonaldehyde	123739	1.00E-02 w		1.90E+00 n	1.90E+00 w		0.035 c	0.0033 c	0.0017 c	3 c	0.34 c		
Cumene	98828	4.00E-02 i	2.57E-03 n				1500 n	9.4 n	54 n	82000 n	3100 n	81 n	65 n
Cyanides:													
Barium cyanide	542621	1.00E-01 w					3700 n	370 n	140 n	200000 n	7800 n		
Calcium cyanide	592018	4.00E-02 i					1500 n	150 n	54 n	82000 n	3100 n		
**Chlorine cyanide	506774	5.00E-02 i					1800 n	180 n	68 n	100000 n	3900 n		
Copper cyanide	544923	5.00E-03 i					180 n	18 n	6.8 n	10000 n	390 n		
Cyanazine	21725462	2.00E-03 n		8.40E-01 n			0.08 c	0.0075 c	0.0038 c	6.8 c	0.76 c		
Cyanogen	460195	4.00E-02 i					1500 n	150 n	54 n	82000 n	3100 n		
Cyanogen bromide	506683	9.00E-02 i					3300 n	330 n	120 n	180000 n	7000 n		
Cyanogen chloride	506774	5.00E-02 i					1800 n	180 n	68 n	100000 n	3900 n		
Free cyanide	57125	2.00E-02 i					730 n	73 n	27 n	41000 n	1600 n		
Hydrogen cyanide	74908	2.00E-02 i	8.57E-04 i				730 n	3.1 n	27 n	41000 n	1600 n		
Potassium cyanide	151508	5.00E-02 i					1800 n	180 n	68 n	100000 n	3900 n		

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Potassium silver cyanide	506616	2.00E-01 i					7300 n	730 n	270 n	410000 n	16000 n		
Silver cyanide	506649	1.00E-01 i					3700 n	370 n	140 n	200000 n	7800 n		
Sodium cyanide	143339	4.00E-02 i					1500 n	150 n	54 n	82000 n	3100 n		
Thiocyanate		2.00E-02 e					730 n	73 n	27 n	41000 n	1600 n		
Zinc cyanide	557211	5.00E-02 i					1800 n	180 n	68 n	100000 n	3900 n		
Cyclohexanone	108941	5.00E+00 i				☒	30000 n	18000 n	6800 n	1E+06 n	390000 n		
Cyclohexlamine	108918	2.00E-01 i					7300 n	730 n	270 n	410000 n	16000 n		
Cyhalothrin/Karate	68085858	5.00E-03 i					180 n	18 n	6.8 n	10000 n	390 n		
Cypermethrin	52315078	1.00E-02 i					370 n	37 n	14 n	20000 n	780 n		
Cyromazine	66215278	7.50E-03 i					270 n	27 n	10 n	15000 n	590 n		
Dacthal	1861321	1.00E-02 i					370 n	37 n	14 n	20000 n	780 n		
Dalapon	75990	3.00E-02 i					1100 n	110 n	41 n	61000 n	2300 n		
Danitol	39515418	2.50E-02 i					910 n	91 n	34 n	51000 n	2000 n		
DDD	72548			2.40E-01 i			0.28 c	0.026 c	0.013 c	24 c	2.7 c	37 e	0.7 e
DDE	72559			3.40E-01 i			0.2 c	0.018 c	0.0093 c	17 c	1.9 c	10 e	0.5 e
DDT	50293	5.00E-04 i		3.40E-01 i	3.40E-01 i		0.2 c	0.018 c	0.0093 c	17 c	1.9 c	80 e	1 e
Decabromodiphenyl ether	1163195	1.00E-02 i				☒	61 n	37 n	14 n	20000 n	780 n		
Demeton	8065483	4.00E-05 i					1.5 n	0.15 n	0.054 n	82 n	3.1 n		
Diallate	2303164			6.10E-02 n		☒	0.17 c	0.1 c	0.052 c	94 c	10 c		
Diazinon	333415	9.00E-04 n					33 n	3.3 n	1.2 n	1800 n	70 n	5400 e	2.8 n
Dibenzofuran	132649	4.00E-03 e					150 n	15 n	5.4 n	8200 n	310 n	120 e	120 n
1,4-Dibromobenzene	106376	1.00E-02 i				☒	61 n	37 n	14 n	20000 n	780 n		
1,2-Dibromo-3-chloropropane	96128		5.71E-05 i	1.40E+00 n	2.42E-03 n	☒	0.048 c	0.21 n	0.0023 c	4.1 c	0.46 c	1.9 n	0.00061 n
1,2-Dibromoethane	106934		5.71E-05 n	8.50E+01 i	7.70E-01 i	☒	0.00075 c	0.0081 c	0.00004 c	0.067 c	0.0075 c	0.0058 c	0.00018 n
Dibutyl phthalate	84742	1.00E-01 i					3700 n	370 n	140 n	200000 n	7800 n	100 e	120 e
Dicamba	1918009	3.00E-02 i					1100 n	110 n	41 n	61000 n	2300 n		
1,2-Dichlorobenzene	95501	9.00E-02 i	4.00E-02 a			☒	270 n	150 n	120 n	180000 n	7000 n	300 e	6 e
1,3-Dichlorobenzene	541731	8.90E-02 n				☒	540 n	120 n	120 n	180000 n	7000 n		
1,4-Dichlorobenzene	106467		2.29E-01 i	2.40E-02 n		☒	0.44 c	0.26 c	0.13 c	240 c	27 c	7700 e	1 e
3,3'-Dichlorobenzidine	91941			4.50E-01 i			0.15 c	0.014 c	0.007 c	13 c	1.4 c	52 e	0.01 e
1,4-Dichloro-2-butene	764410				9.30E+00 n	☒	0.0011 c	0.00067 c					
Dichlorodifluoromethane	75718	2.00E-01 i	5.71E-02 a			☒	390 n	210 n	270 n	410000 n	16000 n	37 n	7.5 n
1,1-Dichloroethane	75343	1.00E-01 n	1.43E-01 a			☒	810 n	520 n	140 n	200000 n	7800 n	980 e	11 e
1,2-Dichloroethane (EDC)	107062		2.86E-03 e	9.10E-02 i	9.10E-02 i	☒	0.12 c	0.069 c	0.035 c	63 c	7 c	0.3 e	0.01 e
1,1-Dichloroethylene	75354	9.00E-03 i		6.00E-01 i	1.75E-01 i	☒	0.044 c	0.036 c	0.0053 c	9.5 c	1.1 c	0.04 e	0.03 e
1,2-Dichloroethylene (cis)	156592	1.00E-02 n				☒	61 n	37 n	14 n	20000 n	780 n	1500 e	0.2 e
1,2-Dichloroethylene (trans)	156605	2.00E-02 i				☒	120 n	73 n	27 n	41000 n	1600 n	3600 e	0.3 e
1,2-Dichloroethylene (mixture)	540590	9.00E-03 n				☒	55 n	33 n	12 n	18000 n	700 n		
2,4-Dichlorophenol	120832	3.00E-03 i					110 n	11 n	4.1 n	6100 n	230 n	4800 e	0.5 e

Sources: I=IRIS H HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
2,4-Dichlorophenoxyacetic Acid (2,4-D)	94757	1.00E-02 I				☒	61 N	37 N	14 N	20000 N	780 N	7000 E	1.7 E
4-(2,4-Dichlorophenoxy)butyric Acid	94826	8.00E-03 I					290 N	29 N	11 N	16000 N	630 N		
1,2-Dichloropropane	78875		1.14E-03 I	6.80E-02 H		☒	0.16 C	0.092 C	0.046 C	84 C	9.4 C	11 E	0.02 E
2,3-Dichloropropanol	616239	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
1,3-Dichloropropene	542756	3.00E-04 I	5.71E-03 I	1.75E-01 H	1.30E-01 H	☒	0.077 C	0.048 C	0.018 C	33 C	3.7 C	0.1 E	0.001 E
Dichlorvos	62737	5.00e-04 I	1.43E-04 I	2.90E-01 I			0.23 C	0.022 C	0.011 C	20 C	2.2 C	3.5 C	0.00072 C
Dicofol	115322			4.40E-01 W			0.15 C	0.014 C	0.0072 C	13 C	1.5 C		
Dicyclopentadiene	77736	3.00E-02 H	5.71E-05 A			☒	0.42 N	0.21 N	41 N	61000 N	2300 N		
Dieldrin	60571	5.00E-05 I		1.60E+01 I	1.61E+01 I		0.0042 C	0.00039 C	0.0002 C	0.36 C	0.04 C	2 E	0.001 E
Diesel emissions			1.43E-03 I				52 N	5.2 N					
Diethyl phthalate	84662	8.00E-01 I					29000 N	2900 N	1100 N	1E+06 N	63000 N	520 E	110 E
Diethylene glycol, monobutyl ether	112345		5.71E-03 H				210 N	21 N					
Diethylene glycol, monoethyl ether	111900	2.00E+00 H					73000 N	7300 N	2700 N	1E+06 N	160000 N		
Diethylforamide	617845	1.10E-02 H					400 N	40 N	15 N	22000 N	860 N		
Di(2-ethylhexyl)adipate	103231	6.00E-01 I		1.20E-03 I			56 C	5.2 C	2.6 C	4800 C	530 C		
Diethylstilbestrol	56531			4.70E+03 H			0.00001 C	1E-06 C	7E-07 C	0.0012 C	0.00014 C		
Difenzoquat (Avenge)	43222486	8.00E-02 I					2900 N	290 N	110 N	160000 N	6300 N		
Diflubenzuron	35367385	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
1,1-Difluoroethane	75376		1.14E+01 I			☒	69000 N	42000 N					
Diisopropyl methylphosphonate (DIMP)	1445756	8.00E-02 I					2900 N	290 N	110 N	160000 N	6300 N		
Dimethipin	55290647	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Dimethoate	60515	2.00E-04 I					7.3 N	0.73 N	0.27 N	410 N	16 N		
3,3'-Dimethoxybenzidine	119904			1.40E-02 H			4.8 C	0.45 C	0.23 C	410 C	46 C		
Dimethylamine	124403		5.71E-06 W				0.21 N	0.021 N					
2,4-Dimethylaniline hydrochloride	21436964			5.80E-01 H			0.12 C	0.011 C	0.0054 C	9.9 C	1.1 C		
2,4-Dimethylaniline	95681			7.50E-01 H			0.09 C	0.0083 C	0.0042 C	7.6 C	0.85 C		
N-N-Dimethylaniline	121697	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
3,3'-Dimethylbenzidine	119937			9.20E+00 H			0.0073 C	0.00068 C	0.00034 C	0.62 C	0.069 C	29 C	0.00039 C
N,N-Dimethylformamide	68122	1.00E-01 H	8.57E-03 I				3700 N	31 N	140 N	200000 N	7800 N		
1,1-Dimethylhydrazine	57147			2.60E+00 W	3.50E+00 W		0.026 C	0.0018 C	0.0012 C	2.2 C	0.25 C		
1,2-Dimethylhydrazine	540738			3.70E+01 W	3.70E+01 W		0.0018 C	0.00017 C	0.00009 C	0.15 C	0.017 C		
2,4-Dimethylphenol	105679	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N	5400 E	3 E
2,6-Dimethylphenol	576261	6.00E-04 I					22 N	2.2 N	0.81 N	1200 N	47 N		
3,4-Dimethylphenol	95658	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Dimethyl phthalate	131113	1.00E+01 H					370000 N	37000 N	14000 N	1E+06 N	780000 N	1600 E	1200 E
Dimethyl terephthalate	120616	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
1,2-Dinitrobenzene	528290	4.00E-04 H					15 N	1.5 N	0.54 N	820 N	31 N		
1,3-Dinitrobenzene	99650	1.00E-04 I					3.7 N	0.37 N	0.14 N	200 N	7.8 N		
1,4-Dinitrobenzene	100254	4.00E-04 H					15 N	1.5 N	0.54 N	820 N	31 N		

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
4,6-Dinitro-o-cyclohexyl phenol	131895	2.00E-03 i					73 n	7.3 n	2.7 n	4100 n	160 n		
2,4-Dinitrophenol	51285	2.00E-03 i					73 n	7.3 n	2.7 n	4100 n	160 n	360 n	0.1 e
Dinitrotoluene mixture				6.80E-01 i			0.099 c	0.0092 c	0.0046 c	8.4 c	0.94 c		
2,4-Dinitrotoluene	121142	2.00E-03 i					73 n	7.3 n	2.7 n	4100 n	160 n	120 e	0.2 e
2,6-Dinitrotoluene	606202	1.00E-03 n					37 n	3.7 n	1.4 n	2000 n	78 n	370 e	0.1 e
Dinoseb	88857	1.00E-03 i					37 n	3.7 n	1.4 n	2000 n	78 n		
di-n-Octyl phthalate	117840	2.00E-02 n					730 n	73 n	27 n	41000 n	1600 n	1000000 e	1000000 e
1,4-Dioxane	123911			1.10E-02 i			6.1 c	0.57 c	0.29 c	520 c	58 c		
Diphenamid	957517	3.00E-02 i					1100 n	110 n	41 n	61000 n	2300 n		
Diphenylamine	122394	2.50E-02 i					910 n	91 n	34 n	51000 n	2000 n		
1,2-Diphenylhydrazine	122667			8.00E-01 i	7.70E-01 i		0.084 c	0.0081 c	0.0039 c	7.2 c	0.8 c		
Diquat	85007	2.20E-03 i					80 n	8 n	3 n	4500 n	170 n		
Direct black 38	1937377			8.60E+00 n			0.0078 c	0.00073 c	0.00037 c	0.67 c	0.074 c		
Direct blue 6	2602462			8.10E+00 n			0.0083 c	0.00077 c	0.00039 c	0.71 c	0.079 c		
Direct brown 95	16071866			9.30E+00 n			0.0072 c	0.00067 c	0.00034 c	0.62 c	0.069 c		
Disulfoton	298044	4.00E-05 i					1.5 n	0.15 n	0.054 n	82 n	3.1 n		
1,4-Dithiane	505293	1.00E-02 i					370 n	37 n	14 n	20000 n	780 n		
Diuron	330541	2.00E-03 i					73 n	7.3 n	2.7 n	4100 n	160 n		
Dodine	2439103	4.00E-03 i					150 n	15 n	5.4 n	8200 n	310 n		
Endosulfan	115297	6.00E-03 i					220 n	22 n	8.1 n	12000 n	470 n	1 e	3 e
Endothall	145733	2.00E-02 i					730 n	73 n	27 n	41000 n	1600 n		
Endrin	72208	3.00E-04 i					11 n	1.1 n	0.41 n	610 n	23 n	16 e	0.4 e
Epichlorohydrin	106898	2.00E-03 n	2.86E-04 i	9.90E-03 i	4.20E-03 i		6.8 c	1 n	0.32 c	580 c	65 c		
1,2-Epoxybutane	106887		5.71E-03 i				210 n	21 n					
Ethephon (2-chloroethyl phosphonic acid)	16672870	5.00E-03 i					180 n	18 n	6.8 n	10000 n	390 n		
Ethion	563122	5.00E-04 i					18 n	1.8 n	0.68 n	1000 n	39 n		
2-Ethoxyethanol acetate	111159	3.00E-01 A					11000 n	1100 n	410 n	610000 n	23000 n		
2-Ethoxyethanol	110805	4.00E-01 n	5.71E-02 i				15000 n	210 n	540 n	820000 n	31000 n		
Ethyl acrylate	140885			4.80E-02 n			1.4 c	0.13 c	0.066 c	120 c	13 c		
EPTC (S-Ethyl dipropylthiocarbamate)	759944	2.50E-02 i					910 n	91 n	34 n	51000 n	2000 n		
Ethyl acetate	141786	9.00E-01 i					33000 n	3300 n	1200 n	1E+06 n	70000 n		
Ethylbenzene	100414	1.00E-01 i	2.86E-01 i			X	1300 n	1000 n	140 n	200000 n	7800 n	260 e	5 e
Ethylene cyanohydrin	109784	3.00E-01 n					11000 n	1100 n	410 n	610000 n	23000 n		
Ethylene diamine	107153	2.00E-02 n					730 n	73 n	27 n	41000 n	1600 n		
Ethylene glycol	107211	2.00E+00 i					73000 n	7300 n	2700 n	1E+06 n	160000 n		
Ethylene glycol, monobutyl ether	111762		5.71E-03 n				210 n	21 n					
Ethylene oxide	75218			1.02E+00 n	3.50E-01 n		0.066 c	0.018 c	0.0031 c	5.6 c	0.63 c		
Ethylene thiourea (ETU)	96457	8.00E-05 i		1.19E-01 n			0.57 c	0.053 c	0.027 c	48 c	5.4 c		
Ethyl ether	60297	2.00E-01 i				X	1200 n	730 n	270 n	410000 n	16000 n		

Sources: I=IRIS H HEAST A HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Ethyl methacrylate	97632	9.00E-02 H					3300 N	330 N	120 N	180000 N	7000 N		
Ethyl p-nitrophenyl phenylphosphorothioate	2104645	1.00E-05 I					0.37 N	0.037 N	0.014 N	20 N	0.78 N		
Ethylnitrosourea	759739			1.40E+02 W			0.00048 C	0.00005 C	0.00002 C	0.041 C	0.0046 C		
Ethylphthalyl ethyl glycolate	84720	3.00E+00 I					110000 N	11000 N	4100 N	1E+06 N	230000 N		
Express	10120	8.00E-03 I					290 N	29 N	11 N	16000 N	630 N		
Fenamiphos	22224926	2.50E-04 I					9.1 N	0.91 N	0.34 N	510 N	20 N		
Fluometuron	2164172	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Fluoride	7782414	6.00E-02 I					2200 N	220 N	81 N	120000 N	4700 N		
Fluoridone	59756604	8.00E-02 I					2900 N	290 N	110 N	160000 N	6300 N		
Flurprimidol	56425913	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Flutolanil	66332965	6.00E-02 I					2200 N	220 N	81 N	120000 N	4700 N		
Fluvalinate	69409945	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
Folpet	133073	1.00E-01 I		3.50E-03 I			19 C	1.8 C	0.9 C	1600 C	180 C		
Fomesafen	72178020			1.90E-01 I			0.35 C	0.033 C	0.017 C	30 C	3.4 C		
Fonofos	944229	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
Formaldehyde	50000	2.00E-01 I			4.55E-02 I		7300 N	0.14 C	270 N	410000 N	16000 N		
Formic Acid	64186	2.00E+00 H					73000 N	7300 N	2700 N	1E+06 N	160000 N		
Fosetyl-al	39148248	3.00E+00 I					110000 N	11000 N	4100 N	1E+06 N	230000 N		
Furan	110009	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Furazolidone	67458			3.80E+00 H			0.018 C	0.0016 C	0.00083 C	1.5 C	0.17 C		
Furfural	98011	3.00E-03 I	1.43E-02 A				110 N	52 N	4.3 N	6100 N	230 N		
Furium	531828			5.00E+01 H			0.0013 C	0.00013 C	0.00006 C	0.11 C	0.013 C		
Furmecyclox	60568050			3.00E-02 I			2.2 C	0.21 C	0.11 C	190 C	21 C		
Glufosinate-ammonium	77182822	4.00E-04 I					15 N	1.5 N	0.54 N	820 N	31 N		
Glycidaldehyde	765344	4.00E-04 I	2.86E-04 H				15 N	1 N	0.54 N	820 N	31 N		
Glyphosate	1071836	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
Haloxyfop-methyl	69806402	5.00E-05 I					1.8 N	0.18 N	0.068 N	100 N	3.9 N		
Harmony	79277273	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
HCH (alpha)	319846			6.30E+00 I	6.30E+00 I		0.011 C	0.00099 C	0.0005 C	0.91 C	0.1 C	0.9 E	0.0004 E
HCH (beta)	319857			1.80E+00 I	1.80E+00 I		0.037 C	0.0035 C	0.0018 C	3.2 C	0.35 C	16 E	0.002 E
HCH (gamma) Lindane	58899	3.00E-04 I		1.30E+00 H			0.052 C	0.0048 C	0.0024 C	4.4 C	0.49 C	4.2 C	0.006 E
HCH-technical	608731			1.80E+00 I	1.79E+00 I		0.037 C	0.0035 C	0.0018 C	3.2 C	0.35 C		
Heptachlor	76448	5.00E-04 I		4.50E+00 I	4.55E+00 I	☒	0.0023 C	0.0014 C	0.0007 C	1.3 C	0.14 C	0.3 E	0.06 E
Heptachlor epoxide	1024573	1.30E-05 I		9.10E+00 I	9.10E+00 I	☒	0.0012 C	0.00069 C	0.00035 C	0.63 C	0.07 C	1 E	0.03 E
Hexabromobenzene	87821	2.00E-03 I				☒	12 N	7.3 N	2.7 N	4100 N	160 N		
Hexachlorobenzene	118741	8.00E-04 I		1.60E+00 I	1.61E+00 I	☒	0.0066 C	0.0039 C	0.002 C	3.6 C	0.4 C	1 E	0.8 E
Hexachlorobutadiene	87683	2.00E-04 H		7.80E-02 I	7.70E-02 I	☒	0.14 C	0.081 C	0.04 C	73 C	8.2 C	1 E	0.1 E
Hexachlorocyclopentadiene	77474	7.00E-03 I	2.00E-05 H			☒	0.15 N	0.073 N	9.5 N	14000 N	550 N	2 E	10 E
Hexachlorodibenzo-p-dioxin mixture	19408743			6.20E+03 I	4.55E+03 I		0.00001 C	1E-06 C	5E-07 C	0.0009 C	0.0001 C		

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects R=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Hexachloroethane	67721	1.00E-03 i		1.40E-02 i	1.40E-02 i	☒	0.75 c	0.45 c	0.23 c	410 c	46 c	49 e	0.2 e
Hexachlorophene	70304	3.00E-04 i					11 n	1.1 n	0.41 n	610 n	23 n		
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121824	3.00E-03 i		1.10E-01 i			0.61 c	0.057 c	0.029 c	52 c	5.8 c		
1,6-Hexamethylene diisocyanate	822060		2.86E-06 i				0.1 n	0.01 n					
n-Hexane	110543	6.00E-02 n	5.71E-02 i			☒	350 n	210 n	81 n	120000 n	4700 n	32 n	13 n
Hexazinone	51235042	3.30E-02 i					1200 n	120 n	45 n	67000 n	2600 n		
Hydrazine, hydrazine sulfate	302012			3.00E+00 i	1.71E+01 i		0.022 c	0.00037 c	0.0011 c	1.9 c	0.21 c		
Hydrogen chloride	7647010		5.71E-03 i				210 n	21 n					
Hydrogen sulfide	7783064	3.00E-03 i	2.85E-04 i				110 n	1 n	4.1 n	6100 n	230 n		
Hydroquinone	123319	4.00E-02 n					1500 n	150 n	54 n	82000 n	3100 n		
Imazalil	35554440	1.30E-02 i					470 n	47 n	18 n	27000 n	1000 n		
Imazaquin	81335377	2.50E-01 i					9100 n	910 n	340 n	510000 n	20000 n		
Iprodione	36734197	4.00E-02 i					1500 n	150 n	54 n	82000 n	3100 n		
Iron	7439896	3.00E-01 e					11000 n	1100 n	410 n	610000 n	23000 n		
Isobutanol	78831	3.00E-01 i				☒	1800 n	1100 n	410 n	610000 n	23000 n		
Isophorone	78591	2.00E-01 i		9.50E-04 i			71 c	6.6 c	3.3 c	6000 c	670 c	3400 e	0.2 e
Isopropalin	33820530	1.50E-02 i					550 n	55 n	20 n	31000 n	1200 n		
Isopropyl methyl phosphonic acid	1832548	1.00E-01 i					3700 n	370 n	140 n	200000 n	7800 n		
Isoxaben	82558507	5.00E-02 i					1800 n	180 n	68 n	100000 n	3900 n		
Kepone	143500			1.80E+01 e			0.0037 c	0.00035 c	0.00018 c	0.32 c	0.035 c		
Lactofen	77501634	2.00E-03 i					73 n	7.3 n	2.7 n	4100 n	160 n		
Linuron	330552	2.00E-03 i					73 n	7.3 n	2.7 n	4100 n	160 n		
Lithium	7439932	2.00E-02 e					730 n	73 n	27 n	41000 n	1600 n		
Londax	83056996	2.00E-01 i					7300 n	730 n	270 n	410000 n	16000 n		
Malathion	121755	2.00E-02 i					730 n	73 n	27 n	41000 n	1600 n		
Maleic anhydride	108316	1.00E-01 i					3700 n	370 n	140 n	200000 n	7800 n		
Maleic hydrazide	123331	5.00E-01 i					18000 n	1800 n	680 n	1E+06 n	39000 n		
Malononitrile	109773	2.00E-05 n					0.73 n	0.073 n	0.027 n	41 n	1.6 n		
Mancozeb	8018017	3.00E-02 n					1100 n	110 n	41 n	61000 n	2300 n		
Maneb	12427382	5.00E-03 i					180 n	18 n	6.8 n	10000 n	390 n		
**Manganese and compounds	7439965	2.30E-02 i	1.43e-05 i				840 n	0.052 n	31 n	47000 n	1800 n		
Mephosfolan	950107	9.00E-05 n					3.3 n	0.33 n	0.12 n	180 n	7 n		
Mepiquat chloride	24307264	3.00E-02 i					1100 n	110 n	41 n	61000 n	2300 n		
Mercuric chloride	7487947	3.00E-04 i					11 n	1.1 n	0.41 n	610 n	23 n		
Mercury (inorganic)	7439976	3.00E-04 n	8.57E-05 n				11 n	0.31 ■	0.41 n	610 ■	23 n	7 e	3 e
Mercury (methyl)	22967926	1.00E-04 i					3.7 n	0.37 n	0.14 n	200 n	7.8 n		
Merphos	150505	3.00E-05 i					1.1 n	0.11 n	0.041 n	61 n	2.3 ■		
Merphos oxide	78488	3.00E-05 i					1.1 n	0.11 n	0.041 n	61 n	2.3 n		
Metalaxyl	57837191	6.00E-02 i					2200 n	220 n	81 n	120000 n	4700 n		

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Methacrylonitrile	126987	1.00E-04 I	2.00E-04 A				3.7 N	0.73 N	0.14 N	200 N	7.8 N		
Methamidophos	10265926	5.00E-05 I					1.8 N	0.18 N	0.068 N	100 N	3.9 N		
Methanol	67561	5.00E-01 I					18000 N	1800 N	680 N	1E+06 N	39000 N		
Methidathion	950378	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Methomyl	16752775	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Methoxychlor	72435	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N	41 S	62 S
2-Methoxyethanol acetate	110496	2.00E-03 A					73 N	7.3 N	2.7 N	4100 N	160 N		
2-Methoxyethanol	109864	1.00E-03 H	5.71E-03 I				37 N	21 N	1.4 N	2000 N	78 N		
2-Methoxy-5-nitroaniline	99592			4.60E-02 H			1.5 C	0.14 C	0.069 C	120 C	14 C		
Methyl acetate	79209	1.00E+00 H					37000 N	3700 N	1400 N	1E+06 N	78000 N		
Methyl acrylate	96333	3.00E-02 A					1100 N	110 N	41 N	61000 N	2300 N		
2-Methylaniline hydrochloride	636215			1.80E-01 H			0.37 C	0.035 C	0.018 C	32 C	3.5 C		
2-Methylaniline	95534			2.40E-01 H			0.28 C	0.026 C	0.013 C	24 C	2.7 C		
Methyl chlorocarbonate	79221	1.00E+00 W					37000 N	3700 N	1400 N	1E+06 N	78000 N		
4-(2-Methyl-4-chlorophenoxy) butyric acid	94815	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
2-Methyl-4-chlorophenoxyacetic acid	94746	5.00E-04 I					18 N	1.8 N	0.68 N	1000 N	39 N		
2-(2-Methyl-14-chlorophenoxy)propionic acid	93652	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Methylcyclohexane	108872		8.57E-01 H				31000 N	3100 N				60 S	1500 N
Methylene bromide	74953	1.00E-02 A				☒	61 N	37 N	14 N	20000 N	780 N		
Methylene chloride	75092	6.00E-02 I	8.57E-01 H	7.50E-03 I	1.64E-03 I	☒	4.1 C	3.8 C	0.42 C	760 C	85 C	7 S	0.01 S
4,4'-Methylene bis(2-chloroaniline)	101144	7.00E-04 H		1.30E-01 H	1.30E-01 H		0.52 C	0.048 C	0.024 C	44 C	4.9 C		
4,4'-Methylenebisbenzenamine	101779			2.50E-01 W			0.27 C	0.025 C	0.013 C	23 C	2.6 C		
4,4'-Methylene bis(N,N'-dimethyl)aniline	101611			4.60E-02 I			1.5 C	0.14 C	0.069 C	120 C	14 C		
4,4'-Methylenediphenyl isocyanate	101688		5.71E-06 I			☒	0.035 N	0.021 N					
Methyl ethyl ketone	78933	6.00E-01 I	2.86E-01 I			☒	1900 N	1000 N	810 N	1E+06 N	47000 N		
Methyl hydrazine	60344			1.10E+00 W			0.061 C	0.0057 C	0.0029 C	5.2 C	0.58 C		
Methyl isobutyl ketone	108101	8.00E-02 H	2.29E-02 A				2900 N	84 N	110 N	160000 N	6300 N		
Methyl methacrylate	80626	8.00E-02 H					2900 N	290 N	110 N	160000 N	6300 N		
2-Methyl-5-nitroaniline	99558			3.30E-02 H			2 C	0.19 C	0.096 C	170 C	19 C		
Methyl parathion	298000	2.50E-04 I					9.1 N	0.91 N	0.34 N	510 N	20 N	28 S	0.041 N
2-Methylphenol (o-cresol)	95487	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N	12000 S	6 S
3-Methylphenol (m-cresol)	103394	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
4-Methylphenol (p-cresol)	106445	5.00E-03 H					180 N	18 N	6.8 N	10000 N	390 N		
Methyl styrene (mixture)	25013154	6.00E-03 A	1.14E-02 A			☒	60 N	42 N	8.1 N	12000 N	470 N	100 N	1 N
Methyl styrene (alpha)	98839	7.00E-02 A				☒	430 N	260 N	95 N	140000 N	5500 N	8.8 S	7.5 N
Methyl tertbutyl ether (MTBE)	1634044	5.00E-03 E	8.57E-01 I			☒	180 N	3100 N	6.8 N	10000 N	390 N		
Metolaclor (Dual)	51218452	1.50E-01 H					5500 N	550 N	200 N	310000 N	12000 N		
Metribuzin	21087649	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Mirex	2385855	2.00E-04 I		1.80E+00 W			0.037 C	0.0035 C	0.0018 C	3.2 C	0.35 C		

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Molinate	2212671	2.00E-03 i					73 n	7.3 n	2.7 n	4100 n	160 n		
Molybdenum	7439987	5.00E-03 i					180 n	18 n	6.8 n	10000 n	390 n		
Monochloramine	10599903	1.00E-01 i					3700 n	370 n	140 n	200000 n	7800 n		
Nalod	300765	2.00E-03 i					73 n	7.3 n	2.7 n	4100 n	160 n		
2-Naphthylamine	91598			1.30e+02 a			0.00052 c	0.00005 c	0.00002 c	0.044 c	0.0049 c		
Napropamide	15299997	1.00E-01 i					3700 n	370 n	140 n	200000 n	7800 n		
Nickel refinery dust					8.40E-01 i			0.0075 c					
Nickel and compounds	7440020	2.00E-02 i					730 n	73 n	27 n	41000 n	1600 n	6900 e	21 e
Nickel subsulfide	12035722				1.70E+00 i			0.0037 c					
Nitrapyrin	1929824	1.50E-03 w					55 n	5.5 n	2 n	3100 n	120 n		
Nitrate	14797558	1.60E+00 i					58000 n	5800 n	2200 n	1E+06 n	130000 n		
Nitric oxide	10102439	1.00E-01 w					3700 n	370 n	140 n	200000 n	7800 n		
Nitrite	14797650	1.00E-01 i					3700 n	370 n	140 n	200000 n	7800 n		
2-Nitroaniline	88744	6.00E-05 w	5.71E-05 n				2.2 n	0.21 n	0.081 n	120 n	4.7 n		
3-Nitroaniline	99092	3.00E-03 o					110 n	11 n	4.1 n	6100 n	230 n		
4-Nitroaniline	100016	3.00E-03 o					110 n	11 n	4.1 n	6100 n	230 n		
Nitrobenzene	98953	5.00E-04 i	5.71E-04 a			☒	3.4 n	2.1 n	0.68 n	1000 n	39 n	110 e	0.09 e
Nitrofurantoin	67209	7.00E-02 n					2600 n	260 n	95 n	140000 n	5500 n		
Nitrofurazone	59870			1.50E+00 n	9.40E+00 n		0.045 c	0.00067 c	0.0021 c	3.8 c	0.43 c		
Nitrogen dioxide	10102440	1.00E+00 w					37000 n	3700 n	1400 n	1E+06 n	78000 n		
Nitroguanidine	556887	1.00E-01 i					3700 n	370 n	140 n	200000 n	7800 n		
4-Nitrophenol	100027	6.20E-02 o					2300 n	230 n	84 n	130000 n	4800 n		
2-Nitropropane	79469		5.71E-03 i		9.40E+00 n		210 n	0.00067 c					
N-Nitrosodi-n-butylamine	924163			5.40E+00 i	5.60E+00 i		0.012 c	0.0011 c	0.00058 c	1.1 c	0.12 c		
N-Nitrosodiethanolamine	1116547			2.80E+00 i			0.024 c	0.0022 c	0.0011 c	2 c	0.23 c		
N-Nitrosodiethylamine	55185			1.50E+02 i	1.51E+02 i		0.00045 c	0.00004 c	0.00002 c	0.038 c	0.0043 c		
N-Nitrosodimethylamine	62759			5.10E+01 i	4.90E+01 i		0.0013 c	0.00013 c	0.00006 c	0.11 c	0.013 c		
N-Nitrosodiphenylamine	86306			4.90E-03 i			14 c	1.3 c	0.64 c	1200 c	130 c	29 c	0.2 e
N-Nitroso di-n-propylamine	621647			7.00E+00 i			0.0096 c	0.00089 c	0.00045 c	0.82 c	0.091 c	0.014 c	0.00002 e
N-Nitroso-N-methylethylamine	10595956			2.20E+01 i			0.0031 c	0.00028 c	0.00014 c	0.26 c	0.029 c		
N-Nitrosopyrrolidine	930552			2.10E+00 i	2.13E+00 i		0.032 c	0.0029 c	0.0015 c	2.7 c	0.3 c		
m-Nitrotoluene	99081	1.00E-02 n				☒	61 n	37 n	14 n	20000 n	780 n	460 e	0.42 e
o-Nitrotoluene	88722	1.00E-02 n				☒	61 n	37 n	14 n	20000 n	780 n	460 e	0.42 e
p-Nitrotoluene	99990	1.00E-02 n				☒	61 n	37 n	14 n	20000 n	780 n	460 e	0.42 e
Norflurazon	27314132	4.00E-02 i					1500 n	150 n	54 n	82000 n	3100 n		
NuStar	85509199	7.00E-04 i					26 n	2.6 n	0.95 n	1400 n	55 n		
Octabromodiphenyl ether	32536520	3.00E-03 i					110 n	11 n	4.1 n	6100 n	230 n		
Octahydro-1357-tetranitro-1357-tetrazocine	2691410	5.00E-02 i					1800 n	180 n	68 n	100000 n	3900 n		
Octamethylpyrophosphoramide	152169	2.00E-03 n					73 n	7.3 n	2.7 n	4100 n	160 n		

Sources: I=IRIS H HEAST A-HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Oryzalin	19044883	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Oxadiazon	19666309	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Oxamyl	23135220	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Oxyfluorfen	42874033	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
Paclobutrazol	76738620	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Paraquat	1910425	4.50E-03 I					160 N	16 N	6.1 N	9200 N	350 N		
Parathion	56382	6.00E-03 H					220 N	22 N	8.1 N	12000 N	470 N	110 E	3.9 N
Pebulate	1114712	5.00E-02 H					1800 N	180 N	68 N	100000 N	3900 N		
Pendimethalin	40487421	4.00E-02 I					1500 N	150 N	54 N	82000 N	3100 N		
Pentabromo-6-chloro cyclohexane	87843			2.30E-02 H			2.9 C	0.27 C	0.14 C	250 C	28 C		
Pentabromodiphenyl ether	32534819	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
Pentachlorobenzene	608935	8.00E-04 I				☒	4.9 N	2.9 N	1.1 N	1600 N	63 N	570 N	48 N
Pentachloronitrobenzene	82688	3.00E-03 I		2.60E-01 H		☒	0.041 C	0.024 C	0.012 C	22 C	2.5 C		
Pentachlorophenol	87865	3.00E-02 I		1.20E-01 I			0.56 C	0.052 C	0.026 C	48 C	5.3 C	7.9 C	0.2 E
Permethrin	52645531	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Phenmedipham	13684634	2.50E-01 I					9100 N	910 N	340 N	510000 N	20000 N		
Phenol	108952	6.00E-01 I					22000 N	2200 N	810 N	1E+06 N	47000 N	21000 E	49 E
m-Phenylenediamine	108452	6.00E-03 I					220 N	22 N	8.1 N	12000 N	470 N		
p-Phenylenediamine	106503	1.90E-01 H					6900 N	690 N	260 N	390000 N	15000 N		
Phenylmercuric acetate	62384	8.00E-05 I					2.9 N	0.29 N	0.11 N	160 N	6.3 N		
2-Phenylphenol	90437			1.94E-03 H			35 C	3.2 C	1.6 C	3000 C	330 C		
Phorate	298022	2.00E-04 H					7.3 N	0.73 N	0.27 N	410 N	16 N		
Phosmet	732116	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Phosphine	7803512	3.00E-04 I	8.57E-05 I				11 N	0.31 N	0.41 N	610 N	23 N		
Phosphoric acid	7664382		2.86E-03 I				100 N	10 N					
Phosphorus (white)	7723140	2.00E-05 I					0.73 N	0.073 N	0.027 N	41 N	1.6 N		
p-Phthalic acid	100210	1.00E+00 H					37000 N	3700 N	1400 N	1E+06 N	78000 N		
Phthalic anhydride	85449	2.00E+00 I	3.43E-02 H				73000 N	130 N	2700 N	1E+06 N	160000 N		
Picloram	1918021	7.00E-02 I					2600 N	260 N	95 N	140000 N	5500 N		
Pirimiphos-methyl	29232937	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
Polybrominated biphenyls		7.00E-06 H		8.90E+00 H			0.0076 C	0.0007 C	0.00035 C	0.64 C	0.072 C		
Polychlorinated biphenyls (PCBs)	1336363			7.70E+00 I			0.0087 C	0.00081 C	0.00041 C	0.74 C	0.083 C		
Aroclor 1016	12674112	7.00E-05 I					2.6 N	0.26 N	0.095 N	140 N	5.5 N		
Aroclor 1254	11097691	2.00E-05 I					0.73 N	0.073 N	0.027 N	41 N	1.6 N		
Polychlorinated terphenyls (PCTs)				4.50E+00 E			0.015 C	0.0014 C	0.0007 C	1.3 C	0.14 C		
Polynuclear aromatic hydrocarbons												110000 E	
Acenaphthene	83329	6.00E-02 I					2200 N	220 N	81 N	120000 N	4700 N	120 E	200 E
Anthracene	120127	3.00E-01 I					11000 N	1100 N	410 N	610000 N	23000 N	6.8 E	4300 E
Benz[a]anthracene	56553			7.30E-01 E	6.10E-01 E		0.092 C	0.01 C	0.0043 E	7.8 E	0.88 C	27 E	0.7 E

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Benzo[b]fluoranthene	205992			7.30E-01 e	6.10E-01 e		0.092 c	0.01 c	0.0043 c	7.8 c	0.88 c	23 e	4 e
Benzo[k]fluoranthene	207089			7.30E-02 e	6.10E-02 e		0.92 c	0.1 c	0.043 c	78 c	8.8 c		4 e
Benzo[a]pyrene	50328			7.30E+00 i	6.10E+00 w		0.0092 c	0.001 c	0.00043 c	0.78 c	0.088 c	11 e	4 e
Carbazole	86748			2.00E-02 H			3.4 c	0.31 c	0.16 c	290 c	32 c	11 e	0.5 e
Chrysene	218019			7.30E-03 e	6.10E-03 e		9.2 c	1 c	0.43 c	780 c	88 c	3.6 e	1 e
Dibenz[ah]anthracene	53703			7.30E+00 e	6.10E+00 e		0.0092 c	0.001 c	0.00043 c	0.78 c	0.088 c	7.2 e	11 e
Fluoranthene	206440	4.00E-02 i					1500 N	150 N	54 N	82000 N	3100 N	68 e	980 e
Fluorene	86737	4.00E-02 i					1500 N	150 N	54 N	82000 N	3100 N	89 e	160 e
Indeno[1,2,3-cd]pyrene	193395			7.30E-01 e	6.10E-01 e		0.092 c	0.01 c	0.0043 c	7.8 c	0.88 c	280 e	35 e
Naphthalene	91203	4.00E-02 w					1500 N	150 N	54 N	82000 N	3100 N	180 e	30 e
Pyrene	129000	3.00E-02 i					1100 N	110 N	41 N	61000 N	2300 N	56 e	1400 e
Prochloraz	67747095	9.00E-03 i		1.50E-01 i			0.45 c	0.042 c	0.021 c	38 c	4.3 c		
Profluralin	26399360	6.00E-03 H					220 N	22 N	8.1 N	12000 N	470 N		
Prometon	1610180	1.50E-02 i					550 N	55 N	20 N	31000 N	1200 N		
Prometryn	7287196	4.00E-03 i					150 N	15 N	5.4 N	8200 N	310 N		
Pronamide	23950585	7.50E-02 i					2700 N	270 N	100 N	150000 N	5900 N		
Propachlor	1918167	1.30E-02 i					470 N	47 N	18 N	27000 N	1000 N		
Propanil	709988	5.00E-03 i					180 N	18 N	6.8 N	10000 N	390 N		
Propargite	2312358	2.00E-02 i					730 N	73 N	27 N	41000 N	1600 N		
Propargyl alcohol	107197	2.00E-03 i					73 N	7.3 N	2.7 N	4100 N	160 N		
Propazine	139402	2.00E-02 i					730 N	73 N	27 N	41000 N	1600 N		
Propham	122429	2.00E-02 i					730 N	73 N	27 N	41000 N	1600 N		
Propiconazole	60207901	1.30E-02 i					470 N	47 N	18 N	27000 N	1000 N		
Propylene glycol	57556	2.00E+01 H					730000 N	73000 N	27000 N	1E+06 N	1000000 N		
Propylene glycol, monoethyl ether	52125538	7.00E-01 H					26000 N	2600 N	950 N	1E+06 N	55000 N		
Propylene glycol, monomethyl ether	107982	7.00E-01 H	5.71E-01 i				26000 N	2100 N	950 N	1E+06 N	55000 N		
Propylene oxide	75569		8.57E-03 i	2.40E-01 i	1.29E-02 i		0.28 c	0.49 c	0.013 c	24 c	2.7 c		
Pursuit	81335775	2.50E-01 i					9100 N	910 N	340 N	510000 N	20000 N		
Pydrin	51630581	2.50E-02 i					910 N	91 N	34 N	51000 N	2000 N		
Pyridine	110861	1.00E-03 i					37 N	3.7 N	1.4 N	2000 N	78 N		
Quinalphos	13593038	5.00E-04 i					18 N	1.8 N	0.68 N	1000 N	39 N		
Quinoline	91225			1.20E+01 H			0.0056 c	0.00052 c	0.00026 c	0.48 c	0.053 c		
Resmethrin	10453868	3.00E-02 i					1100 N	110 N	41 N	61000 N	2300 N		
Ronnel	299843	5.00E-02 H					1800 N	180 N	68 N	100000 N	3900 N		
Rotenone	83794	4.00E-03 i					150 N	15 N	5.4 N	8200 N	310 N		
Savey	78587050	2.50E-02 i					910 N	91 N	34 N	51000 N	2000 N		
Selenious Acid	7783008	5.00E-03 i					180 N	18 N	6.8 N	10000 N	390 N		
Selenium	7782492	5.00E-03 i					180 N	18 N	6.8 N	10000 N	390 N		3 e
Selenourea	630104	5.00E-03 H					180 N	18 N	6.8 N	10000 N	390 N		

Sources: I=IRIS H HEAST A HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Sethoxydim	74051802	9.00E-02 I					3300 N	330 N	120 N	180000 N	7000 N		
Silver and compounds	7440224	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Simazine	122349	5.00E-03 I		1.20E-01 H			0.56 C	0.052 C	0.026 C	48 C	5.3 C		
Sodium azide	26628228	4.00E-03 I					150 N	15 N	5.4 N	8200 N	310 N		
Sodium diethyldithiocarbamate	148185	3.00E-02 I		2.70E-01 H			0.25 C	0.023 C	0.012 C	21 C	2.4 C		
Sodium fluoroacetate	62748	2.00E-05 I					0.73 N	0.073 N	0.027 N	41 N	1.6 N		
Sodium metavanadate	13718268	1.00E-03 H					37 N	3.7 N	1.4 N	2000 N	78 N		
Strontium, stable	7440246	6.00E-01 I					22000 N	2200 N	810 N	1E+06 N	47000 N		
Strychnine	57249	3.00E-04 I					11 N	1.1 N	0.41 N	610 N	23 N		
Styrene	100425	2.00E-01 I	2.86E-01 I			O	1600 N	1000 N	270 N	410000 N	16000 N	1400 E	2 E
Systhane	88671890	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
2,3,7,8-TCDD (dioxin)	1746016			1.56E+05 H	1.16E+05 H		4E-07 C	5E-08 C	C	4E-05 C	4E-06 C		
Tebuthiuron	34014181	7.00E-02 I					2600 N	260 N	95 N	140000 N	5500 N		
Temephos	3383968	2.00E-02 H					730 N	73 N	27 N	41000 N	1600 N		
Terbacil	5902512	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Terbufos	13071799	2.50E-05 H					0.91 N	0.091 N	0.034 N	51 N	2 N		
Terbutryn	886500	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
1,2,4,5-Tetrachlorobenzene	95943	3.00E-04 I				O	1.8 N	1.1 N	0.41 N	610 N	23 N	91 N	0.69 N
1,1,1,2-Tetrachloroethane	630206	3.00E-02 I		2.60E-02 I	2.59E-02 I	O	0.41 C	0.24 C	0.12 C	220 C	25 C		
1,1,2,2-Tetrachloroethane	79345			2.00E-01 I	2.03E-01 I	O	0.052 C	0.031 C	0.016 C	29 C	3.2 C	0.4 E	0.001 E
Tetrachloroethylene (PCE)	127184	1.00E-02 I		5.20E-02 E	2.03E-03 E	O	1.1 C	3.1 C	0.061 C	110 C	12 C	11 E	0.04 E
2,3,4,6-Tetrachlorophenol	58902	3.00E-02 I					1100 N	110 N	41 N	61000 N	2300 N		
p,a,a,a-Tetrachlorotoluene	5216251			2.00E+01 H		O	0.00053 C	0.00031 C	0.00016 C	0.29 C	0.032 C		
Tetrachlorovinphos	961115	3.00E-02 I		2.40E-02 H			2.8 C	0.26 C	0.13 C	240 C	27 C		
Tetraethyldithiopyrophosphate	3689245	5.00E-04 I					18 N	1.8 N	0.68 N	1000 N	39 N		
Tetraethyl lead	78002	1.00E-07 I					0.0037 N	0.00037 N	0.00014 N	0.2 N	0.0078 N	0.00068 N	0.000034 N
1,1,1,2-Tetrafluoroethane	811972	I	2.29E+01			O	140000 N	84000 N					
Thallic oxide	1314325	7.00E-05 W					2.6 N	0.26 N	0.095 N	140 N	5.5 N		
Thallium													0.4 E
Thallium acetate	563688	9.00E-05 I					3.3 N	0.33 N	0.12 N	180 N	7 N		
Thallium carbonate	6533739	8.00E-05 I					2.9 N	0.29 N	0.11 N	160 N	6.3 N		
Thallium chloride	7791120	8.00E-05 I					2.9 N	0.29 N	0.11 N	160 N	6.3 N		
Thallium nitrate	10102451	9.00E-05 I					3.3 N	0.33 N	0.12 N	180 N	7 N		
Thallium selenite	12039520	9.00E-05 W					3.3 N	0.33 N	0.12 N	180 N	7 N		
Thallium sulfate	7446186	8.00E-05 I					2.9 N	0.29 N	0.11 N	160 N	6.3 N		
Thiobencarb	28249776	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
2-(Thiocyanomethylthio)-benzothiazole	21564170	3.00E-02 H					1100 N	110 N	41 N	61000 N	2300 N		
Thiofanox	39196184	3.00E-04 H					11 N	1.1 N	0.41 N	610 N	23 N		
Thiophanate-methyl	23564058	8.00E-02 I					2900 N	290 N	110 N	160000 N	6300 N		

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Thiram	137268	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Tin and compounds		6.00E-01 H					22000 N	2200 N	810 N	1E+06 N	47000 N		
Toluene	108883	2.00E-01 I	1.14E-01 I			☒	750 N	420 N	270 N	410000 N	16000 N	520 E	5 E
Toluene-2,4-diamine	95807			3.20E+00 H			0.021 C	0.002 C	0.00099 C	1.8 C	0.2 C		
Toluene-2,5-diamine	95705	6.00E-01 H					22000 N	2200 N	810 N	1E+06 N	47000 N		
Toluene-2,6-diamine	823405	2.00E-01 H					7300 N	730 N	270 N	410000 N	16000 N		
p-Toluidine	106490			1.90E-01 H			0.35 C	0.033 C	0.017 C	30 C	3.4 C		
Toxaphene	8001352			1.10E+00 I	1.12E+00 I		0.061 C	0.0056 C	0.0029 C	5.2 C	0.58 C	5 E	0.04 E
Tralomethrin	66841256	7.50E-03 I					270 N	27 N	10 N	15000 N	590 N		
Triallate	2303175	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Triasulfuron	82097505	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
1,2,4-Tribromobenzene	615543	5.00E-03 I				☒	30 N	18 N	6.8 N	10000 N	390 N		
Tributyltin oxide (TBTO)	56359	3.00E-05 I					1.1 N	0.11 N	0.041 N	61 N	2.3 N		
2,4,6-Trichloroaniline hydrochloride	33663502			2.90E-02 H			2.3 C	0.22 C	0.11 C	200 C	22 C		
2,4,6-Trichloroaniline	634935			3.40E-02 H			2 C	0.18 C	0.093 C	170 C	19 C		
1,2,4-Trichlorobenzene	120821	1.00E-02 I	5.71E-02 H			☒	190 N	210 N	14 N	20000 N	780 N	240 E	2 E
**1,1,1-Trichloroethane	71556	3.50E-02 E	2.86E-01 W			☒	790 N	1000 N	47 N	72000 N	2700 N	980 E	0.9 E
1,1,2-Trichloroethane	79005	4.00E-03 I		5.70E-02 I	5.60E-02 I	☒	0.19 C	0.11 C	0.055 C	100 C	11 C	0.8 E	0.01 E
Trichloroethylene (TCE)	79016	6.00E-03 E		1.10E-02 W	6.00E-03 E	☒	1.6 C	1 C	0.29 C	520 C	58 C	3 E	0.02 E
Trichlorofluoromethane	75694	3.00E-01 I	2.00E-01 A			☒	1300 N	730 N	410 N	610000 N	23000 N	790 N	13 N
2,4,5-Trichlorophenol	95954	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N	8200 E	120 E
2,4,6-Trichlorophenol	88062			1.10E-02 I	1.09E-02 I		6.1 C	0.57 C	0.29 C	520 C	58 C	150 C	0.06 E
2,4,5-Trichlorophenoxyacetic acid	93765	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
2-(2,4,5-Trichlorophenoxy)propionic acid	93721	8.00E-03 I					290 N	29 N	11 N	16000 N	630 N		
1,1,2-Trichloropropane	598776	5.00E-03 I				☒	30 N	18 N	6.8 N	10000 N	390 N	13 N	0.14 N
1,2,3-Trichloropropane	96184	6.00E-03 I		7.00E+00 I		☒	0.0015 C	0.00089 C	0.00045 C	0.82 C	0.091 C	0.00003 C	6.000E-06 C
1,2,3-Trichloropropene	96195	5.00E-03 H				☒	30 N	18 N	6.8 N	10000 N	390 N		
1,1,2-Trichloro-1,2,2- trifluoroethane	76131	3.00E+01 I	8.57E+00 H			☒	59000 N	31000 N	41000 N	1E+06 N	1000000 N	2400 E	3100 N
Tridiphane	58138082	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
Triethylamine	121448		2.00E-03 I				73 N	7.3 N					
Trifluralin	1582098	7.50E-03 I		7.70E-03 I			8.7 C	0.81 C	0.41 C	740 C	83 C		
1,2,4-Trimethylbenzene	95636	5.00e-02 E				☒	300 N	180 N	68 N	100000 N	3900 N		
1,3,5-Trimethylbenzene	108678	5.00e-02 E				☒	300 N	180 N	68 N	100000 N	3900 N	98 E	0.26 N
Trimethyl phosphate	512561			3.70E-02 H			1.8 C	0.17 C	0.085 C	150 C	17 C		
1,3,5-Trinitrobenzene	99354	5.00E-05 I					1.8 N	0.18 N	0.068 N	100 N	3.9 N		
Trinitrophenylmethylnitramine	479458	1.00E-02 H					370 N	37 N	14 N	20000 N	780 N		
2,4,6-Trinitrotoluene	118967	5.00E-04 I		3.00E-02 I			2.2 C	0.21 C	0.11 C	190 C	21 C		
Uranium (soluble salts)	7440611	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
Vanadium	7440622	7.00E-03 H					260 N	26 N	9.5 N	14000 N	550 N		

Sources: I=IRIS H=HEAST A=HEAST alternate W=Withdrawn from IRIS or HEAST E=EPA-NCEA Regional Support provisional value O=Other EPA documents.

Basis: C=carcinogenic effects N=noncarcinogenic effects E=EPA draft Soil Screening Level S=soil saturation concentration M=EPA MCL.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Vanadium pentoxide	1314621	9.00E-03 i					330 n	33 n	12 n	18000 n	700 n		
Vanadium sulfate	36907423	2.00E-02 n					730 n	73 n	27 n	41000 n	1600 n		
Vernam	1929777	1.00E-03 i					37 n	3.7 n	1.4 n	2000 n	78 n		
Vinclozolin	50471448	2.50E-02 i					910 n	91 n	34 n	51000 n	2000 n		
Vinyl acetate	108054	1.00E+00 n	5.71E-02 i				37000 n	210 n	1400 n	1E+06 n	78000 n	370 e	84 e
Vinyl bromide	593602		8.57E-04 i			X	5.2 n	3.1 n				2 n	0.018 n
Vinyl chloride	75014			1.90E+00 n	3.00E-01 n	X	0.019 c	0.021 c	0.0017 c	3 c	0.34 c	0.002 e	0.01 e
Warfarin	81812	3.00E-04 i					11 n	1.1 n	0.41 n	610 n	23 n	0.046 n	1800 n
m-Xylene	1.08E+05	2.00E+00 n	2.00E-01 w			X	1400 n	730 n	2700 n	1E+06 n	160000 n	950 e	2.40E+02 e
o-Xylene	9.55E+04	2.00E+00 n	2.00E-01 w			X	1400 n	730 n	2700 n	1E+06 n	160000 n	730 e	1.50E+02 e
p-Xylene	1.06E+05		8.57E-02 w			X	520 n	310 n				1000 e	2.20E+02 e
Xylene (mixed)	1.33E+06	2.00E+00 i				X	12000 n	7300 n	2700 n	1E+06 n	160000 n	320 e	7.40E+01 e
Zinc	7.44E+06	3.00E-01 i					11000 n	1100 n	410 n	610000 n	23000 n		4.20E+04 e
Zinc phosphide	1.31E+06	3.00E-04 i					11 n	1.1 n	0.41 n	610 n	23 n		
Zineb	1.21E+07	5.00E-02 i					1800 n	180 n	68 n	100000 n	3900 n		

APPENDIX B

FINAL SOIL TCLP AND TOTAL ANALYTICAL RESULTS VOLUNTARY RELEASE ASSESSMENT

This document has been reproduced directly from the best possible copy.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001t, Mudpit IMC 374

HOLE Number:	HOLE #1	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	12-24 (DUP)	60-72	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	7/31/95	7/31/95	7/31/95	7/31/95	7/31/95	7/31/95	7/31/95	8/2/95	8/2/95
TCLP Sample Numbers:	RA-95-037	RA-95-038	RA-95-042	RA-95-044	RA-95-046	RA-95-048	RA-95-050	RA-95-058	RA-95-060
Total Sample Date:	7/1/96		7/1/96	7/1/96	7/1/96	7/1/96	7/1/96	7/1/96	7/1/96
Total Sample Numbers:	RA-96-035	NA	RA-96-036	RA-96-037	RA-96-038	RA-96-040	RA-96-042	RA-96-044	RA-96-046
Analytes									
Metals									
TCLP Arsenic (As)	0.1 U	1 U	1 U	0.2 UB	1 U	0.1 U	0.2 UB	1 U	1 U
Total Arsenic (As)	**0.5**	**NA**	**0.6**	**0.7**	**0.8**	**0.4**	**0.7**	**0.6**	**0.8**
TCLP Barium (Ba)	0.48 UB	0.66 UB	0.6 UB	0.68 UB	0.45 UB	0.83 B	0.48 UB	0.3 UB	0.36 UB
Total Barium (Ba)	**10**	**NA**	**15**	**16**	**14**	**12**	**16**	**9.3**	**20**
TCLP Cadmium (Cd)	0.05 U	0.05 U	0.06	0.05 U	0.05 U	0.05	0.05 U	0.05 U	0.07
Total Cadmium (Cd)	**0.5 U**	**NA**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**
TCLP Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Chromium (Cr)	**4**	**NA**	**5**	**4**	**5**	**3**	**4**	**3**	**2 U**
TCLP Lead (Pb)	0.5 U	0.05 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Lead (Pb)	**1.5**	**NA**	**1.6**	**1.6**	**1.7**	**1.1**	**1.5**	**1.2**	**1.4 J**
TCLP Mercury (Hg)	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ
Total Mercury (Hg)	**0.02 UJ**	**NA**	**0.02 UJ**	**0.02 UJ**	**0.02 UJ**	**0.02 UJ**	**0.02 UJ**	**0.02 UJ**	**0.02 UJ**
TCLP Thallium (Tl)	0.2 U	2 U	2 U	0.2 U	2 U	0.2 U	0.2 U	2 U	2 U
Total Thallium (Tl)	**20 UJ**	**NA**	**20 UJ**	**20 UJ**	**20 UJ**	**20 UJ**	**20 UJ**	**20 UJ**	**20 UJ**

Data qualifiers and abbreviations:

- B — Analyte was detected in an associated laboratory blank
- J — Result should be considered an estimated value
- NA — Not analyzed
- R — Result has been rejected and is considered unusable
- U — Analyte was not detected, value is the method reporting limit
- UB — Detected in the blank and qualified as not detected

- EQ BLANK — Equipment Rinse Blank
- FD BLANK — Field Blank
- DUP — Field duplicate sample

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001t, Mudpit IMC 374 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	12-24 (DUP)	60-72	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	7/31/95	7/31/95	7/31/95	7/31/95	7/31/95	7/31/95	7/31/95	8/2/95	8/2/95
TCLP Sample Numbers:	RA-95-035	RA-95-036	RA-95-041	RA-95-043	RA-95-045	RA-95-047	RA-95-049	RA-95-057	RA-95-059
Total Sample Date:						**7/1/96**	**7/1/96**	**7/1/96**	**7/1/96**
Total Sample Numbers:	**NA**	**NA**	**NA**	**NA**	**NA**	**RA-96-039**	**RA-96-041**	**RA-96-043**	**RA-96-045**
Analytes									
Volatiles									
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	**NA**	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	**NA**	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	**NA**	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	**NA**	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	**NA**	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Toluene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	**NA**	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	**NA**	**NA**	**NA**	**NA**	**NA**	**0.01 U**	**0.01 U**	**0.01 U**	**0.01 U**
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Xylenes, total	**NA**	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001t, Mudpit IMC 374 (cont.)

HOLE Number:	HOLE #5	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	12-24 (DUP)	60-72		
TCLP Sample Date:	8/2/95	8/2/95	8/2/95	7/31/95	
TCLP Sample Numbers:	RA-95-053	RA-95-054	RA-95-056	RA-95-040	NA
Total Sample Date:				**7/1/96**	**7/1/96**
Total Sample Numbers:	**NA**	**NA**	**NA**	**RA-96-047**	**RA-96-048**
Analytes					
Metals					
TCLP Arsenic (As)	1 U	1 U	0.1 UB	1 U	NA
Total Arsenic (As)	**NA**	**NA**	**NA**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.25 UB	0.3 UB	0.27 UB	0.17 UB	NA
Total Barium (Ba)	**NA**	**NA**	**NA**	**0.038**	**0.038**
TCLP Cadmium (Cd)	0.06	0.05 U	0.05 U	0.05 U	NA
Total Cadmium (Cd)	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.2 U	0.2 U	0.20 U	0.2 U	NA
Total Chromium (Cr)	**NA**	**NA**	**NA**	**0.02 U**	**0.02 U**
TCLP Lead (Pb)	0.5 U	0.5 U	0.5 U	0.05 U	NA
Total Lead (Pb)	**NA**	**NA**	**NA**	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 U	NA
Total Mercury (Hg)	**NA**	**NA**	**NA**	**0.0001 UJ**	**0.0001 UJ**
TCLP Thallium (Tl)	2 U	2 U	0.2 U	2 U	NA
Total Thallium (Tl)	**NA**	**NA**	**NA**	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001t, Mudpit IMC 374 (cont.)

HOLE Number:	HOLE #5	HOLE #5	HOLE #5	EQ BLANK
Depth (inches):	12-24	12-24 (DUP)	60-72	
TCLP Sample Date:	8/2/95	8/2/95	8/2/95	7/31/95
TCLP Sample Numbers:	RA-95-051	RA-95-052	RA-95-055	RA-95-039
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Volatiles				
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	NA	NA	NA	NA
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	NA	NA	NA	NA
TCLP Benzene	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	NA	NA	NA	NA
TCLP Chloroform	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	NA	NA	NA	NA
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	NA	NA	NA	NA
TCLP Toluene	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	NA	NA	NA	NA
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	NA	NA	NA	NA
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U
Total Xylenes, total	NA	NA	NA	NA

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001n, Mudpit P-15

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24 (DUP)	60-72	60-72 (DUP)
TCLP Sample Date:	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95
TCLP Sample Numbers:	RA-95-084	RA-95-086	RA-95-088	RA-95-090	RA-95-093	RA-95-094	RA-95-099	RA-95-100
Total Sample Date:	**7/1/96**	**7/1/96**	**7/1/96**	**7/1/96**	**7/1/96**		**7/1/96**	
Total Sample Numbers:	**RA-96-021**	**RA-96-022**	**RA-96-023**	**RA-96-024**	**RA-96-026**	**NA**	**RA-96-028**	**NA**
Analytes								
Metals								
TCLP Arsenic (As)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total Arsenic (As)	**0.6**	**0.8**	**0.6**	**0.8**	**0.8**	**NA**	**0.8**	**NA**
TCLP Barium (Ba)	0.51 B	0.35 UB	0.42 B	0.54 B	0.51 B	0.45 B	0.3 UB	0.32 UB
Total Barium (Ba)	**13**	**16**	**12**	**19**	**110**	**NA**	**42**	**NA**
TCLP Cadmium (Cd)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Cadmium (Cd)	**0.5 U**	**1.8**	**0.5 U**	**0.5 U**	**0.5 U**	**NA**	**0.5 U**	**NA**
TCLP Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Chromium (Cr)	**4**	**5**	**4**	**4**	**7**	**NA**	**5**	**NA**
TCLP Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Lead (Pb)	**1.2**	**1.4**	**1.3**	**1.6**	**2**	**NA**	**1.8**	**NA**
TCLP Mercury (Hg)	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ
Total Mercury (Hg)	**0.02 UJ**	**0.02 UJ**	**0.02 UJ**	**0.02 UJ**	**0.02 UJ**	**NA**	**0.02 UJ**	**NA**
TCLP Thallium (Tl)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Total Thallium (Tl)	**20 UJ**	**20 UJ**	**20 UJ**	**20 UJ**	**20 UJ**	**NA**	**20 UJ**	**NA**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank
J	Result should be considered an estimated value
NA	Not analyzed
R	Result has been rejected and is considered unusable
U	Analyte was not detected, value is the method reporting limit
UB	Detected in the blank and qualified as not detected
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
DUP	Field duplicate sample

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001n, Mudpit P-15 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24 (DUP)	60-72	60-72 (DUP)
TCLP Sample Date:	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95
TCLP Sample Numbers:	RA-95-083	RA-95-085	RA-95-087	RA-95-089	RA-95-091	RA-95-092	RA-95-097	RA-95-098
Total Sample Date:					7/1/96		7/1/96	
Total Sample Numbers:	NA	NA	NA	NA	RA-96-025	NA	RA-96-027	NA
Analytes								
Volatiles								
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA
TCLP Benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA
TCLP Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA
TCLP Toluene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	NA	NA	NA	NA	**0.01 U**	NA	**0.01 U**	NA
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Xylenes, total	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected, value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank
DUP Field duplicate sample

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001n, Mudpit P-15 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	8/4/95	8/4/95	8/4/95	8/4/95
TCLP Sample Numbers:	RA-95-102	RA-95-106	RA-95-096	RA-95-104
Total Sample Date:	7/1/96	7/1/96	7/1/96	7/1/96
Total Sample Numbers:	RA-96-030	RA-96-032	RA-96-033	RA-96-034
Analytes				
Metals				
TCLP Arsenic (As)	1 U	1 U	1 U	1 U
Total Arsenic (As)	**0.6**	**1**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.34 UB	0.43 B	0.08 UB	0.05 U
Total Barium (Ba)	**27**	**27**	**0.042**	**0.042**
TCLP Cadmium (Cd)	0.05 U	0.1 U	0.05 U	0.05 U
Total Cadmium (Cd)	**0.5 U**	**0.5 U**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U
Total Chromium (Cr)	**5**	**6**	**0.02 U**	**0.02 U**
TCLP Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U
Total Lead (Pb)	**1.9**	**2.6**	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0002 U	0.0002 U	0.0002 UJ	0.0002 U
Total Mercury (Hg)	**0.02 UJ**	**0.02 UJ**	**0.0001 UJ**	**0.0001 UJ**
TCLP Thallium (Tl)	2 U	2 U	2 U	2 U
Total Thallium (Tl)	**20 UJ**	**20 UJ**	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected, value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001n, Mudpit P-15 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	8/4/95	8/4/95	8/4/95	8/4/95
TCLP Sample Numbers:	RA-95-101	RA-95-105	RA-95-095	RA-95-103
Total Sample Date:	**7/1/96**	**7/1/96**		
Total Sample Numbers:	**RA-96-029**	**RA-96-031**	**NA**	**NA**
Analytes				
Volatiles				
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Benzene	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Chloroform	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Toluene	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	**0.01 U**	**0.01 U**	**NA**	**NA**
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U
Total Xylenes, total	**0.005 U**	**0.005 U**	**NA**	**NA**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected, value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001x, WIPP-13

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #3	HOLE #3	HOLE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24 (DUP)	60-72	60-72 (DUP)	12-24
TCLP Sample Date:	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95
TCLP Sample Numbers:	RA-95-108	RA-95-110	RA-95-112	RA-95-114	RA-95-117	RA-95-118	RA-95-121	RA-95-122	RA-95-126
Total Sample Date:	**7/10/96**	**7/10/96**	**7/10/96**	**7/10/96**	**7/10/96**		**7/10/96**		**7/10/96**
Total Sample Numbers:	**RA-96-123**	**RA-96-124**	**RA-96-125**	**RA-96-126**	**RA-96-128**	**NA**	**RA-96-130**	**NA**	**RA-96-132**
Analytes									
Metals									
TCLP Arsenic (As)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total Arsenic (As)	**0.3 U**	**0.6**	**0.4**	**0.7**	**0.6**	**NA**	**1.2**	**NA**	**1**
TCLP Barium (Ba)	0.34 UB	0.33 UB	0.38 UB	0.36 UB	0.28 UB	0.3 UB	0.44 B	0.25 UB	0.19 UB
Total Barium (Ba)	**10**	**12**	**13**	**17**	**16**	**NA**	**40**	**NA**	**3800**
TCLP Cadmium (Cd)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Cadmium (Cd)	**0.5 U**	**0.5**	**0.5 U**	**0.5 U**	**0.6**	**NA**	**0.5 U**	**NA**	**0.5 U**
TCLP Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Chromium (Cr)	**3**	**4**	**6**	**3**	**7**	**NA**	**8**	**NA**	**36**
TCLP Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Lead (Pb)	**1.6**	**1.5**	**1.3**	**1.7**	**1.8**	**NA**	**2.8**	**NA**	**270**
TCLP Mercury (Hg)	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Total Mercury (Hg)	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**NA**	**0.03 U**	**NA**	**0.03 U**
TCLP Thallium (Tl)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Total Thallium (Tl)	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**NA**	**20 U**	**NA**	**20 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001x, WIPP-13 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #3	HOLE #3	HOLE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24 (DUP)	60-72	60-72 (DUP)	12-24
TCLP Sample Date:	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95
TCLP Sample Numbers:	RA-95-107	RA-95-109	RA-95-111	RA-95-113	RA-95-115	RA-95-116	RA-95-119	RA-95-120	RA-95-125
Total Sample Date:					**7/10/96**		**7/10/96**		**7/10/96**
Total Sample Numbers:	NA	NA	NA	NA	**RA-96-127**	NA	**RA-96-129**	NA	**RA-96-131**
Analytes									
Volatiles									
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA	**0.620 U**
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA	**0.620 U**
TCLP Benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA	**0.620 U**
TCLP Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA	**0.620 U**
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA	**0.620 U**
TCLP Toluene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA	**0.620 U**
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	NA	NA	NA	NA	**0.01 U**	NA	**0.01 U**	NA	**1.20 U**
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Xylenes, total	NA	NA	NA	NA	**0.005 U**	NA	**0.005 U**	NA	**0.620 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001x, WIPP-13 (cont.)

Bore Number:	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	60-72		
Sample Date:	8/9/95	8/9/95	8/9/95
	RA-95-128	RA-95-124	RA-95-130
Sample Date:	**7/10/96**	**7/10/96**	**7/10/96**
WID Sample Numbers:	**RA-96-134**	**RA-96-135**	**RA-96-136**
Analytes			
Metals			
TCLP Arsenic (As)	0.2 UB	1 U	0.1 U
Total Arsenic (As)	**0.7**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.36 UB	0.05 U	0.012 UB
Total Barium (Ba)	**680**	**0.02**	**0.008**
TCLP Cadmium (Cd)	0.005 U	0.05 U	0.005 U
Total Cadmium (Cd)	**0.5 U**	**0.006**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.2 U	0.02 U
Total Chromium (Cr)	**10**	**0.02 U**	**0.02 U**
TCLP Lead (Pb)	0.05 U	0.5 U	0.05 U
Total Lead (Pb)	**5**	**0.002 UJ**	**0.002 UJ**
TCLP Mercury (Hg)	0.0002 U	0.0002 U	0.0002 U
Total Mercury (Hg)	**0.03 U**	**0.0001 U**	**0.0002**
TCLP Thallium (Tl)	0.2 U	2 U	0.2 U
Total Thallium (Tl)	**20 U**	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank
J	Result should be considered an estimated value
NA	Not analyzed
R	Result has been rejected and is considered unusable
U	Analyte was not detected; value is the method reporting limit
UB	Detected in the blank and qualified as not detected

EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
DUP	Field duplicate sample

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001x, WIPP-13 (cont.)

Bore Number:	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	60-72		
Sample Date:	8/9/95	8/9/95	8/9/95
WID Sample Numbers:	RA-95-127	RA-95-123	RA-95-129
Sample Date:	**7/10/96**		
WID Sample Numbers:	**RA-96-133**	**NA**	**NA**
Analytes			
Volatiles			
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	**0.025 U**	**NA**	**NA**
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	**0.025 U**	**NA**	**NA**
TCLP Benzene	0.05 U	0.05 U	0.05 U
Total Benzene	**0.025 U**	**NA**	**NA**
TCLP Chloroform	0.05 U	0.05 U	0.05 U
Total Chloroform	**0.025 U**	**NA**	**NA**
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	**0.025 U**	**NA**	**NA**
TCLP Toluene	0.05 U	0.05 U	0.05 U
Total Toluene	**0.025 U**	**NA**	**NA**
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	**0.050 U**	**NA**	**NA**
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U
Total Xylenes, total	**0.025 U**	**NA**	**NA**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001g, H-14

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95
TCLP Sample Numbers:	RA-95-131	RA-95-132	RA-95-133	RA-95-134	RA-95-136	RA-95-138
Total Sample Date:	**7/2/96**	**7/2/96**			**7/2/96**	**7/2/96**
Total Sample Numbers:	**RA-96-049**	**RA-96-050**	**NA**	**NA**	**RA-96-056**	**RA-96-058**
Analytes						
Metals						
TCLP Arsenic (As)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UB
Total Arsenic (As)	**0.9 J**	**2 J**	**NA**	**NA**	**1 J**	**2.3 J**
TCLP Barium (Ba)	0.34	1.0	0.43	0.41	0.57	0.74
Total Barium (Ba)	**15**	**26**	**NA**	**NA**	**22**	**34**
TCLP Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total Cadmium (Cd)	**0.7 J**	**0.5 UJ**	**NA**	**NA**	**0.5 UJ**	**0.5 UJ**
TCLP Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Total Chromium (Cr)	**3**	**7**	**NA**	**NA**	**5**	**7**
TCLP Lead (Pb)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Lead (Pb)	**1.9 J**	**2.7 J**	**NA**	**NA**	**2 J**	**3.4 J**
TCLP Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Total Mercury (Hg)	**0.02 UJ**	**0.02 UJ**	**NA**	**NA**	**0.02 U**	**0.04 J**
TCLP Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Thallium (Tl)	**20 U**	**20 U**	**NA**	**NA**	**20**	**20 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected, value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001g, H-14 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95
TCLP Sample Numbers:	NA	NA	NA	NA	RA-95-135	RA-95-137
Total Sample Date:			**7/2/96**	**7/2/96**	**7/2/96**	**7/2/96**
Total Sample Numbers:	**NA**	**NA**	**RA-96-051**	**RA-96-053**	**RA-96-055**	**RA-96-057**
Analytes						
Volatiles						
TCLP 1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP 1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U
Total 1,2-Dichloroethane	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Benzene	NA	NA	NA	NA	0.05 U	0.05 U
Total Benzene	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Chloroform	NA	NA	NA	NA	0.05 U	0.05 U
Total Chloroform	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U
Total Ethyl benzene	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Toluene	NA	NA	NA	NA	0.05 U	0.05 U
Total Toluene	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U
Total Vinyl chloride	**NA**	**NA**	**0.01 U**	**0.01 U**	**0.01 U**	**0.01 U**
TCLP Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U
Total Xylenes, total	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected, value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001g, H-14 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	10/4/95	10/4/95	10/4/95	
TCLP Sample Numbers:	RA-95-142	RA-95-144	RA-95-140	NA
Total Sample Date:	7/2/96	7/2/96	7/2/96	7/2/96
Total Sample Numbers:	RA-96-052	RA-96-054	RA-96-059	RA-96-060
Analytes				
Metals				
TCLP Arsenic (As)	0.1 UB	0.1 U	0.1 U	NA
Total Arsenic (As)	**1.2 J**	**1.2 J**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.44	0.72	0.21	NA
Total Barium (Ba)	**22**	**24**	**0.011**	**0.01**
TCLP Cadmium (Cd)	0.005 U	0.005 U	0.005 U	NA
Total Cadmium (Cd)	**0.5 UJ**	**0.5 UJ**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.02 U	0.02 U	NA
Total Chromium (Cr)	**6**	**7**	**0.02 U**	**0.02 U**
TCLP Lead (Pb)	0.05 U	0.05 U	0.05 U	NA
Total Lead (Pb)	**3.4 J**	**2.6 J**	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	NA
Total Mercury (Hg)	**0.02 UJ**	**0.02 U**	**0.0001 U**	**0.0001 U**
TCLP Thallium (Tl)	0.2 U	0.2 U	0.2 U	NA
Total Thallium (Tl)	**20 U**	**20 U**	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001g, H-14 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	10/4/95	10/4/95	10/4/95	
TCLP Sample Numbers:	RA-95-141	RA-95-143	RA-95-139	NA
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Volatiles				
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	NA
Total 1,1,1-Trichloroethane	NA	NA	NA	NA
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	NA
Total 1,2-Dichloroethane	NA	NA	NA	NA
TCLP Benzene	0.05 U	0.05 U	0.05 U	NA
Total Benzene	NA	NA	NA	NA
TCLP Chloroform	0.05 U	0.05 U	0.05 U	NA
Total Chloroform	NA	NA	NA	NA
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	NA
Total Ethyl benzene	NA	NA	NA	NA
TCLP Toluene	0.05 U	0.05 U	0.05 U	NA
Total Toluene	NA	NA	NA	NA
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	NA
Total Vinyl chloride	NA	NA	NA	NA
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U	NA
Total Xylenes, total	NA	NA	NA	NA

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001g, Mudpit P-1

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95
TCLP Sample Numbers:	RA-95-145	RA-95-146	RA-95-147	RA-95-148	RA-95-150	RA-95-152
Total Sample Date:	7/2/96	7/2/96	7/2/96	7/2/96	7/2/96	7/2/96
Total Sample Numbers:	RA-96-061	RA-96-062	RA-96-064	RA-96-066	RA-96-068	RA-96-070
Analytes						
Metals						
TCLP Arsenic (As)	0.2 UB	0.2 UB	0.2 UB	0.1 UB	0.2 UB	0.1 U
Total Arsenic (As)	**1 J**	**1.8 J**	**1.2 J**	**1.3 J**	**0.9 J**	**1.5 J**
TCLP Barium (Ba)	0.49	0.46	0.29	0.33	0.68	0.69
Total Barium (Ba)	**35**	**52**	**39**	**34**	**17**	**71**
TCLP Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006
Total Cadmium (Cd)	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**
TCLP Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Total Chromium (Cr)	**5**	**2**	**3**	**7**	**4**	**4**
TCLP Lead (Pb)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Lead (Pb)	**2.1 J**	**3.8 J**	**1.8 J**	**5.4 J**	**3.2 J**	**2.4 J**
TCLP Mercury (Hg)	0.0001 U	0.0001 U	0.0002 U	0.0002 U	0.0002 U	0.0004
Total Mercury (Hg)	**0.02 U**	**0.04**	**0.02 U**	**0.02 U**	**0.02 U**	**0.02 U**
TCLP Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Thallium (Tl)	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001g, Mudpit P-1 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95
TCLP Sample Numbers:	NA	NA	NA	NA	RA-95-149	RA-95-151
Total Sample Date:			7/2/96	7/2/96	7/2/96	7/2/96
Total Sample Numbers:	NA	NA	RA-96-063	RA-96-065	RA-96-067	RA-96-069
Analytes						
Volatiles						
TCLP 1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U
TCLP 1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U
Total 1,2-Dichloroethane	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U
TCLP Benzene	NA	NA	NA	NA	0.05 U	0.05 U
Total Benzene	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U
TCLP Chloroform	NA	NA	NA	NA	0.05 U	0.05 U
Total Chloroform	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U
TCLP Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U
Total Ethyl benzene	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U
TCLP Toluene	NA	NA	NA	NA	0.05 U	0.05 U
Total Toluene	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U
TCLP Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U
Total Vinyl chloride	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U
TCLP Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U
Total Xylenes, total	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U

Data qualifiers and abbreviations:

- B Analyte was detected in an associated laboratory blank
- J Result should be considered an estimated value
- NA Not analyzed
- R Result has been rejected and is considered unusable
- U Analyte was not detected; value is the method reporting limit
- UB Detected in the blank and qualified as not detected

- EQ BLANK Equipment Rinse Blank
- FD BLANK Field Blank
- DUP Field duplicate sample

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001g, Mudpit P-1 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	10/4/95	10/5/95		10/4/95
TCLP Sample Numbers:	RA-95-154	RA-95-158	NA	RA-95-156
Total Sample Date:	7/2/96	7/2/96	7/2/96	7/2/96
Total Sample Numbers:	NA	NA	RA-96-071	RA-96-072
Analytes				
Metals				
TCLP Arsenic (As)	0.2 UB	0.2 UB	NA	0.1 U
Total Arsenic (As)	NA	NA	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.75	0.89	NA	0.037
Total Barium (Ba)	NA	NA	**0.005 U**	**0.005 U**
TCLP Cadmium (Cd)	0.005 U	0.005 U	NA	0.005 U
Total Cadmium (Cd)	NA	NA	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.02 U	NA	0.02 U
Total Chromium (Cr)	NA	NA	**0.02 U**	**0.02 U**
TCLP Lead (Pb)	0.05 U	0.05 U	NA	0.05 U
Total Lead (Pb)	NA	NA	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0002 U	0.0002 U	NA	0.0002 U
Total Mercury (Hg)	NA	NA	**0.0001 U**	**0.0001**
TCLP Thallium (Tl)	0.2 U	0.2 U	NA	0.2 U
Total Thallium (Tl)	NA	NA	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank
J	Result should be considered an estimated value
NA	Not analyzed
R	Result has been rejected and is considered unusable
U	Analyte was not detected, value is the method reporting limit
UB	Detected in the blank and qualified as not detected

EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
DUP	Field duplicate sample

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001g, Mudpit P-1 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	10/4/95	10/5/95		10/4/95
TCLP Sample Numbers:	RA-95-153	RA-95-157	NA	RA-95-155
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Volatiles				
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	NA	0.05 U
Total 1,1,1-Trichloroethane	NA	NA	NA	NA
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	NA	0.05 U
Total 1,2-Dichloroethane	NA	NA	NA	NA
TCLP Benzene	0.05 U	0.05 U	NA	0.05 U
Total Benzene	NA	NA	NA	NA
TCLP Chloroform	0.05 U	0.05 U	NA	0.05 U
Total Chloroform	NA	NA	NA	NA
TCLP Ethyl benzene	0.05 U	0.05 U	NA	0.05 U
Total Ethyl benzene	NA	NA	NA	NA
TCLP Toluene	0.05 U	0.05 U	NA	0.05 U
Total Toluene	NA	NA	NA	NA
TCLP Vinyl chloride	0.1 U	0.1 U	NA	0.1 U
Total Vinyl chloride	NA	NA	NA	NA
TCLP Xylenes, total	0.05 U	0.05 U	NA	0.05 U
Total Xylenes, total	NA	NA	NA	NA

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank
J	Result should be considered an estimated value
NA	Not analyzed
R	Result has been rejected and is considered unusable
U	Analyte was not detected, value is the method reporting limit
UB	Detected in the blank and qualified as not detected
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
DUP	Field duplicate sample

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001k, Mudpit P-4

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95
TCLP Sample Numbers:	RA-95-159	RA-95-160	RA-95-161	RA-95-162	RA-95-164	RA-95-168	RA-95-170	RA-95-172
Total Sample Date:	7/11/96	7/11/96	7/11/96	7/11/96	7/11/96	7/11/96	7/11/96	7/11/96
Total Sample Numbers:	RA-96-151	RA-96-152	RA-96-153	RA-96-154	RA-96-156	RA-96-158	RA-96-160	RA-96-162
Analytes								
Metals								
TCLP Arsenic (As)	0.1 UB	0.2 UB	0.1 UB	0.1 UB	0.2 UB	0.1 UB	0.2 UB	0.1 U
Total Arsenic (As)	**0.6 J**	**0.7 J**	**0.6 J**	**0.7 J**	**0.5 J**	**0.6 J**	**0.5 J**	**0.6 J**
TCLP Barium (Ba)	0.63 B	0.59 B	0.57 B	0.74 B	0.59 B	0.59 B	0.6 B	0.76 B
Total Barium (Ba)	**14 J**	**18 J**	**15 J**	**19 J**	**13 J**	**13 J**	**13 J**	**14 J**
TCLP Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total Cadmium (Cd)	**0.5 UJ**	**1 J**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 J**	**0.5 UJ**
TCLP Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Total Chromium (Cr)	**4 J**	**4 J**	**4 J**	**4 J**	**4 J**	**3 J**	**2 J**	**3 J**
TCLP Lead (Pb)	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Total Lead (Pb)	**1.5**	**1.6**	**1.4**	**1.4**	**1.2**	**1.3**	**1.2**	**1.3**
TCLP Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 J
Total Mercury (Hg)	**0.03 U**	**0.03 U**	**0.06**	**0.03 U**	**0.03 U**	**0.05**	**0.03 U**	**0.03 U**
TCLP Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Thallium (Tl)	**20.0 U**	**20.0 U**	**20.0 U**	**20.0 U**	**20.0 U**	**20.0 U**	**20.0 U**	**20.0 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001k, Mudpit P-4 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95
TCLP Sample Numbers:	NA	NA	NA	NA	RA-95-163	RA-95-167	RA-95-169	RA-95-171
Total Sample Date:					7/11/96	7/11/96	7/11/96	7/11/96
Total Sample Numbers:	NA	NA	NA	NA	RA-96-155	RA-96-157	RA-96-159	RA-96-161
Analytes								
Volatiles								
TCLP 1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	NA	NA	NA	NA	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP 1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	NA	NA	NA	NA	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	NA	NA	NA	NA	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Chloroform	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	NA	NA	NA	NA	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	NA	NA	NA	NA	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Toluene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	NA	NA	NA	NA	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	NA	NA	NA	NA	**0.01 U**	**0.01 U**	**0.01 U**	**0.01 U**
Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Xylenes, total	NA	NA	NA	NA	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**

Data qualifiers and abbreviations:

- B Analyte was detected in an associated laboratory blank
- J Result should be considered an estimated value
- NA Not analyzed
- R Result has been rejected and is considered unusable
- U Analyte was not detected; value is the method reporting limit
- UB Detected in the blank and qualified as not detected

- EQ BLANK Equipment Rinse Blank
- FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001k, Mudpit P-4 (cont.)

HOLE Number:	EQ BLANK	FD BLANK
Depth (inches):		
TCLP Sample Date:	10/23/95	10/23/95
TCLP Sample Numbers:	RA-95-166	RA-95-174
Total Sample Date:	**7/11/96**	**7/11/96**
Total Sample Numbers:	**RA-96-163**	**RA-96-164**

Analytes

Metals

TCLP Arsenic (As)	0.1 U	0.1 U
Total Arsenic (As)	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.048 UB	0.038 UB
Total Barium (Ba)	**0.005 U**	**0.005 U**
TCLP Cadmium (Cd)	0.005 U	0.005 U
Total Cadmium (Cd)	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.02 U
Total Chromium (Cr)	**0.02 UJ**	**0.02 UJ**
TCLP Lead (Pb)	0.05 U	0.05 U
Total Lead (Pb)	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0001 U	0.0001 U
Total Mercury (Hg)	**0.0001 U**	**0.0001 U**
TCLP Thallium (Tl)	0.2 U	0.2 U
Total Thallium (Tl)	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001k, Mudpit P-4 (cont.)

HOLE Number:	EQ BLANK	FD BLANK
Depth (inches):		
TCLP Sample Date:	10/23/95	10/23/95
TCLP Sample Numbers:	RA-95-165	RA-95-173
Total Sample Date:	7/11/96	7/11/96
Total Sample Numbers:	RA-96-163	RA-96-164

Analytes

Volatiles

TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	NA	NA
TCLP 1,2-Dichloroethane	0.05 U	0.05 U
Total 1,2-Dichloroethane	NA	NA
TCLP Benzene	0.05 U	0.05 U
Total Benzene	NA	NA
TCLP Chloroform	0.05 U	0.05 U
Total Chloroform	NA	NA
TCLP Ethyl benzene	0.05 U	0.05 U
Total Ethyl benzene	NA	NA
TCLP Toluene	0.05 U	0.05 U
Total Toluene	NA	NA
TCLP Vinyl chloride	0.1 U	0.1 U
Total Vinyl chloride	NA	NA
Xylenes, total	0.05 U	0.05 U
Xylenes, total	NA	NA

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001h, H-15

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	25-35	12-24	60-72
TCLP Sample Date:	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95
TCLP Sample Numbers:	RA-95-175	RA-95-176	RA-95-177	RA-95-178	RA-95-180	RA-95-184
Total Sample Date:	7/9/96	7/9/96	7/9/96	7/9/96	7/9/96	7/9/96
Total Sample Numbers:	RA-96-097	RA-96-098	RA-96-099	RA-96-100	RA-96-102	RA-96-104
Analytes						
Metals						
TCLP Arsenic (As)	0.2 UB	0.2 U	0.1 UB	0.2 U	0.1 UB	0.2 U
Total Arsenic (As)	**0.9**	**1.7**	**1.2**	**1.9**	**0.6**	**0.018**
TCLP Barium (Ba)	0.43 UB	1.3 B	0.79 B	0.99 B	0.44 UB	1.1 B
Total Barium (Ba)	**21**	**33**	**27**	**170**	**20**	**64**
TCLP Cadmium (Cd)	0.005 U	0.01 U	0.005 U	0.01 U	0.005 U	0.02 U
Total Cadmium (Cd)	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**
TCLP Chromium (Cr)	0.02 U	0.04 U	0.02 U	0.04 U	0.02 U	0.04 U
Total Chromium (Cr)	**4**	**5**	**5**	**5**	**4**	**6**
TCLP Lead (Pb)	0.05 U	0.1 U	0.05 U	0.1 U	0.05 U	0.1 U
Total Lead (Pb)	**2.8 J**	**2.9 J**	**2.4 J**	**2.2 J**	**2 J**	**2.8 J**
TCLP Mercury (Hg)	0.0001 U	0.0001	0.0001 U	0.0001	0.0001 U	0.0001
Total Mercury (Hg)	**0.03 U**	**0.03**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**
TCLP Thallium (Tl)	0.2 U	0.4 U	0.2 U	0.4 U	0.2 U	0.4 U
Total Thallium (Tl)	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank
J	Result should be considered an estimated value
NA	Not analyzed
R	Result has been rejected and is considered unusable
U	Analyte was not detected; value is the method reporting limit
UB	Detected in the blank and qualified as not detected

EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001h, H-15 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95
TCLP Sample Numbers:	NA	NA	NA	NA	RA-95-179	RA-95-183
Total Sample Date:					**7/9/96**	**7/9/96**
Total Sample Numbers:					**RA-96-101**	**RA-96-103**
Analytes						
Volatiles						
TCLP 1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**
TCLP 1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U
Total 1,2-Dichloroethane	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**
TCLP Benzene	NA	NA	NA	NA	0.05 U	0.05 U
Total Benzene	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**
TCLP Chloroform	NA	NA	NA	NA	0.05 U	0.05 U
Total Chloroform	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**
TCLP Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U
Total Ethyl benzene	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**
TCLP Toluene	NA	NA	NA	NA	0.05 U	0.05 U
Total Toluene	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**
TCLP Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U
Total Vinyl chloride	**NA**	**NA**	**NA**	**NA**	**0.01 U**	**0.01 U**
Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U
Xylenes, total	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected, value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:
1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001h, H-15 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	10/24/95	10/24/95	10/24/95	
TCLP Sample Numbers:	RA-95-186	RA-95-188	RA-95-182	NA
Total Sample Date:	7/9/96	7/9/96	7/9/96	7/9/96
Total Sample Numbers:	RA-96-106	RA-96-108	RA-96-109	RA-96-110
Analytes				
Metals				
TCLP Arsenic (As)	0.2 UB	0.5 U	0.1 U	NA
Total Arsenic (As)	**1**	**2.2**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.36 UB	1.2 B	0.005 U	NA
Total Barium (Ba)	**26**	**140**	**0.056**	**0.056**
TCLP Cadmium (Cd)	0.005 U	0.02 U	0.005 U	NA
Total Cadmium (Cd)	**0.5**	**0.5 U**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.1 U	0.02 U	NA
Total Chromium (Cr)	**5**	**7**	**0.02 UJ**	**0.02 UJ**
TCLP Lead (Pb)	0.05 U	0.2 U	0.05 U	NA
Total Lead (Pb)	**2.2**	**3.1**	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0001 U	0.0001	0.0001 U	NA
Total Mercury (Hg)	**0.03 U**	**0.03 U**	**0.0001 U**	**0.0001 U**
TCLP Thallium (Tl)	0.2 U	1 U	0.2 U	NA
Total Thallium (Tl)	**20 U**	**20 U**	**0.07**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank
J	Result should be considered an estimated value
NA	Not analyzed
R	Result has been rejected and is considered unusable
U	Analyte was not detected; value is the method reporting limit
UB	Detected in the blank and qualified as not detected

EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001h, H-15 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	10/24/95	10/24/95	10/24/95	
TCLP Sample Numbers:	RA-95-185	RA-95-187	RA-95-181	NA
Total Sample Date:	7/9/96	7/9/96		
Total Sample Numbers:	RA-96-105	RA-96-107	NA	NA

Analytes

Volatiles

TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 UJ	NA
Total 1,1,1-Trichloroethane	**0.005 U**	**0.005 UJ**	**NA**	**NA**
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 UJ	NA
Total 1,2-Dichloroethane	**0.005 U**	**0.005 UJ**	**NA**	**NA**
TCLP Benzene	0.05 U	0.05 U	0.05 UJ	NA
Total Benzene	**0.005 U**	**0.005 UJ**	**NA**	**NA**
TCLP Chloroform	0.05 U	0.05 U	0.05 UJ	NA
Total Chloroform	**0.005 U**	**0.005 UJ**	**NA**	**NA**
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 UJ	NA
Total Ethyl benzene	**0.005 U**	**0.005 UJ**	**NA**	**NA**
TCLP Toluene	0.05 U	0.05 U	0.05 UJ	NA
Total Toluene	**0.005 U**	**0.005 UJ**	**NA**	**NA**
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 UJ	NA
Total Vinyl chloride	**0.01 U**	**0.01 UJ**	**NA**	**NA**
Xylenes, total	0.05 U	0.05 U	0.05 UJ	NA
Xylenes, total	**0.005 U**	**0.005 UJ**	**NA**	**NA**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001h, Mudpit P-2

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72		
TCLP Sample Date:	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95	
TCLP Sample Numbers:	RA-95-189	RA-95-190	RA-95-192	RA-95-194	RA-95-196	RA-95-198	RA-95-200	NA
Total Sample Date:	7/9/96	7/9/96	7/9/96	7/9/96	7/9/96	7/9/96	7/9/96	7/9/96
Total Sample Numbers:	RA-96-111	RA-96-112	RA-96-114	RA-96-116	RA-96-118	RA-96-120	RA-96-121	RA-96-122
Analytes								
Metals								
TCLP Arsenic (As)	0.1 UB	0.5 U	0.1 UB	0.5 U	0.1 UB	0.5 U	0.1 U	NA
Total Arsenic (As)	**0.8**	**1.4**	**1**	**1.9**	**1.3**	**1.5**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.28 UB	1.2 B	0.39 UB	1.2 B	0.29 UB	1.1 B	0.005 U	NA
Total Barium (Ba)	**19**	**28**	**20**	**65**	**69**	**150**	**0.005 U**	**0.005 U**
TCLP Cadmium (Cd)	0.005 U	0.02 U	0.005 U	0.02 U	0.005 U	0.02 U	0.005 U	NA
Total Cadmium (Cd)	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.1 U	0.02 U	0.1 U	0.02 U	0.1 U	0.02 U	NA
Total Chromium (Cr)	**6**	**6**	**5**	**6**	**5**	**5**	**0.02 UJ**	**0.02 UJ**
TCLP Lead (Pb)	0.05 U	0.2 U	0.05 U	0.2 U	0.05 UJ	0.2 UJ	0.05 UJ	NA
Total Lead (Pb)	**2.1**	**2.6**	**2**	**6.5**	**2.3**	**2.4**	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0001 U	0.0001	0.0001 U	0.0002	0.0001 U	0.0001	0.0001 U	NA
Total Mercury (Hg)	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.0001 U**	**0.0001 U**
TCLP Thallium (Tl)	0.2 U	1 U	0.2 U	1 U	0.2 U	1 U	0.2 U	NA
Total Thallium (Tl)	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**0.2 U**	**0.2 U**

d abbreviations:

- B Analyte was detected in an associated laboratory blank
- J Result should be considered an estimated value
- NA Not analyzed
- R Result has been rejected and is considered unusable
- U Analyte was not detected; value is the method reporting limit
- UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001h, Mudpit P-2 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72		
TCLP Sample Date:	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95	10/24/95	
TCLP Sample Numbers:	NA	NA	RA-95-191	RA-95-193	RA-95-195	RA-95-197	RA-95-199	NA
Total Sample Date:			7/9/96	7/9/96	7/9/96	7/9/96		
Total Sample Numbers:			RA-96-113	RA-96-115	RA-96-117	RA-96-119	NA	NA
Analytes								
Volatiles								
TCLP 1,1,1-Trichloroethane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total 1,1,1-Trichloroethane	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA
TCLP 1,2-Dichloroethane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total 1,2-Dichloroethane	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA
TCLP Benzene	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total Benzene	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA
TCLP Chloroform	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total Chloroform	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA
TCLP Ethyl benzene	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total Ethyl benzene	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA
TCLP Toluene	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total Toluene	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA
TCLP Vinyl chloride	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA
Total Vinyl chloride	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA
Xylenes, total	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Xylenes, total	NA	NA	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA

Data qualifiers and abbreviations:

- B Analyte was detected in an associated laboratory blank
- J Result should be considered an estimated value
- NA Not analyzed
- R Result has been rejected and is considered unusable
- U Analyte was not detected; value is the method reporting limit
- UB Detected in the blank and qualified as not detected

- EQ BLANK Equipment Rinse Blank
- FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 0011, Mudpit P-5

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72		
TCLP Sample Date:	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95	
TCLP Sample Numbers:	RA-95-240	RA-95-241	RA-95-243	RA-95-245	RA-95-249	RA-95-251	RA-95-247	NA
Total Sample Date:	7/8/96	7/8/96	7/8/96	7/8/96	7/8/96	7/8/96	7/8/96	7/8/96
Total Sample Numbers:	RA-96-073	R-96-074	RA-96-076	RA-96-078	RA-96-080	RA-96-082	RA-96-083	RA-96-084
Analytes								
Metals								
TCLP Arsenic (As)	0.1 U	0.1 UB	0.2 U	1 U	0.2 U	0.5 U	0.1 U	NA
Total Arsenic (As)	**1.5 J**	**0.9 J**	**2.3 J**	**2.3 J**	**2.3 J**	**2.5 J**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.68	0.83	1.1	1.3	1.3	1.5	0.033	NA
Total Barium (Ba)	**120**	**62**	**490**	**400**	**390**	**290**	**0.007**	**0.006**
TCLP Cadmium (Cd)	0.005 U	0.01 U	0.02 U	0.05 U	0.02 U	0.02 U	0.005 U	NA
Total Cadmium (Cd)	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.02 U	0.04 U	0.2 U	0.04 U	0.1 U	0.02 U	NA
Total Chromium (Cr)	**3**	**4**	**7**	**5**	**5**	**6**	**0.02 U**	**0.02 U**
TCLP Lead (Pb)	0.05 U	0.05 U	0.1 U	0.5 U	0.1 U	0.2 U	0.05 U	NA
Total Lead (Pb)	**2.2 J**	**3.6 J**	**4.2 J**	**5.1 J**	**3.5 J**	**3.6 J**	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NA
Total Mercury (Hg)	**0.02 U**	**0.03**	**0.02 U**	**0.02 U**	**0.02 U**	**0.02 U**	**0.0001 U**	**0.0001 U**
TCLP Thallium (Tl)	0.2 U	0.2 U	0.4 U	2 U	0.4 U	1 U	0.2 U	NA
Total Thallium (Tl)	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

- B Analyte was detected in an associated laboratory blank
- J Result should be considered an estimated value
- NA Not analyzed
- R Result has been rejected and is considered unusable
- U Analyte was not detected; value is the method reporting limit
- UB Detected in the blank and qualified as not detected

- EQ BLANK Equipment Rinse Blank
- FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 0011, Mudpit P-5 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72		
TCLP Sample Date:	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95	
TCLP Sample Numbers:	NA	NA	RA-95-242	RA-95-244	RA-95-248	RA-95-250	RA-95-246	NA
Total Sample Date:			7/8/96	7/8/96	7/8/96	7/8/96		
Total Sample Numbers:	NA	NA	RA-96-075	RA-96-077	RA-96-079	RA-96-081	NA	NA
Analytes								
Volatiles								
TCLP 1,1,1-Trichloroethane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total 1,1,1-Trichloroethane	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP 1,2-Dichloroethane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total 1,2-Dichloroethane	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Benzene	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total Benzene	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Chloroform	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total Chloroform	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Ethyl benzene	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total Ethyl benzene	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Toluene	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Total Toluene	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Vinyl chloride	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA
Total Vinyl chloride	**NA**	**NA**	**0.01 U**	**0.01 U**	**0.01 U**	**0.01 U**	**NA**	**NA**
Xylenes, total	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA
Xylenes, total	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**

Data qualifiers and abbreviations:

- B Analyte was detected in an associated laboratory blank
- J Result should be considered an estimated value
- NA Not analyzed
- R Result has been rejected and is considered unusable
- U Analyte was not detected; value is the method reporting limit
- UB Detected in the blank and qualified as not detected

- EQ BLANK Equipment Rinse Blank
- FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 0011, WIPP-12

HOLE Number:	HOLE #4	HOLE #4	HOLE #5	HOLE #5	HOLE #6	HOLE #6	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72		
TCLP Sample Date:	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95		11/7/95
TCLP Sample Numbers:	RA-95-252	RA-95-253	RA-95-255	RA-95-257	RA-95-259	RA-95-261	NA	RA-95-263
Total Sample Date:	**7/8/96**	**7/8/96**	**7/8/96**	**7/8/96**	**7/8/96**	**7/8/96**	**7/8/96**	**7/8/96**
Total Sample Numbers:	**RA-96-085**	**RA-96-086**	**RA-96-088**	**RA-96-090**	**RA-96-092**	**RA-96-094**	**RA-96-095**	**RA-96-096**
Analytes								
Metals								
TCLP Arsenic (As)	0.1 U	0.1 UB	0.1 U	0.2 U	0.1 UB	0.2 U	NA	0.1 U
Total Arsenic (As)	**0.7 J**	**0.9 J**	**0.7**	**0.9**	**1.3**	**1.4**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.34	0.34	0.43	1.4	1.4	1.7	NA	0.036
Total Barium (Ba)	**18**	**36**	**140**	**120**	**1700**	**860**	**0.057**	**0.056**
TCLP Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.02 UJ	0.005 UJ	0.02 UJ	NA	0.005 UJ
Total Cadmium (Cd)	**0.5 UJ**	**0.5 UJ**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.04 U	0.02 U	0.04 U	NA	0.02 U
Total Chromium (Cr)	**2**	**4**	**5**	**4**	**6**	**5**	**0.02 U**	**0.02 U**
TCLP Lead (Pb)	0.05 U	0.05 U	0.05 U	0.1 U	0.05 U	0.1 U	NA	0.05 U
Total Lead (Pb)	**1.4 J**	**1.8 J**	**1.7 J**	**1.5 J**	**2.2 J**	**1.8 J**	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NA	0.0001 U
Total Mercury (Hg)	**0.02 U**	**0.02 U**	**0.02 U**	**0.02 U**	**0.02 U**	**0.02 U**	**0.0001U**	**0.0001U**
TCLP Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.4 U	NA	0.2 U
Total Thallium (Tl)	**20**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 0011, WIPP-12 (cont.)

HOLE Number:	HOLE #4	HOLE #4	HOLE #5	HOLE #5	HOLE #6	HOLE #6	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72		
TCLP Sample Date:	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95	11/7/95		11/7/95
TCLP Sample Numbers:	NA	NA	RA-95-254	RA-95-256	RA-95-258	RA-95-260	NA	RA-95-262
Total Sample Date:			**7/8/96**	**7/8/96**	**7/8/96**	**7/8/96**		
Total Sample Numbers:	**NA**	**NA**	**RA-96-087**	**RA-96-089**	**RA-96-91**	**RA-96-093**	**NA**	**NA**
Analytes								
Volatiles								
TCLP 1,1,1-Trichloroethane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Total 1,1,1-Trichloroethane	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP 1,2-Dichloroethane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Total 1,2-Dichloroethane	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Benzene	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Total Benzene	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Chloroform	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Total Chloroform	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Ethyl benzene	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Total Ethyl benzene	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Toluene	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Total Toluene	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Vinyl chloride	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U
Total Vinyl chloride	**NA**	**NA**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**NA**	**NA**
Xylenes, total	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	NA	0.05 U
Xylenes, total	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:
1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001s ERDA-9

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	BORE #4	BORE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	11/9/95	11/13/95	11/9/95	11/13/95	11/9/95	11/13/95	11/9/95	11/13/95
TCLP Sample Numbers:	RA-95-201	RA-95-264	RA-95-202	RA-95-265	RA-95-204	RA-95-267	RA-95-207	RA-95-269
Total Sample Date:	7/12/96	7/15/96	7/12/96	7/15/96	7/12/96	7/15/96	7/12/96	7/15/96
Total Sample Numbers:	RA-96-179	RA-96-180	RA-96-181	RA-96-182	RA-96-184	RA-96-186	RA-96-188	RA-96-190
Analytes								
Metals								
TCLP Arsenic (As)	0.2 UB	0.2 U	0.2 UB	0.1 UB	0.1 UB	0.1 U	0.1 UB	0.1 U
Total Arsenic (As)	**1.4 J**	**0.5 J**	**0.5 J**	**1.2 J**	**0.5 J**	**0.4 J**	**1.1 J**	**0.6 J**
TCLP Barium (Ba)	0.66	0.71	0.54	0.64	0.59	0.6	0.53	0.66
Total Barium (Ba)	**110 J**	**15**	**24 J**	**39**	**44 J**	**19**	**71**	**11**
TCLP Cadmium (Cd)	0.01 U	0.02 UJ	0.005 U	0.01 UJ	0.005 U	0.01 UJ	0.005 U	0.005 UJ
Total Cadmium (Cd)	**0.5 UJ**	**0.5 U**	**0.5 UJ**	**0.5 U**	**0.6 J**	**0.5 U**	**0.5 U**	**0.5 U**
TCLP Chromium (Cr)	0.02 U	0.04 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Total Chromium (Cr)	**4 J**	**4**	**4 J**	**4**	**4 J**	**3**	**8**	**2**
TCLP Lead (Pb)	0.05 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Lead (Pb)	**1.9**	**1.8**	**1.5**	**2.2**	**1.8**	**1.3**	**2.1**	**1.4**
TCLP Mercury (Hg)	0.0001 U	0.0001 U	0.0001	0.0004	0.0001 U	0.0004	0.0001 U	0.0003
Total Mercury (Hg)	**0.03 U**	**0.03 U**	**0.03**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**
TCLP Thallium (Tl)	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Thallium (Tl)	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**

Data qualifiers and abbreviations:

- B — Analyte was detected in an associated laboratory blank
- J — Result should be considered an estimated value
- NA — Not analyzed
- R — Result has been rejected and is considered unusable
- U — Analyte was not detected; value is the method reporting limit
- UB — Detected in the blank and qualified as not detected

- EQ BLANK — Equipment Rinse Blank
- FD BLANK — Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001s ERDA-9 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	BORE #4	BORE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72
TCLP Sample Date:	11/9/95	11/13/95	11/9/95	11/13/95	11/9/95	11/13/95	11/9/95	11/13/95
TCLP Sample Numbers:	NA	NA	NA	NA	RA-95-203	RA-95-266	RA-95-206	RA-95-268
Total Sample Date:					**7/12/96**	**7/15/96**	**7/12/96**	**7/15/96**
Total Sample Numbers:	**NA**	**NA**	**NA**	**NA**	**RA-96-183**	**RA-96-185**	**RA-96-187**	**RA-96-189**
Analytes								
Volatiles								
TCLP 1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 UJ**	**0.005 U**
TCLP 1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 UJ**	**0.005 U**
TCLP Benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 UJ**	**0.005 U**
TCLP Chloroform	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 UJ**	**0.005 U**
TCLP Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 UJ**	**0.005 U**
TCLP Toluene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 UJ**	**0.005 U**
TCLP Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	**NA**	**NA**	**NA**	**NA**	**0.01 U**	**0.01 U**	**0.01 UJ**	**0.01 U**
Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Xylenes, total	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**0.005 U**	**0.005 UJ**	**0.005 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected, value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001s ERDA-9 (cont.)

HOLE Number:	EQ BLANK	FD BLANK
Depth (inches):		
TCLP Sample Date:	11/9/95	11/13/95
TCLP Sample Numbers:	RA-95-205b	RA-95-271
Total Sample Date:	**7/15/96**	**7/15/96**
Total Sample Numbers:	**RA-96-191**	**RA-96-192**

Analytes

Metals

TCLP Arsenic (As)	0.1 U	0.1 U
Total Arsenic (As)	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.027	0.051
Total Barium (Ba)	**0.046**	**0.053**
TCLP Cadmium (Cd)	0.005 U	0.005 UJ
Total Cadmium (Cd)	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.02 U
Total Chromium (Cr)	**0.02 U**	**0.02 U**
TCLP Lead (Pb)	0.05 U	0.05 U
Total Lead (Pb)	**0.002 UJ**	**0.002 UJ**
TCLP Mercury (Hg)	0.0001 U	0.0001 U
Total Mercury (Hg)	**0.0001 U**	**0.0001 U**
TCLP Thallium (Tl)	0.2 U	0.2 U
Total Thallium (Tl)	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank
J	Result should be considered an estimated value
NA	Not analyzed
R	Result has been rejected and is considered unusable
U	Analyte was not detected, value is the method reporting limit
UB	Detected in the blank and qualified as not detected

EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 001s ERDA-9 (cont.)

HOLE Number:	EQ BLANK	FD BLANK
Depth (inches):		
TCLP Sample Date:	11/9/95	11/13/95
TCLP Sample Numbers:	RA-95-205a	RA-95-271
Total Sample Date:		
Total Sample Numbers:	NA	NA

Analytes

Volatiles

TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	NA	NA
TCLP 1,2-Dichloroethane	0.05 U	0.05 U
Total 1,2-Dichloroethane	NA	NA
TCLP Benzene	0.05 U	0.05 U
Total Benzene	NA	NA
TCLP Chloroform	0.05 U	0.05 U
Total Chloroform	NA	NA
TCLP Ethyl benzene	0.05 U	0.05 U
Total Ethyl benzene	NA	NA
TCLP Toluene	0.05 U	0.05 U
Total Toluene	NA	NA
TCLP Vinyl chloride	0.1 U	0.1 U
Total Vinyl chloride	NA	NA
TCLP Xylenes, total	0.05 U	0.05 U
Total Xylenes, total	NA	NA

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank
J	Result should be considered an estimated value
NA	Not analyzed
R	Result has been rejected and is considered unusable
U	Analyte was not detected, value is the method reporting limit
UB	Detected in the blank and qualified as not detected

EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	36-48	12-24	36-48	12-24	36-48	12-24	36-48
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-210	RA-95-213	RA-95-216	RA-95-219	RA-95-222	RA-95-226	RA-95-231	RA-95-234
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-195**	**RA-96-198**	**RA-96-201**	**RA-96-204**	**RA-96-207**	**RA-96-210**	**RA-96-213**	**RA-96-216**
Analytes								
Metals								
TCLP Arsenic (As)	0.1 UB	0.1 UB	0.5 U	0.1 UB	0.1 UB	0.1 U	0.1 UB	0.1 U
Total Arsenic (As)	**0.6 J**	**0.5 J**	**0.7 J**	**0.4 J**	**0.6 J**	**0.6 J**	**0.7 J**	**1.1 J**
TCLP Barium (Ba)	0.72	0.75	1.7	0.48	0.61	0.35	0.85	0.73
Total Barium (Ba)	**48**	**35**	**59**	**14**	**16**	**27**	**29**	**43**
TCLP Cadmium (Cd)	0.01 U	0.01 U	0.02 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Total Cadmium (Cd)	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**
TCLP Chromium (Cr)	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Total Chromium (Cr)	**15**	**25**	**4**	**8**	**50**	**120**	**140**	**4**
TCLP Lead (Pb)	0.05 U	0.05 U	0.2 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Lead (Pb)	**1.6**	**1.5**	**1.7**	**1.2**	**4.2**	**2.4**	**2.6**	**4.8**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	36-48	12-24	36-48	12-24	36-48	12-24	36-48
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-210	RA-95-213	RA-95-216	RA-95-219	RA-95-222	RA-95-226	RA-95-231	RA-95-234
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-195**	**RA-96-198**	**RA-96-201**	**RA-96-204**	**RA-96-207**	**RA-96-210**	**RA-96-213**	**RA-96-216**
Analytes								
Metals								
TCLP Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Total Mercury (Hg)	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**
TCLP Nickel (Ni)	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Total Nickel (Ni)	**6**	**12**	**3**	**5**	**22**	**54**	**66**	**2 U**
TCLP Selenium (Se)	0.1 U	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Selenium (Se)	**0.4 U**	**0.4 U**	**0.5 U**	**0.4 U**	**0.4 U**	**0.4 U**	**0.4 U**	**0.4 U**
TCLP Silver (Ag)	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total Silver (Ag)	**1 U**	**1 U**	**1 U**	**1 U**	**1 U**	**1 U**	**1 U**	**1 U**
TCLP Thallium (Tl)	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Thallium (Tl)	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	36-48	12-24	36-48	12-24	36-48	12-24	36-48
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-208	RA-95-211	RA-95-214	RA-95-217	RA-95-220	RA-95-224	RA-95-229	RA-95-232
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-193**	**RA-96-196**	**RA-96-199**	**RA-96-202**	**RA-96-205**	**RA-96-208**	**RA-96-211**	**RA-96-214**
Analytes								
Volatiles								
TCLP 2-Butanone	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total 2-Butanone	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**
TCLP 4-Methyl-2-pentanone	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0 5 UJ
Total 4-Methyl-2-pentanone	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**	**0.050 U**
TCLP Acetone	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Acetone	**0.050 UJ**	**0.050 UJ**	**0.050 UJ**	**0.050 UJ**	**0.050 UJ**	**0.050 UJ**	**0.050 UJ**	**0.050 UJ**
TCLP Benzene	0.05U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Carbon tetrachloride	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Carbon tetrachloride	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Chlorobenzene	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Chlorobenzene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Chloroform	0.05U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	36-48	12-24	36-48	12-24	36-48	12-24	36-48
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-208	RA-95-211	RA-95-214	RA-95-217	RA-95-220	RA-95-224	RA-95-229	RA-95-232
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-193**	**RA-96-196**	**RA-96-199**	**RA-96-202**	**RA-96-205**	**RA-96-208**	**RA-96-211**	**RA-96-214**
Analytes								
Volatiles								
TCLP cis-1,2-Dichloroethene	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total cis-1,2-Dichloroethene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Cyclohexane	NA	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Total Cyclohexane	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**
TCLP Cyclohexanone	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Cyclohexanone	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**
TCLP Ethyl acetate	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Ethyl acetate	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**
TCLP Ethyl benzene	0.05U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Toluene	0.05U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	36-48	12-24	36-48	12-24	36-48	12-24	36-48
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-208	RA-95-211	RA-95-214	RA-95-217	RA-95-220	RA-95-224	RA-95-229	RA-95-232
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-193**	**RA-96-196**	**RA-96-199**	**RA-96-202**	**RA-96-205**	**RA-96-208**	**RA-96-211**	**RA-96-214**
Analytes								
Volatiles								
TCLP Methylene chloride	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Methylene chloride	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Tetrachloroethene	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Tetrachloroethene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Tribromomethane	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ
Total Tribromomethane	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Trichloroethene	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ
Total Trichloroethene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP Trichloroflouromethane	NA	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Total Trichloroflouromethane	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**
TCLP Vinyl chloride	0.010U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**	**0.010 U**

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	36-48	12-24	36-48	12-24	36-48	12-24	36-48
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-208	RA-95-211	RA-95-214	RA-95-217	RA-95-220	RA-95-224	RA-95-229	RA-95-232
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-193**	**RA-96-196**	**RA-96-199**	**RA-96-202**	**RA-96-205**	**RA-96-208**	**RA-96-211**	**RA-96-214**
Analytes								
Volatiles								
TCLP Xylenes, total	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Xylenes, total	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**
TCLP 2-Ethoxyethanol	NA	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Total 2-Ethoxyethanol	**10 U**	**10 U**	**10 U**	**10 U**	**10 U**	**10 U**	**10 U**	**10 U**
TCLP Isobutanol	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Isobutanol	**2 U**	**2 U**	**2 U**	**2 U**	**2 U**	**2 U**	**2 U**	**2 U**
TCLP Methanol	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Methanol	**2 U**	**2 U**	**2 U**	**2 U**	**2 U**	**42**	**200**	**200**
TCLP n-Butanol	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total n-Butanol	**2 U**	**2 U**	**2 U**	**2 U**	**2 U**	**2 U**	**2 U**	**2 U**

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	36-48	12-24	36-48	12-24	36-48	12-24	36-48
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-209	RA-95-212	RA-95-215	RA-95-218	RA-95-221	RA-95-225	RA-95-230	RA-95-233
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-194**	**RA-96-197**	**RA-96-200**	**RA-96-203**	**RA-96-206**	**RA-96-209**	**RA-96-212**	**RA-96-215**
Analytes								
Semivolatiles								
TCLP 1,2-Dichlorobenzene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total 1,2-Dichlorobenzene	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**
TCLP 1,4-Dichlorobenzene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total 1,4-Dichlorobenzene	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**
TCLP 2,4,5-Trichlorophenol	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total 2,4,5-Trichlorophenol	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**
TCLP 2,4,6-Trichlorophenol	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total 2,4,6-Trichlorophenol	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**
TCLP 2,4-Dinitrotoluene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total 2,4-Dinitrotoluene	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**
TCLP 2-Methylphenol	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total 2-Methylphenol	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**
TCLP 3/4-Methylphenol	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total 3/4-Methylphenol	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	36-48	12-24	36-48	12-24	36-48	12-24	36-48
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-209	RA-95-212	RA-95-215	RA-95-218	RA-95-221	RA-95-225	RA-95-230	RA-95-233
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-194**	**RA-96-197**	**RA-96-200**	**RA-96-203**	**RA-96-206**	**RA-96-209**	**RA-96-212**	**RA-96-215**
Analytes								
Semivolatiles								
TCLP Hexachlorobenzene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Hexachlorobenzene	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**
TCLP Hexachlorobutadiene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Hexachlorobutadiene	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**
TCLP Hexachloroethane	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Hexachloroethane	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**
TCLP Nitrobenzene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Nitrobenzene	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**
TCLP Pentachlorophenol	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Pentachlorophenol	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**	**1.70 U**
TCLP Pyridine	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Pyridine	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**	**0.330 U**

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #4	HOLE #4
Depth (inches):	12-24	36-48	12-24	36-48	12-24	36-48	12-24	36-48
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-209	RA-95-212	RA-95-215	RA-95-218	RA-95-221	RA-95-225	RA-95-230	RA-95-233
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-194**	**RA-96-197**	**RA-96-200**	**RA-96-203**	**RA-96-206**	**RA-96-209**	**RA-96-212**	**RA-96-215**
Analytes								
PCBs								
TCLP PCB-1221	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Total PCB-1221	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**
TCLP PCB-1232	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Total PCB-1232	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**
TCLP PCB-1242/1016	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Total PCB-1242/1016	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**
TCLP PCB-1248	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Total PCB-1248	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**
TCLP PCB-1254	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Total PCB-1254	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**
TCLP PCB-1260	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total PCB-1260	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**	**100 U**

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-235	RA-95-236	RA-95-228	RA-95-239
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-217**	**RA-96-218**	**RA-96-219**	**RA-96-220**
Analytes				
Metals				
TCLP Arsenic (As)	0.1 UJB	0.1 U	0.1 U	0.1 U
Total Arsenic (As)	**0.7 J**	**0.7 J**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.43	0.43	0.036	0.037
Total Barium (Ba)	**14**	**14**	**0.005 U**	**0.005 U**
TCLP Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U
Total Cadmium (Cd)	**0.5 U**	**0.5 U**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U
Total Chromium (Cr)	**2**	**4**	**0.02 UJ**	**0.02 UJ**
TCLP Lead (Pb)	0.05 U	0.05 U	0.05 U	0.05 U
Total Lead (Pb)	**1.4**	**1.5**	**0.002 U**	**0.002 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	RA-95-235	RA-95-236	RA-95-223	RA-95-237
Total Sample Date:	**7/12/96**	**7/12/96**	**7/12/96**	**7/12/96**
Total Sample Numbers:	**RA-96-217**	**RA-96-218**	**RA-96-219**	**RA-96-220**
Analytes				
Metals				
TCLP Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Total Mercury (Hg)	**0.03 U**	**0.03 U**	**0.0001 U**	**0.0001 U**
TCLP Nickel (Ni)	0.02 U	0.02 U	0.02 U	0.02 U
Total Nickel (Ni)	**2 U**	**2 U**	**0.02 U**	**0.02 U**
TCLP Selenium (Se)	0.1 U	0.1 U	0.1 U	0.1 U
Total Selenium (Se)	**0.4 U**	**0.4 U**	**0.004 U**	**0.004 U**
TCLP Silver (Ag)	0.01 U	0.01 U	0.01 U	0.01 U
Total Silver (Ag)	**1 U**	**1 U**	**0.01 U**	**0.01 U**
TCLP Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U
Total Thallium (Tl)	**30**	**20 U**	**0.2**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	NA	NA	RA-95-223	RA-95-237
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Volatiles				
TCLP 1,1,1-Trichloroethane	NA	NA	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	NA	NA	NA	NA
TCLP 1,1,2,2-Tetrachloroethane	NA	NA	0.05 U	0.05 U
Total 1,1,2,2-Tetrachloroethane	NA	NA	NA	NA
TCLP 1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	0.05 U	0.05 U
Total 1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	NA	NA
TCLP 1,1,2-Trichloroethane	NA	NA	0.05 U	0.05 U
Total 1,1,2-Trichloroethane	NA	NA	NA	NA
TCLP 1,1-Dichloroethane	NA	NA	0.05 U	0.05 U
Total 1,1-Dichloroethane	NA	NA	NA	NA
TCLP 1,1-Dichloroethene	NA	NA	0.05 U	0.05 U
Total 1,1-Dichloroethene	NA	NA	NA	NA
TCLP 1,2-Dichloroethane	NA	NA	0.05 U	0.05 U
Total 1,2-Dichloroethane	NA	NA	NA	NA

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	NA	NA	RA-95-223	RA-95-237
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Volatiles				
TCLP 2-Butanone	NA	NA	0.5 U	0.5 U
Total 2-Butanone	NA	NA	NA	NA
TCLP 4-Methyl-2-pentanone	NA	NA	0.5 U	0.5 U
Total 4-Methyl-2-pentanone	NA	NA	NA	NA
TCLP Acetone	NA	NA	0.5 U	0.5 U
Total Acetone	NA	NA	NA	NA
TCLP Benzene	NA	NA	0.05 U	0.05 U
Total Benzene	NA	NA	NA	NA
TCLP Carbon tetrachloride	NA	NA	0.05 U	0.05 U
Total Carbon tetrachloride	NA	NA	NA	NA
TCLP Chlorobenzene	NA	NA	0.05 U	0.05 U
Total Chlorobenzene	NA	NA	NA	NA
TCLP Chloroform	NA	NA	0.05 U	0.05 U
Total Chloroform	NA	NA	NA	NA

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	NA	NA	RA-95-223	RA-95-237
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Volatiles				
TCLP cis-1,2-Dichloroethene	NA	NA	0.05 U	0.05 U
Total cis-1,2-Dichloroethene	NA	NA	NA	NA
TCLP Cyclohexane	NA	NA	0.1 UJ	0.1 UJ
Total Cyclohexane	NA	NA	NA	NA
TCLP Cyclohexanone	NA	NA	0.5 U	0.5 U
Total Cyclohexanone	NA	NA	NA	NA
TCLP Ethyl acetate	NA	NA	0.1 U	0.1 U
Total Ethyl acetate	NA	NA	NA	NA
TCLP Ethyl benzene	NA	NA	0.05 U	0.05 U
Total Ethyl benzene	NA	NA	NA	NA
TCLP Toluene	NA	NA	0.05 U	0.05 U
Total Toluene	NA	NA	NA	NA

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	NA	NA	RA-95-223	RA-95-237
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Volatiles				
TCLP Methylene chloride	NA	NA	0.05 U	0.05 U
Total Methylene chloride	NA	NA	NA	NA
TCLP Tetrachloroethene	NA	NA	0.05 U	0.05 U
Total Tetrachloroethene	NA	NA	NA	NA
TCLP Tribromomethane	NA	NA	0.05 U	0.05 U
Total Tribromomethane	NA	NA	NA	NA
TCLP Trichloroethene	NA	NA	0.05 U	0.05 U
Total Trichloroethene	NA	NA	NA	NA
TCLP Trichloroflouromethane	NA	NA	0.1 UJ	0.1 UJ
Total Trichloroflouromethane	NA	NA	NA	NA
TCLP Vinyl chloride	NA	NA	0.1 U	0.1 U
Total Vinyl chloride	NA	NA	NA	NA

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	NA	NA	RA-95-223	RA-95-237
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Volatiles				
TCLP Xylenes, total	NA	NA	0.05 U	0.05 U
Total Xylenes, total	NA	NA	NA	NA
TCLP 2-Ethoxyethanol	NA	NA	50 UJ	50 UJ
Total 2-Ethoxyethanol	NA	NA	NA	NA
TCLP Isobutanol	NA	NA	10 UJ	10 UJ
Total Isobutanol	NA	NA	NA	NA
TCLP Methanol	NA	NA	10 UJ	10 UJ
Total Methanol	NA	NA	NA	NA
TCLP n-Butanol	NA	NA	10 UJ	10 UJ
Total n-Butanol	NA	NA	NA	NA

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	NA	NA	RA-95-227	RA-95-238
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Semivolatiles				
TCLP 1,2-Dichlorobenzene	NA	NA	0.1 UJ	0.1 UJ
Total 1,2-Dichlorobenzene	NA	NA	NA	NA
TCLP 1,4-Dichlorobenzene	NA	NA	0.1 UJ	0.1 UJ
Total 1,4-Dichlorobenzene	NA	NA	NA	NA
TCLP 2,4,5-Trichlorophenol	NA	NA	0.5 UJ	0.5 UJ
Total 2,4,5-Trichlorophenol	NA	NA	NA	NA
TCLP 2,4,6-Trichlorophenol	NA	NA	0.1 UJ	0.1 UJ
Total 2,4,6-Trichlorophenol	NA	NA	NA	NA
TCLP 2,4-Dinitrotoluene	NA	NA	0.1 UJ	0.1 UJ
Total 2,4-Dinitrotoluene	NA	NA	NA	NA
TCLP 2-Methylphenol	NA	NA	0.1 UJ	0.1 UJ
Total 2-Methylphenol	NA	NA	NA	NA
TCLP 3/4-Methylphenol	NA	NA	0.1 UJ	0.1 UJ
Total 3/4-Methylphenol	NA	NA	NA	NA

Data qualifiers and abbreviations:

B Analyte was detected in an associated laboratory blank
J Result should be considered an estimated value
NA Not analyzed
R Result has been rejected and is considered unusable
U Analyte was not detected; value is the method reporting limit
UB Detected in the blank and qualified as not detected

EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	NA	NA	RA-95-227	RA-95-238
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
Semivolatiles				
TCLP Hexachlorobenzene	NA	NA	0.1 UJ	0.1 UJ
Total Hexachlorobenzene	NA	NA	NA	NA
TCLP Hexachlorobutadiene	NA	NA	0.1 UJ	0.1 UJ
Total Hexachlorobutadiene	NA	NA	NA	NA
TCLP Hexachloroethane	NA	NA	0.1 UJ	0.1 UJ
Total Hexachloroethane	NA	NA	NA	NA
TCLP Nitrobenzene	NA	NA	0.1 UJ	0.1 UJ
Total Nitrobenzene	NA	NA	NA	NA
TCLP Pentachlorophenol	NA	NA	0.5 UJ	0.5 UJ
Total Pentachlorophenol	NA	NA	NA	NA
TCLP Pyridine	NA	NA	0.1 UJ	0.1 UJ
Total Pyridine	NA	NA	NA	NA

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed		
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU # 004a Portacamp (cont.)

HOLE Number:	HOLE #5	HOLE #5	EQ BLANK	FD BLANK
Depth (inches):	12-24	36-48		
TCLP Sample Date:	11/6/95	11/6/95	11/6/95	11/6/95
TCLP Sample Numbers:	NA	NA	RA-95-227	RA-95-238
Total Sample Date:				
Total Sample Numbers:	NA	NA	NA	NA
Analytes				
PCBs				
TCLP PCB-1221	NA	NA	0.5 UJ	0.5 UJ
Total PCB-1221	NA	NA	NA	NA
TCLP PCB-1232	NA	NA	0.5 UJ	0.5 UJ
Total PCB-1232	NA	NA	NA	NA
TCLP PCB-1242/1016	NA	NA	0.5 UJ	0.5 UJ
Total PCB-1242/1016	NA	NA	NA	NA
TCLP PCB-1248	NA	NA	0.5 UJ	0.5 UJ
Total PCB-1248	NA	NA	NA	NA
TCLP PCB-1254	NA	NA	0.5 UJ	0.5 UJ
Total PCB-1254	NA	NA	NA	NA
TCLP PCB-1260	NA	NA	0.5 UJ	0.5 UJ
Total PCB-1260	NA	NA	NA	NA

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank
J	Result should be considered an estimated value
NA	Not analyzed
R	Result has been rejected and is considered unusable
U	Analyte was not detected; value is the method reporting limit
UB	Detected in the blank and qualified as not detected

EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001j, Mudpit P-3

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24 (DUP)	60-72	60-72 (DUP)
TCLP Sample Date:	7/26/95	7/26/95	7/26/95	7/26/95	7/26/95	7/26/95	7/27/95	7/27/95
TCLP Sample Numbers:	RA-95-003	RA-95-006	RA-95-015	RA-95-018	RA-95-020	RA-95-022	RA-95-025	RA-95-026
Total Sample Date:	**7/10/96**	**7/10/96**	**7/10/96**	**7/10/96**	**7/10/96**		**7/10/96**	
Total Sample Numbers:	**RA-96-138**	**RA-96-140**	**RA-96-142**	**RA-96-144**	**RA-96-145**	**NA**	**RA-96-146**	**NA**
Analytes								
Metals								
TCLP Arsenic (As)	0.2 UB	0.2 UB	0.2 UB	0.2 UB	0.1 UB	1 U	1 U	1 U
Total Arsenic (As)	**0.8**	**0.9**	**0.8**	**1.2**	**0.5**	**NA**	**0.6**	**NA**
TCLP Barium (Ba)	0.47 UB	0.75 B	0.71 UB	1.1 B	0.35 UB	0.42 UB	0.48 UB	0.69 UB
Total Barium (Ba)	**34**	**32**	**18**	**29**	**17**	**NA**	**20**	**NA**
TCLP Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Cadmium (Cd)	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**0.5 U**	**NA**	**0.5 U**	**NA**
TCLP Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Chromium (Cr)	**12**	**5**	**22**	**5**	**26**	**NA**	**5**	**NA**
TCLP Lead (Pb)	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Lead (Pb)	**2.1**	**2.3**	**1.7**	**2.6**	**1.5**	**NA**	**2**	**NA**
TCLP Mercury (Hg)	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Total Mercury (Hg)	**0.03 U**	**0.03 U**	**0.06**	**0.06**	**0.03**	**NA**	**0.03 U**	**NA**
TCLP Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	2 U
Total Thallium (Tl)	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**NA**	**20 U**	**NA**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) Containers for samples RA-95-007 and RA-95-010 from SWMU #001j were broken in transit.
4) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001j, Mudpit P-3 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24 (DUP)	60-72	60-72 (DUP)
TCLP Sample Date:	7/26/95	7/26/95	7/26/95	7/26/95	7/26/95	7/26/95	7/27/95	7/27/95
TCLP Sample Numbers:	RA-95-001	RA-95-004	RA-95-013	RA-95-016	RA-95-019	RA-95-021	RA-95-024	RA-95-023
Total Sample Date:	**7/10/96**	**7/10/96**	**7/10/96**	**7/10/96**				
Total Sample Numbers:	**RA-96-137**	**RA-96-139**	**RA-96-141**	**RA-96-143**	**NA**	**NA**	**NA**	**NA**
Analytes								
Volatiles								
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**	**NA**	**NA**
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**	**NA**	**NA**
TCLP Benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**	**NA**	**NA**
TCLP Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**	**NA**	**NA**
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**	**NA**	**NA**
TCLP Toluene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**	**NA**	**NA**
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	**0.01 U**	**0.01 U**	**0.01 U**	**0.01 U**	**NA**	**NA**	**NA**	**NA**
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Xylenes, total	**0.005 U**	**0.005 U**	**0.005 U**	**0.005 U**	**NA**	**NA**	**NA**	**NA**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) Containers for samples RA-95-007 and RA-95-010 from SWMU #001j were broken in transit.
4) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001j, Mudpit P-3 (cont.)

HOLE Number:	HOLE #4	HOLE #4	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	12-24 (DUP)	60-72	60-72 (DUP)		
TCLP Sample Date:	7/27/95	7/27/95	7/27/95	7/27/95	7/26/95	7/26/95
TCLP Sample Numbers:	RA-95-029	RA-95-030	RA-95-033	RA-95-034	RA-95-009	RA-95-012
Total Sample Date:	**7/10/96**		**7/10/96**		**7/10/96**	**7/10/96**
Total Sample Numbers:	**RA-96-147**	**NA**	**RA-96-148**	**NA**	**RA-96-149**	**RA-96-150**
Analytes						
Metals						
TCLP Arsenic (As)	1 U	0.1 U	1 U	1 U	0.1 U	0.1 U
Total Arsenic (As)	**0.7**	**NA**	**1**	**NA**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.68 UB	1.2 B	0.67 UB	0.76 B	0.019 UB	0.016 UB
Total Barium (Ba)	**16**	**NA**	**33**	**NA**	**0.045**	**0.044**
TCLP Cadmium (Cd)	0.05 U	0.06	0.06	0.05 U	0.005 U	0.005 U
Total Cadmium (Cd)	**0.5 U**	**NA**	**0.5 U**	**NA**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U	0.02 U	0.02 U
Total Chromium (Cr)	**4**	**NA**	**4**	**NA**	**0.02 U**	**0.02 U**
TCLP Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.05 U
Total Lead (Pb)	**1.9**	**NA**	**2.3**	**NA**	**0.002 UJ**	**0.002 UJ**
TCLP Mercury (Hg)	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0008 U	0.0008 U
Total Mercury (Hg)	**0.03 U**	**NA**	**0.03 U**	**NA**	**0.0001**	**0.0001 U**
TCLP Thallium (Tl)	2 U	2 U	2 U	2 U	0.2 U	0.2 U
Total Thallium (Tl)	**20 U**	**NA**	**20 U**	**NA**	**0.2**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) Containers for samples RA-95-007 and RA-95-010 from SWMU #001j were broken in transit.
4) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001j, Mudpit P-3 (cont.)

HOLE Number:	HOLE #4	HOLE #4	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	12-24 (DUP)	60-72	60-72 (DUP)		
TCLP Sample Date:	7/27/95	7/27/95	7/27/95	7/27/95		
TCLP Sample Numbers:	RA-95-027	RA-95-028	RA-95-031	RA-95-032	NA	NA
Total Sample Date:						
Total Sample Numbers:	NA	NA	NA	NA	NA	NA
Analytes						
Volatiles						
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA
Total 1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA
Total 1,2-Dichloroethane	NA	NA	NA	NA	NA	NA
TCLP Benzene	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA
Total Benzene	NA	NA	NA	NA	NA	NA
TCLP Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA
Total Chloroform	NA	NA	NA	NA	NA	NA
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA
Total Ethyl benzene	NA	NA	NA	NA	NA	NA
TCLP Toluene	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA
Total Toluene	NA	NA	NA	NA	NA	NA
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	NA	NA
Total Vinyl chloride	NA	NA	NA	NA	NA	NA
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA
Total Xylenes, total	NA	NA	NA	NA	NA	NA

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) Containers for samples RA-95-007 and RA-95-010 from SWMU #001j were broken in transit.
4) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001m, Mudpit P-6

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24 (DUP)	60-72
TCLP Sample Date:	8/2/95	8/2/95	8/2/95	8/2/95	8/2/95	8/2/95	8/2/95
TCLP Sample Numbers:	RA-95-062	RA-95-064	RA-95-066	RA-95-068	RA-95-071	RA-95-072	RA-95-078
Total Sample Date:	7/11/96	7/11/96	7/11/96	7/11/96	7/11/96		7/11/96
Total Sample Numbers:	RA-96-165	RA-96-166	RA-96-167	RA-96-168	RA-96-170	NA	RA-96-172
Analytes							
Metals							
TCLP Arsenic (As)	1 U	1 U	1 U	1 U	0.1 U	0.1 U	0.1 U
Total Arsenic (As)	**0.4 J**	**0.5 J**	**3.1 J**	**0.9 J**	**0.5 J**	**NA**	**1 J**
TCLP Barium (Ba)	0.46 UB	0.26 UB	0.24 UB	0.95 B	0.46 UB	0.71 UB	0.35 UB
Total Barium (Ba)	**11 J**	**10 J**	**20 J**	**19 J**	**24 J**	**NA**	**83 J**
TCLP Cadmium (Cd)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Cadmium (Cd)	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**0.5 UJ**	**NA**	**0.5 UJ**
TCLP Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Chromium (Cr)	**2 UJ**	**4 J**	**6 J**	**4 J**	**3 J**	**NA**	**6 J**
TCLP Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Lead (Pb)	**1.3**	**1.2**	**5.1**	**1.8**	**1.2**	**NA**	**1.4**
TCLP Mercury (Hg)	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0003 UBJ	0.0002 UJ	0.0002 UJ
Total Mercury (Hg)	**0.03 U**	**0.03 U**	**0.03 U**	**0.03 U**	**0.05**	**NA**	**0.03**
TCLP Thallium (Tl)	2 U	2 U	2 U	2 U	0.2 U	2 U	0.2 U
Total Thallium (Tl)	**20 U**	**20 U**	**20 U**	**20 U**	**20 U**	**NA**	**20 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994)
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WIPP

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001m, Mudpit P-6 (cont.)

HOLE Number:	HOLE #1	HOLE #1	HOLE #2	HOLE #2	HOLE #3	HOLE #3	HOLE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24 (DUP)	60-72
TCLP Sample Date:	8/2/95	8/2/95	8/2/95	8/2/95	8/2/95	8/2/95	8/2/95
TCLP Sample Numbers:	RA-95-061	RA-95-063	RA-95-065	RA-95-067	RA-95-069	RA-95-070	RA-95-077
Total Sample Date:					**7/11/96**		**7/11/96**
Total Sample Numbers:	**NA**	**NA**	**NA**	**NA**	**RA-96-169**	**NA**	**RA-96-171**
Analytes							
Volatiles							
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**NA**	**0.005 U**
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**NA**	**0.005 U**
TCLP Benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**NA**	**0.005 U**
TCLP Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**NA**	**0.005 U**
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**NA**	**0.005 U**
TCLP Toluene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**NA**	**0.005 U**
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	**NA**	**NA**	**NA**	**NA**	**0.01 U**	**NA**	**0.01 U**
TCLP Xylenes, total	0.05 U	0.07	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Total Xylenes, total	**NA**	**NA**	**NA**	**NA**	**0.005 U**	**NA**	**0.005 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001m, Mudpit P-6 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	8/2/95	8/2/95	8/2/95	8/2/95
TCLP Sample Numbers:	RA-95-080	RA-95-082	RA-95-074	RA-95-076
Total Sample Date:	**7/11/96**	**7/11/96**	**7/11/96**	**7/11/96**
Total Sample Numbers:	**RA-96-174**	**RA-96-176**	**RA-96-177**	**RA-96-178**
Analytes				
Metals				
TCLP Arsenic (As)	1 U	1 U	1 U	1 U
Total Arsenic (As)	**0.6 J**	**0.9 J**	**0.003 U**	**0.003 U**
TCLP Barium (Ba)	0.68 UB	1.2 B	0.1 UB	0.05 UB
Total Barium (Ba)	**16 J**	**39 J**	**0.005 U**	**0.005 U**
TCLP Cadmium (Cd)	0.05 U	0.05 U	0.05 U	0.05 U
Total Cadmium (Cd)	**0.5 UJ**	**0.5 UJ**	**0.005 U**	**0.005 U**
TCLP Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U
Total Chromium (Cr)	**3 J**	**5 J**	**0.02 UJ**	**0.02 UJ**
TCLP Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U
Total Lead (Pb)	**1.6**	**1.8**	**0.002 U**	**0.002 U**
TCLP Mercury (Hg)	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ
Total Mercury (Hg)	**0.03 U**	**0.04**	**0.0001 U**	**0.0001 U**
TCLP Thallium (Tl)	2 U	2 U	2 U	2 U
Total Thallium (Tl)	**20 U**	**20 U**	**0.2 U**	**0.2 U**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight.
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID.

Final Soil TCLP and Total Analytical Results
Voluntary Release Assessment
SWMU #001m, Mudpit P-6 (cont.)

HOLE Number:	HOLE #4	HOLE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
TCLP Sample Date:	8/2/95	8/2/95	8/2/95	8/2/95
TCLP Sample Numbers:	RA-95-079	RA-95-081	RA-95-073	RA-95-075
Total Sample Date:	**7/11/96**	**7/11/96**		
Total Sample Numbers:	**RA-96-173**	**RA-96-175**	**NA**	**NA**
Analytes				
Volatiles				
TCLP 1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,1,1-Trichloroethane	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP 1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
Total 1,2-Dichloroethane	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Benzene	0.05 U	0.05 U	0.05 U	0.05 U
Total Benzene	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Chloroform	0.05 U	0.05 U	0.05 U	0.05 U
Total Chloroform	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U
Total Ethyl benzene	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Toluene	0.05 U	0.05 U	0.05 U	0.05 U
Total Toluene	**0.005 U**	**0.005 U**	**NA**	**NA**
TCLP Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U
Total Vinyl chloride	**0.01 U**	**0.01 U**	**NA**	**NA**
TCLP Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U
Total Xylenes, total	**0.005 U**	**0.005 U**	**NA**	**NA**

Data qualifiers and abbreviations:

B	Analyte was detected in an associated laboratory blank	EQ BLANK	Equipment Rinse Blank
J	Result should be considered an estimated value	FD BLANK	Field Blank
NA	Not analyzed	DUP	Field duplicate sample
R	Result has been rejected and is considered unusable		
U	Analyte was not detected; value is the method reporting limit		
UB	Detected in the blank and qualified as not detected		

Notes:

1) Soil TCLP results, EQ BLANK results, and FD BLANK results are presented in mg/L. Soil total results are presented in mg/kg, wet weight
2) Data qualifiers are used as defined in the USEPA National Functional Guidelines for Organic and Inorganic Data Review (EPA, 1994).
3) NA denotes background soil samples and volatile organic compound (VOC) soil samples that were not analyzed. Background and VOC sampling was reduced as recommended by EPA in a letter to DOE dated December 19, 1995, and in subsequent EPA communications with DOE and WID

APPENDIX C

RESULTS OF NMED RELEASE ASSESSMENT DUPLICATE SAMPLES COLLECTED AT SWMU 001g

This document has been reproduced directly from the best possible copy.

State of New Mexico
ENVIRONMENT DEPARTMENT
DOE Oversight Bureau Waste Isolation Pilot Plant Site Office
P.O. Box 3090, WIPP Site, Jal Highway
Carlsbad, New Mexico 88221
Telephone: (505) 234-8947 Fax: (505) 887-5871

GARY E. JOHNSON
Governor

MARK E. WEIDLER
Secretary

EDGAR T. THORNTON, III
Deputy Secretary

February 22. 1996

WIPP/WID/Environmental Compliance and Support
WIPP Site

Subject: Split sample results from the H-14 SWMU investigation on October 4, 1995.

Attention: Dan Robertson

Enclosed herewith is a copy of the original Lockheed Analytical Services Analytical Data Report which provides the NMED/ DOE Oversight Bureau results from split sampling with your group on October 4, 1995 at the H-14/P-1 well location (SWMU # 001-g). We also acknowledge receipt of the WIPP/WID results which were hand delivered on October 20, 1996.

TCLP Metals analytical suites are similar except that NMED included Selenium but not Thallium and WIPP/WID did not include Selenium. All parameters were below the detection limits.

TCLP Semi-Volatile Organics are also reported with all parameters below the detection limit.

Quality Control analyses and summaries, chain of custody, and other supporting documentation is also provided.

NMED sample "S951004H14WM" is a split of WID sample "RA-95-134" and NMED sample "S951004H14EM" is a split of "RA-95-142."

NMED Sample ID explanation: S(soil)951004(10/04/95)H14(location code)WM(series identification-west hole middle or 12-24 inch depth sample)

If you have questions, please call either myself or Pat McCasland at 8984 or 8983 respectively.

Sincerely,

Keith E McKamey

Keith McKamey, Program Manager

DOE-OB/WIPP

cc: Neil Weber

Lockheed Analytical Laboratory

FIELD CHAIN-OF-CUSTODY FORM

LS636

Control No. 12849
Date 10-16-95
Page 2 of 2

Client Name and Address
NMED/DOE OVERSIGHT BUREAU/WIPP
PO BOX 3090
WIPP SITE/JAL HWY/TRAILER #907
CARLSBAD NM 88221

PWO/Contract No.

Sampling Site Various 1995

Client Sample ID	Collection Date	Collection Time	Matrix Code*	Sample Type**	Field Preserved (Y or N)	No. and Volume of Containers		TCLP metals	Radiochemistry	metals					Comments	Laboratory Use Only: LAL Sample ID - Aliquot No.
BTD950823PSOCW	8-23-95	AM	GEO	C	N	1-1L Plastic		X	X							
S954004HH4WM	10-4-95	1045	SL	G	N	1-1L Plastic	X									
S954004HHEM	10-4-95	1125	SL	G	N	1-1L Plastic	X									

Date Data Required: 12-10-95 | Cooler No. | Seal No.

Relinquished by: (Signature) [signature] | Date 10-11-95 | Time (AM/PM) 1100

Received by: (Signature) | Date | Time (am/pm)

Relinquished by: (Signature) | Date | Time (am/pm)

Received by: (Signature) | Date | Time (AM/PM)

Relinquished by: (Signature) | Date | Time (am/pm)

Received for Laboratory by: (Signature) [signature] | Date 10-11-95 | Time (AM/PM) 11:00

Method of Shipment: Fed Ex | AIRBILL No. 6523548163

Cooler Sealed (Yes/No) → IF FAIL do not open cooler contact the Program Development Department and the Radiation Safety Officer IMMEDIATELY

Received for Laboratory by: (Signature) [signature] | Date 10-11-95 | Time (AM/PM) 2:00

Cooler Condition Upon Receipt at Laboratory: Seals Intact (Yes) Y | Blue Ice Adequate (Yes) Y | Blue Ice Solid: (Yes) Y

Internal Cooler Temp. 5 °C; Samples in good condition (Yes) Y; Samples surveyed (Yes/No) Y

Comments: Chain of Custody Invoice by Sample type NMED/WIPP

*Sample Matrix Codes
SW - Surface Water
GW - Ground Water
DW - Drinking Water
AR - Air
SL - Soil
SG - Sludge
SD - Sediment
WW - Waste Water
FI - Filter
SI - Slide
O - Other

**Sample Type Codes
G - Grab
C - Composite
O - Other

Distribution: White Copy (Original) - LAL Document Control (Master File)

Yellow Copy - Client / Sample Collection Crew

1C 18 54

Lockheed Analytical Laboratory
SAMPLE SUMMARY REPORT (su02)
New Mexico Env. Dept. * Santa Fe, NM

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
REPORT TYPE	L5636-3		Water	GCMS2
	L5636-3		Water	INORG TYPE 2
S951004H14EM	L5636-2		SolidWaste	1311 TCLP REG
	L5636-2		TCLP Extr	6010 ICP METAL
	L5636-2		TCLP Extr	6010 ICP TRACE
	L5636-2		TCLP Extr	7470 MERCURY
	L5636-2		TCLP Extr	8270 SEMI-VOL
S951004H14WM	L5636-1		SolidWaste	1311 TCLP REG
	L5636-1		TCLP Extr	6010 ICP METAL
	L5636-1		TCLP Extr	6010 ICP TRACE
	L5636-1		TCLP Extr	7470 MERCURY
	L5636-1		TCLP Extr	8270 SEMI-VOL

1C1554

METALS RESULTS

SEMI-VOLATILE ORGANICS BY GC/MS
70 SEMI-VOLATILES

Client Sample ID:	S951004H14EM	LAL Sample ID:	L5636-2
Date Collected:	04-OCT-95	Date Received:	13-OCT-95
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
Matrix:	TCLP Extr	Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		QC Limits
2-Fluorophenol	71	31-110
Phenol-d5	75	27-111
Nitrobenzene-d5	72	40-114
2-Fluorobiphenyl	72	41-111
2,4,6-Tribromophenol	111	34-147
Terphenyl-d14	100	33-141

CONSTITUENT	RESULT mg/L	PRACTICAL QUANTITATION LIMIT mg/L	REGULATORY LIMIT mg/L	DATA QUALIFIER(S)
1,4-Dichlorobenzene	<0.10	0.10	7.5	
2-Methylphenol	<0.10	0.10	200	
Hexachloroethane	<0.10	0.10	3.0	
Nitrobenzene	<0.10	0.10	2.0	
Hexachlorobutadiene	<0.10	0.10	0.50	
2,4,6-Trichlorophenol	<0.10	0.10	2.0	
2,4,5-Trichlorophenol	<0.10	0.10	400	
2,4-Dinitrotoluene	<0.10	0.10	0.13	
Hexachlorobenzene	<0.10	0.10	0.13	
Pentachlorophenol	<0.50	0.50	100	
Pyridine	<0.50	0.50	5.0	
3 & 4 -Methylphenol	<0.20	0.20	200	

TCLP ANALYSIS (SW-846 1311)
SAMPLE RESULTS

Client Sample ID: S951004H14EM	LAL Sample ID: L5636-2
LAL Batch ID: 1018 nmE	Matrix: solid waste → TCLP EXTRACT

Constituent	Method of Analysis	Regulatory Limit (mg/L)	Reporting Limit (mg/L)	Concentration (mg/L)	Data Qualifier	Date Analyzed
Arsenic	6010	5.0	1.0	<1.0		11-10-95
Barium	6010	100	10	<10		11-10-95
Cadmium	6010	1.0	0.1	<0.1		11-10-95
Chromium	6010	5.0	0.5	<0.5		11-10-95
Lead	6010	5.0	1.0	<1.0		11-10-95
Mercury	7470	0.2	0.02	<0.02		11-07-95
Selenium	6010	1.0	0.1	<0.1		11-06-95
Silver	6010	5.0	0.5	<0.5		11-10-95

Comments:

aliquots diluted (1:10) to reduce acetate matrix interferences

EPA METHOD 8270 TCLP (Semivolatile Organics)

SEMI-VOLATILE ORGANICS BY GC/MS
8270 SEMI-VOLATILES

Client Sample ID:	S951004H14WM	LAL Sample ID:	L5636-1
Date Collected:	04-OCT-95	Date Received:	18-OCT-95
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
Matrix:	TCLP Extr	Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	87	31-110
Phenol-d5	96	27-121
Nitrobenzene-d5	88	40-114
2-Fluorobiphenyl	91	41-111
2,4,6-Tribromophenol	133	34-147
Terphenyl-d14	106	33-141

CONSTITUENT	RESULT mg/L	PRACTICAL QUANTITATION LIMIT mg/L	REGULATORY LIMIT mg/L	DATA QUALIFIER S
1,4-Dichlorobenzene	<0.10	0.10	7.5	
2-Methylphenol	<0.10	0.10	200	
Hexachloroethane	<0.10	0.10	3.0	
Nitrobenzene	<0.10	0.10	2.0	
Hexachlorobutadiene	<0.10	0.10	0.50	
2,4,6-Trichlorophenol	<0.10	0.10	2.0	
2,4,5-Trichlorophenol	<0.10	0.10	400	
2,4-Dinitrotoluene	<0.10	0.10	0.13	
Hexachlorobenzene	<0.10	0.10	0.13	
Pentachlorophenol	<0.50	0.50	100	
Pyridine	<0.50	0.50	5.0	
3 & 4 -Methylphenol	<0.20	0.20	200	

TCLP ANALYSIS (SW-846 1311)
SAMPLE RESULTS

Client Sample ID: S951004H14EM	LAL Sample ID: L5636-2
LAL Batch ID: 1018 nmE	Matrix: solid waste → TCLP EXTRACT

Constituent	Method of Analysis	Regulatory Limit (mg/L)	Reporting Limit (mg/L)	Concentration (mg/L)	Data Qualifier	Date Analyzed
Arsenic	6010	5.0	1.0	<1.0		11-10-95
Barium	6010	100	10	<10		11-10-95
Cadmium	6010	1.0	0.1	<0.1		11-10-95
Chromium	6010	5.0	0.5	<0.5		11-10-95
Lead	6010	5.0	1.0	<1.0		11-10-95
Mercury	7470	0.2	0.02	<0.02		11-07-95
Selenium	6010	1.0	0.1	<0.1		11-06-95
Silver	6010	5.0	0.5	<0.5		11-10-95

Comments:

aliquots diluted (1:10) to reduce acetate matrix interferences

APPENDIX D

LETTER FROM BLM AND PHONE LOG OF CONVERSATIONS WITH THE NMED CARLSBAD OFFICE REGARDING AGENCY INSPECTIONS OF THE BRINDERSON AND CONSTRUCTION LANDFILLS

This document has been reproduced directly from the best possible copy.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Carlsbad Resource Area Headquarters
P.O. Box 1778
Carlsbad, New Mexico 88221-1778

IN REPLY REFER TO:
2920

December 8, 1995

RECEIVED

Bob Kaiser, Land Manager
Department of Energy
Carlsbad Area Office
PO Box 3090
Carlsbad, NM 88221

Dear Bob,

I wanted to follow up yesterdays conversation with this written documentation. As we discussed I was the realty specialist working with the DOE on the initial authorization and inspections of the landfills under BLM permits NM-067-LUP-219 and NM-067-LUP-237 from January, 1985 to october, 1987. In my capacity as a reality specialist I had been doing landfill inspections for the BLM since 1982, working closely with the New Mexico Environmental Division.

During the numerous inspections I conducted in that time, I never saw any evidence of the disposal of any unauthorized materials. The contents of the pits were consistently construction debris. I never saw any drums or unmarked containers that may have contained toxic or hazardous substances.

As usual, it was a pleasure to work with the WIPP site again. If I can be of any further assistance to you or any other interested or affected parties please don't hesitate to call.

Sincerely,

James R. Goodbar

☐ INCOMING ☑ OUTGOING C.O. DOE/WIPP-96-2209

WITH JIM SMITH OF THE NMED - CARLSBAD OFFICE

WITH _____ OF THE _____

COPIES TO: _____

SUBJECT: INSPECTION RECORDS FROM NMED AND BLM LANDFILL INSPECTIONS

TIME _____

COST _____

FILE _____

CHARGE _____

DETAIL OF CONFERENCE FOLLOW-UP TO 12/04/95 CALL REQUESTING COPIES OF RECORDS FROM NMED CONSTRUCTION/BRINDERSON LANDFILL INSPECTIONS.

1) MR. SMITH STATED THAT NO RECORDS WERE FOUND IN EITHER CARLSBAD OR ROSWELL OFFICES.

2) HE COMPLETED A COUPLE INSPECTIONS WITH JIM GOODEAR OF BLM. HE STATED THAT THE NMED JUST WENT ON THESE INSPECTIONS TO REVIEW BLM OPERATIONS — AND THAT HE ~~ONLY WENT LAST~~ DUR 12/7/95 WAS TRANSFERRED TO ANOTHER POSITION AND DIDN'T GO ON ANY OTHER INSPECTIONS.

3) HE STATED THAT BLM HAD REGULATORY AUTHORITY FOR THIS SIGHT AS THE PERMITTING AGENCY (RE CONSTRUCTION DEBRIS LANDFILL AND THAT HE SAW NO PROBLEMS WITH THE SITES DURING HIS JOINT BLM/NMED INSPECTIONS

4) SUGGESTED CONTACTING ~~BTH~~ JIM GOODEAR AT BLM FOR FURTHER INFO

DEPT. ECES

(SIGNATURE)

EXT. NO. 8240

APPENDIX E

CONSTRUCTION DEBRIS DISPOSAL FORMS FOR THE WIPP CONSTRUCTION LANDFILL (1988 - 1996)

This document has been reproduced directly from the best possible copy.

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: [illegible]

Company: [illegible]

Date: [illegible]

Time: 0536

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
[illegible]	[illegible]

[illegible]
Landfill User Signature

[illegible]
Landfill Custodian Signature

CONTROLLED COPY

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Gwen R. Gist

Company: Westinghouse

Date: 27 December 1995

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Foam insulation	6 cu. yds.

Gwen R. Gist
Landfill User Signature

Lilian Ferrara
Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

0891W017

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Gwen Gist

Company: Westinghouse

Date: 082495

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Super Bristar 2000 (19 bags)	3.42 kg
Downflake 77 -80% (12 bag)	1,200 lbs
Celtite Technik (7 bags)	336 lbs
Lumber	234 board feet

Gwen Gist
Landfill User Signature

Landfill Custodian Signature

KMS 8/24/95

WP Form 1633: 06/18/91
Page 1 of 1

0691WC17

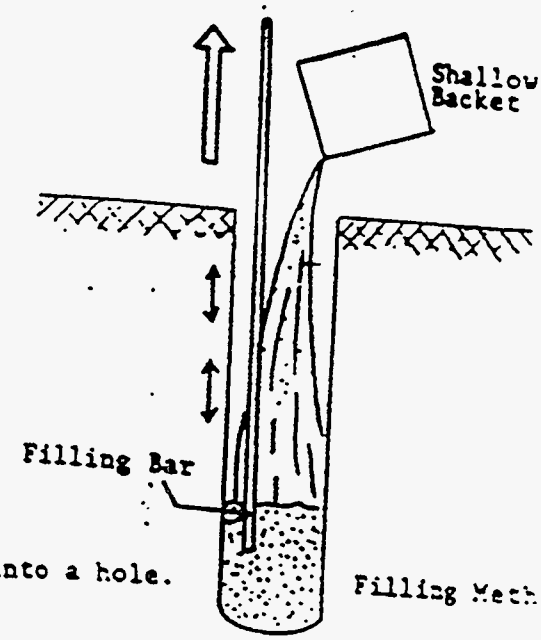
SUPER BRISTAR 2000

1. Mixing

1) Mix SUPER BRISTAR 2000 uniformly and rapidly with approximately 1 litre of water per 5 kg of SUPER BRISTAR 2000 by hand or mechanical mixer.

2) Maximum mixing quantity of SUPER BRISTAR 2000 is 5 kg at a time.

3) Mix SUPER BRISTAR 2000 within 20 seconds.



2. Filling

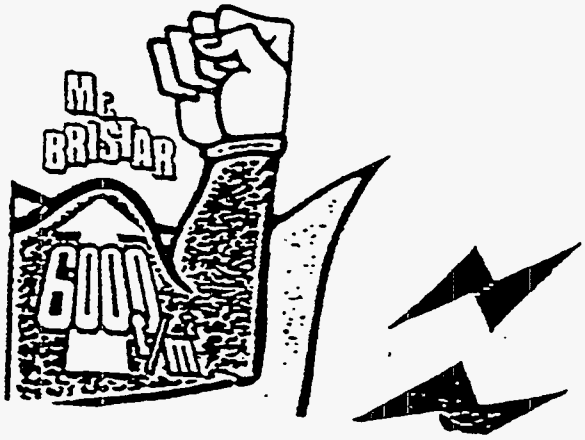
1) Put a filling bar with 2 mm to 5 mm diameter into a hole.

2) Pour the mixture of SUPER BRISTAR 2000 and water into a hole moving the filling bar up and down lightly, gradually extracting it.

3) The mixture of SUPER BRISTAR 2000 and water should be poured into holes within 2 minutes.

3. Storage

Store SUPER BRISTAR 2000 in a dry place. If a bag of SUPER BRISTAR 2000 is partially used, push out the air in bag and seal it with tape. Use it as soon as possible.



Quantity per Hole Depth

Hole Diameter (mm)	42	44	46
Bit Size (inch)	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$
SUPER BRISTAR 2000	2.7	3.0	3.3

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Gwen Gist

Company: Westinghouse Electric

Date: 082395

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
55 gal. drums filled w/concrete	20 drums

Gwen Gist
Landfill User Signature
mps 8/23/95

T. Tom Ward
Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

0891W:01741

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: GEORGE WILCOX

Company: CONSTRUCTORS INC. 415-5369

Date: 8/21/95

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
DIRT	120 yds³

Landfill User Signature

Ruben Carrasco
Landfill Custodian Signature

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Teddy T. Garcia

Company: Westinghouse

Date: 8-7-95 — 9-6-95

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
~~CONCRETE~~ blocks CINDER AND CEMENT DEBRIS	400 (cu. ~~yds~~) 8-8-95

Teddy T. Garcia
Landfill User Signature

Roy L. White
Landfill Custodian Signature

0891W-0:741

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: GWEN GIST

Company: WESTINGHOUSE

Date: 24 JULY 1995

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
CONCRETE WITH REBAR HANDLE	12 ITEMS SIZE: 3' X 3' X 3'
STEEL WRAPPED CONCRETE	14 ITEMS SIZE: 10' DIAMETER X 2' HIGH
STEEL WRAPPED CONCRETE	1 ITEM SIZE: 10' DIAMETER X 7' HIGH

Gwen Gist
Landfill User Signature

Landfill Custodian Signature

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: MACK BROOKS.

Company: CONSTRUCTORS INC.

Date: 7-10-95

Description of Debris (e.g., lumber, concrete, pipes. etc.)	Estimated Volume of Debris (cu. yds.)
SAND + CALICHE	100 cu yds

Landfill User Signature

Landfill Custodian Signature

0891W:017-

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Mark Brooks

Company: Constructors Inc.

Date: 6-29-95

Description of Debris (e.g., lumber, concrete, pipes. etc.)	Estimated Volume of Debris (cu. yds.)
Caliche + Sand	100

Mark Brooks
Landfill User Signature

Ruben Carrasco
Landfill Custodian Signature

0691V 41

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Print Name: Teddy T. Garcia

Company: Westinghouse

Date: 3-3-95

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Concrete	20-cub. yds

Landfill User Signature

Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

0891WC:

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: J. J. WINKEL

Company: (W)

Date: 1/17/95 1200

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Inspected Landfill CONDITIONS: DRY ARTICLES IN LANDFILL: 1. Grout Drum (open) 2. Large Concrete Block 3. 1 GALVANIZED Culvert CONDITIONS SATISFACTORY	

Landfill User Signature

Landfill Custodian Signature

3891W:0174

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Ready L. Walden

Company: (W)

Date: ~~1-10-94~~ RC 1-10-95 1-10-95

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
1 Barrel of Solid Grout from U/G drilling	55 G Barrel

Landfill User Signature

Landfill Custodian Signature

WP Form 1633; 08/18/91
Page 1 of 1

0891W:0174

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Danny Ramirez

Company: W

Date: 12-29-94

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
4 x 6 Concrete Block	4 yds

Landfill User Signature

Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

C891W-0174:

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: _____

Company: CONSTRUCTORS

Date: 21 SEP 94

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
EARTH, CONCRETE, ASPHALT	3 TRUCKS 18 CY EA 54 YDS

Kelly Westfall
Landfill User Signature

Landfill Custodian Signature

0691W:017

CONTROLLED COPY

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Constructors Inc. Mark Brooks

Company: " " "

Date: 9-15-94

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
8 yds 2" Rock	8 yds

Mark Brooks
Landfill User Signature

9/15-94
Landfill Custodian Signature

From TMF/Support Bldg Roof Repair

WP Form 1633; 08/18/91
Page 1 of 1

0891W-01741

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: _____

Company: CONSTRUCTORS

Date: 1 SEP 94

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)	
EARTH, CONCRETE, ASPHALT	TRUCKS	YDS
	~~IIII~~	9 ea
	~~IIII~~	
	~~IIII~~	
	~~IIII~~	
	IIII	
		216

Kelly Westfall
Landfill User Signature

J. W. Davis
Landfill Custodian Signature

0891W:01741

CONTROLLED COPY

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: _____

Company: CONSTRUCTORS

Date: 31 ~~SEPT~~ AUG 94

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)	
	TRUCKS	YDS
EARTH, CONCRETE, ASPHALT	~~LHT~~	9 ea
	~~LHT~~	
	~~LHT~~	
	~~LHT~~	
	~~LHT~~	
	~~LHT~~	
	~~LHT~~	
	!	
		324

Kelly Westfall
Landfill User Signature

J. J. Bair
Landfill Custodian Signature

0691W-01

CONTROLLED COI

Operations
234-8234
August 31, 1994
To: Construction ~~Landfill~~ File
From: J. J. Winkel
Subject: Construction Landfill Designee

This memo is designate Mr. Jim Boris as the Construction Landfill Custodian designee for the purpose of clearing the area for the new bus and employee parking lot. Mr. Boris has the authority to permit the following materials into the Construction Landfill: Wood in the form of native scrub brush, soil, asphalt, and concrete curbing and sidewalk. Mr. Bois understands that access to the Construction Landfill is restricted and the gate to the Construction Landfill is to be locked when he is not in attendance.

I have read procedure WP 06-108, Construction Landfill Operation, and understand its requirements.

Jim Boris

31 August
Date

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: _____

Company: Constructori Inc.

Date: 8-10-94

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Sand cement Brush	2 Trucks × 8 yds
	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
asphalt + sand - Brush	2
	2
	2
	2
	2
	2
	2
	2
	2
	2
	1
	344 yd.

Kelly Westfall
Landfill User Signature

J. Bar
Landfill Custodian Signature

0891W:01

CONTROLLED COPY

Operations
234-8234
August 10, 1994
To: Construction Landfill File
From: J. J. Winkel
Subject: Construction Landfill Designee

This memo is designate Mr. Ray Ashford as the Construction Landfill Custodian designee for the purpose of clearing the area for the new bus parking lot. Mr. Ashford has the authority to permit the following materials into the Construction Landfill: Wood in the form of native scrub brush, soil and concrete curbing and sidewalk. Mr. Ashford understands that access to the Construction Landfill is restricted and the gate to the Construction Landfill is to be locked when he is not in attendance.

I have read procedure WP 06-108, Construction Landfill Operation, and understand its requirements.

Ray Ashford
Ray Ashford

8-10-94
Date
8/10/94

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Kelley Westfall

Company: Constructors Inc.

Date: 21 July 95

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Soil & vegetable matter (Brush/wood)	1 18 yd
	2 20
	3 20
	4 20
	5. 20
	6. 20
	7. 20
	8. 18
	9. 20
	10 20
	11 20
	12. 20
	13. 20
	14 20
	15. 20
	16 18
	17. 20
	18. 20
	19. 20
	374 CY

Kelley Westfall Cons Inc.
Landfill User Signature

Landfill Custodian Signature

See letter in File
7/25/94

0881WC741

CONTROLLED COPY

Operations
234-8234
July 21, 1994
To: File
From: J. J. Winkel
Subject: Construction Landfill Designee

This memo is designate Mr. Jim V. Boris as the Construction Landfill Custodian designee for the purpose of clearing the area for the new parking lot. Mr. Boris has the authority to permit the following materials into the Construction Landfill: Wood in the form of native scrub brush and soil. Mr. Boris understands that access to the Construction Landfill is restricted and the gate to the Construction Landfill is to be locked when he is not in attendance.

I have read procedure WP 06-108, Construction Landfill Operation, and understand its requirements.

J. V. Boris — Jim V. Boris

21 Jul 94 — Date

I spoke to Mr. Don Beardsley of the New Mexico Environment Department Solid Waste Bureau regarding the recent revisions to the EIB/SWMR-4 and specifically to those comments submitted to you from Jeff Winkel. Some of Jeff's concerns have been previously addressed with the Bureau and since the wording in the regulations was not changed in the current revision, I did not bring those up again. Specifically, that was the comment regarding the time limitation for storing infectious waste. We should continue to manage facility infectious waste as we are now. All other comments are addressed below.

The WIPP Construction and Demolition (C & D) landfill so long as it continues to reside on DOE property, accepts only construction and demolition debris from on-site activities in less than 25 tons-per-day (tpd) quantities, and does not violate any provision of the requirements, is still exempt under section 108(C) of EIB/SWMR-4. Therefore, the additional sections regarding C & D landfills and operator certification do not apply to the WIPP facility at this time.

Section 704 requires that chemical characteristics of special wastes be documented by means of: sample results and process knowledge. There was no change from the previous (EIB/SWMR-3) regulations. However, Mr. Beardsley stated that one of the two methods would be adequate for waste characterization purposes. The "and" should probably be an "or" so that only one of the two requirements would be necessary.

I described to Mr. Beardsley that Section 712 requires that all manifests accompanying special waste shipments contain specified information and that it is not possible for the generator to provide the information at the time of manifest generation that is required by section 712(A)(2,6 & 9). This is provided to the generator by the treatment, storage, or disposal facility accepting the waste through the return of the original manifest. He agreed that the wording is not as clear as it should be and that we were right in our interpretation that the returned manifest would meet the requirements of this part.

If I can be of further service regarding these requirements, please contact me at 8190.

Joe Wilk

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: MARK BROOKS

Company: CONSTRUCTORS INC.

Date: 6-15-94

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
CONCRETE + DIRT	36 Cu yds

Mark Brooks
Landfill User Signature

[illegible]
Landfill Custodian Signature

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Steve GREER

Company: GREER Const

Date: 11/30/93

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
DIRT + BASE COURSE	10 cu.yds

Steve Greer
Landfill User Signature

Ruben Carrasco
Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

0891W:01741

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Print Name: Steve Greer

Company: GREER CONST

Date: 11/10/93

Description of Debris (e.g., lumber, concrete. pipes, etc.)	Estimated Volume of Debris (cu. yds.)
CONCRETE - SAND CALICHE mix	10 cu. yds

Steve Greer
Landfill User Signature

Robin Carrasco
Landfill Custodian Signature

WP Form 1633; 08/18/91
Page 1 of 1

0891W:01:

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: STEVE GREER

Company: GREER CONST.

Date: 11/9/93

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
CONCRETE + DIRT	6 Cubic yards

Steve Greer
Landfill User Signature

Ruben Carrasco
Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

0891W:01741

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: HOMER SCRIMSHAE

Company: CONSTRUCTORS

Date: 10-6-93

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
SAND + GRAVEL + DIRT	120 TONS

Homer Scrimshae
Landfill User Signature

Landfill Custodian Signature

0691W:01741

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Bob Pooley

Company: (W)

Date: 8/4/93

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Washout from concrete truck + lumber (form material)	1 cu yd

8/4/93

Landfill User Signature

Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

0891W:0174

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Print Name: MARK BEARKS

Company: CONSTRUCTOR'S INC.

Date: 5-28-93

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
CONCRETE	12

Landfill User Signature

Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

0891W-017A

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Fred Padilla

Company: (illegible)

Date: 5/13/93

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
18 - 55 gal drums of solid grout	5 cu. yd

Landfill User Signature

Landfill Custodian Signature

WP Form 1633; 08/18/91
Page 1 of 1

0891W:01741

RECORD

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Print Name: Bob Pasley

Company: Construction

Date: 1/27/93

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Dirt + concrete	100 cu yds

RECORD

1/27/93
Landfill User Signature

1/27/93
Landfill Custodian Signature

0891W-01741

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Doug Sinon

Company: [illegible]

Date: 12 / 2 / 92

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
wooden crates	.25 cu. yds.

[illegible]
Landfill User Signature

[illegible]
Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

0891W:01741

CONTROLLED COPY

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: MICHAEL A. WEBB

Company: WI EC

Date: 2/10/99

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Dirt and concrete debris from UST project.	.7

Michael A. Webb
Landfill User Signature

Ruben Carrasco
Landfill Custodian Signature

C891W:017

CONSTRUCTION DEBRIS DISPOSAL FORM

RECORD

Print Name: Rijk Moräwe

Company: Westinghouse - Environmental Monitoring

Date: 21. Feb. 92

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
lumber, concrete	27 yds

Rijk Moräwe
Landfill User Signature

Ruben Carrasco
Landfill Custodian Signature

WP Form 1633: 08/18/91
Page 1 of 1

0891W:01741

CONTROLLED COPY

RECORD

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: MICHAEL WIGG

Company: (W)

Date: 11/6/92

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Concrete and dirt from underground storage tank removal	2.4

Michael A Wiegt
Landfill User Signature

Landfill Custodian Signature

WP Form 1633, 08/18/91
Page 1 of 1

CBS-W-017

RECEIVED

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Royce Allen

Company: Westinghouse Electric Corp / WEPF

Date: 12/13/91

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Concrete from underground storage tank removal. Debris containing soil with metal straps	2.0

Landfill User Signature

Landfill Custodian Signature

WP Form 1633; 08/18/91
Page 1 of 1

0891W-01741

RECORD

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Royce Allen

Company: Westinghouse Electric Corp / WIPP

Date: 12/17/91

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Concrete from underground storage tank removal. Debris consisting of dirt to include metal strips	6.0

Landfill User Signature

John T. Gran

Landfill Custodian Signature

WP Form 1633: 08/18/91

Page 1 of 1

0891W-017

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: BOYCE ALLEN

Company: Westinghouse Electric Corp / WIPP SITE

Date: 12/16/91

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Concrete from underground storage TANK removal. Debris consisting of dirt to include metal strips	7.5

Landfill User Signature

Landfill Custodian Signature

WP Form 1633; 08/18/91
Page 1 of 1

0891W-0741

CONSTRUCTION DEBRIS DISPOSAL FORM

Print Name: Bruce Allen

Company: Westinghouse Electric Corp / WIPP SITE

Date: 12/13/91

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
Concrete from underground storage tank removal. Debris also consisting of dirt along with metal strips used as reinforcement.	12.0

Landfill User Signature

Landfill Custodian Signature

0891W2:7

CONSTRUCTION DEBRIS DISPOSAL FORM

RECORD

Print Name: THMH

Company: (W)

Date: 12/9/91

Description of Debris (e.g., lumber, concrete, pipes, etc.)	Estimated Volume of Debris (cu. yds.)
wooden pallets, plywood 2x4's	10 cu yds

Landfill User Signature

Landfill Custodian Signature

0891W:01:74

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Julius Doubrava

Organization: Constractors Inc

Date of Initial Use: 6/27/91

Date of Final Use: 6/27/91

Estimated Volume of Debris: Approx. 84 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Mixture of: Dirt
Caliche
Blow sand
pieces of Concrete
pieces of Asphalt

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: [illegible]

Organization: CONSTRUCTION

Date of Initial Use: 6/15/91

Date of Final Use: 3/20/91

Estimated Volume of Debris: [illegible] cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

[illegible] yards of [illegible]

2 yards [illegible]

WP Form 1633

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: EDWARD McGAKY
BART SMITH

Organization: (4) DRILLING DEPT.

Date of Initial Use: N/A

Date of Final Use: 4/5/91.

Estimated Volume of Debris: 6 SACKS cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

2 WOOD PALLETS
6 SACKS PARTIALLY USED (BENTONITE (4) - CEMENT (2))
6 PAPER SACKS THAT WERE EMPTY (TRASH)

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: MARK BROOKS Organization: CONSTRUCTORS INC

Date of Initial Use: 2-22-91

Date of Final Use: 2-22-91

Estimated Volume of Debris: 1 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

CONCRETE

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Name: Steve Green

Organization: Green const

Date of Initial Use: 2/21/91

Date of Final Use: 2/21/91

Estimated Volume of Debris: 2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
scrap lumber & cardboard

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Gerald Ashford Organization: Underground OPS

Date of Initial Use: 2/11/91

Date of Final Use: 2/22/91

Estimated Volume of Debris: 60 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Concrete removed from Waste Station floor, with some rebar

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM DOE/WIPP-96-2209

Name: Steve [illegible]

Organization: [illegible] Const

Date of Initial Use: 2/11/91

Date of Final Use: 2/11/91

Estimated Volume of Debris: 1 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Scrap lumber + scrap center block
cardboard boxes

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Steve Green

Organization: Green Constr. Co. Inc

Date of Initial Use: 1/15/91

Date of Final Use: 1/15/91.

Estimated Volume of Debris: one cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Clean out concrete pump truck

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Steve Brew

Organization: Brew Const Co.

Date of Initial Use: 1/14/91

Date of Final Use: 1/14/91

Estimated Volume of Debris: one cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Clean out concrete pump truck

HP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Steve Green

Organization: Green Const Co

Date of Initial Use: 1/7/91

Date of Final Use: 1/7/91

Estimated Volume of Debris: one cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): —
Clean out concrete pump truck

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Name: Steve Green

Organization: Green Const Co.

Date of Initial Use: 1/4/91

Date of Final Use: 1/4/91.

Estimated Volume of Debris: 3 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Scrap plywood - 2x4's misc lumber -

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Nichols Organization: Greer Const. Co. Inc.

Date of Initial Use: 12/28/90

Date of Final Use: 12/28/90

Estimated Volume of Debris: 40 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Asphalt - Caliche - Sand

WP Form 1633

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Name:

Organization:

Date of Initial Use: 12/20/90

Date of Final Use: 12/20/90

Estimated Volume of Debris: 2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Cleaned out concrete pump truck, and piles of leftover concrete from testing.

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Steve Green

Organization: Concr Const. Co. Inc

Date of Initial Use: 12-19-90

Date of Final Use: 12-19-90

Estimated Volume of Debris: \ cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Clean out concrete pump.

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name:

Organization:

Constructor's Inc.

Date of Initial Use:
Sept 20-90

Date of Final Use:
Sept 21-90

Estimated Volume of Debris: 70 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Sand and Caliche

Vicente Carrasco

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: [illegible]

Organization: Green Const. Co.

Date of Initial Use: 8-24-90

Date of Final Use: 8-24-90

Estimated Volume of Debris: 5 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): Cardboard
plastic
metal
paper

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM DOE/WIPP-96-2209

Name: Joe Nichols Organization: Greer Const. Co

Date of Initial Use: 8-14-90

Date of Final Use: 8-14-90

Estimated Volume of Debris: 5 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): Carpet Scraps Paper and Cardbx

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: ~~[illegible]~~ GEORGE WILCOX

Organization: CONSTRUCTORS INC

Date of Initial Use: 8-13-90

Date of Final Use:

Estimated Volume of Debris: 20 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
DIRT, LUMBER, & CONCRETE

WP Form 1633

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Nichols Organization: Greer Const. Co

Date of Initial Use: 8-3-90

Date of Final Use: 8-3-90

Estimated Volume of Debris: 5 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): lumber cardboard metal plastic

WP Form 1633

WORKING

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible] Organization Career Coast

Date of Initial Use: 7-25-90

Date of Final Use: 7-25-90

Estimated Volume of Debris: 6 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): cardboard
plastic
lumber

WP 1633

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Bob Underwood Organization Greer Const. Co., Inc.

Date of Initial Use: 7-18-90

Date of Final Use: 7-18-90

Estimated Volume of Debris: 4 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Cardboard

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Bob Underwood Organization: Greer Const. Co, Inc.

Date of Initial Use: 7-9-90

Date of Final Use: 7-9-90

Estimated Volume of Debris: 6 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Cardboard

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Niles Organization: Greer Const. Co

Date of Initial Use: 6-27-90

Date of Final Use: 6-27-90

Estimated Volume of Debris: 6 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): Cardboard
Lumber
wood

6/27/90

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible] Organization Green Coast Co.

Date of Initial Use: 6-20-90

Date of Final Use: 6-20-90

Estimated Volume of Debris: 3 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): cardboard
wood
constructors
fill

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible] Organization Greer Const. Co

Date of Initial Use: 6-15-90

Date of Final Use: 6-15-90

Estimated Volume of Debris: 6 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): lumber
cardboard
conduit pip

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible] Organization [illegible]

Date of Initial Use: 6-7-90

Date of Final Use: 6-7-90

Estimated Volume of Debris: 5 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): sheetrock
metal
cardboard
lumber
paper

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Nichols

Organization: Greer Const. Co

Date of Initial Use: 5-31-90

Date of Final Use: 5-31-90

Estimated Volume of Debris: 6 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

sheetrock
cardboard
metal studs
paper

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: [illegible] Organization Greer Const. Co

Date of Initial Use: 5-24-90

Date of Final Use: 5-24-90

Estimated Volume of Debris: 5 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Scrape - sheetrock
lumber
metal studs
cardboard

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Nichols Organization Greer Const. Co. Inc

Date of Initial Use: 5-21-90

Date of Final Use: 5-21-90

Estimated Volume of Debris: 5 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

lumber
Cardboard boxes
sheetrock
metal stud scrapes

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Vicente Carrasco

Organization: Const. Inc.

Date of Initial Use: May 16-90

Date of Final Use: May 16-90

Estimated Volume of Debris: 46 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Sand & Gravel

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible] Organization: Green Const. Co

Date of Initial Use: 5-7-90

Date of Final Use: 5-7-90

Estimated Volume of Debris: 2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Concrete & Asphalt

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Rivers

Organization: Greer Const. Co.

Date of Initial Use: 5-4-90

Date of Final Use: 5-4-90

Estimated Volume of Debris: 3 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

concrete
lumber
metal
insulation
DIRT

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Nichols Organization Greer Const Co. Inc

Date of Initial Use: 4-30-90

Date of Final Use: 4-30-90

Estimated Volume of Debris: 5 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Cardboard and paper
Metal Scrapes
Lumber
Insulation

WORKING COPY

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: *Vicente Carrasco*

Organization: *Constructors, Inc.*

Date of Initial Use: *April 11, 1990*

Date of Final Use: *April 13, 1990*

Estimated Volume of Debris: *60* cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): *Sand and caliche mix some concrete.*

ORIGINAL

[illegible]
4-10-90

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible] Organization Greer Const. Co.

Date of Initial Use: 4-11-90

Date of Final Use: 4-11-90

WORKING CO

Estimated Volume of Debris: 5to6 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

lumber
metal
paper
plastic

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Nichols Organization Greer Const. Co

Date of Initial Use: 4-4-90

Date of Final Use: 4-4-90

Estimated Volume of Debris: 6 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Lumber
Metal Sheeting
2" vinyle face insulation
Metal Studs

ORIGINAL

vg 4/4

HP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: [illegible] Organization [illegible]

Date of Initial Use: [illegible]

Date of Final Use: [illegible]

Estimated Volume of Debris: [illegible] cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: [illegible] Organization: [illegible]

Date of Initial Use: 2-7-90

Date of Final Use: 2-7-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Wash out concrete pump

CONSTRUCTION DEBRIS DISPOSAL FORM DOE/WIPP-96-2209

Name: Joe [illegible] Organization: [illegible]

Date of Initial Use: 2-6-90

Date of Final Use: 2-6-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Washed out concrete pump

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible] Organization: Greer Const Co

Date of Initial Use: 2-5-90

Date of Final Use: 2-5-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Washed out concrete pump

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

JLW:cp
Enclosures

Name: Joe Nilson

Organization: Greer Const. Co

Date of Initial Use: 2-2-90

Date of Final Use: 2-2-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Washed out concrete pump

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: [illegible] Organization: Green Const. Co.

Date of Initial Use: 2-1-90

Date of Final Use: 2-1-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Wash out concrete pump

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Nichols Organization: Greer Const. Co

Date of Initial Use: 1-31-90

Date of Final Use: 1-31-90

Estimated Volume of Debris: 1 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Washed out concrete pump
Concrete Debris

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible] Organization: Green Const. Co

Date of Initial Use: 1-30-90

Date of Final Use: 1-30-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Washed out concrete pump

DOE/WIPP-96-2209

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible] Organization: GreenCoust.C

Date of Initial Use: 1-29-90

Date of Final Use: 1-29-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

wash out concrete pump

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe Rilw Organization: Greer Const.

Date of Initial Use: 1-25-90

Date of Final Use: 1-25-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Wash out concrete pump.

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Joe [illegible]

Organization: Green Const. C

Date of Initial Use: 1-24-90

Date of Final Use: 1-24-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Wash out concrete pump

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: [illegible] Organization: Greer Const. Co

Date of Initial Use: 1-23-90

Date of Final Use: 1-23-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Wash out concrete pump.

CONSTRUCTION DEBRIS DISPOSAL FORM DOE/WIPP-96-2209

Name: Bob Underwood

Organization: Greer Const. Co.

Date of Initial Use: 1-18-90

Date of Final Use: 1-18-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Concrete

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Bob Underwood Organization: Green Const. Co, Inc.

Date of Initial Use: 1-17-90

Date of Final Use: 1-17-90

Estimated Volume of Debris: 1/2 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Concrete

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Name: CONSTRUCTORS, INC. Organization: CONTRACTORS

Date of Initial Use: 7/24/89

Date of Final Use: 7/28/89

Estimated Volume of Debris: 6180 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

EXCAVATION FROM SPOV DRILL POND

7/24/89 - 1810 YRDS

7/25/89 - 1290 YRDS

7/26/89 1240 YRDS

7/27/89 740 YRDS

7/28/89 1100 YRDS

TOTAL 6180 YRDS

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: CONSTRUCTORS, INC Organization: CONTRACTOR

Date of Initial Use: 7/17/89

Date of Final Use: 7/21/89

Estimated Volume of Debris: 8350 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

EXCAVATION FROM SPDV DRILL POND

7/17/89 - 1260 YRDS. (SLAB OF CONCRETE & PVC PIPE)

7/18/89 - 1670 YRDS

7/19/89 - 2090 YRDS

7/20/89 - 1760 YRDS

7/21/89 - 1570 YRDS

TOTAL 8350 YRDS

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM DOE/WIPP-96-2209

Name: Joneen Cockman
Sweatt Construction Co.

Organization: REPS Reclamation

Date of Initial Use: 7.14.89

Date of Final Use: 7.14.89

Estimated Volume of Debris: 6 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Plastic liner from WIPP 12 reserve pit.

WP Form 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: CONSTRUCTORS, INC Organization: CONTRACTOR

Date of Initial Use: 7/10/89

Date of Final Use: 7/14/89

Estimated Volume of Debris: 9522 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

EXCAVATION FROM SPAV DRILL POND

7/10/89 - 2144 YRDS
7/11/89 - 2060 YRDS
7/12/89 - 2210 YRDS
7/13 89 - 1570 YRDS
7/14/89 - 1538 YRDS

TOTAL 9522 YRDS.

CONSTRUCTION DEBRIS DISPOSAL FORM DOE/WIPP-96-2209

Name: CONSTRUCTORS, INC Organization: CONTRACTOR

Date of Initial Use: 7/5/89

Date of Final Use: 7/7/89

Estimated Volume of Debris: 2864 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

EXCAVATION FROM SPDV DRILL POND

7/5/89 0

7/6/89 1192 YRDS (STARTED)

7/7/89 1672 YRDS

TOTAL 2864 YRDS

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Lynn Terpening Organization: Operations

Date of Initial Use: 6/6/89

Date of Final Use: 6/6/89

Estimated Volume of Debris: 10 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

concrete slabs

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Name: Russell Leach

Organization: Reps

Date of Initial Use: 15 May 89

Date of Final Use: 15 May 89

Estimated Volume of Debris: 1 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Concrete
Rebar
Sheet metal
Plastic
Wood

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Ed Barnes Organization: Cavern City Co

Date of Initial Use: 4-28-89

Date of Final Use: 4-30-89

Estimated Volume of Debris: 50 cu. yds. _

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Contaminated Fill

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Name: Lynn Terpening Organization: Operations

Date of Initial Use: 4/24/89

Date of Final Use: 4/24/89

Estimated Volume of Debris: .0 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

concrete

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: ALEX LUCERO

Organization: Cavern City Const

Date of Initial Use: 4/20/89

Date of Final Use: 4/20/89

Estimated Volume of Debris: Contaminated cu. yds.
caliche

Description of Debris (e.g., lumber, concrete, pipes, etc.):

caliche & red dirt mixed

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Name:

Organization:

Date of Initial Use: 4/13/89

Date of Final Use: 4/13/89

Estimated Volume of Debris: .5 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

lumber & scrap metal

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Kerry Horner

Organization: Frontier Kemper

Date of Initial Use: 4/12/89

Date of Final Use: 4/12/89

Estimated Volume of Debris: 3.4 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Timbers & lumber, scrap iron, scrap wire rope.

CONSTRUCTION DEBRIS DISPOSAL FORMDOE/WIPP-96-2209

Name: [illegible] Barnes Organization: Carlsbad City [illegible]

Date of Initial Use: [illegible]

Date of Final Use: [illegible]

Estimated Volume of Debris: [illegible] cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.): —

Concrete, Contaminated Backfill

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Steve L Anderson **Organization:** REES

Date of Initial Use: 04-07-89

Date of Final Use: 04-10-89

Estimated Volume of Debris: 4-5 **cu. yds.**

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Scarred
Lumber
Small metal pieces
Plastic Shredded pieces
All less than 3 feet long

approved 4/7/89

HP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM DOE/WIPP-96-2209

Name: [illegible] Organization: [illegible]

Date of Initial Use: N/A [illegible]

Date of Final Use: N/A [illegible]

Estimated Volume of Debris: [illegible] cu. yds. 12 [illegible]

Description of Debris (e.g., lumber, concrete, pipes, etc.):

[illegible]

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Kenny Homer

Organization: Frontier Kemper

Date of Initial Use: 4/12/89

Date of Final Use: 4/12/89

Estimated Volume of Debris: 3.4 cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):
Timbers & lumber. scrap iron. scrap wire rope.

CONSTRUCTION DEBRIS DISPOSAL FORM

DOE/WIPP-96-2209

Name: [illegible] Organization:

Date of Initial Use: 04-07-89

Date of Final Use: 04-10-89

Estimated Volume of Debris: [illegible] cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Discarded
Lumber
Small metal pieces
Plastic Shredded pieces
[illegible]

approved 4/7/89
[illegible]

WP 1633

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: Organization:

Date of Initial Use:

Date of Final Use:

Estimated Volume of Debris: cu. yds.

Description of Debris (e.g., lumber, concrete, pipes, etc.):

Concrete Contaminated Backf.

CONSTRUCTION DEBRIS DISPOSAL FORM

Name: [illegible] Organization: [illegible]

Date of Initial Use: N/A 2-27-89 [illegible]

Date of Final Use: N/A 2-27-89 [illegible]

Estimated Volume of Debris: [illegible] cu. yds. [illegible]

Description of Debris (e.g., lumber, concrete, pipes, etc.):

[illegible] crates