WIPP Library

DOE/WIPP DRAFT-2115

VOLUNTARY RELEASE ASSESSMENT/CORRECTIVE ACTION WORKPLAN FOR SOLID WASTE MANAGEMENT UNITS LOCATED AT THE WASTE ISOLATION PILOT PLANT (WIPP)

July 25, 1995

950713

TABLE OF CONTENTS

1.0 RELEASE ASSESSMENT INVESTIGATION 1
- 1.1 Release Assessment Investigation Objectives 1
- 1.2 SWMUs Evaluated as Part of this Release Assessment/Corrective Action Plan 5
- 1.3 Scope of Voluntary Release Assessment 5
- 1.4 Scope of Voluntary Corrective Actions 6
- 1.5 Request for a Determination That No Further Action Is Required 6

2.0 RATIONALE FOR COMPLETING A VOLUNTARY RELEASE ASSESSMENT INVESTIGATION/CORRECTIVE ACTION PLAN 7

3.0 DESCRIPTION OF CURRENT CONDITIONS 7
- 3.1 Facility Background 7
- 3.2 Precipitation 8
- 3.3 Geology and Hydrogeology at the WIPP 8
  - 3.3.1 Surface Formations 9
  - 3.3.2 The Dewey Lake Red Beds 10
  - 3.3.3 Permian Rustler Formation 10
  - 3.3.4 Salado Formation 11

4.0 A BRIEF HISTORY OF SWMUs AT THE WIPP 11
- 4.1 Mudpits 11
- 4.2 Brinderson and Construction Landfills 11
- 4.3 Portacamp Storage Area 11
- 4.4 Additional SWMUs Identified Since the Issuance of the RFA 12

5.0 PREVIOUS FIELD CONDITIONS/INVESTIGATIONS 12
- 5.1 Brinderson Landfill 12
- 5.2 Construction Landfill 13
- 5.3 Sampling and Spill Remediation at Portacamp Prior to the Issuance of the RFA 13
- 5.4 Sampling at the Badger Unit Federal #1 Prior to the Issuance of the RFA 13
- 5.5 Other Site Assessments 13

6.0 PROJECT RELEASE ASSESSMENT/CORRECTIVE ACTION WORKPLAN . 14
- 6.1 Release Assessments 14
  - 6.1.1 Release Assessment Objectives 14
  - 6.1.2 Field Investigation 14
  - 6.1.3 Field Sample Collection Procedures . . . 14
- 6.2 Number of Samples and Method of Sampling 15
  - 6.2.1 General Sampling Considerations 15
  - 6.2.2 Media To Be Sampled 15
  - 6.2.3 Rationale for Selection of Target Analytes 15

RECEIVED
AUG 16 1995

TABLE OF CONTENTS

6.3 Routine and Quality Control Sampling 18
6.3.1 Additional Requirements for the Collection of Organic Samples 19
6.3.2 Quality Control Samples 19
6.3.3 Field Measurements 20
6.3.4 pH Measurement 20
6.3.5 Temperature Measurement 20
6.3.6 Other Sampling 20

7.0 QA/QC PROCEDURES 20
7.1 Quality Assurance Requirements 20
7.1.1 Laboratories, Sample Analysis, Sample Methods 20
7.1.2 Data Management 21
7.1.3 Schedule 21
7.1.4 Health and Safety Plan 21
7.1.5 Public Involvement Plan 21

8.0 SUMMARY OF RELEASE ASSESSMENTS FOR SELECTED SWMUS AT THE WIPP 23
8.1 Release Assessments at Individual SWMUs 23
8.1.1 SWMU 001g (H-14/P-1 Drill Pad) 23
8.1.2 Sample Location Map 24
8.1.3 Number of Samples and Sampling Intervals 25
8.2 SWMU 001h (H-15/P-2 Drill Pad) 26
8.2.1 Sample Locations Map 27
8.2.2 Number of Samples and Sampling Intervals 28
8.3 SWMU 001j (P-3 mud pit) 29
8.3.1 Sample Location Map 30
8.3.2 Number of Samples and Sampling Intervals 31
8.4 SWMU 001k (P-4 Drill Pad) 32
8.4.1 Sample Location Map 33
8.4.2 Number of Samples and Sampling Intervals 34
8.5 SWMU 001L (WIPP-12/P-5 Drill Pad) 35
8.5.1 Sample Location Map 36
8.5.2 Number of Samples and Sampling Intervals 37
8.6 SWMU 001m (P-6 Drill Pad) 38
8.6.1 Sample Location Map 39
8.6.2 Number of Samples and Sampling Intervals 40
8.7 SWMU 001n (P-15 Drill Pad) 41
8.7.1 Sample Location Map 42
8.7.2 Number of Samples and Sampling Intervals 43

TABLE OF CONTENTS

8.8 SWMU 001s (ERDA 9 Drill Pad) 44
8.8.1 Sample Location Map 45
8.8.2 Number of Samples and Sampling Intervals 46
8.9 SWMU 001t (IMC 374 Drill Pad) 47
8.9.1 Sample Location Map 48
8.9.2 Number of Samples and Sampling Intervals 49
8.10 SWMU 001x (WIPP-13 Drill Pad) 50
8.10.1 Sample Location Map 51
8.10.2 Number of Samples and Sampling Intervals 52
8.11 SWMU 003a Portacamp Storage Area, (formerly 004a) . 53
8.11.1 Waste Management at the Portacamp Area . 54
8.11.2 Rationale for Selection of Target Analytes for the Portacamp Area 54
8.11.3 DOE/Westinghouse Portacamp Area Sampling Locations 54
8.11.4 Sandia Portacamp Area Sampling Locations 55
8.11.5 Sample Location Map 56
8.11.6 Number of Samples and Sampling Intervals 57

9.0 SUMMARY OF CORRECTIVE ACTIONS FOR SELECTED SWMUS AT THE WIPP 60
9.1 SWMU 001o (Badger Unit Drill Pad) 60
9.1.1 Media Sampled 61
9.1.2 Quality Control Samples 61
9.1.3 Sampling Lithological Logs for Badger Unit-SWMU 001o Table 4 62
9.1.4 Historic Sample Locations Map 64
9.1.5 Comparison of Analytical Results from RFA Assessments Sampling at the Badger Unit Mudpit (Table 5) 65
9.1.6 Closure of the Badger Unit SWMU 001o . . 73
9.1.7 Rationale for Badger Unit Closure Methodology 73
9.2 SWMU 001p (Cotton Baby Drill Pad) 74
9.2.1 Media Sampled 74
9.2.2 Quality Control Samples 75
9.2.3 Sampling Lithological Logs for Cotton Baby Site-
SWMU 001p (Table) 76
9.2.4 Historic Sample Locations Map 78
9.2.5 Comparison of Analytical Results from RFA Assessments Sampling at the Cotton Baby Mudpit 79
9.2.6 Closure of the Cotton Baby Mudpits, SWMU 001p 90

TABLE OF CONTENTS

9.2.7 Rationale for Cotton Baby Closure Methodology 90
9.3 SWMU 001q (DOE -1 Drill Pad) 91
9.3.1 Media Sampled 91
9.3.2 Quality Control Samples 92
9.3.3 Sampling Lithological Logs for DOE-1 Site - SWMU 001q (Table 8) 93
9.3.4 Historic DOE-1 Sample Location Map . . . 94
9.3.5 Comparison of Analytical Results from RFA Assessments Sampling at the DOE-1 Site (Table 9) 95
9.3.6 Closure of the DOE-1 Mudpits SWMU 001q . 106
9.3.7 Rationale for DOE-1 Closure Methodology . 106

10.0 DETERMINATION OF NO FURTHER ACTION 107
10.1 SWMU 002a (Brinderson Landfill) (formerly 003a) . . 107
10.2 SWMU 002b (Construction Landfill) (New Landfill/Inactive Landfill, formerly 003a) 107
10.3 Justification for a Determination that No Further Action is Required at SWMUS 002a, and 002b 108

LIST OF TABLES

Table 1 Target Analytes and Proposed EPA Analytical Methods for Characterizing SWMU Mudpits at the WIPP

Table 2 Summary of Release Assessment Samples for SWMUs at the WIPP

Table 3 Target Analytes and Proposed EPA Analytical Methods for Characterizing the Portacamp Storage Area

Table 4 Sampling Lithological Logs for Badger Unit (SWMU 001o)

Table 5 Comparison of Analytical Results from RFA Assessments Sampling at the Badger Unit Mudpit

Table 6 Sampling Lithological Logs for Cotton Baby Site (SWMU 001p)

Table 7 Comparison of Analytical Results from RFA Assessments Sampling at the Cotton Baby Mudpit

Table 8 Sampling Lithological Logs for DOE-1 Site (SWMU 001q)

Table 9 Comparison of Analytical Results from RFA Assessments Sampling at the DOE-1 Site

LIST OF FIGURES

Figure 1 WIPP Location Map

Figure 2 Location of Solid Waste Management Units at the WIPP

Figure 3 SWMU 001g - Sample Location Map

Figure 4 SWMU 001h - Sample Location Map

Figure 5 SWMU 001j - Sample Location Map

Figure 6 SWMU 001k - Sample Location Map

Figure 7 SWMU 001L - Sample Location Map

Figure 8 SWMU 001m - Sample Location Map

Figure 9 SWMU 001n - Sample Location Map

Figure 10 SWMU 001s - Sample Location Map

Figure 11 SWMU 001t - Sample Location Map

Figure 12 SWMU 001x - Sample Location Map

Figure 13 SWMU 003a Sample Location Map

Figure 14 SWMU 001o Historic Sample Location Map

Figure 15 SWMU 001p Historic Sample Location Map

Figure 16 SWMU 001q Historic Sample Location Map

LIST OF APPENDICES

Appendix 1	Chapter J of the RCRA Part B Permit Application (Rev.5)
Appendix 2	Permit Closure File for the Brinderson Landfill (NM-067-LUP-219)
Appendix 3	Permit Closure File for the WIPP Construction Landfill (NM-067-LUP-237)
Appendix 4	WIPP Site Effluent and Hazardous Materials Sampling Plan, WP02-EM2, Rev.0
Appendix 5	Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling Plan, WP02-EM1, Rev.0
Appendix 6	Halliburton NUS Laboratory Quality Assurance Plan
Appendix 7	Pettigrew and Associates Hydraulic Conductivity Test for Caliche Materials at the WIPP

Voluntary Release Assessment/Corrective Action Workplan for Solid Waste Management Units Located at the Waste Isolation Pilot Plant (WIPP)

1.0 RELEASE ASSESSMENT INVESTIGATION

The U.S. Department of Energy, Carlsbad Area Office (DOE-CAO), is the Owner and Operator of the Waste Isolation Pilot Plant (WIPP). The WIPP site is located in Eddy County in southeastern New Mexico approximately 26 miles east of Carlsbad, New Mexico (Figure 1). Westinghouse Electric Corporation, Waste Isolation Division (WID) is the Managing and Co-operating Contractor at the site. For the purpose of clarity, any reference to the DOE throughout this release assessment workplan implies both the DOE-CAO and Westinghouse-WID.

The DOE proposes to conduct a voluntary Release Assessment/ Corrective Action program at selected Solid Waste Management Units (SWMUs) at the WIPP. This voluntary Release Assessment/Corrective Action Workplan is intended to be the first phase in implementing the RCRA Facility Investigation (RFI) corrective action process at the site. Data generated as part of this workplan is intended to update information contained in the *Assessment of Solid Waste Management Units at the Waste Isolation Pilot Plant*, NMED/DOE/AIP 94/1, (RFA). Release Assessment data will be used to evaluate and develop the appropriate corrective actions required for each SWMU. Facility investigations and other analyses will be streamlined to focus on plausible concerns and likely remedies. Streamlining will also expedite cleanup decisions as defined in the preamble of the Proposed Subpart S Rule, *Federal Register*, Vol. 55, No. 145; July 27, 1990; 30803.

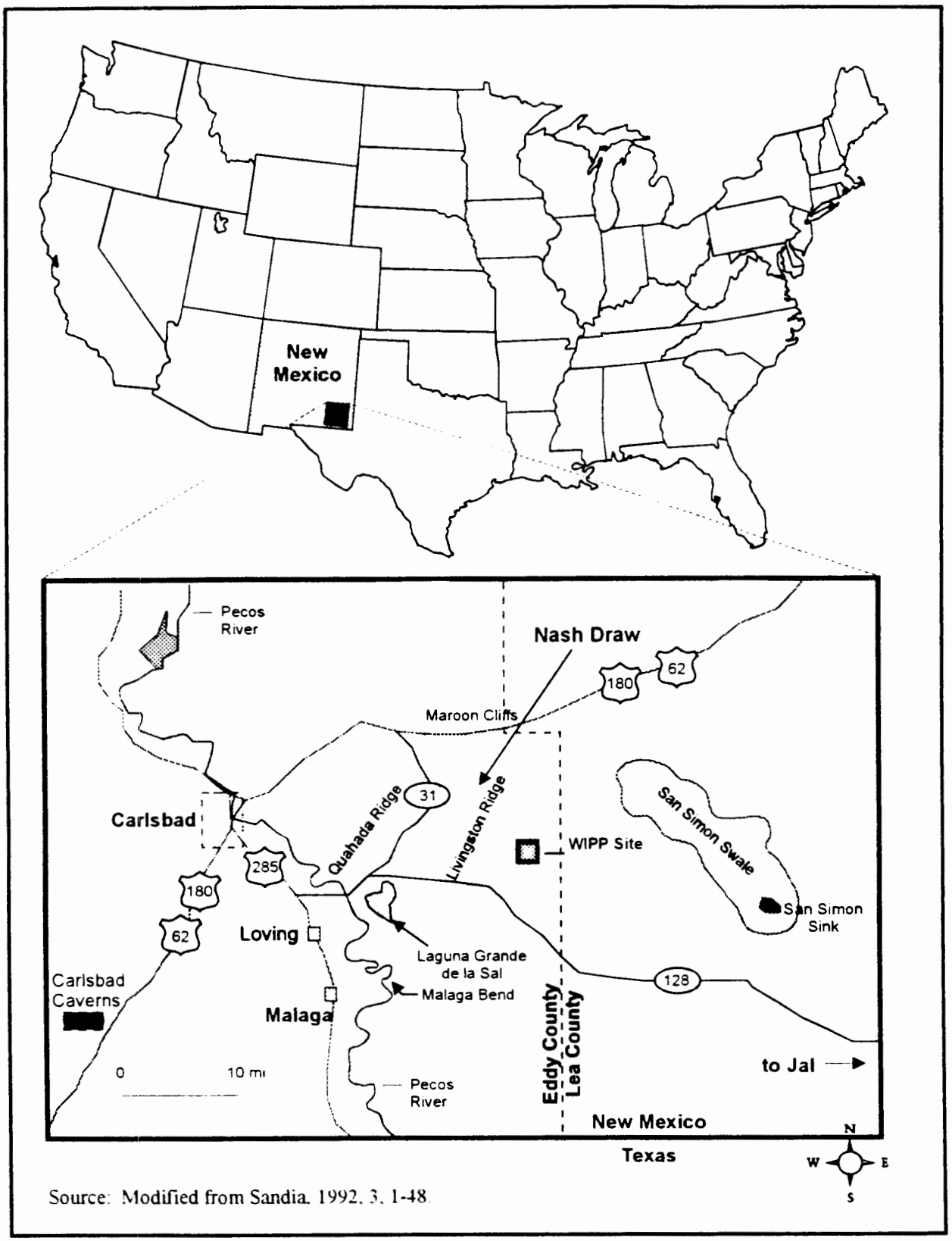
1.1 Release Assessment Investigation Objectives

This Release Assessment/Corrective Action Workplan has been developed in accordance with guidance contained in the final *RCRA Corrective Action Plan*, EPA 520-R-94-004, OSWER Directive 9902.3-2A, May 1994. Based on information contained in the RFA, historical information, and sampling data generated during the Release Assessment process, the DOE proposes to negotiate a schedule with the EPA Region VI to complete voluntary corrective actions. The intent is develop a corrective action schedule, and complete as many corrective actions as possible prior to the issuance of the draft *RCRA Part B Permit* (DOE/WIPP 91-005, Rev. 5) for public comment. The DOE intends to utilize the Data Quality Objective (DQO) process to coordinate release assessment data submittals, address agency comments, and obtain agency approval for voluntary corrective actions.

Because of the abbreviated schedule before the draft Disposal Phase Part B Permit is submitted for public review and comment (eg. January 1, 1996), the DOE has chosen to complete voluntary release assessments/corrective actions for 16 SWMUs at the WIPP. These 16 SWMUs are the units originally identified for RCRA Facility Investigations (RFI) in the draft Hazardous and Solid Waste Amendments (HSWA) permit for the WIPP Test Phase. The DOE proposes to complete release assessments for 11 SWMUs; complete immediate corrective actions on 3 SWMUs; and request a formal determination that no further action is required on the 2 remaining SWMUs (Figure 2).

In October 1993, the DOE made the decision not to conduct tests with radioactive wastes at the WIPP, and on January 13, 1994, submitted a request to modify the RCRA permit application to reflect disposal, rather than test-phase operations. On September 2, 1994, the New Mexico Environment Department (NMED) requested that a modified permit application be submitted by May 31, 1995, to accurately reflect future WIPP disposal activities. These actions delayed the schedule for the issuance of both the Disposal Phase Part B Permit Application and the associated HSWA permit.

Figure 1. WIPP Location in Southeastern New Mexico



Source: Modified from Sandia, 1992, 3, 1-48.

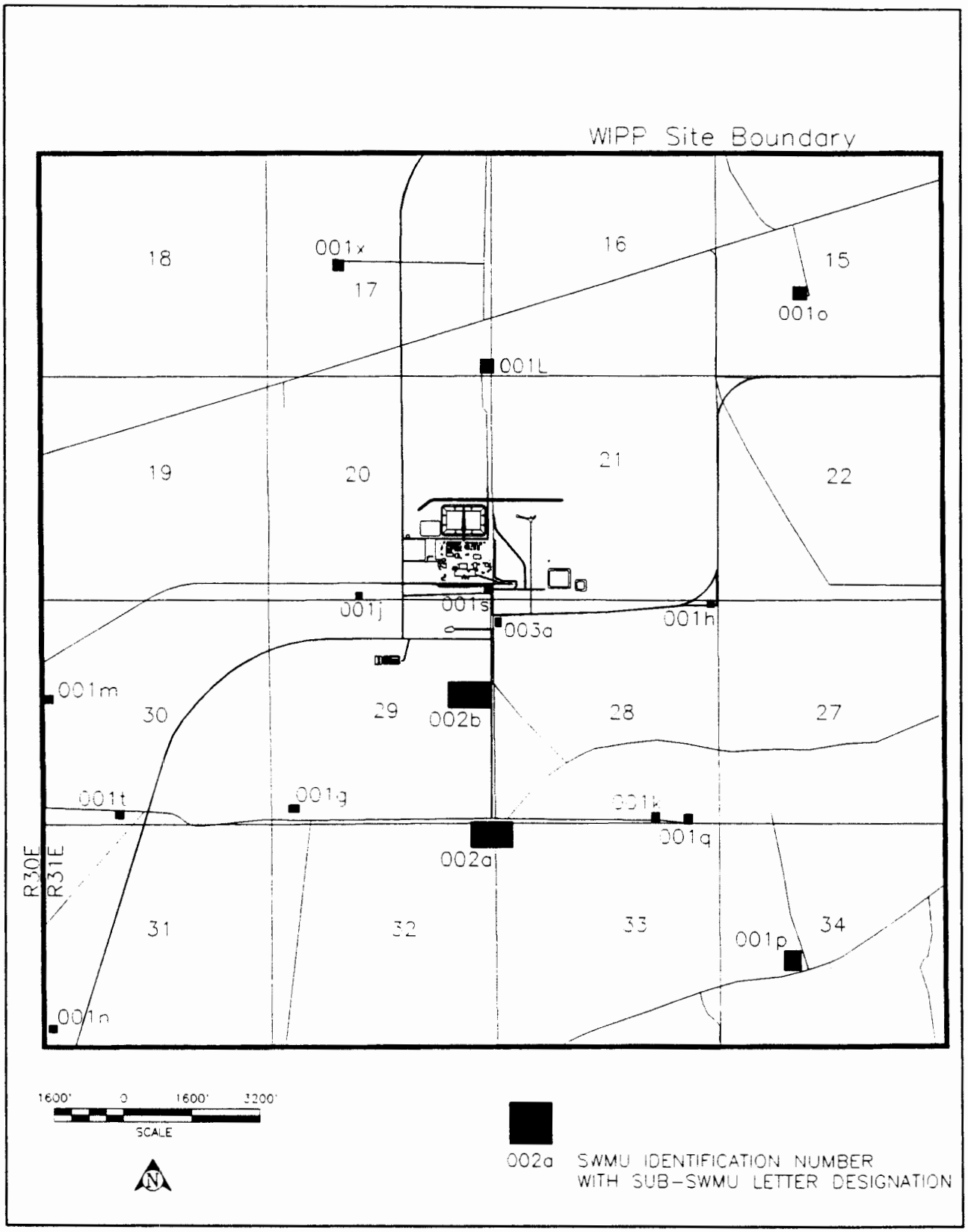


Figure 2. Location of SWMUs Identified in WIPP Release Assessment/Corrective Action Plan

1.2 SWMUs Evaluated as Part of this Release Assessment/Corrective Action Plan

The DOE used the list of SWMUs identified in the draft Test Phase HSWA permit to develop this Release Assessment/Corrective Action Workplan. The numbering system contained in the draft HSWA permit has been revised because the number of SWMUs identified in Chapter J of the Part B Permit Application has been revised. These changes were incorporated into the disposal RCRA Permit application submitted to the NMED in May, 1995. The numbering system originally used to identify SWMUs in the RFA and Chapter J of the permit application have changed. If the identifying number for an individual SWMU described in the Release Assessment is different from the number contained in the RFA, the new number will be listed first; the original number will be enclosed by parentheses and listed second. A copy of Revision 5 of the draft Chapter J is found in Appendix 1.

Voluntary Release Assessments will be completed for the following SWMUs:

SWMU 001g (H-14/P-1 Drill Pad)
SWMU 001h (H-15/P-2 Drill Pad)
SWMU 001j (P-3 mud pit)
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 003a (Portacamp Storage Area) (formerly 004a)

Corrective Actions will be completed at the following SWMUs:

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

A request for a formal determination that "No Further Action is Required" will be initiated for the followings SWMUs:

SWMU 002a (Brinderson Landfill) (formerly 003a)
SWMU 002b (Construction Landfill) (formerly 003a)

1.3 Scope of Voluntary Release Assessment

Sampling plans are designed to define the vertical and horizonal extent of any contaminants that would be present if a release has occurred and to determine if corrective actions will be required. A series of samples will be collected for each type of mudpit at an

individual SWMU. For example, SWMU 001L has a total of four mudpits. Three of the mudpits were constructed to support drilling activities at the WIPP 12 well, and one mudpit was constructed for the P-5 exploration borehole. As part of this Release Assessment, the DOE believes that the type of drilling fluids discharged into all three of the WIPP-12 mudpits are similar in nature. Following this logic, one series of samples will be collected from one of the four WIPP-12 mudpits, and a series of samples will be collected from the P-5 mudpit. Details of voluntary release assessments to be completed at individual SWMUs are described in Sections 6.0, 7.0 and 8.0 of this workplan.

1.4 Scope of Voluntary Corrective Actions

Voluntary corrective actions will be used to complete clean closure at sites where sufficient data exists to support the development and implementation of corrective measures. The determination to complete voluntary closure by the capping in-place of mudpits at SWMUs 001o, 001p, 001q is based on the same decision factors contained in Part 264.525(b) of the proposed Subpart S regulations. The decision factors applicable to the use of compacted caliche caps to contain constituent contaminated soils at these SWMUs include: long-term reliability and effectiveness; a reduction of toxicity, mobility, or volume of wastes constituents; implementability; and cost.

Other factors that support a decision to cap in-place include: the constituent levels of waste contained in the mudpit areas; long-term land use at the WIPP; and the potential that removal and placement of these wastes in a commercial landfill may pose a greater potential for exposure than would occur if the wastes are left in-place.

Due to the climate, geology, depth to limited ground water, and the low concentration of hazardous constituents contained in each SWMU, the DOE considers capping in-place as an effective corrective action to mitigate potential impacts to human health and the environment. The DOE has chosen to move directly into corrective actions for SWMUs 001o, 001p, and 001q. Details of voluntary Corrective Actions are described in Section 9.0 of this workplan.

1.5 Request for a Determination That No Further Action Is Required

As part of this Voluntary Release Assessment/Corrective Action Workplan, the DOE requests a formal determination from the EPA that no further action is required for both the Brinderson and Construction Landfills (SWMU 002a and 002b respectively). The DOE will demonstrate that important information regarding permitting and administrative controls at the landfills was not discussed in the WIPP RFA. The DOE will also demonstrate that releases or suspected releases identified in the RFA are nonexistent, and do not pose a threat to human health or the environment. Details of

information used to develop a request for further action are found in Section 10.0 of this workplan.

2.0 RATIONALE FOR COMPLETING A VOLUNTARY RELEASE ASSESSMENT INVESTIGATION/CORRECTIVE ACTION PLAN

The development of a Voluntary Release Assessment/Corrective Action Workplan is timely for several reasons. First, although preliminary review and visual site inspections were completed at each SWMU, a limited number of sampling visits were conducted as part of the RFA. Release assessment sampling will determine if a release of hazardous wastes or hazardous constituents has occurred, and if any corrective actions will be required. Second, many of the conclusions contained in the RFA regarding the potential for a release and migration of hazardous wastes or hazardous constituents from SWMUs at the WIPP are very conservative. The RFA implies that a release of potentially hazardous constituents has occurred beyond the bottom of mudpit liners at the three sites where sampling data exists. These conclusions conflict with the analytical data presented in the RFA. The sampling data summarized in Section 9.0 demonstrates that the concentration of hazardous constituents were identified at below RCRA hazardous levels and are localized within the vertical and lateral limits of the mudpits tested. The analytical data indicates that the concentration of these constituents drops below Subpart S constituent levels below a depth of 6 feet. A review of analytical data clearly demonstrates that there has been no significant movement in any direction of hazardous constituents since they were deposited in the mudpits between 13 and 21 years ago. Thus, the release and migration potential of hazardous constituents from these areas to any point where they could enter the accessible environment is extremely remote.

Although a release of hazardous constituents may have occurred in the immediate area of the original mudpit due to degradation or destruction of the mudpit liners, there is very limited potential that such a release could adversely impact human health and the environment. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary and the regulations do not require additional corrective actions at these sites. It is with the understanding that the DOE has chosen to develop a voluntary site release assessment and corrective action workplan.

3.0 DESCRIPTION OF CURRENT CONDITIONS

3.1 Facility Background

The WIPP has been sited and constructed to meet the criteria established by the scientific and regulatory community for the safe, long-term disposal of transuranic (TRU) and TRU-mixed waste. The DOE was authorized by the *Department of Energy National Security and Military Applications of Nuclear Energy Authorization*

Act of 1980 (Public Law 96-164) to demonstrate the safe disposal of radioactive waste resulting from U.S. Defense activities and programs. The WIPP is located in Eddy County in southeastern New Mexico approximately 26 miles east of Carlsbad, New Mexico. This region is known as the Los Medanos, or "the dunes." The Los Medanos is a relatively flat, sparsely inhabited plateau with little surface water and limited land uses.

Congress approved the WIPP Land Withdrawal Act in October, 1992. The 16-square miles surrounding the WIPP site is now exclusively controlled by the DOE. The 16-section land withdrawal area includes a significant portion of Township 22 South, Range 31 East. The DOE has developed a 1,454 acre exclusive use area located in the center of the 16 sections. Located in the center of the exclusive use area is a 30-acre secured zone surrounded by a chain link fence. This secured area surrounds the primary surface and underground facilities at the WIPP. Land uses within this area are limited to activities associated with the disposal of TRU wastes. Land uses in the balance of the 16 sections are limited to traditional activities such as grazing and hunting. Hunting, grazing, mining, and oil and gas exploration and production are the predominant land uses in areas just outside the 16 sections.

3.2 Precipitation

The mean annual rainfall for the WIPP site is approximately 12 inches, and the pan evaporation rate at the site is 12 inches per year. Due to the topography, sandy soils, and limited regional precipitation, runoff is quickly evaporated or absorbed into sandy surface soils.

3.3 Geology and Hydrogeology at the WIPP

Because the uppermost strata are the only zones likely to be influenced by any potential release from SWMUs at the WIPP, a general description of the regional geology and a brief description in the individual surface strata are included as part of this workplan. 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.

The WIPP is located in the northern Delaware Basin. This basin is part of a broad and deep structural depression filled with 24,000 feet of Phanerozoic sedimentary rocks. The upper 2,000-3,000 feet consists of thick sections of Upper Paleozoic Carbonates and Evaporites.

The geology at the site is generally characterized by four primary stratigraphic units or regions. The first region includes a near-surface zone made up of Holocene surface deposits, the Mescalero Caliche Formation, and the Gatuna and Dockum Formations. The

second region is the Dewey Lake Red Beds. The third region is the Rustler Formation. The Rustler Formation is made up of five-individual stratigraphic formations. The fourth region is the uppermost part of the Salado Formation.

3.3.1 Surface Formations

The upper most stratigraphic zone is made up of Quaternary and Triassic-age surface and near-surface strata. These formations consists of Holocene surface deposits, the Mescalero Caliche Formation, and the Gatuna and Dockum group of formations. The uppermost formation consists of fine-to-medium-grained Eolian sands of the Holocene age that are typically 10 to 14 feet thick. Soil development is poor, and the overall permeability in this unit is high.

The Mescalero Caliche underlies surfical dune sands. Sands and gravels are characteristically well cemented with a chalky-to-finely crystalline matrix of calcium carbonate. Although the caliche is invoked as a continuous, impermeable barrier over much of the site the Mescalero Caliche may be locally thin or absent. The Gatuna formation occurs as a discontinuous deposit of friable, poorly sorted, pale reddish brown silty sandstone, with local 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 on the site range from 10 to 32 feet. Measurements of hydraulic conductivity in the Gatuna Formation encountered in foundation boreholes at the WIPP facility generally range from $7.8 \times 10_{-6}$ m/s to 1.0×10^{-8} m/s.

Upper Triassic Santa Rosa Formation/Dockum Group overlay 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 over 200 feet to the northeast to less than 50 feet near the area of the WIPP repository. West of the repository itself, the Dockum Formation is essentially absent, and the Gatuna Formation lies directly over the Dewey Lake Formation.

The WIPP site is located at the western limit of water bearing sands in the undifferentiated Dockum Group, which includes the Santa Rosa Formation. While the formation/group is a chief source of domestic water in western Lea County and eastern Eddy County, the only evidence of any water-bearing zones at the WIPP site occurs on the eastern site boundary.

3.3.2 The Dewey Lake Red Beds

Section 2.1.3.6 of the WIPP Project Technical Baseline identifies three main sources of geologic information on the Dewey Lake Red Bed 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, an interpreted geophysical logs of the unit in southeastern New Mexico and west Texas. Holt and Powers (1990) described in detail the Dewey Lake Red Bed Formation at the WIPP Air Intake Shaft.

The Dewey Lake Red Beds are characterized as a deltaic sequence of alternating, thinly bedded siltstone and mudstone with lenticular interbeds of fine-to-coarse-grained sandstone. The formation dips gently to the east and thins to the west, where it is also found at relatively shallow depths. The Dewey Lake Red Beds occur at a depth of 20 to 40 feet at the south end of the site, and 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.

Mercer, (1983) and D'Appolonia (1982b) contend that groundwater occurs perched or semi-perched in lenticular sands in the upper Dewey Lake, and suggests that surface recharge may occur where local geologic conditions permit.

The Dewey Lake Red Bed Formation yields water in sufficient volume and quality for domestic and stock wells along the southern WIPP boundary. On the southeastern boundary of the site, Barn Well is used for domestic purposes and Ranch Well is used for livestock watering. These wells are completed at 94 feet and 212 feet, respectively.

Packer-permeability tests indicate that hydraulic conductivities range from 2.5×10^{-6} m/s to 1.0×10^{-8} m/s. Presumably, water bearing zones would have higher values.

3.3.3 Permian Rustler Formation

The Rustler Formation is stratigraphically placed between the overlying Dewey Lake Formation and underlying Salado Formation. The Rustler Formation is the youngest salt-bearing formation in the Delaware Basin. Within the area of the 16-section WIPP site the Rustler Formation is composed of five members, which in descending order include: the Forty Niner Member; the Magenta Dolomite Member; the Tamarisk Member; the Culebra Dolomite Member; and an unnamed member.

3.3.4 Salado Formation

The Salado Formation consists of approximately 2,000 feet of bedded halite with interbeds or seams of anhydrite, clay, and polyhalite. This formation acts as a regional confining bed and does not contain any circulating fluids. The WIPP repository is located approximately in the center of the Salado Formation. The porosity of the Salado halite is very low and interconnected pores are nonexistent at the depth of the facility horizon.

4.0 A BRIEF HISTORY OF SWMUs AT THE WIPP

4.1 Mudpits

Six of the drill sites (mudpits) to be evaluated as part of this Release Assessment are associated with both WIPP site hydrologic and geologic investigations and potash-resource evaluations. Nine plugged wells remain from private-venture potash (7 wells) and hydrocarbon (2 wells) exploration before such activity was prohibited in 1980. These nine wells were previously the responsibility of the Department of Interior, Bureau of Land Management (BLM). Three of these SWMU sites are "co-located" and contain multiple wellheads from both WIPP and private exploration activities. Each drill pad contains between one to four mudpits that were used to store drilling fluids during drilling operations.

4.2 Brinderson and Construction Landfills

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 for the disposal of construction debris at the WIPP. The Brinderson Landfill is located at the intersection of the NE 1/4 of the NE 1/4 of Section 32, and the NW 1/4 of the NW 1/4 of Section 33, Township 22 South, Range 31 East. The Brinderson Landfill was used to accumulate and dispose of materials such as concrete, scrap wood and other facility construction related debris.

On February 9, 1987, the BLM approved a Land Use Permit Application NM-067-LUP-237, submitted by the DOE, to construct a replacement landfill for the disposal of construction debris at the WIPP. The permit for the Construction Landfill was submitted because the Brinderson Landfill was being closed. The WIPP Construction Landfill is located at the N 1/2 of the NE 1/4 of Section 29, Township 22 South, Range 31 East. Detailed landfill descriptions and closure details can be found in Section 10.0.

4.3 Portacamp Storage Area

The Portacamp Storage Area is an active materials storage area 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.

Equipment and materials such as pipe, hoisting cable, and ventilation tubing, as well as hazardous and nonhazardous materials and wastes, have been managed in the Portacamp area since 1976. Beginning in 1991, all RCRA-regulated materials were managed in the WIPP Hazardous Waste Storage Area. DOE/WIPP, WIPP Procedure WP-502, *Used Oil Management*, states that nonregulated, used oil will be routinely transferred to the Westinghouse portacamp for shipment to off-site disposal or recycling facilities. Used oils that exhibit hazardous characteristics are managed at the Hazardous Waste Staging Area.

4.4 Additional SWMUs Identified Since the Issuance of the RFA

Seven additional SWMUs have been identified since the issuance of the WIPP RCRA Facility Assessment. Six of the new SWMUs have mudpits used to collect drill cuttings generated during the drilling of water-level monitoring wells. The seventh SWMU is a hydropad complex constructed to collect drilling cuttings and drill fluids from a series of tracer test wells. These wells were designed to support WIPP Culebra Transport Test programs. A total of 17 mudpits have been constructed at the seven drill pad locations. All drill mudpits are lined with synthetic liners. The DOE does not propose to conduct release assessments for any of these sites because no releases from mudpits have occurred.

Regulatory requirements for each drill site were evaluated prior to the initiation of work at these locations. Regulatory reviews included the review of existing NEPA documentation, the evaluation of applicable permits, approvals, and determinations from the NMED, the State Engineer, and the State Historical Preservation Office. Evaluations were designed to demonstrate that no hazardous wastes or hazardous constituents were discharged into drill mudpits. Table J-1.1 of the RCRA Part B Permit Application (Rev 5.) provides a list of all additional SWMUs. Table J-1.1 provides the location and size of each mudpit and provides a list of all drill additives and tracers that will be used during the Culebra Transport Test Program.

5.0 PREVIOUS FIELD CONDITIONS/INVESTIGATIONS

5.1 Brinderson Landfill

The Brinderson Landfill was originally permitted and leased from the BLM in January, 1985. The site was originally a caliche pit designed to provide road construction material. In January 1985 the BLM issued Land Use Permit, NM-067-LUP-219, to the DOE for the disposal of construction debris. In August 1989 the BLM's Area Manager approved the final closure of this landfill in accordance

with the management and reclamation requirements established in the permits. The closure of the Brinderson Landfill was overseen by the BLM, Roswell District Office, Hazardous Material Specialist, and the BLM Realty Specialist. Site reclamation was completed by Westinghouse reclamation specialists using a BLM-approved seed mixture. A copy of the BLM Brinderson Landfill closure file, including photographs of the closure, is provided in Appendix 2.

5.2 Construction Landfill

The Construction Landfill was originally permitted and leased from the BLM in February 1987. During operations from 1987 to 1990, the BLM conducted numerous site inspections to verify that the facility was operated in accordance with permit requirements and that only construction debris was disposed in the landfill.

The primary pit at the Construction Landfill was closed by the BLM, in accordance with permit conditions on February 15, 1990. The closure of the primary pit at the Construction Landfill was overseen by the BLM, Roswell District Office, Hazardous Material Specialist, and the BLM Realty Specialist. A copy of the BLM closure file is found in Appendix 3.

5.3 Sampling and Spill Remediation at Portacamp Prior to the Issuance of the RFA

Minor spills of used oil were remediated at the Portacamp area in 1987 and 1989. All spilled materials were removed and transported to an off-site disposal facility in accordance with applicable WIPP spill response procedures.

5.4 Sampling at the Badger Unit Federal #1 Prior to the Issuance of the RFA

The mudpit at Badger Unit Federal #1 well was first sampled in January, 1992. Grab samples were collected for inorganic constituents on January 9, 1992, as part of an initial characterization sampling project.

5.5 Other Site Assessments

No additional site assessments or corrective actions have been completed at any SWMU since the issuance of the RFA. Please refer to the Chapter 4.0 and the Appendices of the WIPP RFA for details of site assessments conducted as part of the RFA.

6.0 PROJECT RELEASE ASSESSMENT/CORRECTIVE ACTION WORKPLAN

6.1 Release Assessments

6.1.1 Release Assessment Objectives

The objective of this Release Assessment/Corrective Action Workplan is to describe the sampling methods and quality assurance protocol that will be used to complete release assessment sampling. Analytical data generated by release assessment sampling will collected and managed in accordance with protocol described in this plan. Data will then be used to evaluate the need for, and the most appropriate voluntary corrective actions needed to meet, the closure requirements established in the proposed Subpart S rules.

6.1.2 Field Investigation

Field investigations will be conducted at the 11 SWMUs described in Section 8.0. Release Assessment sampling will be designed to determine if releases to soil media have occurred. If releases have occurred, then the extent of vertical and horizonal contamination will be evaluated to determine if potential impacts to groundwater exist. Based on this data, additional release assessment sampling may be warranted, or the DOE may develop voluntary corrective actions to contain or remove contaminated media.

A brief discussion of each SWMU being evaluated as part of this Release Assessment/Corrective Action Workplan is provided below. A sample location map is provided for each SWMU. Discussion regarding the type of media evaluated is included in Section 6.2.2. The depth of media to be sampled, the number and the type of sample collected is provided in a sample summary table for each SWMU. Additionally, a Summary Table for all SWMUs described in this Workplan is contained in Section 8.0.

6.1.3 Field Sample Collection Procedures

All sampling, sample handling, and analytical protocols used to complete release assessment sampling are described in the *WIPP Site Effluent and Hazardous Materials Sampling Plan*, WP02-EM2, Rev.0 (Appendix 4). WP02-EM2 was developed to meet the sampling and analytical protocols defined in *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, SW-846*. All release assessment sample and data quality assurance requirements are defined in the *Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling Plan*, WP02-EM1, Rev.0 (Appendix 5). Data Quality Objectives, involving data evaluation, plan modification, and clean-up requirements will be negotiated with EPA Region VI, the New Mexico Hazardous and Radioactive Waste Bureau, in accordance with the *Guidance for the Data Quality Objectives Process, EPA QA/G-4*, September, 1994.

6.2 Number of Samples and Method of Sampling

6.2.1 General Sampling Considerations

Guidance for establishing sample locations at each SWMU is contained in the *RCRA Facility Investigation (RFI) Guidance, Development of an RFI Workplan and General Considerations for RCRA Facility Investigations (Vol. 1)*, EPA 530/SW-89-031, May 1989. The DOE has selected a Judgmental Sampling method to characterize each SWMU. The methodology was selected because site layout or unit characteristics such as mudpit locations, and the location of materials storage areas, indicate where potential contamination exists.

6.2.2 Media To Be Sampled

Soil is the only media that will be sampled to characterize individual SWMUs described in this workplan . As described in the RFA, soil is the only media that has the potential to be impacted by releases at individual SWMUs. Soil analyses from different strata will indicate potential for release to groundwater media.

6.2.3 Rationale for Selection of Target Analytes

The DOE reviewed all material safety data sheets (MSDS) for wastes or materials used in the drilling and testing of drill mudpits. Information contained in the RFA, as well as drill logs and geologic reports, were evaluated to establish the following list of potential wastes that may be contained in mudpits around the site:

1. attapulgite drill gel (salt bentonite gel)
2. bentonite gel
3. diesel fuel
4. gear grease/gear lubricants
5. hydraulic fluids
6. hydrochloric acid (20% solution)
7. lignite
8. meta-trifluorobenzoic acid
9. metal cuttings
10. motor oil
11. portland cement
12. sodium and potassium chloride saturated brine
13. starch
14. soda ash
15. sodium hydroxide (NaOH)

Based on the review of MSDS for each of these potential waste streams, the DOE developed a list of target analytes for all mudpits evaluated in this workplan. Because drilling additives, such as drill mud, trace quantities of gear lubricants, and diesel fuel, have a limited potential to generate hazardous constituents, the list of target analytes has been limited. The selection of

limited-target analytes is further supported by the results of sampling at the Badger Unit, Cotton Baby, and DOE-1. A list of target analytes for all mudpits described in this workplan is provided in Table 1.

Because the Portacamp area was historically used to store and manage hazardous materials and hazardous wastes, the list of sample analytes for the Portacamp area release assessment is more comprehensive. Details of the sampling and analytical requirements for the Portacamp area are described in Section 8.11.

TABLE 1

Target Analytes and Proposed EPA Analytical Methods for Characterizing SWMU Mudpits at the WIPP

PARAMETER	EPA ANALYTICAL METHOD (or equivalent)
Inorganic Analytes	
Arsenic	6010
Barium	6010
Cadmium	6010
Chromium	6010
Lead	6010
Mercury	7470/7471
Thallium	6010
Organic Analytes	
Benzene	8240/8260
Chloroform	8240/8260
1,2 Dichloroethane	8240/8260
Ethylbenzene	8240/8260
Toluene	8240/8260
1,1,1-Trichloroethane	8240/8260
Vinyl Chloride	8240/8260
Xylenes	8240/8260

6.3 Routine and Quality Control Sampling

A total of 216 routine and background samples, and 90 quality control soil samples will be collected from ten mudpits and the Portacamp area during the initial assessment sampling program. A description of the type of sample collected, and sampling interval is contained in the Sampling Summary Table for each SWMU. The organic and inorganic analytes to be sampled at each mudpit area is listed in Table 1. A summary list of samples to be collected to support this Release Assessment/Corrective Action Workplan are described in Table 2. The organic and inorganic analytes to be sampled at the Portacamp area are described in Table 3, found in Section 8.0.

Quality control samples include 30 duplicate samples, 30 equipment blank samples, and 30 field blank samples. Samples at each mudpit will be collected from 12 to 24 inches, and 60 to 72 inches below grade level.

The rationale for selecting sample depths at mudpits during the initial round of voluntary release assessment sampling are based on an evaluation of the individual sites and historical analytical data collected during the RFA. Mudpit samples collected at the 12 to 24-inch depth are designed to obtain a sample from the depth were the highest concentration of constituents have been historically located. Samples collected at the 60 to 72-inch depth are designed to quantify the maximum vertical extent of potential contamination. The down gradient sample is designed to evaluate the lateral extent of potential constituent migration, and the background sample will be collected to establish background concentrations of constituents in the vicinity of the SWMU site. At each sampling interval, one organic sample and one inorganic sample will be collected.

Samples at the Portacamp area will be collected from 0 to 6 inches and 12 to 18 inches below grade level due to the shallow depth of the compacted caliche at this location. At each sampling interval, one organic sample and one inorganic sample will be collected. A relatively shallow sampling depth was selected at the Portacamp area for two reasons. First, this area has been intensively managed and any potential spills have been cleaned up immediately. Second, materials stored at the Portacamp area have been placed on several feet of compacted caliche. This material effectively contains the vertical migration of any spilled materials. Additional samples will be collected, if stained soils are visible at the 18-inch sampling depth. If during sampling visits, additional sampling locations are identified, the plan will be revised to reflect any new sampling locations.

One series of background samples will be collected from each of the 16 SWMU sites. These samples will be collected from an undisturbed location, immediately up gradient, but adjacent to the SWMU area. Sample sites will be selected to ensure that the location has a very low probability of being contaminated by any constituents contained in the adjacent SWMU. Samples will be collected at the same sample depth intervals described above.

Background sample locations will be selected by the sampling team members during the initial sampling visit. Sample locations will be noted in the sample log book, and sampling results will be described in the Final Release Assessment/Corrective Action Report.

A tractor mounted power auger will be used to drill to sampling depth. Hand tools such as a hand auger and a tube sampler or trier will then be used to collect soil grab samples. One liter clear glass bottles will be used for collecting inorganic constituent samples. Four ounce clear glass bottles with welded septum lids will be used to collect volatile organic constituent samples. Eight ounce clear glass bottles with welded septum lids will be used to collect semivolatile organic constituent samples.

6.3.1 Additional Requirements for the Collection of Organic Samples

No deviations are planned from protocol established in this section for the collection of volatile and semivolatile organic soil samples. However, if a deviation is required by field specific problems, these conditions will be noted in the sampling logbook and identified to the EPA as part of the data submittal. Any off-normal sampling protocols will then be evaluated to determine if resulting analytical data can be used to draw conclusions related to this assessment. Both volatile and semivolatile organic samples will be collected as soon as possible after the soil cores or plugs have been collected. At any given sampling interval, organic samples will be collected before the inorganic sample. Organic samples will be collected so that there is minimal or no headspace in the containers. The mixing or homogenizing of either type of organic sample media may invalidate analytical results. Before data of this type can be used to draw conclusions relating to this release assessment workplan, all data must first be reviewed and approved by the EPA Region VI.

6.3.2 Quality Control Samples

Field quality control samples such as duplicate samples and field and equipment blanks will be collected by the sampling team and documented in the sampling logbook. All samples will be 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).

Deionized water will be used for the field and equipment blanks because it provides excellent sensitivity to contamination. Equipment blanks will be collected for each type of sample (organic soil, and inorganic soil). The purpose of the equipment blanks is to check for sampling device cleanliness from the laboratory decontamination efforts. The equipment blanks for soil samples are collected, using deionized water transported to the sampling site. At the sampling location, deionized water is poured over or through the sample collection device, collected, and returned for analysis.

6.3.3 Field Measurements

During the collection of organic and inorganic samples general measurements, such as pH, temperature, may be performed in the field by the sampling technicians. If sampling team members decide to obtain field measurements and it is not possible to perform these tests when the sample is collected, the analyses will be performed as soon as possible. These tests will aid in determining how the sample is contained, preserved, and analyzed. If a sample is of unknown composition, field measurements may provide sampling team members with additional information about the composition of the media being sampled. With an idea of the composition, relevant analytical testing needed from the contract laboratory will be easier to determine. The forms generated by the corresponding field test procedures will be maintained with the sample logbook.

6.3.4 pH Measurement

The pH of any media being sampled will be measured per DOE/WIPP, WP 02-108, *pH Measurement*. This procedure also includes a calibration of the pH meter and electrode. The DOE anticipates that limited pH sampling will be required and that pH sampling will only be used to assist sampling team members with the selection of sampling and analytical protocols.

6.3.5 Temperature Measurement

The temperature of a substance will be measured per DOE/WIPP, WP 02-109, *Temperature Measurement*.

6.3.6 Other Sampling

Additional field measures such as air quality will be collected using Dräger tube sampling techniques. This information will be used to support Industrial Safety personnel in the selection of personal protective equipment (PPE), or to determine if degradation products exist, which may require a modification to the list of constituents being sampled.

7.0 QA/QC PROCEDURES

7.1 Quality Assurance Requirements

7.1.1 Laboratories, Sample Analysis, Sample Methods

All sample analyses will be completed in accordance SW-846 or equivalent analytical protocols. The DOE will utilize Halliburton NUS Laboratories Inc., to analyze all Release Assessment Samples. Sample analytical methods and Quality Assurance/Quality Control requirements will be completed in accordance with the *Halliburton NUS Laboratories General Quality Assurance Plan*, March 10, 1995. The Halliburton QA plan defines all equipment calibration, sample handling, sample analyses, matrix blank, and method blank analyses required to meet SW-846 QA/QC requirements. A copy of the Halliburton QA plan is found in Appendix 6.

7.1.2 Data Management

Data records will be managed in accordance with the requirements established in Section 2.0 of the Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling Plan. Analytical data will be presented in a tabular format.

7.1.3 Schedule

In order to allow the EPA Region VI Hazardous Waste Management Division and the NMED Hazardous and Radioactive Waste Bureau the maximum amount of time to review release assessment data packages, the DOE proposes to submit the release assessment/corrective action sampling data for each individual SWMU as that data is generated. This will allow the agencies maximum time to review proposed corrective actions prior to the issuance of public notice for the draft RCRA Part B Permit.

The DOE will submit a Release Assessment/Corrective Action Findings Report that summarizes all Release Assessment/Corrective Action data to the agencies by December 1, 1995. This will allow the agencies time to review individual SWMU Release Assessment/ Corrective Action summary reports as they are generated and allow the agencies a minimum of 30 days to review the Finding Report, prior to the issuance of public notice for the WIPP Part B Permit Application.

7.1.4 Health and Safety Plan

The DOE will utilize the *WIPP Safety Manual* (WP12-1 Vol. 1 & 2) to evaluate PPE requirements and to evaluate the need to conduct personnel sampling for sampling team members working on the Release Assessment. Based on the list of potential hazardous constituents described in the Section 4.1 of the WIPP RFA, the potential to contact hazardous constituents that pose a threat to the safety of sampling personnel is very low. This is reinforced by the results of sampling previously conducted at the Badger Unit, Cotton Baby, and DOE-1. The need for PPE and personnel sampling will be made by WIPP industrial hygiene personnel as described in Sections 1.6 and 4.1 of the WIPP Safety Plan.

7.1.5 Public Involvement Plan

The DOE does not propose to develop a Public Involvement Plan as part of this Voluntary Release Assessment/Corrective Action Plan.

TABLE 2

Summary of Release Assessment Samples for SWMUS at the WIPP

	NUMBER OF SAMPLES		DUPLICATE SAMPLES		EQUIPMENT BLANKS		FIELD BLANKS	
	Inorganic Analysis	Organic Analysis	Inorganic Analysis	Organic Analysis	Inorganic Analysis	Organic Analysis	Inorganic Analysis	Organic Analysis
SWMU 001 - MUDPITS								
SWMU 001g	14	14	2	2	2	2	2	2
SWMU 001h	14	14	2	2	2	2	2	2
SWMU 001j	8	8	1	1	1	1	1	1
SWMU 001k	8	8	1	1	1	1	1	1
SWMU 001L	14	14	2	2	2	2	2	2
SWMU 001m	8	8	1	1	1	1	1	1
SWMU 001n	8	8	1	1	1	1	1	1
SWMU 001s	8	8	1	1	1	1	1	1
SWMU 001t	8	8	1	1	1	1	1	1
SWMU 001x	8	8	1	1	1	1	1	1
SWMU 004 - STORAGE AREAS								
SWMU 004a	10	10	2	2	2	2	2	2
Total	108	108	15	15	15	15	15	15

8.0 SUMMARY OF RELEASE ASSESSMENTS FOR SELECTED SWMUS AT THE WIPP

8.1 Release Assessments at Individual SWMUs

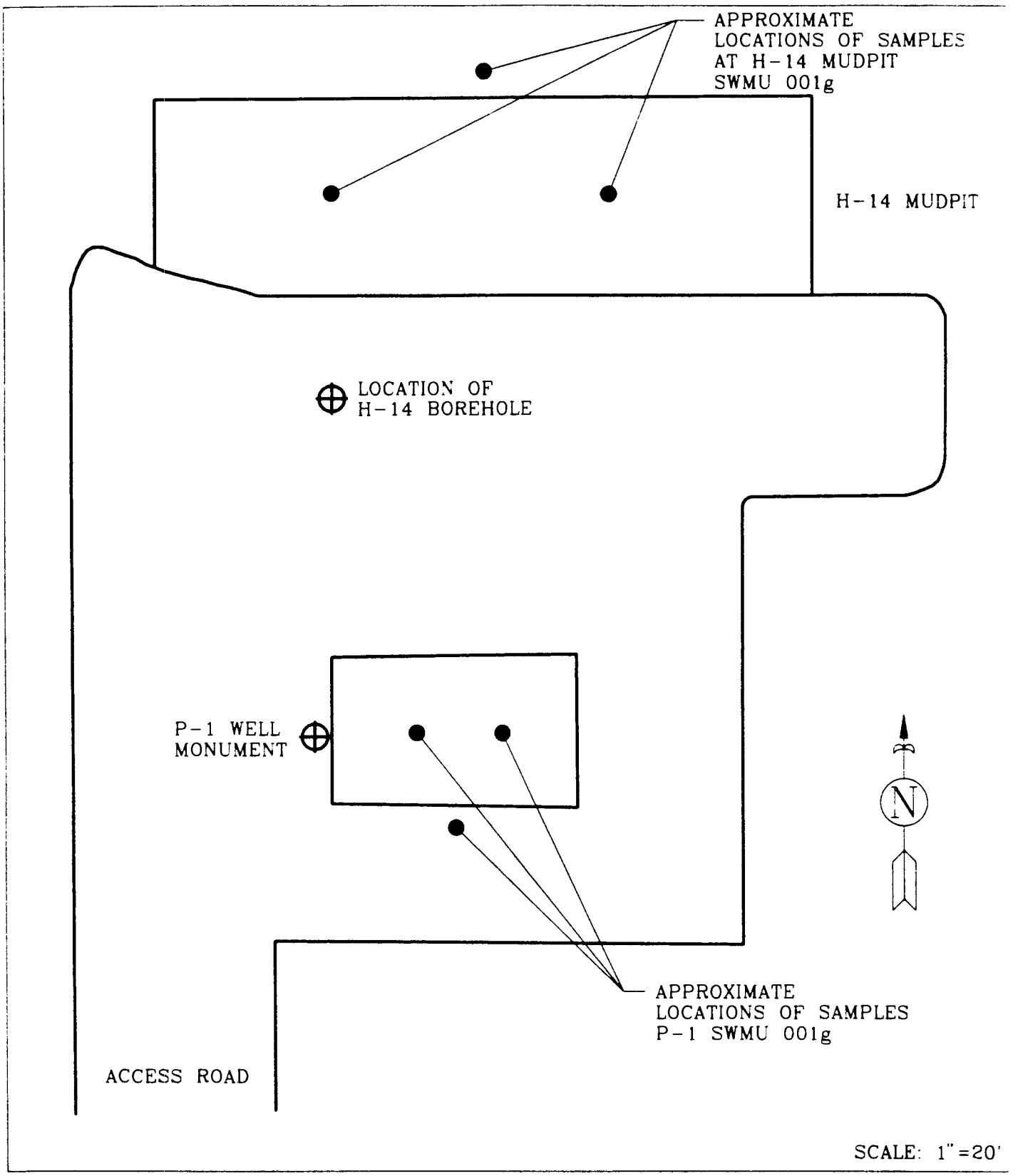
8.1.1 SWMU 001g (H-14/P-1 Drill Pad)

SWMU 001g is located in the SW 1/4 of the SW 1/4 of the SW 1/4 of Section 29, Township 22 South, Range 31 East. One U.S. Geological Survey (USGS) potash evaluation borehole (P-1; abandoned) and one hydrologic well (H-14) are located on this pad. Diesel fuel was added to a mixture of saturated sodium and potassium chloride brine, starch and salt gel (attapulgite) to reduce the degree of dissolution of the Salado formation during drilling operations for P-1. H-14 was drilled in 1986 to provide a Culebra Dolomite monitoring well in the southeast quadrant of the site. According to the borehole data report, brine and tracer saturated water were used as drilling fluids for H-14. Saturated brine is specifically described as a 70/30 mixture of cement slurry and salt with 2 percent bentonitic gel. An organic tracer (meta-trifluorobenzoic acid 10 mg/l) was added to freshwater for one portion of the hole to measure the transmisitivity of the Culebra member.

There are two mudpits at the H-14 drill pad. One rectangular mudpit is located on the north side of the drill pad adjacent to H-14. Another mudpit is located on the pad itself. The mudpit on the north side measures approximately 30 feet by 100 feet and can be identified by disrupted surface soils covered with rock fragments. The other mudpit (P-1 mudpit) is indicated by a discolored and sunken area 50 feet south of H-14 and adjacent to the P-1 monument in the middle of the pad. A detailed sample location map for SWMU 001g is provided as Figure 3., in Section 8.1.2.

8.1.2

FIGURE 3
SAMPLE LOCATION MAP SWMU 001g (H-14 & P-1)



8.1.3 Number of Samples and Sampling Intervals

SUMMARY OF SAMPLES COLLECTED FOR SWMU 001g (Drill Pad H-14, P-1)		
	12 - 24"	**60 - 72"**
NUMBER OF ROUTINE SAMPLES:		
Inorganic Analysis	7	7
Organic Analysis	7	7
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	1
Organic Analysis	1	1

8.2 SWMU 001h (H-15/P-2 Drill Pad)

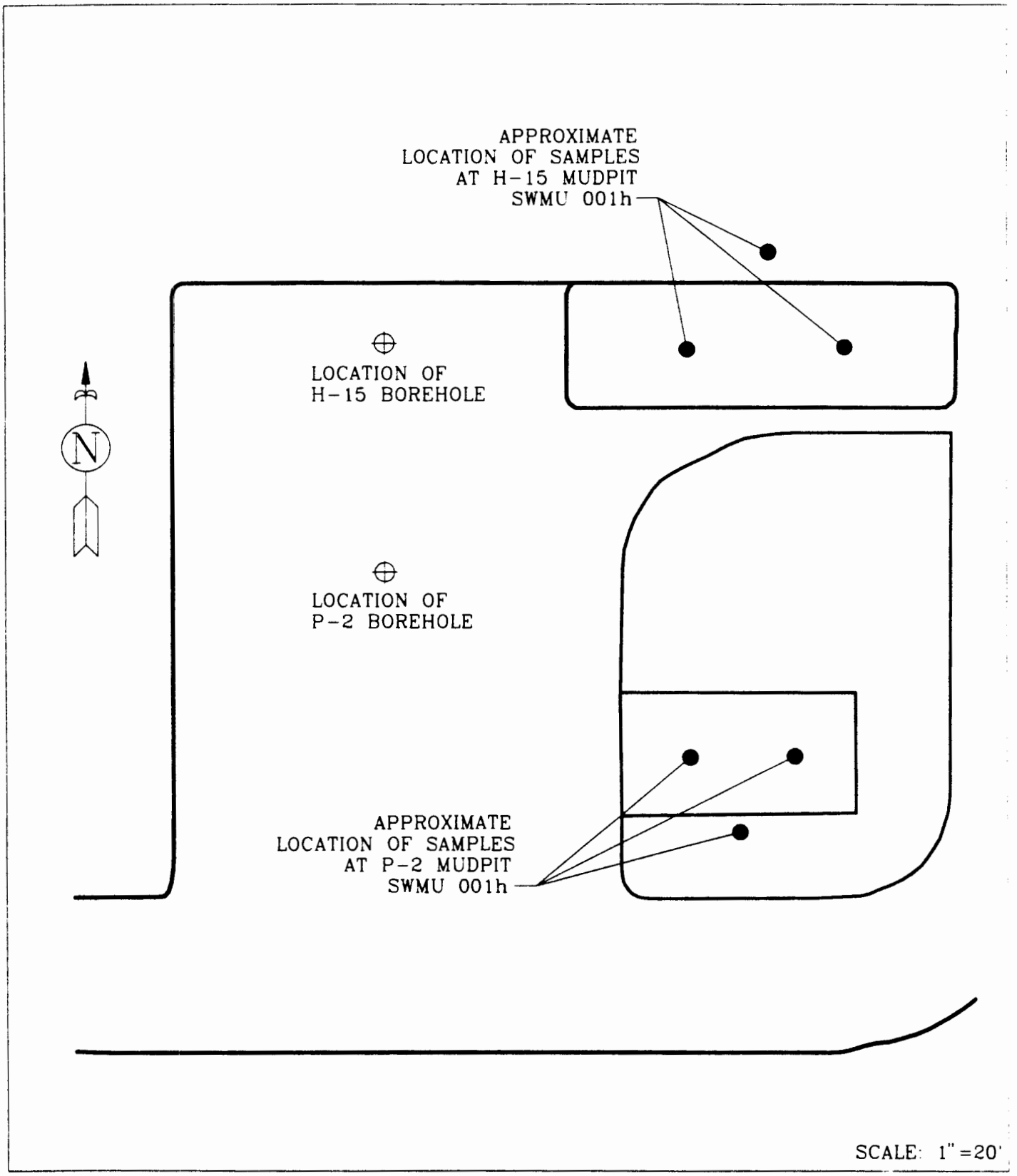
SWMU 001h is located in the NE 1/4 of the NE 1/4 of the NE 1/4 of Section 28, Township 22 South, Range 31 East. One USGS potash evaluation borehole (P-2), and one hydrological monitoring well (H-15) are located on this pad. USGS documentation indicates that air foam was used to stabilize drill cuttings during the drill of P-2. *Sandia National Laboratory Report SAND87-7125*, indicates that saturated sodium and potassium chloride brine with starch and salt gel (attapulgite) were also used as a drill additive. As with P-1, diesel fuel was reported used to inhibit dissolution of the Salado Formation.

H-15 was drilled in 1986. Saturated brine and freshwater with tracers are listed as drilling fluid constituents in the H-15 borehole data report. 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 drilling fluids containing tracers were lost to the formation, representing about 75 percent of the drilling fluid used.

Two mudpits are identified at the SWMU 001h drill pad. On the northeast corner of the drill pad, the rectangular mudpit measures approximately 18 x 60 feet. This mudpit is located adjacent to, and east of, the H-15 wellhead. No soil discolored soil or plastic liner remnants were evident during a visual inspection of the site. Another rectangular area was located on the southeast corner of the pad. This area is assumed to be the mudpit location for the P-2 bore hole. This location is consistent with the location of the P-2 wellhead, and is approximately 25 feet south of H-15 (*WIPP Hydrologic Data Report #5*). A detailed sample location map for SWMU 001h is provided as Figure 4., in Section 8.2.1.

FIGURE 4

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



8.2.2 Number of Samples and Sampling Intervals

SUMMARY OF SAMPLES COLLECTED FOR SWMU 001h (Drill Pad H-15 and P-2)		
	12 - 24"	60 - 72"
NUMBER OF ROUTINE SAMPLES:		
Inorganic Analysis	7	7
Organic Analysis	7	7
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	1
Organic Analysis	1	1

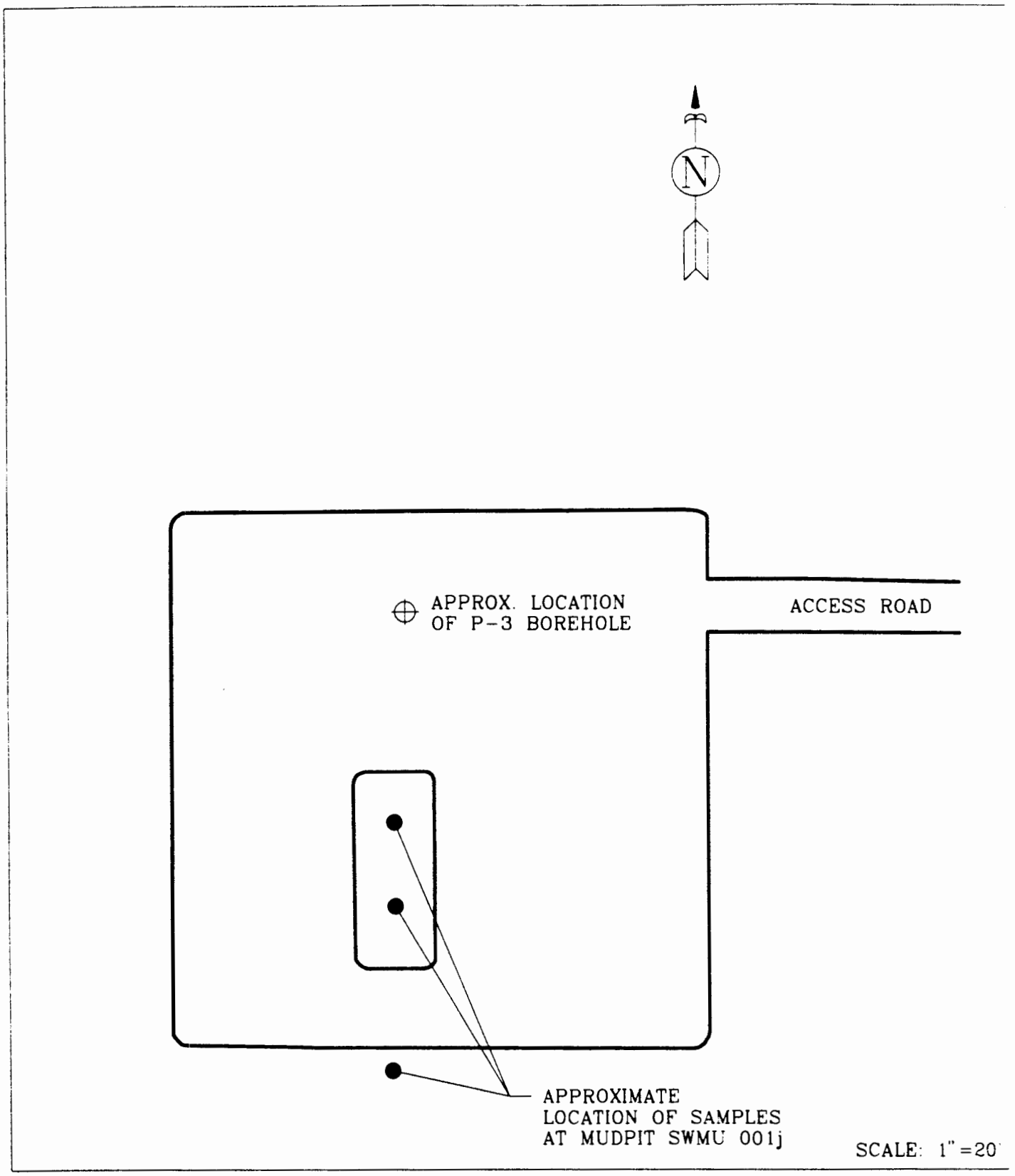
8.3 SWMU 001j (P-3 mud pit)

SWMU 001j is located in the SE 1/4 of the SE 1/4 of the SW 1/4 of Section 20, Township 22 South, Range 31 East. Pennsylvania Drilling Company drilled P-3 in August 1976 as part of a 21-well USGS resource evaluation program to investigate the potash resources in the Salado Formation. Drilling fluid consisted of saturated sodium and potassium chloride brine, starch and salt gel (attapulgite).

Visual inspections identified one rectangular mudpit located on the south central part of the drill pad. The P-3 well pad is heavily overgrown with vegetation. Survey marker N 349 on the pad may be set on top of the abandoned P-3 test hole. No discolored soil or liner material was identified at the drill pad. A detailed sample location map for SWMU 001j is provided as Figure 5., in Section 8.3.1.

FIGURE 5

8 3.1 SAMPLE LOCATION MAP SWMU 001j (P-3)



8.3.2 Number of Samples and Sampling Intervals

SUMMARY OF SAMPLES COLLECTED FOR SWMU 001j (P-3 mud pit)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	4	4
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0

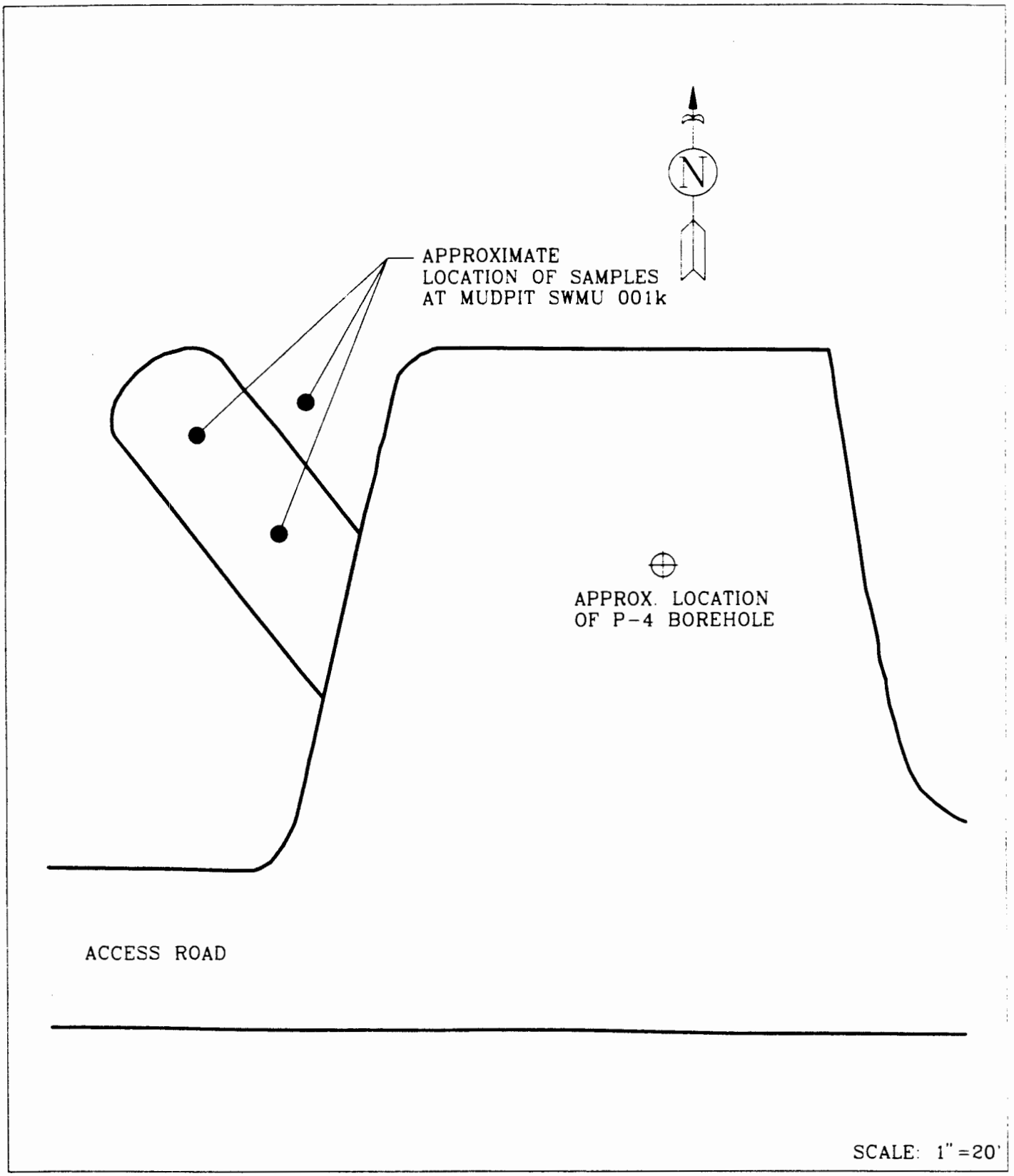
8.4 SWMU 001k (P-4 Drill Pad)

SWMU 001k is located in the SE 1/4 of the SW 1/4 of the SE 1/4 of Section 28, Township 22 South, Range 31 East. Boyles Brothers Drilling Company drilled P-4 in September 1976 as part of a 21-well USGS potash resource evaluation program (*USGS, 1978*). Drilling fluid consisted of saturated sodium and potassium chloride brine, starch and salt gel (attapulgite). Air foam was used to drill to a depth of 958 feet.

A rectangular mudpit area approximately 15 feet by 50 feet is located on the west side of the pad. No discolored soil or plastic liners are evident at this location. Mixed uncompacted soil, broken caliche, and red sandstone on the surface suggest that the drill pad has been extensively graded. A detailed sample location map for SWMU 001k is provided as Figure 6., in Section 8.4.1.

8.4.1

FIGURE 6
SAMPLE LOCATION MAP SWMU 001k (P-4)



8.4.2 Number of Samples and Sampling Intervals

SUMMARY OF SAMPLES COLLECTED FOR SWMU 001k (Drill Pad P-4)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	4	4
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	4	4
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0

8.5 SWMU 001L (WIPP-12/P-5 Drill Pad)

SWMU 001L is located in the SE 1/4 of the SE 1/4 of the SE 1/4 of Section 17, Township 22 South, Range 31 East. 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 be 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.

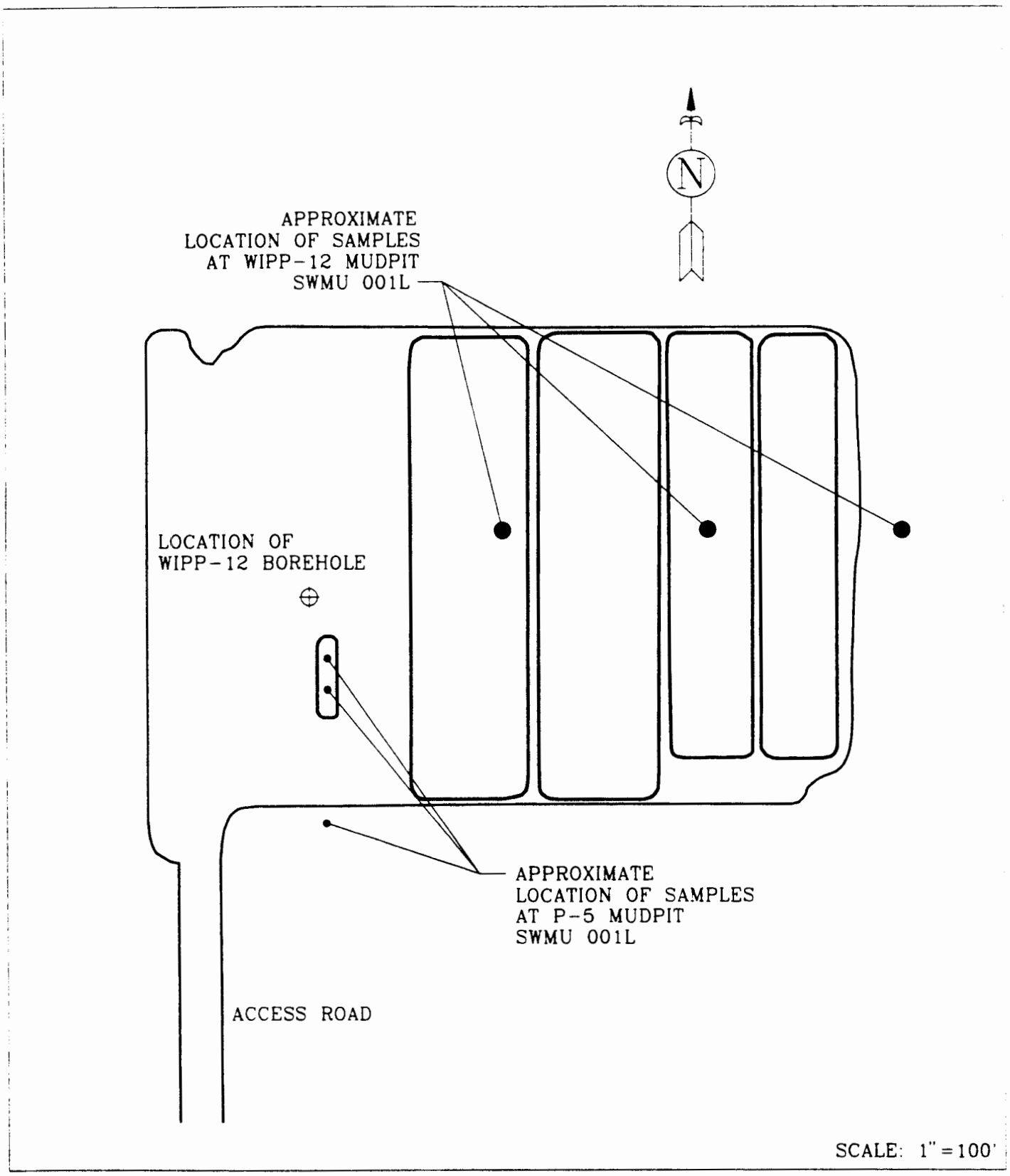
WIPP-12 was drilled on the P-5 well pad in 1978 and deepened in 1981 and 1982 to investigate the Salado and Castile Formations. The *WIPP-12 Borehole Data Report* and *Sandia National Laboratory Report (SAND88-7014)* indicate that several types of drilling fluids were used to drill WIPP-12. A salt-based drilling mud was used to a depth of 1,000 feet, a 10-pound/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 NaCl-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 also 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. 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. A portion of the site was covered with crushed caliche. DOE/WIPP 92-007 also suggests that some sampling of the reserve pits has occurred, however, no analytical data have been obtain for this site.

The large mudpit complex on the eastern site of the drill pad is characterized by hummocky, linear dark bands of fill that form berms separating four distinct rectangular mudpits. The mudpits are defined by dark, possibly stained soil, and continuous linear exposures of white plastic liners along the margins and within the individual units. Discontinuous lengths of plastic liner also appear in the intervening bermed zones. 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. A detailed sample location map for SWMU 001L is provided as Figure 7., in Section 8.5.1.

FIGURE 7

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



8.5.2 Number of Samples and Sampling Intervals

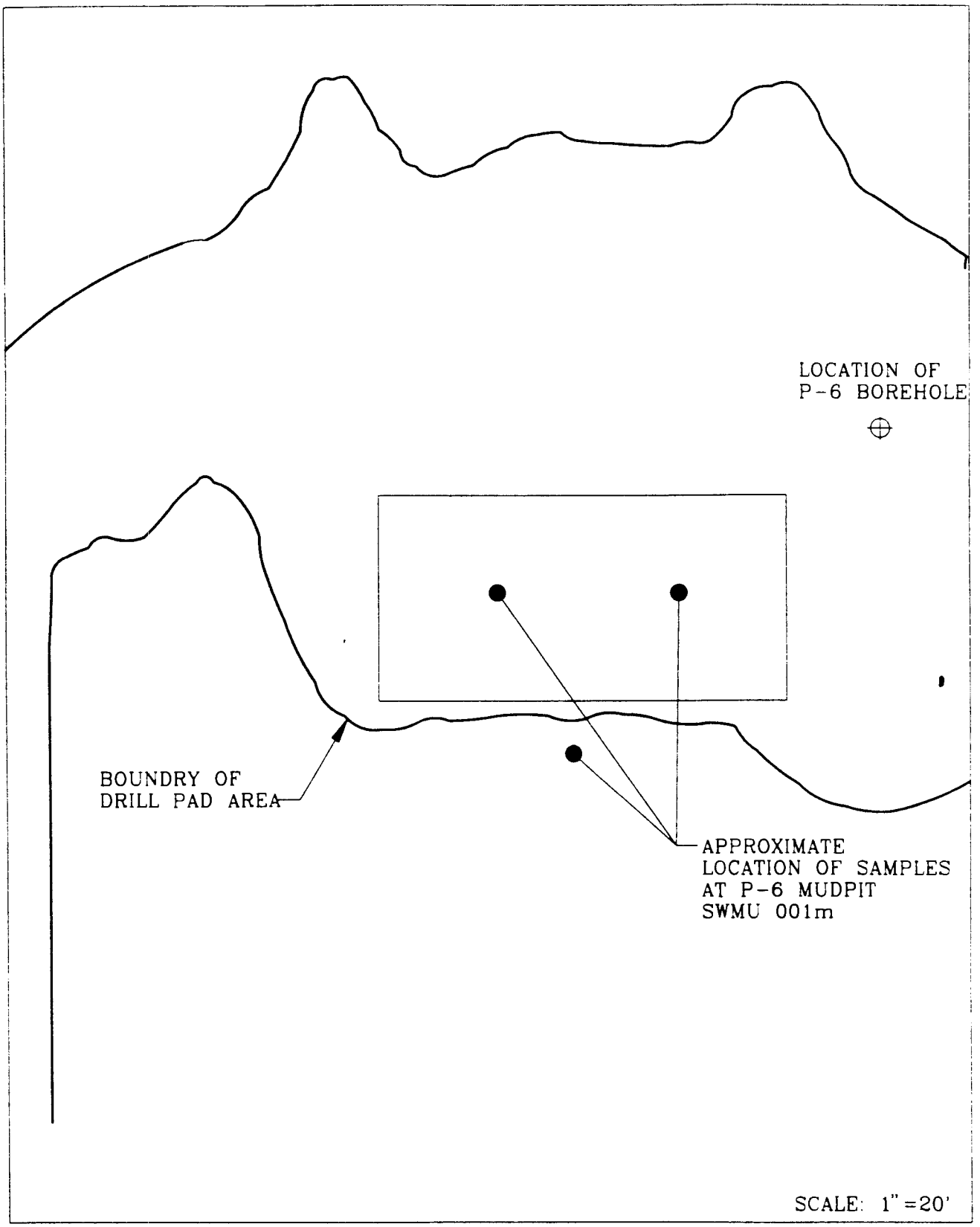
SUMMARY OF SAMPLES COLLECTED FOR SWMU 001L (Drill Pad WIPP-12/P-5)		
	12 - 24"	**60 - 72"**
NUMBER OF SAMPLES:		
Inorganic Analysis	7	7
Organic Analysis	7	7
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	1
Organic Analysis	1	1

8.6 SWMU 001m (P-6 Drill Pad)

SWMU 001m is located in the SW 1/4 of the SW 1/4 of the NW 1/4 of Section 30, Township 22 South, Range 31 East. Boyles Brothers Drilling Company drilled P-6 in September 1976 (*USGS, 1978*). 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). This site is inaccessible by vehicle. The surface of the site has been rough graded and the edges of the mudpit are not easily distinguished. A detailed sample location map for SWMU 001m is provided as Figure 8., in Section 8.6.1.

FIGURE 8

8 6.1 SAMPLE LOCATION MAP SWMU 001m (P-6)



8.6.2 Number of Samples and Sampling Intervals

SUMMARY OF SAMPLES COLLECTED FOR SWMU 001m (Drill Pad P-6)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	4	4
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0

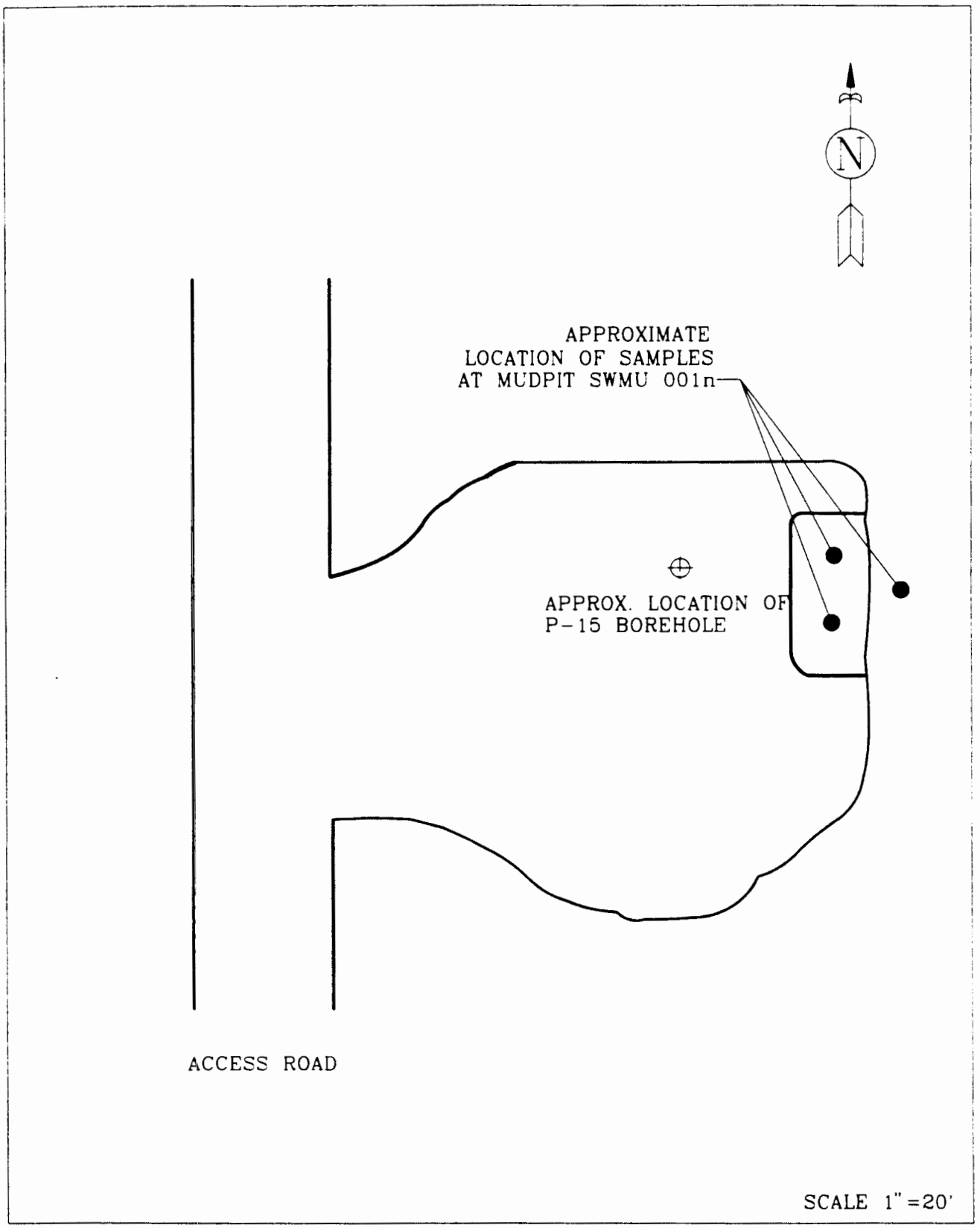
8.7 SWMU 001n (P-15 Drill Pad)

SWMU 001n is located in the SW 1/4 of the SW 1/4 of SW 1/4 of Section 31, Township 22 South, Range 31 East. Boyles Brothers Drilling Company drilled the USGS P-15 borehole in October 1976 to investigate the potash resources in the Salado Formation (*USGS, 1978*). The well was reopened in 1979. Limited data is available on this mudpit, and it is reasonably assumed that diesel fuel was used as a drilling additive. As with other USGS potash test holes, drilling fluids probably consisted of saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite). USGS reports indicate that the P-15 was drilled with air to 405 feet, allowing the presence of shallow groundwater to be detected.

Visual inspection showed that the P-15 pad is overgrown with grass, and typical of other USGS potash test holes. There is no clear evidence of a mudpit at this location. An area of hummocky, loose fill and coarse rubble approximately 10 feet by 20 feet indicates the presence of a mudpit on the east side of the flat graded pad. No plastic liners are evident. A detailed sample location map for SWMU 001n is provided as Figure 9., in Section 8.7.1.

FIGURE 9

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



8.7.2 Number of Samples and Sampling Intervals

SUMMARY OF SAMPLES COLLECTED FOR SWMU 001n (Drill Pad P-15)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	4	4
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0

8.8 SWMU 001s (ERDA 9 Drill Pad)

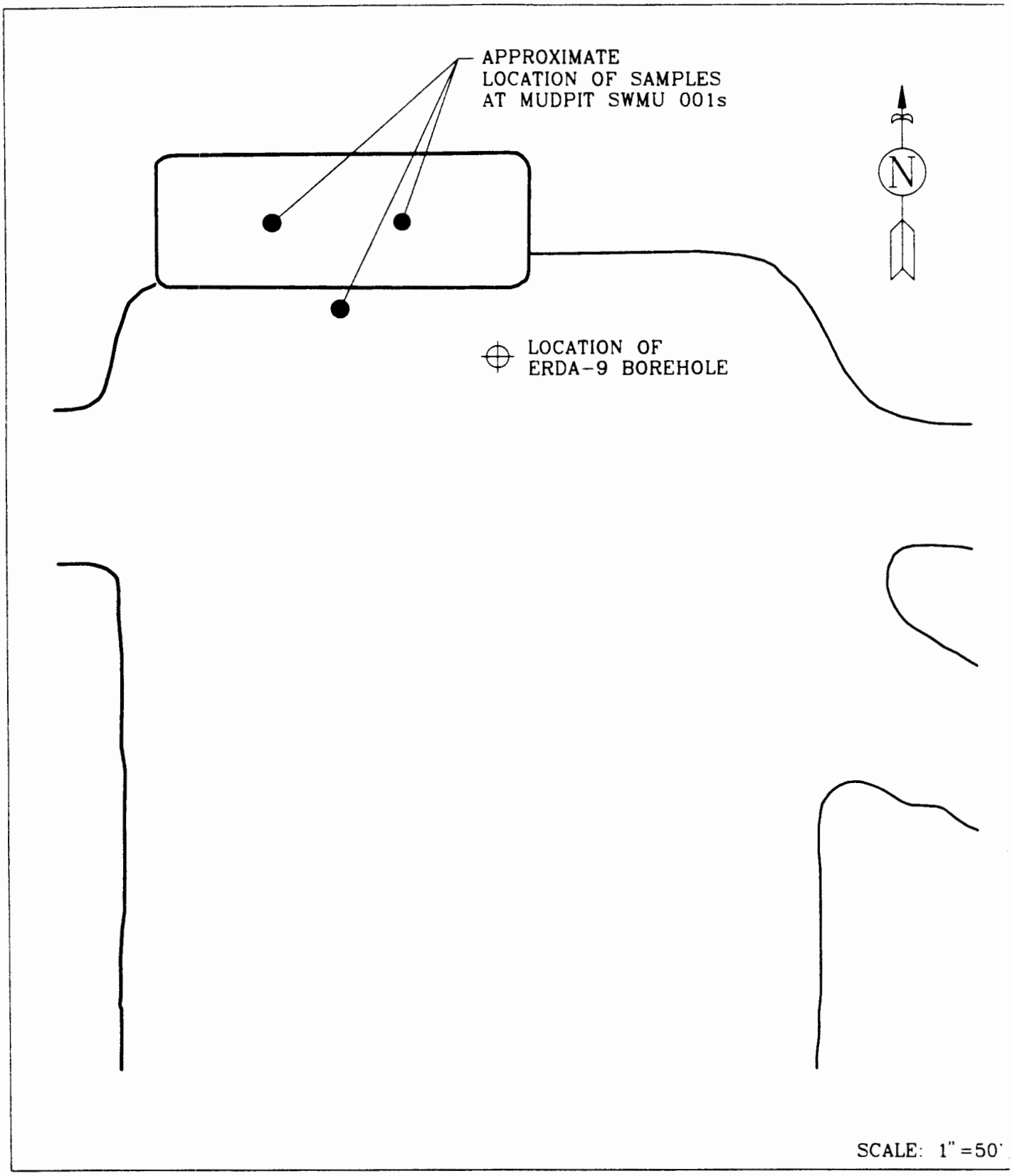
SWMU 001s is located in the SE 1/4 of the SE 1/4 of the SE 1/4 of Section 20, Township 22 South, Range 31 East. ERDA-9 was the first WIPP exploratory borehole. It was drilled and logged in 1976 for information on the Permian Evaporites. The hole was redrilled in 1986 as a Culebra observation well. WIPP Hydrologic Data Report #5 states that salt-based drilling fluids were used for the first 1033 feet. The well was then deepened to 2,877 feet using an oil-emulsion drilling mud, which included diesel fuel. *Sandia Report SAND79-0270*, indicates that a proposed earthen emergency pit was constructed to support the closed mud circulation system. A discolored rectangular zone was observed just to the north-northwest of the well head indicating that the emergency pit was used. The feature measured approximately 50 feet by 145 feet.

In 1986, ERDA-9 was flushed with approximately 13,200 gallons of fresh water, followed by 6,340 gallons of a .27 mg/liter solution of MilChem-MD detergent-type degreaser (*Caufmann, et al. 1990*). A 1986 INTERA/Sandia National Laboratories memoranda documents that all detergent laden rinse solutions were collected in surface frac tanks and transported to an off-site disposal facility.

The ERDA-9 well site is just outside the WIPP primary security fence. Site inspections showed no evidence of the 1976 mudpit at the drill pad. The rectangular discolored zone identified in 1982 air photos is now partially covered by a railroad embankment. Release assessment samples will be taken between the railroad embankment and the south fence. A detailed sample location map for SWMU 001s is provided as Figure 10., in Section 8.8.1.

881

FIGURE 10
SAMPLE LOCATION MAP SWMU 001s (ERDA-9)



8.8.2 Number of Samples and Sampling Intervals

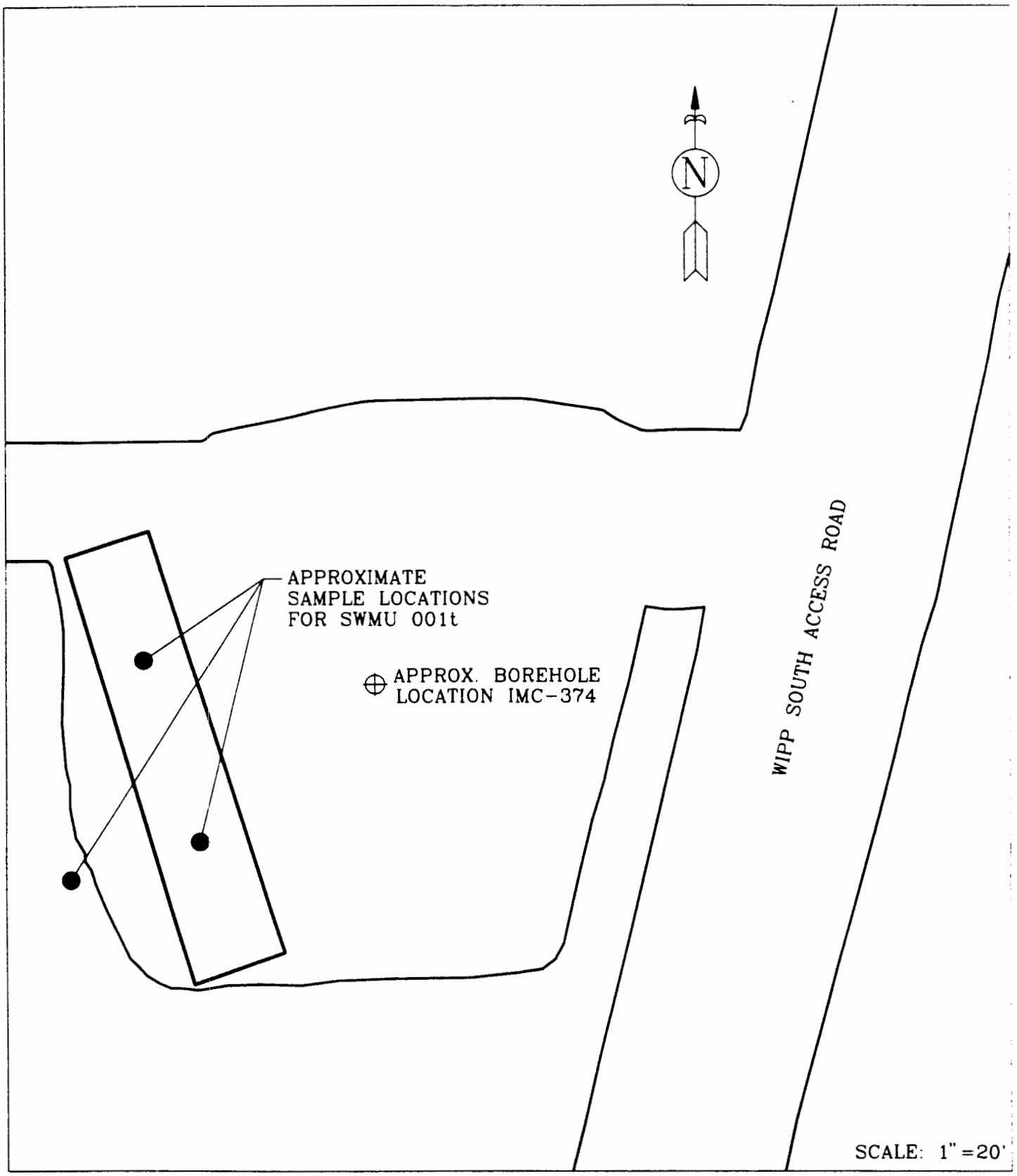
SUMMARY OF SAMPLES COLLECTED FOR SWMU 001s (Drill Pad ERDA 9)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	4	4
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0
NUMBER OF FIELD BLANKS:		
	1	0
Inorganic Analysis	1	0

8.9 SWMU 001t (IMC 374 Drill Pad)

SWMU 001t is located in the SE 1/4 of the SE 1/4 of the SW 1/4 of Section 30, Township 22 South, Range 31 East. No substantive historical records have been located for SWMU 001t (IMC-374). The IMC-374 potash drill pad has been extensively graded and regraded since mudpit closure. Visual inspections indicated that the mudpit area appears to be 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 liners were evident at the site. An area of slightly stained soil, as well as a used oil filter, were located on the north side of the pad. The used oil filter has since been removed by WIPP personnel. A detailed sample location map for SWMU 001t is provided as Figure 11., in Section 8.9.1.

8.9.1

FIGURE 11
SAMPLE LOCATION MAP SWMU 001t (IMC-374)



8.9.2 Number of Samples and Sampling Intervals

SUMMARY OF SAMPLES COLLECTED FOR SWMU 001t (Drill Pad IMC 374)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	4	4
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0

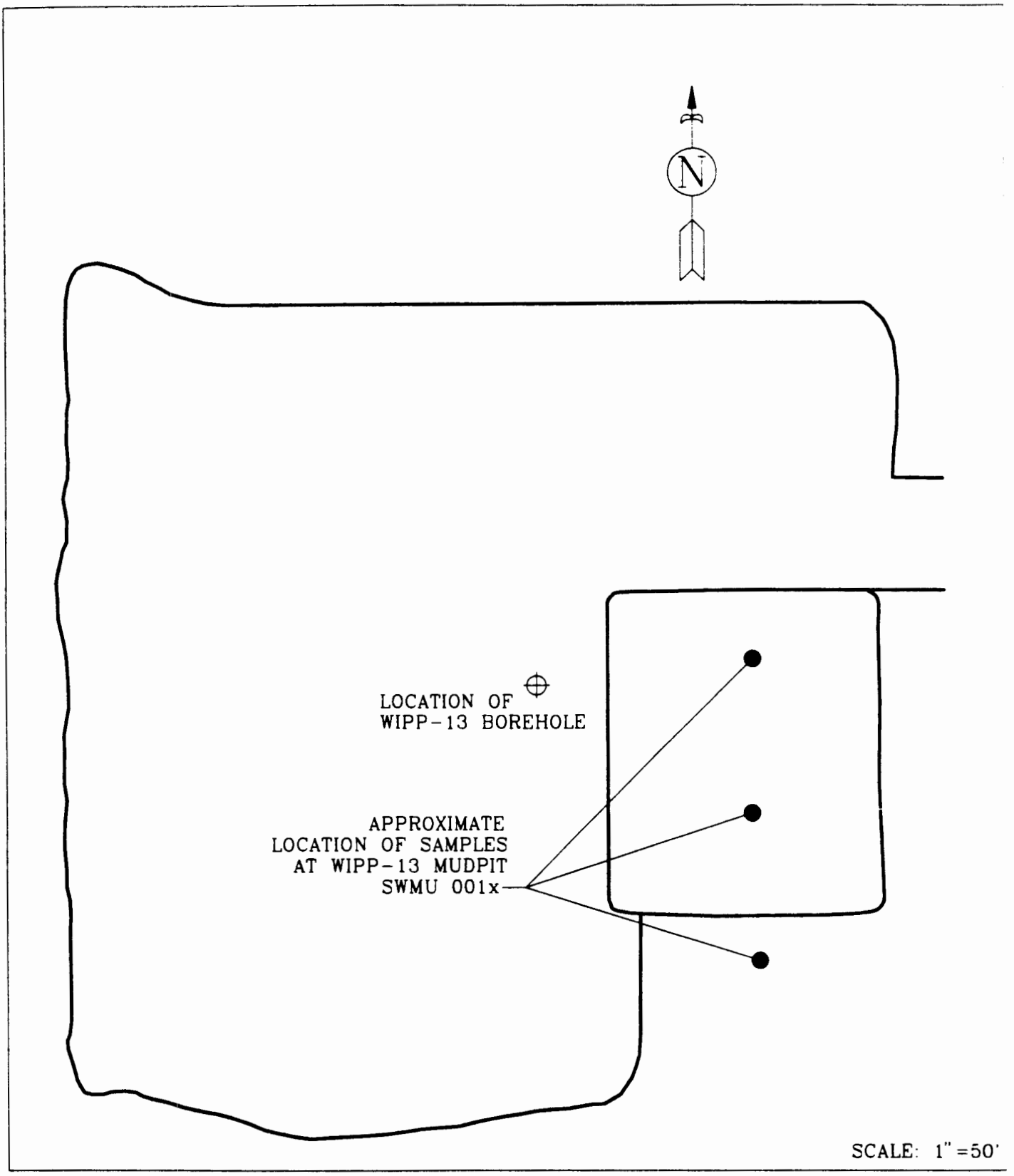
8.10 SWMU 001x (WIPP-13 Drill Pad)

The WIPP-13 drill pad (SWMU 001s) is located in the NW 1/4 of the NE 1/4 of the SW 1/4 of Section 17, Township 22 South, Range 31 East. WIPP-13 was drilled in late 1978 to the upper part of the Salado Formation and later deepened to 3,860 feet in 1979. The borehole was plugged in 1985 below the Culebra formation to create a monitoring well (*Caufmann et al., 1990; D'Appolonia, 1982a; WIPP Hydrologic Report #5*). 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; WIPP Hydrologic Report #5*). A 2,272 gallon solution containing 20 percent 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 that the mudpits were reopened during this time period. Air photo review does show evidence of discolored soil and stressed vegetation at the entrance to the pad from the access road.

There is a large reclaimed rectangular mudpit complex south of the entrance to the WIPP-13 drill pad and just east of the WIPP-13 well head. The mudpit complex measures approximately 100 feet by 120 feet, and the surface of the mudpit area is approximately 1.5 feet below the grade of the WIPP-13 drill pad. No vegetation is growing on the mudpits, and the soil is visibly stained dark grey. Black plastic liner material protrudes through the surface and was used to delineate the lateral extent of the mudpit. A livestock tank is located on the WIPP-13 drill pad. A detailed sample location map for SWMU 001x is provided as Figure 12., in Section 8.10.1.

FIGURE 12

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



8.10.2 Number of Samples and Sampling Intervals

SUMMARY OF SAMPLES COLLECTED FOR SWMU 001x (Drill Pad WIPP-13)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	4	4
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0

8.11 SWMU 003a Portacamp Storage Area, (formerly 004a)

The Portacamp Storage Area is an active materials storage area 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 divided into two separately managed areas divided by an eight-foot, chain link fence. The west side of the Portacamp area is managed by Westinghouse, and the east side is managed by Sandia National Laboratories. Access to each area is limited to Westinghouse and Sandia materials control personnel, and the area is regularly patrolled by WIPP security.

The west side of the Westinghouse Portacamp area contains a 100 by 20 by 14 foot 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 the metal shelter.

The southern half of the Westinghouse 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 nonregulated 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 three feet in diameter.

The Sandia National Laboratory 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 Sandia's activities. Concrete and grout materials are stored on pallets on the south end of the SNL Portacamp.

Next 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 have been 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.

8.11.1 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 was achieved with the issuance of the *WIPP Non-Radioactive Hazardous Waste Management*, DOE/WIPP WP02-601. In 1991 all RCRA compliance procedures and plans were later 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 are managed at the Hazardous Waste Staging Area located in Building 474-B.

8.11.2 Rationale for Selection of Target Analytes for 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 have been selected for samples that will be collected at the Portacamp storage areas. The list of target analytes for both the Westinghouse and Sandia Portacamp Areas is provided in Table 3.

8.11.3 DOE/Westinghouse Portacamp Area Sampling Locations

Sampling at the Westinghouse Portacamp will focus on both current and historical drum storage areas. Samples will be collected at the historical recycled oil and waste water drum storage area and the current empty drum storage area. Samples will be collected from the top 18 inches of caliche surface. Samples will be collected from 0 to 6 inches and 12 to 18 inches below grade. Additional samples will be collected, if stained soils are visible at the 18-inch sampling depth. If during sampling visits, additional sampling locations are identified, the plan will be

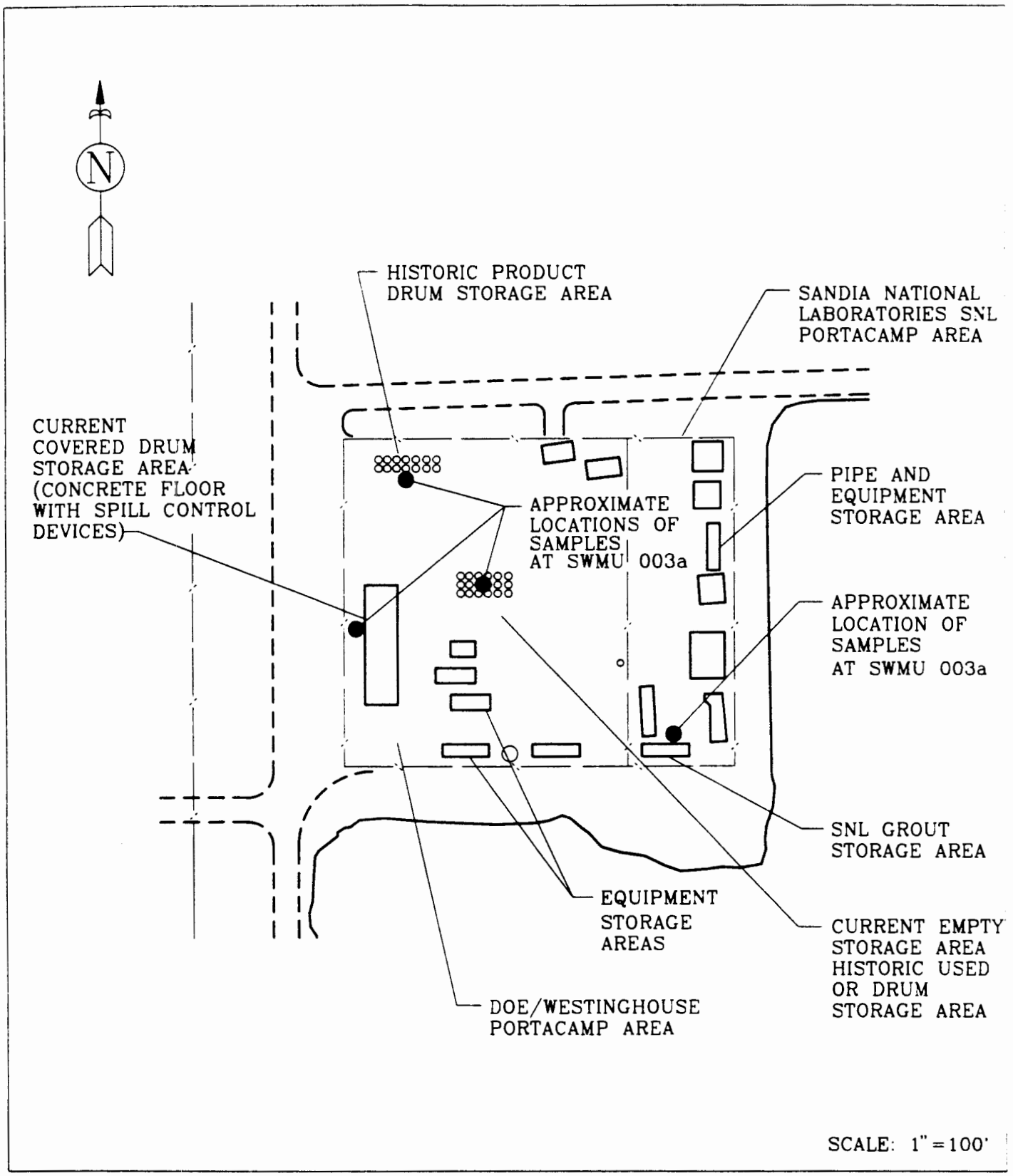
revised to reflect any new sampling locations.

8.11.4 Sandia Portacamp Area Sampling Locations

Sampling in the Sandia Portacamp area will focus on the area where drilling additives are stored. This area is used to store drill muds and gels, cement, and drill grouts. Grab samples will be collected from the top 12 inches of caliche surface. Samples will be collected at 0 to 6-inch, and 12 to 18-inch intervals. Additional samples will be collected, if stained soils are visible at the 18-inch sampling depth. If during sampling visits, additional sampling locations are identified, the plan will be revised to reflect any new sampling location. A detailed Portacamp sample location map is provided as Figure 13., and is contained in Section 8.11.5.

8.11.5

FIGURE 13
SAMPLE LOCATION MAP SWMU 003a
(PORTACAMP STORAGE AREA)



8.11.6 Number of Samples and Sampling Intervals

SUMMARY OF SAMPLES COLLECTED FOR SWMU 003a (Westinghouse and Sandia National Laboratories Portacamp Storage Areas)		
	0 - 6"	12 - 18"
NUMBER OF SAMPLES:		
Inorganic Analysis	5	5
Organic Analysis	5	5
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	1
Organic Analysis	1	1
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	1
Organic Analysis	1	1

TABLE 3

TARGET ANALYTES AND PROPOSED EPA ANALYTICAL METHODS FOR CHARACTERIZING THE PORTACAMP STORAGE AREAS

Parameter	EPA Analytical Method (or equivalent)
Arsenic***	6010
Barium***	6010
Cadmium***	6010
Chromium***	6010
Lead***	6010
Mercury***	7470/7471
Nickel***	6010
Selenium***	6010
Silver***	6010
Thallium***	6010
Acetone*	8240/8260
Benzene*	8240/8260
Bromoform*	8240/8260
n-Butyl alcohol*	8260
Carbon tetrachloride*	8240/8260
Chlorobenzene*	8240/8260
Chloroform*	8240/8260
Cresols	8040/8270
Cyclohexane*	8240/8260
Cyclohexanone	8240/8260
o-Dichlorobenzene*	8260/8270
p-Dichlorobenzene*	8260/8270
1,1-Dichloroethane*	8240/8260
1,2-Dichloroethane*	8240/8260

Parameter	EPA Analytical Method (or equivalent)
1,1-Dichloroethene*	8240/8260
cis-1,2-Dichloroethene*	8240/8260
2,4-Dinitrotoluene**	8250/8270
2-Ethoxyethanol*	8240/8260/8015 (mod.)
Ethyl acetate*	8240/8260
Ethylbenzene*	8240/8260
Hexachloroethane**	8250/8270
Isobutanol*	8240/8260/8015 (mod.)
Methanol*	8240/8260/8015 (Mod.)
Methylene Chloride*	8240/8260
Methyl Ethyl Ketone*	8240/8260
4-Methyl-2-pentanone*	8240/8260
Nitrobenzene**	8250/8270
Polychlorinated biphenyls(-PCB)	8080/8081
Pyridine**	8250/8270
1,1,2,2-Tetrachloroethane*	8240/8260
Tetrachloroethylene*	8240/8260
Toluene*	8240/8260
1,1,1-Trichloroethane*	8240/8260
1,1,2-Trichloroethane*	8240/8260
Trichloroethylene*	8240/8260
Trichlorofluoromethane*	8240/8260
1,1,2-Trichloro-1,2,2-trifluoroethane*	8240/8260
Vinyl chloride*	8240/8260
Xylenes*	8240/8260

* - Volatile, ** - Semivolatile, *** - Metal

9.0 SUMMARY OF CORRECTIVE ACTIONS FOR SELECTED SWMUS AT THE WIPP

Voluntary corrective actions will be implemented at SWMUs where sufficient data exists to demonstrate that further release assessment sampling will have little value in the development or implementation of corrective actions. At the Badger Unit, Cotton Baby and DOE-1, the cost of completing a closure that will effectively mitigate potential impacts to human health and the environment are less than the cost of conducting further release assessment sampling.

Section VI(A)(3) of the proposed Subpart S rule provides guidance for completing voluntary corrective actions. Section VI(A)(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 ground water in an exempt waste water treatment unit."

9.1 SWMU 001o (Badger Unit Drill Pad)

SWMU 001o is located in the NW 1/4 of the NE 1/4 of SW 1/4 of Section 15, Township 22 South, Range 31 East. U.S. Geological Survey well records indicate that the Badger Unit Federal #1 was drilled in 1973 by Superior Oil Company as a wildcat petroleum exploration well. The total well depth was 15,225 feet, and the well was abandoned in 1974.

No documentation describing the closure of this mudpit has been located. The recontoured mudpit area is a large, stained, unvegetated area, ringed with stressed vegetation. Many fragments of intact black polyethylene plastic liner (20 mil) were observed protruding through the surface and occur as much as 20 feet outside the stained soil areas. The number of individual mudpits cannot be discerned. It is possible that a series of multiple mudpits existed at the time drilling was completed. Due to the level of regrading over the historical mudpit area, the RCRA Part B Permit Application considers this area as a single mudpit. The entire complex measures approximately 280 feet by 400 feet.

Numerous shallow test pits dug during the RFA site evaluation of Badger Unit mudpit area indicate that stained soils are a heterogeneous mixture of red brown, dark brown, and dark grey silty sand. Abundant angular fragments of tar-like hydrocarbons and light blue-grey grout and lenses of mottled black and dark- grey sandy clay occur to depths 2.0 feet below grade.

9.1.1 Media Sampled

Soil was the only media sampled at SWMU 001o during both the January 1, 1992, and October 5, 1992, sampling events. As described in Section 4.1 of the RFA, soil is the primary media with any real potential to be impacted by a release from individual SWMUs. Due to the dry environment, regional geology, and depth to small localized perched water-bearing zones, the potential impact to groundwater is very low. However, if the groundwater in the area of a SWMU has been impacted, soil analyses from different strata will indicate any potential for release to this media.

Sampling results contained in the RFA and collected during the January 1992 and October 1992 sampling visits are provided in Section 9.1.2. Samples collected on January 9, 1992, were collected as a initial characterization grab sample. A sampling, analysis, and quality assurance plan were developed by the New Mexico Environment Department (NMED) WIPP Office before joint NMED and Westinghouse sampling conducted on October 5, 1992. The sampling plan identified analytical objectives and sample collection, field extraction, and sample handling procedures. Several boreholes were augered to collect soil for collocated, inorganic and organic, split, and duplicate samples. The collocated boreholes were augered approximately 8.0 feet below the surface of the mudpit. To collect the VOC and aliphatic samples, "syringes" were pressed into soil cores within the auger sample head. The samples were then placed directly into 40 ml VOC vials filled with methyl alcohol and carbon disulfide to extract aromatic compounds and aliphatic hydrocarbons. Collocated WIPP samples were not field extracted.

A sample lithology log developed during the RFA sampling visits at the Badger Unit is provided in Table 4., Section 9.1.3. A historical NMED and Westinghouse sample location map is provided as Figure 16. and is located in Section 9.1.4. A quantitative comparison of RFA analytical results generated during RFA sampling visits by both the NMED and Westinghouse are provided Table 5. and are located in Section 9.1.5. Sample results have been summarized in this table as both total constituent concentrations and TCLP equivalent concentrations. No additional sampling is proposed to implement corrective actions at the Badger Unit mudpit site.

9.1.2 Quality Control Samples

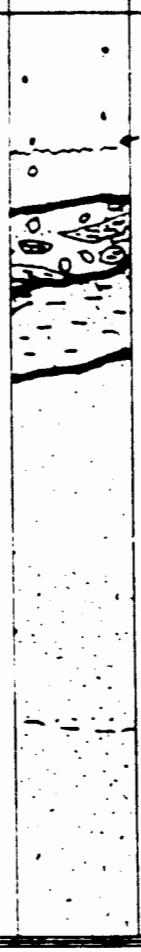
Information regarding RFA quality control samples, including duplicate samples, trip blanks, and equipment blanks collected at the Badger Unit are provided in Section 4.0 of the RFA.

9.1.3 Sampling Lithological Logs for Badger Unit-SWMU 0010 Table 4

New Mexico Environment Department
DOE/WIPP Oversight
TEST PIT/AUGERED BORING
LOG AND DATA SHEET

Project No. 550040	Location. Badger Unit	Boring No. 1	Sheet 1 of 1

Feature. Hudpit Petroleum Exp. — Method. Hand Auger
Date (Time) Logged. 10/5/92 — Logged By. PBS
Area Designation. — Monitoring. Tes/ Dreger Tube (H2S)

Depth and Soil Class	Graphic Log	Sample Taken	Description of Materials Visual Observations	OVA
0 SP-SM Poorly sorted silty sand		Plastic Liner	Sand: Light brown, silty fine to medium, loose, dry, porous, with occasional angular rock fragments (1-2mm) and no odor. Artificial dune sand fill/windblown sand cover over 7 mil black plastic (polyethylene) liner (0-1.0ft)	
1' SP-SM/CL Poorly sorted silty sand and minor sandy lean clay (CL)		VOC and Aliphatic Hydrocarbon Samples. Heavy Metals (ICAP and As) Samples.	Sand: Red brown, silty fine to medium, loose, moist, porous, slight hydrocarbon odor, with increasing angular rock fragments (1-3cm) and occasional inclusions and stratifications of grey sand and black sandy clay (1-2cm). Disrupted and partially mixed artificial fill with hydrocarbon/drilling mud (1.0-1.5ft).	
2' CH Fat sandy clay			Sandy Fat Clay: Dark brown, fine to medium sand, soft and plastic, moist to wet, abundant black and grey mottling and stratification, hydrocarbon smell increases. Drilling mud and hydrocarbon spills (1.5-2.0ft).	
SP Poorly sorted sand			Sand: Light brown to tan, fine to medium, moist, loose, porous, homogeneous with no rock fragments, and hydrocarbon smell decreases. Natural undisturbed to slightly disturbed dune sand (to BGS)	
3'			Light tan, medium dense	
SP-SM Poorly Sorted Silty Sand			Slightly silty sand: pale tan, fine to medium, medium dense, moist, homogeneous.	
4'				
5'				

Remarks: Heavy lines refer to significant transitions.
No significant organic vapors were measured at the surface of the borehole.

9.1.3 (cont.)

Augered Boring Badger Unit (ID) Continued 5-10 ft			Sheet_2_of_1_	
Depth and Soil Class	**Graphic Log**	**Sample Taken**	**Description of Materials Visual Observations**	**O V A**
5'				
		Aliphatic Sample		
6' SP-SM			Sand: Light tan, fine to medium, medium dense to dense, moist, medium porosity, homogeneous except for occasional organics (roots). Continuation of natural sandstone/beginning of well consolidated older dune sand.	
		VOC Sample		
7' SP-SM		Heavy Metal ICAP/As	Sand: Light red tan to tan, fine to medium, medium dense to dense, moist to very moist, and mottled with 1 cm diameter circular iron oxide stains.	
8'	30M			
9'				
10'				

FIGURE 14

HISTORIC SAMPLE LOCATION MAP SWMU 001o (BADGER UNIT)

9.1.4

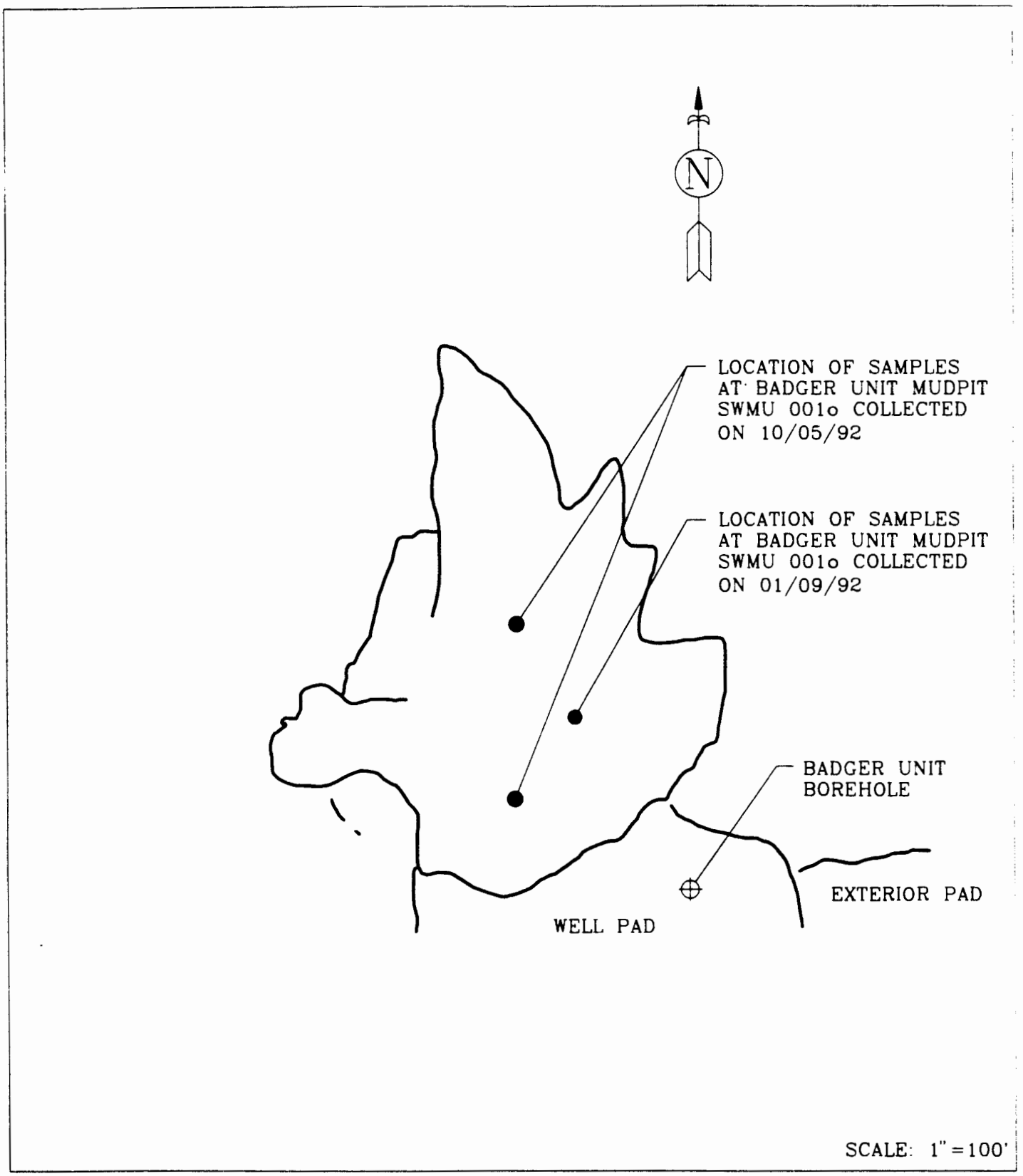


Table 5

Badger Unit: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.4 ft depth)	TCLP equiv. (ug/kg)
Acetone	1250 (U)	NA	----	NA
Benzene	250 (U)	12.5 (U)	<2	<0.1
Bromobenzene	250 (U)	NA	----	NA
Bromochloromethane	250 (U)	NA	----	NA
Bromodichloromethane	250 (U)	NA	<1	NA
Bromoform	250 (U)	NA	<1	NA
2-Butanone (MEK)	1250 (U)	62.5 (U)	----	----
n-Butylbenzene	250 (U)	NA	----	NA
sec-Butylbenzene	250 (U)	NA	----	NA
tert-Butylbenzene	250 (U)	NA	----	NA
tert-Butyl methyl ether	1250 (U)	NA	----	NA
Carbon tetrachloride	250 (U)	12.5 (U)	<1	<.05
Chlorobenzene	250 (U)	12.5 (U)	<2	<0.1
Chloroform	250 (U)	12.5 (U)	<1	<0.1
2-Chlorotoluene	250 (U)	NA	----	NA
4-Chlorotoluene	250 (U)	NA	----	NA

Table 5

Badger Unit: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.4 ft depth)	TCLP equiv. (ug/kg)
1,2-Dibromo-3-chloropropane	250 (U)	NA	----	NA
Dibromochloromethane	250 (U)	NA	<1	NA
1,2-Dibromoethane	250 (U)	NA	----	NA
Dibromoethane	250 (U)	NA	----	NA
1,2-Dichlorobenzene	250 (U)	NA	<2	NA
1,3-Dichlorobenzene	250 (U)	NA	<2	NA
1,4-Dichlorobenzene	250 (U)	12.5 (U)	<2	<0.1
Dichlorodifluoromethane	250 (U)	NA	<1	NA
1,1-dichloroethane	250 (U)	NA	<1	NA
1,2-Dichloroethane	250 (U)	12.5 (U)	30	1.5
1,1-Dichloroethene	250 (U)	12.5 (U)	<1	<.05
cis-1,2-Dichloroethane	250 (U)	NA	----	NA
trans-1,2-Dichloroethene	250 (U)	NA	<1	NA
1,2-Dichloropropane	250 (U)	NA	<1	NA
1,3-Dichloropropane	250 (U)	NA	----	NA

Table 5

Badger Unit: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.4 ft depth)	TCLP equiv. (ug/kg)
2,2-Dichloropropane	250 (U)	NA	----	NA
1,1-Dichloropropene	250 (U)	NA	----	NA
cis-1,3-Dichloropropene	250 (U)	NA	<1	NA
trans-1,3-Dichloropropene	250 (U)	NA	<1	NA
Ethylbenzene	250 (U)	NA	<2	NA
Hexachlorobutadiene	250 (U)	12.5 (U)	----	----
Isopropylbenzene	250 (U)	NA	----	NA
4-Isopropyltoluene	250 (U)	NA	----	NA
Methylene chloride	510 (U)	NA	2	NA
1-Methylnaphthalene	250 (U)	NA	----	NA
2-Methylnaphthalene	250 (U)	NA	----	NA
Naphthalene	250 (U)	NA	----	NA
n-Propylbenzene	250 (U)	NA	----	NA
Styrene	250 (U)	NA	----	NA
1,1,1,2-Tetrachloroethane	250 (U)	NA	----	NA

Table 5

Badger Unit: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.4 ft depth)	TCLP equiv. (ug/kg)
1,1,2,2-Tetrachloroethane	250 (U)	NA	<1	NA
Tetrachloroethene	250 (U)	12.5 (U)	<1	<.05
Tetrahydrofuran (THF)	1250 (U)	NA	----	NA
Toluene	250 (U)	NA	<2	NA
1,2,3-Trichlorobenzene	250 (U)	NA	----	NA
1,2,4-Trichlorobenzene	250 (U)	NA	----	NA
1,1,1-Trichloroethane	250 (U)	NA	1	NA
1,1,2-Trichloroethane	250 (U)	NA	<1	NA
Trichloroethene	250 (U)	12.5 (U)	<1	<.05
Trichlorofluoromethane	250 (U)	NA	2	NA
1,2,3-Trichloropropane	250 (U)	NA	----	NA
1,2,4-Trimethylbenzene	250 (U)	NA	----	NA
1,3,5-Trimethylbenzene	250 (U)	NA	----	NA
Vinyl chloride	250 (U)	12.5 (U)	<1	<.05
o-Xylene	250 (U)	NA	<2	NA
p- & m-Xylene	250 (U)	NA	<2 & 2	NA

(U)- Indicates compound was analyzed for, but not detected above the New Mexico SLD Practical Quantitation Limit.

Table 5

Badger Unit: Comparison of Concentrations of Heavy Metals collected as part of the RCRA facility Assessment. (1.5-2.0 ft depth)

Heavy Metal	NMED Sample (mg/kg)	TCLP equiv. (mg/kg)	WID Sample (mg/kg) 10/5/92	TCLP equiv. (mg/kg)	*WID Sample (mg/kg) 1/9/92		*TCLP equiv. (mg/kg)		Control Sample (mg/kg)	TCLP equiv. (mg/kg)
Arsenic	2.30	.115	<10	<.5	<10	<10	<.5	<.5	<10	<.5
Barium	68.0	3.4	72	3.6	57	26	2.85	1.3	11	.55
Beryllium	<5.0	NA	<0.5	NA	---	---	NA	NA	<.5	NA
Cadmium	<5.0	<.25	<0.5	<.025	<.5	<.5	.025	.025	<.5	<.025
Chromium	12.0	.60	15	.75	12	1	0.6	.05	3	.15
Cobalt	3.0	NA	3	NA	---	---	NA	NA	<1	NA
Copper	9.0	NA	8	NA	---	---	NA	NA	1	NA
Iron	6900.0	NA	6700	NA	---	---	NA	NA	2000	NA
Lead	42.0	2.1	51	2.55	49	<5	2.45	.25	<5	<.25
Nickel	10.0	NA	10	NA	---	---	NA	NA	<2	NA
Vanadium	12.0	NA	14	NA	---	---	NA	NA	4	NA
Zinc	51.0	NA	51	NA	---	---	NA	NA	6	NA
Aluminum	5100.0	NA	5500	NA	---	---	NA	NA	1700	NA
Boron	24.0	NA	29	NA	---	---	NA	NA	<5	NA
Calcium	43200.0	NA	42000	NA	---	---	NA	NA	220	NA
Magnesium	9300.0	NA	11000	NA	---	---	NA	NA	280	NA
Manganese	100.0	NA	130	NA	---	---	NA	NA	19	NA
Silicon	480.0	NA	420	NA	---	---	NA	NA	290	NA

Table 5

Badger Unit: Comparison of Concentrations of Heavy Metals collected as part of the RCRA facility Assessment. (1.5-2.0 ft depth)

Heavy Metal	NMED Sample (mg/kg)	TCLP equiv. (mg/kg)	WID Sample (mg/kg) 10/5/92	TCLP equiv. (mg/kg)	*WID Sample (mg/kg) 1/9/92		*TCLP equiv. (mg/kg)		Control Sample (mg/kg)	TCLP equiv. (mg/kg)
Strontium	200.0	NA	230	NA	---	---	NA	NA	2	NA
Silver	---	---	---	---	<1	<1	<.05	<.05	---	---
Selenium	---	---	---	---	<10	<10	<0.5	<0.5	---	---
Mercury	---	---	---	---	<.1	<.1	<.005	<.005	---	---

*- Results of Westinghouse sampling representing two sample locations collected at 1.5-2 ft depth.

Table 5

Badger Unit: Comparison of Concentrations cont. (7.0-7.5 ft depth)

Heavy Metal	NMED Sample (mg/kg)	TCLP equiv. (mg/kg)	Westinghouse Sample (mg/kg)	TCLP equiv. (mg/kg)	Control Sample (mg/kg)	TCLP equiv. (mg/kg)
Arsenic	----	----	<10	<0.5	<10	<.5
Barium	----	----	22	1.1	11	.55
Beryllium	----	NA	<0.5	NA	<.5	NA
Cadmium	----	----	<0.5	<.025	<.5	<.025
Chromium	----	----	8	0.4	3	.15
Cobalt	----	NA	2	NA	<1	NA
Copper	----	NA	2	NA	1	NA
Iron	----	NA	6500	NA	2000	NA
Lead	----	----	<5	<.25	<5	<.25
Nickel	----	NA	4	NA	<2	NA
Vanadium	----	NA	17	NA	4	NA
Zinc	----	NA	14	NA	6	NA
Aluminum	----	NA	7600	NA	1700	NA
Boron	----	NA	18	NA	<5	NA
Calcium	----	NA	2100	NA	220	NA
Magnesium	----	NA	2400	NA	280	NA
Manganese	----	NA	25	NA	19	NA
Silicon	----	NA	390	NA	290	NA
Strontium	----	NA	22	NA	2	NA

Table 5

Badger Unit Comparisons: Concentrations of Aromatic and Halogenated Purgeables and Aliphatic Hydrocarbons collected as part of the RCRA Facility Assessment.

Analyte	NMED sample (1.0-1.5 ft depth) ug/kg	Westinghouse sample (1.0-1.5 ft depth) ug/kg	NMED sample (5.5-6.0 ft depth) ug/kg	Westinghouse sample (5.5-6.0 ft depth) ug/kg
Aliphatic Hydrocarbons	Gasoline - ND Diesel - ND Lub. oil - ND Unknown C15-C30 pattern- <20	Diesel - 190 Sample 1 (1/9/92)- <20 Sample 2 (1/9/92)- <20	Not Analyzed	Diesel - 14 TPH- <20

ND - Not Detected

Note:
- NMED aliphatic hydrocarbon analyses includes all hydrocarbons in the C5-C30 molecular weight range.
- Gas chromatography and flame ionization detector screening technique results from NMED analyses are provisional.
- Methylene chloride, chloroform, tetrahydrofuran and o-xylene detected in equipment rinsate blank.

9.1.6 Closure of the Badger Unit SWMU 001o

The determination to complete voluntary closure of the Badger Unit mudpit by capping contaminated soils in-place is based on decision factors contained in proposed 40 CFR Part 264.525(b). Decision factors applicable to the use of a compacted caliche cap to contain contaminated soils include: long-term reliability and effectiveness; reduction of toxicity, mobility or volume of wastes; implementability; and cost. Other factors that support a decision to cap in-place include: the constituent levels of wastes contained in the mudpit areas; projected long-term land use at the WIPP; and a concern that the removal and placement of these wastes in a commercial landfill may represent a greater potential for a release and/or adverse impacts to human health and the environment than if the wastes are capped in-place.

Characterization sampling activities conducted on January 9, 1992 and October 10, 1992 indicate that all constituents levels at the Badger Unit site are below RCRA regulated levels. Analyses showed that all organic constituents were below New Mexico State Laboratory Division practical quantification limits (PQLs).

9.1.7 Rationale for Badger Unit Closure Methodology

The proposed voluntary corrective action closure will involve the placement of three wetted, and compacted 6-inch lifts of crushed 3/4 inch minus caliche fill. Using soil discoloration as an indicator of the extent of mudpit contamination, the caliche cap will extend 20 feet beyond the lateral extent of any discolored soils. A total of 18 inches of compacted caliche will be placed over discolored soils. The 18-inch caliche cap will be machine compacted in 6-inch lifts, providing a cost effective barrier that can be implemented immediately and will contain any vertical or lateral migration of regulated constituents. Hydraulic Conductivity Tests have been conducted on the caliche materials to be used for site closures. Permeability rates for an 18-inch caliche cap will average $2.9 \times 10_{.5}$ cm/s, or $2.9 \times 10_{.7}$ m/s. These hydraulic conductivity rates are comparable to permeability found in the Mescalero Caliche Formation (ie. 7.8×10^{-6} m/s to 1.0×10^{-8} m/s.). A copy of Hydraulic Conductivity Test results are provided as Appendix 8.

Although the potential toxicity of the constituents has not been reduced, constituents contained in the mudpits will be effectively immobilized. Capping-in-place will not increase the volume of waste generated, as would occur during excavation and removal. Six to twelve inches of top soil will then be placed on top of the compacted caliche and reclaimed using BLM approved grass seed mix.

When President Bush signed the WIPP Land Withdrawal Act, the 16 sections that make up the WIPP site were withdrawn in perpetuity.

Thus, land use on the WIPP 16-sections will be limited to underground TRU waste disposal and historic land uses such as grazing and hunting. Because all wastes contained in the Badger Unit mudpit are below RCRA hazardous waste levels, the DOE evaluated the option of disposing of these contaminated soils at an off-site municipal landfill. Although this alternative is allowable under the regulations, it is not the preferred alternative. The removal and placement of these wastes in a commercial landfill may represent a greater potential for exposure to workers than removing and placing the wastes in a landfill. The placement of these wastes at an off-site disposal facility also represents greater potential liability for the DOE.

9.2 SWMU 001p (Cotton Baby Drill Pad)

SWMU 001p is located in the SW 1/4 of the NE 1/4 of SW 1/4 of Section 34, Township 22 South, Range 31 East. The Cotton Baby well was drilled in 1973 by Michael Grace Company as a wildcat petroleum exploration well. The total depth of the well was 4,475 feet. The well was abandoned in 1974, and BLM records indicate that the restoration of the mudpits was never completed. The plan submitted to the BLM indicates that a trash pit was planned adjacent to the two mudpits.

There are two stained mudpits on the Cotton Baby drill pad. The remnants of plastic liner material, and stressed and wilted vegetation can be seen at both mudpits. The smaller rectangular mudpit on the east side of the drill pad measures approximately 15 feet by 55 feet. A second irregular-shaped mudpit is located to the west of the smaller mudpit and measures approximately 65 feet by 85 feet. A fibrous 20 mil black plastic liner may mark the bottom of the mudpit to 2.3 feet below grade; however, 2.3 feet is not representative of the depth of typical oil field mudpits. A faint hydrocarbon odor was detected at 5.0 feet below grade in dense eolian sands.

Petroleum residue is exposed at the edges of the larger pit, and a faint hydrocarbon scent was noticed at both mudpits during the RFA sampling visit. A small amount of debris such as bottles, deadman rigging, and oil filters were found during the sampling visit. This debris has been removed by WIPP personnel.

9.2.1 Media Sampled

Soil was the only media sampled at SWMU 001p during the October 5, 1992, sampling event. As described in Section 4.1 of the RFA, soil is the primary media with any real the potential to contribute to a release from individual SWMUs. Due to the dry environment, regional geology, and depth of small localized water bearing zones, the potential impact groundwater is very low. However, if the groundwater in the area of a SWMU could be

impacted, soil analyses from different strata will indicate any potential for release to this media.

The Cotton Baby mudpit was sampled on October 5, 1992, using the same sampling and analysis plan and procedures described in Section 4.1.17 of the RFA. Several boreholes were collocated to retrieve the required volume of soil for the environmental, split, and duplicate samples. The collocated boreholes were augered to approximately 5.7 feet below the surface. To collect the VOC and aliphatic samples, "syringes" were pressed into soil cores contained within the auger sample head. The samples were then placed directly into 40 ml VOC vials filled with extraction fluids: methyl alcohol was used for aromatic compounds and carbon disulfide for aliphatic hydrocarbons. Collocated WIPP samples were not field extracted.

A sample lithology log developed as part of the RFA sampling program at the Cotton Baby site is provided in Table 6, Section 9.2.3. A historical NMED and Westinghouse sample location map is provided as Figure 16. and is contained in Section 9.2.4. A quantitative comparison of RFA analytical results generated during RFA sampling visits by both the NMED and Westinghouse are provided in Table 7. and are located in Section 9.2.5. Sample results have been summarized in this table as both total constituent concentrations and TCLP equivalent concentrations. No additional sampling is proposed to implement corrective actions at the Cotton Baby mudpit site.

9.2.2 Quality Control Samples

Information regarding RFA quality control samples, including duplicate samples, trip blanks, and equipment blanks collected at the Cotton Baby site are provided in Section 4.0 of the RFA.

9.2.3 Sampling Lithological Logs for Cotton Baby Site-SWMU 001p (Table)

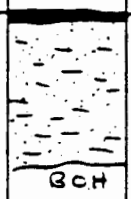
New Mexico Environment Department
DOE/WIPP Oversight
TEST PIT/AUGERED BORING
LOG AND DATA SHEET

Project No. 550040	Location. Cotton Baby	Boring No. 1	Sheet 1 of 1

Feature. Hudpit Petroleum Exp.
Date (Time) Logged. 10/5/92
Area Designation.
Method. Hand Auger
Logged By. PES
Monitoring. Dreger Tube/H2S

Depth and Soil Class	Graphic Log	Sample Taken	Description of Materials Visual Observations	OVA
0 SP-SM Poorly sorted silty sand		Plastic Liner	Sand: Red brown, silty fine to medium, loose, dry, porous, (moisture increases 8 - 3"), angular rock fragments (1cm max) and no odor. Artificial dune sand fill/windblown sand cover over 7 mil black plastic (polyethylene) liner (0-1.0ft)	
1' CH Fat sandy clay		VOC Sample	Sandy Fat Clay: Dark grey to black, fine to medium sand, soft and plastic, wet, laminated black stringers in grey matrix locally and grey and black mottling, hydrocarbon smell strong (see photo of auger bit #7). Drilling mud and hydrocarbon smells (1.0-2.2ft).	
		Aliphatic Hydrocarbon Sample		
2' SP Poorly sorted sand		Heavy Metals (ICAP and As) Sample.	Sand: Dark red brown, fine to medium, moist to wet, loose, porous, faint hydrocarbon smell. Natural undisturbed to slightly disturbed dune sand (to 5ft)	
		Plastic Liner (10 mil fibrous) Collected in Heavy Metal Sample		
3'				
4'		VOC Sample		
5'		Aliphatic Sample	Occasional organics (roots)	

9.2.3

Augered Boring Cotton Baby (ID) **Continued 5-10 ft**				**Sheet 2 of 1**
Depth and Soil Class	***Graphic Log***	***Sample Taken***	***Description of Materials Visual Observations***	**OVA**
5' SC Clayey Sand		Heavy Metal (ICAP/As)	Sand: Red brown, fine to medium, medium dense, moist, faint hydrocarbon smell.	
6'				Ø
7'				
				Ø

Remarks:

FIGURE 15

9.2.4 SAMPLE LOCATION MAP SWMU 001p (COTTON BABY)

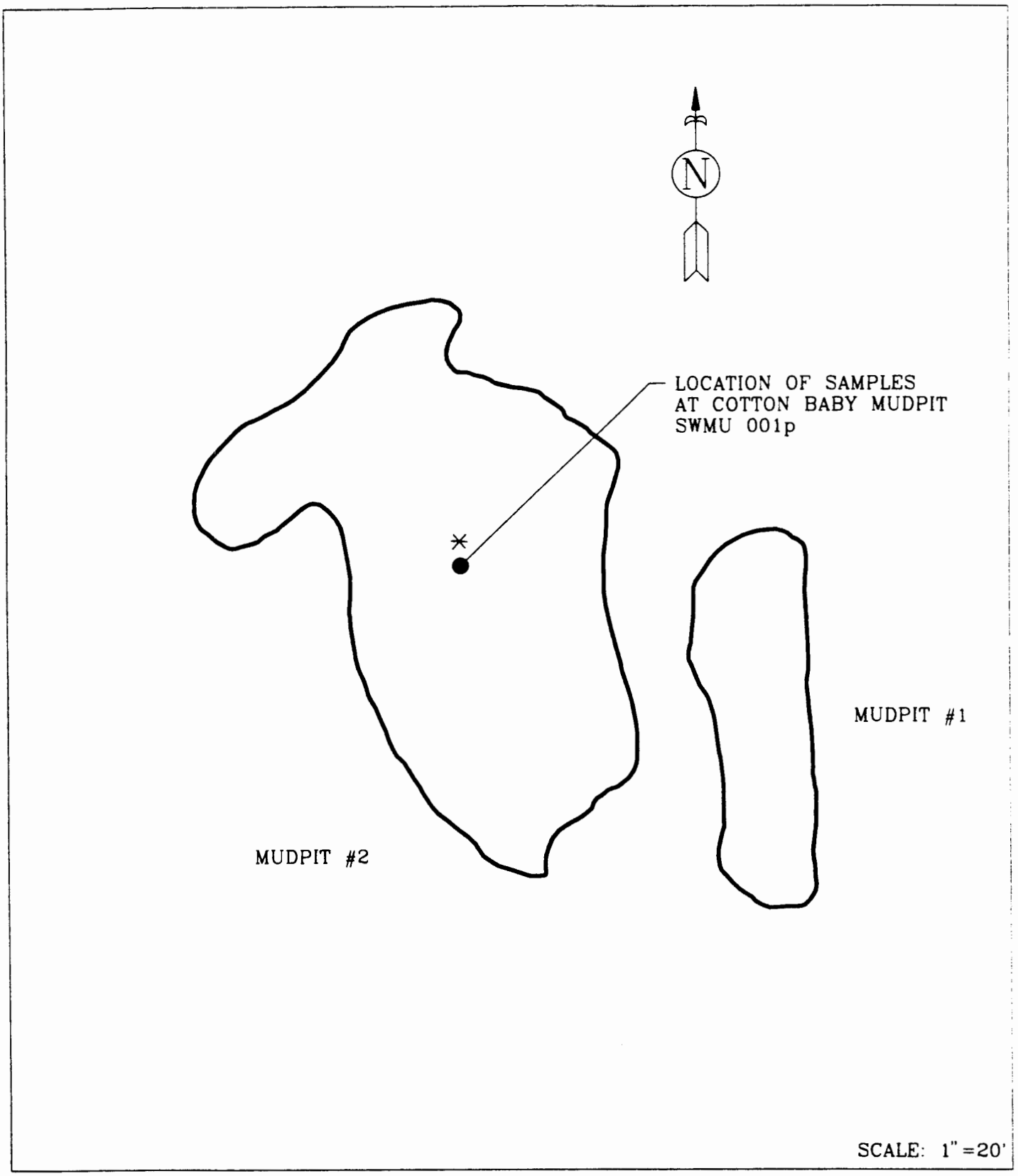


Table 7

Cotton Baby: Comparison of Concentrations of Heavy Metals collected as part of the RCRA Facility Assessment (1.9-2.2 ft depth)

Heavy Metal	NMED Sample (mg/kg)	TCLP equiv. (mg/kg)	Westinghouse Sample (mg/kg)	TCLP equiv. (mg/kg)	Control Sample (mg/kg)	TCLP equiv. (mg/kg)
Arsenic	2.1	.105	<10	<0.5	<10	<0.5
Barium	43	2.15	26	1.3	11	.55
Beryllium	<5	NA	<0.5	NA	<0.5	NA
Cadmium	<5	<.25	<0.5	<.025	<0.5	<.025
Chromium	18	0.9	7	.35	3	.15
Cobalt	<5	NA	1	NA	<1	NA
Copper	15	NA	5	NA	1	NA
Iron	7850	NA	3500	NA	2000	NA
Lead	20	1	10	0.5	<5	<.25
Nickel	13	NA	3	NA	<2	NA
Vanadium	19	NA	8	NA	4	NA
Zinc	31	NA	13	NA	6	NA
Aluminum	7000	NA	3200	NA	1700	NA
Boron	22	NA	11	NA	<5	NA
Calcium	23600	NA	8600	NA	220	NA
Magnesium	10000	NA	2900	NA	280	NA
Manganese	120	NA	51	NA	19	NA
Silicon	570	NA	340	NA	290	NA
Strontium	130	NA	55	NA	2	NA

Table 7

Cotton Baby: Comparison of Concentrations cont. (5.1-5.5 ft depth)

Heavy Metal	NMED Sample (mg/kg)	TCLP equiv. (mg/kg)	Westinghouse Sample (mg/kg)	TCLP equiv. (mg/kg)	Control Sample (mg/kg)	TCLP equiv. (mg/kg)
Arsenic	.77	.0385	<10	<0.5	<10	<0.5
Barium	21	1.05	18	0.9	11	.55
Beryllium	<5	NA	<0.5	NA	<0.5	NA
Cadmium	<5	<.25	<0.5	<.025	<0.5	<.025
Chromium	5	.25	6	0.3	3	.15
Cobalt	<5	NA	1	NA	<1	NA
Copper	<5	NA	2	NA	1	NA
Iron	4300	NA	3500	NA	2000	NA
Lead	<5	<.25	<5	<.25	<5	<.25
Nickel	4	NA	3	NA	<2	NA
Vanadium	8	NA	7	NA	4	NA
Zinc	8	NA	8	NA	6	NA
Aluminum	4300	NA	3400	NA	1700	NA
Boron	12	NA	8	NA	<5	NA
Calcium	650	NA	1800	NA	220	NA
Magnesium	870	NA	1000	NA	280	NA
Manganese	28	NA	30	NA	19	NA
Silicon	480	NA	410	NA	290	NA
Strontium	8	NA	14	NA	2	NA

Table 7

Cotton Baby: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (shallow depth)

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.7-2 ft depth)	TCLP equiv. (ug/kg)
Acetone	1300 (U)	NA	----	NA
Benzene	260 (U)	13 (U)	27	1.35
Bromobenzene	260 (U)	NA	----	NA
Bromochloromethane	260 (U)	NA	----	NA
Bromodichloromethane	260 (U)	NA	<1	NA
Bromoform	260 (U)	NA	<1	NA
2-Butanone (MEK)	1300 (U)	65 (U)	----	----
n-Butylbenzene	260 (U)	NA	----	NA
sec-Butylbenzene	260 (U)	NA	----	NA
tert-Butylbenzene	260 (U)	NA	----	NA
tert-Butyl methyl ether	1300 (U)	NA	----	NA
Carbon tetrachloride	260 (U)	13 (U)	<1	<.05
Chlorobenzene	260 (U)	13 (U)	<2	<0.1
Chloroform	260 (U)	13 (U)	1	.05
2-Chlorotoluene	260 (U)	NA	----	NA
4-Chlorotoluene	260 (U)	NA	----	NA
1,2-Dibromo-3-chloropropane	260 (U)	NA	----	NA

Table 7

Cotton Baby: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (shallow depth)

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.7-2 ft depth)	TCLP equiv. (ug/kg)
Dibromochloromethane	260 (U)	NA	<1	NA
1,2-Dibromoethane	260 (U)	NA	----	NA
Dibromoethane	260 (U)	NA	----	NA
1,2-Dichlorobenzene	260 (U)	NA	<2	NA
1,3-Dichlorobenzene	260 (U)	NA	24	NA
1,4-Dichlorobenzene	260 (U)	13 (U)	23	1.15
Dichlorodifluoromethane	260 (U)	NA	<1	NA
1,1-dichloroethane	260 (U)	NA	<1	NA
1,2-Dichloroethane	260 (U)	13 (U)	3	.15
1,1-Dichloroethene	260 (U)	13 (U)	<1	<.05
cis-1,2-Dichloroethane	260 (U)	NA	----	NA
trans-1,2-Dichloroethene	260 (U)	NA	<1	NA
1,2-Dichloropropane	260 (U)	NA	<1	NA
1,3-Dichloropropane	260 (U)	NA	----	NA
2,2-Dichloropropane	260 (U)	NA	----	NA
1,1-Dichloropropene	260 (U)	NA	----	NA
cis-1,3-Dichloropropene	260 (U)	NA	<1	NA

Table 7

Cotton Baby: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (shallow depth)

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.7-2 ft depth)	TCLP equiv. (ug/kg)
trans-1,3-Dichloropropene	260 (U)	NA	<1	NA
Ethylbenzene	260 (U)	NA	26	NA
Hexachlorobutadiene	260 (U)	13 (U)	----	----
Isopropylbenzene	260 (U)	NA	----	NA
4-Isopropyltoluene	260 (U)	NA	----	NA
Methylene chloride	260 (U)	NA	1	NA
1-Methylnaphthalene	260 (U)	NA	----	NA
2-Methylnaphthalene	260 (U)	NA	----	NA
Naphthalene	260 (U)	NA	----	NA
n-Propylbenzene	260 (U)	NA	----	NA
Styrene	260 (U)	NA	----	NA
1,1,1,2-Tetrachloroethane	260 (U)	NA	----	NA
1,1,2,2-Tetrachloroethane	260 (U)	NA	<1	NA
Tetrachloroethene	260 (U)	13 (U)	<1	<.05
Tetrahydrofuran (THF)	1300 (U)	NA	----	NA
Toluene	260 (U)	NA	11	NA

Table 7

Cotton Baby: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (shallow depth)

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.7-2 ft depth)	TCLP equiv. (ug/kg)
1,2,3-Trichlorobenzene	260 (U)	NA	----	NA
1,2,4-Trichlorobenzene	260 (U)	NA	----	NA
1,1,1-Trichloroethane	260 (U)	NA	<1	NA
1,1,2-Trichloroethane	260 (U)	NA	<1	NA
Trichloroethene	260 (U)	13 (U)	<1	<.05
Trichlorofluoromethane	260 (U)	NA	1	NA
1,2,3-Trichloropropane	260 (U)	NA	----	NA
1,2,4-Trimethylbenzene	260 (U)	NA	----	NA
1,3,5-Trimethylbenzene	260 (U)	NA	----	NA
Vinyl chloride	260 (U)	13 (U)	<1	<.05
o-Xylene	260 (U)	NA	11	NA
p- & m-Xylene	260 (U)	NA	16 & 23	NA

(U)- Indicates compound was analyzed for, but not detected above the New Mexico SLD Practical Quantitation Limit.

Table 7

Cotton Baby: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (deep depth)

Compound	NMED sample (ug/kg) (5-10 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (4.5 ft depth)	TCLP equiv. (ug/kg)
Acetone	1000 (U)	NA	----	NA
Benzene	200 (U)	10 (U)	<2	<.1
Bromobenzene	200 (U)	NA	----	NA
Bromochloromethane	200 (U)	NA	----	NA
Bromodichloromethane	200 (U)	NA	<1	NA
Bromoform	200 (U)	NA	<1	NA
2-Butanone (MEK)	1000 (U)	50 (U)	----	----
n-Butylbenzene	200 (U)	NA	----	NA
sec-Butylbenzene	200 (U)	NA	----	NA
tert-Butylbenzene	200 (U)	NA	----	NA
tert-Butyl methyl ether	1000 (U)	NA	----	NA
Carbon tetrachloride	200 (U)	10 (U)	<1	<.05
Chlorobenzene	200 (U)	10 (U)	<2	<0.1
Chloroform	200 (U)	10 (U)	<1	<.05
2-Chlorotoluene	200 (U)	NA	----	NA
4-Chlorotoluene	200 (U)	NA	----	NA

Table 7

Cotton Baby: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (deep depth)

Compound	NMED sample (ug/kg) (5-10 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (4.5 ft depth)	TCLP equiv. (ug/kg)
1,2-Dibromo-3-chloropropane	200 (U)	NA	----	NA
Dibromochloromethane	200 (U)	NA	<1	NA
1,2-Dibromoethane	200 (U)	NA	----	NA
Dibromoethane	200 (U)	NA	----	NA
1,2-Dichlorobenzene	200 (U)	NA	<2	NA
1,3-Dichlorobenzene	200 (U)	NA	3	NA
1,4-Dichlorobenzene	200 (U)	10 (U)	4	0.2
Dichlorodifluoromethane	200 (U)	NA	<1	NA
1,1-dichloroethane	200 (U)	NA	<1	NA
1,2-Dichloroethane	200 (U)	10 (U)	18	0.9
1,1-Dichloroethene	200 (U)	10 (U)	<1	<.05
cis-1,2-Dichloroethane	200 (U)	NA	----	NA
trans-1,2-Dichloroethene	200 (U)	NA	<1	NA
1,2-Dichloropropane	200 (U)	NA	<1	NA
1,3-Dichloropropane	200 (U)	NA	----	NA
2,2-Dichloropropane	200 (U)	NA	----	NA

Table 7

Cotton Baby: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (deep depth)

Compound	NMED sample (ug/kg) (5-10 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (4.5 ft depth)	TCLP equiv. (ug/kg)
1,1-Dichloropropene	200 (U)	NA	----	NA
cis-1,3-Dichloropropene	200 (U)	NA	<1	NA
trans-1,3-Dichloropropene	200 (U)	NA	<1	NA
Ethylbenzene	200 (U)	NA	<2	NA
Hexachlorobutadiene	200 (U)	10 (U)	----	----
Isopropylbenzene	200 (U)	NA	----	NA
4-Isopropyltoluene	200 (U)	NA	----	NA
Methylene chloride	200 (U)	NA	1	NA
1-Methylnaphthalene	200 (U)	NA	----	NA
2-Methylnaphthalene	200 (U)	NA	----	NA
Naphthalene	200 (U)	NA	----	NA
n-Propylbenzene	200 (U)	NA	----	NA
Styrene	200 (U)	NA	----	NA
1,1,1,2-Tetrachloroethane	200 (U)	NA	----	NA
1,1,2,2-Tetrachloroethane	200 (U)	NA	<1	NA

Table 7

Cotton Baby: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (deep depth)

Compound	NMED sample (ug/kg) (5-10 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (4.5 ft depth)	TCLP equiv. (ug/kg)
Tetrachloroethene	200 (U)	10 (U)	<1	<.05
Tetrahydrofuran (THF)	1000 (U)	NA	----	NA
Toluene	200 (U)	NA	<2	NA
1,2,3-Trichlorobenzene	200 (U)	NA	----	NA
1,2,4-Trichlorobenzene	200 (U)	NA	----	NA
1,1,1-Trichloroethane	200 (U)	NA	<1	NA
1,1,2-Trichloroethane	200 (U)	NA	<1	NA
Trichloroethene	200 (U)	10 (U)	<1	<.05
Trichlorofluoromethane	200 (U)	NA	<1	NA
1,2,3-Trichloropropane	200 (U)	NA	----	NA
1,2,4-Trimethylbenzene	200 (U)	NA	----	NA
1,3,5-Trimethylbenzene	200 (U)	NA		NA
Vinyl chloride	200 (U)	10 (U)	<1	<.05
o-Xylene	200 (U)	NA	2	NA
p- & m-Xylene	200 (U)	NA	2 & 3	NA

(U)- Indicates compound was analyzed for, but not detected above the New Mexico SLD Practical Quantitation Limit.

Table 7

Cotton Baby: Comparison of Concentrations of Aromatic Halogenated Purgeables and Aliphatic Hydrocarbons collected as part of the RCRA Facility Assessment

Analyte	NMED sample (1.2-1.8 ft depth) mg/kg	Westinghouse sample (1.2-1.8 ft depth) mg/kg	NMED sample (4.5-5.0 ft depth) mg/kg	Westinghouse sample (4.5-5.0 ft depth) mg/kg
Aliphatic Hydrocarbons	Gasoline - ND Diesel - ND Lub. oil - ND Unknown C15-C30 pattern- <20	Diesel - 96	Gasoline - ND Diesel - ND Lub. Oil - ND Unknown C15-C30 Pattern - <20	Diesel - 12

ND - Not Detected

Note:
- NMED aliphatic hydrocarbon analyses includes all hydrocarbons in the C5-C30 molecular weight range.
- Gas chromatography and flame ionization detector screening technique results from NMED analyses are provisional.
- Methylene chloride, chloroform, tetrahydrofuran and o-xylene detected in equipment rinsate blank.

9.2.6 Closure of the Cotton Baby Mudpits, SWMU 001p

Like the Badger Unit SWMU, the determination to complete voluntary closure by capping in-place the Cotton Baby mudpit area is based on decision factors contained in proposed 40 CFR Part 264.525(b). The factors which are applicable to the use of a caliche cap to contain contaminated soils in SWMU 001p include: long-term reliability and effectiveness; reduction of toxicity, mobility or volume of wastes; implementability; and cost. Several factors support a decision to cap contaminated soils in-place. These support factors include: (1) the constituent concentrations of contaminated wastes are well below RCRA hazardous waste levels; (2) the long-term land use at the WIPP will effectively control any potential excavation of the mudpit areas; and (3) the removal and placement of these wastes in a commercial landfill may represent an increased exposure to workers and the public than would occur if the wastes are left in-place.

Characterization sampling completed on October 5, 1992, indicates that all constituents levels at the Cotton Baby site are below RCRA hazardous waste regulated levels. The analysis of organic constituents at the Cotton Baby site were also below New Mexico State Laboratory Division Practical Quantification Limits (PQLs).

9.2.7 Rationale for Cotton Baby Closure Methodology

The proposed voluntary corrective action at the Cotton Baby site is identical to the corrective measures proposed for the Badger Unit. Three wetted and compacted 6-inch lifts of crushed 3/4- inch minus caliche fill will be placed over the mudpit areas where soil discoloration occurs. Using soil discoloration as an indicator of the extent of mudpit contamination, the caliche cap will extend 20 feet beyond the outer edge of any discolored soils.

A total of 18 inches of compacted caliche will be placed over all discolored soils. The 18-inch caliche cap will be machine compacted in 6-inch lifts, providing a cost effective barrier that can be implemented immediately and will contain any vertical or lateral migration of regulated constituents. Hydraulic Conductivity Tests have been conducted on the caliche materials to be used for site closures. Permeability rates for an 18-inch caliche cap will average $2.9 \times 10_{5}$ cm/s, or $2.9 \times 10_{7}$ m/s. These hydraulic conductivity rates are comparable to permeability found in the Mescalero Caliche Formation (ie. 7.8×10^{-6} m/s to 1.0×10^{-8} m/s.). A copy of Hydraulic Conductivity Test results are provided as Appendix 8. Six to twelve inches of top soil will then be placed on top of the compacted caliche and reclaimed using BLM approved seed mix.

Although the concentration of the constituents has not been reduced, constituents contained in the mudpits have effectively

been immobilized. As with the Badger Unit, by capping constituent-containing materials in-place, the volume of waste will not be increased as it would by excavation and removal. Similarly the only allowed land use that could directly contact materials contained in the Cotton Baby mudpits are grazing and recreational activities such as hunting. Due to the depth and compaction of cap materials, any potential impact to grazing and recreational activities will be effectively mitigated.

9.3 SWMU 001q (DOE -1 Drill Pad)

SWMU 001q is located in the SE 1/4 of the SE 1/4 of the SE 1/4 of Section 28, Township 22 South, Range 31 East. The DOE-1 was drilled in 1982 to collect stratigraphic, structural, and hydrologic data. The borehole was drilled to a depth of 4,065 feet to examine the nature of the Castile Formation. Salazar Brothers drilling company rotary drilled from the surface to 1,130 feet using a spud mud mixture of fresh water gel, soda ash, and paper as a drilling fluid. From 1,130 feet to the bottom of the borehole, a mixture of salt water gel, starch, KCl brine and lime was used. The Borehole Data Report for DOE-1 specifically includes a Westinghouse Electric Corporation Drilling Contractor Clause which prohibits the introduction of hazardous materials into the mudpits.

There are two mud pits at the DOE-1 drill pad. In the RFA, four pits were identified, however, a site inspection showed that three of the pits were contiguous and will be managed as a single unit. The primary pit measures approximately 150 feet by 45 feet, and a second reserve pit encompasses an area approximately 50 feet by 75 feet. Both ponds were lined with 8-mil reinforced polyethylene liner (*TME 3159, 1982*). Visual inspections showed several areas of stained soil at the mudpits. Approximately 10 feet of rocky fill is piled on the northwest corner of the pad and has not been reclaimed. Several test holes suggest that the recontoured mudpits at this location is 2.5 feet thick. Soils contained in the mudpit are a mixture of red brown, fat, clay and black/grey sludge. The brown, black, and grey clay mixture is present to about 2.0 to 2.5 feet in depth.

9.3.1 Media Sampled

Soil was the only media sampled at SWMU 001o during the October 6, 1992, sampling event. As described in Section 4.1 of the RFA, soil is the primary media with any real potential to contribute to a release from individual SWMUs. Due to the dry environment, regional geology, and depth to small localized perched groundwater, the potential to impact groundwater is very low. Soil analyses from different strata will indicate any potential for release to this media.

Soils in the mudpit contents exuded a strong hydrocarbon smell, which was confirmed by trace measurements of possible benzene vapors detected downhole by an MSA model A/Benzene Tube OVA. Analyses of borehole samples indicated that benzene levels were below PQL levels.

Several boreholes were augered to retrieve the required volume of soil samples collected by the NMED and Westinghouse personnel. RCRA sampling procedures and sampling analysis plans were developed for the RFA sampling event. To collect the VOC and aliphatic samples, "syringes" were pressed into soil cores contained within the auger sample head. The samples were then placed directly into 40 ml VOC vials filled with extraction fluids: methyl alcohol was used for aromatic compounds and carbon disulfide for aliphatic hydrocarbons. Co-located WIPP samples were not field extracted.

A sample lithology log developed as part of the RFA sampling program at the DOE-1 site are provided in Table 8, Section 9.3.3. A historical NMED and Westinghouse sample location map is provided as Figure 16. and is contained in Section 9.3.4. A quantitative comparison of RFA analytical results generated during RFA sampling visits by both the NMED and Westinghouse are provided in Table 9. and are located in Section 9.3.5. Sample results have been summarized in this table as both total constituent concentrations and TCLP equivalent concentrations. No additional sampling is proposed to implement corrective actions at the DOE-1 mudpit site.

9.3.2 Quality Control Samples

Information regarding RFA quality control samples, including duplicate samples, trip blanks, and equipment blanks collected at the DOE-1 site are provided in Section 4.0 of the RFA.

9.3.3 Sampling Lithological Logs for DOE-1 Site - SWMU 001g (Table 8)

New Mexico Environment Department
DOE/WIPP Oversight
TEST PIT/AUGERED BORING
LOG AND DATA SHEET

Project No. 550040	Location. DOE-1	Boring No. 1	Sheet 1 of 1

Feature. Mudpit Hydrologic Exp.
Date (Time) Logged. 10/6/92
Area Designation.

Method. Hand Auger
Logged By. PES
Monitoring. MSA Model A/Benzene Tube

Depth and Soil Class	Graphic Log	Sample Taken	Description of Materials Visual Observations	OVA
0 SP-SM Poorly sorted silty sand CH/CL Fat clay with lean sandy clay pockets @.8ft		Plastic Liners	Sand: Light red brown, fine to medium, loose, dry, porous, occasional angular rock fragments and scattered roots and leaves, black 7 mil liner @ - 2in and white liner @ -.5in below surface. Windblown dune sand over mudpit (0-0.5ft) Fat Clay: Grey with brown laminations, highly plastic, very soft, wet to saturated, relatively homogeneous (0.5-.8ft), behaves as liquid (low shear strength), increasingly mixed with small pockets red sandy clay and black and grey (hydrocarbon?) lenses and stringers (0.8-1.5ft), weak reaction with HCL (SO2 generated). Drilling mud/bentonite/hydrocarbon fill (0.5-1.5ft).	
1' CH/Sludge		Aliphatic VOC Sample Heavy Metals (ICAP and Aa) Sample.	Fat Clay/Sludge: black, very soft/viscous liquid-like shear strength, wet to saturated, locally heavily mottled with brown/red brown sandy clay pockets, strong hydrocarbon smell and measurable voc (benzene). Hydrocarbon/sludge (1.5ft - 2.2ft).	✓
2' SC Clayey Sand		Plastic Liner (White) VOC Aliphatic Heavy Metal Samples	Clayey Sand: Dark red brown, fine to medium, medium dense, moist to wet, faint hydrocarbon smell. Natural undisturbed, slightly contaminated dune sand (to BOH)	
3'	BOH		Very dense, moist, no recovery from auger bit, bottomed out.	
4'				

Remarks: *Mudpits are topographic depressions.*
Measurable organic vapors were measured at the surface of the borehole.

FIGURE 16

9.3.4 HISTORIC SAMPLE LOCATION MAP SWMU 001q (DOE-1)

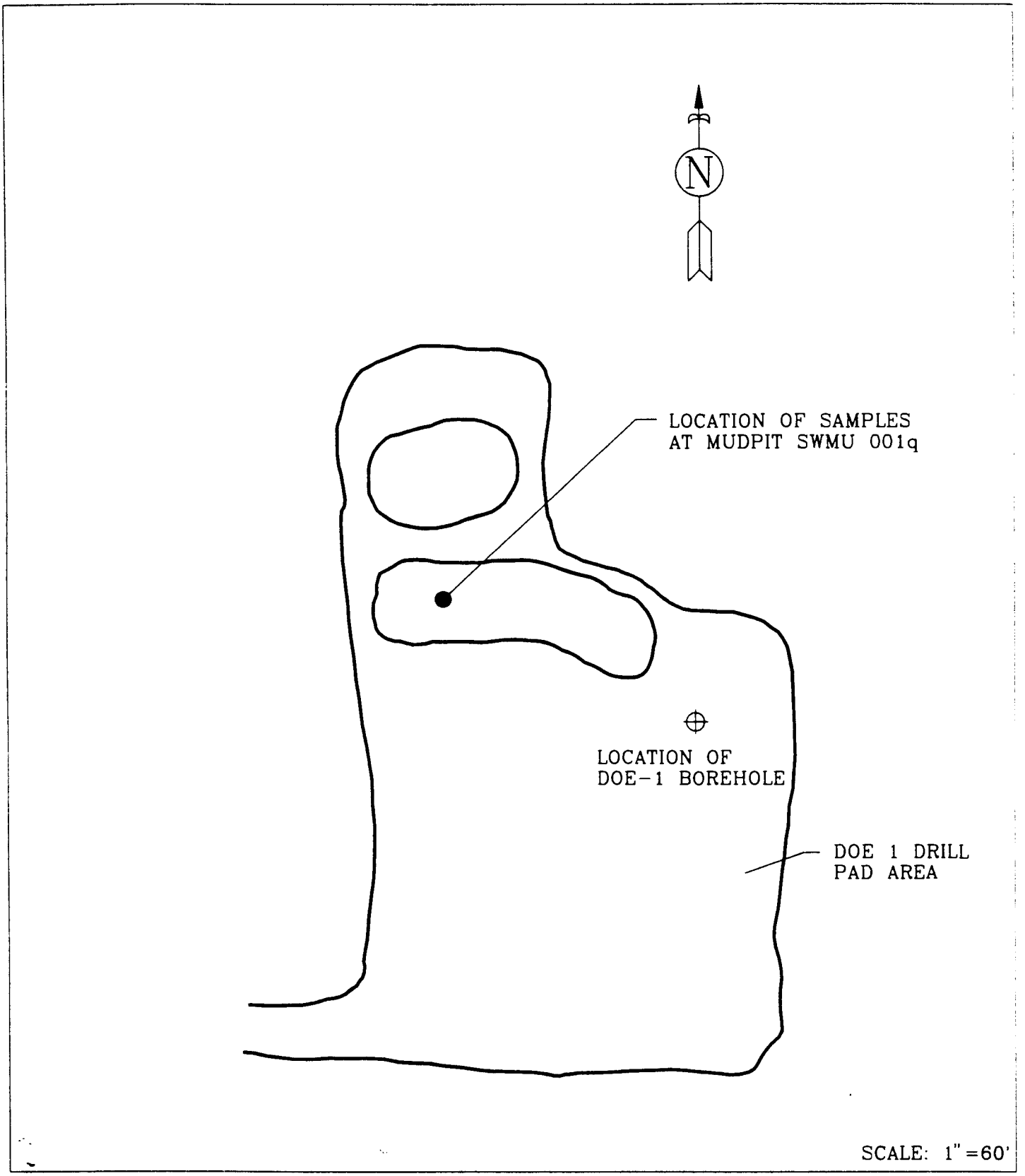


Table 9

DOE-1: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (shallow depth)

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.4 ft depth)	TCLP equiv. (ug/kg)
Acetone	2500 (U)	NA	----	NA
Benzene	500 (U)	25 (U)	3	.15
Bromobenzene	500 (U)	NA	----	NA
Bromochloromethane	500 (U)	NA	----	NA
Bromodichloromethane	500 (U)	NA	<1	NA
Bromoform	500 (U)	NA	<1	NA
2-Butanone (MEK)	2500 (U)	125 (U)	----	----
n-Butylbenzene	500 (U)	NA	----	NA
sec-Butylbenzene	500 (U)	NA	----	NA
tert-Butylbenzene	500 (U)	NA	----	NA
tert-Butyl methyl ether	2500 (U)	NA	----	NA
Carbon tetrachloride	500 (U)	25 (U)	<1	<.05
Chlorobenzene	500 (U)	25 (U)	<2	<0.1
Chloroform	500 (U)	25 (U)	2	0.1
2-Chlorotoluene	500 (U)	NA	----	NA
4-Chlorotoluene	500 (U)	NA	----	NA

Table 9

DOE-1: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (shallow depth)

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.4 ft depth)	TCLP equiv. (ug/kg)
1,2-Dibromo-3-chloropropane	500 (U)	NA	----	NA
Dibromochloromethane	500 (U)	NA	<1	NA
1,2-Dibromoethane	500 (U)	NA	----	NA
Dibromoethane	500 (U)	NA	----	NA
1,2-Dichlorobenzene	500 (U)	NA	<2	NA
1,3-Dichlorobenzene	500 (U)	NA	<2	NA
1,4-Dichlorobenzene	500 (U)	25 (U)	<2	<0.1
Dichlorodifluoromethane	500 (U)	NA	<1	NA
1,1-dichloroethane	500 (U)	NA	<1	NA
1,2-Dichloroethane	500 (U)	25 (U)	4	0.2
1,1-Dichloroethene	500 (U)	25 (U)	<1	<.05
cis-1,2-Dichloroethane	500 (U)	NA	----	NA
trans-1,2-Dichloroethene	500 (U)	NA	<1	NA
1,2-Dichloropropane	500 (U)	NA	<1	NA
1,3-Dichloropropane	500 (U)	NA	----	NA
2,2-Dichloropropane	500 (U)	NA	----	NA

Table 9

DOE-1: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (shallow depth)

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.4 ft depth)	TCLP equiv. (ug/kg)
1,1-Dichloropropene	500 (U)	NA	----	NA
cis-1,3-Dichloropropene	500 (U)	NA	<1	NA
trans-1,3-Dichloropropene	500 (U)	NA	<1	NA
Ethylbenzene	500 (U)	NA	<2	NA
Hexachlorobutadiene	500 (U)	25 (U)	----	----
Isopropylbenzene	500 (U)	NA	----	NA
4-Isopropyltoluene	500 (U)	NA	----	NA
Methylene chloride	500 (U)	NA	2	NA
1-Methylnaphthalene	500 (U)	NA	----	NA
2-Methylnaphthalene	500 (U)	NA	----	NA
Naphthalene	500 (U)	NA	----	NA
n-Propylbenzene	500 (U)	NA	----	NA
Styrene	500 (U)	NA	----	NA
1,1,1,2-Tetrachloroethane	500 (U)	NA	----	NA
1,1,2,2-Tetrachloroethane	500 (U)	NA	<1	NA

Table 9

DOE-1: Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (shallow depth)

Compound	NMED sample (ug/kg) (0-5 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (1.4 ft depth)	TCLP equiv. (ug/kg)
Tetrachloroethene	500 (U)	25 (U)	<1	<.05
Tetrahydrofuran (THF)	2500 (U)	NA	----	NA
Toluene	500 (U)	NA	<2	NA
1,2,3-Trichlorobenzene	500 (U)	NA	----	NA
1,2,4-Trichlorobenzene	500 (U)	NA	----	NA
1,1,1-Trichloroethane	500 (U)	NA	1	NA
1,1,2-Trichloroethane	500 (U)	NA	<1	NA
Trichloroethene	500 (U)	25 (U)	<1	<.05
Trichlorofluoromethane	500 (U)	NA	1	NA
1,2,3-Trichloropropane	500 (U)	NA	----	NA
1,2,4-Trimethylbenzene	500 (U)	NA	----	NA
1,3,5-Trimethylbenzene	500 (U)	NA	----	NA
Vinyl chloride	500 (U)	25 (U)	<1	<.05
o-Xylene	500 (U)	NA	8	NA
p- & m-Xylene	500 (U)	NA	2 & 3	NA

(U)- Indicates compound was analyzed for, but not detected above the New Mexico SLD Practical Quantitation Limit.

Table 9

DOE-1 Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (deep depth)

Compound	NMED sample (ug/kg) (5-10 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (4.5 ft depth)	TCLP equiv. (ug/kg)
Acetone	1225 (U)	NA	----	NA
Benzene	245 (U)	12.25 (U)	<2	<0.1
Bromobenzene	245 (U)	NA	----	NA
Bromochloromethane	245 (U)	NA	----	NA
Bromodichloromethane	245 (U)	NA	<1	NA
Bromoform	245 (U)	NA	<1	NA
2-Butanone (MEK)	1225 (U)	61.25 (U)	----	----
n-Butylbenzene	245 (U)	NA	----	NA
sec-Butylbenzene	245 (U)	NA	----	NA
tert-Butylbenzene	245 (U)	NA	----	NA
tert-Butyl methyl ether	1225 (U)	NA	----	NA
Carbon tetrachloride	245 (U)	12.25 (U)	<1	<.05
Chlorobenzene	245 (U)	NA	<2	NA
Chloroform	245 (U)	12.25 (U)	<1	<.05
2-Chlorotoluene	245 (U)	NA	----	NA
4-Chlorotoluene	245 (U)	NA	----	NA

Table 9

DOE-1 Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (deep depth)

Compound	NMED sample (ug/kg) (5-10 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (4.5 ft depth)	TCLP equiv. (ug/kg)
1,2-Dibromo-3-chloropropane	245 (U)	NA	----	NA
Dibromochloromethane	245 (U)	NA	<1	NA
1,2-Dibromoethane	245 (U)	NA	----	NA
Dibromoethane	245 (U)	NA	----	NA
1,2-Dichlorobenzene	245 (U)	NA	<2	NA
1,3-Dichlorobenzene	245 (U)	NA	2	NA
1,4-Dichlorobenzene	245 (U)	12.25 (U)	<2	<0.1
Dichlorodifluoromethane	245 (U)	NA	<1	NA
1,1-dichloroethane	245 (U)	NA	<1	NA
1,2-Dichloroethane	245 (U)	12.25 (U)	29	1.45
1,1-Dichloroethene	245 (U)	12.25 (U)	<1	<.05
cis-1,2-Dichloroethane	245 (U)	NA	----	NA
trans-1,2-Dichloroethene	245 (U)	NA	<1	NA
1,2-Dichloropropane	245 (U)	NA	<1	NA
1,3-Dichloropropane	245 (U)	NA	----	NA
2,2-Dichloropropane	245 (U)	NA	----	NA

Table 9

DOE-1 Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (deep depth)

Compound	NMED sample (ug/kg) (5-10 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (4.5 ft depth)	TCLP equiv. (ug/kg)
1,1-Dichloropropene	245 (U)	NA	----	NA
cis-1,3-Dichloropropene	245 (U)	NA	<1	NA
trans-1,3-Dichloropropene	245 (U)	NA	<1	NA
Ethylbenzene	245 (U)	NA	<2	NA
Hexachlorobutadiene	245 (U)	12.25	----	----
Isopropylbenzene	245 (U)	NA	----	NA
4-Isopropyltoluene	245 (U)	NA	----	NA
Methylene chloride	245 (U)	NA	2	NA
1-Methylnaphthalene	245 (U)	NA	----	NA
2-Methylnaphthalene	245 (U)	NA	----	NA
Naphthalene	245 (U)	NA	----	NA
n-Propylbenzene	245 (U)	NA	----	NA
Styrene	245 (U)	NA	----	NA
1,1,1,2-Tetrachloroethane	245 (U)	NA	----	NA
1,1,2,2-Tetrachloroethane	245 (U)	NA	<1	NA

Table 9

DOE-1 Comparison of Concentrations of VOC's collected as part of the RCRA Facility Assessment. (deep depth)

Compound	NMED sample (ug/kg) (5-10 ft depth)	TCLP equiv. (ug/kg)	Westinghouse sample (ug/kg) (4.5 ft depth)	TCLP equiv. (ug/kg)
Tetrachloroethene	245 (U)	12.25 (U)	<1	<.05
Tetrahydrofuran (THF)	1225 (U)	NA	----	NA
Toluene	245 (U)	NA	7	NA
1,2,3-Trichlorobenzene	245 (U)	NA	----	NA
1,2,4-Trichlorobenzene	245 (U)	NA	----	NA
1,1,1-Trichloroethane	245 (U)	NA	1	NA
1,1,2-Trichloroethane	245 (U)	NA	<1	NA
Trichloroethene	245 (U)	12.25 (U)	<1	<.05
Trichlorofluoromethane	245 (U)	NA	<1	NA
1,2,3-Trichloropropane	245 (U)	NA	----	NA
1,2,4-Trimethylbenzene	245 (U)	NA	----	NA
1,3,5-Trimethylbenzene	245 (U)	NA	----	NA
Vinyl chloride	245 (U)	12.25 (U)	<1	<.05
o-Xylene	245 (U)	NA	<2	NA
p- & m-Xylene	245 (U)	NA	<2 & 2	NA

(U)- Indicates compound was analyzed for, but not detected above the New Mexico SLD Practical Quantitation Limit.

Table 9

DOE-1: Comparison of Concentrations of Heavy Metals collected as part of the RCRA Facility Assessment. (1.8-2.1 ft depth)

Heavy Metal	NMED Sample (mg/kg)	TCLP equiv. (mg/kg)	Westinghouse Sample (mg/kg)	TCLP equiv. (mg/kg)	Control Sample (mg/kg)	TCLP equiv. (mg/kg)
Arsenic	1.1	.055	<10	<0.5	<10	<0.5
Barium	90	4.5	120	6	11	.55
Beryllium	<5	NA	<0.5	NA	<0.5	NA
Cadmium	<5	<.05	<0.5	<.025	<0.5	<.025
Chromium	27	1.35	43	2.15	3	0.1
Cobalt	<5	NA	2	NA	<1	NA
Copper	5	NA	4	NA	1	NA
Iron	7800	NA	5800	NA	2000	NA
Lead	20	1	12	0.6	<5	<.25
Nickel	6	NA	7	NA	<2	NA
Vanadium	14	NA	13	NA	4	NA
Zinc	16	NA	20	NA	6	NA
Aluminum	7400	NA	6000	NA	1700	NA
Boron	17	NA	13	NA	<5	NA
Calcium	72000	NA	70000	NA	220	NA
Magnesium	14600	NA	8800	NA	280	NA
Manganese	170	NA	140	NA	19	NA
Silicon	570	NA	250	NA	290	NA
Strontium	300	NA	160	NA	2	NA

Table 9

DOE-1: Comparison of Concentrations cont. (2.3-2.7 ft depth)

Heavy Metal	NMED Sample (mg/kg)	TCLP equiv. (mg/kg)	Westinghouse Sample (mg/kg)	TCLP equiv. (mg/kg)	Control Sample (mg/kg)	TCLP equiv. (mg/kg)
Arsenic	2.8	.14	<10	<0.5	<10	<0.5
Barium	65	3.25	69	3.45	11	.55
Beryllium	<5	NA	<0.5	NA	<0.5	NA
Cadmium	<5	<.25	<0.5	<.025	<0.5	<.025
Chromium	53	2.65	Illegible	----	3	0.1
Cobalt	<2.5	NA	3	NA	<1	NA
Copper	8	NA	4	NA	1	NA
Iron	12700	NA	9200	NA	2000	NA
Lead	<5	<.25	6	0.3	<5	<.25
Nickel	10	NA	10	NA	<2	NA
Vanadium	21	NA	20	NA	4	NA
Zinc	26	NA	22	NA	6	NA
Aluminum	12700	NA	8600	NA	1700	NA
Boron	11	NA	20	NA	<5	NA
Calcium	15800	NA	Illegible	NA	220	NA
Magnesium	2700	NA	2200	NA	280	NA
Manganese	66	NA	100	NA	19	NA
Silicon	500	NA	530	NA	290	NA
Strontium	32	NA	28	NA	2	NA

Table 9

DOE-1: Comparison of Concentrations of Aromatic Halogenated Purgeables and Aliphatic Hydrocarbons collected as part of the RCRA Facility Assessment.

Analyte	NMED sample (1.2-1.8 ft depth) mg/kg	Westinghouse sample (1.2-1.8 ft depth) mg/kg	NMED sample (4.5-5.0 ft depth) mg/kg	Westinghouse sample (4.5-5.0 ft depth) mg/kg
Aliphatic Hydrocarbons	Gasoline - ND Diesel - ND Lub. oil - ND Unknown C15-C30 pattern- 25	Diesel - 26	Gasoline - ND Diesel - ND Lub. Oil - ND Unknown C15-C30 Pattern - <20	Diesel - 13

ND - Not Detected

Note:
- NMED aliphatic hydrocarbon analyses includes all hydrocarbons in the C5-C30 molecular weight range.
- Gas chromatography and flame ionization detector screening technique results from NMED analyses are provisional.
- Methylene chloride, chloroform, tetrahydrofuran and o-xylene detected in equipment rinsate blank.

9.3.6 Closure of the DOE-1 Mudpits SWMU 001q

Like the Badger Unit and Cotton Baby sites, the determination to complete voluntary closure of the DOE-1 mudpits by capping contaminated soils in-place is based on decision factors contained in proposed 40 CFR Part 264.525(b). The decision factors which are applicable to the use of a compacted caliche cap to contain contaminated soils at DOE-1 include: the long-term reliability and effectiveness; a reduction of toxicity, mobility or volume of wastes; implementability; and cost. Other factors that support the a decision to cap in-place include: the constituent levels of contamination identified in the mudpit areas; projected long term land use at the WIPP; and the potential that removal and placement of these wastes in a commercial landfill may represent greater exposure potential to workers than if the wastes are capped in-place. Characterization sampling completed on October 10, 1992 indicated that all constituents levels at the DOE-1 site are below RCRA regulated levels. Analyses showed that all organic constituents were below New Mexico State Laboratory Division PQLs.

9.3.7 Rationale for DOE-1 Closure Methodology

The proposed voluntary corrective action for the DOE-1 mudpits is to cover contaminated mudpits with three compacted 6-inch lifts of crushed 3/4 inch minus caliche fill material. Using soil discoloration as an indicator of the extent of mudpit contamination, the caliche cap will be extended 20 feet beyond the outer edge of any discolored soils. A total of 18 inches of compacted caliche will be placed on top of DOE-1 mudpit areas.

Each of the three 6-inch lifts will be wetted and machine compacted providing an 18-inch caliche cap. This type of cap will provide a cost effective barrier that can be implemented immediately, and will serve to preclude any vertical or lateral migration of regulated constituents. Hydraulic Conductivity Tests have been conducted on the caliche materials to be used for site closures. Permeability rates for an 18-inch caliche cap will average $2.9 \times 10_{-5}$ cm/s, or $2.9 \times 10_{-7}$ m/s. These hydraulic conductivity rates are comparable to permeability found in the Mescalero Caliche Formation (ie. 7.8×10^{-6} m/s to 1.0×10^{-8} m/s.). A copy of Hydraulic Conductivity Test results are provided as Appendix 8. Six to twelve inches of top soil will then be placed on top of the compacted caliche and reclaimed using BLM approved seed mix.

Although the concentration of the constituents has not been reduced, constituents contained in the mudpits will be effectively immobilized. The volume of waste constituents has not been increased, as would occur during excavation and removal.

Like the Badger Unit and Cotton Baby sites, the only allowed land use that could potentially contact materials contained in the DOE-1

mudpits are grazing and recreation. Similarly, the depth and compaction of cap materials, will mitigate any potential impact to grazing or recreational activities.

Because all wastes contained in the DOE-1 mudpit are below RCRA hazardous waste levels, the DOE evaluated the disposal of contaminated soils at an off-site municipal landfill. Although this alternative is allowable under the regulations, it is not the preferred alternative. The removal and placement of these wastes in a commercial landfill may represent a greater potential for exposure to workers than leaving them where they are today.

10.0 DETERMINATION OF NO FURTHER ACTION

10.1 SWMU 002a (Brinderson Landfill) (formerly 003a)

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 NE 1/4 of the NE 1/4 of Section 32, and the NW 1/4 of the NW 1/4 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.

10.2 SWMU 002b (Construction Landfill) (New Landfill/Inactive Landfill, formerly 003a)

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 N 1/2 of the NE 1/4 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 second smaller pit on the northwest side of the landfill area remains operational and is managed in accordance with Westinghouse/WIPP, *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. the disposal of construction debris only). 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-3)*.

10.3 Justification for a Determination that No Further Action is Required at SWMUS 002a, and 002b

As part of this Voluntary Release Assessment/Corrective Action Workplan the DOE requests a formal determination that no further action is required for both the Brinderson Landfill (SWMU 002a), and Construction Landfill (SWMUs 002b). Justification for this request is based on information not contained in the WIPP RFA. The RFA does not disclose that both landfills were managed by the DOE in accordance with specific BLM permit conditions. The RFA also does not describe the administrative controls such as limitations on the type of materials that could be disposed at the facility, 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."

Information described in the permits and operating logs for both the Brinderson and Construction Landfills document that any potential releases from these facilities were managed under the provisions of the individual BLM permit. Administrative controls such as monthly inspections and closure documentation provided by the BLM 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 of in these landfills. Thus,

any potential release from these SWMUs does not present a threat to human health and the environment.

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 for several reasons. First, the WIPP RFA does 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 are no reasonable source for a release of regulated constituents from these units. Second, the WIPP is completing release assessments and corrective actions on a voluntary basis, prior to the issuance of a RCRA permit and is requesting a determination that no further action is required prior to the issuance of the RCRA permit.

Based on this information and the guidance contained in Section VI.(B)(2) of the proposed Subpart S rule, the DOE requests a written determination that no further action is required be issued for both the Brinderson and Construction Landfills.

REFERENCES

Air Photos, 1982-1991, *Annual Aerial Photographs of the WIPP Site*: Westinghouse Environmental Monitoring Section, 1:24,000 scale, unpublished.

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

Bureau of Land Management (BLM), *Land Use Permit Application NM-067-LUP-219*, January, 1985.

Bureau of Land Management (BLM), *Land Use Permit Application NM-067-LUP-237*, February 9, 1987.

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

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, 139p.

D'Appolonia Consulting Engineers, Inc., 1982, *Basic Data Report for Borehole DOE-1 at the Waste Isolation Pilot Plant*, TME 3159.

D'Appolonia Consulting Engineers, 1982a, *Basic Data Report for Deepening of Drillhole WIPP-13 (Waste Isolation Pilot Plant)*, Sandia National Laboratory Report SAND82-1880.

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

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

DOE/WIPP WP02-5, 1992, Procedure WP02-5. *Nonradioactive Hazardous Materials Environmental Compliance Manual*, Waste Isolation Pilot Plant/Controlled Document.

DOE/WIPP WP02-6/7, 1991, Procedure WP02-6 and 02-7, *RCRA Compliance Manual*, Waste Isolation Pilot Plant/Controlled Document Rev. 0.

DOE/WIPP WP02-502, 1992, Procedure WP02-502, *Used Oil Management*, Waste Isolation Pilot Plant/Controlled Document, Rev. 2.

DOE/WIPP WP02-506, 1992, Procedure WP02-506, *Environmental Incident Reporting*, Waste Isolation Pilot Plant/Controlled Document Rev. 2.

DOE/WIPP WP02-601, 1992, Procedure WP02-601, *Non-Radioactive Hazardous Waste Management*, Waste Isolation Pilot Plant/Controlled Document Rev. 4.

DOE/WIPP WP02-108, 1994, Procedure WP02-108, *pH Measurement*, Waste Isolation Pilot Plant/Controlled Document, Rev. 1.

DOE/WIPP WP12-1,(Vol. 1) 1994, *WIPP Safety Manual*, Waste Isolation Pilot Plant/Controlled Document, Rev. 3.

DOE/WIPP WP12-1,(Vol. 2) 1994, *WIPP Safety Procedures*, Waste Isolation Pilot Plant/Controlled Document, Rev. 3.

DOE/WIPP WP02-109, 1994, Procedure WP02-109, *Temperature Measurement,* Waste Isolation Pilot Plant/Controlled Document Rev. 1.

DOE/EIS-0026, 1980, *Final Environmental Impact Statement for the Waste Isolation Pilot Plant*.

DOE, 1980., *U.S. Department of Energy Nation Security and Military Applications of Nuclear Energy Authorization Act of 1980* (Public Law 96-164).

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

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

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

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, 1991, 68-W9-0007, *RCRA Sampling Procedures Handbook: U.S. Environmental Protection Agency*, Technical Enforcement Branch, Region VI, Jacobs Engineering Group Contract Number 68-W9-0007.

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

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

Geohydrology Associates Inc, 1979, *Water Resources Study of the Carlsbad Potash Area, New Mexico*, Denver, Colorado, Bureau of Land Management.

Griswold, G.B., 1977, *Site Selection and Evaluation Studies of the Waste Isolation pilot Plant, Los Medanos, Eddy County, New Mexico*, Sandia National Laboratory Report, SAND77-0946.

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

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-3).

Sandia National Laboratory, 1983, SAND79-0270, *Basic Data Report for Drillhole ERDA 9*, Waste Isolation Pilot Plant.

Sandia National Laboratory, 1987, *Hydrologic Data Report # 5*, Waste Isolation Pilot Plant, SAND87-7125.

Sandia National Laboratory, 1988b, SAND887014, *Hydrologic Data Report # 7*, Waste Isolation Pilot Plant.

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.

USGS, 1978, *Test Drilling for Potash Resources: Waste Isolation Pilot Plant Site, Eddy County, New Mexico*, U.S. Geological Survey Open-File Report 78-592.

WIPP-CAO-95-1014, 1995., *Waste Isolation Pilot Plant Project Technical Baseline for Regulatory Compliance*, (Rev. 0).

WIPP Land Withdrawal Act, Public Law 102-579, October 30, 1992.

APPENDIX 1

CHAPTER J OF THE RCRA PART B PERMIT APPLICATION (REV.5)

CHAPTER J
TABLE OF CONTENTS

List of Tables . . . . . J-ii
List of Figures . . . . . J-iii
Introduction J-1
J-1 Solid Waste Management Units J-1
J-1a Characterization of the SWMUs J-2
J-2 Releases J-2
J-2a Assessment of Potential Releases J-3
J-2b Corrective Actions J-3
References J-8
Appendix J1 Solid Waste Management Unit Characterization Sheets

List of Tables

Table	Title	Page
J-1	SWMU Descriptions	J-5

List of Figures

Figure	Title	Page
J-1	Location of SWMUs within the WIPP Site Boundary	J-7

THIS PAGE LEFT BLANK INTENTIONALLY

CHAPTER J
CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS

Introduction

This chapter describes the solid waste management units (SWMU) within the 16-square-mile (mi) (41.4 square-kilometer [km]) Waste Isolation Pilot Plant (WIPP) facility boundary (Title 20 of the New Mexico Administrative Code Chapter 4, Part 1 [20 NMAC 4.1], Subpart V §264.101[a]) which have been identified by U.S. Environmental Protection Agency (EPA) Region 6 as requiring further investigation. SWMU characterization sheets are presented in Appendix J1 in response to regulatory requirements in 20 NMAC 4.1, Subpart IX, §270.14(d).

Corrective actions are only required for SWMUs from which releases of Resource Conservation and Recovery Act (RCRA) hazardous wastes or hazardous constituents have occurred. Hazardous waste is defined in 20 NMAC 4.1, Subpart II, §261.3. Hazardous constituents are listed in 20 NMAC 4.1, Subpart II, Appendix VIII. Based on the RCRA Facility Assessment (RFA) conducted by the New Mexico Environment Department (NMED) for the EPA, 16 SWMUs have been identified as requiring further action (NMED, 1994). These SWMUs are listed in Table J-1. Since the preparation of the RFA, the U.S. Department of Energy (DOE) has created seven additional SWMUs and is closing SWMU 009-f, the Underground Wash Rack, in accordance with written site procedures.

The definition of a SWMU has not yet been finalized by the EPA. The most recent definition, presented in the proposed Subpart S to RCRA regulations in Title 40 of the Code of Federal Regulations (CFR), Part 264, has been used to define SWMUs at the WIPP facility. This definition states that SWMUs are "any discernible unit at which solid wastes have been placed at any time irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units also include any area at or around a facility at which solid wastes have been routinely and systematically released."

J-1 Solid Waste Management Units

According to 20 NMAC 4.1, Subpart §264.90(d), the SWMU requirements of 20 NMAC 4.1, Subpart V, Releases from Solid Waste Management Units, "may apply to miscellaneous units when necessary to comply with §§264.601 through 264.603." The DOE believes compliance with the aforementioned sections is demonstrated in this permit application. Section D-9d(1), Chapter E, and Appendix E1 of this permit application address the requirements of 20 NMAC 4.1, Subpart V, §264.601(a). Section D-9d(2) and D-9d(3) of this permit application address the requirements of 20 NMAC 4.1, Subpart V, §§264.601(b) and (c), respectively. Chapter I of this permit application addresses the requirements of 20 NMAC 4.1, Subpart V, §264.603.

In addition, the DOE will institute corrective actions that are necessary to protect human health and the environment for any releases of hazardous waste or hazardous constituents from SWMUs at the WIPP site. Corrective actions will be performed in compliance with 20 NMAC 4.1, Subpart V, §264.101. Any releases from a SWMU deemed an immediate threat to human health or the environment will be responded to in accordance with the WIPP facility Contingency Plan (Chapter G) of this permit application.

The requirements of 20 NMAC 4.1, Subpart V, §§264.601 through 264.603, including corrective actions, are addressed in this permit application. Therefore, the requirements of 20 NMAC 4.1, Subpart V, Releases from Solid Waste Management Units, are not necessary to show compliance.

To eliminate repetition of information, units that are similar in physical characteristics use or waste type are grouped and described within a SWMU description for the particular type of discernible unit.

The following sections describe characterization of SWMUs identified in the RFA, assessment of potential releases, and corrective actions. Table J-1 provides a list of SWMUs.

J-1a Characterization of the SWMUs

SWMUs at the WIPP facility are identified by a unique number designation shown in the upper left-hand corner of the SWMU characterization sheets in Appendix J1. The individual units grouped within a SWMU are designated by a letter following the SWMU number. The locations of the SWMUs and individual units, if any, within SWMUs are shown in Figure J-1.

The SWMU characterization sheets in Appendix J1 include the name, type, and period of operation for each unit. The unit description includes all available information on the unit, including location, size, dates of operation for the individual units within a SWMU, materials of construction, and waste descriptions. Information on the extent and nature of known releases is also included. The figure showing the location of each individual unit within a SWMU is indicated on the SWMU characterization sheet.

J-2 Releases

Releases from the SWMUs identified in the RFA are described in this section.

J-2a Assessment of Potential Releases

The identified SWMUs were reviewed to assess potential releases. A summary of this assessment is presented in Appendix J1. The assessment includes a description of the material released and the nature of the release.

J-2b Corrective Actions

Based on sampling and analysis data, visual site inspections, and document/record reviews, the DOE believes that no releases of hazardous materials have occurred at any of the WIPP facility SWMUs. The DOE has initiated a voluntary Phase 1 RFI/Release Assessment process as described in the RCRA Corrective Action Plan (EPA 520-R-94-004) to define closure requirements for SWMUs. If corrective actions are required, they will be completed in compliance with applicable regulations.

Potential closure requirements for selected SWMUs will be defined through a voluntary Phase I RFI/Release Assessment process as described in the RCRA Corrective Action Plan (EPA 520-R-94-004). If corrective actions are required at selected SWMUs, all corrective actions will be completed in accordance with the requirements established by the regulator. Final closure of all other SWMUs described in the Resource Conservation and Recovery Act (RCRA) Operating permit will be completed to demonstrate compliance with the Closure Performance Standards contained in 20 NMAC 4.1, Subpart V, 264.111.

THIS PAGE LEFT BLANK INTENTIONALLY

TABLES

THIS PAGE LEFT BLANK INTENTIONALLY

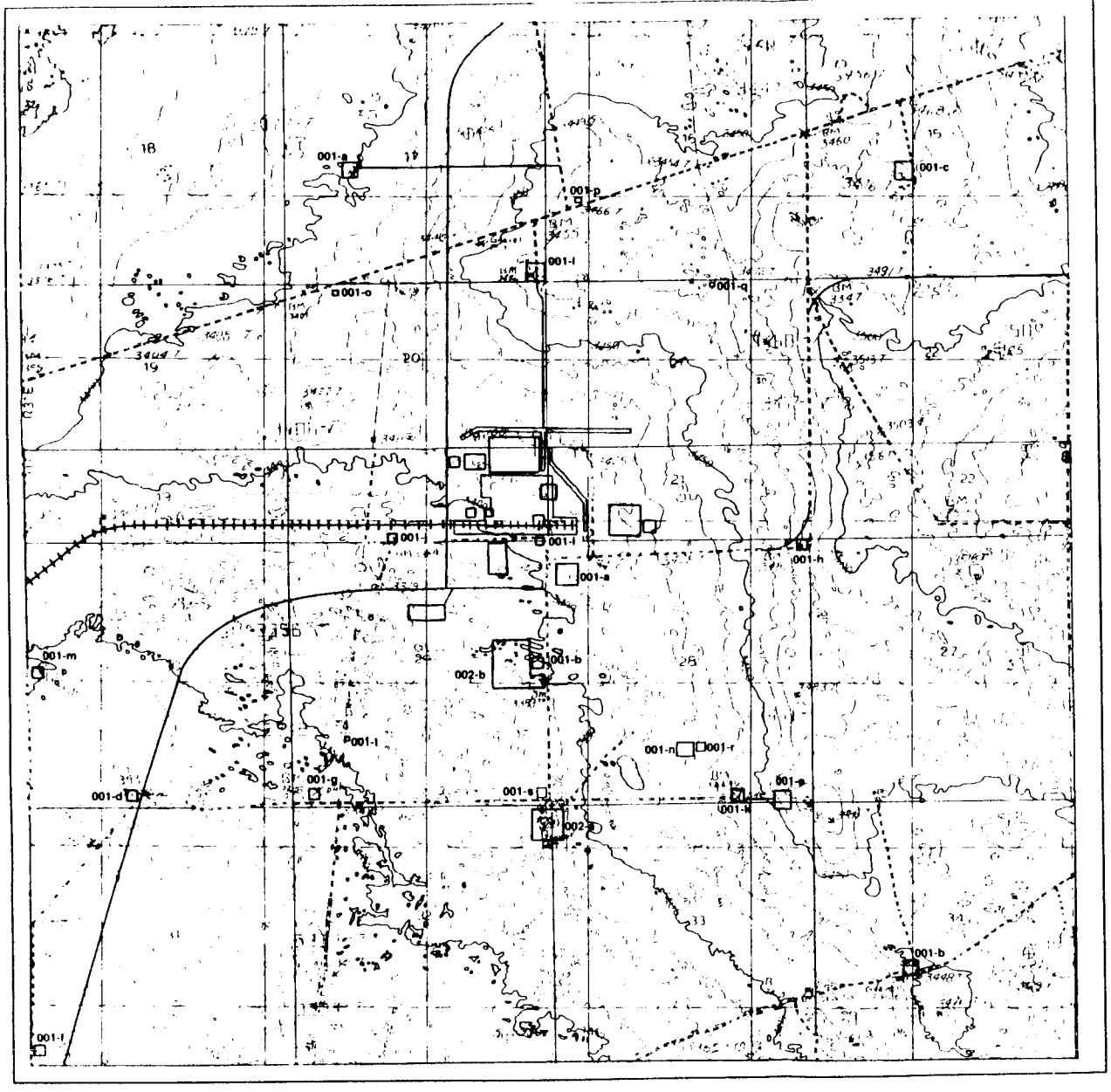
TABLE J-1
SOLID WASTE MANAGEMENT UNIT (SWMU) DESCRIPTIONS

SWMU No.	Unit Type	Unit Description	Waste Description
001	Mud Pits	Thirteen decommissioned mud pits on drill pads are identified in the RCRA Facility Assessment (RFA). Additional mud pits associated with seven groundwater monitoring well sites have been created since the RFA. These were used for settling drill cuttings out of the drilling fluids being used in drilling holes to support hydrologic testing and monitoring, potash evaluation, and drilling for hydrocarbons.	Sodium- and potassium chloride-saturated brine; starch; bentonite gel; diesel fuel; drill cuttings; metal cuttings; grease; hydraulic fluid; motor oil.
002	Landfills	Two landfills used for disposal of construction debris are identified in the RFA.	Foundation excavation soils; concrete; scrap wood; and metal.
003	Storage Yards	One yard used for storage of construction and maintenance materials, wastewater, and used oils or materials that can be reclaimed or recycled has been identified in the RFA.	Water contaminated with motor oil, hydraulic oil, and diesel fuel; used hydraulic oil, motor oil, antifreeze, glycol-based oils, chemical grout; used lead acid batteries; scrap metal. Used hydrocarbons are collected in containers.

THIS PAGE LEFT BLANK INTENTIONALLY

FIGURES

THIS PAGE LEFT BLANK INTENTIONALLY



002 a — SWMU Identification Number With SUB-SWMU Letter Designation

0 2000 FT
0 500 1000 M
SCALE

Figure J-1
Location of SWMUs within the WIPP Site Boundary

APPENDIX J1
SOLID WASTE MANAGEMENT UNIT CHARACTERIZATION SHEETS

THIS PAGE LEFT BLANK INTENTIONALLY

References

New Mexico Environment Department (NMED), 1994, "Assessment of Solid Waste Management Units at the Waste Isolation Pilot Plant," NMED/WIPP 93-001, New Mexico Environment Department, Santa Fe, New Mexico.

THIS PAGE LEFT BLANK INTENTIONALLY

APPENDIX J1
SOLID WASTE MANAGEMENT UNIT CHARACTERIZATION SHEETS

001 MUD PITS

Unit Type:	Mud Pits
Unit Use:	Storage/Settling
Operational Status:	Decommissioned/In Use
Use Period:	1970s - Present
Materials Managed:	Solid Waste
Hazardous Release:	None
Radioactive Release:	None
Information source(s):	Process Knowledge

Unit Description

Refer to Figure J-1 for location. Thirteen decommissioned mud pits are identified in the WIPP RFA. Additional mud pits associated with seven groundwater monitoring well sites have been created since the RFA. They were used for settling drill cuttings out of the drilling fluids being used in drilling holes to support hydrologic testing and monitoring, potash evaluation, and drilling for hydrocarbons. These mud pits ranged in size from approximately 150 by 150 by 5 feet (ft) (46 by 46 by 1.5 m) to 10 by 30 by 5 ft (3 by 9 by 1.5 m). Diesel fuel, foaming agents and other organic additives were added to the drilling mud to reduce dissolution of the water-soluble rocks, promote hole stability, and to help lubricate the drill rods. It is not known how many of the wells were drilled using diesel in the drilling mud. Each mud pit was lined with a plastic sheet and used for one to two months during drilling, then allowed to dry out. To facilitate drying, holes were cut in the bottom of the liner of some pits. In general, once a pit was dry, it was covered with the soil that had been removed to make the berms and then graded to the original contours. The individual mud pits in SWMU No. 001 are listed on Table J1-1. It is difficult to determine the exact location of most of the mud pits because of the grading and revegetation that has taken place.

Many of these mud pits were the result of exploration activity that was conducted prior to the selection of the area for the WIPP facility and, therefore, were not created by DOE in support of the WIPP Project. All such locations are indicated in Table J1-1.

Waste Description

Materials in the mud pits consisted of sodium- and potassium chloride-saturated brine to which starch, bentonite gel, and diesel fuel were added; drill cuttings; metal cuttings; trace amounts of hydraulic fluid, grease, and motor oil; and the plastic liner.

Release Information

Potential releases from each of the drill sites occurred when the mud pits were drained by cutting holes in the liner. The materials released consisted of saturated brines, which are not considered hazardous under the RCRA. All of the solids confined in the plastic liner of the mud pits were buried when the pits were covered with soil and graded.

TABLE J1-1
SWMU DATA -- MUD PITS

SWMU[a]	Location[b]	Hole No.	No. of Pits[c]	Period of Use	Well Status	Size of Drill Pad (Acres/ Hectares)
001-a (001-x)	NW, NE, SW, 17	WIPP-13	2	8/78 & 10/85	Open	4/1.6
001-b[d] (001-p)	SW, NE, SW, 34	Cotton Baby	2	1973-1974	Plugged	3/1.2
001-c[d] (001-o)	NW, NE, SW, 15	Badger Unit	1	1974	Plugged	2/0.8
001-d[d] (001-t)	SE, SE, SW, 30	IMC-374	1	Unknown (pre-1975)	Plugged	1/0.4
001-e (001-q)	SE, SE, SE, 28	DOE-1	2	1982	Open	3/1.2
001-f (001-n)	SW, SW, SW, 31	P-15	1	10/76	Plugged	1/0.4
001-g (001-g)	SW, SW, SW, 29	H-14 P-1	2	9/86 8/76	Sampled once/3 yrs. Plugged	1/0.4
001-h (001-h)	NE, NE, NE, 28	H-15 P-2	2	10/86-11/86	Sampled once/3 yrs.	1/0.4
001-i (001-s)	SE, SE, SE, 20	ERDA-9	1	4/76-6/76	Open	2/0.8
001-j (001-j)	SE, SE, SW, 20	P-3	1	8/76-9/76	Plugged	0.5/0.2
001-k (001-k)	SE, SW, SE, 28	P-4	1	8/76-9/76	Plugged	.75/0.3
001-l (001-l)	SE, SE, SE, 17	P-5 WIPP-12	4	9/76 11/78 & 10/85	Plugged Open	6/2.4
001-m (001-m)	SW, SW, NW, 30	P-6	1	9/76	Plugged	1/0.4
001-n (new)	SE, NW, SW, 28	H-19	multiple	1994-present	Open	4.65/1.9
001-o (new)	NW, NE, NW, 20	WQSP-1	2	1994-present	Open	0.46/0.19
001-p (new)	SW, NW, SW, 16	WQSP-2	2	1994-present	Open	0.46/0.19
001-q (new)	SE, SW, SW, 16	WQSP-3	2	1994-present	Open	0.46/0.19
001-r (new)	SE, NW, SW, 28	WQSP-4	2	1994-present	Open	0.46/0.19
001-s (new)	SE, SE, SE, 29	WQSP-5	2	1994-present	Open	0.46/0.19
001-t (new)	SW, NE, SW, 29	WQSP-6 WQSP-6A	4	1994-present	Open	0.46/0.19

[a]SWMU designation in parentheses is the designation used in the WIPP RCRA Facility Assessment.
[b]All of the mud pits are in T22S, R31E. The location column gives the 1/4 of the 1/4 of the 1/4 of the section.
[c]Probable number of mud pits. Many of the drill pads were used to drill several holes, requiring the use of more than one mud pit.
[d]These are wells that were not drilled at the request of DOE; they were drilled for hydrocarbon and potash exploration.

THIS PAGE LEFT BLANK INTENTIONALLY

002 LANDFILLS

Unit type:	Landfill
Unit use:	Disposal
Operational status:	Active
Use period:	1976 - Present
Materials managed:	Solid Waste
Hazardous release:	None
Radioactive release:	None
Information source(s):	Process Knowledge Aerial Photos

Unit Description

Refer to Figure J-1 for location. Two areas have been used as landfills at the WIPP facility. The older location, called the Brinderson Landfill (002-a),[1] is located 1 mi (1.6 km) due south of Zone I. Prior to use as a construction landfill, the area was used as a quarry for road-bed materials. It was an active landfill from 1976 to January 1988 and covers about 4 acres (ac) (1.6 hectares [ha]). The closure of the Brinderson Landfill was approved by the U.S. Department of Interior, Bureau of Land Management (BLM). Since it was closed, the Brinderson Landfill has been covered over and reseeded. The new landfill (002-b)[2] is located 1/2 mi (0.8 km) south of Zone I. The new construction landfill was developed in two parts. The first part, to the south of the current one, was excavated on BLM land and operated under a BLM permit until 1989. It was closed at the request of the BLM. The second part of the landfill was opened on land designated by the BLM as part of the DOE Exclusive Use Area in Public Land Order 6403. Ground was first broken for the new landfill area in November 1989; it is still active and covers about 15 ac (6 ha). Permits were obtained from the BLM for both landfills on BLM-administered land.

Waste Description

Both of the landfills have been used to bury construction debris consisting of foundation excavation soils, waste concrete, scrap wood, and metal. In addition, it has been reported that small amounts of nonconstruction debris (most likely office wastes) were dumped in the Brinderson Landfill. No asbestos materials are known to have been disposed of in the landfills. Disposal of RCRA hazardous waste or hazardous constituents in the construction landfill is done in accordance with written procedures.

Release Information

Releases of RCRA hazardous waste or hazardous constituents have not occurred at these sites.

---

[1]The Brinderson Landfill is designated as SWMU 003-A in the RFA.

[2]The new landfill is designated as SWMU 003-B in the RFA.

003 STORAGE YARDS

Unit type:	Storage Areas
Unit use:	Storage
Operational status:	Active
Use period:	1976 - Present
Materials managed:	Solid Waste
	Hazardous Waste
	Oils
Hazardous release:	Potential
Radioactive release:	None
Information source(s):	Process Knowledge
	Aerial Photos

Unit Description

Refer to Figure J-1 for location. One area presently used for storage was designated in the RFA. This storage yard, the Portacamp (003-a),[1] is located about 1,000 ft (305 m) southeast of Zone I. The yard is used to store construction and maintenance materials and as temporary storage for wastewater and waste oils awaiting laboratory analysis or recycling. The waste oils are recycled if free of hazardous contamination. The area is approximately 2 ac (0.8 ha) in extent and has been active since 1976.

Waste Description

The wastes stored at the Portacamp are water contaminated with motor oil, hydraulic oil, and diesel fuel from the vehicle wash bays; used hydraulic oil; used motor oil; glycol-based oils; used antifreeze; discontinued oils and empty 55-gallon drums. In 1987 the excess chemical grout from grouting the Exhaust Shaft and the Waste Shaft was stored in this yard prior to being shipped off site for disposal as hazardous waste.

Release Information

There have been no releases of RCRA hazardous waste or hazardous constituents from the area; however, small areas of stained soil under the pallets where excess or used petroleum products are stored indicate there have been minor releases of oil and petroleum products (non-RCRA regulated materials) from the drums. Any releases from the area used for staging wastewater and waste oils are remediated according to the applicable WIPP facility procedure.

[1]The Portacamp is designated as SWMU 004-A in the RFA.

APPENDIX 2

PERMIT CLOSURE FILE FOR THE BRINDERSON LANDFILL (NM-067-LUP-219)

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT
Carlsbad Resource Area Headquarters
P. O. BOX 1778
Carlsbad, New Mexico 88220

NM-067-LUP-219
2920-(067) BKY

AUG 1 5 1989

Memorandum

To: Area Manager (067)

From: Realty Specialist AK

Subject: Close Case

A recent inspection revealed that our recommendation to cover the debris, compact, and reseed had been accomplished. I recommend the file be closed.

Bobbie K. Young

I concur: Roland C. Manns
Area Manager

8/15/89
Date

Department of Energy
Albuquerque Operations Office
Waste Isolation Pilot Plant Project Office
P. O. Box 3090
Carlsbad, New Mexico 88221

RECEIVED

AUG 17 1989

AUG 15 1989

Ms. Bobbe Young
Realty Specialist
Carlsbad Resource Area
Bureau of Land Management
P. O. Box 1778
Carlsbad, NM 88220

Dear Ms. Young:

In reference to the reclamation efforts at Brinderson Construction Landfill, permit number NM-067-LUP-219, an alternate seed mix is being used rather than the Bureau of Land Management seed mix for sandy sites. The Brinderson site is being monitored as part of the reclamation experimental program at WIPP. [Please refer to WD:88:00623 (Proposal for Study on Arid Land Reclamation) and a review letter from The Bureau of Land Management (3042(067)).]

Enclosed is a list of the seeds planted at this site. The list for 1988 seedings are included in experimental plots which are being monitored annually. The list of plants for repairing the site in July and August, 1989 is slightly different. Seeding rates are given in pure live seed (PLS) units. The amounts given are twice the recommended seeding rates for routine seeding activities. If you have any questions, please contact Joneen Cockman of the Regulatory and Environmental Programs Section (REPS), 887-8292.

Sincerely,

Jack Tillman
Project Manager

Enclosure

cc w/o enclosure:
R. Kehrman, WID
J. Cockman, IT/WIPP
V. Ybarra, WID

Seed Mix for Reseeding the Center of Brinderson Construction Landfill

Scientific Name	Common Name	PLS Rate
Sporobolus airoides	alkali sacaton	3.00 lb/acre
Bouteloua curtipendula	sideoats grama	8.00
Setaria macrostachya	plains bristlegrass	6.00
Eragrostis intermedia	lovegrass	3.00
Eragrostis trichodes	lovegrass	3.00
Sporobolus cryptandrus	sand dropseed	3.00

Seed Mix for the 1988 Seeding of Brinderson Construction Landfill

Scientific Name	Common Name	PLS Rate
Bouteloua curtipendula	sideoats grama	8.00 lb/acre
Setaria macrostachya	plains bristlegrass	6.00
Eragrostis intermedia	lovegrass	3.00
Eragrostis trichodes	lovegrass	3.00
Sporobolus cryptandrus	sand dropseed	3.00
Andropogon scoparius	little bluestem	8.00
Aristida purpurea	threeawn	6.00

2920(067) BRY

Byoung
4-15-89
AK 8/15/89

AUG 1 6 1989

Mr. Bob Kerhman
I. T. Corp.
P. O. Box 2078
Carlsbad, NM 88220

Dear Mr. Kerhman:

A recent inspection of your closed construction debris pit was performed by Bobbe Young.

The debris had been covered, compacted, and reseeded. We appreciate the cooperation displayed by Joneen Cockman and other members of your staff in helping us close out this Land Use Permit.

Sincerely,

Orig. Signed by Richard L. Manus

Richard L. Manus
Area Manager

cc: Joneen Cockman
I. T. Corp.
P. O. Box 2078
Carlsbad, NM 88220

Joe Lippus
DOE
P. O. Box 2078
Carlsbad, NM 88220

067:BYoung:nf:8/9/89:WANG#0160M.1

NM-067-LUP-219
2920 (067) bky

MAY 3 1 1989

Mr. Bob Kerhman
I. T. Corp.
P. O. Box 2078
Carlsbad, NM 88220

Dear Mr. Kerhman:

An inspection of your closed construction debris pit was performed by Bobbe Young, Realty Specialist, and Fred Lockley, Hazardous Material Specialist, on February 27, 1989. Another site inspection was made by Bobbe Young May 18, 1989.

The site has been recontoured and reseeded as required and the grass is beginning to come up. Unfortunately, there is a great deal of debris on the area that should be removed. We recommend that you cover this debris with at least two feet of ground cover, compact it, and then reseed.

An inspection was also made of the active dump site (NM-067-LUP-237). Everything seemed to be environmentally safe at this area.

We appreciate the spirit of cooperation you have displayed in our past endeavors. If you have any questions, please call Bobbe Young at 887-6544.

Sincerely,

/s/ Saundra L. Porenta

Richard L. Manus
FOR Area Manager

cc:
Joe Lippus, DOE
P. O. Box 2078
Carlsbad, NM 88220

Veronica Ybarra
I. T. Corp.
P. O. Box 2078
Carlsbad, NM 88220

067:BYoung:by:5-24-89:0712A

UNITED STATES GOVERNMENT

memorandum

DATE: January 27, 1986

REPLY TO ATTN OF: Jim Goodbar, Realty Specialist, CRA Ref: NM-067-LUP-219

SUBJECT: Landfill Inspections During 1/14/85 to 1/14/86

TO: Case File

The subject landfill was inspected several times during its first year of authorization by me and members of D.O.E. Compliance with the special stipulations has been adequate and the fill operation is progressing logically. Future inspections will be documented on Case Log.

Jim Goodbar

OPTIONAL FORM NO. 10
(REV. 1-80)
GSA FPMR (41 CFR) 101-11.6
5010-114

UNITED STATES GOVERNMENT

memorandum

DATE: January 23, 1986

REPLY TO ATTN OF: Jim Goodbar, Realty Specialist, CRA Ref: NM-067-LUP-219

SUBJECT: Renewal of Land Use Permit No. NM-067-LUP-219

TO: Area Manager, Carlsbad Resource Area 1-24-86

D.O.E. has requested a renewal of their Land Use Permit (NM-067-LUP-219) for a disposal area for construction debris. I have recently inspected the site and there is still sufficient room for the burial of more debris. I recommend renewal of the permit to January 14, 1987.

Jim Goodbar

OPTIONAL FORM NO. 10
(REV. 1-80)
GSA FPMR (41 CFR) 101-11.6
5010-114

☆U.S. GOVERNMENT PRINTING OFFICE : 1982 0 - 361-526 (7290)

Department of Energy
Albuquerque Operations Office
Waste Isolation Pilot Plant Project Office
P. O. Box 3090
Carlsbad, New Mexico 88221

JAN 16 1986

Mr. Charles S. Dahlen
Area Manager
Bureau of Land Management
P.O. Box 1778
Carlsbad, NM 88221

Dear Mr. Dahlen:

The existing Land Use Permit (NM-067-LUP-219) for the disposal of construction debris expires January 14, 1986. We have need to continue this disposal activity in connection with construction activities at WIPP. We therefore, respectfully request an extension of this permit for one year, to January 14, 1987.

Thank you for your attention in this matter.

Sincerely,

W. R. Cooper
Project Manager

WIPP:JMO 86-530

cc:
J. Goodbar, BLM

1 ✓ 1-21
3 File 2900
2 X Goodbar 1/17/86

Form 2920-1
(July 1982)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0009
Expires: May 31, 1984

FOR BLM USE ONLY

Application Number

NM-067-LUP-219

LAND USE APPLICATION AND PERMIT

Sec. 302(b) of P.L. 94-579, October 21, 1976, 43 U.S.C. 1732

APPLICATION

1. Name *(first, middle initial, and last)*	Address *(include zip code)*	Phone *(include area code)*
U.S. Department of Energy (Brinderson Corporation)	Waste Isolation Pilot Plant 35 miles east of Carlsbad, NM	(505) 887-0586

2. Attach map or sketch showing public lands for which you are applying

3. Proposed date(s) of use: from January 14, 1985 to January 14, 1986

4. Give legal basis for holding interest in lands in the state of New Mexico
(Check appropriate box and explain.)

☐ Resident ☐ Partnership
☐ Corporation ☐ County
☐ Local Government ☐ State Government
☒ Other

Federal Government

5. Are the lands now improved, occupied, or used? ☐ Yes ☒ No *(If "yes," describe improvements and purposes, identify users and occupants.)*

6. Do you need access to the land? ☒ Yes ☐ No *(If "No," describe access.)*

Existing Physical & Legal Access

7a. What do you propose to use the lands for?

Disposal of construction debris

b. What improvements and/or land development do you propose? *(To complete application processing, engineering and construction drawings may be required.)*

The current excavated pit will be rehabilitated by filling the area with construction debris and then a soil covering.

c. What is the estimated capital cost?	d. What is the source of water for the proposed use?
$ N/A	N/A

I CERTIFY That the information given by me in this application is true, complete, and correct to the best of my knowledge and belief and is given in good faith.

(Signature of Applicant) 1/14/85 (Date)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

January 11, 1985

BUREAU OF LAND MANAGEMENT (BLM) PERMIT STIPULATIONS FOR LANDFILL OPERATIONS IN THE ABANDONED CALICHE PIT, SOUTH OF THE WIPP SITE IN SECTIONS 32 & 33.

1. Only disposal of construction wastes (no office trash or putrifiables).

2. Monthly inspection.

3. Coverage as required.

4. Burial of the two existing car bodies in a trench prior to any debris disposal.

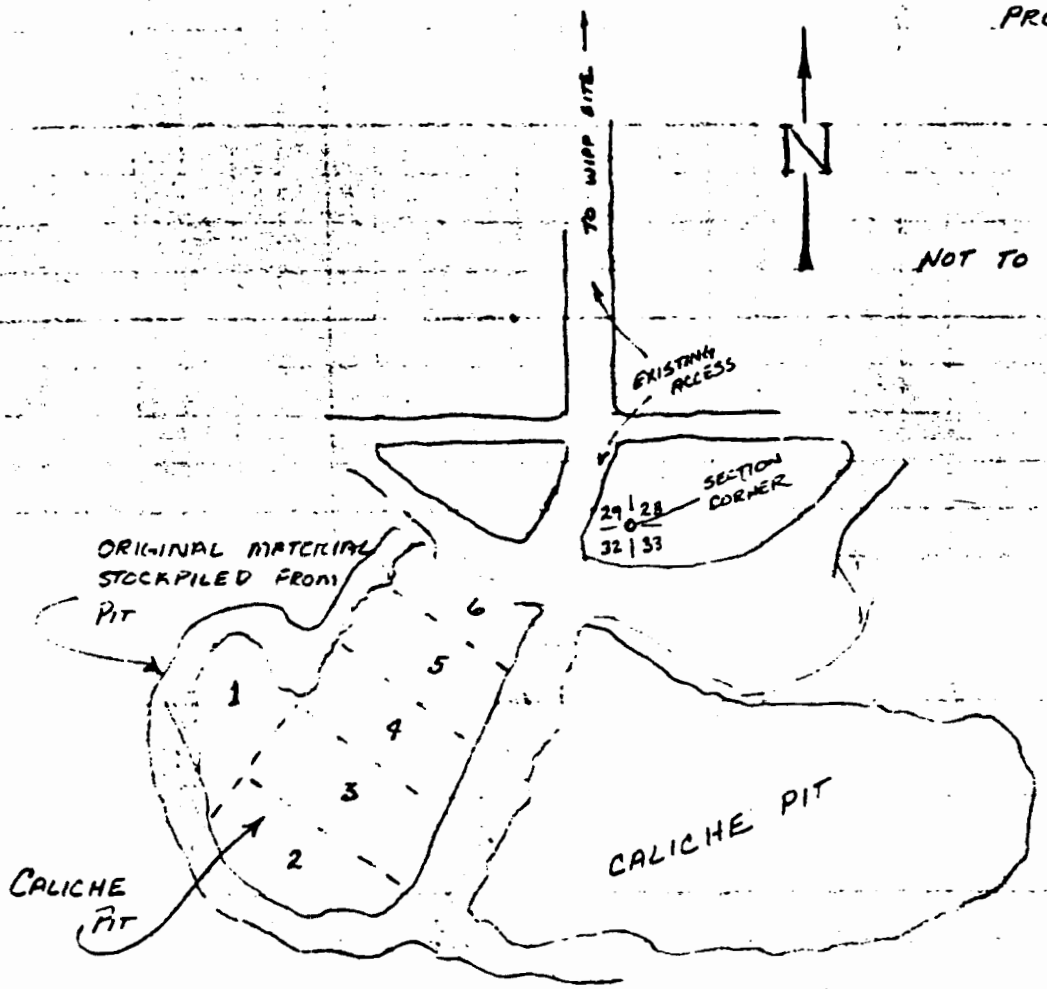
5. Final coverage will be no less than two (2) feet thick of stockpiled top soil.

6. The area will be contoured and reseeded according to standard seeding stipulations in the Roswell District.

7. There will be at least one coverage of the debris between the top cover and pit bottom in the deep pit area.

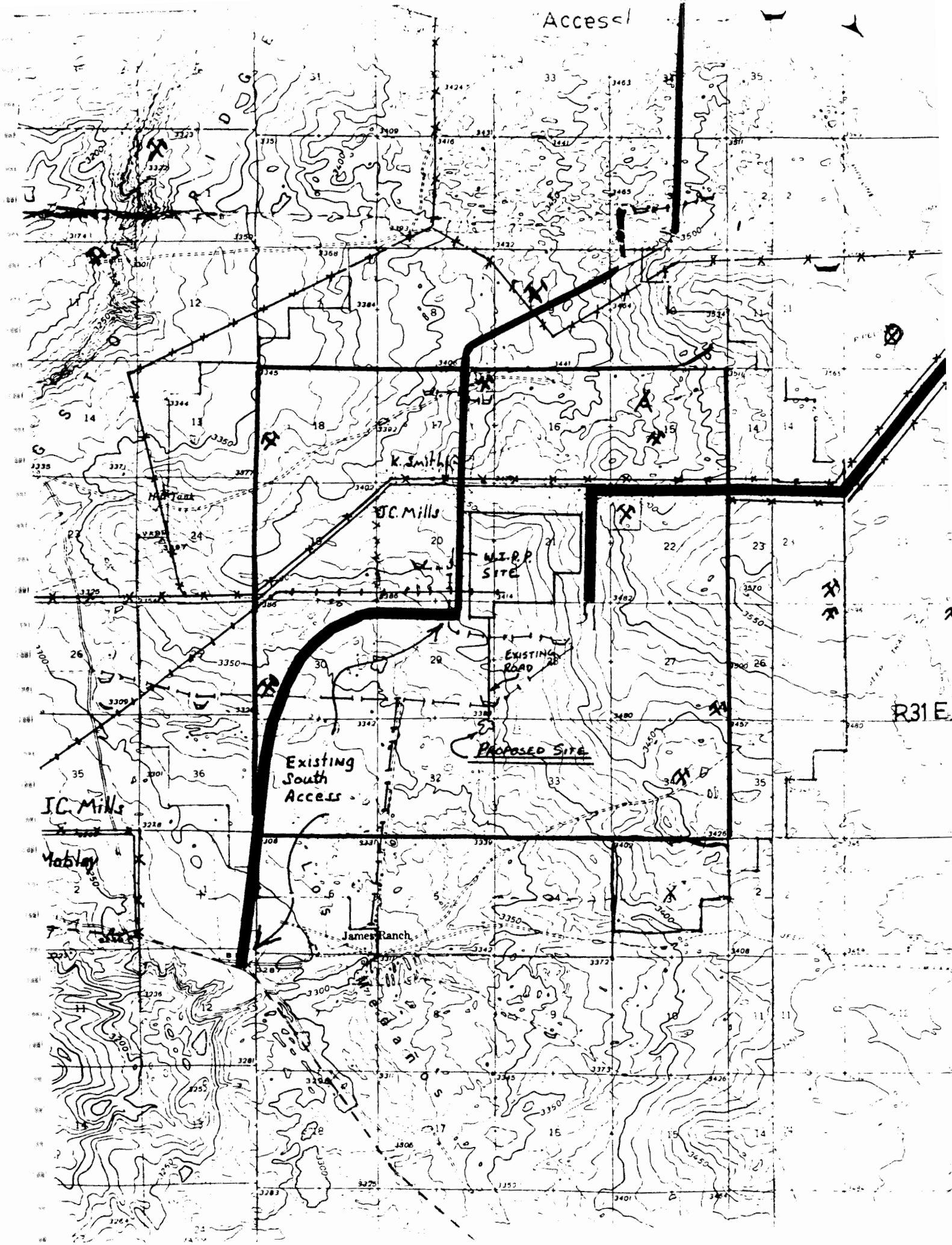
JANUARY 11, 1985

MODIFIED LAND FILL
PROPOSED USE PLAN



1. THE CALICHE PIT WILL BE FILLED IN SECTIONS SO NOTED BY THE DIAGRAM IN THE SEQUENCE SHOWN.

2. WHEN BACK FILL IS COMPLETE THE ORIGINAL MATERIAL STOCKPILED AROUND THE PIT WILL BE USED AS A FINAL COVER.


Access
K. Smith
J.C. Mills
W.I.P.P. SITE
EXISTING ROAD
PROPOSED SITE
Existing South Access
J.C. Mills
Hobley
James Ranch
R31 E.

Department of Energy
Albuquerque Operations Office
Waste Isolation Pilot Plant
P.O. Box 3090
Carlsbad, New Mexico 88221

JAN 14 1985

Mr. Charles S. Dahlen
Area Manager
ATTN: James Goodbar
Bureau of Land Management
P. O. Box 1778
Carlsbad, New Mexico 88220

Dear Mr. Dahlen:

Discussions with your Mr. J. Goodbar have indicated mutual beneifit would be gained for the Bureau of Land Management (BLM) and for the Wipp Project by using an abandoned caliche pit adjacent to the WIPP Site (Section 32 & 33) for disposal of construction debris and possibly plant maintenance debris.

We understand this area would be made available at no cost to the WIPP Project provided all land fill and cover operations were made in accordance with BLM regulations and all filled sections of the pit were reseeded to BLM specifications.

Attached is a Land Use Application & Permit for use of this land as a disposal site. Also attached is a list of seven stipulations discussed and agreed between BLM and DOE and (2) sketches showing the pit location and the proposed fill

areas. Please review the application and advise what time limitations would apply and when landfill operations could commence.

Thank you for your help in this matter.

Sincerely yours,

W. R. Cooper
Project Manager

WIPP:JMO 85-0030

cc: w/Attachment
1. Mary Wilson, AL

cc: w/o Attachment
1. R. Figlik, WPO
2. B. Gage, WPO
3. J. O'Donnell, WPO
4. J. Pickens, USACE
5. D. Bleibtrey, USACE

APPENDIX 3

PERMIT CLOSURE FILE FOR THE WIPP CONSTRUCTION LANDFILL (NM-067-LUP-237)

Form 1541-3
(July 1965)
(formerly 4-1599 a)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

LWP 237

CONFIRMATION/REPORT OF TELEPHONE CONVERSATION

TO		FROM	
	Name		Name Al Collar
	Office		Office
	Location		Location
	Telephone Number		Telephone Number

Purpose of Call:

The WIPP Construction Debris landfill Can be Closed Out, as far as he's Concerned. He's not going to require any kind of Statement from them as to "there are no hazardous

Explanatory Remarks:

Materials buried there."

March 1, 1990
(Date)

Bobbie F. Young
(Signature)

Bye... 2-15-90

FEB 1 5 1990

In Reply
Refer To:
NM-067-LUP-237
2920 (067) bkg

AL 2-15-90

Mr. Arlen Hunt
Acting Project Manager
Department of Energy, WIPP
P.O. Box 3090
Carlsbad, NM 88221

Dear Mr. Hunt:

A recent field examination of your construction debris landfill revealed the area has been covered and contoured except for a small pit area on the west end. This should be filled and the remaining surface debris removed.

We would like to see a gentler contour on the south edge of the area of no greater than 3:1 in the area you have previously filled. We recommend this be accomplished when you have the equipment at the site to fill the pit on the west end.

We do require reseeding of the area. The seeding requirements attached to your permit may no longer be the best suited for the soil mix used in filling the area since the fill dirt was not the native sandy soil. Pits are normally covered with the stockpiled top soil. We understand the fill material was from a brine pit at a drilling operation. We request you conduct a soil analysis to determine which seed mixture to use. If your personnel wish to recommend a seed mixture, based on the soil analysis, we will consider your recommendations. Otherwise, we will specify a seed mix after the soil analysis is conducted, and the results are provided to the BLM.

If you have any questions, contact Bobbe Young at (505) 887-6544.

Sincerely,

Orig. Signed by Richard L. Manus

Richard L. Manus
Area Manager

cc: Veronica Ybarra
I.T. Corp.
P.O. Box 2078
Carlsbad, NM 88220

Bob Kehrman
I.T. Corp.

067:BYOUNG:sp:2-15-90:WA.RGIB0001W/14

Plan ?
then file

RECEIVED

JUL 19 10 42 AM '88

CARL ... AREA ... RCE ... ERS

1703 (064)

Mr. Jack B. Tillman
WIPP Project Manager
P. O. Box 3090
Carlsbad, NM 88221

Dear Mr. Tillman

We received your courtesy copy of DOE's Sanitary Landfill Permit application that was submitted to the State of New Mexico.

As noted in your application to the state, 4 acres of the proposed 22 acre site is currently under BLM permit number 237, scheduled to expire February 9, 1990.

Mr. Tillman, the Bureau of Land Management has been directed to begin closure proceedings on all landfill sites under our jurisdiction. Due to this specific direction we regret to inform DOE that we cannot change the original terms of the permit to allow for a sanitary landfill, nor are we able to extend the permit expiration date.

We regret this situation, especially in light of the cooperative spirit we have enjoyed with the Department of Energy Management, staff, and contractors at the WIPP site.

If Mr. Tom Lukow of your staff needs additional information concerning this site please have him contact our District Realty Specialist, John Rakowski at FTS 572-0277.

Sincerely,

Orig. Sgd. David L. Mast

Francis R. Cherry, Jr.
FOR District Manager

cc:
NM (067, D. Manus)
NM (065, J. Rakowski)

PERMIT

Permission is hereby granted to

of U.S. Department of Energy

to use the following-described lands:

Permit Number NM-067-LUP-237

TOWNSHIP	RANGE	SECTION	SUBDIVISION
T22S	R31E	29	N1/2, NE1/4, SE1/4 (22 31 29 09)

Meridian	State	County	Acres *(number)*
N.M.P.M.	New Mexico	Eddy	

for the purpose of disposal of construction debris.

and subject to the following conditions:

1. This permit is issued for the period specified below. It is revocable at the discretion of the authorized officer of the Bureau of Land Management, at any time upon notice. This permit is subject to valid adverse claims heretofore or hereafter acquired.

2. This permit is subject to all applicable provisions of the regulations (43 CFR 2920) which are made a part hereof.

3. This permit may not be assigned without prior approval of the authorized officer of the Bureau of Land Management.

4. Permittee shall not enclose roads or trails commonly in public use.

5. Authorized representatives of the Department of the Interior, other Federal agencies, and State and local law officials shall at all times have the right to enter the premises on official business.

6. Permittee shall pay the United States for any damage to its property resulting from the use.

7. Permittee shall notify the authorized officer of address change immediately.

8. Permittee shall observe all Federal, State, and local laws and regulations applicable to the premises and to erection or maintenance of signs or advertising displays including the regulations for the protection of game birds and game animals, and shall keep the premises in a neat, orderly, and sanitary condition.

9. Permittee shall pay the authorized officer, in advance, the lump sum of $ for the period of use authorized by this permit or $ dollars, annually, as rental or such other sum as may be required if a rental adjustment is made.

10. Use or occupancy of land under this permit shall commence within months from date hereof and shall be exercised at least days each year.

11. Permittee shall take all reasonable precautions to prevent and suppress forest, brush, and grass fires and prevent pollution of waters on or in the vicinity of the lands.

12. Permittee shall not cut any timber on the lands or remove other resources from the land without prior written permission from the authorized officer. Such permission may be conditioned by a requirement to pay fair market value for the timber or other resources.

13. Permittee agrees to have the serial number of this permit marked or painted on each advertising display or other facility erected or maintained under the authority of such permit.

14. This permit is subject to the provisions of Executive Order No. 11246 of September 24, 1965, as amended, which sets forth the Equal Opportunity clauses. A copy of this order may be obtained from the signing officer.

15. Permittee acknowledges, by signing below, that he/she knows, understands and accepts the terms and conditions under which this permit is issued.

16. Special conditions *(attach additional sheets, if necessary)*

See Attached Special Stipulations Sheet

Permit issued for period

From 2/9/87

To 2/9/90

x Joe R. Gillum
(Permittee)

Charles S. Dalton
(Authorized Officer)

Area Manager, CRA 3-5-87
(Title) (Date)

INSTRUCTIONS

1. Submit, in *duplicate*, to any local office of the Bureau of Land Management having jurisdiction of the lands.

2. Applications for Land Use Permits will not be accepted unless a notification of the availability of the land for non-BLM use *(Notice of Realty Action)* has been published in the Federal Register and for 3 weeks thereafter in a newspaper of general circulation. This provision does not apply in those situations where the publication of a *(Notice of Realty Action)* has been waived by the authorized officer.

3. If the annual rental exceeds $250 dollars per year; costs of processing the application *must* be paid by the applicant in advance.

4. The authorized officer may require additional information to process an application. Processing will be deferred until the required information is furnished by the applicant.

The Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et. seq.) requires us to inform you that:
Information is needed to process application for land use authorizations, pursuant to 43 CFR Section 2920.
Information [illegible] of the applicant and [illegible] meet the requirements of 43 CFR Section 2920.1.

February 3, 1987

BUREAU OF LAND MANAGEMENT (BLM) PERMIT STIPULATIONS
FOR LANDFILL OPERATIONS IN THE SOILS BORROW PIT,
SOUTH OF THE WIPP SITE IN SECTION 29

1. Only disposal of construction wastes (no office trash or putrifiables).

2. Monthly inspection by DOE and BLM.

3. Coverage as required.

4. Final coverage will be no less than two (2) feet thick of stockpiled top soil.

5. The area will be contoured and reseeded according to standard seeding stipulations in the Roswell District.

6. There will be at least one coverage of the debris between the top cover and pit bottom in the deep pit area.

BLM Serial Number _____
Company Reference _____
_____

BLM SEEDING REQUIREMENTS IN THE ROSWELL DISTRICT

Seed Mixture 2 (Sandy Sites)

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)/acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed shall be tested and the viability testing of seed shall be done in accordance with State law(s) and within nine months prior to purchase. Commercial seed shall be either certified or registered seed. The seed mixture container shall be tagged in accordance with State law(s) and available for inspection by the Authorized Officer.

Seed shall be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture shall be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop to the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed shall be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre noted below are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the Authorized Officer. Evaluation of growth will not be made before completion of the first growing season after seeding.

Species to be planted in pounds of pure live seed per acre:

Sand dropseed (*Sporobolus cryptandrus*)	1.0
Sand lovegrass (*Eragrostis trichodes*)	1.0
Plains bristlegrass (*Setaria macrostachya*)	2.0

Pounds of pure live seed: Pounds of seed X percent purity X percent germination = pounds pure live seed

Department of Energy
Albuquerque Operations Office
Waste Isolation Pilot Plant Project Office
P. O. Box 3090
Carlsbad, New Mexico 88221

FEB 9 1987

Mr. Jim Goodbar
Bureau of Land Management
101 E. Mermod
Carlsbad, NM 88220

Dear Mr. Goodbar:

Enclosed please find a land use permit application for the disposal of construction debris in the fenced area about one-half mile south of the WIPP site. This area is currently permitted as a borrow pit (NM-060-MPS-7080).

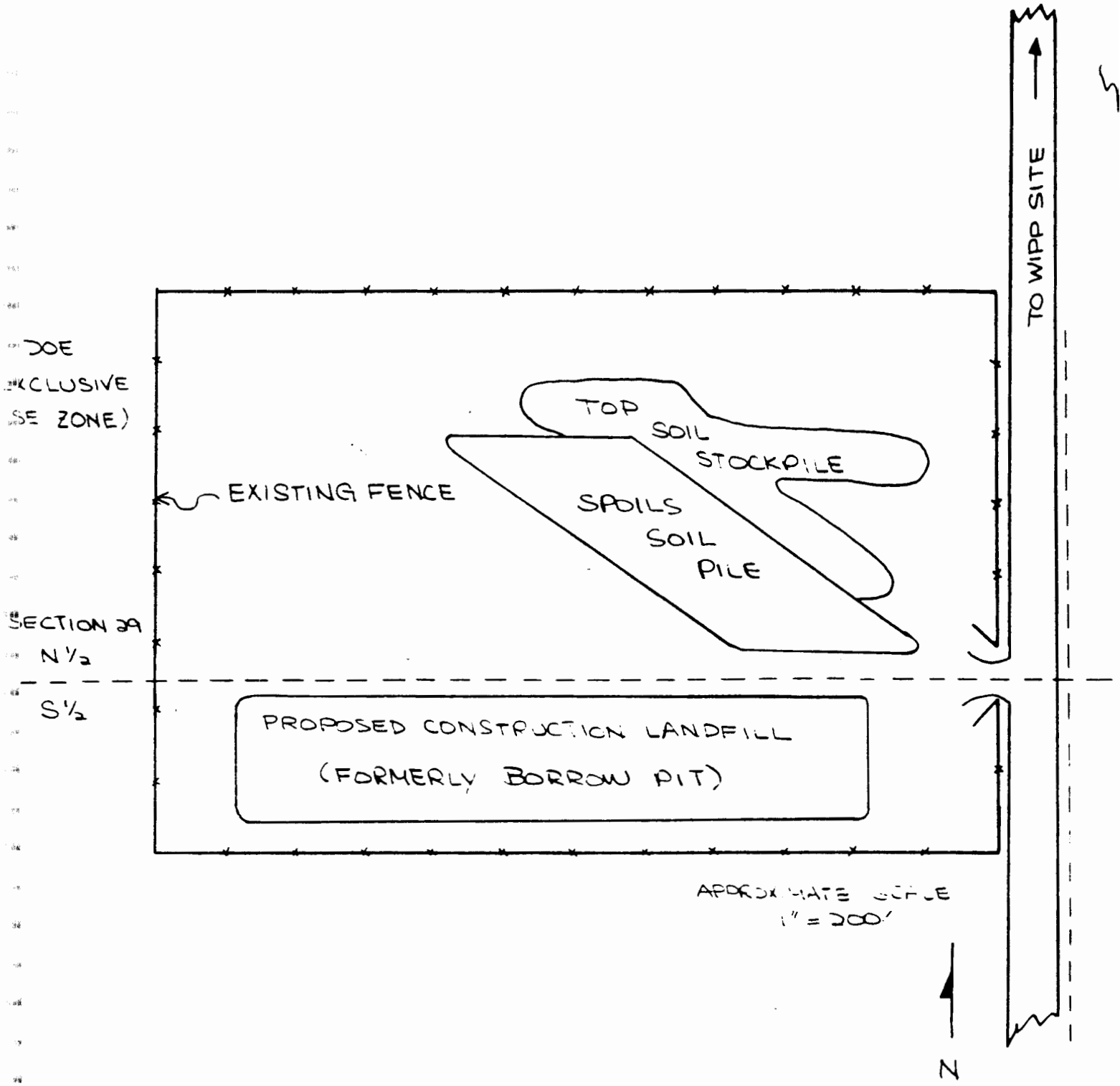
If you have any questions regarding this application, please contact Joe Lippis of my staff.

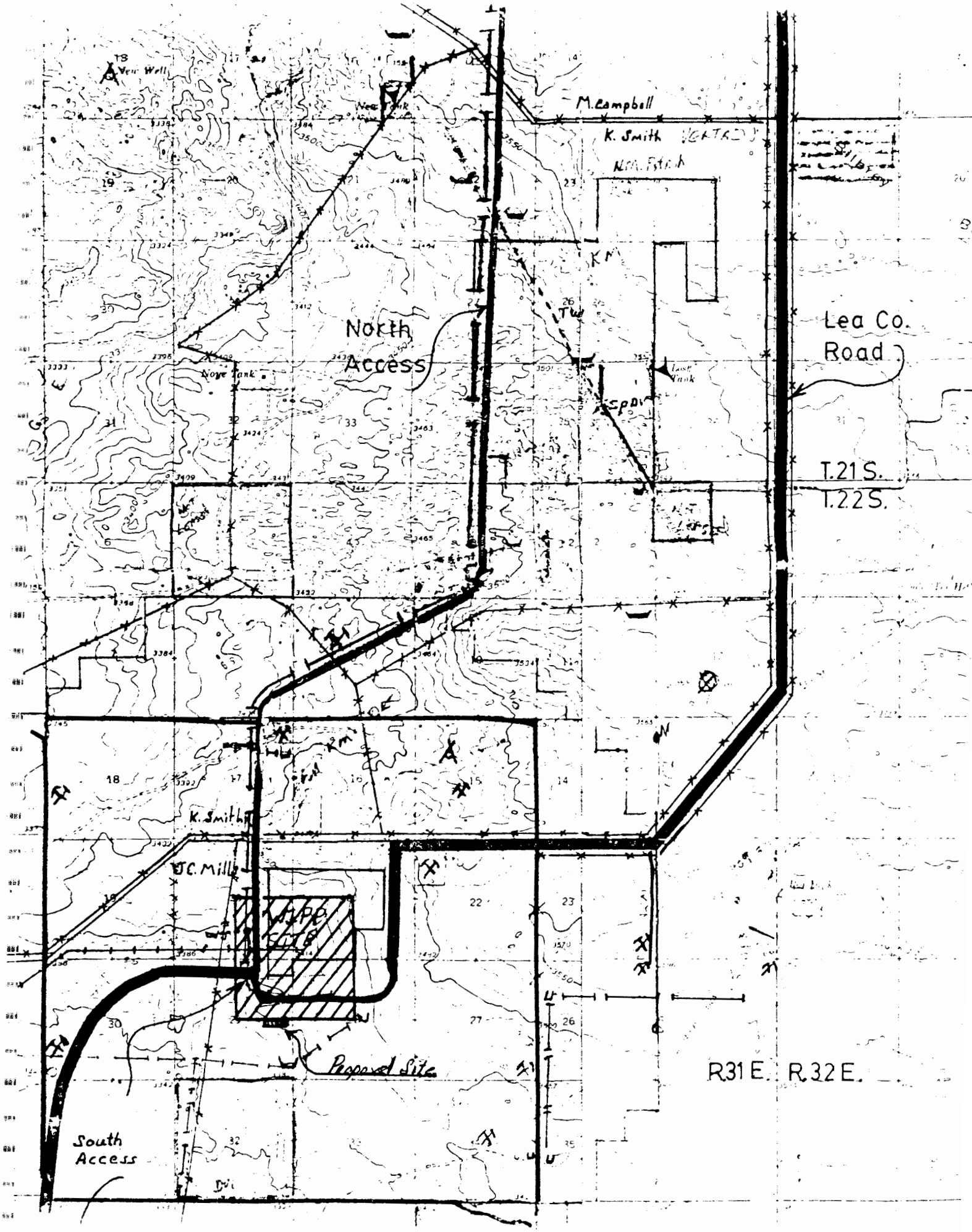
Sincerely,

Jack B. Tillman
Project Manager

Enclosure

ATTACHMENT


TO WIPP SITE
DOE
EXCLUSIVE
USE ZONE)
TOP
SOIL
STOCKPILE
EXISTING FENCE
SPOILS
SOIL
PILE
SECTION 29
N ½
S ½
PROPOSED CONSTRUCTION LANDFILL
(FORMERLY BORROW PIT)
APPROXIMATE SCALE
1" = 200'
N


New Well
New Tank
M. Campbell
K. Smith
North Access
Lea Co. Road
Nove Tank
T.21 S.
T.22 S.
K. Smith
J.C. Mills
Proposed Site
R.31 E.
R.32 E.
South Access

APPENDIX 4

WIPP SITE EFFLUENT AND HAZARDOUS MATERIALS SAMPLING PLAN, WP02-EM2, REV.0

WP 02-EM2, Rev. 0

WIPP Site Effluent and Hazardous Materials Sampling Plan

Table of Contents

1.0 INTRODUCTION . . . 1
1.1 Objectives . . . 1

2.0 PERSONNEL . . . 2

3.0 SAMPLING ACTIVITIES . . . 3
3.1 Sampling Protocol . . . 3
3.1.1 Storm Water Discharges . . . 3
3.1.2 Underground Storage Tanks . . . 3
3.1.3 Hazardous Material Characterization . . . 3
3.1.4 Site Effluent . . . 3
3.1.5 Spill Response . . . 4
3.1.6 Used Oils . . . 4
3.1.7 Solid Waste Management Units (SWMU) . . . 4
3.1.8 Contaminated Soils . . . 4
3.1.9 Contaminated Debris . . . 4
3.1.10 Site Remediations . . . 5
3.1.11 Site Investigations . . . 5
3.2 Sampling Apparati . . . 5
3.2.1 COLIWASA . . . 5
3.2.2 Weighted Bottle . . . 5
3.2.3 Dipper . . . 5
3.2.4 Liquid Thief . . . 6
3.2.5 Solid Thief . . . 6
3.2.6 Trier . . . 6
3.2.7 Auger . . . 6
3.2.8 Scoops and Trowels . . . 6
3.2.9 Peristaltic Pump . . . 6
3.2.10 Tool Decontamination . . . 6
3.2.11 Maintaining Sampling Equipment . . . 7
3.3 Quality Assurance Samples . . . 7
3.3.1 Duplicates . . . 7
3.3.2 Blanks . . . 7
3.4 Sample Containers . . . 7
3.5 Sample Preservation . . . 8

4.0 SAMPLE DOCUMENTATION . . . 9
4.1 Sample Numbers . . . 9
4.2 Sample Logbooks . . . 9
4.2.1 Sample Tracking Logbook . . . 9
4.2.2 Field Logbook . . . 9
4.3 Container Labelling . . . 10
4.4 Tamper Proof Seals . . . 10

Table of Contents

4.5 Sample Custody 11
4.5.1 Sample Chain-of-Custody Forms 11
4.5.2 Request for Analysis 11

5.0 SAFETY 13
5.1 MSDS 13
5.2 Industrial Hygiene 13
5.3 Personal Protective Equipment 13
5.4 General Safety and Sample Integrity 13

6.0 ANALYSES 14
6.1 Field General Chemistry Analyses 14
6.1.1 pH Measurement 14
6.1.2 Temperature Measurement 14
6.1.3 Conductivity Analysis 14
6.2 Qualitative and Quantitative Analyses 14

7.0 TRANSPORTATION 15
7.1 Hazardous Samples 15
7.2 Nonhazardous Samples 15

8.0 DATA PACKAGE REVIEW 16

9.0 RECORDS 17

10.0 REFERENCES 18

Table of Contents

List of Tables

Table 1 - Sampling Equipment for Particular Materials 19
Table 2 - Containers, Preservatives and Holding Times 21
Table 3 - Target Analytes and Proposed EPA Analytical Methods 22
Table 4 - Analytical Requirements for Different Sample Programs 25

List of Figures

Figure 1 - Example of a Container Label 26
Figure 2 - Example of a Container Seal 26

List of Appendices

Appendix A - Contract Analytical Laboratory
Appendix B - Personal Protective Equipment

List of Attachments

Attachment 1 - Review Form for Sample Analysis Data Package WIPP Site Effluent and Hazardous Material Sampling Program

Change History

Pages- iv, 1, 2, 4, and the word "site" was added to the title of this plan. - 6/17/94

Pages - iv, 4, 5, 8, 9, 11, 12 and 18 - 6/23/95

02497

1.0 INTRODUCTION

This document has been developed to encompass the environmental sampling activities at the WIPP site that do not fall under an existing monitoring program. Instead of writing a separate plan for each specific area, or specific procedures, this Plan will provide guidelines that incorporate all of the environmental sampling into one sampling plan, and provide one document that identifies sampling protocol, suggested analytical parameters and quality assurance requirements. This Plan does not apply to radioactive materials, personnel monitoring or industrial hygiene sampling.

Throughout the rest of this document, the WIPP Site Effluent and Hazardous Materials Sampling Plan will be referred to as the "Plan".

1.1 Objectives

The purpose of this Plan is to provide a guide for all types of environmental sampling at the WIPP site. The sampling that will fall under this Plan will be any non-radiological site effluent or hazardous material sampling activity that is not addressed by an established monitoring program. The areas of interest are as follows:

- Storm water discharge
- Underground storage tanks
- Hazardous material characterization
- Site effluent
- Spill response
- Contaminated soils
- Contaminated debris
- Used oils
- Site environmental investigations
- Site remediations
- Solid Waste Management Units (SWMU)

This Plan will outline methods for sampling, containers to use, preservation techniques, sample labeling and documentation, sample custody, suggested analyses, data review and validation.

Each sampling area will be addressed differently. There are separate requirements and different regulations for different types of samples and different sample media. The intent of this Plan was to allow the flexibility to sample each situation using the best possible method for the given situation.

The Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Material Sampling, WP 02-EM1, addresses the quality assurance/quality control measures to be taken when utilizing this Plan.

2.0 PERSONNEL

The Sampling Team will be the primary group responsible for the implementation of this plan. This Sampling Team will consist of at least three people, a team coordinator, and sampling technicians.

The team coordinator will serve as the Quality Assurance Officer (QAO). The QAO responsibilities will include determining the validity of the sample collected. This is done by verifying that the sampling technique, preservation, containment, and shipping ensure a good, representative sample that will produce valid data.

The team coordinator will be the member of the team to determine the type of sampling technique to be utilized. If additional consultation with other groups on site is needed, it is up to the team coordinator to make those contacts. Also, the end user of the data will be the team coordinator, who will review all documentation and data after the process is complete. Any interpretation of data will be the responsibility of the team coordinator. The final report generated from the sampling activity will be produced by the team coordinator with assistance from the sampling team.

The team coordinator is responsible for contacting the WIPP New Mexico Environment Department (NMED) Oversight Staff two weeks prior to when a sample is to be taken. If two weeks notice is not possible, notification will occur as early as possible. The NMED will have the opportunity to witness the sampling activities and determine if independent verification is required.

In order to prevent spills or contamination, two people are essential for sampling activities. It is a good practice to have at least an additional two people available to serve as backup in a hazardous situation. The sampling technicians are responsible for maintaining two sampling logbooks in accordance with section 4.2 of this Plan.

Each member of the team will be trained according to the requirements of the Resource Conservation and Recovery Act (RCRA), and will be part of the RCRA training matrix on site. An EPA approved or equivalent sampling course, which includes proper sampling techniques and sampling quality control management will be attended by each member of the team.

3.0 SAMPLING ACTIVITIES

3.1 Sampling Protocol

Each potential effluent or waste stream will be sampled under different conditions. There are items to be considered whenever these situations are approached.

3.1.1 Storm Water Discharges

The WIPP Site is under a general National Pollutant Discharge Elimination System (NPDES) permit for the State of New Mexico. This permit addresses monitoring of the NPDES discharges. The WIPP has established a retention basin system that will eliminate this site's need for monitoring activities. The Storm Water Pollution Prevention Plan, WP 02-14, discusses the management of the WIPP retention basins. The system greatly reduces the chance of a storm water discharge. In the event that a discharge does occur, a sample of the retained effluent must be taken to ensure that a hazardous substance has not been released. WP 02-14 also discusses the measures taken to ensure that there is not a discharge of non-storm water into the retention basin. These measures minimize the chance of hazardous substances entering the retention basin, and therefore, minimize the chance of a release to the environment.

3.1.2 Underground Storage Tanks

The WIPP Site has two underground storage tanks for diesel and unleaded fuel. These tanks are equipped with leak detection devices that will alarm if a leak occurs. Leaks are also detected by Facility Operations when there is a sudden decrease in the fuel levels. If a leak occurs, sufficient core soil samples to determine the spread or location of the leaking fuel will be required. More information about the underground storage tanks is included in WP 02-605, Underground Storage Tank Leak Detection, Inventory Control, & Corrective Action Requirements.

3.1.3 Hazardous Material Characterization

Most of the waste generated can be identified by Material Safety Data Sheets (MSDS) or the user. In the event that the materials of concern are not identifiable, the materials must be sampled for characterization by the Sampling Team.

3.1.4 Site Effluent

The site has a number of sources of effluent that are not related to the storm water runoff. As outlined in the Storm Water Pollution Prevention Plan, WP 02-14, there are two possible sources of regulated non-storm water discharges. These are the Main Compressor Building and the Air Intake Shaft compressor. The Storm Water Pollution Prevention Plan discusses the containment of the discharges from these sources. If one of these discharges enters the

storm water retention system, samples will be collected to determine the extent of the release.

3.1.5 Spill Response

The Sampling Team will be on call to the FOSS in the event of an unidentifiable spill. Most spills within the site fences will be identifiable by MSDS or user. However, the site consists of sixteen sections that are not behind fences, there is the possibility of having an unidentifiable spill. WP 12-ER4902, Hazardous Material Spill Response, assigns the EST as incident commander. If the incident commander determines, per WP 12-ER4902, that a sample must be collected, the Sampling Team will be called out, weekends, back shift and holidays included, to sample the spill.

3.1.6 Used Oils

When used oils are sent for recycling, certain requirements must be met for the composition of the oil. The WIPP site has an established method for accumulating and storing the used oil, and this method has been proven to deliver the correct quality of oil for recycling. The oil is sampled periodically to ensure the method's integrity. Other possible reasons for sampling would include a change in the current method of storage and accumulation.

3.1.7 Solid Waste Management Units (SWMU)

Chapter J of the WIPP RCRA Part B Permit Application identifies all SWMUs located at the WIPP. Table J 1-1 of the Part B application provides the location of all SWMUS on site. Sampling activities to support release assessments/corrective action programs will be used to determine if further corrective actions are required at each SWMU. All release assessment and corrective action sampling will be completed in accordance with guidance contained in this sampling plan, with the requirement of the proposed Subpart S Rule, Federal Redgiter Volume 55, No. 145; July 27, 1990; 30803, and with guidance contained in the final RCRA Corrective Action Plan, EPA 520-R-94-004, OSWER Directive 9902.3-2A, May 1994.

3.1.8 Contaminated Soils

Due to the remoteness of many areas of the site, there is the possibility of site soils being contaminated by an unknown substance. In this event, soil samples will be collected by the Sampling Team to identify possible contaminants, the extent of contamination, and the course of remediation.

3.1.9 Contaminated Debris

Debris is defined in 40 CFR 268.2 as "solid material exceeding a 60mm particle size that is intended for disposal that is a manufactured object; or plant or animal matter; or natural geologic material." Since this covers a large range of materials, sampling will be done on a case by case basis.

3.1.10 Site Remediations

Samples to determine the levels of contaminants in an area to be remediated or samples to determine if remediation technologies used were sufficient will be the responsibility of the Sampling Team. A follow-up sample of a remediated area will be taken within 72 hours of the initial cleanup to determine if sufficient remediation was done.

3.1.11 Site Investigations

In the event that site investigations are required to prove compliance to various permits or to locate contaminated areas, samples will be drawn according to this Plan.

3.2 Sampling Apparati

This Plan addresses a variety of media. Because of the different media and different constituents that are being analyzed for, there are many methods to collect samples.

One of the major concerns of sampling is to draw a sample that is representative of the constituents. Care should be exercised to ensure that the samples are not taken in a high or low concentration only. When possible, multiple samples should be taken from different locations of the area to develop a representative evaluation of the material.

The different types of sampling apparati are presented in Table 1, along with the media for which each is appropriate. In some situations, combinations or variations of these sampling tools may be needed. The final decision on which sampling apparati to be used will be made by the team coordinator.

3.2.1 COLIWASA

A COLIWASA is a glass, plastic or metal tube with a tapered stopper at the bottom. The stopper is released, the instrument is inserted into the material and then the stopper is retracted, holding the sample inside of the tube.

3.2.2 Weighted Bottle

This apparatus is used to sample from the bottom of a vessel. This sampler consists of a glass or plastic bottle, a stopper, a sinker, and a line to raise, lower, and pull out the stopper. The bottle is lowered into the vessel and the stopper pulled when the bottle reaches the bottom of the vessel.

3.2.3 Dipper

A dipper is a beaker or some type of similar container attached to a telescoping pole, so that samples from different locations can be drawn from the same point. This sampler is used primarily for surface sampling.

3.2.4 Liquid Thief

A liquid thief is a glass tube that can be used for sampling from containers with small openings. It is inserted into the liquid and then the sampler places his/her thumb over the top opening, which will hold the liquid in the tube until it can be transferred to the sample container.

3.2.5 Solid Thief

A sampling thief is a tool that consists of two metal cylinders (usually stainless steel or brass), one inside of the other, with slot openings in both tubes. The outer tube is pointed so that it can be driven into the material to be sampled. The instrument is closed (slots in tubes not lined up and the opening is blocked) when it enters the material, then the tubes are turned so that the slots are aligned and material can enter. The tool is closed before it is withdrawn from the material.

3.2.6 Trier

A trier is a metal tube, cut in half lengthwise and pointed at one end. It is used in a similar fashion to the thief but it cannot encapsulate the sample drawn.

3.2.7 Auger

This tool is used for hard or packed samples. It is made of spiral blades and a central shaft. It is used in a rotating motion, such as a drill, to loosen the material so that it can be scooped or shoveled.

3.2.8 Scoops and Trowels

These are either metal or plastic hand tools used to dig or move material. The amount of sample needed will determine which one of these similar apparati will be used.

3.2.9 Peristaltic Pump

This is the only mechanical tool listed. The peristaltic pump will mechanically pull a sample. This pump could decrease the time for sampling when large samples are needed.

3.2.10 Tool Decontamination

Before a sample is drawn, the tools intended for use will need to be cleaned to prevent any sample contamination. In most cases, the tools are disposable and will be new before each use, and therefore not need to be cleaned. This cleaning can be done by rinsing the tool with deionized water, or appropriate detergent. Wash water must be collected in a container and evaluated to determine if it must be disposed of as waste.

After sampling activities are complete, the tools must again be washed to remove any of the material that was sampled. Deionized water or an appropriate solvent can also be used for this wash. This wash water can be collected in the same container as the pre-sample wash water.

If decontamination of the sampling tools is not possible, or impractical, it will be to the discretion of the team coordinator to discard the tools, through Hazardous Waste Operations (HWO) as a hazardous waste, if applicable.

3.2.11 Maintaining Sampling Equipment

Sampling tools and other equipment must be kept in a controlled area, preferably locked, in order to maintain the integrity of the tools. The instruments used for field parameter testing must be calibrated periodically. The WIPP Measurement and Test Equipment (M&TE) Engineering and Administration calibration laboratory will have the equipment as part of an Measurement and Data Collection (M&DC) calibration recall system, but the equipment should be checked for current calibration before usage.

3.3 Quality Assurance Samples

3.3.1 Duplicates

Duplicates will be collected in the same manner as samples. When a duplicate sample is drawn, the technique, location and amount should be identical to the corresponding sample.

3.3.2 Blanks

Blanks will be composed of the same material as the sample, but from a source that is not contaminated. The blank must be sampled using the same technique as was used for the samples.

3.4 Sample Containers

Each type of sample must be contained in a specific way, suitable for the type of substance being sampled. The types of sampling containers for each type of sample are listed in Table 2.

Special care must be taken to ensure that the containers are not contaminated on the outside with the sampled substance. This could cause cross contamination between samples. Also, if the substance is on the outside of the sample container, it may be a health risk.

When collecting a liquid sample for Volatile Organic analysis, fill the container to the rim, so that there is not any air left in the container. The volatiles can dissipate into the air if air is left at the top of the container.

3.5 Sample Preservation

Certain samples will need to be preserved before shipment to the contract analytical laboratory. The different preservation techniques to be used are listed in Table 2. The sampling containers should prepared with the preservative before being taken into the field, in some cases. Also, the contract laboratory may send containers with preservative already included.

If the material being sampled is of an unknown composition, no preservative will be added. An unknown material may be cooled if appropriate.

Preservatives should be stored in proper chemical lockers. Care should be taken to not store incompatible chemicals in the same locker. Guidelines for the handling, and storage of the preservative chemicals are in WP 02-507, Management of Hazardous Materials.

4.0 SAMPLE DOCUMENTATION

4.1 Sample Numbers

A sample number will be assigned to each sample collected. The format for the sample numbers is as follows:

- "WST", followed by,
- The last two digits of the current year, followed by,
- Three digit sequential numbering starting with "001".

Example: WST-94-032

The next sequential number will be determined from the sample logbook.

Blanks and duplicates will be numbered in the same way, but a note will be made in the logbook that those particular samples are blanks or duplicates.

4.2 Sample Logbooks

Two logbooks will be maintained for all Sampling Team activities. The logbooks should be bound books with consecutively numbered pages. The logbooks will include all samples taken by the team. The samples will be logged by sequential sample number, assigned by the sampler. One logbook will be the sample tracking logbook and the other will be the field logbook.

4.2.1 Sample Tracking Logbook

The sample tracking logbook will include the following information:

- Sample number
- Date of sample collection
- Chain of Custody form number
- Location of sampling
- Analyses requested
- Sample description
- Initials of person logging in information

4.2.2 Field Logbook

The following information will be included in the field logbook:

- Sample number
- Location of sampling point
- Type of materials (e.g.,water, sludge)

- Suspected material composition
- Number and volume of samples taken
- Purpose of sampling (e.g., surveillance)
- Date and time of collection
- Preservative used (if any)
- Sample distribution
- Field observations (if applicable)
- Field measurements (pH, conductivity) (if applicable)
- Serial numbers of the field instruments (if applicable)
- Printed names and signatures of sampling personnel

In addition to this information, a detailed description of how the sample was collected should be recorded. This information is vital since there are not specific procedures for sampling activities.

The logbooks should be kept with all other field records, in a fireproof file safe.

The team coordinator is responsible for reviewing the logbooks on a periodic basis, for accuracy and completeness.

4.3 Container Labelling

The sample container must be labelled with the following information:

- Sample Number
- Name of Sample Collector
- Date and time of Sample Collection
- Location of Sample Collection

Figure 1 is an example of a container label.

4.4 Tamper Proof Seals

Once the sample has been collected in a sample container, with the proper preservatives added, the container must be sealed to resist tampering. Sample bottles are sealed using special sealing tape or electrical tape wrapped around the lid. A tamper resistant sealing label should be placed over the sealing tape in such a way that it would have to be broken if

the container is opened, to detect tampering with the sample after collection. The seal must be placed on the container before the sample leaves the sample location. The container seal should contain the following information:

- Sample Number
- Location of Sample Collection
- Date and time of Sample Collection
- Signature of Sample Collector

An example of a container seal is shown in Figure 2.

4.5 Sample Custody

4.5.1 Sample Chain-of-Custody Forms

Sample chain-of-custody forms must be generated for every sample collected. WP Form 1178 is an appropriate record of custody for the purposes of this plan. These forms should be obtained with sequential numbers stamped onto the form. This form contains all of the pertinent information required on a custody form.

The sampler shall initiate the sample chain-of-custody. The sample number, location and description, date and time of sample collection, sample type, and container type shall be entered at the sample location.

Whenever the sample is given to another person, that person is now considered the custodian. The custody is exchanged by the previous custodian signing to release custody, and the new custodian signing to receive custody. A sample is considered to be in a person's custody if it is in their physical possession, it is in the view of the custodian, or it is secured by the custodian so that no one can tamper with it.

When samples are being shipped, the carrier does not need to sign for custody of the sample. The shipping documentation will be proof of custody until the samples are received at the analytical laboratory.

4.5.2 Request for Analysis

A Request for Analysis, WP Form 1177, should accompany the sample chain of custody form when the samples are being shipped for analysis.

The sampler will also fill out the parts of the form that pertain to the actual sample collection.

The team coordinator, after determining the analyses to be performed, will fill in the information pertaining to analyses.

When the sample is being sent to be analyzed by the contract laboratory, the white and yellow copies of the forms (both WP Form 1177 AND 1178) are sent. Instructions to the laboratory should be sent with the forms explaining to sign for the receipt of the samples and return the yellow copies of the forms. The white copies should be sent back with the analyses results. (An example of instructions for the analytical laboratory is included in Appendix A). The pink copies are filed in the custody records for tracking purposes.

5.0 SAFETY

5.1 MSDS

The Material Safety Data Sheets (MSDS) will be the main source of safety information when approaching a sampling activity. The MSDS contains toxicity information that will be used when deciding how a substance should be contained and sampled. The MSDS also has information on personal protective equipment (PPE) needed when PPE is required.

5.2 Industrial Hygiene

When an MSDS is not available, or the substance to be sampled is of unknown composition, the Industrial Hygienist will be responsible for determining the safest way to sample the substance. If PPE is required, the industrial hygienist will determine what level of PPE is required. In the absence of the Industrial Hygienist, the EST will make the determination.

5.3 Personal Protective Equipment

An example of the levels of Personal Protective Equipment (PPE) is included in Appendix B.

5.4 General Safety and Sample Integrity

Safety of the sampling activity should be thought of before sampling commences. When there are unknown materials, all precautions should be taken. Sample collectors should avoid contact with any of the media being sampled. Training will be provided to ensure the safety of the sampling activities, but every situation is different and should be approached with caution.

Sample integrity is an issue closely related to safety. If the sample is taken in a sloppy or inconsistent manner, the sample will not provide valid data, and will require resampling. Resampling would provide another situation where there could be safety concerns, and will involve additional costs for the site.

In addition to hazards posed by the materials to be sampled, there are other dangers that may be encountered. The area around the WIPP site is undeveloped and contains animals and insects that could prove to be harmful to the sampling team. Awareness of the surroundings of the sampling location should be practiced by all persons involved in the sampling activities. Another hazard could be the weather situations. Samplers should plan the sampling activities so that weather conditions will not pose a threat to the health of the sampling team members.

6.0 ANALYSES

6.1 Field General Chemistry Analyses

General measurements, such as pH, temperature, and conductivity, may be performed in the field by the sampling technicians, when the sample is taken. If it is not possible to perform these tests when the sample is taken, the analyses must be performed as soon as possible. These tests will aid in determining how the sample is contained, preserved and analyzed. If a sample is of unknown composition, the characteristics of the material give the sampler an idea of what the composition may be. With an idea of the composition, the analytical testing needed from the contract laboratory will be easier to determine. The forms generated by the corresponding field test procedures will be maintained with the sample logbook.

6.1.1 pH Measurement

The pH of a substance will be measured per procedure WP 02-108, pH Measurement. The pH can only be measured if the sample media is aqueous or multiphase with the aqueous part of the sample media being at least 20% of the total volume. This procedure also includes a calibration of the pH meter and electrode.

6.1.2 Temperature Measurement

The temperature of a substance will be measured per procedure WP 02-109, Temperature Measurement.

6.1.3 Conductivity Analysis

The conductivity of a solution will be determined by using the procedure Specific Conductance, WP 02-117.

6.2 Qualitative and Quantitative Analyses

There are minimum analyses that must be performed on certain types of samples. In some cases, only characterization will be required, and in other cases, a qualitative and quantitative analysis will be needed. The minimum analyses are listed in Table 4. If additional analyses are needed, they must be specified on the Request for Analysis form that is sent with the sample.

The contracted analytical laboratory will be responsible for providing the results to the qualitative and quantitative analyses, according to their contract. For each parameter of interest, there are suggested methods of analysis. The suggested methods are listed in Table 3. The contracted laboratory will specify which analysis will be done, and present the deviations from this analysis for WID approval, at the time of contract placement.

7.0 TRANSPORTATION

7.1 Hazardous Samples

If a sample is hazardous, contains a reportable quantity and/or an unknown, it will be shipped to the analytical laboratory by the Hazardous Waste Operations section of Operations, per procedure WP 06-101, Shipping of Nonradioactive Hazardous Materials. If the sample was obtained outside of perimeter fence of the site, HWO must be contacted to transport the sample back onto the site, in accordance with WP 06-101, Shipping of Nonradioactive Hazardous Materials.

7.2 Nonhazardous Samples

If a sample is not hazardous, the sampling team will coordinate the shipment with the Materials Control Warehouse, in accordance with WP 15-525, Shipping Authorization, to the contracted laboratory.

8.0 DATA PACKAGE REVIEW

The data package for the sampling activity will consist of the following:

- Sample custody papers
- Request for Analysis
- Copies of the general chemistry results
- Analytical equipment calibration data
- Analytical equipment calibration check data
- Analytical equipment control charts
- Blank analysis data (if appropriate)
- Duplicate analysis data (if appropriate)
- Sample analysis data

The data package will be reviewed by the Sampling team Quality Assurance Officer and by the following groups, as appropriate:

- Environmental Compliance and Support
- Hazardous Waste Operations (for hazardous materials characterization)
- Quality and Regulatory Assurance

Environmental Compliance and Support will review for validity, and compliance with the sampling plan. EC&S will also look at the levels of contaminants found and determine whether the quantities are reportable and if the levels warrant any further actions. If levels are reportable, EC&S must respond according to WP 02-506, Environmental Incident Reporting, and contact the Facility Manager Designee (FMD) per the requirements of WP 12-918, Reporting of Occurrences in accordance with DOE Order 5000.3A.

Quality and Regulatory Assurance will review for validity of the data, compliance with the sampling plan, and completeness of the data package.

The data package will then be validated by the sampling team coordinator. The review will be documented on Attachment 1, Review Form for Sample Analysis Data Package.

9.0 RECORDS

All records generated by this sampling plan will be kept by EC&S, as part of their RIDS, with the exception of records that belong to HWO from the transportation of hazardous samples.

If errors are made on any of the records generated by this plan, corrections should be made by a single line strikeout, with the date of the correction and the initials of the person making the correction.

10.0 REFERENCES

Reporting of Occurrences in Accordance with DOE Order 5000.3A.

SW 846, Test Methods for the Evaluating Solid Waste, Physical/Chemical Methods (SW 846)

WP 02-14, Storm Water Pollution Prevention Plan

WP 02-108, pH Measurement

WP 02-109, Temperature Measurement

WP 02-117, Specific Conductance

WP 02-507, Management of Hazardous Materials

WP 02-605, Underground Storage Tank Leak Detection, Inventory Control, & Corrective Action Requirements

WP 02-EM1, Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling

WP 06-101, Shipping of Nonradioactive Hazardous Materials

WP 12-ER4902, Hazardous Material Spill Response

WP 15-525, Shipping Authorization

WP Form 1178, Chain-of-Custody Record

WP Form 1177, Request for Analysis

02497

Table 1 - Sampling Equipment for Particular Materials

Solid Samplers		
Samplers	Application	Limitations
Solid Thief (Grain Sampler)	Powdered or granular solids	Maximum sampling depth approximately 6 feet. Grains may be approximately the size of a kernel of corn. Limited application for sampling moist or sticky solids.
Sampling Trier	Preferred when powdered or granular materials are moist or sticky. Soft or loosened soil samples.	Maximum sampling depth approximately 2 feet. Difficult to retain core sample of very dry granular materials.
Trowel or Scoop	Dry, granular or powdered material or surface soil collection. Material consisting of large particles.	Maximum sampling depth approximately 3 inches. Difficult to obtain reproducible mass of samples.
Soil Auger	Soil samples 3 inches or deeper.	Maximum sampling depth approximately 6 feet. Cutting diameter up to 8 inches.
Waste Pile Sampler	Waste piles and granular or powdered material.	Maximum sampling depth approximately 6 feet. Unable to sample solid material with dimensions greater than half the diameter of the sampling tube.

Table 1 - Sampling Equipment for Particular Materials (continued)

Liquid Samplers		
Samplers	Application	Limitations
COLIWASA	Liquids, sludges, and slurries in drums, vacuum trucks, barrels, and similar containers.	Maximum sampling depth approximately 5 feet.
Liquid Thief	Use with containers that have smaller openings. Liquids, sludges, slurries, immiscible phases, and sediments.	Maximum sampling depth to about 3 feet. With immiscible phases, problems keeping sample in tube due to loss of surface tension.
Peristaltic Pump	Variable speed collection, depending on pump head type. Used for both composite samples and individual samples.	Difficult to obtain representative sample with immiscible phases. Vacuum in tubing may cause outgassing of organics.
Dipper	Liquids and sludges from surface of ponds, lagoons, or similar reservoirs.	Maximum length about 12 feet. Loss of sample when transferring to sample container.
Weighted Bottle	Storage tanks, deep wells, sumps or other containers too deep for Coliwasa. Multiple depth sampling.	Difficult to use with viscous liquids. Must be aware of chemical compatibility with weight sinker and line or frame.

Table 2 - Containers, Preservatives and Holding Times

Name	Amount	Container	Preservation	Max Hold
Cyanide	1L	P,G	$\leq$4°C,if oxidizing agents present add 5 ml 0.1N $NaAsO_2$ per L or .06 g ascorbic acid per L; adjust pH to 12 with NaOH	14 days
Hydrogen ion pH	25 ml	P,G	None	24 hours
Nitrate	1L	P,G	$\leq$4°C	48 hours
Metals	1L	P,G	HNO_3 to pH<2	6 months
Dissolved Metals	1L	P	$\leq$4°C	6 months
Oil and Grease	100 ml	G	$\leq$4°C	28 days
Organic Carbon TOC	15 ml (4)	P,G	$\leq$4°C	28 days
Volatiles	40 ml (2)	G, Teflon	$\leq$4°C,4 drops HCl	14 days
Semi-volatiles	2L	AG	$\leq$4°C	7 days
Pesticides	1/2 gal	AG	$\leq$4°C	7 days
Phenols	500 ml	G	$\leq$4°C,H_2SO_4 to pH<2	28 days
Total Suspended Solids TSS	1L	AG	HNO_3 to pH<2	180 days

G - Glass
P - Polyethylene
AG - Amber Glass

Table 3 - Target Analytes and Proposed EPA Analytical Methods

Parameter	EPA Analytical Method (or equal)
Arsenic***	6010
Barium***	6010
Beryllium***	6010
Cadmium***	6010
Chromium***	6010
Lead***	6010
Mercury***	7470/7471
Nickel***	6010
Selenium***	6010
Silver***	6010
Thallium***	6010
Acetone*	8240/8260
Benzene*	8240/8260
Bromoform*	8240/8260
n-Butyl alcohol*	8260
Carbon disulfide*	8240/8260
Carbon tetrachloride*	8240/8260
Chlorobenzene*	8240/8260
Chloroform*	8240/8260
Cresols	8040
Cyclohexane*	8240/8260
Cyclohexanone	8315
o-Dichlorobenzene*	8260
p-Dichlorobenzene*	8260
1,1-Dichloroethane*	8240/8260
1,2-Dichloroethane*	8240/8260

Table 3 - Target Analytes and Proposed EPA Analytical Methods (continued)

Parameter	EPA Analytical Method (or equal)
1,1-Dichloroethene*	8240/8260
cis-1,2-Dichloroethene*	8240/8260
Diethyl ether*	8240/8260
2,4-Dinitrotoluene**	8250/8270
2-Ethoxyethanol*	8240/8260
Ethyl acetate*	8240/8260
Ethylbenzene*	8240/8260
Formaldehyde*	8240/8260
Hexachloroethane**	8250/8270
Hydrazine*	8240/8260
Isobutanol*	8240/8260
Methanol*	8240/8260
Methylene Chloride*	8240/8260
Methyl Ethyl Ketone*	8240/8260
Methyl isobutylketone*	8240/8260
Nitrobenzene**	8250/8270
2-Nitropropane*	8240/8260
Polychlorinated biphenyls(PCB)	8080/8081
Pyridine**	8250/8270
1,1,2,2-Tetrachloroethane*	8240/8260
Tetrachloroethylene*	8240/8260
Toluene*	8240/8260
1,1,1-Trichloroethane*	8240/8260
1,1,2-Trichloroethane*	8240/8260
Trichloroethylene*	8240/8260

Table 3 - Target Analytes and Proposed EPA Analytical Methods (continued)

Parameter	EPA Analytical Method (or equal)
Trichlorofluoromethane*	8240/8260
1,3,5-Trimethylbenzene*	8240/8260
1,2,4-Trimethylbenzene*	8240/8260
1,1,2-Trichloro-1,2,2-trifluoroethane*	8240/8260
Vinyl chloride*	8240/8260
Xylenes*	8240/8260

* - Volatile
** - Semivolatile
*** - Metal

Table 4 - Analytical Requirements for Different Sample Programs

Program	Required Analyses
Storm Water Samples	• Chemical Constituents • Metals • Phenols • pH • Conductance • TOC • Volatiles • Semi-volatiles • PCBs
Soil Samples	• pH (if possible) • Conductance • Na • Mg • Cl • Ca • K
Used Oils	• Volatiles • Semi-volatiles • PCBs
Site Effluent	• Metals • Phenols • pH • Conductance • TOC • Volatiles • Semi-volatiles • PCBs
Hazardous Material Characterization	• pH • Conductance • Temperature • Ignitability • Corrosivity • Toxicity (TCLP) • Reactivity

Figure 1 - Example of a Container Label

Sample Number _____
Location _____
Date/Time _____
Sampler _____

Figure 2 - Example of a Container Seal

Sample Number _____ Date/Time _____
Location _____ Sampler _____

Attachment 1 - Review Form for Sample Analysis Data Package WIPP Site Effluent and Hazardous Material Sampling Program

Sample ID Number: _____

Date of Sampling:_____
Description of Sample:_____
_____
_____

SAMPLING TEAM

Are the following constituents present in the data package:

_____ Sample data
_____ Blank data (if applicable)
_____ Calibration data
_____ Laboratory Control Sample sample data

Sample Chain of Custody Form _____
Request for Analysis Form _____
Duplicate Data _____

Comments:_____

Reviewed By: _____ _____
Signature Date

ENVIRONMENTAL COMPLIANCE & SUPPORT

Are any of the constituents present in reportable quantities according to 40CFR302.4? _____

If so, enact **WP 02-505**, Environmental Incident Reporting, and **WP 12-918**, Reposting Occurrences in Accordance with DOE Order 5000.3B.

Comments:_____

Reviewed By: _____ _____
Signature Date

QUALITY & REGULATORY ASSURANCE

Comments: _____

Reviewed By: _____ _____
Signature Date

Appendix A - Instructions to the Contract Analytical Laboratory

To Contract Analytical Laboratory:

Please sign and date for the receipt of the samples on WP Form 1178, Sample Chain-of-Custody. Please detach the yellow copies of WP Form 1177 and WP Form 1178 and send them to:

WIPP Sampling Team MS-170
c/o Waste Isolation Pilot Plant
P.O. Box 2078
Carlsbad, NM 88221

Please relinquish custody by signing and dating on the next appropriate line and return the white copies of the forms with the sample analyses data. Thank you.

Appendix B - Personal Protective Equipment

There are four levels of personal protective equipment that are used when approaching a hazardous material. These levels are as follows:

- A - Full positive pressure suit
- Full face piece SCBA or positive pressure supplied air respirator with escape SCBA
- Totally encapsulated chemical protective suit
- Inner and outer chemical resistant gloves
- Hard hat (if appropriate)
- Chemical resistant steel toe boots

- B - Positive pressure suit
- Full face piece SCBA or positive pressure supplied air respirator with escape SCBA
- Hooded chemical resistant clothing
- Inner and outer chemical resistant gloves
- Chemical resistant steel toe boots
- Disposable boot covers

- C - Full face or half mask air purifying respirator
- Hooded chemical resistant clothing
- Inner and outer chemical resistant gloves
- Steel toe boots
- Disposable boot covers

- D - Work uniform
- Steel toe boots
- Safety glasses
- Work gloves
- Hard hat (if appropriate)

The level of personal protective equipment to be utilized will be determined by the MSDS or the Industrial Hygienist.

APPENDIX 5

QUALITY ASSURANCE PROJECT PLAN FOR WIPP SITE EFFLUENT AND HAZARDOUS MATERIALS SAMPLING PLAN, WP02-EM1, REV.0

WP 02-EM1
Rev. 0

Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling

Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling

WP 02-EM1

Table of Contents

Section	Title	Page
1.0	Introduction	1-1
	1.1 Project Description	1-1
	1.2 Project Organization and Responsibility	1-1
	1.2.1 Sampling Coordination Team	1-1
	1.2.2 Environment, Safety, Health & Regulatory Compliance	1-2
	1.2.3 Operations	1-2
	1.2.4 Quality and Regulatory Assurance	1-2
	1.2.5 Controller	1-2
	1.2.6 Contract Laboratory	1-3
2.0	Technical Specifications	2-1
	2.1 Project Data Quality Objectives	2-1
	2.1.1 DQOs for Precision, Accuracy, and Lower Limits of Detection	2-1
	2.1.2 DQO for Representativeness	2-1
	2.1.3 DQO for Completeness	2-1
	2.1.4 DQO for Comparability	2-1
	2.2 Sampling Procedures	2-1
	2.2.1 Effluent, Discharge, or Spill Sampling Procedures	2-1
	2.2.2 Hazardous Material Characterization Sampling	2-2
	2.2.3 Sewage Discharge Monitoring	2-2
	2.3 Sample Documentation, Handling, and Shipping	2-3
	2.4 Sample Custody	2-4
	2.5 Equipment Calibration and Maintenance	2-4
	2.6 Analytical Methods	2-4
	2.7 Data Reduction, Validation, and Reporting	2-4
	2.8 Internal Quality Control Checks	2-5
	2.9 Performance and System Audit Requirements	2-5
	2.10 Preventive Maintenance	2-5
	2.11 Specific Routine Procedures Used to Assess Data Quality	2-5
	2.12 Corrective Action	2-5
	2.13 QA Reports to Management	2-5
3.0	Definitions	3-1
4.0	References	4-1

Quality Assurance Project Plan
for WIPP Site Effluent and Hazardous
Materials Sampling

WP 02-EM1

List of Figures

Figure	Title	Page
1	Cognizant Organizations	1-4

Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling

WP 02-EM1

Change History

Pages iii, 2-1, 2-2, 2-3, and 4-1 - 6/3/94

Pages iii, 1-1, 2-1, 2-3 and 2-4, 2-6 deleted - 02/10/95

Pages iii, iv, 1-1, 1-2, 2-2, 2-3, 2-5, and 4-1 - 06/23/95

02483

List of Acronyms

DOE - Department of Energy
DQO - Data Quality Objective
EC&S - Environmental Compliance and Support
ECAP - Environmental Compliance Assessment Program
EPA - Environmental Protection Agency
ERT - Emergency Response Team
EST - Emergency Services Technician
ESH&RC - Environment, Safety, Health and Regulatory Compliance
HWO - Hazardous Waste Operations
IS - Industrial Safety
M&DC - Measurement and Data Collection
M&TE - Measurement and Test Equipment
MSDS - Material Safety Data Sheet
Q&RA - Quality and Regulatory Assurance
QA - Quality Assurance
QA/QC - Quality Assurance/Quality Control
QAPjP - Quality Assurance Project Plan
QSL - Qualified Suppliers List
RCRA - Resource Conservation and Recovery Act
RIDS - Records Inventory and Disposition Schedule
SWMU - Solid Waste Management Units
WID - Waste Isolation Division
WIPP - Waste Isolation Pilot Plant

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

This Quality Assurance Project Plan (QAPjP) states the quality assurance (QA) requirements for the WIPP Site Effluent and Hazardous Materials Sampling Program, which is established in the WIPP Site Effluent and Hazardous Materials Sampling Plan. The sampling plan outlines the processes for sampling and analyzing various non-radiological media at the Waste Isolation Pilot Plant (WIPP) site. The WIPP site, for the purpose of this plan, is defined as the area within the fenced boundary, the underground, the sixteen sections, the 401 Canal office, the Greene Street office, and any additional Department of Energy (DOE) leased property used for the operation of the WIPP.

This plan applies to non-radiological, non-routine sampling that is not specified by an established monitoring procedure, except for sewage discharge sampling. Routine sewage lagoon sampling is governed by WP 02-EM1001, Sewage System Discharge Monitoring and Compliance, as established in the WIPP Sewage System Discharge Plan, DP-831. The scope of this plan includes the following environmental data operations, as defined in WP 13-1, WID Quality Assurance Program Description.

- Sewage Discharge
- Storm Water Containment Discharge
- Underground Storage Tank Leaks
- Hazardous Materials Characterization
- Site Effluent
- Spill Response
- Contaminated Soil
- Contaminated Debris
- Used Oil
- Site Investigation
- Site Remediation
- Solid Waste Management Units (SWMUs)

This plan satisfies the requirement for planning and managing these activities in accordance with an approved QAPjP.

1.2 PROJECT ORGANIZATION AND RESPONSIBILITY

The organizations involved in the sampling program are shown in Figure 1.

1.2.1 Sampling Coordination Team

The WIPP Sampling Coordination Team is responsible for performing sampling activities in accordance with the WIPP Site Effluent and Hazardous Materials Sampling Plan and this QAPjP. The team consists of a group leader and at least two sampling technicians who will coordinate with Quality and Regulatory Assurance (Q&RA) and Hazardous Waste Operations (HWO). The team is responsible for evaluating sampling situations and media that may be encountered, and to determine the sampling technique, container, preservative, and analyses of the sample to be taken, in accordance with the sampling plan, or after consultation with appropriate groups on site.

The sampling team will perform parameter tests, such as pH temperature and conductivity if appropriate, when the samples are collected to help to determine

the required analyses and preservatives, and to assist in determine containment and cleanup requirements. The members of the sampling team will have the required training to perform these tests.

The members of the sampling team will be trained in accordance with the Resource Conservation and Recovery Act (RCRA) and will be part of the RCRA matrix on site.

Records generated by sampling activities will be the responsibility of the sampling team. These records, along with any pertinent logbooks, will be addressed in the sampling team's section Records Inventory and Disposition Schedule (RIDS).

The development and management of the contract with the analytical laboratory will be the responsibility of the sampling team. The team will initiate the review cycle of the results and prepare a final report of the sampling activity.

In the event of a spill, the sampling team may be called out to support the Emergency Response Team (ERT). The incident commander will make the determination to activate the sampling team, per WP 12-ER4902, Hazardous Material Spill Response. The sampling team will be on call for back shift and holidays for this type of response.

1.2.2 Environment, Safety, Health & Regulatory Compliance

The Environmental Compliance and Support (EC&S) section of the ESH&RC department will be responsible for providing regulatory oversight of sampling programs and for providing interpretation of regulatory changes that could impact sampling programs. As identified in WP 02-2, Environmental Compliance Assessment Program (ECAP) Plan, EC&S will conduct individual assessments of contract laboratories and the sampling program for regulatory compliance with state and federal regulations.

The Industrial Safety (IS) section of ESH&RC, and/or applicable procedures, will be responsible for determining the type of personal protective equipment to be used for sampling or in the event of spill cleanup.

1.2.3 Operations

The Hazardous Waste Operations (HWO) section of the Operations department is responsible for arranging for transportation of hazardous samples to the contract analytical laboratory.

1.2.4 Quality and Regulatory Assurance

The Quality and Regulatory Assurance (Q&RA) department is responsible for conducting independent assessments of the sampling and analysis program, in accordance with WP 13-1, WID QA Program Description. Q&RA uses a graded approach to determine the frequency of assessments based on the program risk. Q&RA will also ensure that the proposed contract laboratory meets the requirements for the WID qualified suppliers list (QSL).

1.2.5 Controller

The Procurement Services section of the Controller department is responsible for placement of the analytical laboratory subcontract and the administration of Subcontract activities.

The Warehouse is responsible for processing shipping authorization in the event that the samples are not hazardous and are shipped by the sampling team.

1.2.6 Contract Laboratory

The contract laboratory is be responsible for performing the analyses of the samples, for reporting the results, and for having an analytical QA/QC program in place, as specified in the subcontract.

FIGURE 1. COGNIZANT ORGANIZATIONS

APPENDIX 7

PETTIGREW AND ASSOCIATES HYDRAULIC CONDUCTIVITY TEST FOR CALICHE MATERIALS AT THE WIPP

Westinghouse Electric Corporation

APPROVAL/VARIATION REQUEST

Page 1 of

☐ APPROVAL/RECORD REQUEST ☐ VARIATION REQUEST ☐ DEVIATION ☐ WAIVER

AR/VR Number	Equip. No.	Reference No.
001	NA	NA

Supplier Or Subcontractor And Address

Pettigrew and Associates, P.A.
1110 N. Grimes
Hobbs, New Mexico 88240
Eileen Robinett (505) 393-9827

Purchase Order Or Subcontract Number: 67655

Project Name Or Number: FRI Closure EC&S

Drawing Or Specification Number: NA Revision

Requirements

Compliance with submittal of records

Type of Request: ☒ Approval ☐ Record ☐ Other (Describe)

Supplier Or Subcontractor Authorized Signature	Title	Date
Eileen Robinett	Lab Supervisor	6/22/95

DESCRIBE REQUEST IN DETAIL: Include Subcontract Title, AR/VR Number, Specification, or Drawing References on All Attachments.

Forward test results for your review and approval.

DISPOSITION OF APPROVAL REQUEST: ☐ APPROVED ☐ CONDITIONALLY APROVED ☐ DISAPPROVED

DISPOSITION OF RECORD REQUEST: ☐ RECEIPT ACKNOWLEDGED W/O COMMENTS ☐ RECEIPT ACKNOWLEDGED W/COMMENTS

Comments, Conditions, Or Reasons For Disapproval

NOTE TO SUPPLIER OR SUBCONTRACTOR: Requests that are conditionally approved grant an authorization to proceed provided that noted conditions are incorporated into the work.

Requests that are conditionally approved or disapproved require an amended AR/VR to be processed.

☐ Authorized To Proceed ☐ Do Not Proceed
☐ Amendment Not Required ☐ Amendment Required

WP Form 1466-A; revised 10/6/89
Page 1 of 1

AUTHORIZED BY _____ Purchasing Agent Date

PETTIGREW and ASSOCIATES
1110 N. GRIMES
HOBBS, NEW MEXICO 88240
(505) 393-9827

DEBRA P. HICKS, P.E.
WILLIAM M. HICKS, III, P.E.
RICHARD R. PETTIGREW, P.E. P.S.

June 12, 1995

Dan Robertson
WESTINGHOUSE ELECTRIC
P.O. Box 2078
M/S 170
Carlsbad, New Mexico 88221

RE: RFI Closure EC&S

Dear Mr. Robertson:

Enclosed please find the results of the Hydraulic Conductivity Test you requested.

Due to a work overload, the Hydraulic Conductivity Test itself was sent to another firm to be performed. The permeability of this sample was found to be 2.9E-05.

A detailed report of this test and the additional tests performed by this firm are enclosed.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

PETTIGREW and ASSOCIATES, P.A.

Eileen Robinett

Eileen Robinett, E.T.
Lab Supervisor

ER/sab

enclosures: as stated

LABORATORY TEST REPORT

PETTIGREW and ASSOCIATES

P.O. BOX 807
CLOVIS, NM 88102
(505) 762-3716

1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

315 S. CANAL
CARLSBAD, NM 88220
(505) 369-4307

DEBRA P. HICKS, P.E.
WILLIAM M. HICKS, III, P.E.
RICHARD R. PETTIGREW, P.E.-P.

TO: Westinghouse Electric
P.O. Box 2078
M/S 170
Carlsbad, New Mexico 88221

TYPE OF TEST: SIEVE ANALYSIS

TEST METHOD: AASHTO T-27

TYPE OF MATERIAL: Brown Clayey Sand with Caliche

LOCATION: Stockpile

PROJECT: RFI Closure EC&S

DATE OF TEST: May 23, 1995

TEST NO: SA-1

SCREEN SIZE	% PASSING	REQUIRED LIMITS
2"	100	
1 1/2"	98	
1"	95	
3/4"	93	
1/2"	89	
3/8"	86	
#4	77	
#10	72	
#40	67	
#80	44	
#200	25.6	

SAMPLED AND DELIVERED 5/22/95

LAB NO.: 5H-2734-2736

COPIES TO:

Westinghouse Electric

PETTIGREW and ASSOCIATES

BY: [signature] E.T.

C:\FORMS\PETFRMS\LABTESTS\SIEVEFIL.FRM

LABORATORY TEST REPORTS

PETTIGREW and ASSOCIATES

P.O. BOX 807
CLOVIS, NM 88102
(505) 762-3716

1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

315 S. CANAL
CARLSBAD, NM 88220
(505) 369-4307

DEBRA P. HICKS, P.E.
WILLIAM M. HICKS, III, P.E.
RICHARD R. PETTIGREW, P.E.-P.S.

TO: WESTINGHOUSE ELECTRIC
P.O. Box 2078
M/S 170
CARLSBAD, NEW MEXICO 88221

TYPE OF TEST: LIQUID LIMIT
PLASTIC LIMIT AND
PLASTICITY INDEX
OF SOILS
ASTM D4318

PROJECT: RFI CLOSURE EC&S

MATERIAL DESCRITION: Brown Clayey Sand with Caliche

DATE OF TEST: May 23, 1995

LOCATION: Stockpile

LL = 29

PL = 16

PI = 13

SAMPLED AND DELIVERED 05/22/95

LAB NO. 5H-2737

COPIES TO:

PETTIGREW and ASSOCIATES

BY Leon Rulecki E.T.

Flexible Wall Permeability

Project:	PETTIGREW	Test setup date:	5/31/95	Sample (final)	
Boring Number:	COMPACTED	Tested by:	SG	Length, L(cm)	10.319
Sample Number:	SAMPLE 2	Checked by:	WLD	Diameter, D(cm)	7.345
Depth:	N/A	Cell Number:	F	Area, A(cm)	42.37
		Panel Number:	1.00	Volume, V(cm)	437.23
		Standpipe:		Wet Mass, W(gms)	896.00
		area (a in)	0.878	Wet Unit Weight, (gms/cc)	2.049
		area (a out)	0.878	Wet unit Weight,(pcf):	127.87
Sample: (initial)				Moisture content, (%):	19.00
				Assumed Specific gravity, (gms/cc):	2.60
Length, L(cm):		10.160		Volume of Solids, V(cc):	289.59
Diameter, D(cm):		7.264		Pore Volume, V(cc):	147.64
Area, (cm2):		41.44		Void Ratio, e:	0.51
Volume, Vo (cm3):		421.05		Percent Saturation (%):	96.90
Wet Mass, Ww (gms):		848.30		Confining Pressure, (psi):	
Wet Unit Weight, (g/cc):		2.015		Value of C:	0.11
Wet Unit Weight, (pcf):		125.72		C=((a in)*(a out)*L)/((A)*(a in + a out))	
Moisture Content, (%):		12.50			
Burrette Length Correction:		1.14			

Month:

Date: Day	Time: Hrs.	Min.	Press Diff. (PSI)	Head Bot. (cm)	Head Top (cm)	Total Head (cm)	Elapsed Time (sec)	Initial Gradient	Temp. degree C	Ln(h1/h2)	Perm K (cm/sec)	Flow Ratio
2.00	13.00	57.00	1.00	1.50	21.80	93.42						
2.00	14.00	2.00	1.00	5.10	18.20	85.22	300.00	9.19	23.60	9.19E-02	3.00E-05	1.00
2.00	14.00	7.00	1.00	8.10	15.30	78.50	300.00	8.39	23.60	8.21E-02	2.68E-05	0.97
2.00	14.00	12.00	1.00	11.00	12.40	71.89	300.00	7.73	23.60	8.79E-02	2.87E-05	1.00
2.00	14.00	17.00	1.00	13.80	9.60	65.52	300.00	7.08	23.60	9.29E-02	3.03E-05	1.00

Permeability = 2.9E-05 cm/sec.

5H-2906

PETTIGREW & ASSOCIATES

CONSULTING ENGINEERS

CLIENT Westinghouse Electric

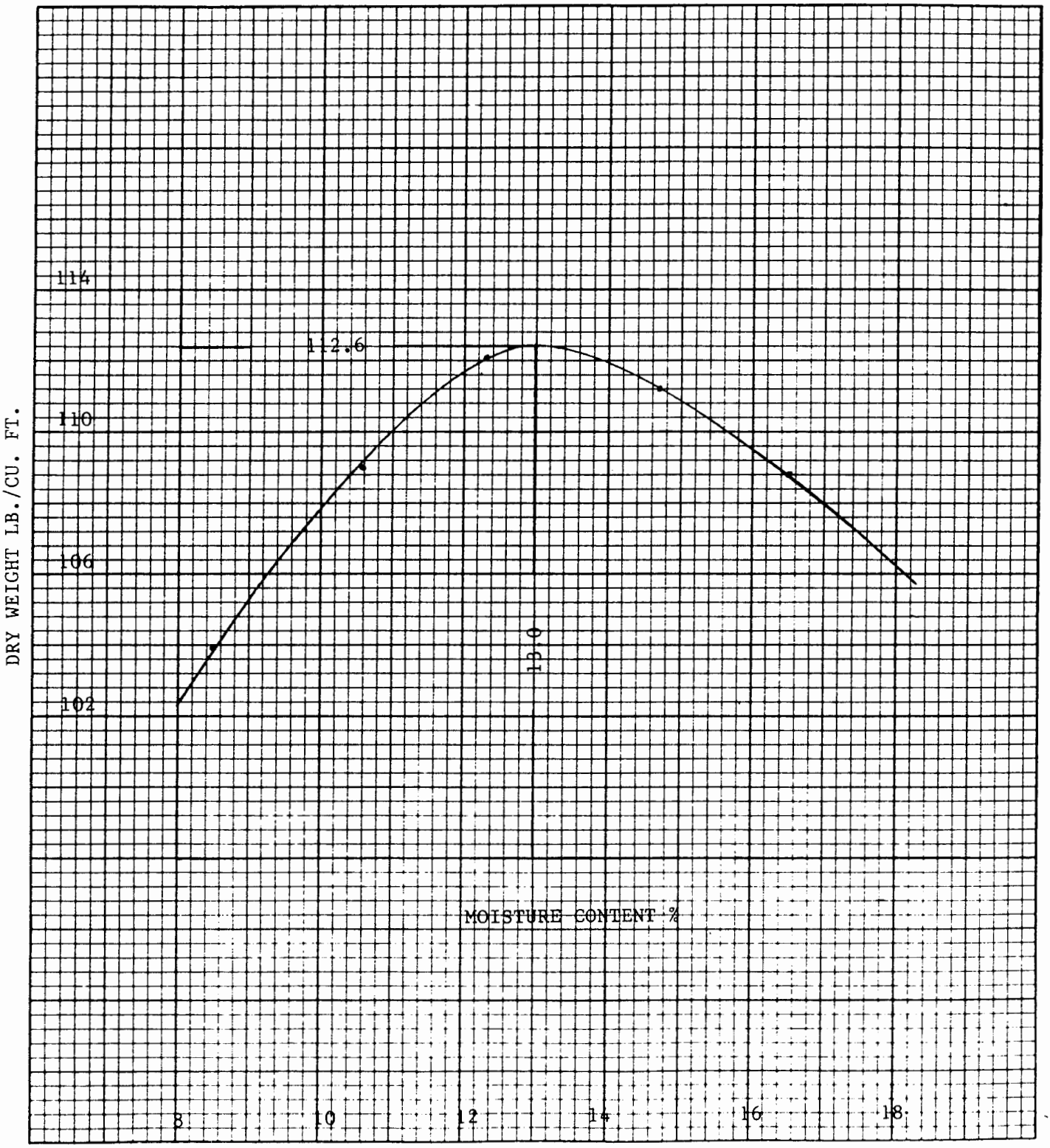
PROJECT RFI Closure EC&S

TYPE OF MATERIAL: Brown Silty Sand with Caliche

LOCATION Stockpile

TYPE OF TEST: ASMT D 698

DATE 5/22/95 LAB NO. 5H-2738

BY Evan Rubenett

SAMPLED AND DELIVERED 5/22/95