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

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Mr. Benito Garcia
New Mexico Environment Department
Hazardous & Radioactive Materials Bureau
2044 A. Galisteo Street
Santa Fe, NM 87502

Dear Mr. Garcia:

Enclosed please find two copies of Data Summary Report No. 2 for Solid Waste Management Units (SWMUs) at the Waste Isolation Pilot Plant (WIPP). This report describes the results of voluntary release assessment sampling at SWMUs 001n, 001x, 001g, and 001k described in the Voluntary Release Assessment/Corrective Action Work Plan (DOE/WIPP draft 2115) submitted to the Environmental Protection Agency (EPA) and NMED on August 1, 1995. The voluntary release assessment program was developed to provide the additional data needed to evaluate potential releases from SWMUs at the WIPP, and describe possible corrective actions at these sites. Data generated as part of this sampling program are intended to update the RCRA Facility Assessment (RFA) for the WIPP (Assessment of Solid Waste Management Units at the Waste Isolation Pilot Plant), NMED/DOE/AIP 94/1.

This summary report is the second of three reports to be submitted to the NMED Hazardous and Radioactive Materials Bureau and EPA Region VI Federal Facilities Section. The third report will be issued on, or before March 22, 1996. This schedule is designed to provide all voluntary assessment data to the agencies prior to the issuance of the Part B permit for public review and comment.

We look forward to meeting with you, your staff, and personnel from the EPA Federal Facilities Section to discuss the results of the voluntary release assessment program, and the DOE's proposed corrective actions. If you have any questions regarding this Data Summary Report, or if you require any additional information, please contact Mr. Craig Snider at (505)234-7452, or Mr. D. C. Robertson at (505)234-8240.

Sincerely,

E K Hunter

E. Kent Hunter, Assistant Manager
Office of National TRU Waste Operations

Enclosures

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cc w/o enclosures:
C. Wayman, CAO
P. Kilgore, CAO
C. Snider, CAO
K. McKamey, NMED
S. Zappe, NMED

cc w/enclosure:
C & C File

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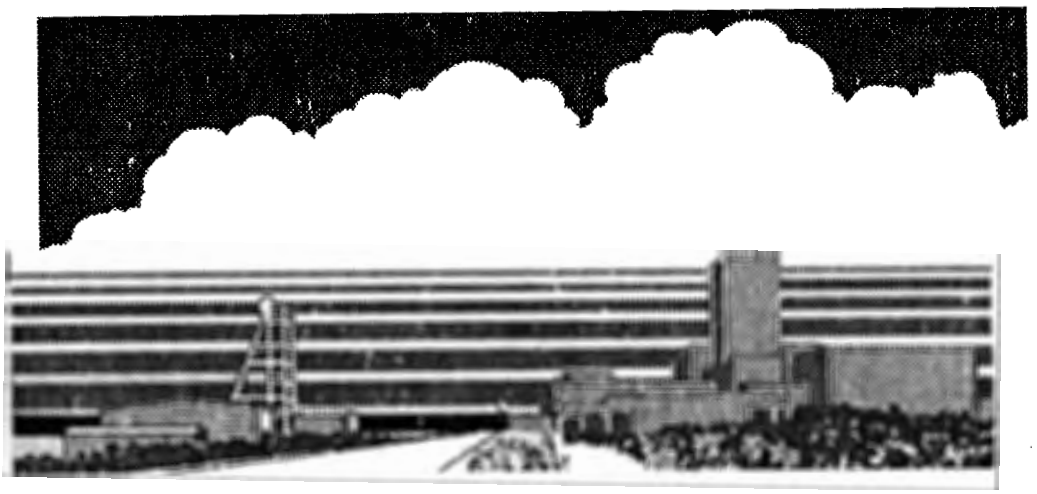
Data Summary Report No. 2 for Solid Waste Management Units

001n, 001x, 001g, and 001k

At the Waste Isolation Pilot Plant



Supplement to DOE/WIPP Draft-2115
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TABLE OF CONTENTS

EXECUTIVE SUMMARY EP-1

1.0 INTRODUCTION 1

1.1 Scope of the Release Assessment Data Summary Report 1
1.2 Rationale for the Selection of Target Analytes at SWMU Mudpits 001n, 001x, 001g and 001k 5
1.3 Geology and Hydrogeology in the Vicinity of the WIPP 8
1.3.1 Surface Formations 8
1.3.2 The Dewey Lake Red Beds 10
1.4 Sample Quality Assurance 11
1.4.1 Data Quality Assurance and Data Validation 11
1.5 Calculation of Action Levels Required to Evaluate Analytical Results . . . 11
1.6 EPA Region III Risk Based Concentration Tables 12
1.6.1 Brief Summary of Guidance on the Content, Use, and Limitations of the Region III Risk Based Concentration Table 12
1.7 Applicability of Assumptions Contained in Appendix D and the EPA Region III RBC Tables 15

2.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001N . . . 16

2.1 Location of SWMU 001n 16
2.2 Geology and Hydrogeology in the Area of SWMU 001n 16
2.3 Sampling Protocols 17
2.4 Data Quality Assurance 20
2.5 Independent Data Validation 20
2.6 Comparison of Analytical Results and EPA Action Levels at SWMU 001n 20
2.7 Evaluation of Selected Analytical Results Using Risk Based Concentrations 24
2.8 Proposed Corrective Actions at SWMU 001n 25

3.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001X . . . 26

3.1 Location of SWMU 001x 26
3.2 Geology and Hydrogeology in the Area of SWMU 001x 26
3.3 Sampling Protocols 27
3.4 Data Quality Assurance 29
3.5 Independent Data Validation 29
3.6 Comparison of Analytical Results and EPA Action Levels at SWMU 001x 31
3.7 Evaluation of Selected Analytical Results Using Risk Based Concentrations 34
3.8 Proposed Corrective Actions at SWMU 001x 35

TABLE OF CONTENTS (cont.)

4.0 **RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001G** . . . 36

4.1 Location of SWMU 001g 36
4.2 Geology and Hydrogeology in the Area of SWMU 001g 37
4.3 Sampling Protocols 38
4.4 Data Quality Assurance 43
4.5 Independent Data Validation 43
4.6 Comparison of Analytical Results and EPA Action Levels at SWMU 001g 43
4.7 Evaluation of Selected Analytical Results Using Risk Based Concentrations 46
4.8 Proposed Corrective Actions at SWMU 001g 47

5.0 **RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001K** . . . 48

5.1 Location of SWMU 001k 48
5.2 Geology and Hydrogeology in the Area of SWMU 001k 48
5.3 Sampling Protocols 49
5.4 Data Quality Assurance 53
5.5 Independent Data Validation 53
5.6 Comparison of Analytical Results and EPA Action Levels at SWMU 001k 53
5.7 Evaluation of Selected Analytical Results Using Risk Based Concentrations 56
5.8 Proposed Corrective Actions at SWMU 001k 57

LIST OF TABLES

Table 1 List of Target Analytes Used in Release Assessment Sampling at SWMUs 001n, 001x, 001g and 001k 7

Table 2 Summary of the Number, Type, and Sampling Interval for Samples Collected at SWMU 001n (P-15 Mud Pit) 16

Table 3 Soil TCLP Analytical Results for Voluntary Release Assessment Sampling at SWMU 001n (Mudpit P-15) 20

Table 3 (cont.) Soil TCLP Analytical Results for Voluntary Release Assessment Sampling at SWMU 001n (Mudpit P-15) 21

Table 4 Summary of the Number, Type, and Sampling Interval for Samples Collected at SWMU 001x (Drill Pad WIPP-13) 26

Table 5 Soil TCLP Analytical Results for Voluntary Release Assessment Sampling at SWMU 001x (Mudpit WIPP-13) 30

Table 5 (cont.) Soil TCLP Analytical Results for Voluntary Release Assessment Sampling at SWMU 001x (Mudpit WIPP-13) 31

Table 6 Summary of the Number, Type, and Sampling Interval for Samples Collected at SWMU 001g (Drill Pad H-14) 39

Table 7 Summary of the Number, Type, and Sampling Interval for Samples Collected at SWMU 001g (Drill Pad P-1) 40

Table 8 Soil TCLP Analytical Results for Voluntary Release Assessment Sampling at SWMU 001g (Mudpit H-14 and P-1) 42

Table 8 (cont.) Soil TCLP Analytical Results for Voluntary Release Assessment Sampling at SWMU 001g (Mudpit H-14 and P-1) 43

Table 9 Summary of the Number, Type, and Sampling Interval for Samples Collected at SWMU 001k (Drill Pad P-4) 49

Table 10 Soil TCLP Analytical Results for Voluntary Release Assessment Sampling at SWMU 001k (Mudpit P-4) 51

Table 10 (cont.) Soil TCLP Analytical Results for Voluntary Release Assessment Sampling at SWMU 001k (Mudpit P-4) 52

LIST OF FIGURES

Figure 1 Location of SWMUs Identified in the WIPP Release Assessment/ Corrective Action Plan 3

Figure 2 Sample Location Map for SWMU 001n (P-15) 17

Figure 3 Sample Location Map for SWMU 001x (WIPP-13) 28

Figure 4 Sample Location Map for SWMU 001g (H-14 and P-1) 37

Figure 5 Sample Location Map for SWMU 001k (P-4) 48

LIST OF APPENDICES

Appendix 1	EPA Region III Risk-Based Concentration Table for the Period July 1995 - December 1995
Appendix 2	Results of Voluntary Release Assessment Samples Collected at SWMU 001n
Appendix 3	Results of Voluntary Release Assessment Samples Collected at SWMU 001x
Appendix 4	Results of NMED - DOE Oversight Bureau Release Assessment Duplicate Samples Collected at SWMU 001g
Appendix 5	Results of Voluntary Release Assessment Samples Collected at SWMU 001g
Appendix 6	Results of Voluntary Release Assessment Samples Collected at SWMU 001k

EXECUTIVE SUMMARY

The U.S. Department of Energy, Carlsbad Area Office (DOE-CAO) has completed a voluntary release assessment sampling program at selected Solid Waste Management Units (SWMUs) at the Waste Isolation Pilot Plant (WIPP). This release assessment data summary report is the second of three reports to be submitted to the EPA Region VI, Hazardous Waste Management Division and the NMED Hazardous and Radioactive Materials Bureau to describe the results of voluntary release assessment sampling and identify proposed corrective actions.

The voluntary release assessment/corrective action program is intended to be the first phase in implementing the RCRA Facility Investigation (RFI) corrective action process at the WIPP. Data generated as part of this sampling program are intended to update the RCRA Facility Assessment (RFA) for the WIPP (*Assessment of Solid Waste Management Units at the Waste Isolation Pilot Plant), NMED/DOE/AIP 94/1*. This Release Assessment Data Summary Report documents the results of release assessment sampling at SWMU 001n, 001x, 001g, and 001k. These results are provided to document voluntary release assessment/ corrective action commitments contained in the *Voluntary Release Assessment/Corrective Action Work Plan (DOE/WIPP Draft 2115)* submitted to the EPA and NMED in July, 1995.

A total of 92 release assessment samples were collected to determine if a release had occurred from any of the four SWMUs discussed in this data summary report. Based on the criteria provided in proposed *40 CFR § 264.514 FR Vol. 55, No. 145, VI(D), p. 30813*, and the October 1995, *EPA Region III Risk-Based Concentration Table, July - December 1995.* EPA Region III Office of RCRA Technical & Program Support Branch (3HW70), the analytical data collected at SWMUs 001n, 001x, 001g, and 001k demonstrates that no release of hazardous constituents has occurred. Thus, there is no potential for impacts to human health or the environment.

Based on the results of voluntary release assessment sampling, the DOE-CAO formally requests that a determination of No Further Action be granted for SWMUs 001n, 001x, 001g, and 001k. Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that after appropriate public review and agency approval, a No Further Action determination be granted for the four SWMUs described in this Data Summary Report prior to the issuance of the RCRA Part B Permit for the WIPP. Any delay in the issuance of No Further Action determination may require the DOE to submit a Class III permit modification to remove this SWMU from the list of sites requiring evaluation under the RFI process. The submittal of a Class III permit modification to remove sites with no potential to impact human health or the environment represents an unreasonable expense. If a No Further Action determination is supported by both the EPA and NMED, these sites will be replanted with native vegetation, in accordance with the *WIPP Land Management Plan (DOE WIPP 93-004)* guidelines.

DATA SUMMARY REPORT FOR SOLID WASTE MANAGEMENT UNITS 001N, 001X, 001G, AND 001K

1.0 INTRODUCTION

The U.S. Department of Energy, Carlsbad Area Office (DOE-CAO) has completed a voluntary Release Assessment sampling program at selected Solid Waste Management Units (SWMUs) at the Waste Isolation Pilot Plant (WIPP). The DOE-CAO, is the Owner and Operator of the WIPP. Westinghouse Electric Corporation, Waste Isolation Division (WID) is the Co-Operator at the site. For the purpose of clarity, any reference to the DOE throughout this release assessment data summary report implies both the DOE-CAO and Westinghouse-WID.

The voluntary release assessment/corrective action program is intended to be the first phase in implementing the RCRA Facility Investigation (RFI) corrective action process at the WIPP. Data generated as part of this sampling program are intended to update the RCRA Facility Assessment (RFA) for the WIPP (*Assessment of Solid Waste Management Units at the Waste Isolation Pilot Plant), NMED/DOE/AIP 94/1*. This Release Assessment Data Summary Report is the first of three reports that will be submitted to the Environmental Protection Agency (EPA) Region VI, Hazardous Waste Management Division and the New Mexico Environment Department (NMED) Hazardous and Radioactive Materials Bureau to describe the results of release assessment sampling and to identify proposed corrective actions. Throughout the balance of this Release Assessment Data Summary report, the acronym EPA will be used for any further reference to the EPA Region VI Hazardous Waste Management Division, and the acronym NMED will be used to reference the NMED Hazardous and Radioactive Materials Bureau.

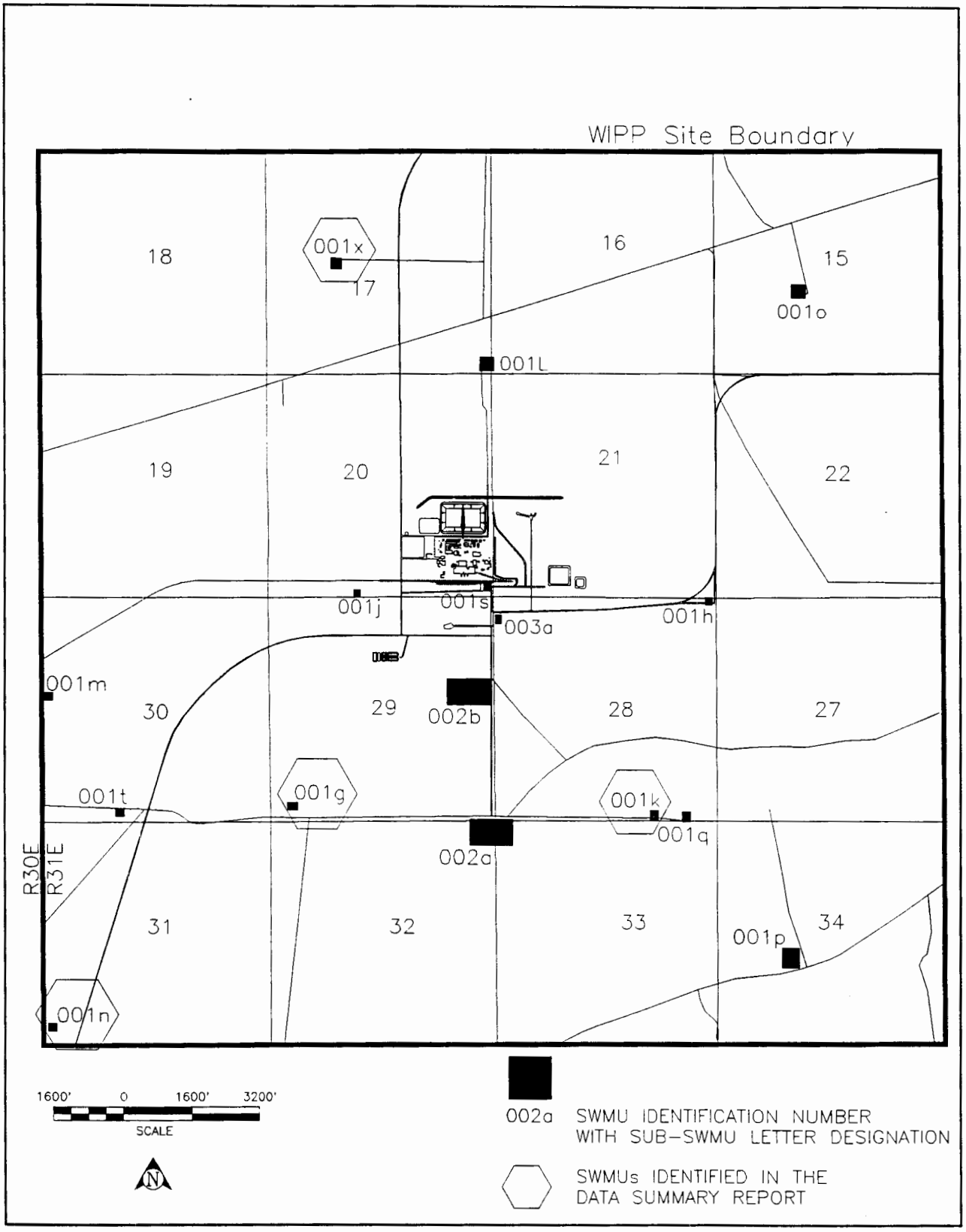
1.1 Scope of the Release Assessment Data Summary Report

This Release Assessment Data Summary Report documents the results of release assessment sampling at SWMU 001n (mudpit P-15), SWMU 001x (WIPP-13), SWMU 001g (mudpits H-14 and P-1) and SWMU 001k (mudpit P-4). To reduce repetition, information regarding sampling requirements, regional geology, and data quality assurance which are shared by all four SWMUs are provided in the introduction section of this report. Release Assessment Data, as well as historical data, are being used to evaluate and develop appropriate voluntary corrective actions required for each SWMU. The results of facility investigations and other analyses will be used to focus on plausible concerns and expedite cleanup decisions as defined in the preamble of the Proposed Subpart S Rule, *Federal Register, Vol. 55, No. 145; July 27, 1990; 308033.*

The *Voluntary Release Assessment/Corrective Action Work Plan (DOE/WIPP Draft 2115)* is the document developed by the DOE to describe the voluntary release assessment sampling protocols and proposed corrective actions at the 16 SWMUs identified in Chapter J of the

draft RCRA Part B Permit Application. The relative location of the 16 SWMUs at the WIPP is provided in Figure 1. In the July 1995, *Release Assessment/Corrective Action Work Plan*, the DOE committed to completing release assessment sampling at 11 SWMUs, initiating corrective actions at 3 SWMUs, and requesting a formal determination of No Further Action at the 2 remaining SWMUs.

Figure 1
Location of SWMUs Identified in WIPP Release Assessment/Corrective Action Plan



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Voluntary Release Assessment Sampling has been completed at the following SWMUs:

(2) SWMU 001g (H-14/P-1 Drill Pad)
SWMU 001h (H-15/P-2 Drill Pad)
(7) SWMU 001j (P-3 mud pit)
(2) SWMU 001k (P-4 Drill Pad)
SWMU 001L (WIPP-12/P-5 Drill Pad)
(1) SWMU 001m (P-6 Drill Pad)
(2) SWMU 001n (P-15 Drill Pad)
SWMU 001s (ERDA 9 Drill Pad)
(1) SWMU 001t (IMC 374 Drill Pad)
(2) SWMU 001x (WIPP-13 Drill Pad)
SWMU 003a (Portacamp Storage Area) (formerly 004a)

Voluntary Corrective Actions have been proposed 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 for No Further Action has been submitted for the followings SWMUs:

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

As described in Data Summary Report No. 1, meetings were held with EPA and NMED personnel in February, August, and September 1995, to review the proposed *Release Assessment/Corrective Action Work Plan* and to obtain approval of sampling protocols. Data quality objectives for the release assessment sampling program were reviewed and verbally approved by both EPA and NMED personnel prior to completing SWMU sampling. The EPA subsequently provided written approval of the sampling protocols used in a December 19, 1995, letter that contained formal review and comment of the July 1995, *Release Assessment/Corrective Action Work Plan.*

A detailed description of sampling methods and quality assurance protocols used to complete assessment sampling are described in the work plan. Sampling personnel utilized the sampling and analytical protocols that are described in the *WIPP Site Effluent and Hazardous Materials Sampling Plan*, WP02-EM2, Rev. 0. 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.*

Release assessment sample and data quality assurance requirements are defined in the *Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling*, WP02-EM1, Rev.0. Agency and DOE personnel discussed the implementation of Data Quality Objectives, including data quality evaluation, and release assessment plan modifications. Potential corrective actions were discussed, in accordance with the *Guidance for the Data Quality Objectives Process, EPA QA/G-4*, September, 1994.

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

1.2 Rationale for the Selection of Target Analytes at SWMU Mudpits 001n, 001x, 001g and 001k

Material Safety Data Sheets (MSDS) have been reviewed to determine potential drilling additives and other products that may have been used to drill the boreholes at each of these four SWMUs. It was assumed that these constituents were subsequently discharged into the mudpits at SWMU 001n, SWMU 001x, SWMU 001g, and SWMU 001k. Information contained in the RFA, as well as drill logs and geologic reports, were also used to establish the following list of potential wastes streams:

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 and the agencies approved, a list of target analytes for all mudpits evaluated in the original release assessment work plan. Because drilling additives, such as drill mud, gear lubricants, and diesel fuel, have a limited potential to generate hazardous constituents, the list of target analytes has been limited. A list of target analytes used in release assessment sampling at SWMUs 001n, 001x, 001g, and 001k is provided in Table 1.

TABLE 1
LIST OF TARGET ANALYTES USED IN RELEASE ASSESSMENT SAMPLING AT SWMUS 001N, 001X, 001G, AND 001K

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

1.3 Geology and Hydrogeology in the Vicinity of the WIPP

The geology at the WIPP is characterized by four primary stratigraphic units or regions. The first region includes a near-surface region 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, which is made up of five individual stratigraphic formations. The fourth region is the uppermost part of the Salado Formation.

Because the uppermost strata are the only zones likely to be influenced by any potential release from SWMUs at the WIPP, a brief description of the regional geology and individual surface strata are the only formations discussed in this data summary report. The determination to examine only the near-surface geology at each SWMU site is based on information contained in Section 4.0 of the WIPP RFA. In Section 4.0 of the RFA, the NMED described the potential for a release to groundwater sources in the vicinity of SWMUs 001k and 001x as low, and the release potential to groundwater at SWMUs 001g and 001n as low to moderate. This determination is based on the depth to groundwater and the relative low permeability of the Dewey Lake Formation, the shallowest potential water bearing zone at each of these SWMU sites. A detailed description of the geology and hydrogeology at the WIPP is contained in Chapter D of the *WIPP RCRA Part B Permit Application*, Chapter 2 of the *No-Migration Variance Petition for the Waste Isolation Pilot Plant* (DOE-CAO-95-2043), and Section 3.3 of the *WIPP RFA*.

1.3.1 Surface Formations

The uppermost stratigraphic formations are made up of Quaternary and Triassic-age surface and near-surface strata. These formations consists of 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 10-14 feet thick. Soil development is poor, and the overall permeability in this unit is high.

The Mescalero Caliche underlies surface dune sands. Sands and gravels in the Mescalero Caliche are characteristically well cemented with a chalky-to-finely-crystalline matrix of calcium carbonate. The caliche is invoked as a continuous, impermeable barrier over much of the site, however, 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 localized mudstone and gravelly beds. The rock generally occurs as the most shallow formation on the western side of the WIPP site, where the thickness and distribution of the formation is variable and erratic. Representative thicknesses at the site range from 10-32 feet. Measurements of hydraulic conductivity in the Gatuna Formation encountered in foundation boreholes at the WIPP facility generally range from 7.8×10^{-6} m/s. to 1.0×10^{-8} m/s.

Triassic-aged Santa Rosa Formation overlays the Dewey Lake Beds over the eastern half of the WIPP site. Mercer (1983) describes the formation as "a sequence of well-indurated, cemented, fine-to-coarse grain sandstone with interbeds of siltstone and mudstone." The formation ranges in thickness 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.

1.3.2 The Dewey Lake Red Beds

Section 2.1.3.6 of the *No-Migration Variance Petition for the Waste Isolation Pilot Plant* 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 and 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. 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 semiperched 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. These wells may produce from perched aquifers (Mercer, 1983, Lappin et al., 1989), or they may produce from transmissive zones in a continuously saturated zone that is elsewhere unproductive due to low transmissivities. On the southeastern boundary of the site, Barn Well is used for domestic purposes and Ranch Well is used for livestock watering. Wells in this area are adjacent to an extensive, thick, active area of dunes, which could be the recharge area for these water bearing sand dunes units. 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.

1.4 Sample Quality Assurance

Field quality control samples such as duplicate samples, field blanks, and equipment rinsate samples were collected by the sampling team and documented in the sampling logbook. All samples were collected and managed in accordance with Section 3.3.1 of the *Quality Assurance Project Plan for WIPP Site Effluent and Hazardous Materials Sampling (WP02-EM1)*, and Section 3.3 of the *WIPP Site Effluent and Hazardous Materials Sampling Plan (WP02-EM2)*.

Deionized water was used for the field and equipment rinsate blank samples because deionized water provides excellent sensitivity to contamination. Equipment rinsate samples were collected for each type of sample (organic soil, and inorganic soil). Equipment rinsate blanks were collected to verify the effectiveness of field equipment decontamination. The equipment blanks 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.

1.4.1 Data Quality Assurance and Data Validation

All sample analyses were completed in accordance SW-846 or equivalent analytical protocols. Halliburton NUS Laboratories is the contract laboratory used to analyze all Release Assessment Samples. Sample analytical methods and Quality Assurance/Quality Control requirements have been 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.

An independent data quality review was completed by Harding Lawson & Associates (HLA) Engineering and Environmental Services. HLA developed a procedure to complete QA/QC data package reviews in accordance with the data quality requirements described in SW-846 and the *Halliburton NUS General Quality Assurance Plan.*

1.5 Calculation of Action Levels Required to Evaluate Analytical Results

Appendix D of Proposed *40 CFR § 264.521(d), FR Vol. 55, No. 145, VI(D), p. 30870,* establishes criteria for selecting and calculating action levels for soils. Action level concentrations in Appendix D assume a chronic exposure through consumption of soil media contaminated with hazardous constituents. Criteria for establishing soil action levels can also be found in proposed *40 CFR § 264.521(d)*, Appendix A. The tables contained in Appendix A provide "Examples of Concentrations Meeting Criteria for Action Levels for Air, Water, and Soil Media." To complete Appendix D soil action level calculations, the DOE multiplied all TCLP concentrations by 20 (total concentration level in mg/kg) to obtain the intake assumption used in the Appendix D formula to compute the actual action level.

No action levels are established in Appendices A, D, or F for Barium, Benzene, Thallium or Vinyl Chloride tested at SWMUs 001n, 001x, 001g, and 001k. For these four analytes, only Barium was detected above the method detection limit. It is important to note that constituent concentrations for these analytes collected inside the SWMU mudpit areas are identical to concentrations for both up-and-down gradient background samples.

1.6 EPA Region III Risk Based Concentration Tables

As part of the assessment of the constituent action levels, the DOE evaluated action level criteria developed by the EPA Region III office of Technical and Program Support. The DOE requests that the "EPA Region III Risk Based Concentration (RBC) Table" be used in the evaluation of release assessment data when an action level has not been established in Appendices A, D, or F. As part of the evaluation of analytical data collected at SWMUs 001n, 001x, 001g, and 001k, the DOE used the RBC action levels for the constituents that do not have calculated action levels in Appendix D of the Subpart S rule. When using the RBC tables, the DOE used the risk-based concentrations for soil ingestion from an industrial land use. This criteria appeared to most closely match the parameters established in Appendix D. The Soil Screening Levels for transfers to groundwater are not appropriate because geologic data demonstrates that any potential release of hazardous constituents to groundwater from any of the SWMUs described in this data summary report is extremely remote.

1.6.1 Brief Summary of Guidance on the Content, Use, and Limitations of the Region III Risk Based Concentration Table

Toxicologists working with the EPA Region III Technical and Program Support Branch developed the RBC table to screen sites not yet on the National Priority List (NPL), respond rapidly to citizen inquiries, and spot-check formal baseline risk assessments. Region III distributes this table and associated guidance to all interested parties on a semiannual basis. The Risk-Based table used in this assessment is the table published for the period July - December. A complete copy of the July - December 1995, Risk-Based Table and associated guidance information is contained in Appendix 1.

The EPA Region III Technical and Program Support Branch developed guidance and limitations on the use of the RBC table. Important sections of this guidance have been transcribed here to define the scope and limitations of the RBC table. Background materials provide the complete basis for all the calculations, with the intent of showing users exactly how the RBCs were developed.

The RBC table contains reference doses and carcinogenic potency slopes obtained from the Integrated Risk Information System (IRIS) through September 1, 1995, the Health Effect Assessment Summary Table (HEAST) through May 1995, and the EPA National Center for Environmental Assessment (NCEA) Superfund Health Risk constants. Constants have been combined with "standard" exposure scenarios to calculate RBCs. The RBCs are chemical

concentrations corresponding to fixed levels of risk (i.e., a hazard quotient of 1, or lifetime cancer risk of 10^{-6}, whichever occurs to a lower concentration) in water, air, fish tissue, and soil.

The RBC table also includes soil screening levels (SSLs) for protection of groundwater and air. Most SSLs were obtained directly from the proposed SSL guidance document developed by the EPA Office of Solid Waste and Emergency Response (OSWER). The Technical and Program Support Branch has have added some additional SSLs based on the same methodology. Sources of SSLs are noted in the RBC table. SSLs incorporate the same exposure assumptions as RBCs, plus additional assumptions needed for intermedia extrapolation. SSLs are therefore distinct from RBCs and should be used only in the framework proposed in the OSWER document.

Guidance provided by Region III also states that the RBCs have several important limitations. Specifically excluded from consideration are (1) transfers from soil to air and groundwater, and (2) cumulative risk from multiple contaminants or media. Additionally, the guidance documentation also states that the toxicity information contained in the table have been assembled by hand, and despite extensive checking and years of use, may contain errors. Thus, agency personnel advise that users cross-check all information before relying on any referenced doses (RfDs) or carcinogenic potency slopes (CPSs) in the table.

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

1. A single medium is contaminated

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

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

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

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

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

The risk-based concentrations would probably be protective as no-action levels or cleanup goals. However, to the extent that a site deviates from this description, as most do, the RBCs would not necessarily be appropriate. Although the four SWMU sites described in this work plan may not specifically meet the six criteria described above, the results of release

assessment sampling indicate no potential impact to human health and the environment exists. Thus, the values contained in the RBC table may be appropriate to use as guidance for making a No Further Action determination.

1.7 Applicability of Assumptions Contained in Appendix D and the EPA Region III RBC Tables

Several assumptions contained in Appendix D for evaluating action levels are not applicable to the soils contained in the four SWMUs described in this summary report. First, Appendix D assumes that shallow soils in the vicinity of a SWMU site will ultimately be used for residential use. Second, this model also assumes that soils will be ingested over a long period of time creating a long-term or chronic health risk. All of the SWMUs at the WIPP are located within the WIPP Land Withdrawal Area. Congress withdrew these areas from all types of land use except TRU waste management and historical land uses such as hunting and livestock grazing. The WIPP land withdrawal effectively precludes residential land for posterity and eliminates a direct ingestion pathway. Ingestion due to the human consumption of livestock or game animals will be precluded by the implementation of reclamation activities that will cover all SWMU sites with top soil and replant the site with native vegetation. And third, analytical data demonstrates that soil contamination at these SWMU sites are below 40 CFR § 264.521(d), Appendix D or Region III RBC concentrations and do not represent a potential threat to groundwater sources.

2.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001N

2.1 Location of SWMU 001n

This section of the release assessment data summary report documents the results of release assessment sampling at SWMU 001n and describes the proposed corrective actions at this location. SWMU 001n is located in the SW 1/4 of the SW 1/4 of the 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 as part of a 21-well U.S. Geologic Survey (USGS) resource evaluation program to investigate the potash resources in the Salado Formation (USGS, 1978). The mudpit constructed for the drilling of the P-15 potash exploration well is SWMU 001n. As with other USGS potash test boreholes, the drilling fluids used at the P-15 site include saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite). USGS reports indicate that the P-15 borehole was drilled with air to a depth of 405 feet. The use of air drilling greatly increased the drillers ability to detect the presence of shallow groundwater in the borehole.

2.2 Geology and Hydrogeology in the Area of SWMU 001n

The USGS lithology logs identify the near-surface deposits at SWMU 001n as shallow, fine-to-medium grained Holocene soils and Eolian sands that are about 11 feet thick. The Gatuna Formation approximately 21 feet thick (USGS, 1978). The Gatuna Formation is discontinuous zone of sandstone and caliche that overlays the Dewey Lake Redbed Formation.

The Dewey Lake formation is approximately 199 feet thick in the P-15 borehole. The Dewey Lake Red Beds in this region are characterized as a deltaic sequence of alternating, thinly bedded siltstone and mudstone with lenticular interbeds of fine-to-coarse grained sandstone (Mercer, 1983; D'Appolonia 1982b). Mercer (1983) contends that groundwater occurs perched or semiperched in lenticular sands in the upper Dewey Lake.

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

The use of air drilling greatly increased the drillers' ability to detect the presence of shallow groundwater in the borehole. Migration to the Culebra Dolomite aquifer 413 feet below surface is less credible.

Although the RFA identifies the release potential to surface soils at this location as high, analytical data from samples collected at SWMU 001n indicate that the constituent concentrations for all analytes except Barium are below method detection limit, and concentrations for samples collected inside the mudpit area are equal to the background concentrations. The mean TCLP Barium concentration at this location is .42 mg/l or 8.4 mg/kg total concentration equivalent. These concentrations are significantly below RBC table action level concentration of 140,000 mg/kg.

Once drilling of the P-15 borehole was completed, the hole was cemented from 1,465 feet to a depth 660 feet. This cementing process included 500 gallons of mud flush ahead of 75 sacks of 50 percent Pozmix "A," 50 percent class C cement, 2 percent gel, and 19.4 pounds per sack of cement. Drill rods were pulled to 600 feet and excess cement was circulated from the hole. The hole was then cased with 4½ inch casing. The casing was perforated with 72 holes from a depth of 532 feet to 556 feet. The annular space around the casing was cemented to the surface, and the casing cut off 1 foot above the surface. A 2-inch bull plug with a screw-on retainer cap was welded to the top of the casing.

2.3 Sampling Protocols

During sampling visits, the sampling team used location data contained in the RFA to surveyed the location of the P-15 mudpit. The sampling team marked a single rectangular mudpit approximately 10 feet wide and 20 feet long on the northeastern edge of the drill pad. The P-15 well pad is heavily vegetated, and no discolored soil or liner material was identified during sampling activities. A total of 24 soil samples were collected to characterize the vertical and horizontal extent of any potential release from the SWMU 001n mudpit. The rationale for selecting sample depths at mudpits during the initial round of voluntary release assessment sampling was based on an evaluation of the 001n SWMU site and historical information contained in the RFA.

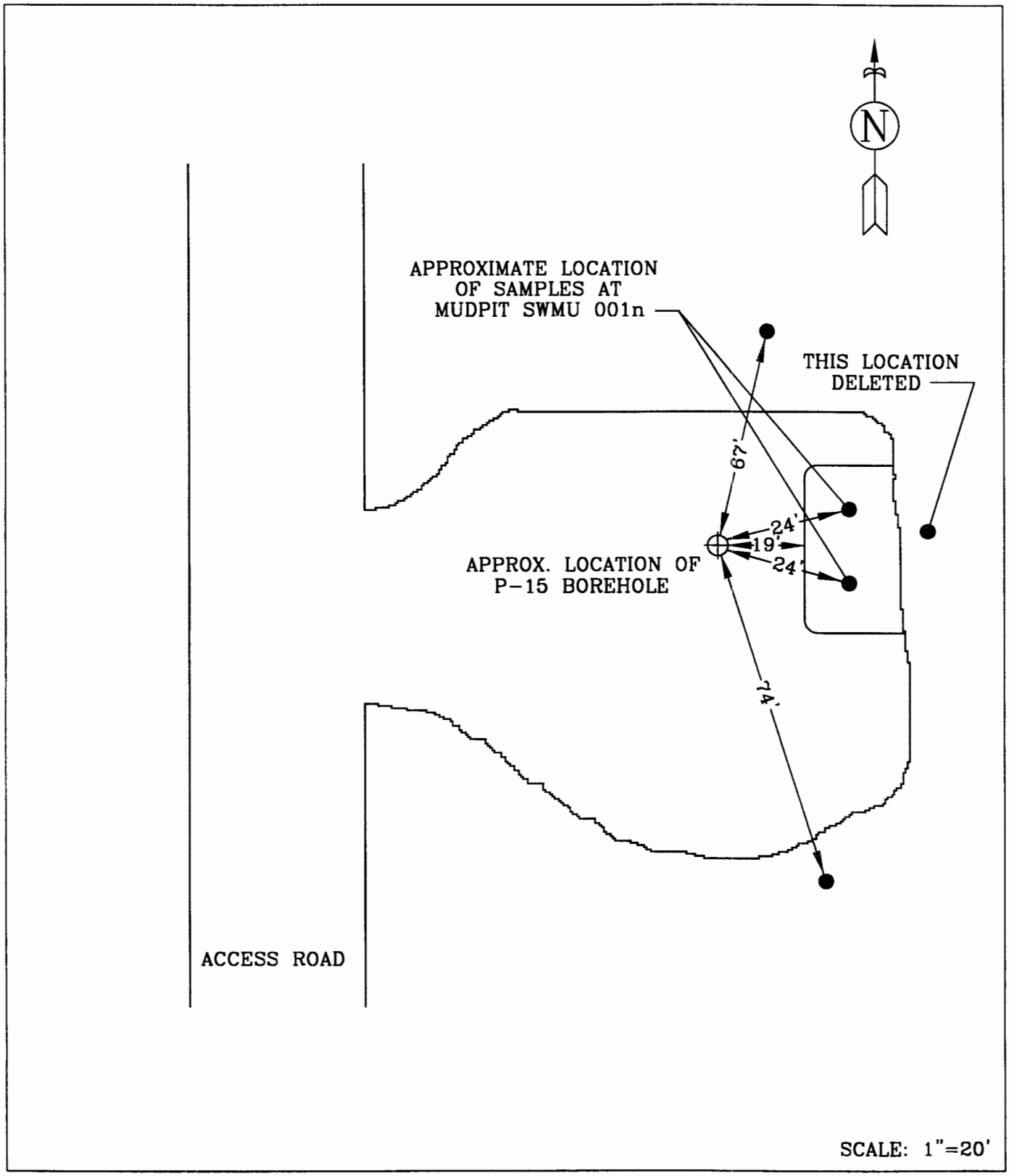
A list of the number and type of samples collected at SWMU 001n and associated sample intervals are provided in Table 2. Organic and metals samples collected in the mudpit area at the 12-24 inch depth were used to provide data from the depth where the highest concentration of potential hazardous constituents was anticipated. Samples collected at the 60-72 inch depth were used to quantify the maximum vertical extent of potential constituent migration. Figure 2 is a revised sample location map showing sample locations and measurements between sample borehole locations at SWMU 001n.

TABLE 2

NUMBER, TYPE, AND SAMPLING INTERVAL FOR SAMPLES COLLECTED AT SWMU 001N (P-15 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

FIGURE 2

SAMPLE LOCATION MAP SWMU 001n (P-15)



Up-gradient and down-gradient samples were collected to evaluate the lateral extent of potential constituent migration and to establish background concentrations for constituents in the vicinity of the P-15 mudpit site. These samples were collected from an undisturbed location, immediately up and down gradient, of the SWMU area. Up-gradient and down-gradient metals and volatile samples were collected at both the 12-24 inch and 60-72 inch depth. Background sample locations were selected by the sampling team during the sampling visit. Sample locations were noted in the sample logbook and sampling location maps were revised to reflect the location of up-gradient and down-gradient samples.

A tractor mounted power auger was used to drill an 8 inch diameter borehole to the appropriate sampling depth. A stainless tube sampler was used to collect a core sample for organic analytes from both the 12-24 inch and 60-72 inch depths. A disposable teflon scoop was generally used to collect metal constituent samples from the 12-24 inch depth. Metal constituent samples were collected in one liter (1000 ml) clear glass bottles with teflon lined lids. Volatile organic constituent samples were collected in 4 ounce (125 ml) clear glass bottles with welded septum lids.

2.4 Data Quality Assurance

Analytical data generated for samples collected at SWMU 001n were completed in accordance with SW-846 or equivalent analytical protocols. Halliburton NUS Laboratories is the contract laboratory used to analyze all Release Assessment Samples. Sample analytical methods and Quality Assurance/Quality Control requirements have been 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.

2.5 Independent Data Validation

An independent data quality review of SWMU 001n samples was completed by Harding Lawson & Associates (HLA) Engineering and Environmental Services Incorporated. HLA developed the procedure to complete QA/QC data package reviews in accordance with the data quality requirements described in *SW-846* and the *Halliburton NUS General Quality Assurance Plan*. A copy of the independently reviewed analytical data package for SWMU 001n is provided as Appendix 2.

2.6 Comparison of Analytical Results and EPA Action Levels at SWMU 001n

Appendix D of proposed *40 CFR § 264.521(d), FR Vol. 55, No. 145, VI(D), p.30870*, establishes criteria for selecting and calculating action levels for soils. Action level concentrations in Appendix D assume a chronic exposure through consumption of soil media contaminated with hazardous constituents. Criteria for establishing soil action levels can also be found in *40 CFR § 264.521(d)*, Appendix A. The tables in Appendix A contain

"Examples of Concentrations Meeting Criteria for Action Levels for Air, Water, and Soil Media." In order to complete Appendix D soil action level calculations, the DOE multiplied all TCLP concentrations by 20 (estimated total concentrations in mg/kg.) to obtain the intake assumption used in the Appendix D formula to compute the actual action level.

For all constituents listed in Appendix A and Appendix D, analytical results demonstrate that sample constituent concentrations are all below soil action levels. The constituent concentration for Lead for all samples collected at was <0.05 mg/l. This concentration is below the Maximum Contaminant Level (MCL) for Lead of 0.05 mg/l established in Appendix A. The results of voluntary release assessment samples collected at SWMU 001n are provided in Table 3.

No action levels are established in Appendices A, D, or F for Barium, Benzene, Thallium or Vinyl Chloride tested at SWMU 001n. For these analytes, only Barium was detected above the method detection limit. It is important to note that constituent concentrations for these analytes collected from inside the SWMU mudpit area are all below method detection limits and identical to concentrations for both up-and-down gradient background samples.

TABLE 3

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #3	BORE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24	60-72	60-72
Sample Date:	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95
WID Sample Numbers:	RA-95-083	RA-95-085	RA-95-087	RA-95-089	RA-95-091	RA-95-092	RA-95-097	RA-95-098
	RA-95-084	RA-95-086	RA-95-088	RA-95-090	RA-95-093	RA-95-094	RA-95-099	RA-95-100
						Duplicate		Duplicate
Analytes								
Leachable Metals (mg/L)								
Arsenic (As)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Barium (Ba)	0.51 B	0.35 UB	0.42 B	0.54 B	0.51 B	0.45 B	0.3 UB	0.32 UB
Cadmium (Cd)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Mercury (Hg)	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ
Thallium (Tl)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Leachable Volatiles (mg/L)								
1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
J	Estimated value
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

TABLE 3 (cont.)

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

Bore Number:	BORE #4	BORE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
Sample Date:	8/4/95	8/4/95	8/4/95	8/4/95
WID Sample Numbers:	RA-95-101	RA-95-105	RA-95-095	RA-95-103
	RA-95-102	RA-95-106	RA-95-096	RA-95-104
Analytes				
Leachable Metals (mg/L)				
Arsenic (As)	1 U	1 U	1 U	1 U
Barium (Ba)	0.34 UB	0.43 B	0.08 UB	0.05 U
Cadmium (Cd)	0.05 U	0.1 U	0.05 U	0.05 U
Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U
Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U
Mercury (Hg)	0.0002 U	0.0002 U	0.0002 UJ	0.0002 U
Thallium (Tl)	2 U	2 U	2 U	2 U
Leachable Volatiles (mg/L)				
1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
J	Estimated value
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

2.7 Evaluation of Selected Analytical Results Using Risk Based Concentrations

As part of the assessment of the constituent action levels at SWMU 001n, the CAO used the Risk Based Concentration (RBC) levels, developed by the EPA Region III office of Technical and Program Support, to evaluate analytical results for Barium, Benzene, Thallium, and Vinyl Chloride. These criteria appeared to most closely match the parameters established in Appendix D.

The RBC soil concentration for Barium is 140,000 mg/kg. The analytical results for Barium at SWMU 001n ranged from 0.30 mg/l to 0.54 mg/l. These TCLP concentrations can be converted to total concentrations (mg/kg equivalent) by multiplying the TCLP concentration by 20. Thus the total concentration equivalent for Barium analytes at SWMU 001n range from 6.0 mg/kg to 10.8 mg/kg, significantly below the 140,000 mg/kg RBC soil concentration.

Using the same methodology, the Region III RBC soil concentration for Benzene is 200 mg/kg. Benzene concentrations at SWMU 001n were all listed below the TCLP method detection limit of <0.05 mg/l. Converting the TCLP concentration to total concentration, the total Benzene concentration for all samples collected at SWMU 001n are <1.0 mg/kg. This concentration is significantly below the 200 mg/kg soil concentration established for Benzene contained in the RBC table.

Initial Thallium analyses at SWMU 001n were all at a method detection limit of <2.0 mg/l. Although none of the samples from SWMU 001n were selected for re-analysis to obtain a lower detection limit, every sample that was re-analyzed came back at 0.20 mg/l. No RBC industrial soil ingestion concentration for Thallium is provided in Table 1. However, a SSL of 0.40 mg/kg for soil transfers to groundwater is provided. As discussed earlier, geologic data demonstrates that the release of constituents from SWMU 001n to groundwater is extremely remote. Thus, a soil screening concentration has limited application at this site. Additionally, the TCLP concentrations for samples collected inside both the P-15 mudpit area and at the up and down gradient sample locations are below SW-846 method detection limits.

The RBC soil concentration for Vinyl Chloride is 3.0 mg/kg. TCLP analytical concentrations for Vinyl Chloride at all of the boreholes sampled at SWMU 001n were <0.1 mg/l. Converting the TCLP concentration to total concentration, the total Vinyl Chloride concentration for samples collected at each of the SWMU 001n boreholes is <2.0 mg/kg. Thus, the Vinyl Chloride concentration at all locations and depths are below both the method detection limit, and the Region III Risk Based Concentrations for industrial soils.

2.8 Proposed Corrective Actions at SWMU 001n

Based on the criteria provided in proposed *40 CFR § 264.514 FR Vol. 55, No. 145, VI(D), p. 30813*, the voluntary release assessment analytical data collected at SWMU 001n demonstrates that no release of hazardous constituents has occurred. This data clearly demonstrates that there is no threat to human health or the environment from drilling activities conducted at SWMU 001n and that additional RFI assessments are not required. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary, and the regulations do not require additional corrective actions at these sites.

Because it is the EPA's intent to encourage voluntary corrective actions as described in the preamble of the Proposed Subpart S Rule, the DOE requests that after appropriate public review and agency approval, a No Further Action determination be granted for SWMU 001n prior to the issuance of the RCRA Part B Permit for the WIPP. Any delay in the issuance of No Further Action determination may require the DOE to submit a Class III permit modification to remove this SWMU from the list of sites requiring evaluation under the RFI process. The submittal of a Class III permit modification to remove sites with no potential to impact human health or the environment represents an unreasonable expense. If a No Further Action is supported by both the EPA and NMED, this site will be replanted with native vegetation, in accordance with guidelines developed in the *WIPP Land Management Plan (DOE WIPP 93-004)*.

3.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001X

3.1 Location of SWMU 001x

This section of the Release Assessment Data Summary Report documents the results of release assessment sampling at SWMU 001x and describes the proposed corrective actions at this location. SWMU 001x is located in the NW 1/4 of the NE 1/4 of the SW 1/4 of Section 17, Township 22 South, Range 31 East. Pennsylvania Drilling Company began drilling the WIPP-13 borehole in July 1978. The borehole was drilled to a depth of 1,025 feet to the upper part of the Salado Formation in 1978, and later deepened to 3,860 feet in 1979. The borehole was later plugged in 1985 below the Culebra to create a monitoring well (Caufmann et al., 1990; D'Appolonia, 1982a; 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). Additionally 8,600 liters of a 20 percent concentration hydrochloric acid solution was used in 1986 to complete the well for monitoring purposes (Caufmann et al., 1990). Air photos from 1986 show no evidence for reopening of the mudpits during this time period.

A site visit on September 29, 1992, as part of the RFA assessment confirmed the location of two adjacent rectangular depressions at the entrance to the pad and just east of the WIPP-13 well head. The mudpits are sunken approximately 1.5 feet below pad grade and forms a single mudpit complex measuring 100 feet wide and 120 feet long. No vegetation is growing on the mudpits and the soil is a dark grey color. Black plastic liners protrude through the surface and delineate the mudpit area. A livestock tank is located on the WIPP-13 drill pad area approximately 100 feet north of the mudpit complex.

3.2 Geology and Hydrogeology in the Area of SWMU 001x

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

The Dewey Lake Redbed formations in the WIPP-13 borehole extend from 66 feet below surface down to 517 feet in depth. In this region 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 (Mercer, 1983; D'Appolonia 1982b). Mercer (1983) contends that groundwater occurs perched or semiperched in lenticular sands in the upper Dewey Lake. The RFA identifies the migration potential to groundwater at this

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

Because the estimated depth of the WIPP-13 mudpit potentially lies near the Mescalero Caliche contact with the overlying Holocene eolian sands and soils, the RFA identifies the release potential to surface soils as high. Although the RFA describes the release potential to surface soils as high, assessment sampling data indicates that the constituent concentration of samples collected inside the mudpit area, and the concentrations of up gradient and down gradient samples, are below the SW-846 method detection concentrations.

Once drilling of the WIPP-13 borehole was completed in 1978, the entire 8-inch borehole was filled with salt-based drilling mud. In 1979, the well was reamed to a 12.25 inch open hole diameter. The hole was then cased and cemented with 9.75 inch casing, to the upper part of the Salado Formation at a depth of 1025 feet. The hole was then deepened to a depth of 3,850 feet in the Castile Formation. WIPP-13 was left filled with a brine-gel drilling fluid and capped at the surface. In 1985, the hole was acidified after a retrievable bridge plug was set in the casing at a depth of approximately 740 feet. The casing was then perforated between 702 feet and 727 feet. This portion of the hole was capped at the surface and the hole left open for water level monitoring.

3.3 Sampling Protocols

During the sampling visits to the SWMU 001x, the sampling team located a single mudpit complex that measures approximately 100 feet wide and 120 feet long. The mudpits area is sunken approximately 1.5 feet below the surface grade of the pad. No vegetation is growing on the mudpit area, and the soil in the mudpit is a dark grey color. Black plastic liners protrude through the surface and delineate the mudpits. A white plastic liner material was encountered while collecting both samples in the mudpit area. Plastic liner material was encountered at a depth of approximately 22 inches. Soil in both these holes had a moist clay texture and had a mild petroleum odor. Samples collected at the 60-72 inch depth did not have a petroleum odor. A livestock tank is located on the WIPP-13 drill pad area approximately 100 feet north of the mudpit complex.

A total of 24 soil samples were collected to characterize the vertical and horizontal extent of any releases from the mudpit located at SWMU 001x. A list of the number, type, and interval of samples collected at SWMU 001x is provided in Table 4.

TABLE 4

NUMBER, TYPE, AND SAMPLING INTERVAL FOR SAMPLES COLLECTED AT 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

The rationale for selecting sample depths at mudpits during the initial round of voluntary release assessment sampling was based on an evaluation of the 001x SWMU site and historical information about this site contained in the RFA. Organic and metals samples collected in the mudpit area from the 12-24 inch depth were used to provide a sample from the depth where the highest concentration of potential hazardous constituents were anticipated. Samples collected at the 60-72 inch depth were used to quantify the maximum vertical extent of potential contamination migration. Figure 3 is the revised SWMU 001x sample location map showing sample locations and measurements between sample boreholes.

Up-and-down-gradient samples were collected to evaluate the lateral extent of potential constituent migration and to establish background concentrations for constituents in the vicinity of the WIPP-13 mudpit. These samples were collected from an undisturbed location, immediately up and down gradient, of the SWMU area. Up-gradient and down-gradient metals and volatile samples were collected at both the 12-24 inch and 60-72 inch depth. Background sample locations were selected by the sampling team members during the sampling visit. Sample locations were noted in the sample logbook and sampling location maps revised to identify up gradient and down gradient samples.

A tractor mounted power auger was used to drill an 8-inch diameter borehole to the appropriate sampling depth. A stainless tube sampler was used to collect a core sample for organic analytes from both the 12-24 inch and 60-72 inch depths. A disposable teflon scoop was generally used to collect metals constituent samples from the 12-24 inch depth. Metal constituent samples were collected in one liter (1000 ml) clear glass bottles with teflon lined lids. Volatile organic constituent samples were collected in four ounce (125 ml) clear glass bottles with welded septum lids.

3.4 Data Quality Assurance

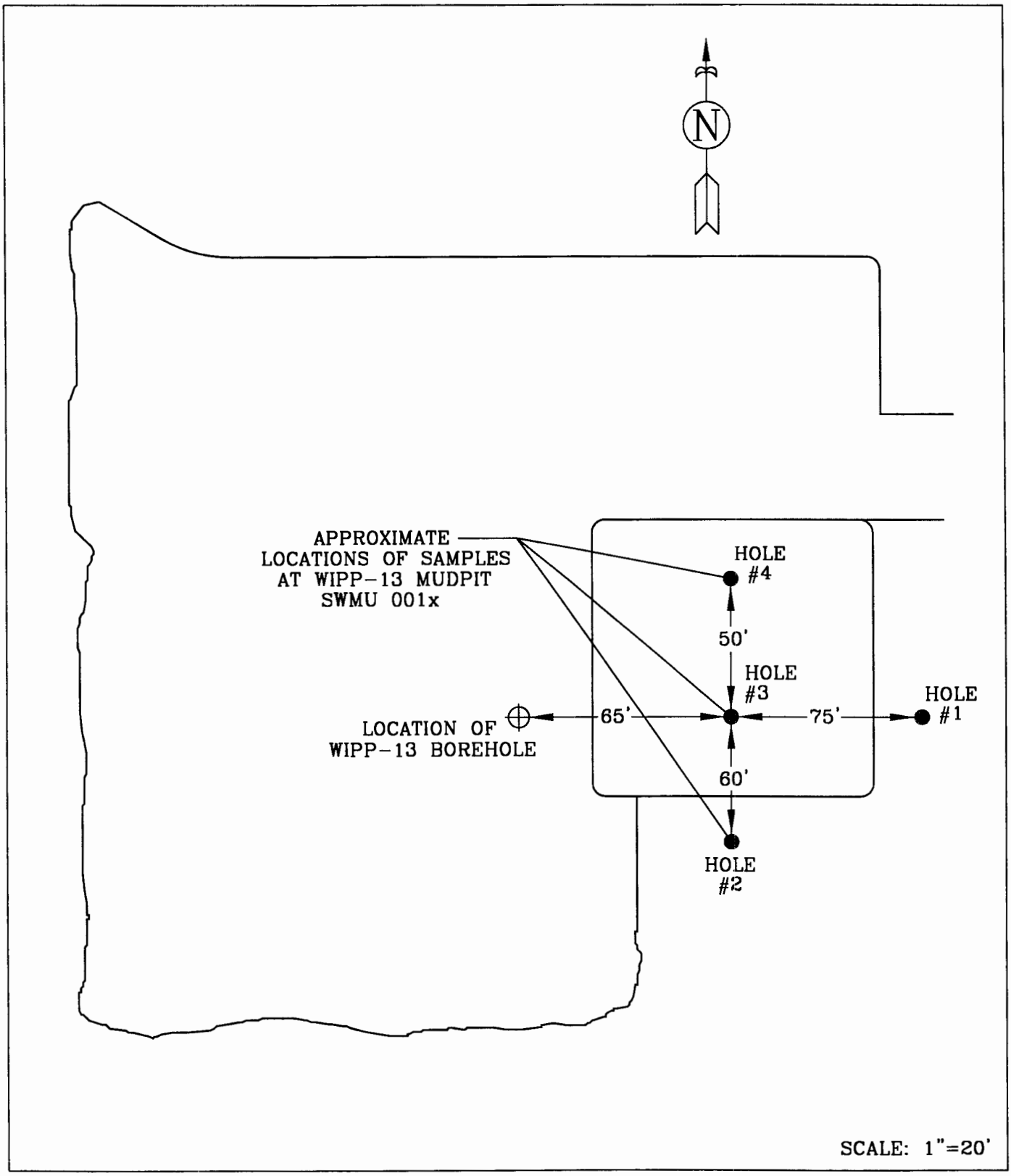
All sample analyses were completed in accordance with SW-846 or equivalent analytical protocols. Halliburton NUS Laboratories is the contract laboratory used to analyze all Release Assessment Samples. Sample analytical methods and Quality Assurance/Quality Control (QA/QC) requirements have been completed 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.

3.5 Independent Data Validation

An independent data quality review was completed by Harding Lawson & Associates (HLA) Engineering and Environmental Services. HLA developed a procedure to complete QA/QC data package reviews in accordance with the data quality requirements described in SW-846 and the *Halliburton NUS Laboratories General Quality Assurance Plan*. A copy of the HLA analytical data package for SWMU 001x is provided as Appendix 3.

FIGURE 3

SAMPLE LOCATION MAP SWMU 001x (WIPP-13)



3.6 Comparison of Analytical Results and EPA Action Levels at SWMU 001x

Appendix D of proposed *40 CFR § 264.521(d), FR Vol. 55, No. 145, VI(D), p.30870,* establishes criteria for selecting and calculating action levels for soils. Action level concentrations in Appendix D assume a chronic exposure through consumption of soil media contaminated with hazardous constituents. Criteria for establishing soil action levels can also be found in *40 CFR § 264.521(d), Appendix A.* The tables contained in Appendix A provide "Examples of Concentrations Meeting Criteria for Action Levels for Air, Water, and Soil Media." In order to complete Appendix D soil action level calculations, the DOE multiplied all TCLP concentrations by 20 (the estimated total concentrations in mg/kg) to obtain the intake assumption used in the Appendix D formula to compute the actual action level.

For all but one constituent contained in either Appendix A and Appendix D, analytical results demonstrate that sample constituent concentrations are below soil action levels. The only exceptions were constituent concentrations for Lead. Consistently, the TCLP analytical concentration for Lead was at the established TCLP method detection limit of <0.5 mg/l. One of the samples from SWMU 001x was included in the list of randomly selected samples that were re-analyzed to obtain a lower detection limit. This retesting resulted in a TCLP Lead concentration of <0.05 mg/l. This concentration is identical to the constituent concentrations for the other samples from SWMU 001j and 001t that were re-analyzed for Lead. In every case the re-analysis resulted in a Lead concentration below the 0.05 mg/l MCL for Lead. The results of voluntary release assessment samples collected at SWMU 001x are provided in Table 5.

No action levels are established in Appendices A, D, or F for Barium, Benzene, Thallium or Vinyl Chloride tested at SWMU 001x. For these analytes, only Barium was detected above the method detection limit. It is important to note that the constituent concentrations of samples collected inside the mudpit area, and the concentrations of up gradient and down gradient samples, are both at or below the SW-846 method detection concentration.

TABLE 5

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #3	BORE #3	BORE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24	60-72	60-72	12-24
Sample Date:	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95
WID Sample Numbers:	RA-95-107	RA-95-109	RA-95-111	RA-95-113	RA-95-115	RA-95-116	RA-95-119	RA-95-120	RA-95-125
	RA-95-108	RA-95-110	RA-95-112	RA-95-114	RA-95-117	RA-95-118	RA-95-121	RA-95-122	RA-95-126
						Duplicate		Duplicate	
Analytes									
Leachable Metals (mg/L)									
Arsenic (As)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Barium (Ba)	0.34 UB	0.33 UB	0.38 UB	0.36 UB	0.28 UB	0.3 UB	0.44 B	0.25 UB	0.19 UB
Cadmium (Cd)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Mercury (Hg)	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Thallium (Tl)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Leachable Volatiles (mg/L)									
1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

B Detected in the blank
EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank
J Estimated value
R Rejected value
U Not detected; value is method reporting limit
UB Detected in the blank and qualified as not detected

TABLE 5 (cont.)

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

Bore Number:	BORE #4	EQ BLANK	FD BLANK
Depth (inches):	60-72		
Sample Date:	8/9/95	8/9/95	8/9/95
WID Sample Numbers:	RA-95-127	RA-95-123	RA-95-129
	RA-95-128	RA-95-124	RA-95-130
Analytes			
Leachable Metals (mg/L)			
Arsenic (As)	0.2 UB	1 U	0.1 U
Barium (Ba)	0.36 UB	0.05 U	0.012 UB
Cadmium (Cd)	0.005 U	0.05 U	0.005 U
Chromium (Cr)	0.02 U	0.2 U	0.02 U
Lead (Pb)	0.05 U	0.5 U	0.05 U
Mercury (Hg)	0.0002 U	0.0002 U	0.0002 U
Thallium (Tl)	0.2 U	2 U	0.2 U
Leachable Volatiles (mg/L)			
1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U	0.05 U
Benzene	0.05 U	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U	0.05 U
Toluene	0.05 U	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
J	Estimated value
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

3.7 Evaluation of Selected Analytical Results Using Risk Based Concentrations

As previously discussed, the DOE used RBC levels developed by EPA Region III to evaluate analytical results for Barium, Benzene, Thallium, and Vinyl Chloride at SWMU 001x. These criteria appeared to most closely match the parameters established in Appendix D. The use of SSLs for transfers to groundwater are not appropriate at this site because geologic data demonstrate that any potential release to groundwater of constituents contained in the SWMU 001x mudpit is extremely remote.

The RBC soil concentration for Barium is 140,000 mg/kg, the analytical results for Barium at SWMU 001x ranged from 0.19 mg/l to .44 mg/l. These TCLP concentrations can be converted to total concentrations (mg/kg equivalent) by multiplying the TCLP concentration by 20. Thus, the total concentration equivalent for Barium analytes at SWMU 001x range from 3.8 mg/kg to 8.8 mg/kg, significantly below the 140,000 mg/kg RBC soil concentration.

Using the same methodology, the Region III RBC soil concentration for Benzene is 200 mg/kg. Benzene concentrations at SWMU 001x are all below the TCLP method detection limit of <0.05 mg/l. Converting the TCLP concentration to total concentrations, the total Benzene concentration for all samples at SWMU 001x is <1.0 mg/kg, significantly below the 200 mg/kg RBC soil concentration.

No RBC industrial soil ingestion concentration is provided in Table 1 for Thallium. Table 1 does provide a SSL concentration of 0 .4 mg/kg for soil transfers to groundwater is provided. However, geologic data from this site demonstrates that the release of hazardous constituents from the WIPP-13 mudpit to groundwater is extremely remote. Thus, a soil screening concentration has limited application at this site.

Initial Thallium analyses at SWMU 001x were all at a method detection limit of <2.0 mg/l. Based on these analytical results, two arbitrarily selected samples from SWMU 001x were re-analyzed for Thallium. Re-analysis established a lower detection limit for Thallium of <0.2 mg/l. A Risk Based soil concentration for Thallium is not provided in the EPA Region III RBC table. The TCLP analytical concentration for Thallium samples collected both inside the mudpit area, and at up and down gradient sample locations are below SW-846 method detection limits.

The RBC soil concentration for Vinyl Chloride is 3.0 mg/kg. TCLP analyses for Vinyl Chloride at all of the boreholes sampled at SWMU 001x had concentrations of <0.1 mg/l. Converting the TCLP concentration to total concentrations as described earlier, the total Vinyl Chloride concentration at all of the SWMU 001x boreholes is <2.0 mg/kg. Thus, the Vinyl Chloride concentration at all locations and depths are below both the method detection limit and the Region III Risk Based Concentrations for industrial soils.

3.8 Proposed Corrective Actions at SWMU 001x

Based on the criteria provided in proposed *40 CFR § 264.514 FR Vol. 55, No. 145, VI(D), p. 30813*, the voluntary release assessment analytical data collected at SWMU 001x demonstrates that no release of hazardous constituents has occurred. This data clearly demonstrates that there is no threat to human health or the environment from drilling activities conducted at SWMU 001x and that additional RFI assessments are not required. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary, and the regulations do not require additional corrective actions at these sites.

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

4.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001G

4.1 Location of SWMU 001g

This section of the release assessment data summary report documents the results of release assessment sampling at SWMU 001g, and describes the proposed corrective actions at this location. SWMU 001g is located in the SW 1/4 of the SW 1/4 of the SW 1/4 of Section 29, Township 22 South, Range 31 East. The abandoned mudpits from the drilling of the P-1 and H-14 boreholes make up the 001g SWMU site. The P-1 potash exploration borehole was drilled by Pennsylvania Drilling Company in August, 1976. The total depth of the P-1 borehole was 1,591 feet. The H-14 borehole was drilled in October 1986 to provide a Culebra-dolomite monitoring well in the southwest quadrant of the WIPP site. The H-14 monitoring well was drilled to a total depth of 589 feet. The H-14 well was originally drilled using a 7.875 inch rockbit to a depth of 533 feet, 12 feet above the Culebra Formation. The original borehole was hydrologically tested in the Dewey Lake and Rustler Formations. A 5.5 inch casing was set in the hole and cemented to the surface. A 4.5 inch hole was then cored through the cement and then continued to a depth of 574 feet. After a series of drill stem tests in the Culebra Formation, the corehole was reamed to 4.75 inches and deepened to a final depth of 589 feet.

Drilling fluids that may have been used to complete both the P-1 and H-14 borehole include: saturated sodium and potassium chloride brine, starch, and salt gel (attapulgite). Diesel fuel was added to a mixture of saturated sodium and potassium chloride brine, starch and salt gel, and attapulgite to reduce the degree of dissolution of the Salado formation during drilling operations for P-1 (WIPP Hydrologic Data Report #5). Saturated brine used in the H-14 borehole 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 at H-14 to measure contamination of the Culebra member from the drilling process. Approximately 4,620 gallons of traced drilling fluid were lost to the member, representing about 80 to 90 percent of the recirculated drilling fluid (WIPP Hydrologic Data Report #5).

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

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

4.2 Geology and Hydrogeology in the Area of SWMU 001g

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

Underlying the Gatuna Formation is the Dewey Lake Redbed Formation. The Dewey Lake Redbed Formation in the P-1 and H-14 boreholes is approximately 318 feet thick. The Dewey Lake Redbeds in this region are characterized as a deltaic sequence of alternating, thinly bedded siltstone and mudstone with lenticular interbeds of fine-to coarse-grained sandstone (Mercer, 1983; D'Appolonia 1982b).

The RFA describes soil development at this location as poor, and the release potential to near surface formations at the P-1 and H-14 boreholes as high. Although the release potential to surface soils is high, release assessment sampling data described in Sections 4.6 and 4.7 of this data summary report indicate that, with the exception of Barium, the constituent concentrations of samples collected inside the mudpit area, and the concentrations of up-gradient and down-gradient samples, are below the SW-846 method detection concentrations. Barium concentrations of all samples collected by the DOE at SWMU 001g are equal to or below 1 mg/l, and the mean Barium concentration of soil samples is 0.58 mg/l.

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

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

As described previously, the H-14 borehole was originally drilled using a 7.875 inch rockbit to a depth of 533 feet. The original borehole was hydrologically tested in the Dewey Lake and Rustler Formations. A 5.5 inch casing was set in the hole and cemented to the surface. A 4.5 inch hole was then cored through the cement and then continued to a depth of 574

feet. After a series of drill stem tests in the Culebra Formation, the corehole was reamed to 4.75 inches and deepened to a final depth of 589 feet. The H-14 borehole was capped with a locking cap, and remains in use as a Culebra Formation water level monitoring well.

4.3 Sampling Protocols

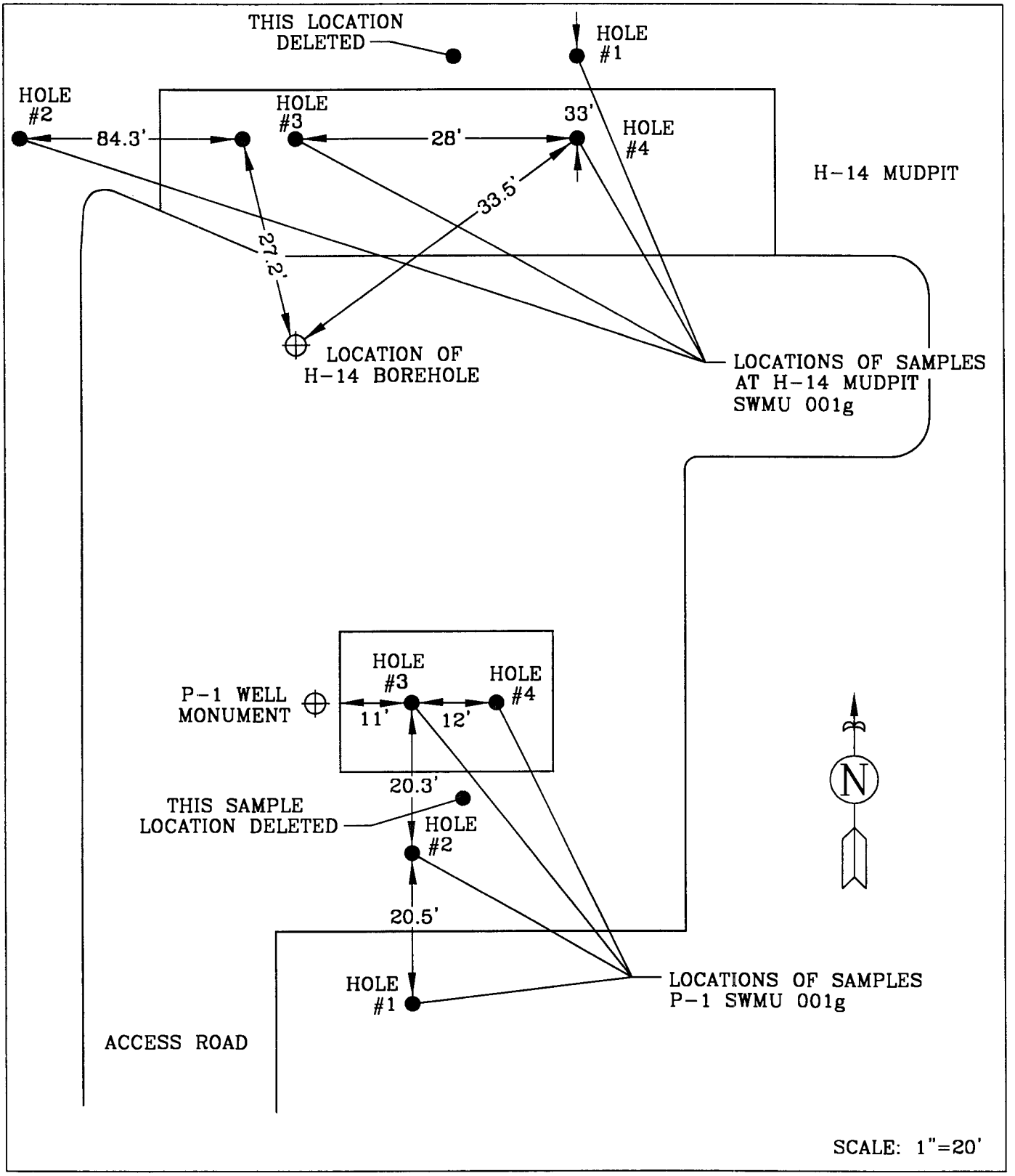
A total of 56 soil samples were collected to characterize the vertical and horizontal extent of any potential release from the SWMU 001g. The DOE collected 14 samples from the P-1 mudpit area and 14 samples from the H-14 site. The NMED - DOE/WIPP Oversight Bureau collected an equal number of split samples at SWMU 001g. A list of the number and type of samples collected by the DOE at SWMU 001g, and the their associated sample intervals are provided in Table 6. Because the split sampling data generated by NMED - DOE Oversight Bureau consistently had a higher method detection limit, this data was only used as a reference to ensure that no data anomalies were identified. Analytical data collected by the NMED - DOE/WIPP Oversight Bureau are provided in Appendix 4.

The rationale for selecting sample depths at mudpits during the initial round of voluntary release assessment sampling was based on an evaluation of the 001g SWMU site and historical information contained in the RFA. Organic and metal samples collected at the mudpit area at the 12-24 inch depth were used to provide a sample from the depth where the highest concentration of potential hazardous constituents were anticipated. Samples collected at the 60-72 inch depth were used to quantify the maximum vertical extent of potential contamination. A revised sample location map showing sample locations and measurements between sample borehole locations at SWMU 001g is provided as Figure 4.

Up-gradient and down-gradient samples were collected to evaluate the lateral extent of potential constituent migration and to establish background soil constituent concentrations in the vicinity of the SWMU 001g. These samples were collected from an undisturbed location, immediately up-and-down-gradient of both mudpit locations. Only metal constituent samples were collected from up-gradient and down-gradient sample locations at SWMU 001g. Metal constituent samples were collected at both the 12-24 inch and 60-72 inch depths. The decision to collect only metal constituent samples at background sample locations came after discussion with both the NMED and EPA. Based on the analytical results from samples collected at other SWMUs, the agencies determined that analytical costs could be reduced by eliminating the analysis of organic constituents at background sample locations. Thus, organic sample analyses was not completed at the remainder of SWMU locations with the exemption of SWMU 003a. Background sample locations were selected by the sampling team during the sampling visit. Sample locations were noted in the sample logbook, and sampling location maps were revised to reflect the location of up-gradient and down-gradient samples.

FIGURE 4

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



A tractor mounted power auger was used to drill an 8-inch diameter borehole to the appropriate sampling depth. A stainless tube sampler was used to collect a core sample for organic analytes from both the 12-24 inch and 60-72 inch depths. A disposable teflon scoop was generally used to collect metal constituent samples from the 12-24 inch depth. Metal constituent samples were collected in one liter (1000 ml) clear glass bottles with teflon lined lids. Volatile organic constituent samples were collected in four ounce (125 ml) clear glass bottles with welded septum lids.

Table 6

SUMMARY OF THE NUMBER, TYPE, AND SAMPLING INTERVAL OF SAMPLES COLLECTED AT SWMU 001g (DRILL PAD H-14)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	2	2
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	0	0
Organic Analysis	0	0
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	0	0
Organic Analysis	0	0

Table 7

SUMMARY OF THE NUMBER, TYPE, AND SAMPLING INTERVAL OF SAMPLES COLLECTED AT SWMU 001g (DRILL PAD P-1)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	2	2
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	0	0
Organic Analysis	0	0
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	0	0
Organic Analysis	0	0
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0

4.4 Data Quality Assurance

All sample analyses were completed in accordance with SW-846 or equivalent analytical protocols. Halliburton NUS Laboratories is the contract laboratory used to analyze all Release Assessment Samples. Sample analytical methods and Quality Assurance/Quality Control (QA/QC) requirements have been 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.

4.5 Independent Data Validation

Independent data quality review of samples collected by the DOE was completed by Harding Lawson & Associates (HLA) Engineering and Environmental Services. HLA developed a procedure to complete QA/QC data package reviews in accordance with the data quality requirements described in SW-846 and the *Halliburton NUS Laboratories General Quality Assurance Plan*. A copy of the independently reviewed analytical data package for samples collected by the DOE at SWMU 001g is provided as Appendix 5.

4.6 Comparison of Analytical Results and EPA Action Levels at SWMU 001g

Appendix D of proposed *40 CFR § 264.521(d), FR Vol. 55, No. 145, VI(D), p.30870*, establishes criteria for selecting and calculating action levels for soils. Action level concentrations in Appendix D assume a chronic exposure through consumption of soil media contaminated with hazardous constituents. Criteria for establishing soil action levels can also be found in *40 CFR § 264.521(d)*, Appendix A. The tables contained in Appendix A provide "Examples of Concentrations Meeting Criteria for Action Levels for Air, Water, and Soil Media." In order to complete Appendix D, soil action level calculations for samples collected at SWMU 001g, the DOE multiplied all TCLP concentrations by 20 (the total concentrations in mg/kg) to obtain the intake assumption used in the Appendix D formula to compute the actual action level.

For all constituents listed in Appendix A and Appendix D, analytical results demonstrate that sample constituent concentrations are all below soil action levels. The constituent concentration for Lead for all samples collected at was <0.05 mg/l. This concentration is below the Maximum Contaminant Level (MCL) for Lead of 0.05 mg/l established in Appendix A. The results of voluntary release assessment samples collected at SWMU 001g are provided in Table 8.

TABLE 8

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #4	BORE #4	EQ BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72	
Sample Date:	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95
WID Sample Numbers:	RA-95-131	RA-95-132	RA-95-133	RA-95-134	RA-95-135	RA-95-137	RA-95-141	RA-95-143	RA-95-139
					RA-95-136	RA-95-138	RA-95-142	RA-95-144	RA-95-140
Analytes									
Leachable Metals (mg/L)									
Arsenic (As)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UB	0.1 UB	0.1 U	0.1 U
Barium (Ba)	0.34	1.0	0.43	0.41	0.57	0.74	0.44	0.72	0.21
Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Lead (Pb)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Leachable Volatiles (mg/L)									
1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
J	Estimated value
NA	Not Analyzed
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

TABLE 8 (cont.)

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #4	BORE #4	FD BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72	
Sample Date:	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/5/95	10/4/95
WID Sample Numbers:	RA-95-145	RA-95-146	RA-95-147	RA-95-148	RA-95-149	RA-95-151	RA-95-153	RA-95-157	RA-95-155
					RA-95-150	RA-95-152	RA-95-154	RA-95-158	RA-95-156
Analytes									
Leachable Metals (mg/L)									
Arsenic (As)	0.2 UB	0.2 UB	0.2 UB	0.1 UB	0.2 UB	0.1 U	0.2 UB	0.2 UB	0.1 U
Barium (Ba)	0.49	0.46	0.29	0.33	0.68	0.69	0.75	0.89	0.037
Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006	0.005 U	0.005 U	0.005 U
Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Lead (Pb)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Mercury (Hg)	0.0001 U	0.0001 U	0.0002 U	0.0002 U	0.0002 U	0.0004	0.0002 U	0.0002 U	0.0002 U
Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Leachable Volatiles (mg/L)									
1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

B Detected in the blank
FD BLANK Field Blank
J Estimated value
NA Not Analyzed
R Rejected value
U Not detected; value is method reporting limit
UB Detected in the blank and qualified as not detected

No action levels are established in Appendices A, D, or F for Barium, Benzene, Thallium or Vinyl Chloride tested at SWMU 001g. For these analytes, only Barium was detected above the method detection limit. It is important to note that constituent concentrations for these analytes collected inside the P-1 and H-14 mudpit areas are identical to concentrations for both up-gradient and down-gradient background samples.

4.7 Evaluation of Selected Analytical Results Using Risk Based Concentrations

The DOE used the RBC table to evaluate the analytical results for Barium, Benzene, Thallium, and Vinyl Chloride samples collected at SWMU 001g. These criteria appeared to most closely match the parameters established in Appendix D. The SSL for transfers to groundwater are not appropriate because geologic data demonstrates that any potential release of hazardous constituents from SWMU 001g to groundwater is extremely remote.

The RBC soil concentration for Barium is 140,000 mg/kg, analytical results for Barium at P-1 mudpit range from 0.29 mg/l to 0.89 mg/l. These TCLP concentrations can be converted to total concentrations (mg/kg equivalent) by multiplying the TCLP concentration by 20. Thus, the total concentration equivalent for Barium analytes at the P-1 mudpit range from 8.7 mg/kg to 17.8 mg/kg. Barium analytes at the H-14 mudpit range from 0.34 mg/l to 1.0 mg/l. Calculated total concentrations range from 8.7 mg/kg to 17.8 mg/kg, significantly below the 140,000 mg/kg RBC soil concentration.

Using the same methodology, the Region III RBC soil concentration for Benzene is 200 mg/kg. Benzene concentrations at both the P-1 and H-14 mudpit area are below the TCLP method detection limit of <0.05 mg/l. Converting the TCLP concentration to total concentrations, the total Benzene concentration for all samples at SWMU 001g is <1.0 mg/kg, significantly below the 200 mg/kg RBC soil concentration.

No RBC industrial soil ingestion concentration is provided in Table 1 for Thallium, however, an SSL for soil transfers to groundwater of 0.4 mg/kg is provided. As discussed earlier, geologic data demonstrates that the release of constituents from SWMU 001g to groundwater is extremely remote. Thus, a soil screening concentration has limited application at this site. Thallium analyses at SWMU 001g were all at a method detection limit of <0.2 mg/l. No Risk Based soil concentration for Thallium is provided in the EPA Region III RBC table. However, TCLP analytical concentrations for samples collected inside the mudpit area and for up and down gradient background samples are below SW-846 method detection limits.

The RBC soil concentration for Vinyl Chloride is 3.0 mg/kg. TCLP analyses for Vinyl Chloride at all of the boreholes sampled at SWMU 001g had concentrations of <0.1 mg/l. Converting the TCLP Vinyl Chloride concentration to total concentrations, the total Vinyl Chloride concentration for all sample sites at SWMU 001g is <2.0 mg/kg. Thus, the Vinyl Chloride concentration for all samples collected at the SWMU 001g are below both the method detection limit and the Region III risk based concentration for industrial soils.

4.8 Proposed Corrective Actions at SWMU 001g

Based on the criteria provided in proposed *40 CFR § 264.514 FR Vol. 55, No. 145, VI(D), p. 30813*, the voluntary release assessment analytical data collected at SWMU 001g demonstrates that no release of hazardous constituents has occurred. This data clearly demonstrates that there is no threat to human health or the environment from drilling activities conducted at SWMU 001g and that additional RFI assessments are not required. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary, and the regulations do not require additional corrective actions at these sites.

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

5.0 RESULTS OF RELEASE ASSESSMENT SAMPLING AT SWMU 001K

5.1 Location of SWMU 001k

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

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

5.2 Geology and Hydrogeology in the Area of SWMU 001k

The USGS lithology logs for the P-4 borehole identify the surface strata a SWMU 001k as a 5-8 foot zone of fine-grained dune sands which overlay a Triassic aged Santa Rosa Sandstone Formation. The Santa Rosa Sandstone in this area is approximately 81 feet thick. The Permian aged Dewey Lake Redbed Formations is located directly below the Santa Rosa Sandstone. The Dewey Lake Redbeds at this location are characterized as a deltaic sequence of alternating, thinly bedded siltstone and mudstone with lenticular interbeds of fine-to-coarse grained sandstone (Mercer, 1983; D'Appolonia 1982b).

The RFA identifies the release potential to soils at SWMU 001k as high due to the fine grained eolian sands and the shallow contact with the Santa Rosa Sandstone Formation. Although the RFA identifies the release potential to surface soils at this location as high, analytical data from samples collected at SWMU 001k indicate that the constituent concentrations for all analytes are below method detection limit, and concentrations for samples collected inside the mudpit area are equal to background concentrations.

The RFA goes on to identify the groundwater migration potential at SWMU 001k as low relative to other locations on site. No groundwater is noted in drillers' logs during air foam circulation between 99 feet and 609 feet below the land surface, suggesting no groundwater occurs in the Dewey Lake Formation at this location. Subsurface logs also indicate that the top of the Dewey Lake Red Beds would be relatively impermeable at this location. Migration to the Culebra Dolomite aquifer 775 feet below surface is not credible.

Once drilling of the P-4 borehole was completed, it was cemented from the bottom of the borehole at 1,857 feet to the surface. All casing was removed, and a 500 gallons flush of drill mud was proceeded with 250 sacks of 50 percent Pozmix "A," 50 percent class C cement, 2 percent gel, and 19.4 pounds per sack of cement. One joint of 3.5 inch casing was set in the soft cement and cut off 1 foot above the surface to mark the hole.

5.3 Sampling Protocols

A total of 16 soil samples were collected to characterize the vertical and horizontal extent of any potential release from the P-4 mudpit. A list of the number and type of samples collected at SWMU 001k, and the their associated sample intervals is provided in Table 6.

The rationale for selecting sample depths at mudpits during the initial round of voluntary release assessment sampling was based on an evaluation of the 001k SWMU site and historical information contained in the RFA. Organic and metal samples collected at the mudpit area at the 12-24 inch depth were used to provide a sample from the depth where the highest concentration of potential hazardous constituents were anticipated. Samples collected at the 60-72 inch depth were used to quantify the maximum vertical extent of potential contamination. A revised sample location map showing sample locations and measurements between sample borehole locations at SWMU 001k is provided as Figure 5.

Up-gradient and down-gradient samples were collected to evaluate the lateral extent of potential constituent migration and to establish background soil constituent concentrations in the vicinity of the P-4 mudpit. These samples were collected from an undisturbed location, immediately up-and-down gradient of the SWMU area. Up-gradient and down-gradient metals samples were collected at both the 12-24 inch and 60-72 inch depths. Background sample locations were selected by the sampling team during the sampling visit. Sample locations were noted in the sample logbook, and sampling location maps were revised to reflect the location of up-gradient and down-gradient samples.

A tractor mounted power auger was used to drill an 8-inch diameter borehole to the appropriate sampling depth. A stainless tube sampler was used to collect a core sample for organic analytes from both the 12-24 inch and 60-72 inch depths. A disposable teflon scoop was generally used to collect metals constituent samples from the 12-24 inch depth. Metal constituent samples were collected in one liter (1000 ml) clear glass bottles with teflon lined lids. Volatile organic constituent samples were collected in four ounce (125 ml) clear glass bottles with welded septum lids.

FIGURE 5

SAMPLE LOCATION MAP SWMU 001k (P-4)

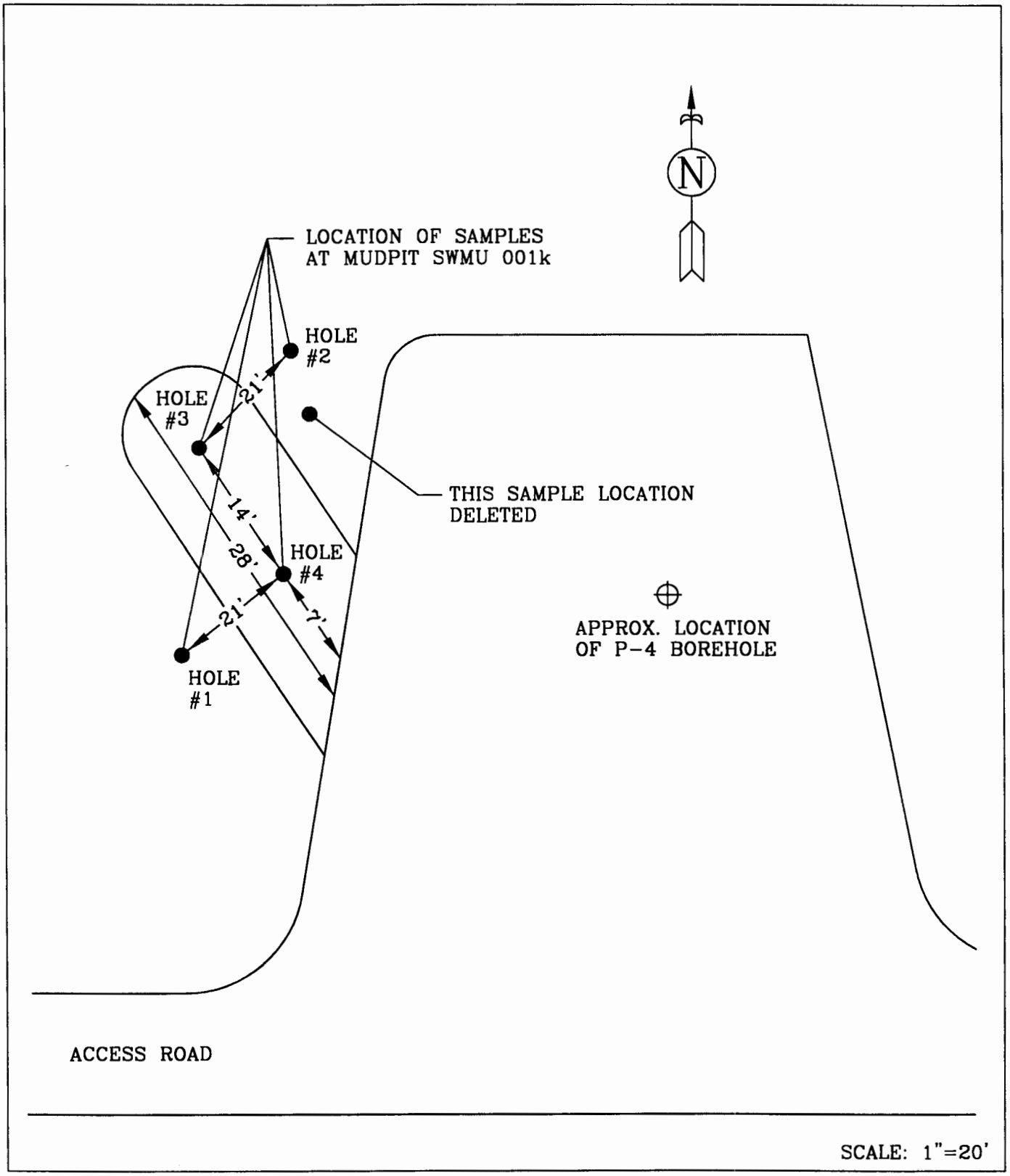


Table 9

SUMMARY OF THE NUMBER, TYPE, AND SAMPLING INTERVAL OF SAMPLES COLLECTED AT SWMU 001K (MUDPIT P-4)		
	12 - 24"	60 - 72"
NUMBER OF SAMPLES:		
Inorganic Analysis	4	4
Organic Analysis	2	2
NUMBER OF DUPLICATE SAMPLES:		
Inorganic Analysis	0	0
Organic Analysis	0	0
NUMBER OF EQUIPMENT BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0
NUMBER OF FIELD BLANKS:		
Inorganic Analysis	1	0
Organic Analysis	1	0

5.4 Data Quality Assurance

All sample analyses were completed in accordance with SW-846 or equivalent analytical protocols. Halliburton NUS Laboratories is the contract laboratory used to analyze all Release Assessment Samples. Sample analytical methods and Quality Assurance/Quality Control (QA/QC) requirements have been 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.

5.5 Independent Data Validation

Independent data quality validation was completed by Harding Lawson & Associates (HLA) Engineering and Environmental Services. HLA developed a procedure to complete QA/QC data package reviews in accordance with the data quality requirements described in SW-846 and the *Halliburton NUS Laboratories General Quality Assurance Plan.* A copy of the independently reviewed analytical data package for SWMU 001k is provided as Appendix 6.

5.6 Comparison of Analytical Results and EPA Action Levels at SWMU 001k

Appendix D of proposed *40 CFR § 264.521(d), FR Vol. 55, No. 145, VI(D), p.30870,* establishes criteria for selecting and calculating action levels for soils. Action level concentrations in Appendix D assume a chronic exposure through consumption of soil media contaminated with hazardous constituents. Criteria for establishing soil action levels can also be found in *40 CFR § 264.521(d)*, Appendix A. The tables contained in Appendix A provide "Examples of Concentrations Meeting Criteria for Action Levels for Air, Water, and Soil Media." In order to complete Appendix D, soil action level calculations for samples collected at SWMU 001k, the DOE multiplied all TCLP concentrations by 20 (the total concentrations in mg/kg) to obtain the intake assumption used in the Appendix D formula to compute the actual action level.

For all constituents listed in Appendix A and Appendix D, analytical results demonstrate that sample constituent concentrations are all below soil action levels. The constituent concentration for Lead for all samples collected at was <0.05 mg/l. This concentration is below the Maximum Contaminant Level (MCL) for Lead of 0.05 mg/l established in Appendix A. Lead analyses from samples collected at SWMU 001k have been validated as "estimated values" by the independent quality control contract laboratory. Section 6, Paragraph 7., documents that the Lead recovery from the laboratory control sample was 72.4 percent. This value is below the 81.2 percent minimum control limit established in the Halliburton NUS Quality Control Procedure, and the 80 percent Functional Guideline Criteria established by the EPA in SW-846. Therefore, the Lead results for samples collected at SWMU 001k from batch 38573 were qualified as "estimated values." The results of voluntary release assessment samples collected at SWMU 001k are provided in Table 10.

TABLE 10

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #4	BORE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72
Sample Date:	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95
WID Sample Numbers:	RA-95-159	RA-95-160	RA-95-161	RA-95-162	RA-95-163	RA-95-167	RA-95-169	RA-95-171
					RA-95-164	RA-95-168	RA-95-170	RA-95-172
Analytes								
Leachable Metals (mg/L)								
Arsenic (As)	0.1 UB	0.2 UB	0.1 UB	0.1 UB	0.2 UB	0.1 UB	0.2 UB	0.1 U
Barium (Ba)	0.63 B	0.59 B	0.57 B	0.74 B	0.59 B	0.59 B	0.6 B	0.76 B
Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Lead (Pb)	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 J
Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Leachable Volatiles (mg/L)								
1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U

B Detected in the blank
EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank
J Estimated value
NA Not Analyzed
R Rejected value
U Not detected; value is method reporting limit
UB Detected in the blank and qualified as not detected

TABLE 10 (cont.)

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

Bore Number:	EQ BLANK	FD BLANK
Depth (inches):		
Sample Date:	10/23/95	10/23/95
WID Sample Numbers:	RA-95-165	RA-95-173
	RA-95-166	RA-95-174
Analytes		
Leachable Metals (mg/L)		
Arsenic (As)	0.1 U	0.1 U
Barium (Ba)	0.048 UB	0.038 UB
Cadmium (Cd)	0.005 U	0.005 U
Chromium (Cr)	0.02 U	0.02 U
Lead (Pb)	0.05 U	0.05 U
Mercury (Hg)	0.0001 U	0.0001 U
Thallium (Tl)	0.2 U	0.2 U
Leachable Volatiles (mg/L)		
1,1,1-Trichloroethane	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U
Benzene	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U
Toluene	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U

B Detected in the blank
EQ BLANK Equipment Rinse Blank
FD BLANK Field Blank
J Estimated value
NA Not Analyzed
R Rejected value
U Not detected; value is method reporting limit
UB Detected in the blank and qualified as not detected

No action levels are established in Appendices A, D, or F for Barium, Benzene, Thallium or Vinyl Chloride tested at SWMU 001k. For these analytes, only Barium was detected above the method detection limit. It is important to note that constituent concentrations for these analytes collected inside the SWMU mudpit areas are identical to concentrations for both up-gradient and down-gradient background samples.

5.7 Evaluation of Selected Analytical Results Using Risk Based Concentrations

The DOE used the RBC table to evaluate the analytical results for Barium, Benzene, Thallium, and Vinyl Chloride samples collected at SWMU 001k. These criteria appeared to most closely match the parameters established in Appendix D. The SSL for transfers to groundwater are not appropriate because geologic data demonstrates that any potential release of hazardous constituents from SWMU 001k to groundwater is extremely remote.

The RBC soil concentration for Barium is 140,000 mg/kg, the analytical results for Barium at SWMU 001k ranged from 0.57 mg/l to 0.76 mg/l. These TCLP concentrations can be converted to total concentrations (mg/kg equivalent) by multiplying the TCLP concentration by 20. Thus the total concentration equivalent for Barium analytes at SWMU 001k range from 11.4 mg/kg to 15.2 mg/kg, significantly below the 140,000 mg/kg RBC soil concentration.

Using the same methodology, the Region III RBC soil concentration for Benzene is 200 mg/kg. Benzene concentrations at SWMU 001k were all listed at below the TCLP method detection limit of <0.05 mg/l. Converting the TCLP concentration to total concentrations, the total Benzene concentration for all samples at SWMU 001k is <1.0 mg/kg, significantly below the 200 mg/kg RBC soil concentration.

No RBC industrial soil ingestion concentration is provided in Table 1 for Thallium, however, an SSL for soil transfers to groundwater of 0.4 mg/kg is provided. As discussed earlier, geologic data demonstrates that the release of constituents from SWMU 001k to groundwater is extremely remote. Thus, a soil screening concentration has limited application at this site. However, TCLP analytical concentrations for samples collected inside the mudpit area and for up and down gradient background samples are below SW-846 method detection limits.

The RBC soil concentration for Vinyl Chloride is 3.0 mg/kg. TCLP analyses for Vinyl Chloride at all of the boreholes sampled at SWMU 001k had concentrations of <0.1 mg/l. Converting the Vinyl Chloride TCLP concentration to total concentrations, the total Vinyl Chloride concentration for each of the samples collected at SWMU 001k is <2.0 mg/kg. Thus, the Vinyl Chloride concentration for all samples collected at the SWMU 001k are below both the method detection limit and the Region III risk based concentrations for industrial soils.

5.8 Proposed Corrective Actions at SWMU 001k

Based on the criteria provided in proposed *40 CFR § 264.514 FR Vol. 55, No. 145, VI(D), p. 30813*, the voluntary release assessment analytical data collected at SWMU 001k demonstrates that no release of hazardous constituents has occurred. This data clearly demonstrates that there is no threat to human health or the environment from drilling activities conducted at SWMU 001k and that additional RFI assessments are not required. In fact, thousands of similar mudpits exist immediately outside the WIPP boundary, and the regulations do not require additional corrective actions at these sites.

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

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

APPENDIX 1

EPA Region III Risk-Based Concentration Table for the Period July 1995 - December 1995

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

October 20, 1995

SUBJECT: Risk-Based Concentration Table, July - December 1995

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

TO: RBC Table mailing list

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

IMPORTANT MESSAGE

EPA Region III has established a homepage on the World Wide Web which you can find at http://earth1.epa.gov:80/ or http://www.epa.gov/. Our homepage will soon include the RBC table in downloadable form. We strongly encourage all RBC table users having Internet access to obtain the table electronically rather than on paper. In this way, users can obtain the most current issue immediately in a form that can be used directly as input for risk assessment calculations. This distribution method will also save large amounts of paper and cost substantially less.

For those lacking Internet access, it's once again time to re-register to receive a paper copy of the RBC table. We need to hear from you periodically to ensure that you still have an interest and that we have your correct address. Please fax your registration request to Vanessa Sizer at 215-597-9890, including your name, address, and phone number. Please don't phone to re-register; we need hard copy to document your continued interest. If we don't hear from you by March 30, 1996, we'll assume you no longer need a paper copy. Thanks for your cooperation.

CONTENTS, USES, AND LIMITATIONS OF THE RBC TABLE

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

The RBC table also includes soil screening levels (SSLs) for protection of groundwater

and air. Most SSLs were obtained directly from EPA/OSWER's proposed SSL guidance document, to which we have added some additional SSLs based on the same methodology. Sources of SSLs are noted in the table. SSLs incorporate the same exposure assumptions as RBCs, plus additional assumptions needed for inter-media extrapolation. SSLs are therefore distinct from RBCs, and should be used only in the framework proposed in the OSWER document (available from NTIS as document numbers 9355.4-1, PB95-965530, or EPA540/R-94/105).

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

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

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

1. A single medium is contaminated;
2. A single contaminant contributes nearly all of the health risk;
3. Volatilization or leaching of that contaminant from soil is expected not to be significant;
4. The exposure scenarios used in the RBC table are appropriate for the site;
5. The fixed risk levels used in the RBC table are appropriate for the site; and
6. Risk to ecological receptors is expected not to be significant;

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

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

ANSWERS TO FREQUENTLY ASKED QUESTIONS

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

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

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

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

Arsenic is double-entered to ensure that the risk assessor realizes that non-carcinogenic concerns are significant for arsenic. Otherwise, one might be tempted to accept a 1e-4 risk (37 ppm in residential soil), when the oral reference dose would be exceeded at 23 ppm.

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

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

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

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

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

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

priority because the table's primary purpose is to identify environmental problems needing further study. RBCs were never intended for uncritical use as cleanup levels, merely to identify potential problems which need a closer look.

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

The calculation comes from basic physiology. It's a scaling of the mass-specific 20 m3/d rate for adults from a body mass of 70 kg to 15 kg, using the 2/3 power of mass, as follows:

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

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

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

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

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

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

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

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

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

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

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

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

The reason lead is missing from the RBC table is simple, and fundamental: EPA has no

reference dose or potency slope for inorganic lead, so it wasn't possible to calculate risk-based concentrations. EPA considers lead a special case because:

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

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

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

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

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

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

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

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

11. I've noticed that some soil RBCs are 1 million parts per million. Since some of these substances are liquids, that's obviously ridiculous. What is that basis for these calculations?

A soil RBC of 1 million parts per million means that no amount of the contaminant in soil will cause a receptor to exceed the oral reference dose by incidental ingestion of soil. In

fact, some contaminants would have RBCs of more than 1 million ppm, but the algorithms cap concentrations at 100%. The reason we retain these admittedly impossible numbers is to let users see that the contaminant is not a threat via soil ingestion.

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

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

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

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

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

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

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

Unfortunately, Region 3 does not have a complete set of supporting documents. The EPA-NCEA Superfund Health Risk Technical Support Center prepares these interim toxicity constants in response to site-specific requests from Regional risk assessors, and sends the documentation only to the requestor. The RBC tables contain only the interim values (those with "E" codes) that we've either requested ourselves or otherwise obtained copies of. There may be many more interim values of which we are unaware. Also, we don't receive automatic updates when NCEA revisits a contaminant, so it's likely that some interim values in the RBC table are obsolete.

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

CHANGES IN THIS ISSUE OF THE RBC TABLE

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

If you want to raise issues or get answers to questions about the RBC table, please call the Technical Support Help Line at 215-597-1116. The line has a voice mail system to take your calls if we're not available. We'll return your call as soon as we can. Please limit calls to RBC issues; if you have a question about applying RBCs to a site, please call the EPA Regional office handling the project. Thanks for your help and cooperation, and we hope the RBC table continues to be a useful resource.

Attachment

EPA Region III Risk-Based Concentration Table

Background Information

Roy L. Smith, Ph.D.
Toxicologist
October 4, 1995

Development of Risk-Based Concentrations

General

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

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

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

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

Age-adjusted factors

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

Air inhalation

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

Tap water ingestion

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

Soil ingestion

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

Residential water

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

oral RfDs for both volatile and non-volatile compounds. RBCs for carcinogens were based on combined childhood and adult exposure; for non-carcinogens RBCs were based on adult exposure.

Carcinogens

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

Non-carcinogens

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

Ambient air

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

Carcinogens

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

Non-carcinogens

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

Edible fish

All RBCs were based on adult exposure.

Carcinogens

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

Non-carcinogens

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

Commercial/industrial soil ingestion

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

Carcinogens

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

Non-carcinogens

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

Residential soil ingestion

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

Carcinogens

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

Non-carcinogens

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

Development of Soil Screening Levels

General

In December 1994 the EPA Office of Solid Waste and Emergency Response proposed Soil Screening Guidance (Document 9355.4-1, PB95-963530, EPA540/R-94/101, available through NTIS at 703-487-4650). This draft document provides (1) a framework in which soil screening levels are to be used, (2) a detailed methodology for calculating soil screening levels, and (3) soil screening levels for 107 substances.

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

new table. The table clearly distinguishes the OSWER SSLs from the "unofficial" ones.

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

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

The SSLs are based on the following assumptions:

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

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

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

consulting that document. The "unofficial" SSLs were developed under the following conditions:

Soil Screening Levels for Inhalation

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

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

Carcinogens

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

Non-carcinogens

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

Soil Screening Levels for Groundwater Use

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

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

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

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

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

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Bromoxynil	1689845	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Bromoxynil octanoate	1689992	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
1,3-Butadiene	106990				9.80E-01 I	☒	0.011 C	0.0064 C				0.0013 C	0.000072 C
1-Butanol	71363	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N	9700 E	8 E
Butyl benzyl phthalate	85687	2.00E-01 I					7300 N	730 N	270 N	410000 N	16000 N	530 E	68 E
Butylate	2008415	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
sec-Butylbenzene	135988	1.00E-02 E				☒	61 N	37 N	14 N	20000 N	780 N	80 S	0.27 M
tert-Butylbenzene	104518	1.00E-02 E				☒	61 N	37 N	14 N	20000 N	780 N		0.27 M
Butylphthalyl butylglycolate	85701	1.00E+00 I					37000 N	3700 N	1400 N	1E+06 N	78000 N		
Cacodylic acid	75605	3.00E-03 H					110 N	11 N	4.1 N	6100 N	230 N		
**Cadmium and compounds	7440439	5.00E-04 I	5.71E-05 E		6.30E+00 I		18 N	0.00099 C	0.68 N	1000 N	39 N	920 E	6 E
Caprolactam	[illegible]	5.00E-01 I					18000 N	1800 N	680 N	1E+06 N	39000 N		
Captafol	2425061	2.00E-03 I		8.60E-03 H			7.8 C	0.73 C	0.37 C	670 C	74 C		
Captan	133062	1.30E-01 I		3.50E-03 H			19 C	1.8 C	0.9 C	1600 C	180 C		
Carbaryl	63252	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N	0.34 S	23 N
Carbofuran	1563662	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
**Carbon disulfide	75150	1.00E-01 I	2.00E-01 I			☒	1000 N	730 N	140 N	200000 N	7800 N	11 E	14 E
Carbon tetrachloride	56235	7.00E-04 I	5.71E-04 E	1.30E-01 I	5.25E-02 I	☒	0.16 C	0.12 C	0.024 C	44 C	4.9 C	0.2 E	0.03 E
Carbosulfan	55285148	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
Carboxin	5234684	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
Chloral	75876	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
Chloramben	133904	1.50E-02 I					550 N	55 N	20 N	31000 N	1200 N		
Chloranil	118752			4.03E-01 H			0.17 C	0.016 C	0.0078 C	14 C	1.6 C		
Chlordane	57749	6.00E-05 I		1.30E+00 I	1.29E+00 I		0.052 C	0.0049 C	0.0024 C	4.4 C	0.49 C	10 E	2 E
Chlorimuron-ethyl	90982324	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Chlorine	7782505	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
Chlorine dioxide	10049044		5.71E-05 I				2.1 N	0.21 N					
Chloroacetaldehyde	107200	6.90E-03 O					250 N	25 N	9.3 N	14000 N	540 N		
Chloroacetic acid	79118	2.00E-03 H					73 N	7.3 N	2.7 N	4100 N	160 N		
2-Chloroacetophenone	532274		8.57E-06 I				0.31 N	0.031 N					
4-Chloroaniline	106478	4.00E-03 I					150 N	15 N	5.4 N	8200 N	310 N	1200 S	0.3 E
Chlorobenzene	108907	2.00E-02 I	5.71E-03 A			☒	39 N	21 N	27 N	41000 N	1600 N	94 E	0.6 E
Chlorobenzilate	510156	2.00E-02 I		2.70E-01 H	2.70E-01 H		0.25 C	0.023 C	0.012 C	21 C	2.4 C		
p-Chlorobenzoic acid	74113	2.00E-01 H					7300 N	730 N	270 N	410000 N	16000 N		
4-Chlorobenzotrifluoride	98566	2.00E-02 H					730 N	73 N	27 N	41000 N	1600 N	86 N	7.5 N
2-Chloro-1,3-butadiene	126998	2.00E-02 A	2.00E-03 H			☒	14 N	7.3 N	27 N	41000 N	1600 N		
1-Chlorobutane	109693	4.00E-01 H				☒	2400 N	1500 N	540 N	820000 N	31000 N		
Chlorodibromomethane	124481	2.00E-02 I		8.40E-02 I		☒	0.13 C	0.075 C	0.038 C	68 C	7.6 C	1900 E	0.2 E
**1-Chloro-1,1-difluoroethane	75683	I	1.43E+01			☒	87000 N	52000 N					

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Chlorodifluoromethane	75456		1.43e+01 I			☒	87000 N	52000 N					
Chloroethane	75003	4.00E-01 E	2.86E+00 I			☒	8600 N	10000 N	540 N	820000 N	31000 N	2600 S	33 N
2-Chloroethyl vinyl ether	110758	2.50E-02 O				☒	150 N	91 N	34 N	51000 N	2000 N		
Chloroform	67663	1.00E-02 I		6.10E-03 I	8.05E-02 I	☒	0.15 C	0.078 C	0.52 C	940 C	100 C	0.2 E	0.3 E
Chloromethane	74873			1.30E-02 H	6.30E-03 H	☒	1.4 C	0.99 C	0.24 C	440 C	49 C	0.063 C	0.0066 C
4-Chloro-2,2-methylaniline hydrochloride	3165933			4.60E-01 H			0.15 C	0.014 C	0.0069 C	12 C	1.4 C		
4-Chloro-2-methylaniline	95692			5.80E-01 H			0.12 C	0.011 C	0.0054 C	9.9 C	1.1 C		
beta-Chloronaphthalene	91587	8.00E-02 I					2900 N	290 N	110 N	160000 N	6300 N	2.8 S	140 N
o-Chloronitrobenzene	88733			2.50E-02 H		☒	0.42 C	0.25 C	0.13 C	230 C	26 C		
p-Chloronitrobenzene	100005			1.80E-02 H		☒	0.59 C	0.35 C	0.18 C	320 C	35 C		
2-Chlorophenol	95578	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N	53000 E	2 E
2-Chloropropane	75296		2.86E-02 H			☒	170 N	100 N				22 N	0.64 N
Chlorothalonil	1897456	1.50E-02 I		1.10E-02 H			6.1 C	0.57 C	0.29 C	520 C	58 C		
o-Chlorotoluene	95498	2.00E-02 I				☒	120 N	73 N	27 N	41000 N	1600 N	1200 N	5.6 N
Chlorpropham	101213	2.00E-01 I					7300 N	730 N	270 N	410000 N	16000 N		
Chlorpyrifos	2921882	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
Chlorpyrifos-methyl	5598130	1.00E-02 H					370 N	37 N	14 N	20000 N	780 N		
Chlorsulfuron	64902723	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Chlorthiophos	60238564	8.00E-04 H					29 N	2.9 N	1.1 N	1600 N	63 N		
Chromium III and compounds	16065831	1.00E+00 I	5.71E-07 W				37000 N	0.0021 N	1400 N	1E+06 N	78000 N		
Chromium VI and compounds	18540299	5.00E-03 I			4.20E+01 I		180 N	0.00015 C	6.8 N	10000 N	390 N	140 E	19 E
Coal tar	8001589				2.20E+00 W			0.0028 C					
Cobalt	7440484	6.00E-02 E					2200 N	220 N	81 N	120000 N	4700 N		
Coke Oven Emissions	8007452				2.17E+00 I			0.0029 C					
**Copper and compounds	7440508	4.00E-02 E					1500 N	150 N	54 N	82000 N	3100 N		
Crotonaldehyde	123739	1.00E-02 W		1.90E+00 H	1.90E+00 W		0.035 C	0.0033 C	0.0017 C	3 C	0.34 C		
Cumene	98828	4.00E-02 I	2.57E-03 H				1500 N	9.4 N	54 N	82000 N	3100 N	81 N	65 N
Cyanides:													
Barium cyanide	542621	1.00E-01 W					3700 N	370 N	140 N	200000 N	7800 N		
Calcium cyanide	592018	4.00E-02 I					1500 N	150 N	54 N	82000 N	3100 N		
Copper cyanide	544923	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Cyanazine	21725462	2.00E-03 H		8.40E-01 H			0.08 C	0.0075 C	0.0038 C	6.8 C	0.76 C		
Cyanogen	460195	4.00E-02 I					1500 N	150 N	54 N	82000 N	3100 N		
Cyanogen bromide	506683	9.00E-02 I					3300 N	330 N	120 N	180000 N	7000 N		
Cyanogen chloride	506774	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Free cyanide	57125	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Hydrogen cyanide	74908	2.00E-02 I	8.57E-04 I				730 N	3.1 N	27 N	41000 N	1600 N		
Potassium cyanide	151508	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Potassium silver cyanide	506616	2.00E-01 I					7300 N	730 N	270 N	410000 N	16000 N		

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Silver cyanide	506649	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
Sodium cyanide	143339	4.00E-02 I					1500 N	150 N	54 N	82000 N	3100 N		
**Thiocyanate		2.00E-02 E					730 N	73 N	27 N	41000 N	1600 N		
Zinc cyanide	557211	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Cyclohexanone	108941	5.00E+00 I				☒	30000 N	18000 N	6800 N	1E+06 N	390000 N		
Cyclohexlamine	108918	2.00E-01 I					7300 N	730 N	270 N	410000 N	16000 N		
Cyhalothrin/Karate	68085858	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Cypermethrin	52315078	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
Cyromazine	66215278	7.50E-03 I					270 N	27 N	10 N	15000 N	590 N		
Dacthal	1861321	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
Dalapon	75990	3.00E-02 I					1100 N	110 N	41 N	61000 N	2300 N		
Danitol	39515418	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
DDD	72548			2.40E-01 I			0.28 C	0.026 C	0.013 C	24 C	2.7 C	37 S	0.7 E
DDE	72559			3.40E-01 I			0.2 C	0.018 C	0.0093 C	17 C	1.9 C	10 S	0.5 E
DDT	50293	5.00E-04 I		3.40E-01 I	3.40E-01 I		0.2 C	0.018 C	0.0093 C	17 C	1.9 C	80 E	1 E
Decabromodiphenyl ether	1163195	1.00E-02 I				☒	61 N	37 N	14 N	20000 N	780 N		
Demeton	8065483	4.00E-05 I					1.5 N	0.15 N	0.054 N	82 N	3.1 N		
Diallate	2303164			6.10E-02 H		☒	0.17 C	0.1 C	0.052 C	94 C	10 C		
Diazinon	333415	9.00E-04 H					33 N	3.3 N	1.2 N	1800 N	70 N	5400 S	2.8 N
Dibenzofuran	132649	4.00E-03 E					150 N	15 N	5.4 N	8200 N	310 N	120 S	120 N
1,4-Dibromobenzene	106376	1.00E-02 I				☒	61 N	37 N	14 N	20000 N	780 N		
1,2-Dibromo-3-chloropropane	96128		5.71E-05 I	1.40E+00 N	2.42E-03 H	☒	0.048 C	0.21 N	0.0023 C	4.1 C	0.46 C	1.9 N	0.00061 M
1,2-Dibromoethane	106934		5.71E-05 H	8.50E+01 I	7.70E-01 I	☒	0.00075 C	0.0081 C	0.00004 C	0.067 C	0.0075 C	0.0058 C	0.00018 M
Dibutyl phthalate	84742	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N	100 E	120 E
Dicamba	1918009	3.00E-02 I					1100 N	110 N	41 N	61000 N	2300 N		
1,2-Dichlorobenzene	95501	9.00E-02 I	4.00E-02 A			☒	270 N	150 N	120 N	180000 N	7000 N	300 E	6 E
1,3-Dichlorobenzene	541731	8.90E-02 O				☒	540 N	320 N	120 N	180000 N	7000 N		
1,4-Dichlorobenzene	106467		2.29E-01 I	2.40E-02 N		☒	0.44 C	0.26 C	0.13 C	240 C	27 C	7700 E	1 E
3,3'-Dichlorobenzidine	91941			4.50E-01 I			0.15 C	0.014 C	0.007 C	13 C	1.4 C	52 S	0.01 E
1,4-Dichloro-2-butene	764410				9.30E+00 H	☒	0.0011 C	0.00067 C					
Dichlorodifluoromethane	75718	2.00E-01 I	5.71E-02 A			☒	390 N	210 N	270 N	410000 N	16000 N	37 N	7.5 N
1,1-Dichloroethane	75343	1.00E-01 H	1.43E-01 A			☒	810 N	520 N	140 N	200000 N	7800 N	980 E	11 E
1,2-Dichloroethane (EDC)	107062		2.86E-03 E	9.10E-02 I	9.10E-02 I	☒	0.12 C	0.069 C	0.035 C	63 C	7 C	0.3 E	0.01 E
1,1-Dichloroethylene	75354	9.00E-03 I		6.00E-01 I	1.75E-01 I	☒	0.044 C	0.036 C	0.0053 C	9.5 C	1.1 C	0.04 E	0.03 E
1,2-Dichloroethylene (cis)	156592	1.00E-02 H				☒	61 N	37 N	14 N	20000 N	780 N	1500 E	0.2 E
1,2-Dichloroethylene (trans)	156605	2.00E-02 I				☒	120 N	73 N	27 N	41000 N	1600 N	3600 E	0.3 E
1,2-Dichloroethylene (mixture)	540590	9.00E-03 H				☒	55 N	33 N	12 N	18000 N	700 N		
2,4-Dichlorophenol	120832	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N	4800 S	0.5 E
2,4-Dichlorophenoxyacetic Acid (2,4-D)	94757	1.00E-02 I				☒	61 N	37 N	14 N	20000 N	780 N	7000 S	1.7 M

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4-(2,4-Dichlorophenoxy)butyric Acid	94826	8.00E-03 I					290 N	29 N	11 N	16000 N	630 N		
1,2-Dichloropropane	78875		1.14E-03 I	6.80E-02 H		☒	0.16 C	0.092 C	0.046 C	84 C	9.4 C	11 E	0.02 E
2,3-Dichloropropanol	616239	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
1,3-Dichloropropene	542756	3.00E-04 I	5.71E-03 I	1.75E-01 H	1.30E-01 H	☒	0.077 C	0.048 C	0.018 C	33 C	3.7 C	0.1 E	0.001 E
Dichlorvos	62737	5.00e-04 I	1.43E-04 I	2.90E-01 I			0.23 C	0.022 C	0.011 C	20 C	2.2 C	3.5 C	0.00072 C
Dicofol	115322			4.40E-01 W			0.15 C	0.014 C	0.0072 C	13 C	1.5 C		
Dicyclopentadiene	77736	3.00E-02 H	5.71E-05 A			☒	0.42 N	0.21 N	41 N	61000 N	2300 N		
Dieldrin	60571	5.00E-05 I		1.60E+01 I	1.61E+01 I		0.0042 C	0.00039 C	0.0002 C	0.36 C	0.04 C	2 E	0.001 E
Diesel emissions			1.43E-03 I				52 N	5.2 N					
Diethyl phthalate	84662	8.00E-01 I					29000 N	2900 N	1100 N	1E+06 N	63000 N	520 E	110 E
Diethylene glycol, monobutyl ether	112345		5.71E-03 H				210 N	21 N					
Diethylene glycol, monoethyl ether	111900	2.00E+00 H					73000 N	7300 N	2700 N	1E+06 N	160000 N		
Diethylforamide	617845	1.10E-02 H					400 N	40 N	15 N	22000 N	860 N		
Di(2-ethylhexyl)adipate	103231	6.00E-01 I		1.20E-03 I			56 C	5.2 C	2.6 C	4800 C	530 C		
Diethylstilbestrol	56531			4.70E+03 H			0.00001 C	1E-06 C	7E-07 C	0.0012 C	0.00014 C		
Difenzoquat (Avenge)	43222486	8.00E-02 I					2900 N	290 N	110 N	160000 N	6300 N		
Diflubenzuron	35367385	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
1,1-Difluoroethane	75376		1.14E+01 I			☒	69000 N	42000 N					
Diisopropyl methylphosphonate (DIMP)	1445756	8.00E-02 I					2900 N	290 N	110 N	160000 N	6300 N		
Dimethipin	55290647	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Dimethoate	60515	2.00E-04 I					7.3 N	0.73 N	0.27 N	410 N	16 N		
3,3'-Dimethoxybenzidine	119904			1.40E-02 H			4.8 C	0.45 C	0.23 C	410 C	46 C		
Dimethylamine	124403		5.71E-06 W				0.21 N	0.021 N					
2,4-Dimethylaniline hydrochloride	21436964			5.80E-01 H			0.12 C	0.011 C	0.0054 C	9.9 C	1.1 C		
2,4-Dimethylaniline	95681			7.50E-01 H			0.09 C	0.0083 C	0.0042 C	7.6 C	0.85 C		
N-N-Dimethylaniline	121697	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
3,3'-Dimethylbenzidine	119937			9.20E+00 H			0.0073 C	0.00068 C	0.00034 C	0.62 C	0.069 C	29 C	0.00039 C
N,N-Dimethylformamide	68122	1.00E-01 H	8.57E-03 I				3700 N	31 N	140 N	200000 N	7800 N		
1,1-Dimethylhydrazine	57147			2.60E+00 W	3.50E+00 W		0.026 C	0.0018 C	0.0012 C	2.2 C	0.25 C		
1,2-Dimethylhydrazine	540738			3.70E+01 W	3.70E+01 W		0.0018 C	0.00017 C	0.00009 C	0.15 C	0.017 C		
2,4-Dimethylphenol	105679	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N	5400 E	3 E
2,6-Dimethylphenol	576261	6.00E-04 I					22 N	2.2 N	0.81 N	1200 N	47 N		
3,4-Dimethylphenol	95658	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Dimethyl phthalate	131113	1.00E+01 H					370000 N	37000 N	14000 N	1E+06 N	780000 N	1600 E	1200 E
Dimethyl terephthalate	120616	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
1,2-Dinitrobenzene	528290	4.00E-04 H					15 N	1.5 N	0.54 N	820 N	31 N		
1,3-Dinitrobenzene	99650	1.00E-04 I					3.7 N	0.37 N	0.14 N	200 N	7.8 N		
1,4-Dinitrobenzene	100254	4.00E-04 H					15 N	1.5 N	0.54 N	820 N	31 N		
4,6-Dinitro-o-cyclohexyl phenol	131895	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		

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2,4-Dinitrophenol	51285	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N	360 N	0.1 E
Dinitrotoluene mixture				6.80E-01 I			0.099 C	0.0092 C	0.0046 C	8.4 C	0.94 C		
2,4-Dinitrotoluene	121142	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N	120 S	0.2 E
2,6-Dinitrotoluene	606202	1.00E-03 H					37 N	3.7 N	1.4 N	2000 N	78 N	370 S	0.1 E
Dinoseb	88857	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
di-n-Octyl phthalate	117840	2.00E-02 H					730 N	73 N	27 N	41000 N	1600 N	1000000 S	1000000 E
1,4-Dioxane	123911			1.10E-02 I			6.1 C	0.57 C	0.29 C	520 C	58 C		
Diphenamid	957517	3.00E-02 I					1100 N	110 N	41 N	61000 N	2300 N		
Diphenylamine	122394	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
1,2-Diphenylhydrazine	122667			8.00E-01 I	7.70E-01 I		0.084 C	0.0081 C	0.0039 C	7.2 C	0.8 C		
Diquat	85007	2.20E-03 I					80 N	8 N	3 N	4500 N	170 N		
Direct black 38	1937377			8.60E+00 H			0.0078 C	0.00073 C	0.00037 C	0.67 C	0.074 C		
Direct blue 6	2602462			8.10E+00 H			0.0083 C	0.00077 C	0.00039 C	0.71 C	0.079 C		
Direct brown 95	16071866			9.30E+00 H			0.0072 C	0.00067 C	0.00034 C	0.62 C	0.069 C		
Disulfoton	298044	4.00E-05 I					1.5 N	0.15 N	0.054 N	82 N	3.1 N		
1,4-Dithiane	505293	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
Diuron	330541	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
Dodine	2439103	4.00E-03 I					150 N	15 N	5.4 N	8200 N	310 N		
Endosulfan	115297	6.00E-03 I					220 N	22 N	8.1 N	12000 N	470 N	1 S	3 E
Endothall	145733	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Endrin	72208	3.00E-04 I					11 N	1.1 N	0.41 N	610 N	23 N	16 S	0.4 E
Epichlorohydrin	106898	2.00E-03 H	2.86E-04 I	9.90E-03 I	4.20E-03 I		6.8 C	1 N	0.32 C	580 C	65 C		
1,2-Epoxybutane	106887		5.71E-03 I				210 N	21 N					
Ethephon (2-chloroethyl phosphonic acid)	16672870	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Ethion	563122	5.00E-04 I					18 N	1.8 N	0.68 N	1000 N	39 N		
2-Ethoxyethanol acetate	111159	3.00E-01 A					11000 N	1100 N	410 N	610000 N	23000 N		
2-Ethoxyethanol	110805	4.00E-01 H	5.71E-02 I				15000 N	210 N	540 N	820000 N	31000 N		
Ethyl acrylate	140885			4.80E-02 H			1.4 C	0.13 C	0.066 C	120 C	13 C		
EPTC (S-Ethyl dipropylthiocarbamate)	759944	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Ethyl acetate	141786	9.00E-01 I					33000 N	3300 N	1200 N	1E+06 N	70000 N		
Ethylbenzene	100414	1.00E-01 I	2.86E-01 I			☒	1300 N	1000 N	140 N	200000 N	7800 N	260 E	5 E
Ethylene cyanohydrin	109784	3.00E-01 H					11000 N	1100 N	410 N	610000 N	23000 N		
Ethylene diamine	107153	2.00E-02 H					730 N	73 N	27 N	41000 N	1600 N		
Ethylene glycol	107211	2.00E+00 I					73000 N	7300 N	2700 N	1E+06 N	160000 N		
Ethylene glycol, monobutyl ether	111762		5.71E-03 H				210 N	21 N					
Ethylene oxide	75218			1.02E+00 H	3.50E-01 H		0.066 C	0.018 C	0.0031 C	5.6 C	0.63 C		
Ethylene thiourea (ETU)	96457	8.00E-05 I		1.19E-01 H			0.57 C	0.053 C	0.027 C	48 C	5.4 C		
Ethyl ether	60297	2.00E-01 I				☒	1200 N	730 N	270 N	410000 N	16000 N		
Ethyl methacrylate	97632	9.00E-02 H					3300 N	330 N	120 N	180000 N	7000 N		

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Ethyl p-nitrophenyl phenylphosphorothioate	2104645	1.00E-05 I					0.37 N	0.037 N	0.014 N	20 N	0.78 N		
Ethylnitrosourea	759739			1.40E+02 W			0.00048 C	0.00005 C	0.00002 C	0.041 C	0.0046 C		
Ethylphthalyl ethyl glycolate	84720	3.00E+00 I					110000 N	11000 N	4100 N	1E+06 N	230000 N		
Express	10120	8.00E-03 I					290 N	29 N	11 N	16000 N	630 N		
Fenamiphos	22224926	2.50E-04 I					9.1 N	0.91 N	0.34 N	510 N	20 N		
Fluometuron	2164172	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Fluoride	7782414	6.00E-02 I					2200 N	220 N	81 N	120000 N	4700 N		
Fluoridone	59756604	8.00E-02 I					2900 N	290 N	110 N	160000 N	6300 N		
Flurprimidol	56425913	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Flutolanil	66332965	6.00E-02 I					2200 N	220 N	81 N	120000 N	4700 N		
Fluvalinate	69409945	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
Folpet	133073	1.00E-01 I		3.50E-03 I			19 C	1.8 C	0.9 C	1600 C	180 C		
Fomesafen	72178020			1.90E-01 I			0.35 C	0.033 C	0.017 C	30 C	3.4 C		
Fonofos	944229	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
Formaldehyde	50000	2.00E-01 I			4.55E-02 I		7300 N	0.14 C	270 N	410000 N	16000 N		
Formic Acid	64186	2.00E+00 H					73000 N	7300 N	2700 N	1E+06 N	160000 N		
Fosetyl-al	39148248	3.00E+00 I					110000 N	11000 N	4100 N	1E+06 N	230000 N		
Furan	110009	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Furazolidone	67458			3.80E+00 H			0.018 C	0.0016 C	0.00083 C	1.5 C	0.17 C		
Furfural	98011	3.00E-03 I	1.43E-02 A				110 N	52 N	4.1 N	6100 N	230 N		
Furium	531828			5.00E+01 H			0.0013 C	0.00013 C	0.00006 C	0.11 C	0.013 C		
Furmecyclox	60568050			3.00E-02 I			2.2 C	0.21 C	0.11 C	190 C	21 C		
Glufosinate-ammonium	77182822	4.00E-04 I					15 N	1.5 N	0.54 N	820 N	31 N		
Glycidaldehyde	765344	4.00E-04 I	2.86E-04 H				15 N	1 N	0.54 N	820 N	31 N		
Glyphosate	1071836	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
Haloxyfop-methyl	69806402	5.00E-05 I					1.8 N	0.18 N	0.068 N	100 N	3.9 N		
Harmony	79277273	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
HCH (alpha)	319846			6.30E+00 I	6.30E+00 I		0.011 C	0.00099 C	0.0005 C	0.91 C	0.1 C	0.9 E	0.0004 E
HCH (beta)	319857			1.80E+00 I	1.80E+00 I		0.037 C	0.0035 C	0.0018 C	3.2 C	0.35 C	16 E	0.002 E
HCH (gamma) Lindane	58899	3.00E-04 I		1.30E+00 H			0.052 C	0.0048 C	0.0024 C	4.4 C	0.49 C	4.2 C	0.006 E
HCH-technical	608731			1.80E+00 I	1.79E+00 I		0.037 C	0.0035 C	0.0018 C	3.2 C	0.35 C		
Heptachlor	76448	5.00E-04 I		4.50E+00 I	4.55E+00 I	☒	0.0023 C	0.0014 C	0.0007 C	1.3 C	0.14 C	0.3 E	0.06 E
Heptachlor epoxide	1024573	1.30E-05 I		9.10E+00 I	9.10E+00 I	☒	0.0012 C	0.00069 C	0.00035 C	0.63 C	0.07 C	1 E	0.03 E
Hexabromobenzene	87821	2.00E-03 I				☒	12 N	7.3 N	2.7 N	4100 N	160 N		
Hexachlorobenzene	118741	8.00E-04 I		1.60E+00 I	1.61E+00 I	☒	0.0066 C	0.0039 C	0.002 C	3.6 C	0.4 C	1 E	0.8 E
Hexachlorobutadiene	87683	2.00E-04 H		7.80E-02 I	7.70E-02 I	☒	0.14 C	0.081 C	0.04 C	73 C	8.2 C	1 E	0.1 E
Hexachlorocyclopentadiene	77474	7.00E-03 I	2.00E-05 H			☒	0.15 N	0.073 N	9.5 N	14000 N	550 N	2 E	10 E
Hexachlorodibenzo-p-dioxin mixture	19408743			6.20E+03 I	4.55E+03 I		0.00001 C	1E-06 C	5E-07 C	0.0009 C	0.0001 C		
Hexachloroethane	67721	1.00E-03 I		1.40E-02 I	1.40E-02 I	☒	0.75 C	0.45 C	0.23 C	410 C	46 C	49 E	0.2 E

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Hexachlorophene	70304	3.00E-04 I					11 N	1.1 N	0.41 N	610 N	23 N		
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121824	3.00E-03 I		1.10E-01 I			0.61 C	0.057 C	0.029 C	52 C	5.8 C		
1,6-Hexamethylene diisocyanate	822060		2.86E-06 I				0.1 N	0.01 N					
n-Hexane	110543	6.00E-02 H	5.71E-02 I			☒	350 N	210 N	81 N	120000 N	4700 N	32 N	13 N
Hexazinone	51235042	3.30E-02 I					1200 N	120 N	45 N	67000 N	2600 N		
Hydrazine, hydrazine sulfate	302012			3.00E+00 I	1.71E+01 I		0.022 C	0.00037 C	0.0011 C	1.9 C	0.21 C		
**Hydrogen chloride	7647010		5.71E-03 I				210 N	21 N					
**Hydrogen sulfide	7783064	3.00E-03 I	2.85E-04 I				110 N	1 N	4.1 N	6100 N	230 N		
Hydroquinone	123319	4.00E-02 H					1500 N	150 N	54 N	82000 N	3100 N		
Imazalil	35554440	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Imazaquin	81335377	2.50E-01 I					9100 N	910 N	340 N	510000 N	20000 N		
Iprodione	36734197	4.00E-02 I					1500 N	150 N	54 N	82000 N	3100 N		
**Iron	7439896	3.00E-01 E					11000 N	1100 N	410 N	610000 N	23000 N		
Isobutanol	78831	3.00E-01 I				☒	1800 N	1100 N	410 N	610000 N	23000 N		
Isophorone	78591	2.00E-01 I		9.50E-04 I			71 C	6.6 C	3.3 C	6000 C	670 C	3400 E	0.2 E
Isopropalin	33820530	1.50E-02 I					550 N	55 N	20 N	31000 N	1200 N		
Isopropyl methyl phosphonic acid	1832548	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
Isoxaben	82558507	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Kepone	143500			1.80E+01 E			0.0037 C	0.00035 C	0.00018 C	0.32 C	0.035 C		
Lactofen	77501634	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
Linuron	330552	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
Lithium	7439932	2.00E-02 E					730 N	73 N	27 N	41000 N	1600 N		
Londax	83056996	2.00E-01 I					7300 N	730 N	270 N	410000 N	16000 N		
Malathion	121755	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Maleic anhydride	108316	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
Maleic hydrazide	123331	5.00E-01 I					18000 N	1800 N	680 N	1E+06 N	39000 N		
Malononitrile	109773	2.00E-05 H					0.73 N	0.073 N	0.027 N	41 N	1.6 N		
Mancozeb	8018017	3.00E-02 H					1100 N	110 N	41 N	61000 N	2300 N		
Maneb	12427382	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Manganese and compounds	7439965	5.00E-03 I	1.43c-05 I				180 N	0.052 N	6.8 N	10000 N	390 N		
Mephosfolan	950107	9.00E-05 H					3.3 N	0.33 N	0.12 N	180 N	7 N		
Mepiquat chloride	24307264	3.00E-02 I					1100 N	110 N	41 N	61000 N	2300 N		
**Mercuric chloride	7487947	3.00E-04 I					11 N	1.1 N	0.41 N	610 N	23 N		
Mercury (inorganic)	7439976	3.00E-04 H	8.57E-05 H				11 N	0.31 N	0.41 N	610 N	23 N	7 E	3 E
Mercury (methyl)	22967926	1.00E-04 I					3.7 N	0.37 N	0.14 N	200 N	7.8 N		
Merphos	150505	3.00E-05 I					1.1 N	0.11 N	0.041 N	61 N	2.3 N		
Merphos oxide	78488	3.00E-05 I					1.1 N	0.11 N	0.041 N	61 N	2.3 N		
Metalaxyl	57837191	6.00E-02 I					2200 N	220 N	81 N	120000 N	4700 N		
Methacrylonitrile	126987	1.00E-04 I	2.00E-04 A				3.7 N	0.73 N	0.14 N	200 N	7.8 N		

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Methamidophos	10265926	5.00E-05 I					1.8 N	0.18 N	0.068 N	100 N	3.9 N		
Methanol	67561	5.00E-01 I					18000 N	1800 N	680 N	1E+06 N	39000 N		
Methidathion	950378	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Methomyl	16752775	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Methoxychlor	72435	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N	41 S	62 E
2-Methoxyethanol acetate	110496	2.00E-03 A					73 N	7.3 N	2.7 N	4100 N	160 N		
2-Methoxyethanol	109864	1.00E-03 H	5.71E-03 I				37 N	21 N	1.4 N	2000 N	78 N		
2-Methoxy-5-nitroaniline	99592			4.60E-02 H			1.5 C	0.14 C	0.069 C	120 C	14 C		
Methyl acetate	79209	1.00E+00 H					37000 N	3700 N	1400 N	1E+06 N	78000 N		
Methyl acrylate	96333	3.00E-02 A					1100 N	110 N	41 N	61000 N	2300 N		
2-Methylaniline hydrochloride	636215			1.80E-01 H			0.37 C	0.035 C	0.018 C	32 C	3.5 C		
2-Methylaniline	95534			2.40E-01 H			0.28 C	0.026 C	0.013 C	24 C	2.7 C		
Methyl chlorocarbonate	79221	1.00E+00 W					37000 N	3700 N	1400 N	1E+06 N	78000 N		
4-(2-Methyl-4-chlorophenoxy) butyric acid	94815	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
2-Methyl-4-chlorophenoxyacetic acid	94746	5.00E-04 I					18 N	1.8 N	0.68 N	1000 N	39 N		
2-(2-Methyl-14-chlorophenoxy)propionic acid	93652	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Methylcyclohexane	108872		8.57E-01 H				31000 N	3100 N				60 S	1500 N
Methylene bromide	74953	1.00E-02 A				☒	61 N	37 N	14 N	20000 N	780 N		
Methylene chloride	75092	6.00E-02 I	8.57E-01 H	7.50E-03 I	1.64E-03 I	☒	4.1 C	3.8 C	0.42 C	760 C	85 C	7 E	0.01 E
4,4'-Methylene bis(2-chloroaniline)	101144	7.00E-04 H		1.30E-01 H	1.30E-01 H		0.52 C	0.048 C	0.024 C	44 C	4.9 C		
4,4'-Methylenebisbenzeneamine	101779			2.50E-01 W			0.27 C	0.025 C	0.013 C	23 C	2.6 C		
4,4'-Methylene bis(N,N'-dimethyl)aniline	101611			4.60E-02 I			1.5 C	0.14 C	0.069 C	120 C	14 C		
4,4'-Methylenediphenyl isocyanate	101688		5.71E-06 I			☒	0.035 N	0.021 N					
Methyl ethyl ketone	78933	6.00E-01 I	2.86E-01 I			☒	1900 N	1000 N	810 N	1E+06 N	47000 N		
Methyl hydrazine	60344			1.10E+00 W			0.061 C	0.0057 C	0.0029 C	5.2 C	0.58 C		
Methyl isobutyl ketone	108101	8.00E-02 H	2.29E-02 A				2900 N	84 N	110 N	160000 N	6300 N		
Methyl methacrylate	80626	8.00E-02 H					2900 N	290 N	110 N	160000 N	6300 N		
2-Methyl-5-nitroaniline	99558			3.30E-02 H			2 C	0.19 C	0.096 C	170 C	19 C		
Methyl parathion	298000	2.50E-04 I					9.1 N	0.91 N	0.34 N	510 N	20 N	28 S	0.041 N
2-Methylphenol (o-cresol)	95487	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N	12000 S	6 E
3-Methylphenol (m-cresol)	103394	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
4-Methylphenol (p-cresol)	106445	5.00E-03 H					180 N	18 N	6.8 N	10000 N	390 N		
Methyl styrene (mixture)	25013154	6.00E-03 A	1.14E-02 A			☒	60 N	42 N	8.1 N	12000 N	470 N	100 N	1 N
Methyl styrene (alpha)	98839	7.00E-02 A				☒	430 N	260 N	95 N	140000 N	5500 N	8.8 S	7.5 N
Methyl tertbutyl ether (MTBE)	1634044	5.00E-03 E	8.57E-01 I			☒	180 N	3100 N	6.8 N	10000 N	390 N		
Metolaclor (Dual)	51218452	1.50E-01 H					5500 N	550 N	200 N	310000 N	12000 N		
Metribuzin	21087649	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Mirex	2385855	2.00E-04 I		1.80E+00 W			0.037 C	0.0035 C	0.0018 C	3.2 C	0.35 C		
Molinate	2212671	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		

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Molybdenum	7439987	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Monochloramine	10599903	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
Naled	300765	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
2-Naphthylamine	91598			1.30e+02 E			0.00052 C	0.00005 C	0.00002 C	0.044 C	0.0049 C		
Napropamide	15299997	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
Nickel refinery dust					8.40E-01 I			0.0075 C					
Nickel and compounds	7440020	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N	6900 E	21 E
Nickel subsulfide	12035722				1.70E+00 I			0.0037 C					
Nitrapyrin	1929824	1.50E-03 W					55 N	5.5 N	2 N	3100 N	120 N		
Nitrate	14797558	1.60E+00 I					58000 N	5800 N	2200 N	1E+06 N	130000 N		
Nitric Oxide	10102439	1.00E-01 W					3700 N	370 N	140 N	200000 N	7800 N		
Nitrite	14797650	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
2-Nitroaniline	88744	6.00E-05 W	5.71E-05 H				2.2 N	0.21 N	0.081 N	120 N	4.7 N		
3-Nitroaniline	99092	3.00E-03 O					110 N	11 N	4.1 N	6100 N	230 N		
4-Nitroaniline	100016	3.00E-03 O					110 N	11 N	4.1 N	6100 N	230 N		
Nitrobenzene	98953	5.00E-04 I	5.71E-04 A			☒	3.4 N	2.1 N	0.68 N	1000 N	39 N	110 E	0.09 E
Nitrofurantoin	67209	7.00E-02 H					2600 N	260 N	95 N	140000 N	5500 N		
Nitrofurazone	59870			1.50E+00 H	9.40E+00 H		0.045 C	0.00067 C	0.0021 C	3.8 C	0.43 C		
Nitrogen dioxide	10102440	1.00E+00 W					37000 N	3700 N	1400 N	1E+06 N	78000 N		
Nitroguanidine	556887	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N		
4-Nitrophenol	100027	6.20E-02 O					2300 N	230 N	84 N	130000 N	4800 N		
2-Nitropropane	79469		5.71E-03 I		9.40E+00 H		210 N	0.00067 C					
N-Nitrosodi-n-butylamine	924163			5.40E+00 I	5.60E+00 I		0.012 C	0.0011 C	0.00058 C	1.1 C	0.12 C		
N-Nitrosodiethanolamine	1116547			2.80E+00 I			0.024 C	0.0022 C	0.0011 C	2 C	0.23 C		
N-Nitrosodiethylamine	55185			1.50E+02 I	1.51E+02 I		0.00045 C	0.00004 C	0.00002 C	0.038 C	0.0043 C		
N-Nitrosodimethylamine	62759			5.10E+01 I	4.90E+01 I		0.0013 C	0.00013 C	0.00006 C	0.11 C	0.013 C		
N-Nitrosodiphenylamine	86306			4.90E-03 I			14 C	1.3 C	0.64 C	1200 C	130 C	29 C	0.2 E
N-Nitroso di-n-propylamine	621647			7.00E+00 I			0.0096 C	0.00089 C	0.00045 C	0.82 C	0.091 C	0.014 C	0.00002 E
N-Nitroso-N-methylethylamine	10595956			2.20E+01 I			0.0031 C	0.00028 C	0.00014 C	0.26 C	0.029 C		
N-Nitrosopyrrolidine	930552			2.10E+00 I	2.13E+00 I		0.032 C	0.0029 C	0.0015 C	2.7 C	0.3 C		
m-Nitrotoluene	99081	1.00E-02 H				☒	61 N	37 N	14 N	20000 N	780 N	460 S	0.42 N
o-Nitrotoluene	88722	1.00E-02 H				☒	61 N	37 N	14 N	20000 N	780 N	460 S	0.42 N
p-Nitrotoluene	99990	1.00E-02 H				☒	61 N	37 N	14 N	20000 N	780 N	460 S	0.42 N
Norflurazon	27314132	4.00E-02 I					1500 N	150 N	54 N	82000 N	3100 N		
NuStar	85509199	7.00E-04 I					26 N	2.6 N	0.95 N	1400 N	55 N		
Octabromodiphenyl ether	32536520	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
Octahydro-1357-tetranitro-1357-tetrazocine	2691410	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Octamethylpyrophosphoramide	152169	2.00E-03 H					73 N	7.3 N	2.7 N	4100 N	160 N		
Oryzalin	19044883	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		

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Oxadiazon	19666309	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Oxamyl	23135220	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Oxyfluorfen	42874033	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
Paclobutrazol	76738620	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Paraquat	1910425	4.50E-03 I					160 N	16 N	6.1 N	9200 N	350 N		
Parathion	56382	6.00E-03 H					220 N	22 N	8.1 N	12000 N	470 N	110 S	3.9 N
Pebulate	1114712	5.00E-02 H					1800 N	180 N	68 N	100000 N	3900 N		
Pendimethalin	40487421	4.00E-02 I					1500 N	150 N	54 N	82000 N	3100 N		
Pentabromo-6-chloro cyclohexane	87843			2.30E-02 H			2.9 C	0.27 C	0.14 C	250 C	28 C		
Pentabromodiphenyl ether	32534819	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
Pentachlorobenzene	608935	8.00E-04 I				☒	4.9 N	2.9 N	1.1 N	1600 N	63 N	570 N	48 N
Pentachloronitrobenzene	82688	3.00E-03 I		2.60E-01 H		☒	0.041 C	0.024 C	0.012 C	22 C	2.5 C		
Pentachlorophenol	87865	3.00E-02 I		1.20E-01 I			0.56 C	0.052 C	0.026 C	48 C	5.3 C	7.9 C	0.2 E
Permethrin	52645531	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		
Phenmedipham	13684634	2.50E-01 I					9100 N	910 N	340 N	510000 N	20000 N		
Phenol	108952	6.00E-01 I					22000 N	2200 N	810 N	1E+06 N	47000 N	21000 S	49 E
m-Phenylenediamine	108452	6.00E-03 I					220 N	22 N	8.1 N	12000 N	470 N		
p-Phenylenediamine	106503	1.90E-01 H					6900 N	690 N	260 N	390000 N	15000 N		
Phenylmercuric acetate	62384	8.00E-05 I					2.9 N	0.29 N	0.11 N	160 N	6.3 N		
2-Phenylphenol	90437			1.94E-03 H			35 C	3.2 C	1.6 C	3000 C	330 C		
Phorate	298022	2.00E-04 H					7.3 N	0.73 N	0.27 N	410 N	16 N		
Phosmet	732116	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
**Phosphine	7803512	3.00E-04 I	8.57E-05 H				11 N	0.31 N	0.41 N	610 N	23 N		
**Phosphoric acid	7664382	I	2.86E-03				100 N	10 N					
Phosphorus (white)	7723140	2.00E-05 I					0.73 N	0.073 N	0.027 N	41 N	1.6 N		
p-Phthalic acid	100210	1.00E+00 H					37000 N	3700 N	1400 N	1E+06 N	78000 N		
Phthalic anhydride	85449	2.00E+00 I	3.43E-02 H				73000 N	130 N	2700 N	1E+06 N	160000 N		
Picloram	1918021	7.00E-02 I					2600 N	260 N	95 N	140000 N	5500 N		
Pirimiphos-methyl	29232937	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
Polybrominated biphenyls		7.00E-06 H		8.90E+00 H			0.0076 C	0.0007 C	0.00035 C	0.64 C	0.072 C		
Polychlorinated biphenyls (PCBs)	1336363			7.70E+00 I			0.0087 C	0.00081 C	0.00041 C	0.74 C	0.083 C		
Aroclor 1016	12674112	7.00E-05 I					2.6 N	0.26 N	0.095 N	140 N	5.5 N		
Aroclor 1254	11097691	2.00E-05 I					0.73 N	0.073 N	0.027 N	41 N	1.6 N		
Polychlorinated terphenyls (PCTs)				4.50E+00 E			0.015 C	0.0014 C	0.0007 C	1.3 C	0.14 C		
Polynuclear aromatic hydrocarbons												110000 S	
Acenaphthene	83329	6.00E-02 I					2200 N	220 N	81 N	120000 N	4700 N	120 S	200 E
Anthracene	120127	3.00E-01 I					11000 N	1100 N	410 N	610000 N	23000 N	6.8 S	4300 E
Benz[a]anthracene	56553			7.30E-01 E	6.10E-01 E		0.092 C	0.01 C	0.0043 C	7.8 C	0.88 C	27 S	0.7 E
Benzo[b]fluoranthene	205992			7.30E-01 E	6.10E-01 E		0.092 C	0.01 C	0.0043 C	7.8 C	0.88 C	23 S	4 E

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Benzo[k]fluoranthene	207089			7.30E-02 E	6.10E-02 E		0.92 C	0.1 C	0.043 C	78 C	8.8 C		4 E
Benzo[a]pyrene	50328			7.30E+00 I	6.10E+00 W		0.0092 C	0.001 C	0.00043 C	0.78 C	0.088 C	11 S	4 E
Carbazole	86748			2.00E-02 H			3.4 C	0.31 C	0.16 C	290 C	32 C	11 S	0.5 E
Chrysene	218019			7.30E-03 E	6.10E-03 E		9.2 C	1 C	0.43 C	780 C	88 C	3.6 S	1 E
Dibenz[ah]anthracene	53703			7.30E+00 E	6.10E+00 E		0.0092 C	0.001 C	0.00043 C	0.78 C	0.088 C	7.2 S	11 E
Fluoranthene	206440	4.00E-02 I					1500 N	150 N	54 N	82000 N	3100 N	68 S	980 E
Fluorene	86737	4.00E-02 I					1500 N	150 N	54 N	82000 N	3100 N	89 S	160 E
Indeno[1,2,3-cd]pyrene	193395			7.30E-01 E	6.10E-01 E		0.092 C	0.01 C	0.0043 C	7.8 C	0.88 C	280 S	35 E
Naphthalene	91203	4.00E-02 W					1500 N	150 N	54 N	82000 N	3100 N	180 S	30 E
Pyrene	129000	3.00E-02 I					1100 N	110 N	41 N	61000 N	2300 N	56 S	1400 E
Prochloraz	67747095	9.00E-03 I		1.50E-01 I			0.45 C	0.042 C	0.021 C	38 C	4.3 C		
Profluralin	26399360	6.00E-03 H					220 N	22 N	8.1 N	12000 N	470 N		
Prometon	1610180	1.50E-02 I					550 N	55 N	20 N	31000 N	1200 N		
Prometryn	7287196	4.00E-03 I					150 N	15 N	5.4 N	8200 N	310 N		
Pronamide	23950585	7.50E-02 I					2700 N	270 N	100 N	150000 N	5900 N		
Propachlor	1918167	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Propanil	709988	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Propargite	2312358	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Propargyl alcohol	107197	2.00E-03 I					73 N	7.3 N	2.7 N	4100 N	160 N		
Propazine	139402	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Propham	122429	2.00E-02 I					730 N	73 N	27 N	41000 N	1600 N		
Propiconazole	60207901	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Propylene glycol	57556	2.00E+01 H					730000 N	73000 N	27000 N	1E+06 N	1000000 N		
Propylene glycol, monoethyl ether	52125538	7.00E-01 H					26000 N	2600 N	950 N	1E+06 N	55000 N		
Propylene glycol, monomethyl ether	107982	7.00E-01 H	5.71E-01 I				26000 N	2100 N	950 N	1E+06 N	55000 N		
Propylene oxide	75569		8.57E-03 I	2.40E-01 I	1.29E-02 I		0.28 C	0.49 C	0.013 C	24 C	2.7 C		
Pursuit	81335775	2.50E-01 I					9100 N	910 N	340 N	510000 N	20000 N		
Pydrin	51630581	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Pyridine	110861	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Quinalphos	13593038	5.00E-04 I					18 N	1.8 N	0.68 N	1000 N	39 N		
Quinoline	91225			1.20E+01 H			0.0056 C	0.00052 C	0.00026 C	0.48 C	0.053 C		
Resmethrin	10463868	3.00E-02 I					1100 N	110 N	41 N	61000 N	2300 N		
Ronnel	299843	5.00E-02 H					1800 N	180 N	68 N	100000 N	3900 N		
Rotenone	83794	4.00E-03 I					150 N	15 N	5.4 N	8200 N	310 N		
Savey	78587050	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Selenious Acid	7783008	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Selenium	7782492	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		3 E
Selenourea	630104	5.00E-03 H					180 N	18 N	6.8 N	10000 N	390 N		
Sethoxydim	74051802	9.00E-02 I					3300 N	330 N	120 N	180000 N	7000 N		

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

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg-d/mg	CPSi kg-d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Silver and compounds	7440224	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		
Simazine	122349	5.00E-03 I		1.20E-01 H			0.56 C	0.052 C	0.026 C	48 C	5.3 C		
Sodium azide	26628228	4.00E-03 I					150 N	15 N	5.4 N	8200 N	310 N		
Sodium diethyldithiocarbamate	148185	3.00E-02 I		2.70E-01 H			0.25 C	0.023 C	0.012 C	21 C	2.4 C		
Sodium fluoroacetate	62748	2.00E-05 I					0.73 N	0.073 N	0.027 N	41 N	1.6 N		
Sodium metavanadate	13718268	1.00E-03 H					37 N	3.7 N	1.4 N	2000 N	78 N		
Strontium, stable	7440246	6.00E-01 I					22000 N	2200 N	810 N	1E+06 N	47000 N		
Strychnine	57249	3.00E-04 I					11 N	1.1 N	0.41 N	610 N	23 N		
Styrene	100425	2.00E-01 I	2.86E-01 I			☒	1600 N	1000 N	270 N	410000 N	16000 N	1400 E	2 E
Systhane	88671890	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
2,3,7,8-TCDD (dioxin)	1746016			1.56E+05 H	1.16E+05 H		4E-07 C	5E-08 C	C	4E-05 C	4E-06 C		
Tebuthiuron	34014181	7.00E-02 I					2600 N	260 N	95 N	140000 N	5500 N		
Temephos	3383968	2.00E-02 H					730 N	73 N	27 N	41000 N	1600 N		
Terbacil	5902512	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Terbufos	13071799	2.50E-05 H					0.91 N	0.091 N	0.034 N	51 N	2 N		
Terbutryn	886500	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
1,2,4,5-Tetrachlorobenzene	95943	3.00E-04 I				☒	1.8 N	1.1 N	0.41 N	610 N	23 N	91 N	0.69 N
1,1,1,2-Tetrachloroethane	630206	3.00E-02 I		2.60E-02 I	2.59E-02 I	☒	0.41 C	0.24 C	0.12 C	220 C	25 C		
1,1,2,2-Tetrachloroethane	79345			2.00E-01 I	2.03E-01 I	☒	0.052 C	0.031 C	0.016 C	29 C	3.2 C	0.4 E	0.001 E
Tetrachloroethylene (PCE)	127184	1.00E-02 I		5.20E-02 E	2.03E-03 E	☒	1.1 C	3.1 C	0.061 C	110 C	12 C	11 E	0.04 E
2,3,4,6-Tetrachlorophenol	58902	3.00E-02 I					1100 N	110 N	41 N	61000 N	2300 N		
p,a,a,a-Tetrachlorotoluene	5216251			2.00E+01 H		☒	0.00053 C	0.00031 C	0.00016 C	0.29 C	0.032 C		
Tetrachlorovinphos	961115	3.00E-02 I		2.40E-02 H			2.8 C	0.26 C	0.13 C	240 C	27 C		
Tetraethyldithiopyrophosphate	3689245	5.00E-04 I					18 N	1.8 N	0.68 N	1000 N	39 N		
Tetraethyl lead	78002	1.00E-07 I					0.0037 N	0.00037 N	0.00014 N	0.2 N	0.0078 N	0.00068 N	0.000034 N
**1,1,1,2-Tetrafluoroethane	811972	I	2.29E+01			☒	140000 N	84000 N					
Thallic oxide	1314325	7.00E-05 W					2.6 N	0.26 N	0.095 N	140 N	5.5 N		
Thallium													0.4 E
Thallium acetate	563688	9.00E-05 I					3.3 N	0.33 N	0.12 N	180 N	7 N		
Thallium carbonate	6533739	8.00E-05 I					2.9 N	0.29 N	0.11 N	160 N	6.3 N		
Thallium chloride	7791120	8.00E-05 I					2.9 N	0.29 N	0.11 N	160 N	6.3 N		
Thallium nitrate	10102451	9.00E-05 I					3.3 N	0.33 N	0.12 N	180 N	7 N		
Thallium selenite	12039520	9.00E-05 W					3.3 N	0.33 N	0.12 N	180 N	7 N		
Thallium sulfate	7446186	8.00E-05 I					2.9 N	0.29 N	0.11 N	160 N	6.3 N		
Thiobencarb	28249776	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
2-(Thiocyanomethylthio)-benzothiazole	21564170	3.00E-02 H					1100 N	110 N	41 N	61000 N	2300 N		
Thiofanox	39196184	3.00E-04 H					11 N	1.1 N	0.41 N	610 N	23 N		
Thiophanate-methyl	23564058	8.00E-02 I					2900 N	290 N	110 N	160000 N	6300 N		
Thiram	137268	5.00E-03 I					180 N	18 N	6.8 N	10000 N	390 N		

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

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Tin and compounds		6.00E-01 H					22000 N	2200 N	810 N	1E+06 N	47000 N		
Toluene	108883	2.00E-01 I	1.14E-01 I			☒	750 N	420 N	270 N	410000 N	16000 N	520 E	5 E
Toluene-2,4-diamine	95807			3.20E+00 H			0.021 C	0.002 C	0.00099 C	1.8 C	0.2 C		
Toluene-2,5-diamine	95705	6.00E-01 H					22000 N	2200 N	810 N	1E+06 N	47000 N		
Toluene-2,6-diamine	823405	2.00E-01 H					7300 N	730 N	270 N	410000 N	16000 N		
p-Toluidine	106490			1.90E-01 H			0.35 C	0.033 C	0.017 C	30 C	3.4 C		
Toxaphene	8001352			1.10E+00 I	1.12E+00 I		0.061 C	0.0056 C	0.0029 C	5.2 C	0.58 C	5 E	0.04 E
Tralomethrin	66841256	7.50E-03 I					270 N	27 N	10 N	15000 N	590 N		
Triallate	2303175	1.30E-02 I					470 N	47 N	18 N	27000 N	1000 N		
Triasulfuron	82097505	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
1,2,4-Tribromobenzene	615543	5.00E-03 I				☒	30 N	18 N	6.8 N	10000 N	390 N		
Tributyltin oxide (TBTO)	56359	3.00E-05 I					1.1 N	0.11 N	0.041 N	61 N	2.3 N		
2,4,6-Trichloroaniline hydrochloride	33663502			2.90E-02 H			2.3 C	0.22 C	0.11 C	200 C	22 C		
2,4,6-Trichloroaniline	634935			3.40E-02 H			2 C	0.18 C	0.093 C	170 C	19 C		
1,2,4-Trichlorobenzene	120821	1.00E-02 I	5.71e-02 H			☒	190 N	210 N	14 N	20000 N	780 N	240 E	2 E
1,1,1-Trichloroethane	71556	9.00E-02 W	2.86E-01 W			☒	1300 N	1000 N	120 N	180000 N	7000 N	980 E	0.9 E
1,1,2-Trichloroethane	79005	4.00E-03 I		5.70E-02 I	5.60E-02 I	☒	0.19 C	0.11 C	0.055 C	100 C	11 C	0.8 E	0.01 E
Trichloroethylene (TCE)	79016	6.00E-03 E		1.10E-02 W	6.00E-03 E	☒	1.6 C	1 C	0.29 C	520 C	58 C	3 E	0.02 E
Trichlorofluoromethane	75694	3.00E-01 I	2.00E-01 A			☒	1300 N	730 N	410 N	610000 N	23000 N	790 N	13 N
2,4,5-Trichlorophenol	95954	1.00E-01 I					3700 N	370 N	140 N	200000 N	7800 N	8200 S	120 E
2,4,6-Trichlorophenol	88062			1.10E-02 I	1.09E-02 I		6.1 C	0.57 C	0.29 C	520 C	58 C	150 C	0.06 E
2,4,5-Trichlorophenoxyacetic acid	93765	1.00E-02 I					370 N	37 N	14 N	20000 N	780 N		
2-(2,4,5-Trichlorophenoxy)propionic acid	93721	8.00E-03 I					290 N	29 N	11 N	16000 N	630 N		
1,1,2-Trichloropropane	598776	5.00E-03 I				☒	30 N	18 N	6.8 N	10000 N	390 N	13 N	0.14 N
1,2,3-Trichloropropane	96184	6.00E-03 I		7.00e+00 I		☒	0.0015 C	0.00089 C	0.00045 C	0.82 C	0.091 C	0.00003 C	6.000E-06 C
1,2,3-Trichloropropene	96195	5.00E-03 H				☒	30 N	18 N	6.8 N	10000 N	390 N		
1,1,2-Trichloro-1,2,2- trifluoroethane	76131	3.00E+01 I	8.57E+00 H			☒	59000 N	31000 N	41000 N	1E+06 N	1000000 N	2400 S	3100 N
Tridiphane	58138082	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
Triethylamine	121448		2.00E-03 I				73 N	7.3 N					
Trifluralin	1582098	7.50E-03 I		7.70E-03 I			8.7 C	0.81 C	0.41 C	740 C	83 C		
**1,2,4-Trimethylbenzene	95636	5.00e-02 E				☒	300 N	180 N	68 N	100000 N	3900 N		
**1,3,5-Trimethylbenzene	108678	5.00e-02 E				☒	300 N	180 N	68 N	100000 N	3900 N	98 S	0.26 M
Trimethyl phosphate	512561			3.70E-02 H			1.8 C	0.17 C	0.085 C	150 C	17 C		
1,3,5-Trinitrobenzene	99354	5.00E-05 I					1.8 N	0.18 N	0.068 N	100 N	3.9 N		
Trinitrophenylmethylnitramine	479458	1.00E-02 H					370 N	37 N	14 N	20000 N	780 N		
2,4,6-Trinitrotoluene	118967	5.00E-04 I		3.00E-02 I			2.2 C	0.21 C	0.11 C	190 C	21 C		
Uranium (soluble salts)	7440611	3.00E-03 I					110 N	11 N	4.1 N	6100 N	230 N		
Vanadium	7440622	7.00E-03 H					260 N	26 N	9.5 N	14000 N	550 N		
Vanadium pentoxide	1314621	9.00E-03 I					330 N	33 N	12 N	18000 N	700 N		

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Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg·d/mg	CPSi kg·d/mg	VOC	Risk-Based Concentrations: Tap Water µg/L	Ambient Air µg/m3	Fish mg/kg	Soil Ingestion: Industrial mg/kg	Soil Ingestion: Residential mg/kg	Soil Screening Levels-Transfers from Soil to: Air mg/kg	Groundwater mg/kg
Vanadium sulfate	36907423	2.00E-02 H					730 N	73 N	27 N	41000 N	1600 N		
Vernam	1929777	1.00E-03 I					37 N	3.7 N	1.4 N	2000 N	78 N		
Vinclozolin	50471448	2.50E-02 I					910 N	91 N	34 N	51000 N	2000 N		
Vinyl acetate	108054	1.00E+00 H	5.71E-02 I				37000 N	210 N	1400 N	1E+06 N	78000 N	370 E	84 E
Vinyl bromide	593602		8.57E-04 I			☒	5.2 N	3.1 N				2 N	0.018 N
Vinyl chloride	75014			1.90E+00 H	3.00E-01 H	☒	0.019 C	0.021 C	0.0017 C	3 C	0.34 C	0.002 E	0.01 E
Warfarin	81812	3.00E-04 I					11 N	1.1 N	0.41 N	610 N	23 N	0.046 N	1800 N
m-Xylene	108323	2.00E+00 H	2.00E-01 W			☒	1400 N	730 N	2700 N	1E+06 N	160000 N	950 S	240 M
o-Xylene	9.55E+04	2.00E+00 H	2.00E-01 W			☒	1400 N	730 N	2700 N	1E+06 N	160000 N	730 S	1.50E+02 M
p-Xylene	1.06E+05		8.57E-02 W			☒	520 N	310 N				1000 S	2.20E+02 M
Xylene (mixed)	1.33E+06	2.00E+00 I				☒	12000 N	7300 N	2700 N	1E+06 N	160000 N	320 E	7.40E+01 E
Zinc	7.44E+06	3.00E-01 I					11000 N	1100 N	410 N	610000 N	23000 N		4.20E+04 E
Zinc phosphide	1.31E+06	3.00E-04 I					11 N	1.1 N	0.41 N	610 N	23 N		
Zineb	1.21E+07	5.00E-02 I					1800 N	180 N	68 N	100000 N	3900 N		

APPENDIX 2

Results of Voluntary Release Assessment Samples Collected at SWMU 001n

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #3	BORE #3
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24	60-72	60-72
Sample Date:	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95	8/4/95
WID Sample Numbers:	RA-95-083	RA-95-085	RA-95-087	RA-95-089	RA-95-091	RA-95-092	RA-95-097	RA-95-098
	RA-95-084	RA-95-086	RA-95-088	RA-95-090	RA-95-093	RA-95-094 Duplicate	RA-95-099	RA-95-100 Duplicate
Analytes								
Leachable Metals (mg/L)								
Arsenic (As)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Barium (Ba)	0.51 B	0.35 UB	0.42 B	0.54 B	0.51 B	0.45 B	0.3 UB	0.32 UB
Cadmium (Cd)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Mercury (Hg)	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ	0.0002 UJ
Thallium (Tl)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Leachable Volatiles (mg/L)								
1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
J	Estimated value
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

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

Bore Number:	BORE #4	BORE #4	EQ BLANK	FD BLANK
Depth (inches):	12-24	60-72		
Sample Date:	8/4/95	8/4/95	8/4/95	8/4/95
WID Sample Numbers:	RA-95-101	RA-95-105	RA-95-095	RA-95-103
	RA-95-102	RA-95-106	RA-95-096	RA-95-104
Analytes				
Leachable Metals (mg/L)				
Arsenic (As)	1 U	1 U	1 U	1 U
Barium (Ba)	0.34 UB	0.43 B	0.08 UB	0.05 U
Cadmium (Cd)	0.05 U	0.1 U	0.05 U	0.05 U
Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U
Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U
Mercury (Hg)	0.0002 U	0.0002 U	0.0002 UJ	0.0002 U
Thallium (Tl)	2 U	2 U	2 U	2 U
Leachable Volatiles (mg/L)				
1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
J	Estimated value
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

WIPP Soil Samples
Data Review Form

Statement of Purpose:

To review laboratory data packages for soil samples collected at SWMUs, evaluate data package completeness, and compare analytical quality control data to program objectives.

Section 1: Data Package Identification

P.O. Number: 67763 - Report 27206 No. Of Samples In Package: 24
Sample Collection Date: 8/4/95 Sample Receipt Date: 8/8/95
Sample Report Date: 8/24/95 Analytical Parameters: TCLP - VOCs, Metals
Sample Numbers in Data Package: RA-95-083 (P0318146), RA-95-084 (P0318147), RA-95-085 (P0318148), RA-95-086 (P0318149), RA-95-087 (P0318150), RA-95-088 (P0318151), RA-95-089 (P0318152), RA-95-090 (P0318153), RA-95-091 (P0318154), RA-95-092 (P0318155), RA-95-093 (P0318156), RA-95-094 (P0318157), RA-95-095 (P0318158), RA-95-096 (P0318159), RA-95-097 (P0318160), RA-95-098 (P0318161), RA-95-099 (P0318162), RA-95-100 (P0318163), RA-95-101 (P0318164), RA-95-102 (P0318165), RA-95-103 (P0318166), RA-95-104 (P0318167), RA-95-105 (P0318168), RA-95-106 (P0318169)

Data Reviewer: Donald K. Wambold Date of Review: 1/8/96

Symbols used in the sections below are defined as follows:

X	Included: no problem	R	Resubmission
*	Included: problems noted	NR	Not Required
O	Not Included		

Section 2. Data Summary

Data for the above listed samples are:

____ Acceptable for use
X Acceptable for use with qualifications noted
____ Preliminary - pending action or verification
____ Unacceptable for use
____ To be reviewed by senior chemist

Reviewed by: _____ Date: _____

Section 3. Data Package Completeness Review

X Chain of Custody/Request for Analysis
X Laboratory Analysis Report
X Holding Times
X[1] Method Reporting Limits
X Dilution Factors
X[2] Quality Control Report

Section 4. QC Review (from Laboratory Quality Control Report)

Volatiles

X Method Blank
O[3] Leachate Blank
X Surrogate Standard Recovery
NR[4] Matrix Spike/Matrix Spike Duplicate Samples
X Laboratory Control Sample
NR Duplicate Sample

Metals

X Method Blank
*[5] Leachate Blank
O[6] Matrix Spike/Matrix Spike Duplicate Samples
X Laboratory Control Sample
NR Duplicate Sample

Section 5. Calibration Data

Volatiles

O[7] GC/MS Analysis Log
O[7] GC/MS Initial Calibration Data
O[7] GC/MS Continuing Calibration Data

Metals

X[8] ICP Analysis Log
X[8] ICP Initial Calibration Data
O[8] ICP Continuing Calibration Data
X[8] CVAA Analysis Log
X[8] CVAA Initial Calibration Data
X[8] CVAA Continuing Calibration Data

Section 6. Comments

1. The method reporting limits (MRLs) and sample results for 1,1,1-trichloroethane, ethyl benzene, chloroform, total xylenes, and thallium were not evaluated relative to the toxicity characteristic regulatory levels because limits have not been promulgated for these analytes.

2. The information provided in the quality control (QC) summary was not complete for all reported samples and could not be directly referenced to the sample results and/or analysis logs. The "supplemental information" section of the quality control summary provides analytical and extraction batch numbers which can be referenced to the appropriate QC samples in the QC summary. The laboratory relies on these batch references, which are stored in the laboratory information management system (LIMS), to relate the appropriate QC data to sample batches, and does not typically include the batch numbers or internal laboratory QC sample numbers on the analysis logs. Therefore, QC sample results generally cannot be traced to the raw analytical data.

3. A leachate blank analysis was not provided for the TCLP volatiles analyses in this package. Based on the laboratory's procedures, leachate blanks are performed once per twenty samples processed through the TCLP extraction procedure on each extraction apparatus. The leachate blank associated with the samples in this package may not be reported because it is reported in another package with the remaining samples in the extraction batch. There were not any detections of volatile compounds reported in the data package, and no common volatile laboratory contaminants or other volatile compounds were reported in the method blanks. Therefore, the potential for laboratory cross contamination of samples appeared to be low, and sample results were not qualified.

4. A matrix spike/matrix spike duplicate was not performed for the TCLP volatile analyses due to limited sample volume produced during the TCLP extraction.

5. The laboratory provided metal leachate blank sample results for extraction batch 342 which was considered representative of the extraction conditions for the WIPP samples in this data package. Specific sample associations for the blank were not included, therefore the representative blanks was used to evaluate the WIPP sample results from the three TCLP extraction batches in the case. Arsenic and barium were detected at or above the MRL in the leachate blank sample. Barium results for samples RA-95-086, RA-95-096, RA-95-099, RA-95-100, and RA-95-102 were less than five times the blank concentration, and therefore were qualified as "UB" (not detected) due to blank contamination. The barium results for samples RA-95-084, RA-95-088, RA-95-090, RA-95-093, RA-95-094, and RA-95-106 were not less than five times the blank concentration, and therefore were qualified with a "B" to indicate that the analyte was detected in the blank.

6. The matrix spike recovery of 41% for mercury from analytical batch 36783 was below the EPA Functional Guidelines lower acceptance limit of 75%. The matrix spike duplicate recovery was acceptable at 102%. Due to the low MS recovery, and the resulting high

RPD for the MS and MSD results (71%), the mercury results for samples RA-95-084, RA-95-086, RA-95-088, RA-95-090, RA-95-093, RA-95-094, RA-95-096, RA-95-099 and RA-95-100 (all from batch 36783) were considered estimated and qualified as "J".

MS/MSD results were not provided for analytical batches 35784 (sample RA-95-102) and 36881 (samples RA-95-104 and RA-95-106). Sample matrix effects for the samples from these batches could not be evaluated.

7. The analysis run log and initial and continuing calibration summaries for laboratory analytical batch 36807 was not included in the data package. Data pertaining to this batch had been included with report 27176, therefore, the data from that case was used to perform this review.

8. Representative calibration data provided with the data package were reviewed to evaluate the calibration procedures and protocols followed by the laboratory, and to assess the operating conditions of the instruments used for analysis of the samples in the data package. Specific items reviewed include: 1) analysis run logs, and initial and continuing calibration summaries for volatiles analyses of laboratory batches 36807 and 36858; 2) analysis run logs and initial calibration summaries for ICP metals analyses of laboratory batches 36754 and 36790; and 3) analysis run logs, and initial and continuing calibration data for CVAA mercury analyses of laboratory batches 36783, 36784 and 36881. WIPP sample results did not require qualification based on the representative calibration information that was provided in the data package.

Signatures below constitutes validation of this record.

Validator:

Printed Name	Signature	Date
Donald K. Wambold	Donald K. Wambold	1/18/96

QA/QC Reviewer:

Printed Name	Signature	Date
Mark R. Colsman	MARK R. COLSMAN	1/18/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-083 TCLP
NUS SAMPLE NO: P0318146
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
?	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/14(1330)
		End Date/Time		08/15(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/9/96

Halliburton NUS
CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 2

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-084 TCLP
NUS SAMPLE NO: P0318147
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		08/13(1000)		
		End Date/Time		08/14(0725)		
		Extraction Fluid		1		
		Final Leachate pH		4.9		
3	AASL	Arsenic, Leachable (As)	1	< 1	mg/L	
4	ABAL	Barium, Leachable (Ba)	1	0.51	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.5	mg/L	
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L	J
9	ATLL	Thallium, Leachable (Tl)	1	< 2	mg/L	

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 3

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-085 TCLP
NUS SAMPLE NO: P0318148
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/15(1240)
		End Date/Time		08/16(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
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LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-086 TCLP
NUS SAMPLE NO: P0318149
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		08/13(1000)		
		End Date/Time		08/14(0725)		
		Extraction Fluid		1		
		Final Leachate pH		4.9		
3	AASL	Arsenic, Leachable (As)	1	< 1	mg/L	
4	ABAL	Barium, Leachable (Ba)	1	0.35	mg/L	UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.5	mg/L	
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L	J
9	ATLL	Thallium, Leachable (Tl)	1	< 2	mg/L	

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 5

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-087 TCLP
NUS SAMPLE NO: P0318150
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/15(1240)
		End Date/Time		08/16(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 6

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-088 TCLP
NUS SAMPLE NO: P0318151
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/13(1000)
		End Date/Time		08/14(0725)
		Extraction Fluid		1
		Final Leachate pH		4.9
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.42 mg/L B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L J
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 7

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-089 TCLP
NUS SAMPLE NO: P0318152
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/15(1240)
		End Date/Time		08/16(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 8

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-090 TCLP
NUS SAMPLE NO: P0318153
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/13(1000)
		End Date/Time		08/14(0725)
		Extraction Fluid		1
		Final Leachate pH		4.9
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.54 mg/L B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L J
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 9

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-091 TCLP
NUS SAMPLE NO: P0318154
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/15(1240)
		End Date/Time		08/16(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 10

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-092 TCLP
NUS SAMPLE NO: P0318155
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/15(1240)
		End Date/Time		08/16(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By

Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 11

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-093 TCLP
NUS SAMPLE NO: P0318156
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		08/13(1000)		
		End Date/Time		08/14(0725)		
		Extraction Fluid		1		
		Final Leachate pH		6.3		
3	AASL	Arsenic, Leachable (As)	1	< 1	mg/L	
4	ABAL	Barium, Leachable (Ba)	1	0.51	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.5	mg/L	
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L	J
9	ATLL	Thallium, Leachable (Tl)	1	< 2	mg/L	

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 12

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-094 TCLP
NUS SAMPLE NO: P0318157
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		08/13(1000)		
		End Date/Time		08/14(0725)		
		Extraction Fluid		1		
		Final Leachate pH		6.2		
3	AASL	Arsenic, Leachable (As)	1	< 1	mg/L	
4	ABAL	Barium, Leachable (Ba)	1	0.45	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.5	mg/L	
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L	J
9	ATLL	Thallium, Leachable (Tl)	1	< 2	mg/L	

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS
CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

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Section A Page 13

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-095 TCLP
NUS SAMPLE NO: P0318158
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/15(0725)
		End Date/Time		08/15(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:
2 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 14

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-096 TCLP
NUS SAMPLE NO: P0318159
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Final Leachate pH		5.8
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.08 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L J
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:
1 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By [signature]
Date 1/9/96

Halliburton NUS CORPORATION

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 15

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-097 TCLP
NUS SAMPLE NO: P0318160
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/15(1240)
		End Date/Time		08/16(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 16

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-098 TCLP
NUS SAMPLE NO: P0318161
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/16(1230)
		End Date/Time		08/17(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-099 TCLP
NUS SAMPLE NO: P0318162
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		08/14(1350)		
		End Date/Time		08/15(0725)		
		Extraction Fluid		1		
		Final Leachate pH		5.3		
3	AASL	Arsenic, Leachable (As)	1	< 1	mg/L	
4	ABAL	Barium, Leachable (Ba)	1	0.3	mg/L	UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.5	mg/L	
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L	J
9	ATLL	Thallium, Leachable (Tl)	1	< 2	mg/L	

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-100 TCLP
NUS SAMPLE NO: P0318163
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/14(1350)
		End Date/Time		08/15(0725)
		Extraction Fluid		1
		Final Leachate pH		5.7
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.32 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L J
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

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Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 19

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-101 TCLP
NUS SAMPLE NO: P0318164
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/16(1230)
		End Date/Time		08/17(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-102 TCLP
NUS SAMPLE NO: P0318165
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		08/14(1350)	
		End Date/Time		08/15(0725)	
		Extraction Fluid		1	
		Final Leachate pH		5.0	
3	AASL	Arsenic, Leachable (As)	1	< 1	mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.34	mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2	mg/L

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 1/9/96

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CORPORATION

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 21

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-103 TCLP
NUS SAMPLE NO: P0318166
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/17(0725)
		End Date/Time		08/17(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:
2 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS
CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206
Section A Page 22

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-104 TCLP
NUS SAMPLE NO: P0318167
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Final Leachate pH		5.8
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	< 0.05 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:
1 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

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Pittsburgh, Pennsylvania 15205

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August 24, 1995
Report No.: 00027206

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-105 TCLP
NUS SAMPLE NO: P0318168
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/16(1230)
		End Date/Time		08/17(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 24, 1995
Report No.: 00027206

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-106 TCLP
NUS SAMPLE NO: P0318169
P.O. NO.: 67763

DATE SAMPLED: 04-AUG-95
DATE RECEIVED: 08-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/15(1330)
		End Date/Time		08/16(0725)
		Extraction Fluid		1
		Final Leachate pH		5.1
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.43 mg/L B
5	ACDL	Cadmium, Leachable (Cd)	2	< 0.1 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:
5 An elevated reporting limit was reported for Cadmium due to sample matrix interference.

VALIDATED
Reviewed By
Date 1/9/96

APPENDIX 3

Results of Voluntary Release Assessment Samples Collected at SWMU 001x

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #3	BORE #3	BORE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	12-24	60-72	60-72	12-24
Sample Date:	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95	8/9/95
WID Sample Numbers:	RA-95-107	RA-95-109	RA-95-111	RA-95-113	RA-95-115	RA-95-116	RA-95-119	RA-95-120	RA-95-125
	RA-95-108	RA-95-110	RA-95-112	RA-95-114	RA-95-117	RA-95-118	RA-95-121	RA-95-122	RA-95-126
						Duplicate		Duplicate	
Analytes									
Leachable Metals (mg/L)									
Arsenic (As)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Barium (Ba)	0.34 UB	0.33 UB	0.38 UB	0.36 UB	0.28 UB	0.3 UB	0.44 B	0.25 UB	0.19 UB
Cadmium (Cd)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chromium (Cr)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Lead (Pb)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Mercury (Hg)	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Thallium (Tl)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Leachable Volatiles (mg/L)									
1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
J	Estimated value
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

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

Bore Number:	BORE #4	EQ BLANK	FD BLANK
Depth (inches):	60-72		
Sample Date:	8/9/95	8/9/95	8/9/95
WID Sample Numbers:	RA-95-127	RA-95-123	RA-95-129
	RA-95-128	RA-95-124	RA-95-130
Analytes			
Leachable Metals (mg/L)			
Arsenic (As)	0.2 UB	1 U	0.1 U
Barium (Ba)	0.36 UB	0.05 U	0.012 UB
Cadmium (Cd)	0.005 U	0.05 U	0.005 U
Chromium (Cr)	0.02 U	0.2 U	0.02 U
Lead (Pb)	0.05 U	0.5 U	0.05 U
Mercury (Hg)	0.0002 U	0.0002 U	0.0002 U
Thallium (Tl)	0.2 U	2 U	0.2 U
Leachable Volatiles (mg/L)			
1,1,1-Trichloroethane	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U	0.05 U
Benzene	0.05 U	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U	0.05 U
Toluene	0.05 U	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
J	Estimated value
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

WIPP Soil Samples
Data Review Form

Statement of Purpose:

To review laboratory data packages for soil samples collected at SWMUs, evaluate data package completeness, and compare analytical quality control data to program objectives.

Section 1: Data Package Identification

P.O. Number: 67763 - Report 27278 No. Of Samples In Package: 24
Sample Collection Date: 8/9/95 Sample Receipt Date: 8/11/95
Sample Report Date: 8/29/95 Analytical Parameters: TCLP - VOCs, Metals
Sample Numbers in Data Package: RA-95-107 (P0318453), RA-95-108 (P0318454), RA-95-109 (P0318455), RA-95-110 (P0318456), RA-95-111 (P0318457), RA-95-112 (P0318458), RA-95-113 (P0318459), RA-95-114 (P0318460), RA-95-115 (P0318461), RA-95-116 (P0318462), RA-95-117 (P0318463), RA-95-118 (P0318464), RA-95-119 (P0318465), RA-95-120 (P0318466), RA-95-121 (P0318467), RA-95-122 (P0318468), RA-95-123 (P0318469), RA-95-124 (P0318470), RA-95-125 (P0318471), RA-95-126 (P0318472), RA-95-127 (P0318473), RA-95-128 (P0318474), RA-95-129 (P0318475), RA-95-130 (P0318476)

Data Reviewer: Donald K. Wambold Date of Review: 1/9/96

Symbols used in the sections below are defined as follows:

X	Included: no problem	R	Resubmission
*	Included: problems noted	NR	Not Required
O	Not Included		

Section 2. Data Summary

Data for the above listed samples are:

____ Acceptable for use
X Acceptable for use with qualifications noted
____ Preliminary - pending action or verification
____ Unacceptable for use
____ To be reviewed by senior chemist

Reviewed by: _____ Date: _____

Section 3. Data Package Completeness Review

X	Chain of Custody/Request for Analysis
X	Laboratory Analysis Report
X	Holding Times
X[1]	Method Reporting Limits
X	Dilution Factors
X[2]	Quality Control Report

Section 4. QC Review (from Laboratory Quality Control Report)

Volatiles

X	Method Blank
O[3]	Leachate Blank
X	Surrogate Standard Recovery
NR[4]	Matrix Spike/Matrix Spike Duplicate Samples
X	Laboratory Control Sample
NR	Duplicate Sample

Metals

X	Method Blank
*[5]	Leachate Blank
O[6]	Matrix Spike/Matrix Spike Duplicate Samples
X	Laboratory Control Sample
NR	Duplicate Sample

Section 5. Calibration Data

Volatiles

O[7,8]	GC/MS Analysis Log
O[7,8]	GC/MS Initial Calibration Data
O[7,8]	GC/MS Continuing Calibration Data

Metals

X[7]	ICP Analysis Log
X[7]	ICP Initial Calibration Data
O[7]	ICP Continuing Calibration Data
X[7]	CVAA Analysis Log
X[7]	CVAA Initial Calibration Data
X[7]	CVAA Continuing Calibration Data

Section 6. Comments

1. The method reporting limits (MRLs) and sample results for 1,1,1-trichloroethane, ethyl benzene, chloroform, total xylenes, and thallium were not evaluated relative to the toxicity characteristic regulatory levels because limits have not been promulgated for these analytes.

2. The information provided in the quality control (QC) summary was not complete for all reported samples and could not be directly referenced to the sample results and/or analysis logs. The "supplemental information" section of the quality control summary provides analytical and extraction batch numbers which can be referenced to the appropriate QC samples in the QC summary. The laboratory relies on these batch references, which are stored in the laboratory information management system (LIMS), to relate the appropriate QC data to sample batches, and does not typically include the batch numbers or internal laboratory QC sample numbers on the analysis logs. Therefore, QC sample results generally cannot be traced to the raw analytical data.

3. A leachate blank analysis was not provided for the TCLP volatiles analyses in this package. Based on the laboratory's procedures, leachate blanks are performed once per twenty samples processed through the TCLP extraction procedure on each extraction apparatus. The leachate blank associated with the samples in this package may not be reported because it is reported in another package with the remaining samples in the extraction batch. There were not any detections of volatile compounds reported in the data package, and no common volatile laboratory contaminants or other volatile compounds were reported in the method blanks. Therefore, the potential for laboratory cross contamination of samples appeared to be low, and sample results were not qualified.

4. A matrix spike/matrix spike duplicate was not performed for the TCLP volatile analyses due to limited sample volume produced during the TCLP extraction.

5. The laboratory provided metal leachate blank sample results for extraction batch 344 which was considered representative of the extraction conditions for the WIPP samples in this data package. Specific sample associations for the blank were not included, therefore the representative blank~~s~~ MRL 1/18/96 was used to evaluate the WIPP sample results from both TCLP extraction batches in the case. Arsenic and barium were detected at or above the MRL in the leachate blank sample. Barium results for samples RA-95-108, RA-95-110, RA-95-112, RA-95-114, RA-95-117, RA-95-118, RA-95-122, RA-95-126, and RA-95-130, and both the arsenic and barium results for sample RA-95-128, were less than five times the blank concentration, and therefore were qualified as "UB" (not detected) due to blank contamination. The barium result for sample RA-95-121, was not less than five times the blank concentration, and therefore was qualified with a "B" to indicate that the analyte was detected in the blank.

6. Matrix spike/matrix spike duplicate (MS/MSD) recoveries were not included in the QC summary for mercury. Sufficient information was included in the raw data to evaluate the MS/MSD recoveries and determine that they were acceptable.

7. Representative calibration data provided with the data package were reviewed to evaluate the calibration procedures and protocols followed by the laboratory, and to assess the operating conditions of the instruments used for analysis of the samples in the data package. Specific items reviewed include: 1) analysis run logs, and initial and continuing calibration summaries for volatiles analyses of laboratory batch 36782; 2) analysis run logs and initial calibration summaries for ICP metals analyses of laboratory batches 36854, 36892, and 36923; and 3) analysis run logs, and initial and continuing calibration data for CVAA mercury analyses of laboratory batch 36957. WIPP sample results did not require qualification based on the representative calibration information that was provided in the data package.

8. The analysis run logs and initial and continuing calibration summaries for laboratory analytical batches 36883 (samples RA-95-113, RA-95-115, RA-95-116, RA-95-119, RA-95-120, RA-95-123, RA-95-125, and RA-95-129) and 36963 (sample RA-95-127) were not included in the data package, therefore specific calibration information pertaining to these samples could not be reviewed.

Signatures below constitutes validation of this record.

Validator: Donald K. Wimbish	Donald K. Wimbish	1/9/96
Printed Name	Signature	Date
QA/QC Reviewer: MARK R COLSMAN	Mark R. Colsman	1/18/96
Printed Name	Signature	Date

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-107 TCLP
NUS SAMPLE NO: P0318453
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/16(1230)
		End Date/Time		08/17(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 2

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-108 TCLP
NUS SAMPLE NO: P0318454
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/16(1325)
		End Date/Time		08/17(0700)
		Extraction Fluid		1
		Final Leachate pH		4.9
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.34 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 3

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-109 TCLP
NUS SAMPLE NO: P0318455
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/16(1230)
		End Date/Time		08/17(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 4

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-110 TCLP
NUS SAMPLE NO: P0318456
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/16(1325)
		End Date/Time		08/17(0725)
		Extraction Fluid		1
		Final Leachate pH		4.9
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.33 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 5

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-111 TCLP
NUS SAMPLE NO: P0318457
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/16(1230)
		End Date/Time		08/17(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 6

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-112 TCLP
NUS SAMPLE NO: P0318458
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/16(1325)
		End Date/Time		08/17(0725)
		Extraction Fluid		1
		Final Leachate pH		5.0
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.38 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 7

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-113 TCLP
NUS SAMPLE NO: P0318459
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/17(1225)
		End Date/Time		08/18(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 8

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-114 TCLP
NUS SAMPLE NO: P0318460
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/16(1325)
		End Date/Time		08/16(0725)
		Extraction Fluid		1
		Final Leachate pH		5.0
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.36 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS
CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 9

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-115 TCLP
NUS SAMPLE NO: P0318461
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/17(1225)
		End Date/Time		08/18(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 10

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-116 TCLP
NUS SAMPLE NO: P0318462
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/17(1225)
		End Date/Time		08/18(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 11

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-117 TCLP
NUS SAMPLE NO: P0318463
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/17(1320)
		End Date/Time		08/18(0725)
		Extraction Fluid		1
		Final Leachate pH		5.7
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.28 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 12

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-118 TCLP
NUS SAMPLE NO: P0318464
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		08/17(1320)	
		End Date/Time		08/18(0725)	
		Extraction Fluid		1	
		Final Leachate pH		5.7	
3	AASL	Arsenic, Leachable (As)	1	< 1	mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.30	mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2	mg/L

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 13

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-119 TCLP
NUS SAMPLE NO: P0318465
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/17(1225)
		End Date/Time		08/18(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

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Pittsburgh, Pennsylvania 15205

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August 29, 1995
Report No.: 00027278
Section A Page 14

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-120 TCLP
NUS SAMPLE NO: P0318466
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/17(1225)
		End Date/Time		08/18(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 15

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-121 TCLP
NUS SAMPLE NO: P0318467
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		08/17(1320)	
		End Date/Time		08/18(0725)	
		Extraction Fluid		1	
		Final Leachate pH		5.0	
3	AASL	Arsenic, Leachable (As)	1	< 1	mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.44	mg/L B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2	mg/L

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 16

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-122 TCLP
NUS SAMPLE NO: P0318468
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		08/17(1320)	
		End Date/Time		08/18(0725)	
		Extraction Fluid		1	
		Final Leachate pH		5.2	
3	AASL	Arsenic, Leachable (As)	1	< 1	mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.25	mg/L JB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2	mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 17

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-123 TCLP
NUS SAMPLE NO: P0318469
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/18(0725)
		End Date/Time		08/18(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:
2 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
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August 29, 1995
Report No.: 00027278
Section A Page 18

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-124 TCLP
NUS SAMPLE NO: P0318470
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Final Leachate pH		5.6
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	< 0.05 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:
1 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 19

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-125 TCLP
NUS SAMPLE NO: P0318471
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/17(1225)
		End Date/Time		08/18(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 20

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-126 TCLP
NUS SAMPLE NO: P0318472
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		08/17(1320)
		End Date/Time		08/18(0725)
		Extraction Fluid		1
		Final Leachate pH		5.8
3	AASL	Arsenic, Leachable (As)	1	< 1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.19 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.05 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.2 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.5 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 21

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-127 TCLP
NUS SAMPLE NO: P0318473
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/21(1240)
		End Date/Time		08/22(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
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Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 22

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-128 TCLP
NUS SAMPLE NO: P0318474
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		08/17(1320)	
		End Date/Time		08/18(0725)	
		Extraction Fluid		1	
		Final Leachate pH		5.0	
3	AASL	Arsenic, Leachable (As)	1	0.2	mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.36	mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

August 29, 1995
Report No.: 00027278
Section A Page 23

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-129 TCLP
NUS SAMPLE NO: P0318475
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		08/18(0725)
		End Date/Time		08/18(0725)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:
2 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 1/9/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
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August 29, 1995
Report No.: 00027278
Section A Page 24

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-130 TCLP
NUS SAMPLE NO: P0318476
P.O. NO.: 67763

DATE SAMPLED: 09-AUG-95
DATE RECEIVED: 11-AUG-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Final Leachate pH		5.4
3	AASL	Arsenic, Leachable (As)	1	< 0.1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.012 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

1 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED

Reviewed By [signature]

Date 1/9/96

APPENDIX 4

Results of NMED - DOE Oversight Bureau Release Assessment Duplicate Samples Collected at SWMU 001g

State of New Mexico
ENVIRONMENT DEPARTMENT
DOE Oversight Bureau / Waste Isolation Pilot Plant Site Office
P.O. Box 3090, WIPP Site, Jal Highway
Carlsbad, New Mexico 88221
Telephone: (505) 234-8947 *Fax: (505) 887-5871*

GARY E. JOHNSON
Governor

MARK E.WEIDLER
Secretary

EDGAR T. THORNTON, III
Deputy Secretary

February 22, 1996

WIPP/WID/Environmental Compliance and Support
WIPP Site

Subject: Split sample results from the H-14 SWMU investigation on October 4, 1995.

Attention: Dan Robertson

Enclosed herewith is a copy of the original Lockheed Analytical Services Analytical Data Report which provides the NMED/ DOE Oversight Bureau results from split sampling with your group on October 4, 1995 at the H-14/P-1 well location (SWMU # 001-g). We also acknowledge receipt of the WIPP/WID results which were hand delivered on October 20, 1996.

TCLP Metals analytical suites are similar except that NMED included Selenium but not Thallium and WIPP/WID did not include Selenium. All parameters were below the detection limits.

TCLP Semi-Volatile Organics are also reported with all parameters below the detection limit.

Quality Control analyses and summaries, chain of custody, and other supporting documentation is also provided.

NMED sample "S951004H14WM" is a split of WID sample "RA-95-134" and NMED sample "S951004H14EM" is a split of "RA-95-142."

NMED Sample ID explanation: **S**(soil)**951004**(10/04/95)**H14**(location code)**WM**(series identification-west hole middle or 12-24 inch depth sample)

If you have questions, please call either myself or Pat McCasland at 8984 or 8983 respectively.

Sincerely,

Keith E McKamey

Keith McKamey, Program Manager

DOE-OB/WIPP

cc: Neil Weber

RECEIVED
JAN 04 '00
NM ED WIPP Site

LOCKHEED MARTIN

Lockheed Analytical Services

NEW MEXICO ENVIRONMENT DEPT.

ANALYTICAL DATA REPORT

FOR

TCLP METALS AND SEMI-VOLATILE ORGANICS

LOG-IN NUMBER: L5636

QUOTATION NUMBER: Q408030-WIP-TCLP

DOCUMENT FILE NUMBER: 1018544

Lockheed Environmental Systems & Technologies Co.
Lockheed Analytical Services
975 Keily Johnson Drive Las Vegas, Nevada 89119-3705
Telephone 702-361-0220 800-582-7605 Facsimile 702-361-8146

LOCKHEED MARTIN

December 11, 1995

Martyne Kieling
New Mexico Environment Dept.
DOE Oversight Bureau
525 Camino De Los Marquez
P.o. Box 26110
Santa Fe, NM 87502

RE: Log-in No: L5636
Quotation No: Q408030-WIP-TCLP
Document File No: 1018544

The attached data report contains the analytical results of samples that were submitted to Lockheed Analytical Services on 18 October 1995.

The temperature of the cooler upon receipt was 5°C. Sample containers received agree with the chain-of-custody documentation. Sample containers were received intact. Samples were received in time to meet the analytical holding time requirements.

The case narratives included in the following attachments provide a detailed description of all events that occurred during sample preparation, analysis, and data review specific to the samples and analytical methods requested.

A list of data qualifiers, chain-of-custody forms, sample receiving checklist, and log-in report are also enclosed representing the samples received within this group.

If you have any questions concerning the analysis or the data please call Karen Germann at (702) 361-3955, ext. 289.

Release of this data report has been authorized by the Laboratory Director or the Director's designee as evidenced by the following signature.

Sincerely,

Karen Germann

Karen Germann
Client Services Representative

cc: Client Services
Document Control

CASE NARRATIVE
INORGANIC ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

All samples were received on October 18, 1995. The samples were logged in as L5636 and were prepared and analyzed in batch 1018 nmE.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Method Blanks

- The concentration levels of all the requested analytes in the method blank were below the reporting detection limits.

Internal Quality Control

- All Internal Quality Control were within acceptance limits.

Sample Results

- TCLP results are not bias corrected for matrix spike recovery.

Shellee McGrath
Prepared By

November 14, 1995
Date

CASE NARRATIVE
ORGANIC ANALYSES

Analytical Method 8270 SemiVolatiles (TCLP Extr)

The associated samples were analyzed in one analytical batch. All instrument tunes, initial and continuing calibrations were within QC criteria. Target compounds were not detected in the water method blank. All surrogate compound recoveries were within QC limits. All internal standard area counts and retention times were within QC limits.

Analytical Batch 111895-8270-K (water)

Note: Sample S951004H14WM (L5636-1) was the native sample used for 29248MS/MSD analyzed in this analytical batch.

The samples were extracted within holding time on October 25, 1995 and were analyzed within holding time on November 18, 1995. The compound recoveries in the MS, MSD and LCS were all within QC limits. Due to the recoveries of Pyridine being at the low end of the QC limits, the RPD for the recoveries of this compound exceeded the QC limits for this compound. The RPDs for the recoveries of all other compounds were within QC limits.

Donald A. Hilke
Prepared By

December 11, 1995
Date

Lockheed Analytical Services
DATA QUALIFIERS FOR INORGANIC ANALYSES
[Revised 08/28/92]

For Use on the Analytical Data Reporting Forms	
B	***For CLP Analyses Only*** -- Reported value is less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit (IDL).
C	***For Routine, Non-CLP Analyses Only*** -- Any constituent that was also detected in the associated blank whose concentration was greater than the reporting detection limit (RDL).
D	Presence of high levels of interfering constituents required dilution of sample which increased the RDL by the dilution factor.
E	Estimated value due to presence of interference.
H	Sample analysis performed outside of method-or client-specified maximum holding time requirement.
M	***For CLP Analyses Only*** -- Duplicate injection precision criterion was not met.
N	Matrix spike recovery exceeded acceptance limits.
S	Reported value was determined from the method of standard addition.
U	***For CLP Reporting Only*** -- Constituent was analyzed for but not detected (sample quantitation must be corrected for dilution and percent moisture).
W	***For AAS Only*** -- Post-digestion spike for Furnace AAS did not meet acceptance criteria and sample absorbance is less than 50% of spike absorbance.
X, Y, or Z	Analyst-defined qualifier.
*	Relative percent difference (RPD) for duplicate analysis exceeded acceptance limits.
+	Correlation coefficient (r) for the MSA is less than 0.995.
For Use on the QC Data Reporting Forms	
a[1]	The spike recovery and/or RPD for matrix spike and matrix spike duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b[1]	The RPD cannot be computed because the sample and/or duplicate concentration was below the RDL.

[1] Used as footnote designations on the QC summary form.

Lockheed Analytical Services
DATA QUALIFIERS FOR ORGANIC ANALYSES

[Revised 04/12/1995]

For Use On The Analytical Data Reporting Forms	
A	***For CLP analyses Only*** -- The TIC is a suspected aldol-condensation product.
B	Any constituent that was also detected in the associated blank whose concentration was greater than the practical or reporting detection limit (PQL or RDL).
C	Constituent confirmed by GC/MS analysis. *[pesticide/PCB analyses only]*
D	Constituent detected in the diluted sample. It also indicates that an accurate quantitation is not possible due to surrogates being diluted out of the samples during the course of the analysis.
E	Constituent concentration exceeded the calibration range.
G	The quantitation is not gasoline or diesel but believed to be some other combination of hydrocarbons.
H	Sample analysis performed outside of method- or client-specified maximum holding time requirement.
J	*Estimated value* -- (1) constituent detected at a level less than the RDL or PQL and greater than or equal to the MDL; (2) estimated concentration for TICs ***(For CLP Reporting Only)***.
N	***For CLP Reporting Only*** -- Tentatively identified constituents (TICs) identified based on mass spectral library search.
P	***For CLP Reporting Only*** -- The percent difference between the concentrations detected on both GC columns was greater than 25 percent *[pesticide/PCB analyses only]*.
U	***For CLP Reporting Only*** -- Constituent was analyzed for but not detected (sample quantitation must be corrected for dilution and percent moisture).
X, Y, or Z	Analyst-defined qualifier.
N/A (% Moisture)	N/A in the % moisture cell indicates that data are reported on an "*as received*" basis. A value in the % moisture cell indicates that data are reported based on a "*dry weight*" basis.
For Use On The QC Data Reporting Forms	
*****	QC data (i.e., percent recovery data for matrix spike, matrix spike duplicate, laboratory control standard, or surrogates; and RPD for matrix spike duplicate or unspiked duplicate) exceeded acceptance limits.
a[1]	The spike recovery and/or RPD for matrix spike and matrix spike duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.
b[1]	The RPD cannot be computed because the sample and/or duplicate concentration was below the RDL.

[1] Used as footnote designations on the QC Summary Form.

L5636

SAMPLE LOGIN AND CHAIN OF CUSTODY

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (1M01)
Oct 18 1995, 03:42 pm

Login Number: L5636
Account: 544 New Mexico Env. Dept. * Santa Fe, NM
Project: WIPP-TCLP tclp svoc,metals only

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L5636-1	S951004H14WM	04-OCT-95	18-OCT-95		17-NOV-95

temp 5; TCLP=M,S
Location: RFG01-16C

SolidWaste	8	S	1311	TCLP REG. EXTR.	Hold:18-OCT-95
TCLP Extr	13	S	6010	ICP METALS	Hold:01-APR-96
TCLP Extr	13	S	6010	ICP TRACE	Hold:01-APR-96
TCLP Extr	13	S	7470	MERCURY	Hold:01-NOV-95
TCLP Extr	13	S	8270	SEMI-VOLATILES	Hold:18-OCT-95

L5636-2	S951004H14EM	04-OCT-95	18-OCT-95		17-NOV-95

temp 5; TCLP=M,S
Location: RFG01-16C

SolidWaste	8	S	1311	TCLP REG. EXTR.	Hold:18-OCT-95
TCLP Extr	13	S	6010	ICP METALS	Hold:01-APR-96
TCLP Extr	13	S	6010	ICP TRACE	Hold:01-APR-96
TCLP Extr	13	S	7470	MERCURY	Hold:01-NOV-95
TCLP Extr	13	S	8270	SEMI-VOLATILES	Hold:18-OCT-95

L5636-3	REPORT TYPE	18-OCT-95	18-OCT-95		17-NOV-95

Location:

Water	1	S	GCMS2
Water	1	S	INORG TYPE 2 RPT

Signature: [illegible]

Date: 10-18-95

101854

Lockheed Analytical Laboratory

FIELD CHAIN-OF-CUSTODY FORM

L5636

Serial No: 12849
Date: 10-16-95
Page 2 of 2

Client Name and Address
NMED/DOE OVERSIGHT BUREAU/WIPP
PO BOX 3090
WIPP SITE/JAL HWY/TRAILER #907
CARLSBAD NM 88221

PWO/Contract No.

Sampling Site Various 1995

Analysis Required

Client Sample ID	Collection Date	Collection Time	Matrix Code*	Sample Type**	Field Preserved (Y or N)	No. and Volume of Containers		TCLP metals	Radiochemistry	Metals					Comments	Laboratory Use Only: LAL Sample ID - Aliquot No.
BTD950823PEOCHT	8-23-95	NA	BEO	C	N	1-1L Plastic		X	X							
S951004HH4WM	10-4-95	1045	SL	G	N	1-1L Plastic	X									
S951004HHEM	10-4-95	1125	SL	G	N	1-1L Plastic	X									

Date Data Required: 12-10-95	Cooler No.	Seal No.	Received for Laboratory By: (Signature) Paula Dias — Date 10-18-95 Time (am pm) 17:00
Relinquished by: (Signature) [signature]		Date 10-17-95 Time (am pm) 1100	Method of Shipment: Fed Ex — Airbill No. 6522548263
Received By: (Signature)		Date Time (am pm)	Cooler Survey (pass/fail) → If FAIL do not open cooler; contact the Program Development Department and the Radiation Safety Officer IMMEDIATELY
Relinquished by: (Signature)		Date Time (am pm)	Surveyed by: (Signature) Paula Dias — Date 10-18-95 Time (am pm) 2:00
Received By: (Signature)		Date Time (am pm)	Cooler Condition Upon Receipt at Laboratory: Seals Intact: (Y/N) Y Blue Ice Adequate: (Y/N) Y Blue Ice Solid: (Y/N) Y
Relinquished by: (Signature)		Date Time (am pm)	Internal Cooler Temp. 5 °C; Samples in good condition: (Y/N) Y ; Samples surveyed (pass/fail) Y

Comments: Chain of Custody
Invoice by Sample + copy NMED/WIPP

***Sample Matrix Codes**
SW - Surface Water
GW - Ground Water
DW - Drinking Water
AR - Air
SL - Soil
SG - Sludge
SD - Sediment
WW - Waste Water
FI - Filter
BI - Biota
O - Other

****Sample Type Codes**
G - Grab
C - Composite
O - Other

Distribution: White Copy (Original)- LAL Document Control (Master Files) — Yellow Copy - Client / Sample Collection Crew

1C18344

LOCKHEED MARTIN

Sample Login
Login Review Checklist

Lot Number L5636

The login review should be conducted by that person logging in the samples as well as a peer. Please use this checklist to ensure that such reviews occur in a uniform basis. Please sign and date below to verify that a login review has occurred. This checklist should be affixed to each login package prior to distribution.

For effective login review, at a minimum, five reports form the login process are required. These are the COC (or equivalent), the login COC report, the sample summary report, the sample receiving checklist, and the login quotation. Before beginning review, ensure that these five components are available. Jobs with single component samples, the sample summary report may be omitted.

SAMPLE SUMMARY REPORT	YES	NO	N/A	Comment
1. Are all sample ID's correct?	X			
2. Are all samples present?	X			
3. Are all matrices indicated correctly?	X			
4. Are all analyses on the COC logged in for the appropriate samples?	X			
5. Are all analyses logged in for the correct container?	X			
6. Are samples logged in according to LAS batching procedures?	X			

LOGIN CHAIN OF CUSTODY	YES	NO	N/A	Comment
1. Are the collect, receive, and due dates correct for every sample?	X			
2. Have all appropriate comments been indicated in the comment section?			X	

SAMPLE RECEIVING CHECKLIST	YES	NO	N/A	Comment
1. Are all discrepancies between the COC and the login noted (if applicable)?			X	

[illegible] — primary review signature — 10-18-95 — date

Paula Davis — secondary review signature — 10-18-95 — date

101854

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: New Mexico / DOE Job No. L5634 Cooler ID:

COOLER CONDITION UPON RECEIPT

Temperature of cooler upon receipt: 5°C

temperature of temp. blank upon receipt:

	Yes	No	* Comments/Discrepancies
custody seals intact	Y		
chain of custody present	Y		
blue ice (or equiv.) present/frozen	Y		
rad survey completed	Y		

SAMPLE CONDITION UPON RECEIPT

	Yes	No	* Comments/Discrepancies
all bottles labeled	Y		
samples intact	Y		
proper container used for sample type	Y		
sample volume sufficient for analysis	Y		
proper pres. indicated on the COC	Y		
VOA's contain headspace			N/A
are samples bi-phasic (if so, indicate sample ID'S):			N/A

MISCELLANEOUS ITEMS

	Yes	No	* Comments/Discrepancies
samples with short holding times		Y	
samples to subcontract		Y	

ADDITIONAL COMMENTS/DISCREPANCIES

JO # B1O9S0823PECIAT is on hold and will be logged in under another job, per Mary Ford.

Completed by / date: [illegible] 10-18-95

Sent to the client (date/initials): ** Client's signature upon receipt:

*Notes: * = contact the appropriate CSR of any discrepancies immediately upon receipt*

*** = please review this information and return via facsimile to the appropriate CSR (702) 361-8146*

1018

Lockheed Analytical Laboratory
SAMPLE SUMMARY REPORT (su02)
New Mexico Env. Dept. * Santa Fe, NM

Client Sample Number	LAL Sample Number	SDG Number	Matrix	Method
REPORT TYPE	L5636-3		Water	GCMS2
	L5636-3		Water	INORG TYPE 2 RP
S951004H14EM	L5636-2		SolidWaste	1311 TCLP REG.
	L5636-2		TCLP Extr	6010 ICP METALS
	L5636-2		TCLP Extr	6010 ICP TRACE
	L5636-2		TCLP Extr	7470 MERCURY
	L5636-2		TCLP Extr	8270 SEMI-VOLAT
S951004H14WM	L5636-1		SolidWaste	1311 TCLP REG.
	L5636-1		TCLP Extr	6010 ICP METALS
	L5636-1		TCLP Extr	6010 ICP TRACE
	L5636-1		TCLP Extr	7470 MERCURY
	L5636-1		TCLP Extr	8270 SEMI-VOLAT

1C1852

METALS RESULTS

TCLP ANALYSIS (SW-846 1311)
SAMPLE RESULTS

Client Sample ID: S951004H14WM	**LAL Sample ID: L5636-1**
LAL Batch ID: 1018 nmE	**Matrix: solid waste → TCLP EXTRACT**

Constituent	Method of Analysis	Regulatory Limit (mg/L)	Reporting Limit (mg/L)	Concentration (mg/L)	Data Qualifier	Date Analyzed
Arsenic	6010	5.0	1.0	<1.0		11-10-95
Barium	6010	100	10	<10		11-10-95
Cadmium	6010	1.0	0.1	<0.1		11-10-95
Chromium	6010	5.0	0.5	<0.5		11-10-95
Lead	6010	5.0	1.0	<1.0		11-10-95
Mercury	7470	0.2	0.02	<0.02		11-07-95
Selenium	6010	1.0	0.1	<0.1		11-06-95
Silver	6010	5.0	0.5	<0.5		11-10-95

Comments:

aliquots diluted (1:10) to reduce acetate matrix interferences

TCLP ANALYSIS (SW-846 1311)
SAMPLE RESULTS

Client Sample ID: S951004H14EM	**LAL Sample ID: L5636-2**
LAL Batch ID: 1018 nmE	**Matrix: solid waste → TCLP EXTRACT**

Constituent	Method of Analysis	Regulatory Limit (mg/L)	Reporting Limit (mg/L)	Concentration (mg/L)	Data Qualifier	Date Analyzed
Arsenic	6010	5.0	1.0	<1.0		11-10-95
Barium	6010	100	10	<10		11-10-95
Cadmium	6010	1.0	0.1	<0.1		11-10-95
Chromium	6010	5.0	0.5	<0.5		11-10-95
Lead	6010	5.0	1.0	<1.0		11-10-95
Mercury	7470	0.2	0.02	<0.02		11-07-95
Selenium	6010	1.0	0.1	<0.1		11-06-95
Silver	6010	5.0	0.5	<0.5		11-10-95

Comments:

aliquots diluted (1:10) to reduce acetate matrix interferences

TCLP Analysis (SW-846 1311)
QC DATA SUMMARY

Client Sample ID: S951004H14WM	LAL Sample ID: L5636-1
LAL Batch ID: 1018 nmE	

Constituent	QC Sample Analyses				
	Method Blank (mg/L)	Duplicate Precision (% RPD)	Matrix Spike Recovery (%)	Data Qualifier	Date Analyzed
Arsenic	<1.0	b	114		11-10-95
Barium	<10	b	104		11-10-95
Cadmium	<0.1	b	94		11-10-95
Chromium	<0.5	b	106		11-10-95
Lead	<1.0	b	118		11-10-95
Mercury	<0.02	b	90		11-07-95
Selenium	<0.1	b	102		11-06-95
Silver	<0.5	b	105		11-10-95

"b" - The RPD cannot be computed, because the sample or the duplicate concentration was below the Reporting Detection Limit.

Comments:

TCLP METALS QC DATA SUMMARY

For Laboratory Control Sample Recovery Data Results

LAL Batch ID(s): 1018 nmE

Constituent	Client Sample ID	LAL Sample ID	Date Analyzed	QC Sample Analyses			
				Laboratory Control Sample Result (mg/L)	True Value (mg/L)	(%) Recovery	Data Qualifier
Arsenic	NA	LCSL1018nmE	11-10-95	5.526	5.0	111	
Barium	NA	LCSL1018nmE	11-10-95	102.7	100	103	
Cadmium	NA	LCSL1018nmE	11-10-95	0.980	1.0	98	
Chromium	NA	LCSL1018nmE	11-10-95	5.321	5.0	106	
Lead	NA	LCSL1018nmE	11-10-95	5.983	5.0	120	
Mercury	NA	LCSL1018nmE	11-07-95	0.1800	0.20	90	•
Selenium	NA	LCSL1018nmE	11-06-95	1.031	1.0	103	
Silver	NA	LCSL1018nmE	11-10-95	5.244	5.0	105	

Comments:

EPA METHOD 8270 TCLP (Semivolatile Organics)

SAMPLE RESULTS FORMS AND QC SUMMARIES

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE ORGANICS BY GC/MS
8270 SEMI-VOLATILES

Client Sample ID:	S951004H14WM	LAL Sample ID:	L5636-1
Date Collected:	04-OCT-95	Date Received:	18-OCT-95
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
Matrix:	TCLP Extr	Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	87	31-110
Phenol-d5	96	27-111
Nitrobenzene-d5	88	40-114
2-Fluorobiphenyl	91	41-111
2,4,6-Tribromophenol	133	34-147
Terphenyl-d14	106	33-141

CONSTITUENT	RESULT mg/L	PRACTICAL QUANTITATION LIMIT mg/L	REGULATORY LIMIT mg/L	DATA QUALIFIER S
1,4-Dichlorobenzene	<0.10	0.10	7.5	
2-Methylphenol	<0.10	0.10	200	
Hexachloroethane	<0.10	0.10	3.0	
Nitrobenzene	<0.10	0.10	2.0	
Hexachlorobutadiene	<0.10	0.10	0.50	
2,4,6-Trichlorophenol	<0.10	0.10	2.0	
2,4,5-Trichlorophenol	<0.10	0.10	400	
2,4-Dinitrotoluene	<0.10	0.10	0.13	
Hexachlorobenzene	<0.10	0.10	0.13	
Pentachlorophenol	<0.50	0.50	100	
Pyridine	<0.50	0.50	5.0	
3 & 4 -Methylphenol	<0.20	0.20	200	

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE ORGANICS BY GC/MS
8270 SEMI-VOLATILES

Client Sample ID:	S951004H14EM	LAL Sample ID:	L5636-2
Date Collected:	04-OCT-95	Date Received:	18-OCT-95
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
Matrix:	TCLP Extr	Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	71	31-110
Phenol-d5	75	27-111
Nitrobenzene-d5	72	40-114
2-Fluorobiphenyl	72	41-111
2,4,6-Tribromophenol	111	34-147
Terphenyl-d14	100	33-141

CONSTITUENT	RESULT mg/L	PRACTICAL QUANTITATION LIMIT mg/L	REGULATORY LIMIT mg/L	DATA QUALIFIER(S)
1,4-Dichlorobenzene	<0.10	0.10	7.5	
2-Methylphenol	<0.10	0.10	200	
Hexachloroethane	<0.10	0.10	3.0	
Nitrobenzene	<0.10	0.10	2.0	
Hexachlorobutadiene	<0.10	0.10	0.50	
2,4,6-Trichlorophenol	<0.10	0.10	2.0	
2,4,5-Trichlorophenol	<0.10	0.10	400	
2,4-Dinitrotoluene	<0.10	0.10	0.13	
Hexachlorobenzene	<0.10	0.10	0.13	
Pentachlorophenol	<0.50	0.50	100	
Pyridine	<0.50	0.50	5.0	
3 & 4 -Methylphenol	<0.20	0.20	200	

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE ORGANICS BY GC/MS

Client Sample ID:	TCLP MB - MB	LAL Sample ID:	29248MB
Date Collected:	N/A	Date Received:	N/A
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
		Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)

		QC Limits
2-Fluorophenol	63	31-110
Phenol-d5	70	27-111
Nitrobenzene-d5	64	40-114
2-Fluorobiphenyl	69	41-111
2,4,6-Tribromophenol	125	34-147
Terphenyl-d14	101	33-141

CONSTITUENT	RESULT mg/L	PRACTICAL QUANTITATION LIMIT mg/L	REGULATORY LIMIT mg/L	DATA QUALIFIER
1,4-Dichlorobenzene	<0.10	0.10	7.5	
2-Methylphenol	<0.10	0.10	200	
Hexachloroethane	<0.10	0.10	3.0	
Nitrobenzene	<0.10	0.10	2.0	
Hexachlorobutadiene	<0.10	0.10	0.50	
2,4,6-Trichlorophenol	<0.10	0.10	2.0	
2,4,5-Trichlorophenol	<0.10	0.10	400	
2,4-Dinitrotoluene	<0.10	0.10	0.13	
Hexachlorobenzene	<0.10	0.10	0.13	
Pentachlorophenol	<0.50	0.50	100	
Pyridine	<0.50	0.50	5.0	
3 & 4 -Methylphenol	<0.20	0.20	200	

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE ORGANICS BY GC/MS

Client Sample ID:	S951004H14WM	LAL Sample ID:	29248MS
Date Collected:	04-OCT-95	Date Received:	18-OCT-95
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
		Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	81	31-110
Phenol-d5	91	27-111
Nitrobenzene-d5	89	40-114
2-Fluorobiphenyl	89	41-111
2,4,6-Tribromophenol	141	34-147
Terphenyl-d14	106	33-141

CONSTITUENT	RESULT mg/L	PRACTICAL QUANTITATION LIMIT mg/L	REGULATORY LIMIT mg/L	DATA QUALIFIERS
1,4-Dichlorobenzene	0.58	0.10	7.5	
2-Methylphenol	1.3	0.10	200	
Hexachloroethane	0.49	0.10	3.0	
Nitrobenzene	0.87	0.10	2.0	
Hexachlorobutadiene	0.47	0.10	0.50	
2,4,6-Trichlorophenol	1.4	0.10	2.0	
2,4,5-Trichlorophenol	1.5	0.10	400	
2,4-Dinitrotoluene	1.1	0.10	0.13	
Hexachlorobenzene	0.88	0.10	0.13	
Pentachlorophenol	1.5	0.50	100	
Pyridine	<0.50	0.50	5.0	
3 & 4 -Methylphenol	3.0	0.20	200	E

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE ORGANICS BY GC/MS

Client Sample ID:	S951004H14WM	LAL Sample ID:	29248MSD
Date Collected:	04-OCT-95	Date Received:	18-OCT-95
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
		Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	83	31-110
Phenol-d5	91	27-111
Nitrobenzene-d5	91	40-114
2-Fluorobiphenyl	90	41-111
2,4,6-Tribromophenol	131	24-147
Terphenyl-d14	104	33-141

CONSTITUENT	RESULT mg/L	PRACTICAL QUANTITATION LIMIT mg/L	REGULATORY LIMIT mg/L	DATA QUALIFIERS
1,4-Dichlorobenzene	0.60	0.10	7.5	
2-Methylphenol	1.3	0.10	200	
Hexachloroethane	0.52	0.10	3.0	
Nitrobenzene	0.86	0.10	2.0	
Hexachlorobutadiene	0.51	0.10	0.50	
2,4,6-Trichlorophenol	1.4	0.10	2.0	
2,4,5-Trichlorophenol	1.2	0.10	400	
2,4-Dinitrotoluene	1.1	0.10	0.13	
Hexachlorobenzene	0.79	0.10	0.13	
Pentachlorophenol	1.4	0.50	100	
Pyridine	<0.50	0.50	5.0	
3 & 4 -Methylphenol	3.0	0.20	200	E

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE ORGANICS BY GC/MS

Client Sample ID:	TCLP MB - LCS	LAL Sample ID:	29248LCS
Date Collected:	N/A	Date Received:	N/A
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
		Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	59	31-110
Phenol-d5	69	27-111
Nitrobenzene-d5	69	40-114
2-Fluorobiphenyl	80	41-111
2,4,6-Tribromophenol	139	34-147
Terphenyl-d14	102	33-141

CONSTITUENT	RESULT mg/L	PRACTICAL QUANTITATION LIMIT mg/L	REGULATORY LIMIT mg/L	DATA QUALIFIER(S)
1,4-Dichlorobenzene	0.42	0.10	7.5	
2-Methylphenol	1.0	0.10	200	
Hexachloroethane	0.35	0.10	3.0	
Nitrobenzene	0.64	0.10	2.0	
Hexachlorobutadiene	0.34	0.10	0.50	
2,4,6-Trichlorophenol	1.3	0.10	2.0	
2,4,5-Trichlorophenol	1.4	0.10	400	
2,4-Dinitrotoluene	1.1	0.10	0.13	
Hexachlorobenzene	0.82	0.10	0.13	
Pentachlorophenol	1.4	0.50	100	
Pyridine	<0.50	0.50	5.0	
3 & 4 -Methylphenol	2.5	0.20	200	E

LOCKHEED ANALYTICAL SERVICES

MATRIX SPIKE DATA SUMMARY
SEMI-VOLATILE ORGANICS BY GC/MS

Client Sample ID:	S951004H14WM	LAL Sample ID:	29248MS
Date Collected:	04-OCT-95	Date Received:	18-OCT-95
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
		Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	81	31-110
Phenol-d5	91	27-111
Nitrobenzene-d5	89	40-114
2-Fluorobiphenyl	89	41-111
2,4,6-Tribromophenol	141	34-147
Terphenyl-d14	106	33-141

Constituent	Spike Added mg/L	Sample Concentration mg/L	Matrix Spike Concentration mg/L	% Recovery	QC Limits % Recovery
1,4-Dichlorobenzene	1.00	0.000	0.575	58	18-110
2-Methylphenol	1.50	0.000	1.34	89	46-110
Hexachloroethane	1.00	0.000	0.492	49	18-110
Nitrobenzene	1.00	0.000	0.868	87	20-144
Hexachlorobutadiene	1.00	0.000	0.465	47	12-110
2,4,6-Trichlorophenol	1.50	0.000	1.38	92	48-112
2,4,5-Trichlorophenol	1.50	0.000	1.49	99	27-134
2,4-Dinitrotoluene	1.00	0.000	1.10	110	42-126
Hexachlorobenzene	1.00	0.000	0.879	88	52-124
Pentachlorophenol	1.50	0.000	1.51	101	10-163
Pyridine	1.00	0.000	0.443	44	10-120
3 & 4 -Methylphenol	3.00	0.000	2.96	99	41-110

LOCKHEED ANALYTICAL SERVICES

MATRIX SPIKE DUPLICATE DATA SUMMARY
SEMI-VOLATILE ORGANICS BY GC/MS

Client Sample ID:	S951004H14WM	LAL Sample ID:	29248MSD
Date Collected:	04-OCT-95	Date Received:	18-OCT-95
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
		Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	83	31-110
Phenol-d5	91	27-111
Nitrobenzene-d5	91	40-114
2-Fluorobiphenyl	90	41-111
2,4,6-Tribromophenol	131	34-147
Terphenyl-d14	104	33-141

Constituent	Spike Added mg/L	Matrix Spike Duplicate Concentration mg/L	% Recovery	RPD	QC Limits RPD	QC Limits % Recovery
1,4-Dichlorobenzene	1.00	0.601	60	4	50	1[illegible]-110
2-Methylphenol	1.50	1.34	89	0	50	46-110
Hexachloroethane	1.00	0.519	52	5	50	18-110
Nitrobenzene	1.00	0.862	86	1	50	20-144
Hexachlorobutadiene	1.00	0.506	51	8	50	12-110
2,4,6-Trichlorophenol	1.50	1.40	93	1	50	48-112
2,4,5-Trichlorophenol	1.50	1.23	82	19	50	27-134
2,4-Dinitrotoluene	1.00	1.05	105	5	50	42-126
Hexachlorobenzene	1.00	0.785	79	11	50	52-124
Pentachlorophenol	1.50	1.36	91	11	50	10-163
Pyridine	1.00	0.243	24	58*	50	10-120
3 & 4 -Methylphenol	3.00	3.02	101	2	50	41-110

LOCKHEED ANALYTICAL SERVICES

LCS DATA SUMMARY
SEMI-VOLATILE ORGANICS BY GC/MS

Client Sample ID:	TCLP MB - LCS	LAL Sample ID:	29248LCS
Date Collected:	N/A	Date Received:	N/A
Date Analyzed:	18-NOV-95	Date Extracted:	25-OCT-95
		Analytical Batch ID:	111895-8270-K
QC Group:	8270 SEMI-VOLATILES_29248	Analytical Dilution:	1
		Preparation Dilution:	10.0

SURROGATE RECOVERY (%)		
		QC Limits
2-Fluorophenol	59	31-110
Phenol-d5	69	27-111
Nitrobenzene-d5	69	40-114
2-Fluorobiphenyl	80	41-111
2,4,6-Tribromophenol	139	34-147
Terphenyl-d14	102	33-141

Constituent	Spike Added mg/L	LCS Concentration mg/L	LCS % Recovery	QC Limits
1,4-Dichlorobenzene	1.00	0.415	42	18-110
2-Methylphenol	1.50	1.00	67	46-110
Hexachloroethane	1.00	0.349	35	18-110
Nitrobenzene	1.00	0.643	64	20-144
Hexachlorobutadiene	1.00	0.342	34	12-110
2,4,6-Trichlorophenol	1.50	1.29	86	48-112
2,4,5-Trichlorophenol	1.50	1.41	94	27-134
2,4-Dinitrotoluene	1.00	1.07	107	42-126
Hexachlorobenzene	1.00	0.824	82	52-124
Pentachlorophenol	1.50	1.43	95	10-163
Pyridine	1.00	0.389	39	10-120
3 & 4 -Methylphenol	3.00	2.45	82	41-110

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE INTERNAL STANDARD

AREA AND RT SUMMARY

Instrument ID: hpk

Date/Time Analyzed: 18-NOV-95 09:23

LAL Batch ID: 111895-8270-K

		IS1 Area	RT	IS2 Area	RT	IS3 Area	RT
12 HOUR STD		418956	5.989	1530767	7.288	757351	9.784
UPPER LIMIT		837912	6.489	3061534	7.788	1514702	10.284
LOWER LIMIT		209478	5.489	765384	6.788	378676	9.284
Client Sample ID	LAL Sample ID						
TCLP MB - MB	29248MB	340751	5.989	1234732	7.283	638663	9.789
Method Blank	30125MB	363070	5.998	1312497	7.291	724034	9.787
Method Blank	30226MB	344936	5.998	1223682	7.292	687813	9.788
Lab Ctrl Sample	30226LCS	402208	5.999	1413437	7.294	766624	9.792
TCLP MB - LCS	29248LCS	411199	6.000	1408669	7.296	764587	9.796
Lab Ctrl Sample	30125LCS	424673	5.998	1466394	7.293	778926	9.791
Lab Ctrl Sample Dup	30125LCSDUP	418844	5.998	1420228	7.292	774793	9.800
S951004H14WM	L5636-1	344402	6.000	1210883	7.294	662145	9.791
S951004H14WM	29248MS	384671	6.001	1293846	7.297	715400	9.798
S951004H14WM	29248MSD	442329	6.001	1484839	7.298	847502	9.799
S951004H14EM	L5636-2	377064	6.000	1325962	7.304	717047	9.801
N1-EB1-232	L5825-17	369429	6.007	1317225	7.301	733267	9.798
N1-EB1-231	L5825-15	358376	6.007	1154814	7.301	705012	9.798
N3-EB1-247	L5818-13	403066	6.007	1457174	7.301	819906	9.799

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = -50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

IS1 = 1,4-DICHLOROBENZENE-D4
IS2 = NAPHTHALENE-D8
IS3 = ACENAPHTHENE-D10

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE INTERNAL STANDARD

AREA AND RT SUMMARY

Instrument ID: hpk

Date/Time Analyzed: 18-NOV-95 09:23

LAL Batch ID: 111895-8270-K

		IS4 Area	RT	IS5 Area	RT	IS6 Area	RT
12 HOUR STD		959550	12.388	700488	17.496	607263	20.097
UPPER LIMIT		1919100	12.888	1400976	17.996	1214526	20.597
LOWER LIMIT		479775	11.888	350244	16.996	303632	19.597
Client Sample ID	LAL Sample ID						
P110895-EF	L5817-7	1029613	12.399	755717	17.498	731748	20.102
N15-EB1-265	L5806-7	1141276	12.395	781524	17.494	841824	20.109
TBAS02(71912)	L5820-4	1187009	12.398	798506	17.497	851647	20.102
TBAS02(71912)	30226MS	1057838	12.404	727660	17.495	762118	20.100
TBAS02(71912)	30226MSD	1138997	12.397	712952	17.500	727697	20.105

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = -50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

IS4 = PHENANTHRENE-D10
IS5 = CHRYSENE-D12
IS6 = PERYLENE-D12

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE INTERNAL STANDARD
AREA AND RT SUMMARY

Instrument ID: hpk

Date/Time Analyzed: 18-NOV-95 09:23

LAL Batch ID: 111895-8270-K

		IS4 Area	RT	IS5 Area	RT	IS6 Area	RT
12 HOUR STD		959550	12.388	700488	17.496	607263	20.097
UPPER LIMIT		1919100	12.888	1400976	17.996	1214526	20.597
LOWER LIMIT		479775	11.888	350244	16.996	303632	19.597
Client Sample ID	LAL Sample ID						
TCLP MB - MB	29248MB	862131	12.384	604215	17.484	609046	20.100
Method Blank	30125MB	962115	12.391	649163	17.489	650553	20.094
Method Blank	30226MB	906849	12.393	598012	17.492	642582	20.097
Lab Ctrl Sample	30226LCS	968425	12.391	687613	17.492	739142	20.098
TCLP MB - LCS	29248LCS	990667	12.395	687790	17.495	719020	20.101
Lab Ctrl Sample	30125LCS	963036	12.399	650852	17.500	695831	20.104
Lab Ctrl Sample Dup	30125LCSDUP	977363	12.399	684124	17.499	732918	20.104
S951004H14WM	L5636-1	904182	12.397	614023	17.496	640079	20.102
S951004H14WM	29248MS	924488	12.397	639239	17.499	663811	20.105
S951004H14WM	29248MSD	1089091	12.398	680248	17.500	710615	20.106
S951004H14EM	L5636-2	966585	12.396	622461	17.496	603930	20.103
N1-EB1-232	L5825-17	998543	12.403	698932	17.502	730739	20.107
N1-EB1-231	L5825-15	963748	12.393	680785	17.501	696305	20.105
N3-EB1-247	L5818-13	1101275	12.394	789275	17.502	855451	20.107

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = -50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

IS4 = PHENANTHRENE-D10
IS5 = CHRYSENE-D12
IS6 = PERYLENE-D12

LOCKHEED ANALYTICAL SERVICES

SEMI-VOLATILE INTERNAL STANDARD
AREA AND RT SUMMARY

Instrument ID: hpk

Date/Time Analyzed: 18-NOV-95 09:23

LAL Batch ID: 111895-8270-K

		IS1 Area	RT	IS2 Area	RT	IS3 Area	RT
12 HOUR STD		418956	5.989	1530767	7.288	757351	9.784
UPPER LIMIT		837912	6.489	3061534	7.788	1514702	10.284
LOWER LIMIT		209478	5.489	765384	6.788	378676	9.284
Client Sample ID	LAL Sample ID						
P110895-EF	L5817-7	369116	6.000	1399056	7.296	764405	9.794
N15-EB1-265	L5806-7	419540	6.008	1488629	7.302	837234	9.800
TBAS02(71912)	L5820-4	533365	6.010	1799544	7.305	922031	9.802
TBAS02(71912)	30226MS	464170	6.010	1542775	7.305	822827	9.804
TBAS02(71912)	30226MSD	524770	6.010	1732749	7.306	929026	9.806

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = -50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

IS1 = 1,4-DICHLOROBENZENE-D4
IS2 = NAPHTHALENE-D8
IS3 = ACENAPHTHENE-D10

RUN LOGS/EXTRACTION SHEETS

LOCKHEED ANALYTICAL LAB REVIEWED BY _____ INSTRUMENT ID # GC/MS K PAGE # 000049

ANALYST	DATE	TIME OF INJ.	LAL #	DESCRIPTION/CLIENT	SOL #	MATRIX/DIL	DATA FILE	BATCH ID	METHOD FILE	TAPE #	DR	COMMENTS
[illegible]	11/17	0711		8270 DETPI SL	[illegible]		[illegible]	[illegible]	[illegible]			[illegible] 8270
		0810		8270 SSTD050	[illegible]		[illegible]		[illegible]		DONT	
		0856		8270 SSTD050	[illegible]		[illegible]					[illegible] 8270
		1139	15753 20	M114SB001 (M9990)		[illegible]	[illegible]					
		1205	30043,M11	110695 MB			[illegible]					
		1238	30043CCS	110695 CCS			[illegible]					
		1311	15750-19	M114SB001 (M9991)			[illegible]					
		1324	15753 18	M114SB001 (M9992)			[illegible]					
		1402	15753 17	M114SB001 (M9993)			[illegible]					
		1451	15753 16	M114SB001 (M9994)			[illegible]					
		1524	15767-16	M114SB002 (M9987)			[illegible]					
		1557	30043,M1				[illegible]					
		1630	30043,M50				[illegible]					
		1703	15767 9	M114SB002 (M0374)			[illegible]					
		1737	15767-10	M114SB002 (M0375)			[illegible]					
		1810	15767-11	M114SB002 (M0376)			[illegible]					
		1843	15767-12	M114SB002 (M0377)			[illegible]					
		1916	15767-13	M114SB002 (M0378)			[illegible]					
		1949	15767-14	M114SB002 (M9989)			[illegible]					
		2022	15767-15	M114SB002 (M9988)			[illegible]					
				Method		—	[illegible]				DONT	
				Method		—	[illegible]				DONT	
				Method		—	[illegible]				DONT	
[illegible]	11/17	0914		8270 DETPI SL	[illegible]		[illegible]	[illegible]	[illegible]			[illegible] 8270
		0923		8270 SSTD050	[illegible]		[illegible]		[illegible]			[illegible] 8270
		1002	29248MB			[illegible]	[illegible]				R	
		1028	30125MB			[illegible]	[illegible]				R	
		1101	30226MB			[illegible]	[illegible]				R	
		1134	30226CCS			[illegible]	[illegible]				R	
		1207	29248CCS			[illegible]	[illegible]				R	
		1244	30125CCS			[illegible]	[illegible]				R	

LOCKHEED ANALYTICAL LAB REVIEWED BY _____ INSTRUMENT ID # GCMS K

ANALYST	DATE	TIME OF INJ	LAL #	DESCRIPTION/CLIENT	BOX #	MATRIX/DIL	DATA FILE	BATCH ID	METHOD FILE	TAPE #	DR	COMMENTS
N	11/18	1314	34735CCSD	UP			5060100 9	Kw1895	K1270ctlp		R	
		1317	15636-1				5060100 10				R	
		1420	29286MS				5060100 11				R	
		1453	29248MSD				5060100 12				R	
		1526	15636-2				5060100 13				R	
		1600	15625-17				5060100 14				R	
		1633	15723-15				5060100 15				R	
		1706	15818-13				5060100 16				R	
		1739	15817-7				5060100 17				R	
		1813	15806-7				5060100 18				R	
		1845	15826-4				5060100 19				R	
		1919	30226MS				5060100 20				R	
		1952	30226MSD				5060100 21				R	
				Acetone			5060100 22				DNR	
				Hexane			5060100 23				DNR	
N	11/20	0925		3Ctc DF7PP 50	552.44		5060001	Kw2695	K1270ctlp			Pb 270
		0955		2Ctc 55TPD50			5060002		K1270ctlp			Pb 270
		1012	29680MS	110245MS			5060107				R	
		1039	29680CCS	116475CCS			5060104				R	
		1112	29248CCS				5060105				R	
		1145	15622-42	T.U.001-042-S-11			5060106				R	
		1218	29680MS				5060107				R	
		1252	29680MSD				5060108				R	
		1324	15633-2	~~FIB-mod~~ LAL 4D-C		1:5	5060109				R	Dark black extract
		1358	15622-70	T.U.001-070-S-18			5060110				R	
		1431	15622-18	T.U.001-018-S-5			5060111				R	
		1505	15622-2	T.U.001-002-S-1			5060112				R	
		1537	15622-6	T.U.001-006-S-2			5060113				R	
		1610	15622-54	T.U.001-054-S-14			5060114				R	
		1643	15622-46	T.U.001-046-S-12			5060115				R	
		1717	15622-50	T.U.001-050-S-13			5060116				R	

LOCKHEED ANALYTICAL LAB REVIEWED BY _____ INSTRUMENT ID # GCMS K PAGE # 000051

ANALYST	DATE	TIME OF INJ.	LAL #	DESCRIPTION/CLIENT	SOIL #	MATRIX/AM	DATA FILE	BATCH ID	METHOD FILE	TAPE #	DR	COMMENTS
[illegible]	11/20	1250	15672-38	T.0.001-038-S 10	[illegible]	[illegible]	117 010 17	[illegible]	[illegible]		R	
		1873	15672-26	T.0.001-026-S 7			118 010 18				R	
		1886	15672-34	T.0.001-034-S 9			119 010 19				R	
		1929	15672-14	T.0.001-014-S 4			120 010 20				R	
		2002	15672-22	T.0.001-022-S 6			121 010 21				R	
		2015	15672-66	T.0.001-066 S 16			122 010 22				R	
		2068	15673-2	CAL-SED-C		1:2	123 010 23				R	
				McCl3			124 010 24				DNR	
				[illegible]			125 010 25				DNR	
				McCl			126 010 26				DNR	
		2322		[illegible]	[illegible]		127 010 27				DNR	
[illegible]	11/21	1253		[illegible] DETOP 50	[illegible]		501 010 01	[illegible]	[illegible]			[illegible]
		1302		[illegible] SSTOP50	[illegible]		502 010 02		[illegible]			[illegible]
		1342	30225MS			[illegible]	503 010 03					
		1405	29336MS			[illegible]	504 010 04					
		1441	29336CS				505 010 05					
		1514	29336CS2X	P			506 010 06					
		1547	30225CS			[illegible]	507 010 07					
		1621	15672-58			[illegible]	508 010 08					
		1654	15672-62				509 010 09					
		1727	15672-10				510 010 10					
		1800	15672-30				511 010 11					
		1833	15672-74				512 010 12					
		1906	CS220-1			[illegible]	513 010 13					
		1940	30225MS				514 010 14					
		2014	30225MSD				515 010 15					
		2046	CS661-22			[illegible]	516 010 16					
		2120	CS661-26				517 010 17					
		2153	15672-78				518 010 18					
		2225	15672-84				519 010 19					
		2258	15672-90				520 010 20					

LOCKHEED ANALYTICAL LAB REVIEWED BY _____ INSTRUMENT ID # GCMS K PAGE # 000052

ANALYST	DATE	TIME OF INJ.	LAL #	DESCRIPTION/CLIENT	SOL #	MATRIX/DIL	DATA FILE	BATCH ID	METHOD FILE	TAPE #	DR	COMMENTS
B	4/21	2331	L5661-19				S21010 21	Rnu 2175	K2704.tp			
	4/22	0005	L5661-20				S22010 22					
		0038	L5661-21				S23010 23					
				Hexane			S24010 24				DNK	
	4/24/95	1323		BLTU DETRC 50			S01C0001	Rnu 2195	K2704.tp			
		1353		PLR SSTRO50			S02C0002		K2704.tp		DNK	
		1409		STU SSTRO50			S03C0003				DNK	
		1502		BLTU DETRC 50			S04C0004		K2704.tp			Pass 8270
		1514		8270 GSTRO50			S05C0005		K2704.tp			Pass 8270
		1555	302LMB	LLWQCM			S06C0006					
		1622	302LCS	LLWQCS			S07C0007					
		1655	L5661-19				S08C0008					
		1722	L5662-78				S09C0009					
		1801	L5662-89				S10C0010					
		1834	L5662-90				S11C0011					
		1907	L5788-91				S12C0012					
		1941	302LMS				S13C0013					
		2014	302LMSD				S14C0014					
		2042	L5788-77				S15C0015					
		2120	L5788-81				S16C0016					
		2153	L5788-14				S17C0017					
		2226	L5788-21				S18C0018					
		2300	L5788-49				S19C0019					
		2333	L5788-6				S20C0020					
	4/22	0006	L5788-28				S21C0021					
		0040	L5788-35				S22C0022					
		0113	L5788-42				S23C0023					
		0146	L5788-56				S24C0024					
		0219	L5788-63				S25C0025					
		0252	L5788-70				S26C0026					
		0325		MeCl2			S27C0027					

LOCKHEED ANALYTICAL LAB REVIEWED BY _____ INSTRUMENT ID # GC/MS K PAGE # 000053

ANALYST	DATE	TIME OF INJ.	LAL #	DESCRIPTION/CLIENT	SOL #	MATRIX/DR	DATA FILE	BATCH ID	METHOD FILE	TAPE #	DR	COMMENTS
AL	11/27/95	1147		8270 DETPP SC	[illegible]		501010001	K-002595	K8270LHT			Pass 8270
		1156		8270 SSTDOSC	[illegible]		[illegible]		K8270LHP			Pass 8270
		1237	30342MB				502010003				R	
		1307	30342CCS				504010004				R	
		1339	CS826-10				505010005				R	
		1413	30392MB				506010006				R	
		1445	30392MSD				507010007				R	
		1519	CS826-10				508010008				R	
		1552	CS826-11				509010009				R	
		1625	CS826-12				510010010				R	
		1658	CS826-13				511010011				R	
		1731	CS826-14				512010012				R	
		1804	CS826-15				513010013				R	
		1837	CS826-17				514010014				R	
		1911	CS826-18				515010015				R	
		1944	CS826-19				516010016				R	
		2017	CS826-20				517010017				R	
		2050	CS826-21				518010018				R	
		2124		Method			519010019				DNR	
		2200		Blank			520010020				DNR	
AL	11/27/95	1112		8270 DETPP SC	[illegible]		501010001	K-002795	K8270LHT			Pass 8270
		1121		8270 SSTDOSC	[illegible]		502010002		K8270LHP			Pass 8270
		1200	30354MB	11/29/95 MB			503010003				R	
		1226	30352MB	11/29/95 MB			504010004				R	
		1259	30352CCS	11/29/95 CCS			505010005				R	
		1333	30354CCS	11/29/95 CCS			506010006				R	
		1406	CS826-17				507010007				R	
		1439	CS826-18				508010008				R	
		1513	CS826-19				509010009				R	
		1546	CS826-20				510010010				R	
		1619	CS826-21				511010011				R	

LOCKHEED ANALYTICAL LAB REVIEWED BY _____ INSTRUMENT ID # GCMS K PAGE # 000054

ANALYST	DATE	TIME OF INJ.	LAL #	DESCRIPTION/CLIENT	SOL #	MATRIX/ADL	DATA FILE	BATCH ID	METHOD FILE	TAPE #	DR	COMMENTS
AL	11/7	1652	30554MS		[illegible]	Soil	S120012	Know2745	K8270ALP		R	
		1726	30554MSD				S13 010 13				R	
		1759	15838-39				S14 010 14				R	
		1832	15838-40				S15 010 15				R	
		1905	15838-41				S16 010 16				R	
		1938	15838-42				S17 010 17				R	
		2012	15837-43				S18 010 18				R	
		2045	15846-82				S19 010 19				R	
		2118	15846-83				S20 010 20				R	
				McCl		—	S21 010 21				DMR	
				Blank		—	S22 010 22				DMR	
AL	11/23	1127		8270 DETECT SO	[illegible]		S010001	Know2845	K8270ALT			Blank
		1137		8270 SS70056	[illegible]		S020002		K8270ALP		DMR	
		1244		1170 SS70056	[illegible]		S030003					Blank
		1348	30432MS			Soil	S04 010 04				R	
		1421	30432MSD				S05 010 05				R	
		1455	30438MSD				S06 010 06				R	
		1528	15837-12				S07 010 07				R	
		1601	15837-13				S08 010 08				R	
		1634	15837-14				S09 010 09				R	
		1707	15837-15				S10 010 10				R	
		1740	15837-16				S11 010 11				R	
		1813	15837-17				S12 010 12				R	
		1846	15837-18				S13 010 13				R	
		1920	15837-19				S14 010 14				R	
		1953	15837-20				S15 010 15				R	
		2026	15837-21				S16 010 16				R	
		2059		8270 McCl Soil Blk	[illegible]	—	S17 010 17				DMR	Blk Check only
				McCl		—	S18 010 18				DMR	

LOCKHEED ANALYTICAL LAB REVIEWED BY _____ INSTRUMENT ID # GC/MS K PAGE

ANALYST	DATE	TIME OF INJ.	LAL #	DESCRIPTION/CLIENT	SCH #	MATRIX/DIL	DATA FILE	BATCH ID	METHOD FILE	TAPE #	DR	COMMENTS
[illegible]	11/27/95	1016		[illegible] DETECT SC	[illegible]		SU1 0101	Knov2495	KNTright			[illegible]
		1025		[illegible] SCTDUSO	[illegible]		SU2 0102		KNTright		DIVE	
		1110		[illegible] SCTDUSO	[illegible]		SU3 0103					[illegible]
		1148	[illegible]		[illegible]	Hz-	SU4 0104					
		1216	[illegible]				SU5 0105					
		1247	[illegible]				SU6 0106					
		1320	LS841-24	[illegible] 0704			SU7 0107					
		1354	LS838-16				SU8 0108					
		1427	LS838-18				SU9 0109					
		1501	LS838-19				SU10 0110					
		1535	LS846-37				SU11 0111					
		1608	LS846-39				SU12 0112					
		1640	LS846-41				SU13 0113					
		1713	LS846-43				SU14 0114					
		1744	LS846-44				SU15 0115					
		1819	LS848-9				SU16 0116					
		1853	LS848-11				SU17 0117					
		1926	LS848-13				SU18 0118					
		1959	LS857-22				SU19 0119					
		2032	LS857-24				SU20 0120					
		2106	LS857-26				SU21 0121					
		2139	LS857-28				SU22 0122					
		2214	LS863-29				SU23 0123					
	11/28/95	0941		[illegible] DETECT SC	[illegible]		SU24 0124	Knov2495	KNTright			[illegible]
		0953		[illegible] SSTDUSO	[illegible]		SU25 0125		KNTright			[illegible]
		1033	30564MB		[illegible]	Hz-	SU26 0126					
		1059	30564LS				SU27 0127					
		1132	30564LS				SU28 0128					
		1206	LS874-12				SU29 0129					
		1234	LS838-18				SU30 0130					
		1313	LS838-19				SU31 0131					

Initial
Calibration
for GEMS-K

11/4/95

LOCKHEED ANALYTICAL LAB REVIEWED BY D. Gray 11/8/95 INSTRUMENT ID # GC-4 K PAGE # 000040

ANA LYST	DATE	TIME OF INJ.	LAL #	DESCRIPTION/CLIENT	BOX #	MATRIX/DIL	DATA FILE	BATCH ID	METHOD FILE	TAPE #	DR	COMMENTS
	11/06/95	1155		RCRA DETECT 50			501010 01	2-110695	KRCRA.MT	710		RCRA
				RCRA SSTD050			502010 02		KRCRA.mp		MIX	
				RCRA SSTD060			503010 03				DIL	Reg Cutoff
				RCRA SSTD120			504010 04				DIL	
				RCRA SSTD050			505010 05				DIL	
		1214		RCRA SSTD050			506010 06					
		1413		RCRA SSTD050			507010 07					
		1431		RCRA SSTD050			508010 08					RCRA SPK
		1504		RCRA SSTD120			509010 09					
		1538		RCRA SSTD160			510010 10					
		1620		RCRA DETECT 50			511010 11		KRCRA.MT			RCRA Recp
		1630		RCRA SSTD050			512010 12		KRCRA.mp			RCRA RCRA
		1706	29027MG	1029281MG			513010 13				R	
		1754	29027MGS	1-1292MGS			514010 14				R	
		1803	29027MGSD	1-1292MGSD			515010 15				PNR	
		1842	CS650-50	NI-MDSB-NI-131			516010 16				R	
		1916	29027MS				517010 17				R	
		1950	29027MSD				518010 18				R	
		2023	CS617-19	S-39-02-41			519010 19				R	
		2058	CS617-18	S-39-02-36			520010 20				R	
		2131	CS617-17	S-39-02-31			521010 21				R	
		2205	CS617-16	S-39-02-26			522010 22				R	
		2239	CS701-2	CSTD-001658			523010 23				I	
		2315	CS617-15	S-39-02-21			524010 24				R	
		2347	CS617-14	S-39-02-16.5			525010 25				R	
	11/07	0021	CS617-13	S-39-02-11			526010 26				R	
		0054	CS701-1	CSTD-001072			527010 27				R	
		0131	CS617-12	WB025-02-TA3-ST-R-0-S			528010 28				R	
		0202	CS617-12	S-39-02-6			529010 29				R	
		0236	CS617-11	S-13-01-16			530010 30				R	
		0310	CS617-10	S-13-01-11			531010 31				R	

TCLP

LOCKHEED ANALYTICAL SERVICES

TRACKING SHEET DATA REPORT (bs08)

EXTRACTION SHEET FOR: 8270 SEMI-VOLATILES Extraction

WORKSHEET NUMBER: 8270 SEMI-VOLATILES_29248

TCLP Matrix Spike

Continuous

HT = 10/24
DUE 11/

LAL #	QC TYPE	CLIENT ID	DATE COLLECTED	DATE RECEIVED/ CREATED	VOL/WT EXTR	SURR MLS	MS MLS	1ST COOK FINAL VOL MLS	TOTAL VOL ON GPC	APPROX VOL OFF GPC	2ND COOK FINAL VOL MLS	BROUGHT TO FINAL VOLUME OF	AMT GIVEN TO ANALYST
					EW 10-25-95			SW 11/6/95				SW 11/6/95	
L5636-1		S951004H14WM	04-OCT-95	18-OCT-95	100mL 1000mL	1ml		.5ml				1.0ml	1ml
L5636-2		S951004H14EM	04-OCT-95	18-OCT-95									
29248MB	MB	TCLP MB - MB		24-OCT-95									
29248LCS	LCS	TCLP MB - LCS		24-OCT-95			1ml						
29248MS L5636-1	MS	S951004H14WM	04-OCT-95	18-OCT-95									
29248MSD L5636-1	MSD	S951004H14WM	04-OCT-95	18-OCT-95									
~~SPIKELOT29248~~	~~SPIKELOT~~	~~Spike Lot Sample~~		~~24-OCT-95~~						DEB 10-24-95			

CONTINUOUS EXTRACTION
EXTRACTION STARTED : 10-25-95 EXTRACTION COMPLETED : 11-6-95

DATE & TIME STARTED (BN) : 10-25-95 9:00PM DATE & TIME COMPLETED (BN) : 10-26-95 3:00 P.M.

DATE & TIME STARTED (acid): 10-26-95 at 4:00P.M DATE & TIME COMPLETED (acid): 10-27-95 11:45 AM

QC BATCH# : 8270 SEMI-VOLATILES_29248 LOT #'S

SURR ID # : 0705-78-2 CONC: 100-150 ppb MECL2 : 35173

MS ID # : 0705-75-1 CONC: 100-150 ppb ACETONE: N/A NA2SO4 : J24734

SIGNED:

SIGNED:

SPIKED WITNESS:

SIGNED:

REVIEWED BY: Judith Lyons 11-0

NARRATIVE

EXTRACT COC: RECIEVED BY: DATE: 11-07

APPENDIX 5

Results of Voluntary Release Assessment Samples Collected at SWMU 001g

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #4	BORE #4	EQ BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72	
Sample Date:	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95
WID Sample Numbers:	RA-95-131	RA-95-132	RA-95-133	RA-95-134	RA-95-135	RA-95-137	RA-95-141	RA-95-143	RA-95-139
					RA-95-136	RA-95-138	RA-95-142	RA-95-144	RA-95-140
Analytes									
Leachable Metals (mg/L)									
Arsenic (As)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UB	0.1 UB	0.1 U	0.1 U
Barium (Ba)	0.34	1.0	0.43	0.41	0.57	0.74	0.44	0.72	0.21
Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Lead (Pb)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Leachable Volatiles (mg/L)									
1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
J	Estimated value
NA	Not Analyzed
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #4	BORE #4	FD BLANK
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72	
Sample Date:	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/4/95	10/5/95	10/4/95
WID Sample Numbers:	RA-95-145	RA-95-146	RA-95-147	RA-95-148	RA-95-149	RA-95-151	RA-95-153	RA-95-157	RA-95-155
					RA-95-150	RA-95-152	RA-95-154	RA-95-158	RA-95-156
Analytes									
Leachable Metals (mg/L)									
Arsenic (As)	0.2 UB	0.2 UB	0.2 UB	0.1 UB	0.2 UB	0.1 U	0.2 UB	0.2 UB	0.1 U
Barium (Ba)	0.49	0.46	0.29	0.33	0.68	0.69	0.75	0.89	0.037
Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006	0.005 U	0.005 U	0.005 U
Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Lead (Pb)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Mercury (Hg)	0.0001 U	0.0001 U	0.0002 U	0.0002 U	0.0002 U	0.0004	0.0002 U	0.0002 U	0.0002 U
Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Leachable Volatiles (mg/L)									
1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

B	Detected in the blank
FD BLANK	Field Blank
J	Estimated value
NA	Not Analyzed
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

WIPP Soil Samples
Data Review Form

Statement of Purpose:

To review laboratory data packages for soil samples collected at SWMUs, evaluate data package completeness, and compare analytical quality control data to program objectives.

Section 1: Data Package Identification

P.O. Number: 500101 - Report 27976 No. Of Samples In Package: 28
Sample Collection Date: 10/4/95 - 10/5/95 Sample Receipt Date: 10/9/95
Sample Report Date: 10/19/95 Analytical Parameters: TCLP - VOCs, Metals
Sample Numbers in Data Package: RA-95-131 (P0324881), RA-95-132 (P0324882), RA-95-133 (P0324883), RA-95-134 (P0324884), RA-95-135 (P0324885), RA-95-136 (P0324886), RA-95-137 (P0324887), RA-95-138 (P0324888), RA-95-139 (P0324889), RA-95-140 (P0324890), RA-95-141 (P0324891), RA-95-142 (P0324892), RA-95-143 (P0324893), RA-95-144 (P0324894), RA-95-145 (P0324895), RA-95-146 (P0324896), RA-95-147 (P0324897), RA-95-148 (P0324898), RA-95-149 (P0324899), RA-95-150 (P0324900), RA-95-151 (P0324901), RA-95-152 (P0324902), RA-95-153 (P0324903), RA-95-154 (P0324904), RA-95-155 (P0324905), RA-95-156 (P0324906), RA-95-157 (P0324907), RA-95-158 (P0324908)

Data Reviewer: Donald K. Wambold Date of Review: 1/9/96

Symbols used in the sections below are defined as follows:

X	Included: no problem	R	Resubmission
*	Included: problems noted	NR	Not Required
O	Not Included		

Section 2. Data Summary

Data for the above listed samples are:

____ Acceptable for use
X Acceptable for use with qualifications noted
____ Preliminary - pending action or verification
____ Unacceptable for use
____ To be reviewed by senior chemist

Reviewed by: _____ Date: _____

Section 3. Data Package Completeness Review

X	Chain of Custody/Request for Analysis
X	Laboratory Analysis Report
X	Holding Times
X[1]	Method Reporting Limits
X	Dilution Factors
X[2]	Quality Control Report

Section 4. QC Review (from Laboratory Quality Control Report)

Volatiles

X	Method Blank
O[3]	Leachate Blank
X	Surrogate Standard Recovery
NR[4]	Matrix Spike/Matrix Spike Duplicate Samples
X	Laboratory Control Sample
NR	Duplicate Sample

Metals

X	Method Blank
*[5]	Leachate Blank
O[6]	Matrix Spike/Matrix Spike Duplicate Samples
X	Laboratory Control Sample
NR	Duplicate Sample

Section 5. Calibration Data

Volatiles

O[7,8]	GC/MS Analysis Log
O[7,8]	GC/MS Initial Calibration Data
O[7,8]	GC/MS Continuing Calibration Data

Metals

X[7]	ICP Analysis Log
X[7]	ICP Initial Calibration Data
O[7,8]	ICP Continuing Calibration Data
X[7]	CVAA Analysis Log
X[7]	CVAA Initial Calibration Data
X[7]	CVAA Continuing Calibration Data

Section 6. Comments

1. The method reporting limits (MRLs) and sample results for 1,1,1-trichloroethane, ethyl benzene, chloroform, total xylenes, and thallium were not evaluated relative to the toxicity characteristic regulatory levels because limits have not been promulgated for these analytes.

2. The information provided in the quality control (QC) summary was not complete for all reported samples and could not be directly referenced to the sample results and/or analysis logs. The "supplemental information" section of the quality control summary provides analytical and extraction batch numbers which can be referenced to the appropriate QC samples in the QC summary. The laboratory relies on these batch references, which are stored in the laboratory information management system (LIMS), to relate the appropriate QC data to sample batches, and does not typically include the batch numbers or internal laboratory QC sample numbers on the analysis logs. Therefore, QC sample results generally cannot be traced to the raw analytical data.

3. A leachate blank analysis was not provided for the TCLP volatiles analyses in this package. Based on the laboratory's procedures, leachate blanks are performed once per twenty samples processed through the TCLP extraction procedure on each extraction apparatus. The leachate blank associated with the samples in this package may not be reported because it is reported in another package with the remaining samples in the extraction batch. There were not any detections of volatile compounds reported in the data package, and no common volatile laboratory contaminants or other volatile compounds were reported in the method blanks. Therefore, the potential for laboratory cross contamination of samples appeared to be low, and sample results were not qualified.

4. A matrix spike/matrix spike duplicate was not performed for the TCLP volatile analyses due to limited sample volume produced during the TCLP extraction.

5. The laboratory provided metal leachate blank sample results for extraction batch 362 which was considered representative of the extraction conditions for the WIPP samples in this data package. Specific sample associations for the blank were not included, therefore the representative blank was used to evaluate the WIPP sample results from both TCLP extraction batches in the case. Arsenic was detected at or above the MRL in the leachate blank sample. Arsenic results for samples RA-95-138, RA-95-142, RA-95-145, RA-95-146, RA-95-147, RA-95-148, RA-95-150, RA-95-154, and RA-95-158 were less than five times the blank concentration, and therefore were qualified as "UB" (not detected) due to blank contamination.

6. Matrix spike/matrix spike duplicate (MS/MSD) recoveries were not included in the QC summary for mercury analysis batch 38223 because the MS/MSD was not performed on a sample in this batch. Sufficient information was included in the raw data to evaluate the MS/MSD recoveries and determine that they were acceptable.

7. Representative calibration data provided with the data package were reviewed to evaluate the calibration procedures and protocols followed by the laboratory, and to assess the operating conditions of the instruments used for analysis of the samples in the data package. Specific items reviewed include: 1) analysis run logs, and initial and continuing calibration summaries for volatiles analyses of laboratory batch 38244; 2) analysis run logs and initial calibration summaries for ICP metals analyses of laboratory batches 38168, 38191, and 38210; and 3) analysis run logs, and initial and continuing calibration data for CVAA mercury analyses of laboratory batches 38223 and 38230. WIPP sample results did not require qualification based on the representative calibration information that was provided in the data package.

8. The analysis run logs and initial and continuing calibration summaries for volatiles analyses of laboratory analytical batch 38296 (samples RA-95-139 and RA-95-156), and continuing calibration summaryies for ICP metals analyses of laboratory batches 38168, 38191, and 38210 (all metals samples), were not included in the data package, therefore the specific calibration information pertaining to these samples could not be reviewed.

Signatures below constitutes validation of this record.

Validator:		
Donald K. Wainwright	Donald K. Wainwright	1/10/96
Printed Name	Signature	Date
QA/QC Reviewer:		
MARK R. COLSMAN	Mark R. Colsman	1/18/96
Printed Name	Signature	Date

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-131 TCLP
NUS SAMPLE NO: P0324881
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		10/10(1300)
		End Date/Time		10/11(0730)
		Extraction Fluid		1
		Final Leachate pH		4.9
3	AASL	Arsenic, Leachable (As)	1	< 0.1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.34 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 11/1/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 2

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-132 TCLP
NUS SAMPLE NO: P0324882
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		10/10(1300)	
		End Date/Time		10/11(0730)	
		Extraction Fluid		1	
		Final Leachate pH		5.0	
3	AASL	Arsenic, Leachable (As)	1	< 0.1	mg/L
4	ABAL	Barium, Leachable (Ba)	1	1.0	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 11/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 3

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-133 TCLP
NUS SAMPLE NO: P0324883
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		10/10(1300)	
		End Date/Time		10/11(0730)	
		Extraction Fluid		1	
		Final Leachate pH		4.9	
3	AASL	Arsenic, Leachable (As)	1	< 0.1	mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.43	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 11/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 4

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-134 TCLP
NUS SAMPLE NO: P0324884
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		10/10(1300)
		End Date/Time		10/11(0730)
		Extraction Fluid		1
		Final Leachate pH		4.9
3	AASL	Arsenic, Leachable (As)	1	< 0.1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.41 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 1/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 5

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-135 TCLP
NUS SAMPLE NO: P0324885
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/12(1200)
		End Date/Time		10/13(0600)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 6

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-136 TCLP
NUS SAMPLE NO: P0324886
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		10/10(1300)
		End Date/Time		10/11(0730)
		Extraction Fluid		1
		Final Leachate pH		5.2
3	AASL	Arsenic, Leachable (As)	1	< 0.1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.57 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 11/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 7

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-137 TCLP
NUS SAMPLE NO: P0324887
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/12(1200)
		End Date/Time		10/13(0600)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By _____

Date 1/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 8

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-138 TCLP
NUS SAMPLE NO: P0324888
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		10/10(1300)	
		End Date/Time		10/11(0730)	
		Extraction Fluid		1	
		Final Leachate pH		5.0	
3	AASL	Arsenic, Leachable (As)	1	0.1	mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.74	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 11/10/95

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 9

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-139 TCLP
NUS SAMPLE NO: P0324889
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/11(1200)
		End Date/Time		10/11(1200)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:
2 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 1/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 10

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-140 TCLP
NUS SAMPLE NO: P0324890
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Final Leachate pH		5.6
3	AASL	Arsenic, Leachable (As)	1	< 0.1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.21 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:
1 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 1/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 11

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-141 TCLP
NUS SAMPLE NO: P0324891
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/12(1200)
		End Date/Time		10/13(0600)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By

Date 11/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 12

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-142 TCLP
NUS SAMPLE NO: P0324892
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		10/10(1300)	
		End Date/Time		10/11(0730)	
		Extraction Fluid		1	
		Final Leachate pH		5.0	
3	AASL	Arsenic, Leachable (As)	1	0.1	mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.44	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 13

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-143 TCLP
NUS SAMPLE NO: P0324893
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/12(1200)
		End Date/Time		10/13(0600)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By

Date 11/10/95

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-144 TCLP
NUS SAMPLE NO: P0324894
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		10/10(1300)
		End Date/Time		10/11(0730)
		Extraction Fluid		1
		Final Leachate pH		4.9
3	AASL	Arsenic, Leachable (As)	1	< 0.1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.72 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 11/10/96

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NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 15

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-145 TCLP
NUS SAMPLE NO: P0324895
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		10/10(1300)
		End Date/Time		10/11(0730)
		Extraction Fluid		1
		Final Leachate pH		5.0
3	AASL	Arsenic, Leachable (As)	1	0.2 mg/L U B
4	ABAL	Barium, Leachable (Ba)	1	0.49 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 11/10/96

Halliburton NUS
CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 16

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-146 TCLP
NUS SAMPLE NO: P0324896
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		10/10(1300)
		End Date/Time		10/11(0730)
		Extraction Fluid		1
		Final Leachate pH		4.9
3	AASL	Arsenic, Leachable (As)	1	0.2 mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.46 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 17

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-147 TCLP
NUS SAMPLE NO: P0324897
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		10/11(1300)
		End Date/Time		10/12(0700)
		Extraction Fluid		#1
		Final Leachate pH		6.4
3	AASL	Arsenic, Leachable (As)	1	0.2 mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.29 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 18

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-148 TCLP
NUS SAMPLE NO: P0324898
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		10/11(1300)
		End Date/Time		10/12(0700)
		Extraction Fluid		#1
		Final Leachate pH		5.3
3	AASL	Arsenic, Leachable (As)	1	0.1 mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.33 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 11/10/95

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 19

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-149 TCLP
NUS SAMPLE NO: P0324899
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/12(1200)
		End Date/Time		10/13(0600)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By

Date 1/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 20

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-150 TCLP
NUS SAMPLE NO: P0324900
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		10/11(1300)	
		End Date/Time		10/12(0700)	
		Extraction Fluid		#1	
		Final Leachate pH		6.3	
3	AASL	Arsenic, Leachable (As)	1	0.2	mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.68	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 11/12/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 21

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-151 TCLP
NUS SAMPLE NO: P0324901
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/12(1200)
		End Date/Time		10/13(0600)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By

Date 11/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-152 TCLP
NUS SAMPLE NO: P0324902
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		10/11(1300)	
		End Date/Time		10/12(0700)	
		Extraction Fluid		#1	
		Final Leachate pH		5.2	
3	AASL	Arsenic, Leachable (As)	1	< 0.1	mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.69	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	0.006	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	0.0004	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L

COMMENTS:

VALIDATED

Reviewed By

Date 1/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 23

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-153 TCLP
NUS SAMPLE NO: P0324903
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/12(1200)
		End Date/Time		10/13(0600)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By

Date 1/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 24

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-154 TCLP
NUS SAMPLE NO: P0324904
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		10/11(1300)	
		End Date/Time		10/12(0700)	
		Extraction Fluid		#1	
		Final Leachate pH		6.2	
3	AASL	Arsenic, Leachable (As)	1	0.2	mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.75	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 11/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 25

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-155 TCLP
NUS SAMPLE NO: P0324905
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Final Leachate pH		6.1
3	AASL	Arsenic, Leachable (As)	1	< 0.1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.037 mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:
1 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By [signature]
Date 11/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 26

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-156 TCLP
NUS SAMPLE NO: P0324906
P.O. NO.: 500101

DATE SAMPLED: 04-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/11(1200)
		End Date/Time		10/11(1200)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:
2 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 11/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 27

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-157 TCLP
NUS SAMPLE NO: P0324907
P.O. NO.: 500101

DATE SAMPLED: 05-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Kieda, Chuck

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/12(1200)
		End Date/Time		10/13(0600)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/10/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

October 19, 1995
Report No.: 00027976
Section A Page 28

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-158 TCLP
NUS SAMPLE NO: P0324908
P.O. NO.: 500101

DATE SAMPLED: 05-OCT-95
DATE RECEIVED: 09-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS
1	S903	TCLP Bottle Extraction			
		Begin Date/Time		10/11(1300)	
		End Date/Time		10/12(0700)	
		Extraction Fluid		#1	
		Final Leachate pH		6.2	
3	AASL	Arsenic, Leachable (As)	1	0.2	mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.89	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0002	mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 11/10/96

APPENDIX 6

Results of Voluntary Release Assessment Samples Collected at SWMU 001k

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

Bore Number:	BORE #1	BORE #1	BORE #2	BORE #2	BORE #3	BORE #3	BORE #4	BORE #4
Depth (inches):	12-24	60-72	12-24	60-72	12-24	60-72	12-24	60-72
Sample Date:	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95	10/23/95
WID Sample Numbers:	RA-95-159	RA-95-160	RA-95-161	RA-95-162	RA-95-163	RA-95-167	RA-95-169	RA-95-171
					RA-95-164	RA-95-168	RA-95-170	RA-95-172
Analytes								
Leachable Metals (mg/L)								
Arsenic (As)	0.1 UB	0.2 UB	0.1 UB	0.1 UB	0.2 UB	0.1 UB	0.2 UB	0.1 U
Barium (Ba)	0.63 B	0.59 B	0.57 B	0.74 B	0.59 B	0.59 B	0.6 B	0.76 B
Cadmium (Cd)	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chromium (Cr)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Lead (Pb)	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Mercury (Hg)	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 J
Thallium (Tl)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Leachable Volatiles (mg/L)								
1,1,1-Trichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Ethyl benzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl chloride	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, total	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
J	Estimated value
NA	Not Analyzed
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

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

Bore Number:	EQ BLANK	FD BLANK
Depth (inches):		
Sample Date:	10/23/95	10/23/95
WID Sample Numbers:	RA-95-165	RA-95-173
	RA-95-166	RA-95-174
Analytes		
Leachable Metals (mg/L)		
Arsenic (As)	0.1 U	0.1 U
Barium (Ba)	0.048 UB	0.038 UB
Cadmium (Cd)	0.005 U	0.005 U
Chromium (Cr)	0.02 U	0.02 U
Lead (Pb)	0.05 U	0.05 U
Mercury (Hg)	0.0001 U	0.0001 U
Thallium (Tl)	0.2 U	0.2 U
Leachable Volatiles (mg/L)		
1,1,1-Trichloroethane	0.05 U	0.05 U
1,2-Dichloroethane	0.05 U	0.05 U
Benzene	0.05 U	0.05 U
Chloroform	0.05 U	0.05 U
Ethyl benzene	0.05 U	0.05 U
Toluene	0.05 U	0.05 U
Vinyl chloride	0.1 U	0.1 U
Xylenes, total	0.05 U	0.05 U

B	Detected in the blank
EQ BLANK	Equipment Rinse Blank
FD BLANK	Field Blank
J	Estimated value
NA	Not Analyzed
R	Rejected value
U	Not detected; value is method reporting limit
UB	Detected in the blank and qualified as not detected

WIPP Soil Samples
Data Review Form

Statement of Purpose:

To review laboratory data packages for soil samples collected at SWMUs, evaluate data package completeness, and compare analytical quality control data to program objectives.

Section 1: Data Package Identification

P.O. Number: 500101 - Report 28337 No. Of Samples In Package: 16
Sample Collection Date: 10/23/95 Sample Receipt Date: 10/24/95
Sample Report Date: 11/16/95 Analytical Parameters: TCLP - VOCs, Metals
Sample Numbers in Data Package: RA-95-159 (P0326416), RA-95-160 (P0326417), RA-95-161 (P0326418), RA-95-162 (P0326419), RA-95-163 (P0326420), RA-95-164 (P0326421), RA-95-165 (P0326422), RA-95-166 (P0326423), RA-95-167 (P0326424), RA-95-168 (P0326425), RA-95-169 (P0326426), RA-95-170 (P0326427), RA-95-171 (P0326428), RA-95-172 (P0326429), RA-95-173 (P0326430), RA-95-174 (P0326431)

Data Reviewer: Donald K. Wambold Date of Review: 1/11/96

Symbols used in the sections below are defined as follows:

X	Included: no problem	R	Resubmission
*	Included: problems noted	NR	Not Required
O	Not Included		

Section 2. Data Summary

Data for the above listed samples are:

____ Acceptable for use
X Acceptable for use with qualifications noted
____ Preliminary - pending action or verification
____ Unacceptable for use
X To be reviewed by senior chemist

Reviewed by: Mark R. Coleman Date: 1/23/96
— See note 9a.

Section 3. Data Package Completeness Review

X Chain of Custody/Request for Analysis
X Laboratory Analysis Report
X Holding Times
X[1] Method Reporting Limits
X Dilution Factors
X[2] Quality Control Report

Section 4. QC Review (from Laboratory Quality Control Report)

Volatiles

X Method Blank
O[3] Leachate Blank
X Surrogate Standard Recovery
NR[4] Matrix Spike/Matrix Spike Duplicate Samples
X Laboratory Control Sample
NR Duplicate Sample

Metals

X Method Blank
*[5] Leachate Blank
O[6] Matrix Spike/Matrix Spike Duplicate Samples
*[7] Laboratory Control Sample
NR Duplicate Sample

Section 5. Calibration Data

Volatiles

X[8,9] GC/MS Analysis Log
X[8,9] GC/MS Initial Calibration Data
X[8,9] GC/MS Continuing Calibration Data

Metals

O[8,9] ICP Analysis Log
⊛ R ~~O~~[8,9] ICP Initial Calibration Data
⊛ R ~~O~~[8,9] ICP Continuing Calibration Data
X[8] CVAA Analysis Log
X[8] CVAA Initial Calibration Data
⊛ R ~~O~~[8,9] CVAA Continuing Calibration Data

⊛ MRC, 1/23/96. See note 9a.

Section 6. Comments

1. The method reporting limits (MRLs) and sample results for 1,1,1-trichloroethane, ethyl benzene, chloroform, total xylenes, and thallium were not evaluated relative to the toxicity characteristic regulatory levels because limits have not been promulgated for these analytes.

2. The information provided in the quality control (QC) summary was not complete for all reported samples and could not be directly referenced to the sample results and/or analysis logs. The "supplemental information" section of the quality control summary provides analytical and extraction batch numbers which can be referenced to the appropriate QC samples in the QC summary. The laboratory relies on these batch references, which are stored in the laboratory information management system (LIMS), to relate the appropriate QC data to sample batches, and does not typically include the batch numbers or internal laboratory QC sample numbers on the analysis logs. Therefore, QC sample results generally cannot be traced to the raw analytical data.

3. A leachate blank analysis was not provided for the TCLP volatiles analyses in this package. Based on the laboratory's procedures, leachate blanks are performed once per twenty samples processed through the TCLP extraction procedure on each extraction apparatus. The leachate blank associated with the samples in this package may not be reported because it is reported in another package with the remaining samples in the extraction batch. There were not any detections of volatile compounds reported in the data package, and no common volatile laboratory contaminants or other volatile compounds were reported in the method blanks. Therefore, the potential for laboratory cross contamination of samples appeared to be low, and sample results were not qualified.

4. A matrix spike/matrix spike duplicate was not performed for the TCLP volatile analyses due to limited sample volume produced during the TCLP extraction.

5. The laboratory provided metal leachate blank sample results for extraction batch 365 which were considered representative of the extraction conditions for the WIPP samples in this data package. Specific sample associations for the blank were not included, therefore the representative blank was used to evaluate all the WIPP sample results from the TCLP extraction batch in the case. (Note: the blank provided was from a different TCLP extraction batch performed two days prior to the TCLP extraction of the samples in this case). Arsenic and barium were detected at or above the MRL in the leachate blank samples. Arsenic results for samples RA-95-159, RA-95-160, RA-95-161, RA-95-162, RA-95-164, RA-95-168, RA-95-170, and RA-95-172 (*), and barium results for samples RA-95-166 and RA-95-174, were less than five times the blank concentration, and therefore were qualified as "UB" (not detected) due to blank contamination. The barium results for samples RA-95-159, RA-95-160, RA-95-161, RA-95-162, RA-95-164, RA-95-168, RA-95-170, and RA-95-172 were not less than five times the blank concentration, and therefore were qualified with a "B" to indicate that the analyte was detected in the blank.

(*) The laboratory resubmitted metals results for sample RA-95-172 on 1/12/96. Arsenic was rereported as a nondetection at 0.1 mg/L, therefore the "UB" qualifier was no longer necessary and was removed. (See the attached resubmitted analysis report).
MRC, 1/23/96

6. The MS/MSD recoveries for mercury (128%/128%) were above the EPA Functional Guidelines maximum criteria of 125% for batch 38522. Therefore, the detected mercury result for samples RA-95-172 from batch 38522 was qualified as estimated, J. The nondetected results did not require qualification.

7. The laboratory control sample (LCS) recovery for lead (72.4%) from laboratory analytical batch 38573 was below both the laboratory's minimum control limit of 81.2% and the EPA Functional Guidelines criteria of 80%. Therefore, the lead results for samples RA-95-159, RA-95-160, RA-95-161, RA-95-162, RA-95-164, RA-95-168, RA-95-170, and RA-95-172 from batch 38573 were qualified as estimated, J.

8. Representative calibration data provided with the data package were reviewed to evaluate the calibration procedures and protocols followed by the laboratory, and to assess the operating conditions of the instruments used for analysis of the samples in the data package. Specific items reviewed include: 1) analysis run logs, and initial and continuing calibration summaries for volatiles analyses of laboratory batch 38582; 2) analysis run logs for both runs of ICP metals analyses of laboratory batch 38573; and 3) analysis run logs, and initial calibration data for CVAA mercury analyses of laboratory batch 38522. WIPP sample results did not require qualification based on the representative calibration information that was provided in the data package.

9. The following specific items were not included by the laboratory, and could not be evaluated for potential effects on the reported sample results: 1) analysis run logs, and initial and continuing calibration data for volatiles analyses of laboratory batch 38473 (samples RA-95-165 and RA-95-173); 2) analysis run logs, and initial and continuing calibration data for ICP metals analyses of arsenic, barium, cadmium, chromium, and lead for laboratory batch 38573 (reported from the run on 11/4/95), and continuing calibration data for ICP metals analyses of thallium for laboratory batch 38573 (reported for the run on 11/8/95), samples RA-95-159, RA-95-160, RA-95-161, RA-95-162, RA-95-164, RA-95-168, RA-95-170, and RA-95-172 were reported from these two sets of analyses; and 3) continuing calibration data for CVAA mercury analyses of laboratory batch 38522.

9a. Additional initial and continuing calibration data for ICP metals and CVAA mercury analyses were provided by the laboratory for the sample batches in this data package. WIPP sample results did not require qualification based on review of the additional calibration data.
MRC, 1/23/96

Signatures below constitutes validation of this record.

Validator:
Donald K. Wambold — Signature — 1/11/96
Printed Name — Signature — Date

QA/QC Reviewer:
MARK R. COLEMAN — Signature — 1/23/96
Printed Name — Signature — Date

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-159
NUS SAMPLE NO: P0326416
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		10/26(1330)		
		End Date/Time		10/27(0700)		
		Extraction Fluid		1		
		Final Leachate pH		5.0		
3	AASL	Arsenic, Leachable (As)	1	0.1	ug/L	UB
4	ABAL	Barium, Leachable (Ba)	1	0.63	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L	J
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L	
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L	

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/11/96

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

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ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-160
NUS SAMPLE NO: P0326417
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		10/26(1330)		
		End Date/Time		10/27(0700)		
		Extraction Fluid		1		
		Final Leachate pH		5.1		
3	AASL	Arsenic, Leachable (As)	1	0.2	mg/L	UB
4	ABAL	Barium, Leachable (Ba)	1	0.59	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L	J
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L	
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L	

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/11/96

Halliburton NUS CORPORATION

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

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ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-161
NUS SAMPLE NO: P0326418
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		10/26(1330)		
		End Date/Time		10/27(0700)		
		Extraction Fluid		1		
		Final Leachate pH		5.0		
3	AASL	Arsenic, Leachable (As)	1	0.1	mg/L	UB
4	ABAL	Barium, Leachable (Ba)	1	0.57	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L	J
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L	
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L	

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/11/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337
Section A Page 4

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-162
NUS SAMPLE NO: P0326419
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		10/26(1330)		
		End Date/Time		10/27(0700)		
		Extraction Fluid		1		
		Final Leachate pH		5.4		
3	AASL	Arsenic, Leachable (As)	1	0.1	mg/L	UB
4	ABAL	Barium, Leachable (Ba)	1	0.74	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L	J
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L	
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L	

COMMENTS:

VALIDATED
Reviewed By
Date 1/11/96

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337
Section A Page 5

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-163
NUS SAMPLE NO: P0326420
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/30(1230)
		End Date/Time		10/31(0630)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By _____

Date 11/11/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337

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CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-164
NUS SAMPLE NO: P0326421
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		10/26(1330)		
		End Date/Time		10/27(0700)		
		Extraction Fluid		1		
		Final Leachate pH		4.9		
3	AASL	Arsenic, Leachable (As)	1	0.2	mg/L	UB
4	ABAL	Barium, Leachable (Ba)	1	0.59	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L	J
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L	
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L	

COMMENTS:

VALIDATED
Reviewed By [signature]
Date 1/11/96

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
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CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-165
NUS SAMPLE NO: P0326422
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/26(1330
		End Date/Time		10/26(1330
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:
2 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By
Date 11/11/96

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5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

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FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-166
NUS SAMPLE NO: P0326423
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Final Leachate pH		5.4
3	AASL	Arsenic, Leachable (As)	1	< 0.1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.048 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:
1 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED
Reviewed By [signature]
Date 1/11/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-167
NUS SAMPLE NO: P0326424
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/30(1230)
		End Date/Time		10/31(0630
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/4/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-168
NUS SAMPLE NO: P0326425
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		10/26(1330)		
		End Date/Time		10/27(0700)		
		Extraction Fluid		1		
		Final Leachate pH		4.8		
3	AASL	Arsenic, Leachable (As)	1	0.1	mg/L	UB
4	ABAL	Barium, Leachable (Ba)	1	0.59	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L	J
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001	mg/L	
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L	

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 1/11/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-169
NUS SAMPLE NO: P0326426
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/30(1230)
		End Date/Time		10/31(0630)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 11/16/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337
Section A Page 12

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-170
NUS SAMPLE NO: P0326427
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time		10/26(1330)
		End Date/Time		10/27(0700)
		Extraction Fluid		1
		Final Leachate pH		5.0
3	AASL	Arsenic, Leachable (As)	1	0.2 mg/L UB
4	ABAL	Barium, Leachable (Ba)	1	0.6 mg/L B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L J
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 1/11/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-171
NUS SAMPLE NO: P0326428
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/30(1230)
		End Date/Time		10/31(0630)
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:

VALIDATED
Reviewed By
Date 1/11/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337
Section A Page 14

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-172
NUS SAMPLE NO: P0326429
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT	UNITS	
1	S903	TCLP Bottle Extraction				
		Begin Date/Time		10/26(1330)		
		End Date/Time		10/27(0700)		
		Extraction Fluid		1		
		Final Leachate pH		5.0		
3	AASL	Arsenic, Leachable (As)	1	0.1	mg/L	UB
4	ABAL	Barium, Leachable (Ba)	1	0.76	mg/L	B
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005	mg/L	
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02	mg/L	
7	APBL	Lead, Leachable (Pb)	1	< 0.05	mg/L	U
8	AHGL	Mercury, Leachable (Hg)	1	0.0001	mg/L	U
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2	mg/L	

COMMENTS:

VALIDATED

Reviewed By [signature]

Date 1/11/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

November 16, 1995
Report No.: 00028337
Section A Page 15

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-173
NUS SAMPLE NO: P0326430
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
2	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time		10/261330
		End Date/Time		10/261330
10	OVZHE	VOLATILES - TCLP/ZHE		
		1,1,1-trichloroethane	10	< 0.05 mg/L
		1,2-dichloroethane	10	< 0.05 mg/L
		benzene	10	< 0.05 mg/L
		chloroform	10	< 0.05 mg/L
		ethyl benzene	10	< 0.05 mg/L
		toluene	10	< 0.05 mg/L
		vinyl chloride	10	< 0.1 mg/L
		xylenes, total	10	< 0.05 mg/L

COMMENTS:
2 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

VALIDATED

Reviewed By _____

Date 11/11/96

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
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November 16, 1995
Report No.: 00028337

LABORATORY ANALYSIS REPORT

CLIENT NAME: WESTINGHOUSE ELECTRIC CORPORATIO
ADDRESS: P.O. BOX 2078
CARLSBAD, NM 88221-2078
ATTENTION: MR. RICK CHAVEZ

NUS CLIENT NO: 1783 0003
WORK ORDER NO: 55830
VENDOR NO: 01830727

SAMPLE ID: RA-95-174
NUS SAMPLE NO: P0326431
P.O. NO.: 500101

DATE SAMPLED: 23-OCT-95
DATE RECEIVED: 24-OCT-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	DILUTION FACTOR	RESULT UNITS
1	S903	TCLP Bottle Extraction		
		Final Leachate pH		5.7
3	AASL	Arsenic, Leachable (As)	1	< 0.1 mg/L
4	ABAL	Barium, Leachable (Ba)	1	0.038 mg/L UB
5	ACDL	Cadmium, Leachable (Cd)	1	< 0.005 mg/L
6	ACRL	Chromium, Leachable (Cr)	1	< 0.02 mg/L
7	APBL	Lead, Leachable (Pb)	1	< 0.05 mg/L
8	AHGL	Mercury, Leachable (Hg)	1	< 0.0001 mg/L
9	ATLL	Thallium, Leachable (Tl)	1	< 0.2 mg/L

COMMENTS:

1 This sample was less than 0.5% solid, thus the sample was filtered, not extracted.

8 This sample was analyzed as a matrix spike. Recovery of the spike was outside established acceptance limits indicating the presence of a possible matrix interference.

VALIDATED

Reviewed By

Date 1/11/96