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H Salomon/ A L. Primrose	G D DiGregorio	J E Law
Originator Name	**QA Approval**	**Contractor Manager(s)**

T C Greengard	A D Rodgers
Kaiser-Hill Program Manager(s)	**Kaiser-Hill Director**

Document Subject:

CLOSEOUT REPORT FOR THE SOURCE REMOVAL AT THE MOUND SITE IHSS 113 - JEL-109-97

KH-00003NS1A December 2, 1997

Discussion and/or Comments

RMRS is pleased to provide copies of the Mound Source Removal Closeout Report for transmittal to DOE for distribution to EPA and CDPHE The Mound Site Closeout Report was prepared using language from the RFCA Implementation Guidance Document Enclosed are 4 copies for Kaiser-Hill and 8 copies for distribution to DOE, EPA, and CDPHE Also enclosed are 4 copies of Appendix C, one each for Kaiser-Hill, DOE, EPA, and CDPHE

Recently, EPA has requested cost breakdown information regarding several source removals at Rocky Flats Therefore, the following cost breakdown information is being supplied with the Closeout Report in anticipation of a similar request by EPA The total estimated unburdened project cost was $2,316K The cost breakdown is as follows planning and site preparation for the Mound Source Removal cost $580K, project management cost $210K, excavation, treatment, site restoration, and waste disposition cost $1,526K

In addition, as requested in EPA's letter dated September 19, 1997, following are the responses to their request for further information concerning the disposition of a contaminated hot spot which was discovered near the Mound Contaminated Soil Feed Stockpile on March 22, 1997

- *Who performed the original analysis?*

In June 1997, four characterization samples, collected from the three drums of radiologically contaminated soil excavated from the Trench 3 / Trench 4 hotspot, were analyzed at RFETS under the then-existing gamma spectroscopy program Safe Sites of Colorado (SSOC) was assigned site responsibility for the RFETS Radiological Control Program by Kaiser Hill in late February 1997 One element of this functional transfer was the site gamma spectroscopy program, which was established under EG&G in 1993

- *Why was the original analysis in error?*

The error in the original analysis resulted from the use of a counting efficiency factor for a detector and source geometry different than those used to count the samples An erroneous assumption that the use of this efficiency factor would not result in significant error provided the basis for the use of these incorrect values

- *Prior to disposition of the hot spot soils, there was some concern by representatives at the site such that disposal was postponed for several days Please provide further details as to what these issues were, and why concerns of validity and the QA/QC were not addressed prior to placing the material in the excavation*

Quality Assurance of the gamma spectroscopy results were a concern prior to the decision to place this material into the excavation These concerns addressed the availability of Quality Control records Radiation Safety Management requested a delay to review the available records and establish a technical basis for the efficiency factor used to calculate the results This review suggested that the gamma spectroscopy data was reliable A significant misunderstanding between technical personnel as to the application of correction factors for the different efficiencies went undetected at that time This mistake resulted in the acceptance of the data, which was later found to be in error

- *Which individuals or organization is responsible for instrumentation calibration/data computation, and who has been performing these tasks in past projects?*

The gamma spectroscopy program was the responsibility of Radiological Protection under EG&G from 1993 to June 1995, Kaiser-Hill from July 1995 to February 1997, and Safe Sites of Colorado from February 1997 to the present

- *Why was the data re-evaluated two weeks following the original decision for putback of these soils?*

Data reevaluation started two business days after the soil was buried At that point the technical misunderstanding of the application of conversion factors was identified Hand calculations were performed to validate the use of detector efficiency and geometry conversion factors, and confirmatory measurements were performed This work took approximately two weeks The four samples were sent to an offsite laboratory for comparative analysis

- *What corrective measures will be taken to alleviate such errors in the future?*

Corrective actions include a formal suspension of the gamma spectroscopy program until a comprehensive investigation and corrective action plan are completed In the interim, Safe Sites of Colorado is developing a new gamma spectroscopy program that will correct any identified deficiencies and provide a technically defensible program that meets all Quality Assurance requirements It is anticipated that gamma spectroscopy programmatic issues will be resolved before January 1, 1998

If you have any questions concerning this transmittal please contact Wayne Sproles at extension 5790 or Hopi Salomon at extension 6627

HS/aw

Attachments
As Stated

cc
A C Crawford
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[redacted] (2)

KAISER•HILL
COMPANY

RMRS Rocky Mountain Remediation Services, L.L.C
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CLOSEOUT REPORT FOR THE SOURCE REMOVAL AT THE MOUND SITE IHSS 113

RF/RMRS-97-041-UN

October, 1997
Revision 0

RF/RMRS-97-041.UN

CLOSEOUT REPORT FOR THE SOURCE REMOVAL AT THE MOUND SITE IHSS 113

Rocky Mountain Remediation Services, L.L.C.

October 1997

Revision 0

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APPENDICIES

Appendix A Integrated Work Control Packages Used in Support of the Mound Site Source Removal

Appendix B Sampling Type and Location Information

Appendix C Analytical Data, Log Sheets & COC Forms (separate binder)

ACRONYMS

CCR	Colorado Code of Regulations
CDPHE	Colorado Department of Public Health and Environment
CSFS	Contaminated Soil Feed Stockpile
CWTF	Consolidated Water Treatment Facility
EPA	Environmental Protection Agency
FIP	Field Implementation Plan
FIDLER	Field Instrument for the Detection of Low Energy Radiation
GAC	Granular Activated Carbon
HEAF	High Efficiency Air Filter
HEPA	High Efficiency Particulate Air
IHSS	Individual Hazardous Substance Site
IWCP	Integrated Work Control Package
LDR(s)	Land Disposal Restrictions
LLW	Low-level Waste
M-H	McLaren-Hart Environmental Engineering Corporation
MLLW	Mixed Low-Level Waste
NRWOL	Non Routine Waste Origination Log
PAM	Proposed Action Memorandum
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCE	Tetrachloroethene
PPE	Personal Protective Equipment
PWRE	Property/Waste Release Evaluation
RCT(s)	Radiological Control Technicians
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RMRS	Rocky Mountain Remediation Services, LLC
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TDU	Thermal Desorption Unit
VOA	Volatile Organic Analysis
VOCs	Volatile Organic Compounds
WAC	Waste Acceptance Criteria
yd^3	Cubic Yard

1.0 INTRODUCTION

This closeout report describes the Source Removal at the Mound Site, Individual Hazardous Substance Site (IHSS) 113, at the Rocky Flats Environmental Technology Site (RFETS) The Source Removal was conducted in 1997

1.1 Background

The Mound Site is located north of Central Avenue, and east of the Protected Area fence (Figure 1-1) Approximately 1,405 intact drums were placed at the Mound Site between April 1954 and September 1958 and covered with soil, thus generating a "mound" The drums originated from Buildings 444, 883, 771, and 776, and contained uranium, beryllium, hydraulic oil, carbon tetrachloride and tetrachloroethene (PCE) In 1970, the drums were removed from the Mound Site along with radiologically contaminated soil Approximately 10 percent of the drums were thought to have holes at the time of removal Records did not indicate the volume of contaminants released to the soils at the Mound Site

More recent characterization data indicated volatile organic compounds (VOCs), predominantly PCE, remained in subsurface soils at levels requiring cleanup It was estimated that 400 to 1,000 cubic yards (yd^3) of soil were contaminated with VOCs (RMRS, 1997a) above the Tier I Subsurface Soil Action Levels specified in the Rocky Flats Cleanup Agreement (RFCA) (DOE, 1996)

Historical information regarding operations, chemical and radiological contamination, geology, and hydrogeology of the Mound Site have been collected over many years and documented in various reports including the *Rocky Flats Environmental Technology Site Historical Release Report for the Rocky Flats Plant* (DOE, 1992), the *Phase II RFI/RI Report for Operable Unit No 2* (DOE, 1995), the *Soil Vapor Survey Report for Operable Unit 2 Subsurface Interim Remedial Action* (EG&G, 1994), the *Draft Trenches and Mound Site Characterization Report* (RMRS, 1996a), and *Results of the 1996 Pre-Remedial Investigation of the Mound Site* (RMRS, 1996b)

1.2 Project Summary

This source removal was conducted in accordance with the Proposed Action Memorandum (PAM) for the Source Removal at the Mound Site (RMRS, 1997a) This source removal was conducted by Rocky Mountain Remediation Services (RMRS) on behalf of Kaiser-Hill Company, Inc , for the U S Department of Energy/Rocky Flats Field Office The purpose of this

source removal was to remove VOC contaminated soil at the Mound Site by excavating soil contaminated with VOCs and treating the soil using low temperature thermal desorption, and return of the soils to the excavation

The excavation of contaminated soils at the Mound Site began in the March 1997 and the treatment of VOC contaminated soil using low temperature thermal desorption was completed in August, 1997 Figure 1-1 indicates the location of the Mound Site, treatment area and various stockpiles used during the project

Supporting documents used by RMRS to complete this project included the Field Implementation Plan (RMRS, 1997b), the Sampling and Analysis Plan (SAP, RMRS, 1997c), the Project Specific Health and Safety Plan (RMRS, 1997d), and several Integrated Work Control Packages (IWCPs), which are listed in Appendix A of this closeout report

The vendor providing treatment services to RMRS was McLaren-Hart Environmental Engineering Corporation (M-H) The controlling documents used by M-H to complete the thermal desorption processing of the VOC contaminated soils included the Mound Site Soil Work Plan (M-H, 1997a) and the Site Specific Health and Safety Plan (M-H, 1997b)

2.0 REMEDIAL ACTION DESCRIPTION

The objective of this source removal was to remove VOC contaminated soils identified in the PAM (RMRS, 1997a) and treat the soil using low temperature thermal desorption to remove the VOC contaminants Following treatment, the soil was planned to be returned to the site, as appropriate

3.0 EXCAVATION OF THE MOUND SITE

The excavation of the Mound Site was conducted between March 21 and April 8, 1997 A hydraulic excavator equipped with a 2 45 yd^3 bucket was used for excavation activities Soil was surveyed by Radiological Control Technicians (RCTs) prior to being placed in a dump truck for transport RCTs used Field Instruments for the Detection of Low Energy Radiation (FIDLERs) for this screening No soil was encountered with contamination levels requiring further isotopic characterization as stipulated by the SAP (RMRS, 1997c) The rate of radiological screening was decreased from each bucket of excavated material loaded into the dump truck to 3 buckets per

dump truck load after radiological controls personnel determined it unlikely that significant contamination would be encountered

After excavating to a depth beyond the claystone/alluvial contact, samples for VOC analysis were collected from the excavation sidewall Eleven locations were sampled approximately 2 feet above the claystone contact (Figure 3-1) The highest contaminant of concern detected was PCE at 0 93 mg/kg from sample EB00012RM on the north sidewall
No contaminants were detected above the VOC Cleanup Target Levels for Excavation stated in Table 3-1 of the PAM (RMRS, 1997a)

Following excavation sidewall sampling, additional soil was removed from the excavation bottom such that the excavation proceeded past the highly weathered claystone bedrock, located immediately below the alluvial/bedrock contact On April 8, 1997, fourteen areas were sampled from the excavation bottom (approximately 17 feet below the land surface) These samples were EB00013RM to EB00027RM

Results from two of the 14 samples exceeded the VOC Cleanup Target Levels for Excavation stated in Table 3-1 of the PAM (RMRS, 1997a) Both samples exceeded the 11 5 mg/kg cleanup target level for PCE Sample EB00019RM contained PCE at 12 mg/kg and sample number EB00026RM contained PCE at 86 mg/kg These results, which were received on April 9, 1997, were transmitted to the EPA and the Colorado Department of Public Health and Environment (CDPHE) for review On April 10, 1997 EPA, CDPHE, DOE and contractor personnel conferred to discuss the results It was decided that because the majority of contaminated soil had been removed, the difficulty of excavation deeper into the bedrock and that the limiting conditions established in the PAM had been met (excavation through the highly weathered bedrock) that excavation activities would cease A letter was prepared by DOE and transmitted to EPA and the CDPHE to document this decision and to provide supporting rational (DOE, 1997) Table 3-1 provides a listing of the range of contaminants of concern remaining after excavation activities were completed

FIGURE 3-1 MOUND SITE EXCAVATION BOUNDARY SAMPLING LOCATIONS

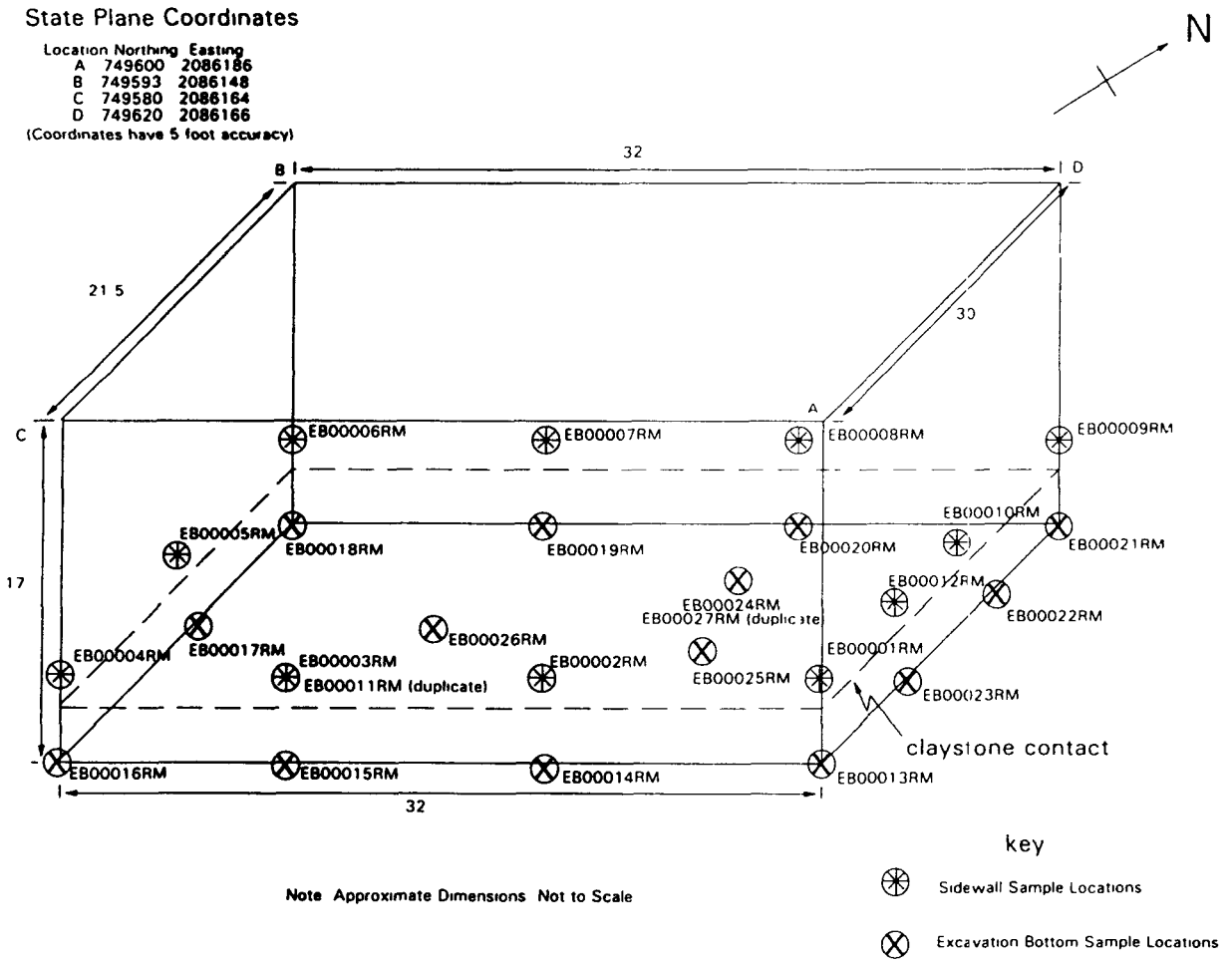

TABLE 3-1 MOUND SITE CONTAMINANTS OF CONCERN, EXCAVATION BOUNDARY CONCENTRATIONS

Contaminant	VOC Cleanup Target Levels for Excavation (ug/kg)	Low Concentration (ug/kg)	High Concentration (ug/kg)
PCE	11, 500	620 U	86,000
TCE	9,270	620 U	900
Methylene Chloride	5,770	620 U	630 U
Carbon Tetrachloride	11,000	620 U	630 U

U= detection limit, contaminant was not detected at or above this level
J = estimated concentration

Following excavation and radiological surveys, the excavated soil was hauled to the contaminated soil feed stockpile (CSFS) The CSFS was located approximately 700 feet east of the Mound Site, adjacent to the area were M-H would later set up the TDU All soils were staged at the CSFS pending treatment using the TDU system

Approximately 724 5 yd^3 of soil was removed from the Mound excavation for processing This volume was determined from the actual amount of soil loaded into the treatment ovens and processed by M-H

4.0 TREATMENT OF MOUND SITE SOILS

The treatment phase of the Mound Site Source Removal began on July 17, 1997 with the start of equipment mobilization by the TDU vendor, M-H Mound Site Soil was processed between August 5 and August 21, 1997

4.1 Description of the Treatment Process

The treatment system used for the project was the M-H IRV-150 Hydrocarbon Extractor which was developed as a result of process improvements suggested by RMRS following two earlier thermal desorption projects at RFETS This was the first time that this treatment system had been used by M-H

The IRV-150 Low Temperature Thermal Desorption System (LTTDS) is a portable modular unit used to remove volatile contaminants from soil The principle used in this method of soil treatment includes infrared heat, convection heat, vacuum extraction, and reduced pressure volatilization in a batch treatment system Heat from propane fired infrared heaters mounted in the lid of each batch process oven, above the contaminated soil, is drawn down through the contaminated soil by vacuum, liberating the contaminants

The air containing entrained soil moisture and contaminants from the treatment chamber passes through a condenser designed to remove the condensable contaminants from the exhaust gas stream The carrier gas is subsequently discharged to a granular activated carbon (GAC) system for polishing to remove non-condensable and adsorbable contaminants prior to discharge to the atmosphere High efficiency air filters (HEAF) and high efficiency particulate air (HEPA) filters are positioned upstream of the GAC system to minimize particulate emissions

The system essentially removes volatile contaminants from soil in a non-oxidative atmosphere using low temperature, such that the desorbed contaminants do not degrade and generate thermal or oxidative bi-products The desorbed contaminants undergo a phase change from liquid to vapor in the treatment chamber and then are condensed back to liquid in the condenser A more complete description of the process including the various components of the system can be found in the M-H workplan developed for the project (M-H, 1997a)

4 2 Shakedown Testing of the Treatment System

Between July 30 and August 4, M-H conducted a shakedown test of the TDU system The shakedown test was conducted with clean uncontaminated soils During the first shakedown run, only standard construction personal protective equipment (PPE) was worn so that project personnel could focus on the system operation without the burden of full PPE Self contained breathing apparatus and full level B PPE were used during the second shakedown run to simulate full scale treatment conditions

4.3 Soil Treatment

Soil treatment began August 5 following completion of the shakedown test Soil treatment activities were completed on August 21, 1997

The initial phase of soil treatment began with a process to establish baseline conditions from which to operate the TDU system At the beginning of the treatment process, one process

verification sample was collected from every oven load of processed soil This continued until two successive loads from each oven meet the TDU performance goals stated in the PAM (RMRS, 1997a), and the two main operating parameters (residence time at a terminal soil bed temperature) were established, and were relatively constant During this phase of the project M-H encountered problems with their automatic bed temperature monitoring system As such, continuous real time monitoring of the soil bed temperatures was not possible and manual temperature monitoring was performed using hand held temperature probes This resulted in a number of oven loads of soil being treated at higher temperatures and for longer treatment times As such, baseline conditions took more time to establish than originally planned A letter summarizing establishment of baseline conditions was prepared to document the decision process (RMRS, 1997e) Baseline conditions for operation of the TDU system were established at a minimum soil bed temperature of 180°F with a minimum processing time of 30 minutes after the soil reached the 180°F temperature All soils met the TDU Performance Goals established in Table 3-2 of the PAM during baseline testing

After baseline conditions were established operating parameters remained consistent throughout the remainder of the treatment phase Results from process verification samples collected on August 19, 1997 from batch 9, TDU ovens 1, and 3 (TDU-1, TDU-3) exceeded the TDU Performance Goals stated in the PAM Process Verification sample PV00540RM from TDU-1 contained PCE at 22 7 mg/kg while sample PV00541RM from TDU-3 contained PCE at 16 5 mg/kg, both above the 6 mg/kg level for PCE established in the PAM All the soil from these two batches was subsequently re-treated and sample results met the criteria established in the PAM A total of approximately 724 5 yd^3 of soil was treated from the Mound Site excavation

A summary of the Mound Site process verification sample information is found in Appendix B and analytical results (e g , Form 1s) are in Appendix C Table 4-1 provides a summary of the range of treated soil VOC concentrations returned to the Mound Site excavation

TABLE 4-1 MOUND SITE CONTAMINANTS OF CONCERN, POST THERMAL DESORPTION PROCESSING CONCENTRATIONS

Contaminant	TDU Performance Goals (ug/kg)	Low Concentration (ug/kg)	High Concentration (ug/kg)
PCE	6000	625 U	630 U
TCE	4000	625 U	630 U
Methylene Chloride	5770	300 J,B	3,000*
Carbon Tetrachloride	2000	625 U	630U

U= detection limit, contaminant was not detected at or above this level

J = estimated concentration

B = contaminant was found in the blank

* = methylene chloride detected in associated trip blank, therefore considered undetected

5.0 SITE RECLAMATION AND CSFS SAMPLING AFTER USE

Following removal and treatment of the stockpiled soils from the CSFS, the CSFS was divided into 8 approximately equal grid areas and samples were collected from the center of each area A duplicate sample (ST00020RM) collected from one grid area exceeded the VOC Cleanup Target Level established in the PAM Approximately 4 inches of soil was removed from the area represented by this sample and treated This area was subsequently resampled, and the results of this sample (ST00026RM) met the criteria established in the PAM

All treated soil was staged in the treated soil stockpile pending return to the Mound Site excavation This soil was covered with ConCover® Remediation Cover material, a soil binder to minimize erosion and windblown dispersion from the stockpile This product performed effectively with no evidence of erosion Following demobilization of M-H from the site, the treated soil which had been stockpiled in the treated soil stockpile (Figure 1-1) was transported back to the original Mound Site for return to the excavation

The return of the treated soil to the Mound Site excavation was conducted between September 3 and 8, 1997 A ramp was constructed into the bottom of the excavation and gravel placed to mitigate wet soil conditions During backfilling operations, each load of soil was compacted with a front end loader Following the completion of backfilling operations, the surface soil at the Mound Site was covered with ConCover® to minimize the generation of dust from the site All fences, posting and support equipment were subsequently removed from the site

As part of the this backfilling operation, three partially filled 55 gallon drums of soil (approximately 50 gallons total volume) were emptied into the bottom of the Mound Site excavation This soil, which contained depleted uranium, originated as a remnant from the T-3/T-4 project This material was discovered in March, 1997 when RCTs were conducting routine radiological surveys at the CSFS, which had been used the year before in support of the T-3/T-4 Project The soil was sampled after it was placed in the three drums Initial results indicated that the soil was below the RFCA Tier II subsurface soil action levels for radionuclides As a result, a determination was made by RMRS, K-H, SSOC, DOE, EPA and CDPHE to place this soil in the Mound Site excavation

After placement of the soil and backfilling was complete, it was determined that the initial analyses were in error Re-analysis of the samples indicated that the soil was above the Tier I subsurface soil action levels, and a decision was made to exhume this soil On September 26, 1997 approximately 3 yd^3 of soil was removed from the excavation and placed into two half crates Project RCTs identified the "hot spot" using a FIDLER and easily discernable visual characteristics between the "hot spot" soil and the surrounding treated Mound Site soils After excavation, samples were collected for gross alpha/beta analyses below the hot spot location Results of these samples are contained in Appendix C of this plan This soil was sent to the Nevada Test Site for final disposition with other T-3/T/4 waste

6.0 DISPOSITION OF SECONDARY WASTE STREAMS

During the excavation and processing of soils, several secondary waste streams were generated and are described below These waste streams were managed in a manner consistent with Rocky Flats policies and procedures and the requirements established by the PAM (RMRS, 1997a) A summary of the Mound Site secondary waste sample information is found in Appendix B and analytical results (e g , Form 1s) are in Appendix C

The major secondary waste streams included

- aqueous-phase condensate,
- spent HEAF and HEPA filters,
- spent GAC

Approximately 28,066 gallons of aqueous phase condensate was generated during the Mound Site Source Removal Project This condensate was pumped from the treatment unit condensers to one of two double walled 10,000 gallon tanks located at the treatment site, awaiting transfer to the onsite Consolidated Water Treatment Facility (CWTF) One sample of condensate was collected for CWTF waste acceptance purposes The results from sample DB00522RM indicated that the condensate was acceptable for treatment The condensate was transferred to the CWTF (Building 891) in facility operated tanker trucks

HEAF and HEPA filters were used to eliminate particulate emissions and protect downstream equipment and materials (e g , GAC) from becoming radioactively contaminated The spent filters were classified as mixed low level waste (MLLW) because of detectable levels of radionuclides and requirements of the "RCRA derived from rule" (6 CCR-1007-3, 261 3(c)(2)(i)), that materials containing residuals from the treatment of listed hazardous waste are listed hazardous waste Three samples were taken to characterize the spent HEAF and HEPA filters These were DB00518RM, DB00519RM, DB00520RM All sample results indicated that VOC levels for which this waste was listed were below the LDR treatment standards found in 6 CCR-1007-3, 268 40 Therefore, this waste was disposed as LDR compliant MLLW at the Envirocare of Utah Facility, in Clive, Utah

Isotopic analysis performed on the spent GAC indicated that the GAC was non-radioactive This analysis supported the process knowledge (two sets of upstream HEPA filters, and low radiological concentrations in soil) used in the determination by Radiological Engineering that the GAC was free of radiological contamination As such, a PWRE was issued (PWRE # 970827-T130B-003) for release of the GAC as non-radioactive Samples used for the radiological evaluation were DB00533RM to DB00540RM As with the HEAF/HEPA filters, the spent GAC was also classified as a listed waste because of requirements of the "RCRA derived from rule" Sample DB00541RM used for chemical characterization of the GAC indicated levels of VOCs (e g , PCE @ 1,440 mg/kg) above the LDR treatment standards Therefore, the spent GAC was sent offsite to Chemical Waste Management, Inc , for incineration as a non-LDR compliant hazardous waste

Table 6-1 provides a summary of the Mound Site Wastes This table includes waste types, volumes generated, final disposition and references to supporting information, e g , Non-Routine Waste Origination Logs (NRWOLs), Property/Waste Release Evaluations (PWREs) and sample numbers

TABLE 6-1 MOUND SITE SOURCE REMOVAL WASTE/MEDIA DISPOSITION

Waste Type	Regulatory Classification	Packaging	NRWOL/ Container numbers	Interim Storage	Disposition	Sampling Analysis/Media	Volume
contaminated soils	CERCLA Waste	not packaged	NRWOL T0090239-4-1	CSFS awaiting processing	Returned to the Mound Site Excavation after processing	Sampled per section 3 2 of the SAP	724 5 yd^3
Spent HEAF/HEPA filters	MLLW (F-Listed, LDR compliant)	3 full crates 1 half crate	NRWOL P02568, P02570, P02620, H05543	BLD 884 UNIT 13	Envirocare of Utah, Inc	Per Section 3 3 2 of the SAP	14 5 yd^3
Mound Site condensate, incidental waters	CERCLA waste (handle as MLLW)	temporarily stored in tanks awaiting transport to Building 891	NRWOL T0090239-4-6	Building 891	Released after processing at the CWTF	initial sampling per Section 3 3 1 of SAP	28,066 gal condensate 8,586 gal incid/decon Tot = 36,652
Spent PPE and Field Trash	Solid Waste PWRE 970618-T690B-001, 970917-T130B-001, 970819-T690B-002, 970929-1130B-004	2 Dumpsters	Material Transfer and Disposal No D01784400, D07413700, D000127700 and D07413900	Mound Site	On-site landfill	Rad surveys per ROI 3 02	18 yd^3

Waste Type	Regulatory Classification	Packaging	NRWOL/ Container numbers	Interim Storage	Disposition	Sampling Analysis/Media	Volume
Granular Activated Carbon (GAC)	Hazardous Waste (F-Listed) PWRE 970827-T130B-003	41, 55-gal drums	NRWOL T0090239-4 N04848, N04887, N04888, N04889, N04890, N04891, N04897, N04898, N04899, N04925, N04927, N04928, N04929, N04936, N04937, N04938, N04943, N04944, N04945, N04983, N04984, N04985, N04986, N04987, N04988, N04995, N04996, N04997, N04998, N04999, N05000, N05001, N05002, N05003, N05004, N05005, N05006, N05007, N05020, N05021, N05022	Unit 18 04 Cargo 17	Incineration Chem Waste Management/ Rollins	Sampling per Appendix 3 of the SAP	11 2 yd^3
Large Tarp (120' x 60')	Solid Waste PWRE 970910-T130B-001	N A	Material Transfer and Disposal No D07413400	Decon Pad	On-site landfill	N A	1 yd^3
HDPE liner, lumber, plywood boxes	Solid Waste PWRE 970911-T130B-006	pallets	Material Transfer and Disposal No D07413500	Mound Site	On-site landfill	N A	9 yd^3
Plastic sandbags, inner tubes, rope and cement blocks	Solid Waste PWRE 970916-T130B-002	Dumpster	Material Transfer and Disposal No D07760700	Mound Site	On-site landfill	N A	1 yd^3
Soil which originated from the T-3/T-4 Hot Spot (include plastic, etc)	LLW	2 half crates	NRWOL T0094104-2 H05606, H05613	Building 664	Nevada Test Site	Profiled as part of T-3/T-4 Waste disposition	3 yd^3

7.0 DATA QUALITY ASSESSMENT

In this section, the quality of the data used in the Mound Site Source Removal is assessed in terms of the five data-quality parameters precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters The PARCC parameter evaluation was performed in accordance with the guidance established by the Rocky Flats Administrative Procedure 2-G32-ER-ADM-08 02, *Evaluation of ERM Data for Usability in Final Reports,* and with guidance provided by the EPA (EPA, 1989)

As described in the SAP (RMRS, 1997c), field decisions were based on "Form-1s" faxed directly from the laboratory to support timely field decisions Data validation was performed after the data were used for its intended purpose Analytical laboratories supporting this project have all passed regular laboratory audits by the Rocky Flats Analytical Projects Office

The following data sets were quantitatively evaluated as part of this data quality assessment (e g , full PARCC parameter evaluation)

- excavation boundary samples,
- process verification samples, and
- samples from the bottom of the contaminated soil feed stockpile

Since field duplicates and rinsate samples were not required, the evaluation of secondary waste streams is limited to a qualitative assessment only

Carbon tetrachloride, methylene chloride, TCE and PCE were identified as the contaminants of concern in the PAM (RMRS, 1997a), and therefore were evaluated as part of this qualitative data quality assessment Table 7-1 lists the sample types and objectives addressed in the SAP (RMRS, 1997c) for the Mound Site Project

TABLE 7-1 MOUND SITE SAMPLING OBJECTIVES AND RESULTS

Sample Type	Section of SAP	Validation performed	Objective	Results
Excavation Boundary	3 1	Yes - 100%	To verify that cleanup target levels stated in Table 3-1 of the PAM were met	25 real samples collected, 2 samples exceeded target levels specified in PAM, but approval to discontinue excavation granted by EPA (DOE, 1997)
Process Verification	3 2	Yes - 46%	To verify that TDU performance goals stated in the Table 3-2 of the PAM were met	44 real samples collected of which two samples exceeded TDU performance goals stated in PAM, soil was re-treated and subsequently met goals
Stockpile (below CSFS)	3 4	None (However lab/analysis same as process verification samples therefore, validation is associated)	To verify that residual VOC contamination has been removed from the CSFS	11 real samples collected, one sample exceeded PAM levels, soil represented by sample was subsequently treated, and the following sample met PAM criteria
HEPA/HEAF	3 3 2	None	To verify that the filters are LDR compliant and meet the Envirocare of Utah WAC (Envirocare, 1996)	Three sets of samples collected, acceptable to disposal facility
GAC	Appendix 3 & 4	None	To verify that GAC is non-radioactive and meets the appropriate offsite WAC	Samples supported the determination by radiological engineering that the GAC was non radioactive and samples were acceptable to disposal facility
Condensate	3 3 1	None	To verify that condensate can be treated at the CWTF	One sample collected for complete CWTF suite - water accepted by CWTF

The PARCC parameter evaluation process used to assess Mound Site Data and the results are described below

Precision

Precision is a measure of the reproducibility of analytical results Precision is expressed quantitatively by the relative percent difference (RPD) between real and duplicate sample results as defined by the following equation

$$RPD = \frac{|C_1 - C_2|}{(C_1 + C_2)/2} * 100$$

where

C_1=first sample

C_2=duplicate sample

The RPD was not calculated where the analytical result for either sample was qualified with a "U" by the laboratory The data flag "U" indicates that the analyte was not present above the detection limit The average RPD for the project was 17 7% The QC criterion for RPDs was ≤ 40% Five of the six measurements used in the overall precision calculation were within the ≤ 40% RPD criterion The overall precision compliance was 83 3%, which is slightly below the 85% overall RPD compliance goal established in the data quality assessment procedure The deficiency is insignificant as it was caused by a single outlier with respect to precision (the outlier was a duplicate sample collected from the CSFS, described in Section 5), and would therefore not indicate that additional sampling is required Soil represented by this sample was subsequently removed and retreated Table 7-2 lists the samples and results of the full precision calculations in spreadsheet form

Accuracy.

Accuracy is a measure of how closely an analytical result corresponds to the "true" concentration in a sample Accuracy is evaluated by comparing the required analytical method and detection limit with the actual method used Evaluation of the excavation boundary, process verification and CSFS bottom samples were required under EPA SW846 Method 8260A (EPA, 1992), using medium level VOA reporting criteria These methods and reporting limits were used by all of the laboratories performing analysis in support of this project

As Table 7-1 indicates, many of the analytical results used during the Mound Site Source Removal Project were validated Minor problems were noted during this validation process with

TABLE 7-2 PRECISION CALCULATIONS FOR THE MOUND SOURCE REMOVAL

			Compound/Concentration (ug/kg)			
sample #	Type	Location	PCE	TCE	Methylene Chloride	Carbon tetrachloride
EB00003RMRE	Real	Exc Bound	BDL	BDL	BDL	BDL
EB00011RMRE	Duplicate	Exc Bound	BDL	BDL	BDL	BDL
notes						
RPD(%)						
EB00024RM	Real	Exc Bound	3700	280	BDL	BDL
EB00027RM	Duplicate	Exc Bound	4200	230	BDL	BDL
notes				J flagged		
RPD(%)			12 66	19 61		
PV00509RM	Real	Process Verif	BDL	BDL	480	BDL
PV00510RM	Duplicate	Process Verif	BDL	BDL	460	BDL
notes					J,B flagged	
RPD(%)					4 26	
PV00532RM	Real	Process Verif	BDL	BDL	1,105	BDL
PV00533RM	Duplicate	Process Verif	BDL	BDL	1,205	BDL
notes					B flagged	
RPD(%)					8 66	
ST00019RM	Real	Stockpile	6,969	BDL	779	BDL
ST00020RM	Duplicate	Stockpile	12,339	BDL	739	BDL
notes						
RPD (%)			55 62		5 27	
			PCE	TCE	Methylene Chloride	Carbon tetrachloride
RPD by VOC			34 14	19 61	6 06	All BDL, cannot eval
RPD - Project						17 68

U= detection limit, contaminant was not detected at or above this level

J = estimated concentration

B = contaminant was found in the blank

some of the data (described in the following paragraphs), however other data were considered valid without qualification No problems were noted with any of the contaminants of concern, other than methylene chloride, which is also a ubiquitous laboratory contaminant The full validated data set is located in the Analytical Projects Office files under Report Identification Numbers 97L1376 and 97A2186 The following discussion summarizes the results of the validation process

All of the validated process verification samples analyzed by Paragon Laboratory should be qualified with "J" flags for the following compounds bromomethane, chloroethane, trichlorofluoromethane, acetone, methylene chloride, and 2-butanone The relative standard deviations of these compounds exceeded 30% of the initial calibration These compounds are not specified as calibration check compounds (CCCs), and as such were not required to be within 30%

The percent difference for dichlorofluoromethane, trichlorofluoromethane, methylene chloride, 2-butanone, carbon disulfide, and chloroethane, often exceeded 25% during the daily (continuing) calibrations Again, these compounds are not specified CCCs, and as such were not required to be within 25%, but are qualified as estimated quantities (J flagged) where appropriate in the validated data packages As a result of method blank contamination, acetone and methylene chloride are considered undetected in the following samples PV00501RM - PV00517RM, and PV00519RM

All of the excavation boundary samples analyzed by the RFETS 559 Laboratory were validated The percent difference for 2-butanone exceeded 25% during the daily (continuing) calibrations This compound is not a specified CCC, and was not required to be within 25%, but is qualified as an estimated quantity (J flagged) in the validated data package

All of the excavation boundary samples analyzed by the Quantera Denver Laboratory were validated The percent difference for acetone exceeded 25% during all of the daily (continuing) calibrations This compound is not a specified CCC, and was not required to be within 25%, but is qualified as an estimated quantity below the detection limit (UJ flagged) in the validated data package In addition, the percent difference for chloromethane and chloroethane exceeded 25% in one of the continuing calibrations, affecting samples EB00013RM - EB00027RM These compounds are not a specified CCCs, and as such were not required to be within 25%, but are qualified as estimated quantities below the detection limit (UJ flagged)

Representativeness

The discussion of representativeness in this section is limited to an evaluation of whether analytical results for field samples are truly representative of environmental concentrations or whether they may have been influenced by the introduction of contamination during collection and handling This is assessed by evaluating results of various blanks, specifically rinsates and trip blanks Other aspects of representativeness such as numbers of samples and spatial distribution are addressed in the SAP (RMRS, 1997c)

Possible introduction of contamination from sampling equipment is evaluated by examination of the analytical results for equipment rinsates Equipment rinsates are used to assess the proficiency of the decontamination process and possible cross-contamination between environmental samples They are samples of distilled water that have been poured over or through decontaminated sampling equipment and subsequently handled in the same manner as environmental samples

Although rinsates are used specifically as indicators of cross-contamination during decontamination of equipment, they are carried through the entire sampling, shipping, and laboratory process and are, consequently, also good indicators of possible introduced contamination during any of these steps

Trip blanks are used as general indicators of potential cross contamination by VOCs, and are often used to assess migration of VOCs from the air or shipping containers through the sample containers septum or lid into the sample

EPA considers acetone, 2-butanone and methylene chloride to be common laboratory contaminants These compounds were detected in various blanks Of these VOCs, only methylene chloride was identified as a contaminant of concern for the project The highest levels of these compounds detected in the field blanks were

Compound	Concentration (ug/L)	Qualifiers	Sample Number	Blank Type
Acetone	210		PV00605RM	Rinsate
2-Butanone	87	J	PV000605RM	Rinsate
Methylene Chloride	7 8	B	PV00511RM	Trip

Acetone was detected in all the real samples evaluated with the blank containing the highest acetone level (a rinsate sample) In accordance with EPA Guidance (EPA, 1989), the concentration detected in the real samples was less than 10x the acetone concentration in the

blank and therefore, acetone was determined to be a laboratory contaminant 2-Butanone was not detected in any of the real samples evaluated under the blank containing the highest 2-butanone levels (a rinsate sample) This is probably a result of the fact that the blanks (all water samples) were analyzed under the low-level VOC analysis criteria and the real samples (all soil samples) were analyzed under the medium level VOC analysis criteria Therefore, the detection level for 2-butanone was much lower in the blank samples in which it was detected and higher in the real samples in which it was not detected This fact makes it impossible to apply EPA's 10x rule However, as stated before, the level of 2-butanone detected in the blank was relatively low, the compound was not a contaminant of concern, and is considered by EPA to be a common laboratory contaminant No actions were required to further address 2-butanone

Methylene chloride was detected in all of the real samples evaluated under the blank containing the highest methylene chloride level (a trip blank) Unlike acetone and 2-butanone, methylene chloride was detected at greater than 10x the blank results in the real samples However, when evaluating the raw instrument data and considering the dilution used on the real samples, it appears that the methylene chloride detections are the result of laboratory contamination It should also be noted that methylene chloride was never detected above the action levels stated in the PAM (RMRS, 1997a)

Completeness

All excavation boundary, process verification and CSFS bottom samples specified in the SAP were collected During these phases of sampling, 100 samples were collected for VOC analysis (SW846, Method 8260A) Of these, 80 were real samples, 5 samples were duplicates, 12 samples were trip blanks and 3 samples were equipment rinsates Significant third party data validation problems were not identified in any of the validated data, and all the validated data were considered usable by the validators It is assumed that the unvalidated data is of similar quality and therefore, completeness is 100%

Comparability

Analytical methods and sampling techniques remained consistent for each analyte group over the sampling period Laboratory analyses were performed according to standard SW-846 protocols and results are comparable to data produced by similar methods

8.0 REFERENCES

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RMRS, 1997d, *Final Site Specific Health and Safety for the Source Removal at the Mound Site, IHSS 113*, RF/RMRS-96-0061, Rev 0 , February

RMRS, 1997e, Letter from Greg DiGregorio to Ann Tyson, Establishing Baseline Treatment Time and Temperature for the Soils at IHSS 113 Mound Site, August 8

Appendix A

Integrated Work Control Packages
Used in Support of the Mound Site Source Removal

IWCP	Description
T0090239-1	Phase 1, Source Removal at the Mound Site IHSS 113
	Scope Central Ave Culvert extension activities
T0090239-2	Phase 2, Source Removal at the Mound Site IHSS 113
	Scope Install CSFS, general site preparation
T0090239-3	Phase 2, Source Removal at the Mound Site IHSS 113
	Scope Excavation of Mound Site
T0090239-4	Phase 3, Source Removal at the Mound Site IHSS 113
	Scope Soil Treatment and return/backfill of treated soil to Mound Site
T0091870	Return OU2 Temporary Propane Piping to Service
	Scope Return to and take out of service the propane system
T0086898	Tempoary Power Mod for OU2 T3/T4 Trench & Mound Projects
	Scope Modify temporary power installation for Mound Site Project
T0093126	Electrical Connections to Power Dist Panel PDP-OU2-1
	Scope Connection of M-H equipment to the Power distribution system
T009126-1	Electrical Connections to Power Dist Panel PDP-OU2-1
	Scope Disconnection of M-H equipment from the Power distribution system
T0090529	Minor Maintenance Craft Support - Mound Project/ Cluster 63
	Scope General Craft Support for Mound Site Project
T0094104	Excavate Mound Site Hot Spot

Appendix B
Sampling Type and Location Information

EXCAVATION BOUNDARY SAMPLES
Report Identification Number (RIN) 97L1376

Sample Num	Location	Samp type	COC	Sampled	Shipped	Pass/Fail	Notes
EB00001 RM	Sidewall	Real	RFP900440	3/31/97	4/1/97	Pass	
EB00002 RM	Sidewall	Real	RFP900441	4/1/97	4/1/97	Pass	
EB00003 RM	Sidewall	Real	RFP900442	4/1/97	4/1/97	Pass	
EB00004 RM	Sidewall	Real	RFP900443	4/1/97	4/1/97	Pass	
EB00005 RM	Sidewall	Real	RFP900444	4/1/97	4/1/97	Pass	
EB00006 RM	Sidewall	Real	RFP900445	4/1/97	4/1/97	Pass	
EB00007 RM	Sidewall	Real	RFP900446	4/1/97	4/1/97	Pass	
EB00008 RM	Sidewall	Real	RFP900447	4/1/97	4/1/97	Pass	
EB00009 RM	Sidewall	Real	RFP900440	3/31/97	4/1/97	Pass	
EB00010 RM	Sidewall	Real	RFP900440	3/31/97	4/1/97	Pass	
EB00011 RM	Sidewall	Duplicate	RFP900445	4/1/97	4/1/97	Pass	Duplicate of EB00003RM
EB00012 RM	Sidewall	Real	RFP900440	3/31/97	4/1/97	Pass	
EB00013 RM	Excavation Bottom	Real	RFP900442	4/8/97	4/8/97	Pass	
EB00014 RM	Excavation Bottom	Real	RFP900443	4/8/97	4/8/97	Pass	
EB00015 RM	Excavation Bottom	Real	RFP900444	4/8/97	4/8/97	Pass	
EB00016 RM	Excavation Bottom	Real	RFP900445	4/8/97	4/8/97	Pass	
EB00017 RM	Excavation Bottom	Real	RFP900446	4/8/97	4/8/97	Pass	
EB00018 RM	Excavation Bottom	Real	RFP900447	4/8/97	4/8/97	Pass	
EB00019 RM	Excavation Bottom	Real	RFP900448	4/8/97	4/8/97	Fail	PCE at 12 ppm
EB00020 RM	Excavation Bottom	Real	RFP900449	4/8/97	4/8/97	Pass	
EB00021 RM	Excavation Bottom	Real	RFP900450	4/8/97	4/8/97	Pass	
EB00022 RM	Excavation Bottom	Real	RFP900451	4/8/97	4/8/97	Pass	
EB00023 RM	Excavation Bottom	Real	RFP900452	4/8/97	4/8/97	Pass	
EB00024 RM	Excavation Bottom	Real	RFP900453	4/8/97	4/8/97	Pass	
EB00025 RM	Excavation Bottom	Real	RFP900454	4/8/97	4/8/97	Pass	
EB00026 RM	Excavation Bottom	Real	RFP900455	4/8/97	4/8/97	Fail	PCE at 86 ppm
EB00027 RM	Excavation Bottom	Duplicate	RFP900456	4/8/97	4/8/97	Pass	Duplicate of EB00024RM
EB00028 RM	N A	Trip	RFP900457	4/8/97	4/8/97	N A	

PROCESS VERIFICATION SAMPLES
Report Identification Number (RIN) 97A2186

Sample Num	Event Num	Bottle Num	Samp type	TDU	Batch Run	Load	COC	Sampled	Shipped	Pass/Fail
PV00501 RM	001	001	real	1	01	1	RFP900420	8/5/97	8/6/97	Pass
PV00502 RM	002	002	real	2	01	1	RFP900420	8/5/97	8/6/97	Pass
PV00503 RM	003	003	real	3	01	1	RFP900420	8/5/97	8/6/97	Pass
PV00504 RM	004	004	real	4	01	1	RFP900420	8/5/97	8/6/97	Pass
PV00505 RM	005	005	trip blank	na	na	na	RFP900420	8/5/97	8/6/97	na
PV00505 RM	005	006	trip blank	na	na	na	RFP900420	8/5/97	8/6/97	na
PV00506 RM	006	007	real	1	02	1	RFP900420	8/6/97	8/6/97	Pass
PV00507 RM	007	008	real	2	02	1	RFP900421	8/7/97	8/8/97	Pass
PV00508 RM	008	009	real	3	02	1	RFP900420	8/6/97	8/6/97	Pass
PV00509 RM	009	010	real	4	02	1	RFP900420	8/6/97	8/6/97	Pass
PV00510 RM	010	011	duplicate	4	02	1	RFP900420	8/6/97	8/6/97	Pass
PV00511 RM	012	014	trip blank	na	02	1	RFP900421	8/7/97	8/8/97	na
PV00511 RM	012	015	trip blank	na	02	1	RFP900421	8/7/97	8/8/97	na
PV00512 RM	011	012	rinsate	2	na	na	RFP900420	8/5/97	8/6/97	na
PV00512 RM	011	013	rinsate	2	na	na	RFP900420	8/5/97	8/6/97	na
PV00513 RM	013	016	real	1	03	1	RFP900421	8/7/97	8/8/97	Pass
PV00514 RM	014	017	real	3	03	1	RFP900421	8/7/97	8/8/97	Pass
PV00515 RM	015	018	real	4	03	1	RFP900421	8/7/97	8/8/97	Pass
PV00516 RM	016	019	real	2	03	1	RFP900421	8/8/97	8/8/97	Pass
PV00517 RM	017	020	real	1	04	1	RFP900421	8/7/97	8/8/97	Pass
PV00518 RM	018	021	real	4	04	4	RFP900423	8/8/97	8/11/97	Pass
PV00519 RM	019	022	real	2	04	1	RFP900421	8/8/97	8/8/97	Pass
PV00520 RM	020	023	real	3	04	4	RFP900423	8/8/97	8/11/97	Pass
PV00521 RM	021	024	real	1	04	5	RFP900423	8/8/97	8/11/97	Pass
PV00522 RM	022	025	real	2	05	3	RFP900423	8/9/97	8/11/97	Pass
PV00523 RM	023	026	real	4	05	3	RFP900426	8/12/97	8/12/97	Pass
PV00524 RM	024	027	real	1	05	5	RFP900426	8/12/97	8/12/97	Pass
PV00525 RM	025	028	real	3	05	4	RFP900426	8/12/97	8/12/97	Pass
PV00526 RM	026	029	real	2	06	4	RFP900427	8/13/97	8/13/97	Pass
PV00527 RM	027	030	real	1	06	4	RFP900427	8/13/97	8/13/97	Pass

Proc

Sample Num	Event Num	Bottle Num	Samp type	TDU	Run	Load	COC	Sampled	Shipped	Pass/Fail
PV00528 RM	028	031	real	3	06	5	RFP900430	8/13/97	8/14/97	Pass
PV00529 RM	029	032	real	4	06	5	RFP900430	8/13/97	8/14/97	Pass
PV00530 RM	030	033	real	2	07	4	RFP900430	8/13/97	8/14/97	Pass
PV00531 RM	031	034	real	1	07	3	RFP900431	8/15/97	8/15/97	Pass
PV00532 RM	032	035	real	3	07	3	RFP900431	8/15/97	8/15/97	Pass
PV00533 RM	033	036	duplicate	3	07	3	RFP900431	8/15/97	8/15/97	Pass
PV00534 RM	034	037	real	4	07	3	RFP900431	8/15/97	8/15/97	Pass
PV00535 RM	035	038	real	2	08	5	RFP900432	8/15/97	8/18/97	Pass
PV00536 RM	036	039	real	3	08	3	RFP900432	8/16/97	8/18/97	Pass
PV00537 RM	037	040	real	1	08	4	RFP900452	8/18/97	8/18/97	Pass
PV00538 RM	038	041	real	4	08	4	RFP900452	8/18/97	8/18/97	Pass
PV00539 RM	039	042	real	2	09	3	RFP900453	8/18/97	8/19/97	Pass
PV00540 RM	040	043	real	1	09	2	RFP900453	8/19/97	8/19/97	Fail
PV00541 RM	041	044	real	3	09	3	RFP900453	8/19/97	8/19/97	Fail
PV00542 RM	042	045	real	4	09	3	RFP900453	8/19/97	8/19/97	Pass
PV00543 RM	043	046	real	2	10	2	RFP900454	8/19/97	8/20/97	Pass
PV00544 RM	044	047	real	3	10	1	RFP900454	8/19/97	8/20/97	Pass
PV00554 RM	054	057	real	1	10	1	RFP900454	8/19/97	8/20/97	Pass
PV00555 RM	055	058	real	1	11	1	RFP900456	8/21/97	8/22/97	Pass
PV00556 RM	056	059	real	2	11	2	RFP900456	8/21/97	8/22/97	Pass
PV00557 RM	057	060	real	3	11	2	RFP900456	8/21/97	8/22/97	Pass
PV00558 RM	058	061	real	4	11	3	RFP900456	8/21/97	8/22/97	Pass
PV00600 RM	100	103	trip blank	na	na	na	RFP900423	8/9/97	8/11/97	na
PV00600 RM	100	104	trip blank	na	na	na	RFP900423	8/9/97	8/11/97	na
PV00601 RM	101	105	trip blank	na	na	na	RFP900426	8/12/97	8/12/97	na
PV00601 RM	101	106	trip blank	na	na	na	RFP900426	8/12/97	8/12/97	na
PV00602 RM	102	107	trip blank	na	na	na	RFP900427	8/13/97	8/13/97	na
PV00602 RM	102	108	trip blank	na	na	na	RFP900427	8/13/97	8/13/97	na
PV00603 RM	103	109	trip blank	na	na	na	RFP900300	8/14/97	8/14/97	na
PV00603 RM	103	110	trip blank	na	na	na	RFP900300	8/14/97	8/14/97	na
PV00604 RM	104	111	trip blank	na	na	na	RFP900431	8/14/97	8/15/97	na
PV00604 RM	104	112	trip blank	na	na	na	RFP900431	8/14/97	8/15/97	na
PV00605 RM	105	113	rinse	na	na	na	RFP900431	8/15/97	8/15/97	na
PV00605 RM	105	114	rinse	na	na	na	RFP900431	8/15/97	8/15/97	na

Sample Num	Event Num	Bottle Num	Samp type	TDU	Run	Load	COC	Sampled	Shipped	Pass/Fail
PV00606 RM	106	115	trip blank	na	na	na	RFP900432	8/15/97	8/18/97	na
PV00606 RM	106	116	trip blank	na	na	na	RFP900432	8/15/97	8/18/97	na
PV00607 RM	107	117	trip blank	na	na	na	RFP900453	8/18/97	8/19/97	na
PV00607 RM	107	118	trip blank	na	na	na	RFP900453	8/18/97	8/19/97	na
PV00608 RM	108	119	trip blank	na	na	na	RFP900454	8/19/97	8/20/97	na
PV00608 RM	108	120	trip blank	na	na	na	RFP900454	8/19/97	8/20/97	na
PV00609 RM	109	121	rinse	na	na	na	RFP900454	8/19/97	8/20/97	na
PV00609 RM	109	122	rinse	na	na	na	RFP900454	8/19/97	8/20/97	na
PV00610 RM	110	123	trip blank	na	na	na	RFP900456	8/21/97	8/22/97	na
PV00610 RM	110	124	trip blank	na	na	na	RFP900456	8/21/97	8/22/97	na

Samples from under CSFS and soil stockpiles
Report Identification Number (RIN) 97A2186

Sample Num	Event Num	Bottle Num	Samp type	Location			COC	Sampled	Shipped	Pass/Fail
ST00017 RM	045	048	real	CSFS			RFP90045	8/19/97	8/20/97	Pass
ST00018 RM	046	049	real	CSFS			RFP90045	8/19/97	8/20/97	Pass
ST00019 RM	047	050	real	CSFS			RFP90045	8/19/97	8/20/97	Pass
ST00020 RM	048	051	duplicate	CSFS			RFP90045	8/19/97	8/20/97	Fail
ST00021 RM	049	052	real	CSFS			RFP90045	8/19/97	8/20/97	Pass
ST00022 RM	050	053	real	CSFS			RFP90045	8/19/97	8/20/97	Pass
ST00023 RM	051	054	real	CSFS			RFP90045	8/19/97	8/20/97	Pass
ST00024 RM	052	055	real	CSFS			RFP90045	8/19/97	8/20/97	Pass
ST00025 RM	053	056	real	CSFS			RFP90045	8/19/97	8/20/97	Pass
ST00026 RM	059	062	real	ST00020RM	scrapped	soils	RFP90045	8/21/97	8/22/97	Pass
ST00027 RM	060	063	real	Under 1-09	stockpile	area	RFP90045	8/21/97	8/22/97	Pass
ST00028 RM	061	064	real	Under 3-09	stockpile	area	RFP90045	8/21/97	8/22/97	Pass

Hot Spot Cleanup Samples
Report Identification Number (RIN) 97A2867

Sample Num	Event	Bottle	Location	Samp type	COC	Notes
EB00029 RM	001	001	bottom	Real	RPF 943330	
EB00030 RM	002	002	bottom	Real	RPF 943330	
EB00031 RM	003	003	bottom	Real	RPF 943330	
EB00032 RM	004	004	bottom	Duplicate	RPF 943330	Duplicate of EB00029RM
EB00033 RM	005	005	sidewall	Real	RPF 943330	
EB00034 RM	006	006	sidewall	Real	RPF 943330	
EB00035 RM	007	007	sidewall	Real	RPF 943330	

GA

GAC Samples
Report Identification Number (RIN) 97A2188

Sample Num	Event Nu	ottle Num	Sample Type	Location	COC	Sampled	Shipped	Notes
DB00511 RM	001	001	Real	Mound GAC	945964	7/22/97	7/23/97	Virgin GAC, not required to be analyzed
DB00512 RM	002	002	Real	Mound GAC	945964	7/22/97	7/23/97	Virgin GAC, not required to be analyzed
DB00513 RM	003	003	Real	Mound GAC	945964	7/22/97	7/23/97	Virgin GAC, not required to be analyzed
DB00514 RM	004	004	Real	Mound GAC	945964	7/22/97	7/23/97	Virgin GAC, not required to be analyzed
DB00515 RM	005	005	Real	Mound GAC	945964	7/22/97	7/23/97	Virgin GAC, not required to be analyzed
DB00516 RM	006	006	Real	Mound GAC	945964	7/22/97	7/23/97	Virgin GAC, not required to be analyzed
DB00517 RM	007	007	Real	Mound GAC	945964	7/22/97	7/23/97	Virgin GAC, not required to be analyzed
DB00523 RM	008	008	Real	Mound GAC	945943	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00524 RM	009	009	Real	Mound GAC	945943	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00525 RM	010	010	Real	Mound GAC	945943	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00526 RM	011	011	Real	Mound GAC	945943	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00527 RM	012	012	Real	Mound GAC	945943	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00528 RM	013	013	Real	Mound GAC	945943	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00529 RM	014	014	Real	Mound GAC	945943	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00530 RM	015	015	Duplicate	Mound GAC	945943	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00531 RM	016	016	Real	Mound GAC	900455	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00531 RM	016	017	Real	Mound GAC	900455	8/20/97	8/20/97	Spent GAC, not required to be analyzed
DB00532 RM	017	018	Trip Blank	Mound Site	900455	8/20/97	8/20/97	not required to be analyzed
DB00532 RM	017	019	Trip Blank	Mound Site	900455	8/20/97	8/20/97	not required to be analyzed
DB00533 RM	018	020	Real	Mound GAC	945944	8/22/97	8/22/97	Spent GAC
DB00534 RM	019	021	Real	Mound GAC	945944	8/22/97	8/22/97	Spent GAC
DB00535 RM	020	022	Real	Mound GAC	945944	8/22/97	8/22/97	Spent GAC
DB00536 RM	021	023	Real	Mound GAC	945944	8/22/97	8/22/97	Spent GAC
DB00537 RM	022	024	Real	Mound GAC	945944	8/22/97	8/22/97	Spent GAC
DB00538 RM	023	025	Duplicate	Mound GAC	945944	8/22/97	8/22/97	Spent GAC
DB00539 RM	024	026	Real	Mound GAC	945944	8/22/97	8/22/97	Spent GAC
DB00540 RM	025	027	Real	Mound GAC	945944	8/22/97	8/22/97	Spent GAC
DB00541 RM	026	028	Real	Mound GAC	900457	8/22/97	8/22/97	Spent GAC
DB00541 RM	026	029	Real	Mound GAC	900457	8/22/97	8/22/97	Spent GAC
DB00542 RM	027	030	Trip Blank	Mound Site	900457	8/22/97	8/22/97	
DB00542 RM	027	031	Trip Blank	Mound Site	900457	8/22/97	8/22/97	

HE.

HEPA/HEAF Filter Samples
Report Identification Number (RIN) 97A2190

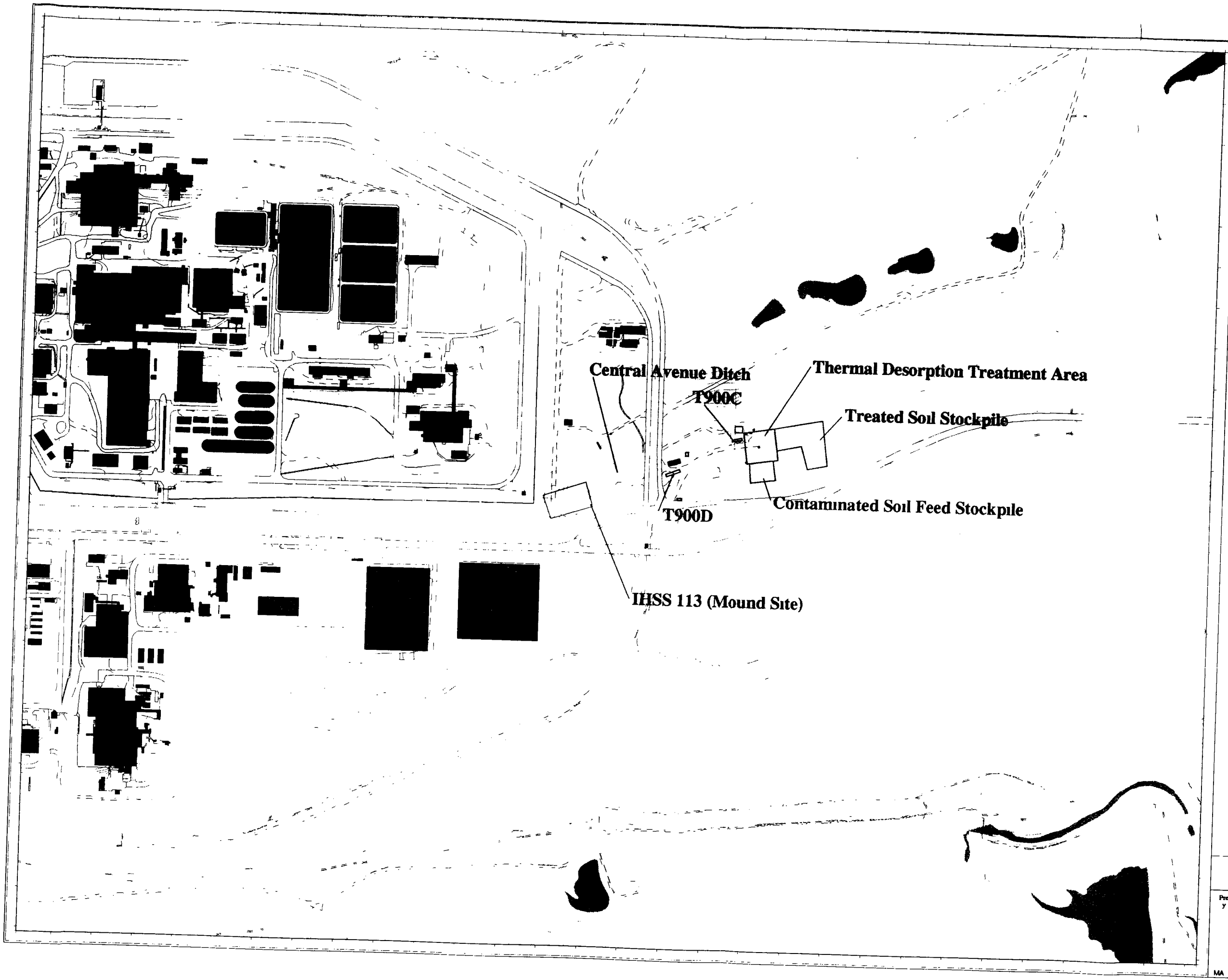
Sample Num	Event Num	Bottle Num	Analysis	Sample Type	Location	COC	Sampled	Shipped	Notes
DB00518 RM	001	001	TCLP, Reactive CN and S, pH	Real	Mound HEPA	900425	8/11/97	8/12/97	Passed TCLP
DB00518 RM	001	002	VOA	Real	Mound HEPA	900425	8/11/97	8/12/97	
DB00518 RM	001	003	SVOA	Real	Mound HEPA	900425	8/11/97	8/12/97	
DB00518 RM	001	004	Isotopics	Real	Mound HEPA	900425	8/11/97	8/12/97	
DB00518 RM	001	005	Gamma Spec	Real	Mound HEPA	900425	8/11/97	8/12/97	
DB00519 RM	002	006	TCLP, Reactive CN and S, pH	Real	Mound HEAF	900425	8/11/97	8/12/97	Passed TCLP
DB00519 RM	002	007	VOA	Real	Mound HEAF	900425	8/11/97	8/12/97	
DB00519 RM	002	008	SVOA	Real	Mound HEAF	900425	8/11/97	8/12/97	
DB00519 RM	002	009	Isotopics	Real	Mound HEAF	900425	8/11/97	8/12/97	
DB00519 RM	002	010	Gamma Spec	Real	Mound HEAF	900425	8/11/97	8/12/97	
DB00520 RM	003	011	VOA	Real	Mound HEPA	900425	8/11/97	8/12/97	
DB00521 RM	004	012	VOA	Trip Blank	Mound Site	900425	8/11/97	8/12/97	
DB00521 RM	004	013	VOA	Trip Blank	Mound Site	900425	8/11/97	8/12/97	

Condensate samples
Report Identification Number (RIN) 97A2189

Sample Num	Event Num	Bottle Num	Analysis	Sample Type	Location	COC	Sampled	Shipped
DB00522 RM	001	001	VOA	Real	Condensate	900428	8/13/97	8/13/97
DB00522 RM	001	002	VOA	Real	Condensate	900428	8/13/97	8/13/97
DB00522 RM	001	003	VOA	Real	Condensate	900428	8/13/97	8/13/97
DB00522 RM	001	004	SVOA	Real	Condensate	900428	8/13/97	8/13/97
DB00522 RM	001	005	SVOA	Real	Condensate	900428	8/13/97	8/13/97
DB00522 RM	001	006	SVOA	Real	Condensate	900428	8/13/97	8/13/97
DB00522 RM	001	007	PCBs	Real	Condensate	900428	8/13/97	8/13/97
DB00522 RM	001	008	Metals	Real	Condensate	900428	8/13/97	8/13/97
DB00522 RM	001	009	Ignitability	Real	Condensate	900428	8/13/97	8/13/97
DB00522 RM	001	010	Total CN	Real	Condensate	900429	8/13/97	8/13/97
DB00522 RM	001	011	NO2/NO3, TOC	Real	Condensate	900429	8/13/97	8/13/97
DB00522 RM	001	012	TDS, TSS, CL, F, SO4	Real	Condensate	900429	8/13/97	8/13/97
DB00522 RM	001	013	Isotopics	Real	Condensate	945940	8/13/97	8/13/97
DB00522 RM	001	014	Isotopics	Real	Condensate	945940	8/13/97	8/13/97

Air Samples
Report Identification Number (RIN) 97A2187
(TO-14 VOC analysis using Summa Canisters)

Sample Num	Event Num	Bottle Num	Location	TDU's	COC	Sampled	Shipped	Notes
GS00001 RM	001	001	Pre_Cond-1	1,2	RFP900418	8/5/97	8/5/97	
GS00002 RM	002	002	Post_Cond-1	1,2	RFP900418	8/5/97	8/5/97	
GS00003 RM	003	003	Stack	1,2,3,4	RFP900418	8/5/97	8/5/97	
GS00004 RM	004	004	Pre_Cond-1	1,2	RFP900419	8/7/97	8/7/97	
GS00005 RM	005	005	Post_Cond-1	1,2	RFP900419	8/7/97	8/7/97	
GS00006 RM	006	006	Stack	1,2,3,4	RFP900419	8/7/97	8/7/97	Sampled for numerous constituents
GS00007 RM	007	007	Pre_Cond-1	1,2	RFP900422	8/8/97	8/11/97	
GS00008 RM	008	008	Post_Cond-1	1,2	RFP900422	8/8/97	8/11/97	
GS00009 RM	009	009	Stack	1,2,3,4	RFP900422	8/8/97	8/11/97	



Mound Site Location Map

Figure 1 1

EXPLANATION

C (5 erval)

IHSS

Standard Map Features

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DATA SOURCE:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over ata captured by G&O SI., Las Vegas. Digitized from the photographs. /96

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