environmental restoration project

A Department of Energy
Environmental Cleanup Program

LA-UR-01-522
January 2001
ER2001-0024

Project Completion Report for the Accelerated Action at TA-16, MDA R

Los Alamos
NATIONAL LABORATORY
Los Alamos, NM 87545

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36

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Miscellaneous Comments:

ER CATALOG #ER2001-0092. CERRO GRANDE FIRE RELATED.

THIS FORM IS SUBJECT TO CHANGE. CONTACT THE RPF FOR LATEST VERSION. (JUNE 1997)

Los Alamos
NATIONAL LABORATORY

memorandum

Environmental Restoration Project
Los Alamos, New Mexico 87545

To/MS:	Stephen Mee, FWO-DO, MS M878
Thru:	Julie Canepa, E/ER, MS M992
From/MS:	Warren Neff, E/ET, MS M992
Phone/FAX:	667-6080/667-5801
Symbol:	ER2001-0092
Date:	February 1, 2001

SUBJECT: PROJECT COMPLETION REPORT FOR THE ACCELERATED ACTION AT TA-16, MATERIAL DISPOSAL AREA (MDA) R

Attached is the Project Completion Report documenting the Accelerated Action at TA-16, MDA R. This site is a former high explosives burning ground that was active in the 1940's until the early 1950's. The intense heat of the Cerro Grande Fire caused combustible materials below the ground surface to burn at MDA R for weeks after the wildfire swept over the site on May 10-11, 2000. The uncharacterized nature of the site demanded immediate suppression of the fire. Further, the site is in a flood plain, and due to the loss of vegetation and the charred soil at the site, the potential for accelerated erosion and runoff was high. The scope of work included extinguishing the fire, removal of surface debris, and construction of surface water runoff controls.

Due to the burning material in MDA R this task was managed as an Accelerated Action under the Cerro Grande Fire Recovery Effort. On May 31, 2000, a meeting was held to assess the situation at the site; by June 5 contract personnel were onsite fighting the fire, and by June 13, the fire was substantially extinguished. ER personnel worked closely with the contractor (Roy F. Weston, Inc.) to expedite the rapid, safe transition into the field. This enabled successful completion of all tasks within the scope of the project. Actual cost for this work totaled approximately $129,000.

The transmittal of this report completes the work for Activity ID 1.3.09, Air Monitoring, B939 0045 3220, MDA R Fire Protection Waste Removal.

Thank you for your support on this project.

JC/WN/nr

Attachment: Completion Report

Cy:
TA-16 Project File
RPF, MS M707
Skip Natalie, PP&C, MS M992 (w/o attachment)
Jeremy Valdez, PP&C, MS M992 (w/o attachment)
RAFA File (w/o attachment)

APR 2 6 20

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1.0 INTRODUCTION

This report summarizes the fieldwork conducted during an Accelerated Action at Material Disposal Area (MDA) R, located within Technical Area 16 (TA-16) at Los Alamos National Laboratory (the Laboratory). After the May 2000 Cerro Grande Fire, the Environmental (ER) Project identified sites that were subject to corrective action and/or located in floodplains. MDA R was one of the fire-burned sites with the potential for contaminant migration through flooding and erosion.

The site, a former high explosives (HE) burning ground which was active from the mid-1940s until the early 1950s, contained debris and potentially unburned and partially burned HE pieces. Due to the loss of vegetation and the charred soil at this site, the potential for accelerated erosion and runoff was high. In addition, the intense heat of the Cerro Grande Fire caused combustible materials below the ground surface to burn at MDA R for weeks after the wildfire swept over the site on May 10–11. The risks associated with this burning subsurface material demanded immediate suppression of the fire.

Section 2.0 documents the efforts to extinguish the fire, the removal of visible debris at the site, and the implementation of erosion control measures. Sections 3.0 and 4.0 cover the health, safety, and waste-management requirements for these activities.

1.1 Site Description

MDA R is an approximately 2.25-acre site located north of TA-16-260, an HE-machining building, and south of Cañon de Valle. It lies on level terrain with a moderate-to-steep slope to the north, dropping off 80 ft into the canyon. MDA R was an active burning ground and waste disposal site for S-Site's weapons experiments from the mid-1940s until the early 1950s, probably 1951. Initially, waste materials were burned in an open field at MDA R; later, three U-shaped bermed pits (75 ft × 75 ft) were constructed for burning. HE scrap was collected, broken up, and burned in these pits. When the 260 Line was constructed, the berms and the surface soil at MDA R were graded northward into Cañon de Valle. A 1992 inspection of MDA R revealed the presence of oil cans, glass vials, metal structures, and coaxial cables below MDA R, on the south side of the canyon.

Appendix J contains photographs of the site and Cerro Grande Fire suppression activities.

1.2 Potential Source Terms

At the time of the Cerro Grande Fire, limited analytical data existed for MDA R, and the volume of material disposed of or burned was unknown. A limited site characterization indicated residues of high explosives, particularly RDX and TNT, along with above-background concentrations of barium, cobalt, silver, and zinc. By analogy with modern burn areas and with MDA P, the likely contaminants of concern were assumed to be HE, HE byproduct residuals from burning, semivolatiles, fuel oil, uranium, asbestos, and metals, particularly barium.

2.0 FIELD ACTIVITIES

The field activities immediately following the Cerro Grande Fire were directed toward fire suppression, debris removal, and erosion control. Limited debris removal was integrated with fire suppression activities; erosion control was begun after the subsurface fire appeared to be out. Although MDA R covers 2.25 acres, these field activities were focused on a smoldering area measuring 60 ft by 600 ft that had been ignited by the fire.

2.1 Fire Suppression Activities

MDA R began smoldering when the Cerro Grande Fire ran over the site on May 10–11. Workers at the site reported that tree roots, tree trunks, railroad ties, and cabling were the materials burning within MDA R.

2.1.1 Planning and Site Preparation

On Wednesday afternoon, May 31, 2000, a meeting was held at TA-16 to determine the course of action for suppressing the then-smoldering fire at MDA R. At this meeting, personnel from Roy F. Weston, Inc., were asked to visit the site and prepare for using a remote excavator (a remotely controlled, fully functioning track hoe with mounted television survey cameras) to uncover and extinguish burning/smoldering materials. The remote excavator was required because of the possibility that unexploded HE remained within MDA R. Any fire found in the smoldering material was to be extinguished with a low-pressure water stream from a fire hose. Notes from this initial planning meeting are included as Appendix A to this report.

Preparations included installation of a robotic control system (with television monitors) for the excavator at TA-16's Building 260, transportation of heavy equipment from MDA P to MDA R, compilation of a corporate health and safety plan for field activities (see Appendix B), and acquisition of a fire hose from a local vendor. Before excavation began, a flat and level bench was constructed at the top of the landfill. From there, the remote excavator could gain access to the lower slope of the landfill.

Approximately 600 yd^3 of soil were removed and field-screened for metals using x-ray fluorescence (XRF) instrumentation. The removed soil was determined to be "clean": metals concentrations were measured at background levels. The soil was stockpiled for use in berms and erosion control later in the project.

Johnson Controls of Northern New Mexico (JCNNM) constructed a temporary earthen dam above the site, across an existing drainage channel, to retain any run-on water that might occur during the excavation.

2.1.2 Excavation

On Sunday, June 4, 2000, a readiness review was conducted and excavation proceeded, moving from west to east across the landfill. (See Appendix C for a checklist from the readiness review.) The remote excavator reached from the bench, down the slope, to the burning materials. The excavator spread the materials on the bench where the fire was extinguished. The excavated material was then visually inspected, manually sorted, and stored in segregated piles at the on-site storage area.

On Tuesday, June 6, a power supply on the remote excavator failed; personnel used this time to construct a second bench on the lower eastern side of the site. The remote excavator was repaired and became operational again on June 7. Excavation continued eastward through June 8.

On June 9, the excavator was returned to the west end of the landfill where, using an infrared thermometer, intense heat was detected below a standing tree. The tree was pushed over, the fire was exposed, and the area was doused with water.

During this period, the lowest area at the landfill was very hot and, because of difficulty constructing an access bench on the outcropping, manual (not remote) excavation of the smoldering debris was determined to be most effective. Once the excavator was placed on the lower slope, it was operated manually using a continuous stream of water to cool the exposed materials and to control the ash and

dust. Landfill materials were cast from the lower slopes to a staging bench where they were picked up by a second excavator and placed on the mesa top for segregation and storage.

By mid-afternoon on June 13, it appeared that, although the lower western end of MDA R was still very hot, the fire had been extinguished and that erosion stabilization efforts could proceed. A detailed description of the fire suppression activities that took place through July 6, 2000, is provided in Appendix D.

In fact, on July 3, and again on August 31, 2000, small plumes of smoke were observed on the lower western and eastern ends of the site, respectively. Weston employees excavated the eastern area for what is believed to have been the final fire suppression activity at MDA R.

2.2 Debris Removal and Definition of Remaining Contamination

The primary focus of this activity was fire suppression; however, debris removal and segregation were concurrent with fire suppression activities at MDA R.

2.2.1 Debris Removal

All large and smaller, yet visible, pieces of metal were surveyed for beta radiation which would indicate the presence of depleted or natural uranium. All surveys indicated that uranium was not present.

On June 12, 2000, materials containing asbestos were exposed in a small area on the western end of the site. Personnel in Level C personal protective equipment (PPE) conducted an asbestos recovery. This was done before excavation continued to prevent widespread dispersal of the friable contamination.

Not all landfill material was removed from the site during excavation since fire suppression was of primary concern; however, significant quantities of barium nitrate pieces, friable asbestos, and industrial soils were removed from MDA R. Landfill material that was not excavated during fire suppression remains in the eastern and western ends of MDA R. The actual lateral extent of the landfill was not defined during these activities.

2.2.2 Definition of Remaining Contamination

After the fire was suppressed, an XRF survey was done on the slopes exposed by the excavation. Barium and lead appeared to be the principal remaining contaminants at MDA R. Soils contaminated with barium remain in the central area. The barium contamination in surface soils near the former drainage arroyo exceeded 200,000 ppm. A few shallow (less than 1 ft deep) subsurface samples exceeded 14,000 ppm. A crude map of this XRF survey was prepared and is provided in Appendix E. Approximately 100 lb of barium nitrate pieces were collected and managed as hazardous debris during this survey.

2.3 Erosion Control Activities

Erosion control activities included stabilization of the spoils piles, stabilization of the canyon slopes, and the redirection of a small drainage arroyo that previously conducted surface water runoff through the landfill.

2.3.1 Spoils Pile Stabilization

An earthen berm was constructed around the spoils pile to inhibit waterborne migration of the soil in the pile. The berm was constructed from the clean soil that had been stockpiled during excavation of the initial bench. Straw wattles were installed around the perimeter of the pile.

2.3.2 Slope Stabilization

The remaining clean soil from the bench excavation was returned to the upper slopes and contoured to control erosion. Dead and burned trees were cut and placed parallel to Cañon de Valle, along the mid-slope, below the landfill. Straw wattles were placed, then packed, along the trees to act as silt control, attenuating silt migration while allowing water to pass. Straw wattles were also placed at the top of the slope, near the mesa top, to attenuate silt migration.

2.3.3 Redirection of the Drainage Arroyo

During fire suppression activities, a small drainage arroyo and a dam south of the landfill were constructed by JCNNM. Inspection of the small dam indicated that a significant rainfall event would breach the dam and that water would run across the most contaminated part of the landfill. To solve this potential problem, a temporary drainage ditch was constructed west of the landfill. The ditch led from the dam to the canyon edge. Water from this new ditch does not drain through the contaminated area. The new diversion ditch consists of a simple unlined ditch, approximately 100 yd long, with local rock reinforcement. Straw wattles were placed along the ditch to attenuate silt while allowing water to pass. This ditch completely replaces the former arroyo that drained through the landfill. The ditch now drains through an area on the western side of the landfill, through a relatively clean area that does not exhibit any exposed landfill debris.

3.0 HEALTH AND SAFETY

3.1 Health and Safety Requirements

The Site Safety Officer (SSO) was responsible for enforcing all health and safety requirements per the health and safety plan (Appendix B). The SSO conducted tailgate safety meetings before site activities began each day (see Appendix F for tailgate safety meeting notes). The SSO was also responsible for informing visitors about site health and safety requirements. The Laboratory's industrial hygiene group (ESH-5) provided health and safety oversight during the field activities.

The following additional safety precautions were taken:

- Building TA-260 was closed during all fire suppression activities.
- The Engineering Sciences and Applications (ESA) Site Safety Officer (SSO) was present during all activities and wrote periodic project status reports (see Appendix G).
- Los Alamos County provided personnel and equipment either on-site or nearby, as backup, while all fire suppression activities were taking place.

3.2 Monitoring

Because the burning material at MDA R had the potential to release air emissions, the Laboratory's Air Quality Group (ESH-17) conducted an ambient air monitoring investigation. This was done to address concerns about the impact of these potential air emissions on human health and the environment.

The investigatory activity included monitoring for volatile organic compounds (VOCs) at the eastern and western ends of the excavation area. In addition, a background sample was collected at TA-16, Building 900. Personnel from the Laboratory and the Waste Isolation Pilot Project (WIPP), as well as equipment from WIPP, were used.

Results of this effort showed 11 VOCs detected in the sample sets. "The concentrations measured upwind and downwind of the MDA were comparable, indicating that the area was not a net source of air emissions . . . all of the VOCs were present at concentrations at least three orders of magnitude (i.e., more than 1,000 times) below the applicable occupational exposure limit, the 8-hr time-weighted average (TWA)" (report to Jean Dewart; see Appendix H).

Details of the air monitoring study and the analytical results are provided in Appendix H.

4.0 WASTE MANAGEMENT, CHARACTERIZATION, AND DISPOSAL

All wastes generated during this project were managed in accordance with all US Environmental Protection Agency, New Mexico Environment Department, US Department of Energy, and Laboratory requirements, as well as the site-specific Waste Characterization Strategy Form prepared for this project. The waste generated during the excavation of MDA R consisted of industrial soils, barium nitrate pieces, and asbestos-containing material.

Generated soils were managed as solid waste within the boundary of the project area, pending the results of analyses performed on composite samples. Results of the analyses indicated that the soils were not characteristically hazardous waste. No listed hazardous constituents were noted. Therefore, the 1960 yd^3 of soil were managed as industrial soil, within a bermed area, until they were transported to the Rio Rancho industrial landfill in 20-yd^3 semitrailers. This took place on November 17, 2000; December 15, 2000; and January 4, 5, and 8, 2001.

Approximately 175 lb of barium nitrate pieces were visually identified during the soil-screening process. This waste was containerized, appropriately labeled as hazardous waste, and placed in the less-than-90-day accumulation area at the southern end of Building 260 until it was transported to Technical Area 54 (TA-54) on August 8, 2000. Final disposal will be made through a permitted disposal facility.

Approximately 300 lb of friable asbestos-containing waste was also visually identified during the screening process. This waste was containerized, appropriately labeled, and placed in the less-than-90-day accumulation area at the southern end of Building 260 until it was transported to TA-54 on August 29, 2000. Final disposal will be made through a permitted disposal facility.

Copies of the Waste Characterization Strategy Forms are provided as Appendix I to this report.

Appendix A
May 31, 2000, Planning Meeting Notes

X-Sender: sylvia@popmail.esa.lanl.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.1
Date: Fri, 02 Jun 2000 13:31:10 -0500
To: wb@lanl.gov, goldier@lanl.gov, ditrujillo@lanl.gov, jeffw@lanl.gov,
sherrard@lanl.gov, jnuttall@lanl.gov, macdonell@lanl.gov,
jim_stapleton@lanl.gov, mac@lanl.gov, boissier@rt66.com,
hatler@lanl.gov, sbryan@lanl.gov, rvortiz@lanl.gov, bob_grace@lanl.gov,
jcarnes@lanl.gov, emhanson@lanl.gov, ruminer@lanl.gov
From: "Sylvia Y. Martinez" <sylvia@lanl.gov>
Subject: MDA-R Fire Suppression Meeting
Cc: dhemphill@lanl.gov

Attached are Minutes from the MDA-R Fire Suppression Meeting held on the morning of Friday, June 3rd. Please make sure any interactions with non-LANL personnel go through Public Affairs.

Doug Hemphill

Sylvia Y. Martinez
ESA-WMM Group Office
667-6867 / 665-5548 fax
sylvia@lanl.gov

minutes2.doc

Results of the MDA-R fire suppression meeting held on Friday June 2, 2000.

A meeting is being held this afternoon to discuss status of Laboratory Emergency Conditions. If Emergency Conditions have been lifted, all operations listed below will be replanned.

Responsibilities Defined:

EM&R – Authorize operation to proceed
ESA (WMM and FM) – Provide Logistics/Operational Lead
ESA-WMM – Provide Safety Support
ESH-18 – Provide Erosion Control
ESA-FM Provide Safety Support, Air Quality Support
Fire Dept. – Provide stand-by support during fire suppression operations
Weston/BEAR – Perform remote excavation of hot spots and remote operation of fire hose

Paperwork Required (Pending Approval of Operation under Emergency Conditions):

Excavation Permit – ESH-18 and Weston with FM
HASP (or equivalent) – Weston and ESA-FM
Purchase Request – ER and ESA
Penetration Permit – ESA-FM and Weston

Operations and Designee (by temporal priority)

1st Priority
Meeting to determine status of Laboratory EC status (if Lab is not under EC all work stopped)
Tape off area with "Caution" and "Do Not Enter" tape - Jim
Fill Ditch to allow access
Place air quality monitors – (Ann)
Initiate Excavation Permits (Jeff and Bill M/Bill C

2nd Priority
Level Ground - Weston
Move Excavators - Weston
Move Control room - Weston
Provide utilities (Bill M. Larry)
Write Safety Plan – Bill C.

3rd Priority
Build Dams - Jeff
Operational Check of Excavator - Weston

4th Priority
Kick-Off Meeting with Excavation Team to discuss ES&H issues – ESA management
Notify Fire Dept to stand by – Jim S

6/2/00

MDA-R Recovery

Discussion of project startup/status

TA-16 Bldg 200, Cont. Rm.

- EMTR stance - work @ MDA-R is not an emergency - No

- If not an emergency - Then must follow all LANL LIRs for Safety and Procedures

  - Excavation Permit - must be ok'd by EOC (?) Judy Martinez coordinates Review - Bill McC. To help

  - Safety Plan - one way to approve is to have a RFW HASP (use Template)

- Still under Emergency conditions? - ESA is lead mtg. this afternoon to determine status - 3pm Today

- Work on surface pad clearance + construction on hold until decision (JCNNM)

- PR - purchase request - need SOW/cost est. - ESA is doing

- Next week - setup air samplers (VOC, metals, rad) - ESA-17 Today

- RFW to proceed w/ field preparations until notification This p.m.

- ESA to provide mtg. notes via e-mail

- written by Bill Criswell 6/2/00

- see signup sheet attached

Time 2:30 pm Friday 6/2/00
@ MDA-R

- Larry Hatler - ESA - WMM
- Dick Burick - Executive Office
- Earl Marie Hansen - ESA

Dick directed that the fire extinguisher @ MDA-R was
To proceed w/o delay. Must work Saturday/Sunday
Do not wait until Monday.
He will expect daily briefing from his folks on progress.

- written by Bill Criswell
6/3/00

Bob Holder
7-9420

Appendix B
Site Health and Safety Plan

SITE HEALTH AND SAFETY PLAN (HASP)

Prepared by: Wendy Litts

W.O. Number: 02244-070-002-1200-00 Date: 6/3/00

Project Identification
Office:
Site Name: MDA - R
Client: Los Alamos National Laboratory
Work Location Address: TA - 16

Site History:
MDA-R was in operation from 1943 until 1950 as a disposal site for explosives-contaminated debris. Landfill may contain raw TNT explosives material.

Scope of Work:
Remote excavation for suppression of underground fire at MDA-R that is currently smoldering; benching and sloping to provide acces; brush and tree clearance. Personnel will not enter excavation area and will be out of area during remote excavation.

☐ Site visit only, site HASP not necessary. List personnel here and sign off below:

Regulatory Status:

Site regulatory status:

CERCLA/SARA	RCRA	Other Federal Agency
☐ U.S. EPA	☐ U S EPA	☒ DOE
☐ State	☒ State	☐ USACE
☐ NPL Site	NRC	☐ Air Force
☐ OSHA	☐ 10 CFR 20	☐ _____

☒ Hazard Communication (Req'd See Attachment D)
☐ 1910 ☐ 1926 ☐ State

☒ Safety Officer Manual (Required to be On-Site)
Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan.

☐ Stack Test ☐ _____
☐ Air Emissions ☐ _____
☐ Asbestos ☐ _____
☐ Industrial Hygiene ☐ _____
☐ _____ ☐ _____

Review and Approval Documentation:

Reviewed by: SO/DSM/CHS — MIKE STUART (Name (Print)) — Signature — Date 6-6-00

Other — JANE SPENCER (Name (Print)) — Signature — Date 6/5/00

Approved by Project Manager — Bill Criswell (Name (Print)) — Signature — Date 6/3/00

Hazard Assessment and Equipment Selection:
In accordance with WESTON's Personal Protective Equipment Program and 29 CFR 1910 132, at the site prior to personnel beginning work, the SHSC and/or the Site Manager have evaluated conditions and verified that the personal protective equipment selection outlined within this HASP is appropriate for the hazards known or expected to exist. (Refer to Safety Officer Manual Section 2, Personal Protection Program, for guidance.)

☒ SHSC ☐ Site Manager — Wendy Litts (Name (Print)) — Signature — Date 6/3/00

Project start date: 06/02/00 End date: 08/02/00	This site HASP **must** be **reissued/reapproved** for any activities conducted after: Date: 8/3/00	Amendment date(s) By: 1. 2. 3. 4. 5.

WESTON REPRESENTATIVES

Organization/Branch	Name/Title	Address	Telephone
WESTON	Bill Criswell / Project Manager		699-2240
WESTON	Fred Gray / Site Manager		699-2245
WESTON	Wendy Litts / Site Health & Safety		699-4892

Roles and Responsibilities: Administration, Management and health and safety of all work activities.

WESTON SUBCONTRACTORS

Organization/Branch	Name/Title	Address	Telephone
BEAR, Inc.	Peter Boissiere / Robotics Lead		

Roles and Responsibilities: Will control the robotic equipment on-site under the direction of the site manager.

SITE-SPECIFIC HEALTH AND SAFETY PERSONNEL

The Site Health and Safety Coordinator (SHSC) for activities to be conducted at this site is: Wendy Litts

The SHSC has total responsibility for ensuring that the provisions of this Site HASP are adequate and implemented in the field.

Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, the personnel assigned as SHSCs are experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120.

Qualifications:

Site Health and Safety Coordinator Course

Designated alternates include: Gary Stoopes

HEALTH AND SAFETY EVALUATION

Hazard Assessment

Background Review: ☒ Complete ☐ Partial If partial why?

Activities Covered Under This Plan:

No.	Task/Subtask	Description	Schedule
1	Area Preparation	Clearing, grubbing and logging of vegetation and trees in area of excavation	
2	Remote Excavation	Robotic excavation and stockpiling of soil and debris from landfill.	

Types of Hazards:

1 Numbers refer to one of the following hazard evaluation forms Complete hazard evaluation forms for each appropriate hazard class

Physiochemical 1

- ☐ Flammable
- ☒ Explosive
- ☐ Corrosive
- ☐ Reactive
- ☐ O_2 Rich
- ☐ O_2 Deficient

Chemically Toxic 1

- ☐ Inhalation
- ☐ Ingestion
- ☐ Contact
- ☐ Absorption
- ☐ Carcinogen
- ☐ Mutagen
- ☐ Teratogen
- ☐ OSHA 1910.1000 Substance (Air Contaminants)
- ☐ OSHA Specific Hazard Substance Standard (Refer to following page for listing)

Radiation 3

Ionizing

- ☐ Internal exposure
- ☐ External exposure

Non-ionizing

- ☒ UV
- ☐ IR
- ☐ RF
- ☐ MicroW
- ☐ Laser

Biological 2

- ☐ Etiological Agent
- ☒ Other (plant, insect, animal)

- ☐ **Physical Hazards 4**
- ☒ Construction Activities

Source/Location of Contaminants and Hazardous Substances:

Directly Related to Tasks

- ☐ Air
- ☐ Other Surface
- ☐ Groundwater
- ☒ Soil
- ☐ Surface Water
- ☐ Sanitary Wastewater
- ☐ Process Wastewater

Indirectly Related to Tasks — Nearby Process(es) That Could Affect Team Members:

- ☒ Client Facility/WESTON Work Location
- ☐ Nearby Non-Client Facility

Describe: All activities in proximity have been shutdown until completion of this project

- ☒ Have activities (task[s]) been coordinated with facility?

HEALTH AND SAFETY EVALUATION — 2 BIOLOGICAL HAZARDS OF CONCERN

☒ **Poisonous Plants** (FLD 43)

Location/Task No(s):

Source: ☒ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion ☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No

Immunization required: ☐ Yes ☒ No

☒ **Insects** (FLD 43)

Location/Task No(s):

Source: ☒ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion ☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No

Immunization required: ☐ Yes ☒ No

☒ **Snakes, Reptiles** (FLD 43)

Location/Task No(s):

Source: ☐ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion ☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No

Immunization required: ☐ Yes ☒ No

☒ **Animals** (FLD 43)

Location/Task No(s):

Source: ☒ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion ☒ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☒ No

Immunization required: ☐ Yes ☒ No

FLD 43 — WESTON Biohazard Field Operating Procedures Att. OP ☐

☐ **Sewage**

Location/Task No(s):

Source: ☐ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No

Immunization required: ☐ Yes ☐ No

Tetanus Vaccination within Past 10 yrs: ☐ Yes ☐ No

☐ **Etiologic Agents (List)**

Location/Task No(s):

Source: ☐ Known ☐ Suspect

Route of Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☐ Direct Penetration

Team Member(s) Allergic: ☐ Yes ☐ No

Immunization required: ☐ Yes ☐ No

FLD 44 — WESTON Bloodborne Pathogens Exposure Control Plan – First Aid Procedures Att. OP ☒

FLD 45 — WESTON Bloodborne Pathogens Exposure Control Plan – Working with Infectious Waste Att. OP ☐

HEALTH AND SAFETY EVALUATION — 4 PHYSICAL HAZARDS OF CONCERN

Phy. Haz. Cond.	Physical Hazard	Attach OP	WESTON OP Titles
Loud noise	Hearing loss/disruption of communication	☒	FLD01 - Noise Protection
Inclement weather	Rain/humidity/cold/ice/snow/lightning	☒	FLD02 - Inclement Weather
Steam heat stress	Burns/displaced oxygen/wet working surfaces	☐	FLD03 - Hot Process - Steam
Heat stress	Burns/hot surfaces/low pressure steam	☒	FLD04 - Hot Process - LT3
Ambient heat stress	Heat rash/cramps/exhaustion/heat stroke	☐	FLD05 - Heat Stress Prevention/Monitoring
Cold stress	Hypothermia/frostbite	☐	FLD06 - Cold Stress
Cold/wet	Trench/paddy/immersion foot/edema	☐	FLD07 - Wet Feet
Confined spaces	Falls/burns/drowning/engulfment/electrocution	☐	FLD08 - Confined Space Entry
Explosive vapors	Thermal burns/impaction/dismemberment	☐	FLD09 - Hot Work
Improper lifting	Back strain/abdomen/arm/leg muscle/joint injury	☐	FLD10 - Manual Lifting/Handling Heavy Objects
Uneven surfaces	Vehicle accidents/slips/trips/falls	☒	FLD11 - Rough Terrain
Poor housekeeping	Slips/trips/falls/punctures/cuts/fires	☐	FLD12 - Housekeeping
Structural integrity	Crushing/overhead hazards/compromised floors	☐	FLD13 - Structural Integrity
Hostile persons	Bodily injury	☐	FLD14 - Site Security
Remote area	Slips/trips/falls/back strain/communication	☐	FLD15 - Remote Area
Improper cyl. handling	Mechanical injury/fire/explosion/suffocation	☐	FLD16 - Pressure Systems - Compressed Gases
Water hazards	Poor visibility/entanglement/drowning/cold stress	☐	FLD17 - Diving
Water hazards	Drowning/heat/cold stress/hypothermia/falls	☐	FLD18 - Operation and Use of Boats
Water hazards	Drowning/frostbite/hypothermia/falls/electrocution	☐	FLD19 - Working Over Water
Vehicle hazards	Struck by vehicle/collision	☐	FLD20 - Traffic
Explosions	Explosion/fire/thermal burns	☒	FLD21 - Explosives
Moving mechanical parts	Crushing/pinch points/overhead hazards/electrocution	☒	FLD22 - Heavy Equipment Operation
Moving mech. parts	Overhead hazards/electrocution	☐	FLD23 - Cranes/Lifting Equipment Operation
Working at elevation	Overhead hazards/falls/electrocution	☐	FLD24 - Aerial Lifts/Manlifts
Working at elevation	Overhead hazards/falls/electrocution	☐	FLD25 - Working at Elevation
Working at elevation	Overhead hazards/falls/electrocution/slips	☐	FLD26 - Ladders
Working at elevation	Slips/trips/falls/overhead hazards	☐	FLD27 - Scaffolding
Trench cave-in	Crushing/falling/overhead hazards/suffocation	☒	FLD28 - Excavating/Trenching
Improper material handling	Back injury/crushing from load shifts	☐	FLD29 - Materials Handling
Physiochemical	Explosions/fires from oxidizing, flam./corr. material	☐	FLD30 - Hazardous Materials Use/Storage
Physiochemical	Fire and explosion	☐	FLD31 - Fire Prevention/Response Plan Required
Physiochemical	Fire	☐	FLD32 - Fire Extinguishers Required
Structural integrity	Overhead/electrocution/slips/trips/falls/fire	☐	FLD33 - Demolition
Electrical	Electrocution/shock/thermal burns	☐	FLD34 - Utilities
Electrical	Electrocution/shock/thermal burns	☐	FLD35 - Electrical Safety
Burns/fires	Heat stress/fires/burns	☐	FLD36 - Welding/Cutting/Burning
Impact/thermal	Thermal burns/high pressure impaction/heat stress	☐	FLD37 - High Pressure Washers
Impaction/electrical	Smashing body parts/pinching/cuts/electrocution	☒	FLD38 - Hand and Power Tools
Poor visibility	Slips/trips/falls	☐	FLD39 - Illumination
Fire/explosion	Burns/impaction	☐	FLD40 - Storage Tank Removal/Decommissioning
Communications	Disruption of communications	☐	FLD41 - Std. Hand/Emergency Signals
Energy release	Unexpected release of energy	☐	FLD42 - Lockout/Tagout
Drilling hazards	Electrocution/overhead hazards/pinch points	☐	2.5 - Drilling Safety Guide

FLD 47 CLEARING + GRUBBING OP

HASP FORMS.DOC

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Task No. 1 - Area preparation including cutting, grubbing and logging of trees and vegetation and benching with excavator to provide access to landfill.

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

A chainsaw and backhoe will be used for clearing, grubbing, and logging of area.

Hard hat, safety shoes, safety glasses, leather gloves, hearing protection will be required. Chaps will be worn when using a chainsaw.

POTENTIAL HAZARDS/RISKS

Chemical

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L
What justifies risk level?

Physical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L
What justifies risk level?
Chainsaw, backhoe and hand tools
A mishap could occur with moderate harm resulting.

Biological

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L
What justifies risk level?
Snakes, animals, plants
A mishap could occur with injury or illness resulting in reversible harm.

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☒ M ☐ L
What justifies risk level?
Sun
Sunburn could occur.

LEVELS OF PROTECTION/JUSTIFICATION

Level D protective equipment will be worn. The possibility of chemical or airborne contamination is minimal.

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

FLD01, FLD02, FLD04, FLD11, FLD22, FLD38, FLD47

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Task No. 2 - Remote excavation and stockpiling of soil and debris from landfill. Landfill is located on steep slope. Benching of slope will be required for access. Benching will be performed by a conventional excavator

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

A remote controlled excavator will be used to excavate soil and debris from the landfill and placed in an area constructed to receive it. A front end loader may be used to move soils to construct berms and to stage overburden materials. A conventional excavator will be used to bench down slope for access

No personnel will be within 100 yards of the area during robotic excavation

POTENTIAL HAZARDS/RISKS

Chemical

☐ Hazard Present — Risk Level: ☐ H ☒ M ☐ L

What justifies risk level?
Explosives potential at remote site
Landfill will be excavated remotely.

Physical

☒ Hazard Present — Risk Level: ☐ H ☒ M ☐ L

What justifies risk level?
Operator and site personnel inspecting site.
A mishap could occur with moderate harm resulting. Visual inspection of spoils piles will be performed from the outside of staging area. Visual inspection of excavation will be performed on top of slope. No one will descend down slope for any reason.

Biological

☐ Hazard Present — Risk Level: ☐ H ☐ M ☐ L

What justifies risk level?

RADIOLOGICAL

☐ Hazard Present — Risk Level: ☐ H ☒ M ☒ L

What justifies risk level?
Ultra violet exposure

LEVELS OF PROTECTION/JUSTIFICATION

There will be no personnel in area during remote excavation.

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

FLD01, FLD02, FLD04, FLD11, FLD21, FLD22, FLD28, FLD38

PERSONNEL PROTECTION PLAN

Engineering Controls
Describe Engineering Controls used as part of Personnel Protection Plan

Task(s)

1, 2, 3 Noise exposure will be monitored and controlled by the use of hearing protection

2 Personnel will be protected from any potential explosion by control of distance from landfill, barricades and blast shields if needed. Robotic control will be within client Building 260 which has all safety protection required to protect personnel from potential detonation. The fire department will be on call if fire flames up

Fire control will utilize local fire hydrant and hoses supplied by Los Alamos Fire Department.

Administrative Controls
Describe Administrative Controls used as part of Personnel Protection Plan

Task(s)

1, 2, 3 Chainsaw and heavy equipment will be inspected daily before operation and will be operated by a competent and proficient person

1, 2 Weather will be monitored by health and safety and a work/rest regimen will be implemented to reduce the risk of heat or cold stress

Caution and observation will be used when moving in areas of potential concern of slips, trips, and falls

Until landfill materials are removed, personnel will not enter active excavation area and inspection of excavation will be performed from top of slope.

A LANL High Explosive Safety person will be present during all activities

Personal Protective Equipment
Action Levels for Changing Levels of Protection. Refer to HASP Form 13, Site Air Monitoring Program—Action Levels. Define Action Levels for up or down grade for each task

Task(s)

1,3 Level D - Hard hat, safety shoes, safety glasses, gloves and hearing protection. (Chaps will be worn when operating chainsaw)

2 Entry to inspect excavation and spoils piles will only be allowed when no remote excavation is in process. Modified Level D will be worn.

DESCRIPTION OF LEVELS OF PROTECTION

Level D	Level D Modified
Task(s):	**Task(s):**
☒ Head	☒ Head
☒ Eye and Face	☒ Eye and Face
☒ Hearing	☒ Hearing
☒ Arms and Legs Only	☒ Arms and Legs Only
☐ Appropriate Work Uniform	☒ Whole Body
☒ Hand - Gloves	☐ Apron
☒ Foot - Safety Boots	☒ Hand - Gloves
☐ Fall Protection	☐ Gloves
☐ Flotation	☐ Gloves
☐ Other	☒ Foot - Safety Boots
	☒ Over Boots

SITE OR PROJECT HAZARD MONITORING PROGRAM

Air Monitoring Instruments Calibration Record

Instrument, Mfg., Model, Equip. ID No.	Date	Time	Calib. Material	Calib. Method Mfg.'s	Other	Initial Setting and Reading	Final Setting and Reading	Calibrator's Initials

CONTINGENCIES

Emergency Contacts and Phone Numbers

Agency	Contact	Phone Number
Local Medical Emergency Facility (LMF)	Los Alamos Medical Center	662-4201
WESTON Medical Emergency Contact	EMR - Dr. Elyane Thernult	1-800-229-3674
WESTON Health and Safety	Corporate Health and Safety	(610) 701-3000
Fire Department	Los Alamos Fire Department	667-4055
Police Department	Los Alamos Police Department	662-8222
On-Site Coordinator- SHSC	Wendy Litts	699-4892
Client Site Contact	Bill McCormick	667-6316
Site Telephone	Fred Gray	699-2245
Nearest Telephone	Control Room (Bldg 260)	667-6695

Local Medical Emergency Facility(s)

Name of Hospital: Los Alamos Medical Center

Address: 3917 West Rd Los Alamos, NM — Phone No.: 662-4201

Name of Contact: — Phone No.: 662-2455

Type of Service:
- ☐ Physical trauma only
- ☐ Chemical exposure only
- ☐ Physical trauma and chemical exposure
- ☒ Available 24 hours

Route to Hospital (written detail): See Attached

Travel time from site: 10 minutes

Distance to hospital: 5 miles

Name/no. of 24-hr ambulance service: /

Secondary or Specialty Service Provider

Name of Hospital: Los Alamos Occupational Health Facility

Address: — Phone No.: 667-7848

Name of Contact: — Phone No.:

Type of Service:
- ☐ Physical trauma only
- ☐ Chemical exposure only
- ☐ Physical trauma and chemical exposure
- ☐ Available 24 hours

Route to Hospital (written detail): See Attached

Travel time from site: 8 minutes

Distance to hospital: 4 miles

Name/no. of 24-hr ambulance service: /

Figure 1. Route to Hospital

(Draw map to hospital here if space permits or attach on next sheet.)

EMERGENCY CONTACTS AND PHONE NUMBERS

(Post on-site in Support Zone)

MEDICAL EMERGENCY/FIRE:

Los Alamos Fire Department..... LANL phone: **911** Cellular phone: **667-7080**

HAZARDOUS RELEASE/SPILL:

LANL HAZMAT Team (EM&R) **667-6211**
LANL Occupational Medicine Clinic (ESH-2) **667-0660**
Los Alamos Medical Center Hospital **662-4201**
Security OS/Pro Force **667-6534**
Los Alamos Police **662-8222**
ESA FM and ESH Team **665-2265**
TA/Facility Operations **667-9192**
ESA Site Representative: Bill McCormick **667-6316**
LANL Health and Safety – ESH-5 ..... **665-7221**
LANL Radiation – ESH-1 ..... **667-7137**
(FPL) Program Administrator: Ken Bostick **667-8483**
(FTM) Project Manager: Bill Criswell **662-6445**
Project HS Rep.: Dan Sandoval .....
Project ESH-1 Rep: Dave Martinez **699-1674**
..... **Pager: 996-1248**

EXPLOSIVES STORED OVERNIGHT:

ESA-WMM **667-6867**
Security **667-4438**
Station 100 ..... **667-4437**

EMERGENCY REPORTING INFORMATION:

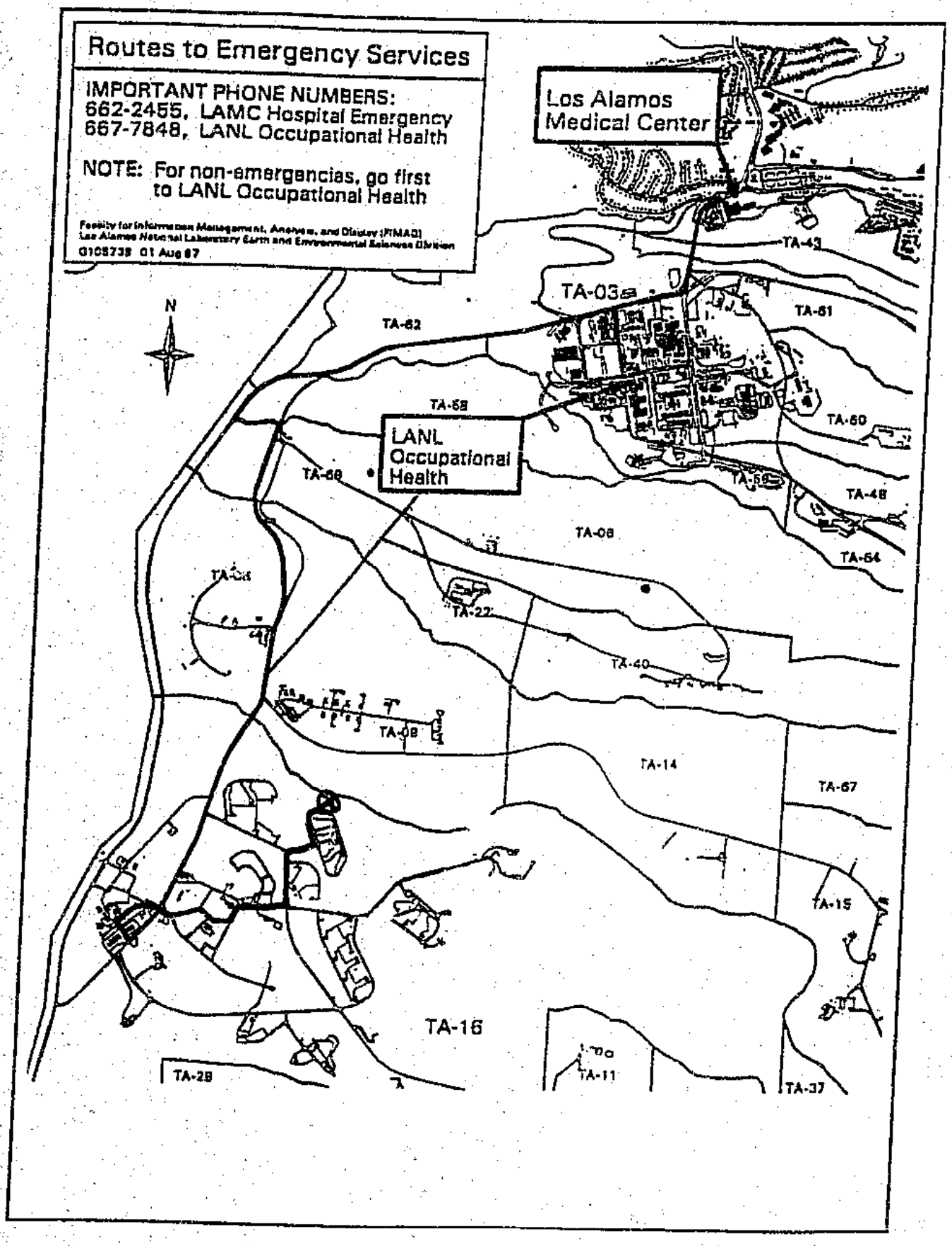
When calling for emergency services, have the following information available to report:

- Site name/location/phone #
- Caller ID
- Nature of emergency
- Number of personnel involved
- Name and condition of affected people
- Actions taken and assistance required

WESTON – TA-16 / MDA-P

SITE CELL PHONES

Site Manager (Fred Gray) ..... **(505) 699-2245**
Safety Officer (Wendy Litts) ..... **(505) 699-4892**
Project Manager (Bill Criswell) ..... **(505) 699-2240**


Routes to Emergency Services
IMPORTANT PHONE NUMBERS:
662-2455, LAMC Hospital Emergency
667-7848, LANL Occupational Health
NOTE: For non-emergencies, go first to LANL Occupational Health
Facility for Information Management, Analysis, and Display (FIMAD)
Los Alamos National Laboratory Earth and Environmental Sciences Division
G105738 01 Aug 87
Los Alamos Medical Center
LANL Occupational Health
N
TA-03
TA-43
TA-61
TA-62
TA-58
TA-60
TA-66
TA-59
TA-48
TA-08
TA-64
TA-22
TA-40
TA-08
TA-14
TA-67
TA-15
TA-16
TA-28
TA-11
TA-37

DECONTAMINATION PLAN

Personnel Decontamination

Consistent with the levels of protection required, step-by-step procedures for personnel decontamination for each level of protection are attached

Levels of Protection Required for Decontamination Personnel

The levels of protection required for personnel assisting with decontamination will be:

☐ Level B ☐ Level C ☒ Level D

Modifications include

Disposition of Decontamination Wastes

Provide a description of waste disposition, including identification of storage area, hauler, and final disposal site, if applicable:

Soil and debris will be staged in exclusion zone south of excavation.

No hauling, sorting or disposal of soil and debris will be done at this time.

Equipment Decontamination

A procedure for decontamination steps required for non-sampling equipment and heavy machinery follows

A dry decon and high explosives spot test will be done on the heavy equipment used in area

Sampling Equipment Decontamination

Sampling equipment will be decontaminated in accordance with the following procedure.

No sampling will be done at this time

LEVEL D/MODIFIED LEVEL D DECONTAMINATION PLAN

Check indicated functions or add steps, as necessary:

Function	Description of Process, Solution, and Container
☐ Segregated equipment drop	
☐ Boot cover and glove wash	
☐ Boot cover and glove rinse	
☐ Tape removal - outer glove and boot	
☒ Boot cover removal	Removed and disposed of in plastic bags
☒ Outer glove removal	Removed and disposed of in plastic bags
HOTLINE	
☐ Suit/safety boot wash	
☐ Suit/boot/glove rinse	
☐ Safety boot removal	
☐ Suit removal	
☐ Inner glove wash	
☐ Inner glove rinse	
☐ Inner glove removal	
☐ Inner clothing removal	
CONTAMINATION REDUCTION ZONE (CRZ)/SAFE ZONE BOUNDARY	
☐ Field wash	
☐ Redress	

Disposal Plan, End of Day:

Disposal Plan, End of Week:

Disposal Plan, End of Project:

SITE PERSONNEL AND CERTIFICATION STATUS

Subcontractor's Health and Safety Program Evaluation

Name of Subcontractor: BEAR, Inc.
Address: 2815 Broadbent Pkwy NE, Ste E, Albuquerque, NM 87107-1625

Activities To Be Conducted by Subcontractor: Remote Excavation

Evaluation Criteria

Medical program meets OSHA/WESTON criteria ☒ Acceptable ☐ Unacceptable Comments:	Personal protective equipment available ☒ Acceptable ☐ Unacceptable Comments	On-site monitoring equipment available, calibrated, and operated properly ☐ Acceptable ☐ Unacceptable Comments: n/a
Safe working procedures clearly specified ☒ Acceptable ☐ Unacceptable Comments:	Training meets OSHA/WESTON criteria ☒ Acceptable ☐ Unacceptable Comments	Emergency procedures ☒ Acceptable ☐ Unacceptable Comments:
Decontamination procedures ☒ Acceptable ☐ Unacceptable Comments:	General health and safety program evaluation ☒ Acceptable ☐ Unacceptable Comments:	Additional comments: ☒ Subcontractor has agreed to and will conform with the WESTON HASP for this project. ☐ Subcontractor will work under his own HASP, which has been accepted by project PM

Evaluation Conducted by: Date:

Subcontractor

Name: Peter Boissiere Title: Robotics Lead Task(s): Remote Excavate Certification Level or Description: ☒ Medical Current ☒ Training Current ☐ Fit Test Current (Qual.) ☒ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

HEALTH AND SAFETY PLAN APPROVAL/SIGNOFF FORM

Site Name: LANL MDA-R | WO#02744-070-002-1290

Address: TA-16

I understand, agree to, and will conform with the information set forth in this Health and Safety Plan (and attachments) and discussed in the personnel health and safety briefing(s).

Name	Signature	Date
Bill Criswell	[signature]	6/3/00
Wendy Litts	[signature]	6/3/00
Scott Pugh	[signature]	6/3/00
Gerald Begany	[signature]	6/3/00
Fred Gray	[signature]	6-3-00
DIANE SPENGLER	[signature]	6-3-00
Peter Boissière	[signature]	6/3/00
MARK GRAY	[signature]	6-6-00
Stephen McManus	[signature]	6/20/00
Craig Dodd	[signature]	6-20-00

TRAINING AND BRIEFING TOPICS

The following items will be covered at the site-specific training meeting, daily or periodically.

☐ Site characterization and analysis. Sec. 3.0, 29 CFR 1910.120 i	☐ Level A
☒ Physical hazards, HASP Form 07	☐ Level B
☒ Chemical hazards, HASP Form 04	☐ Level C
☒ Animal bites, stings, and poisonous plants	☒ Level D
☐ Etiologic (infectious) agents	☐ Monitoring, 29 CFR 1910.120 (h)
☒ Site control, 29 CFR 1910.120 d	☐ Decontamination, 29 CFR 1910.120 (k)
☒ Engineering controls and work practices, 29 CFR 1910.120 (g)	☐ Emergency response, 29 CFR 1910.120 (l)
☒ Heavy machinery	☐ Elements of an emergency response, 29 CFR 1910.120 (l)
☐ Forklift	☐ Procedures for handling site emergency incidents, 29 CFR 1910.120 (l)
☒ Backhoe	☐ Off-site emergency response, 29 CFR 1910.120 (l)
☒ Equipment	☐ Handling drums and containers, 29 CFR 1910.120 (j)
☒ Tools	☐ Opening drums and containers
☐ Ladder, 29 CFR 1910.27 (d)/29 CFR 1926	☐ Electrical material handling equipment
☐ Overhead and underground utilities	☐ Radioactive waste
☐ Scaffolds	☐ Shock-sensitive waste
☐ Structural integrity	☐ Laboratory waste packs
☐ Unguarded openings - wall, floor, ceilings	☐ Sampling drums and containers
☐ Pressurized air cylinders	☐ Shipping and transport, 49 CFR 172.101, IATA
☐ Personal protective equipment, 29 CFR 1910.120 (g); 29 CFR 1910.134	☐ Tank and vault procedures
☐ Respiratory protection, 29 CFR 1910.120 (g); ANSI Z88.2	☐ Illumination, 29 CFR 1910.120 (m)
☐	☐ Sanitation, 29 CFR 1910.120 (n)
☐	☐
☐	☐
☐	☐

ATTACHMENT A

CHEMICAL CONTAMINANTS DATA SHEETS

(Attach completed HASP Form 25
[H&S—1 Chemical Hazards Form]
or attach appropriate data sheets.)

HEALTH AND SAFETY EVALUATION — 1 CHEMICAL HAZARDS

Hazardous Substance/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/ Symptoms	Monitoring Instruments/ Ionization Potential + % Response
TNT	☒ Explosive ☐ Flammable ☐ Corrosive ☐ Reactive ☐ Water Reactive ☐ Oxidizer ☐ Radioactive ☐ Other	☒ Solid ☐ Liquid ☐ Gas	☒ Solid ☐ Liquid ☐ Gas	pH FP LEL UEL Auto. Ig BP MP Sp. Gr Vap. D Vap. P H_2O Sol. Other:	☐ CA ☐ PEL ☐ TLV ☐ IDLH ☐ Only toxicological data available ☐ Other	☐ Inhalation ☐ Ingestion ☐ Skin Absorption ☐ Contact ☐ Direct Penetration ☐ Other:	☐ HNu ☐ 11.7 eV ☐ 10.2 eV ☐ OVM ☐ 10.0/10.6 eV ☐ 11.8 eV ☐ CGI ☐ OVA ☐
CAS No		Incompatible With				Symptoms	IP
Synonyms							% Response

HASP_FORMS.DOC

ATTACHMENT B

MATERIAL SAFETY DATA SHEETS

(MSDSs)

MOBIL >> DIESEL FUELS
MATERIAL SAFETY DATA SHEET
FSC: 9140
NIIN: 004190450
Manufacturer's CAGE: 57635
Part No. Indicator: A
Part Number/Trade Name: DIESEL FUELS

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General Information

==========

Item Name: DIESEL FUEL
Manufacturer's Name: MOBIL CORP
Manufacturer's Street: 150 E 42ND ST
Manufacturer's City: NEW YORK
Manufacturer's State: NY
Manufacturer's Country: US
Manufacturer's Zip Code: 10017-5612
Manufacturer's Emerg Ph #: 212-883-4411 / 800-424-9300CHEMTREC
Manufacturer's Info Ph #: 212-883-4411
Record No. For Safety Entry: 024
Tot Safety Entries This Stk#: 034
Status: SM
Date MSDS Prepared: 31MAY89
Safety Data Review Date: 08DEC92
Supply Item Manager: CX
MSDS Preparer's Name: ENVIRONMENTAL AFFAIRS
Preparer's City: PRINCETON
Preparer's State: NJ
MSDS Serial Number: BPMGX
Specification Number: VV-F-800
Spec Type, Grade, Class: DF-1 GRADE
Hazard Characteristic Code: F4
Unit Of Issue: DR
Unit Of Issue Container Qty: 500 GALLONS
Type Of Container: DRUM
Net Unit Weight: 3540 LBS
NRC/State License Number: NONE
Net Propellant Weight-Ammo: NONE
Report for NIIN: 004190450

==========

Ingredients/Identity Information

==========

Proprietary: NO
Ingredient: PETROLEUM OIL (DIESEL FUEL)
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: 1004418PO
CAS Number: 68334-30-5
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

==========

Physical/Chemical Characteristics

Emergency/First Aid Proc: EYE:FLUSH WITH WATER. SKIN:WASH CONTACT AREAS WITH SOAP & WATER. INHALED:REMOVE FROM EXPOSURE. IF UNCONSCIOUSNESS OCCURS SEEK IMMEDIATE MEDICAL ASSISTANCE. IF BREATHING HAS STOPPED, GIVE MOUTH TO MOUTH RESUSCITATION. INGESTED:DO NOT INDUCE VOMITING. ADMINISTER VEGETABLE OIL. GET MEDICAL ASSISTANCE. (PHYSICIAN:IF MATERIAL IS ASPIRATED INTO LUNGS, MAY CAUSE CHEMICAL PNEUMONITIS; TREAT ACCORDINGLY.)

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ABSORB ON FIRE RETARDENT SAWDUST, DIATOMACEOUS EARTH, ETC.. SHOVEL UP AND DISPOSE AT AN APPROPRIATE WASTE DISPOSALFACILITY I/A/W CURRENT FEDERAL, STATE & LOCAL REGULATIONS AT TIME OF DISPOSAL.

Neutralizing Agent: NO INFORMATION GIVEN ON MSDS BY MFR.

Waste Disposal Method: PRODUCT IS SUITABLE FOR BURNING FOR FUEL VALUE I/A/W FEDERAL, STATE & LOCAL LAWS AND REGULATIONS.

Precautions-Handling/Storing: NO INFORMATION GIVEN BY MFR ON THE MSDS. STORE AS A COMBUSTABLE LIQUID. SEE CONDITIONS TO AVOID FOR STORAGE PROHIBIYIONS.

Other Precautions: OVEREXPOSURE TO DIESEL EXHAUST FUMES MAY RESULT IN EYE AND RESPIRATORY IRRITATION, NAUSEA, AND HEADACHE. ANIMAL STUDIES INVOLVING LIFETIME EXPOSURE TO HIGH LEVELS OF THE FUMES HAVE SHOWD A VARIABLE POTENTIAL FOR LUNG CANCER. (SUPP DATA)

Control Measures

Respiratory Protection: NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE WITH ADEQUATE VENTILATION.

Ventilation: EXPLOSION PROOF LOCAL AND MECHANICAL EXHAUST TO MAINTAIN ADEQUATE VENTILATION IS DESIRABLE.

Protective Gloves: IMPERVIOUS

Eye Protection: NO SPECIAL EQUIPMENT REQUIRED.

Other Protective Equipment: NO INFORMATION GIVEN BY MFR ON THE MSDS.

Work Hygienic Practices: USE GOOD PERSONAL HYGIENE PRACTICES. AVOID PROLONGED/REPEATED CONTACT.

Suppl. Safety & Health Data: FROM OTHER PRECAUTIONS:EVEN THOUGH NO HUMAN CONNECTION HAS BEEN FOUND, PRUDENCY INDICATES THAT ADEQUATE VENTILATION AND/OR RESPIRATORS BE USED.

Report for NIIN: 004190450

Transportation Data

Trans Data Review Date: 92343

DOT PSN Code: GTF

DOT Proper Shipping Name: GAS OIL

DOT Class: 3

DOT ID Number: UN1202

DOT Pack Group: III

DOT Label: FLAMMABLE LIQUID

IMO PSN Code: HRR

IMO Proper Shipping Name: GAS OIL

IMO Regulations Page Number: 3375

IMO UN Number: 1202

TEXACO
MATERIAL SAFETY DATA SHEET
FAXBACK DOCUMENT NUMBER: 26412

NOTE: Read and understand Material Safety Data Sheet before handling or disposing of product.

N.D. - Not Determined N.A. - Not Applicable N.T. - Not Tested
< - Less Than > - Greater Than

26412 URSA SUPER PLUS MOTOR OILS
1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATERIAL IDENTITY
Product Code and Name:
26412 URSA SUPER PLUS MOTOR OILS
Chemical Name and/or Family or Description:
Ursa Oils

Manufacturer's Name and Address:
TEXACO LUBRICANTS COMPANY
P.O. Box 4427
Houston, TX 77210-4427

Telephone Numbers:

Transportation Emergency	-Company	: (914) 831-3400
	CHEMTREC (USA)	: (800) 424-9300
	In Canada	: (800) 567-7455
Health Emergency	-Company	: (914) 831-3400
General MSDS Assistance		: (914) 838-7204
Texaco FaxBack System		: (713) 432-3383
Technical Information	-Fuels	: (914) 838-7336
	-Lubricant/Antifreezes/Fuel Additives	: (800) 782-7852(Option 4)
	-Solvents/Chemicals	: (800) 876-3738

This Material Safety Data Sheet may be used for the following products for Hazard Communications purposes only; not intended to imply identical performance/technical specifications:

02109 URSA SUPER PLUS SAE 15W-40
02110 URSA SUPER PLUS SAE 10W
02111 URSA SUPER PLUS SAE 20-20W
02112 URSA SUPER PLUS SAE 30
02113 URSA SUPER PLUS SAE 40
02114 URSA SUPER PLUS SAE 50
02120 URSA SUPER PLUS SAE 10W-30

26412 URSA SUPER PLUS MOTOR OILS
2. COMPOSITION/INFORMATION ON INGREDIENTS

THE CRITERIA FOR LISTING COMPONENTS IN THE COMPOSITION SECTION IS AS FOLLOWS: CARCINOGENS ARE LISTED WHEN PRESENT AT 0.1 % OR GREATER; COMPONENTS WHICH ARE OTHERWISE HAZARDOUS ACCORDING TO OSHA ARE LISTED WHEN PRESENT AT 1.0 % OR GREATER; NON-HAZARDOUS COMPONENTS ARE LISTED AT 3.0 % OR GREATER. THIS IS NOT INTENDED TO BE A COMPLETE COMPOSITIONAL DISCLOSURE. REFER TO SECTION 14 FOR APPLICABLE STATES' RIGHT TO KNOW AND OTHER REGULATORY INFORMATION.

Product and/or Component(s) Carcinogenic According to:

OSHA	IARC	NTP	OTHER	NONE
				X
-	-	-	-	-

Composition: (Sequence Number and Chemical Name)

Seq.	Chemical Name	CAS Number	Range in %

Skin:
Brief contact may cause slight irritation. Prolonged contact, as with clothing wetted with material, may cause more severe irritation and discomfort, seen as local redness and swelling.

Other than the potential skin irritation effects noted above, acute (short term) adverse effects are not expected from brief skin contact; see other effects, below, and Section 11 for information regarding potential long term effects.

Inhalation:
Vapors or mist, in excess of permissible concentrations, or in unusually high concentrations generated from spraying, heating the material or as from exposure in poorly ventilated areas or confined spaces, may cause irritation of the nose and throat, headache, nausea, and drowsiness.

Ingestion:
If more than several mouthfuls are swallowed, abdominal discomfort, nausea, and diarrhea may occur.

Sensitization Properties:
Unknown.

Chronic:
No adverse effects have been documented in humans as a result of chronic exposure. Section 11 may contain applicable animal data.

Medical Conditions Aggravated by Exposure:
Because of its irritating properties, repeated skin contact may aggravate an existing dermatitis (skin condition).

Other Remarks:
When overheated, product may release hydrogen sulfide (H_2S) gas. H_2S concentrations above permissible concentrations can cause irritation of the eyes and respiratory tract, headache, dizziness, nausea, vomiting, diarrhea and pulmonary edema. At concentrations above 300 ppm, respiratory paralysis, causing unconsciousness and death, can occur.

26412 URSA SUPER PLUS MOTOR OILS

4. FIRST AID MEASURES

Eyes:
Flush eyes with plenty of water for several minutes. Get medical attention if eye irritation persists.

Skin:
Wash skin with plenty of soap and water for several minutes. Get medical attention if skin irritation develops or persists.

Ingestion:
If more than several mouthfuls of this material are swallowed, give two glasses of water (16 oz.). Get medical attention.

Inhalation:
If irritation, headache, nausea, or drowsiness occurs, remove to fresh air. Get medical attention if breathing becomes difficult or respiratory irritation persists.

Other Instructions:
Remove and dry-clean or launder clothing soaked or soiled with this material before reuse. Dry cleaning of contaminated clothing may be more effective than normal laundering. Inform individuals responsible for cleaning of potential hazards associated with handling contaminated

Respiratory Protection:
Airborne concentrations should be kept to lowest levels possible. If vapor, mist or dust is generated and the occupational exposure limit of the product, or any component of the product, is exceeded, use appropriate NIOSH or MSHA approved air purifying or air supplied respirator after determining the airborne concentration of the contaminant. Air supplied respirators should always be worn when airborne concentration of the contaminant or oxygen content is unknown.

Ventilation:
Adequate to meet component occupational exposure limits (see Section 2).

Exposure Limit for Total Product:
None established for product; refer to Section 2 for component exposure limits.

26412 URSA SUPER PLUS MOTOR OILS
9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:
Bright and clear liquid
Odor:
Not determined

Boiling Point (degrees F):
Not determined.

Melting/Freezing point (degrees F):
Not applicable.

Specific Gravity (water=1):
.88 - .91

pH of undiluted product:
Not applicable.

Vapor Pressure:
Not determined.

Viscosity:
45.1 - 215 cSt at 40.0 C

VOC Content:
Not determined.

Vapor Density (air=1):
Not determined.

Solubility in Water (%):
Not determined.

Other: None

26412 URSA SUPER PLUS MOTOR OILS
10. STABILITY AND REACTIVITY

This Material Reacts Violently With:
(If Others is checked below, see comments for details)

Air	Water	Heat	Strong Oxidizers	Others	None of These
			X		
-	-	-	-	-	-

Comments:
Under extreme temperatures or extended storage periods, hydrogen sulfide (H_2S) gas may accumulate in the head-space of container.

TDG:
Proper Shipping Name:
Not regulated

26412 URSA SUPER PLUS MOTOR OILS

14. REGULATORY INFORMATION

Federal Regulations:
SARA Title III:
Section 302/304 Extremely Hazardous Substances

Seq.	Chemical Name	CAS Number	Range in %
None			

Section 302/304 Extremely Hazardous Substances (CONT)

Seq.	TPQ	RQ
None		

Section 311 Hazardous Categorization:

Acute	Chronic	Fire	Pressure	Reactive	N/A
					X
-	-	-	-	-	-

Section 313 Toxic Chemical

Chemical Name	CAS Number	Concentration
Zinc alkyl dithiophosphate	68649-42-3	1.00-2.99

CERCLA 102(a)/DOT Hazardous Substances: (+ indicates DOT Hazardous Substance)

Seq.	Chemical Name	CAS Number	Range in %
01+	Naphthalene	91-20-3	0.01-0.09
02+	Cumene	98-82-8	0.01-0.09
03+	Ethylbenzene	100-41-4	0.01-0.09
04+	Styrene	100-42-5	0.01-0.09

CERCLA/DOT Hazardous Substances (Sequence Numbers and RQ's):

Seq.	RQ
01+	100
02+	5000
03+	1000
04+	1000

TSCA Inventory Status:
This product, or its components, are listed on or are exempt from the Toxic Substance Control Act (TSCA) Chemical Substance Inventory.

Other:
None.

State Regulations:
California Proposition 65:
The following detectable components of this product are substances, or belong to classes of substances, known to the State of California to cause cancer and/or reproductive toxicity.

Chemical Name	CAS Number
None	

International Regulations:

WHMIS Classification:
Not regulated

attention if eye irritation persists.

Skin Contact:
Wash skin with plenty of soap and water for several minutes. Get medical attention if skin irritation develops or persists.

Ingestion:
If more than several mouthfuls of this material are swallowed, give two glasses of water (16 oz.). Get medical attention.

Inhalation:
If irritation, headache, nausea, or drowsiness occurs, remove to fresh air. Get medical attention if breathing becomes difficult or respiratory irritation persists.

Note to Physician:
None

FIRE

In case of fire, use water spray, dry chemical, foam or carbon dioxide. Water may cause frothing. Use water spray to cool fire-exposed containers.

If more than 840,265 pounds of product is spilled, then report spill according to SARA 304 and/or CERCLA 102(a) requirements, unless product qualifies for the petroleum exemption (CERCLA Section 101(14)).

	Chemical Name	CAS Number	Range in %
#	Solvent-dewaxed heavy paraffinic petroleum distillates	64742-65-0	65.00-79.99
#	Hydrotreated heavy paraffinic petroleum distillates	64742-54-7	10.00-19.99
#	Solvent-refined heavy paraffinic petroleum distillates	64741-88-4	3.00-9.99
#	Solvent refined light paraffinic petroleum distillates or	64741-89-5	3.00-9.99
	Hydrotreated middle distillate	64742-46-7	3.00-9.99
#	Modified polyolefin amide alkyleneamine dispersant		3.00-9.99
*	Zinc alkyl dithiophosphate	68649-42-3	1.00-2.99

PRODUCT IS NON-HAZARDOUS ACCORDING TO OSHA (1910.1200).
* COMPONENT IS HAZARDOUS ACCORDING TO OSHA.
# COMPONENT, BY DEFINITION, IS CONSIDERED HAZARDOUS ACCORDING TO OSHA BECAUSE IT CARRIES THE PERMISSIBLE EXPOSURE LIMIT (PEL) FOR MINERAL OIL MIST.

Pennsylvania Special Hazardous Substance(s)	CAS Number	Range in %
None		

HMIS			NFPA		
Health:	1	Reactivity: 0	Health:	1	Reactivity: 0
Flammability:	1	Special : -	Flammability:	1	Special : -

Transportation
DOT:
Proper Shipping Name:
Not regulated

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be hazardous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers might cause fire, explosion or toxic fumes from residues. Do not pressurize or expose to open flame or heat. Keep container closed and drum

MSDS for ETHYLENE GLYCOL

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: [redacted]
FORMULA: HOCH2CH2OH
FORMULA WT: 62.07
CAS NO.: 107-21-1
NIOSH/RTECS NO.: KW2975000
COMMON SYNONYMS: 1,2-ETHANEDIOL; EG; GLYCOL; 1,2-DIHYDROXYETHANE
PRODUCT CODES: 5387,9140,L715,9300
EFFECTIVE: 11/25/86
REVISION #02

PRECAUTIONARY LABELLING
BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 1 SLIGHT
FLAMMABILITY - 1 SLIGHT
REACTIVITY - 1 SLIGHT
CONTACT - 1 SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

WARNING
CAUSES IRRITATION
HARMFUL OR FATAL IF SWALLOWED
AVOID CONTACT WITH EYES, SKIN, CLOTHING.
KEEP IN TIGHTLY CLOSED CONTAINER. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
ETHYLENE GLYCOL	90-100	00107-21-1

3 - PHYSICAL DATA

LIQUID MAY BE IRRITATING TO SKIN AND EYES.
SKIN ABSORPTION MAY BE HARMFUL.
INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTROINTESTINAL IRRITATION.
INGESTION MAY BE FATAL.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE DAMAGE TO KIDNEYS, LIVER, LUNGS, BLOOD, OR CENTRAL NERVOUS SYSTEM.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, ABSORPTION, SKIN CONTACT, EYE CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG ACIDS, POLYMERIZATION CATALYSTS & ACCELERATORS

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. TAKE UP WITH SAND OR OTHER NONCOMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL.
FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

ATTACHMENT C

SAFETY PROCEDURES/FIELD OPERATING PROCEDURES

(FLD OPs)

Guidance Document for the Operation of the Hybrid rEmote Robotic Manipulation and Excavation System (HERMES)

Submitted by:
Boissiere Engineering and Applied Robotics (BEAR), Inc.
2815 Broadbent Parkway NE, Suite - E
Albuquerque, NM 87107-1625
505-342-2020 (v)
505-342-2030 (f)

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1. Purpose/Scope

1.1. Purpose

The purpose of this document is to define and inform personnel of the safe field operations associated with the use of the tracked excavator, robotic manipulator, and associated equipment that make up the **H**ybrid r**E**mote **R**obotic **M**anipulation and **E**xcavation **S**ystem (HERMES). HERMES is an robotic system developed by Boissiere Engineering and Applied Robotics (BEAR), Inc. that integrates a hydraulic manipulator with a remotely operated tracked excavator to allow dexterous manipulation and excavation at remote sites. Specific guidelines are provided for the operation of HERMES and its sub-systems. However, these guidelines are not intended to replace the judgment and common sense of the users of this equipment.

1.2. Overview

Due to the potential of personnel discovering hazardous materials during remediation of landfills and other potential hazardous sites, BEAR has developed HERMES for excavation, characterization and retrieval of buried chemical, explosive, and radioactive materials which are discovered during the clean-up operations. The system removes remediation personnel from direct contact with objects such as engineered high explosives, radioactive, and shock sensitive chemical components, while delivering the dexterity and versatility required to retrieve and dispose of the landfill materials.

1.2.1. System Description:

HERMES consists of a computer controlled tracked excavator coupled with a hydraulic robotic manipulator. The standard excavator human interfaces (i.e. seat, control joy-sticks and pedals, etc.) have been replaced with on-board computing systems, servo controlled actuators, and supporting electronics which enable teleoperated control of all system functions. The manipulator is mounted at the distal end of the excavator stick, directly behind and to the side of the bucket. A secondary hydraulic circuit has been designed which allows power for the robot to be provided directly from the excavator's primary hydraulic power unit. This design minimizes the need for a secondary power source thus reducing complexity and equipment costs. The system is controlled from a remote operator console, which receives and transmits data from/to the system via two RF comm. links. One which transmits visual information to the operator, and a second link which provides bi-directional digital communication between computer systems for data transfer and command/control. The pre-programmable and repeatable capabilities of the robotic system allow many functions to be automated thus removing the operator from direct responsibility for control of the robot much of the time. Functions such as the retrieval and placement of on-board excavation and characterization tools, and the execution of sensor scan paths are available to the operator at the touch of a button. Finally, several on-board cameras are used to provide visual feedback to the system operator during conventional operations. One camera mounted on a pan/tilt gimbal is placed at "eye-level" on the excavator cab enclosure. Two additional cameras are attached at specific locations to give additional perspective of the remote operations. Finally, a fourth camera is mounted to the "wrist" of the manipulator. All camera outputs are transmitted to the remote operator via the system RF link.

The purpose of this configuration is to allow the excavator to accomplish conventional excavations such as removal of overburden and rubble, while the versatility and dexterity of the robotic manipulator will allow HERMES to address any sensitive objects once they have been uncovered, without placing personnel in direct contact with

1.4. Definitions

• AUTHORIZED USER	Specially trained personnel that operate equipment, systems, and sub-systems of HERMES. All Authorized Users must acknowledge their responsibilities described in Section 2 and must have completed specialized training described in Section 2.2. (Synonymous with User)
• BARRIER	Physical barrier (e.g., rope, chain or fence).
• BASE STATION	The control point for the remote operation of the manipulator which provides continuous operator interface to HERMES.
• EMERGENCY STOP BUTTON (E-STOP)	A red palm button which, when pressed, depressurizes the manipulator hydraulic circuit on HERMES. The Emergency Stop Button shall be reset only by purposeful action of an Authorized User.
• EXCAVATOR WORK ENVELOPE	The volume of space swept by the excavator along all possible paths relative to its current position for a distance of 75 ft.
• GD	Guidance Document
• HERMES	Hybrid rEmote Robotic Manipulation and Excavation System
• MANIPULATOR ARM WORK ENVELOPE	The volume of space enclosing the maximum reach of the manipulator arm, relative to the vehicle, including the end effector. See Appendix 7.2.
• MOBILE MANIPULATION	The use of a vehicle mounted manipulator to accomplish dexterous tasks in a variety of environments.
• OBSERVER	An Authorized User who ensures the safe operation of HERMES by maintaining constant and direct observation of the manipulator and remaining in continuous communication with the Operator located at the base station. This person shall require the Operator to stop the vehicle and shut off the hydraulic system anytime the work envelope is approached with unauthorized entry.
• OPERATOR	An Authorized User who is located at the HERMES base station and performs computerized remote operation of HERMES.
• PRINCIPAL USER	A person designated by Boissiere Engineering and Applied Robotics, Inc. who has authority over and responsibility for HERMES. The Principal User has documented, device specific training for the operation of all sub-systems. This person is authorized to train and certify Authorized Users.

All personnel operating HERMES shall have received formal robot operations and safety instructions for this system either from Boissiere Engineering and Applied Robotics (BEAR), Inc., the robot manufacturer or from the Principle User or his official designee. All required operations training for HERMES shall be in accordance with all site specific SOP's and GD's.

The Principal User is responsible for providing all Authorized Users with information about changes in HERMES including updates, system enhancements, and manufacturer's modifications. The Principal User is also responsible for providing appropriate training and certification for all new personnel and Authorized Users.

This GD shall be used by all personnel whose responsibilities requires them to work with HERMES. The only personnel authorized to operate this system, are those who have received the training described below and know and understand robot safety, the operational hardware, systems, and procedures.

Authorized Users must:

- Read ANSI/RIA R15.06 American National Standard for Industrial Robots and Robot Systems - Safety Requirements (read before initial operation)
- Take the class on ANSI/RIA R15.06 (videotape viewed before initial operation), or equivalent training.
- User must have hands-on training in the safe and proper operation of HERMES from the Principal User and be certified for operation by the Principal User.
- Be familiar with the robot safety and operational hardware, systems and procedures. Show a demonstrated proficiency with the equipment to be used.

Authorized Service Personnel representing manufacturers of equipment which comprise elements of HERMES, are exempted from the above requirements under the following conditions:

- Shall be briefed on the basic safety issues for the entire system and the specific modifications that have been made to the related sub-systems.
- An Authorized User must be present at any time that equipment is energized.

Authorized Users may allow the remote operation of HERMES by visitors as a means of demonstrating the capabilities of the System. However, an Authorized User must be present at all times during these demonstrations and must have access to the Emergency Stop as an additional measure of safety for casual observers and bystanders. These Visitors shall be instructed on the limits of the safe operation of HERMES before assuming the operator controls.

3. Hazards

3.1. Identification

Due to the anticipated unstructured and unknown nature of a buried waste site, the operation of HERMES is not well-defined and will be driven by the type and size of objects encountered at the work site, and as such, HERMES has no standard operating modes. However, the following safety systems, precautions, and procedures shall be observed at

Appendix 7.2). The manipulator is mounted at the distal end of the excavator front linkage, directly behind and to the side of the bucket and can operate while the vehicle is stationary or in motion.

A minimum distance of ten (10) feet beyond the work space of the manipulator will be maintained during operations with personnel present. In addition, all motion of the main excavator boom must be disabled. A hard hat must be worn at all times, and there must be at least two persons present while working within the work envelope of the manipulator whenever the hydraulic system is activated. The second person must be outside the work envelope and must be familiar with Sub-Section 3. (Hazards) of this GD.

Mechanical motions of the manipulator joints can cause injury to personnel by impact, or by pinching (pinning) personnel between the manipulator arm and any fixed obstacle in the area, including the ground, stationary obstacles, or the vehicle itself. These situations can be caused by: joints which are free to move due to loss of braking action, unanticipated motions due to joint singularities or control computer malfunction, or computer or manual controlled motions.

The manipulator sub-system uses 3000 psi hydraulic pressure. High pressure hazards can occur during maintenance operations or in the event of a hydraulic line break. All operations must be conducted in accordance with standard high pressure safety procedures.

The manipulator can throw payloads and tooling during a malfunction. If the manipulator stops in mid-motion (mid-air) during a failure of the system, the arm or an object could inadvertently be released.

To mitigate the hazards associated with operation of the manipulator the following procedures should be followed:

- The workspace is sized and the restricted area is defined to protect personnel from possible projectiles.
- The manipulator has mechanical brakes that function during loss of hydraulic pressure to lock the first three joints.
- Training/ Required Reading by all personnel associated with this project.
- Warning signs shall be placed in appropriate locations.
- An emergency stop (E-STOP) button is located on the excavator, and an emergency kill button is located at the Base Station. These stop the manipulator motion and depressurize the hydraulic circuit.
- HERMES will never be operated unattended.
- Self checks for erratic behavior are built into the manipulator control system.
- Only Authorized Users will have keys to the control console.
- Software features to detect loss of RF communication are in use.

- Section 7.4 : Start-up Checklist
- Section 7.5 : Shut-down Checklist
- Section 7.6 : Maintenance Checklist

The following checks will be made on a daily basis:

- Check the excavators engine and hydraulic fluid levels.
- Check the condition of the above fluids.
- Check the condition of the hydraulic filters.
- Check the control linkages.
- Check all safety devices.
- Check indicator lights.
- Check condition of cabling and electrical connections.
- Check link bolt connections

4.2. Materials

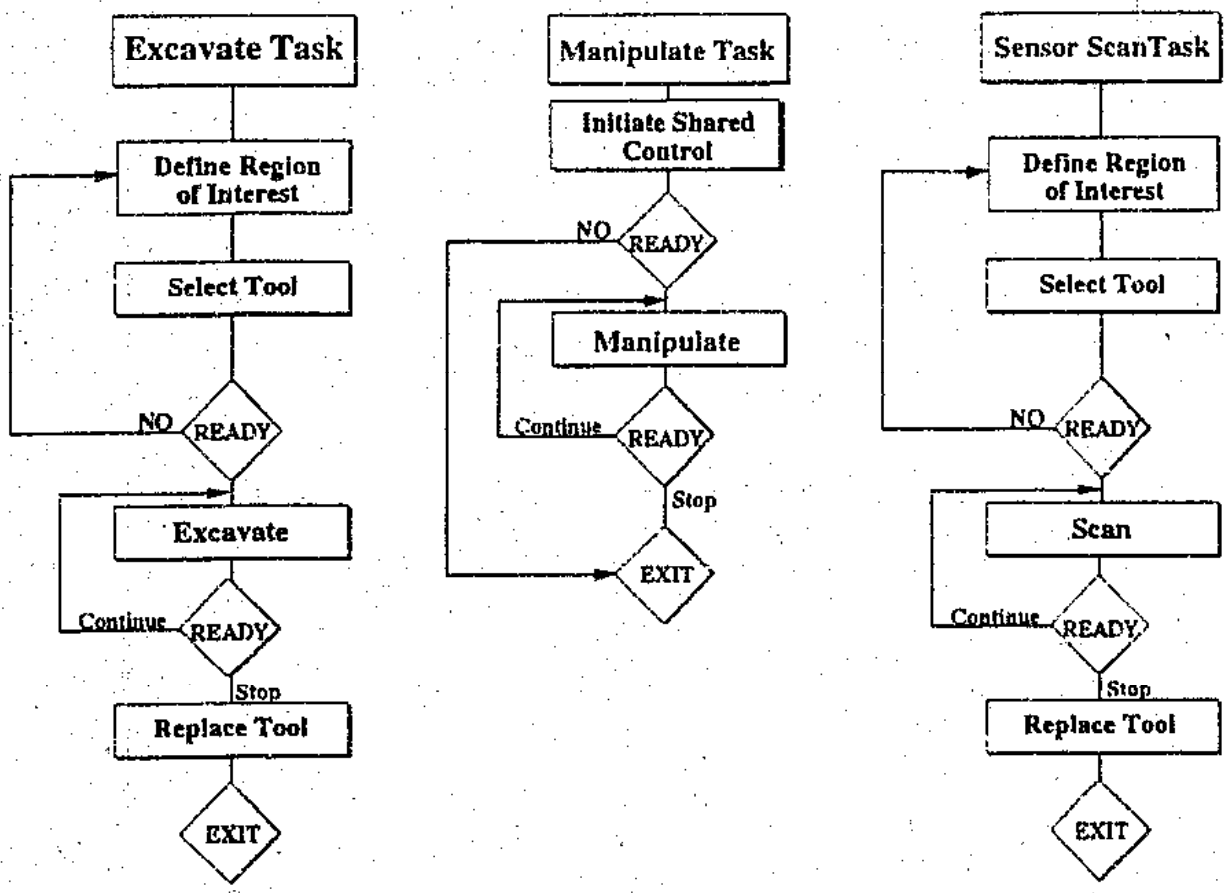
Handling and storage of these liquids is conducted in accordance with the site ES&H Manual. The excavator engine produces combustion by-products that can cause an asphyxiation hazard in enclosed areas. Operation of the vehicle's engine inside garage areas is limited to entering and exiting the area. Unauthorized use of the vehicle is precluded by the removal of the system keys by the Operator when the vehicle is not in use.

The excavator is powered by diesel fuel, and utilizes hydraulic oil and cooling system antifreeze. Diesel fuel is a flammable liquid, handling and storage shall be conducted in accordance with the site ES&H Manual. Detailed information on each of these materials is contained in the manufacturer supplied Material Safety Data Sheets (MSDSs) see Appendix 7.8 of this GD section. Copies of these MSDSs are also contained in the information package and log book kept with the HERMES Base Station. The hydraulic fluid used for this system is described in the manufacturer supplied Material Safety Data Sheet (MSDS) as non-toxic, non-flammable and non-irritating to the skin and eyes. Any fluid spills must be cleaned up immediately and disposed of properly before they enter the environment.

4.3. Waste Disposal

The only hazardous waste associated with HERMES is the generation of oily rags. These oily rags will be deposited in the red covered waste receptacle labeled "OILY RAGS ONLY". Operations that utilize additional hazardous materials or wastes will be performed under specific test plans that are separate from this section of the GD. Waste disposal will be in accordance with guidance in the site ES&H Manual,. In general, waste is minimized by ordering only those quantities of chemicals, gas, etc., that are needed to perform an operation. Chemical identity and control will be maintained throughout its use cycle. Containers will be appropriately labeled by using an appropriate hazardous waste label. Waste products should be disposed of by completing the appropriate chemical waste disposal request form and forwarding this form to the appropriate site authorities.

5.1.2. Individual Robot Tasks



5.2. Field Methods

During field operations utilizing HERMES the hydraulic excavator will remove the majority of the overburden found in the landfill, and the robotic manipulator will be used to handle any objects once they are uncovered. In this scenario the remote excavator will continue to remove dirt and debris in the landfill, utilizing standard excavation techniques until a suspicious object has been visually detected. At this point the excavator bucket is curled under the boom and placed on the ground adjacent to the object in question. The robotic manipulator is deployed and used to scan, inspect, and retrieve the object. Once removed from the soil, the object in question is placed in the bucket and carried out of the pit by the excavator. In order to accomplish this scenario there are three phases of operation for HERMES: initialization, standard operation, and shutdown. Each phase has specific requirements for successful deployment of the system.

5.2.1. Initialization

Prior to beginning excavation with HERMES each work day, the embedded computing system responsible for control of the robotic manipulator and remote cameras must be brought on line and evaluated. As shown in the flow diagram in section 5.1.1 system initialization is accomplished by:

operations. Three basic capabilities are available to the robot operator, these are: excavation, manipulation, and sensor scan of the object in question

As shown in the flow diagrams in section 5.1.2, both excavation and sensor scans require the operator to first define the area of interest. This is accomplished by selecting the "define area" option from the base station, and using the tip of the manipulator designate the corners of the area in question. Once this function is completed the geometric information is stored in the onboard computing system and is used to excavate or scan an area. Next, the operator must command the system to retrieve the appropriate tool. Tool selection is accomplished automatically based on the required operation, but a verification is required from the operator. After the setup is complete the system is commanded to begin. The operator is in a supervisory capacity during the operations and has the ability to modify, or stop completely, the excavation/scan at any time.

For direct manipulation tasks the operator selects the "shared control" option at the Base Station and the manipulator is ready trajectory input from the operator. The onboard control system will first replace any tool currently held in the robot jaws before input is accepted. During shared control the operators input is used a trajectory input for the arm, but, all motions are modified to keep the manipulator with in the RESTRICTED ROBOT ENVELOP. This keeps the operator out of trouble by not allowing the manipulator to move into a position which may damage the equipment. Also, contact forces are monitored and the robot is not allowed to exert more force than that preset by the operator during the "set force" option. The goal of shared control for direct manipulation is to allow the robot operator to accomplish his task while protecting the equipment from damage due to inappropriate actions.

5.2.3. Shutdown

Once excavation activities have been completed, a specific sequence of operations must be executed to correctly shutdown HERMES. These are:

- Move the system to any required shut down location
- Place the bucket of the excavator on the ground.
- Replace any tools currently held by the robot.
- Complete the Shutdown checklist
- Stow the manipulator
- Disable the manipulator and excavator hydraulic circuits
- Shutdown Excavator engine.
- Disengage electrical power to the remote system and Base Station

Once operations have ceased for the work day the Base Station telescoping mast will be retracted. Also, before turning off the Base Station the video tape used to record the days operations should be removed from the video tape recorder, correctly labeled and stored.

6. References.

6.1. ANSI/RIA R15.06 Robot Standard

(continued on next page)

Foreword (This foreword is not part of the American National Standard ANSI/RIA R15.06 - 1992)

The objective of this Standard is to enhance the safety of personnel associated with the use of industrial robot systems by establishing guidelines for the manufacture, remanufacture, rebuilding, installation, safeguarding, maintenance and repair of industrial robots.

To accomplish this objective, the Robotic Industries Association Subcommittee R15.06 on Safety considered the potential tasks associated with the efficient and productive use of Industrial Robots. It is recognized that the operational scope and characteristics of a robot may be significantly different than other equipment and machines and that certain maintenance or programming tasks may require a person to be in the proximity of the robot while motive power to the robot is available. It is also recognized that an industrial robot may not be a stand alone machine but rather may interact with other machines and equipment and may be controlled by signals from many sources.

To assist in the interpretation of this Standard, the Subcommittee intended that the manufacturer, the remanufacturer, the rebuilder, the installer, and the user have specific responsibilities. From a practical standpoint, the ultimate responsibility for safeguarding of employees associated with robots lies with the user. It is recognized that the words "safe" and "safety" are not absolutes. The ultimate link in safeguarding a system is the person. Necessary components in every safeguarding system are the maintenance and the intended use of the system. Personnel skill, training, and attitude are important factors.

This standard is a revision of ANSI/RIA R15.06-1986. There are seven major changes from the first edition of the standard with the addition of:

- illustrations
- an application clause
- an expanded clause 9 - Safety training of personnel
- a clause on risk assessment
- detection of failure to complete intended robot location signal
- attended continuous operation
- the concept of slow speed control

Each of these changes was incorporated based on public comments received and by a review of the standard by the R15.06 Subcommittee.

Industry standards, including this one are voluntary. The Robotic Industries Association makes no determination with respect to whether any robot, associated safety devices, manufacturer, or user is in compliance with this standard.

Suggestions for improvement of the standard are welcome. They should be sent to the: RIA Subcommittee R15.06 on Safety, P.O. Box 3724, Ann Arbor, Michigan 48106.

Subcommittee R15.06 on Safety had the following members at the time it processed and approved this Standard:

Howard Kutcher, Chair
(Aluminum Company of America)
Roberta Nelson, Vice Chair
(Data Instruments, Inc.)

Active Members

Chris Anderson
(Motoman)
Cathy Barcheck
(Procter & Gamble Company)
Joseph Bellino P.E.
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John Brazil
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Mike Calardo
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Thomas Huff
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Administrative services were provided by James A. Peyton and Sharon Myers of the Robotic Industries Association. Illustrations courtesy of Triodyne, Inc., Niles, Illinois.

American National Standard for Industrial Robots and Robot Systems - Safety Requirements

1 Scope, purpose, application and exclusions

1.1 Scope

This safety standard applies to the manufacture, remanufacture, rebuild, installation, safeguarding, maintenance, testing and start-up, and training requirements for industrial robots and robot systems.

1.2 Purpose

The purpose of this Standard is to provide guidelines for industrial robot manufacture, remanufacture and rebuild; robot system installation; and methods of safeguarding to enhance the safety of personnel associated with the use of robots and robot systems. This standard is not intended to provide specific guidelines for the installation or use of other industrial equipment within the robot system.

NOTE - As used in this Standard, the words "robot" or "robot system" are intended to mean "industrial robots" or "industrial robot systems" as defined in Clause 3.

1.3 Application

1.3.1 New robots/robot systems. The requirements of this standard shall apply to all newly manufactured robots and robot systems within eighteen (18) months after the approval date of this standard.

1.3.2 Existing robots. The requirements of this standard shall apply to existing robots when remanufactured or rebuilt.

1.3.3 Existing robot systems. The requirements of this standard shall apply to existing robot systems when robots in the system are remanufactured or rebuilt.

1.4 Exclusions

This Standard applies to robots and robot systems only and is not intended to apply to the following:

- Personal robots;
- Automatic guided vehicle systems;
- Undersea and space robots;
- Automated storage and retrieval systems;
- Automatic conveyor and shuttle system;
- Teleoperators;
- Mobile robots;
- Prosthetics and other aids for the handicapped;
- Numerically controlled machine tools.

This list is not intended to be all inclusive.

2 Normative references

The following standards contain additional information but are not essential for the completion of the requirements of this standard. When they are superseded by a revision approved by the American National Standards Institute, Inc. the revision shall apply.

ANSI Z244.1-1982, *Lockout/tagout of energy sources*

ANSI/ASME B15.1-1984, *Mechanical power transmission apparatus*

ANSI/NFPA 79 1987, *Electrical standard for industrial equipment*

UL1740 *Safety standard for industrial robots and robotic equipment*[1]

3 Definitions

3.1 actuator: A power mechanism used to effect motion of the robot; that which converts electrical, hydraulic or pneumatic energy to effect motion of the robot.

[1] In preparation

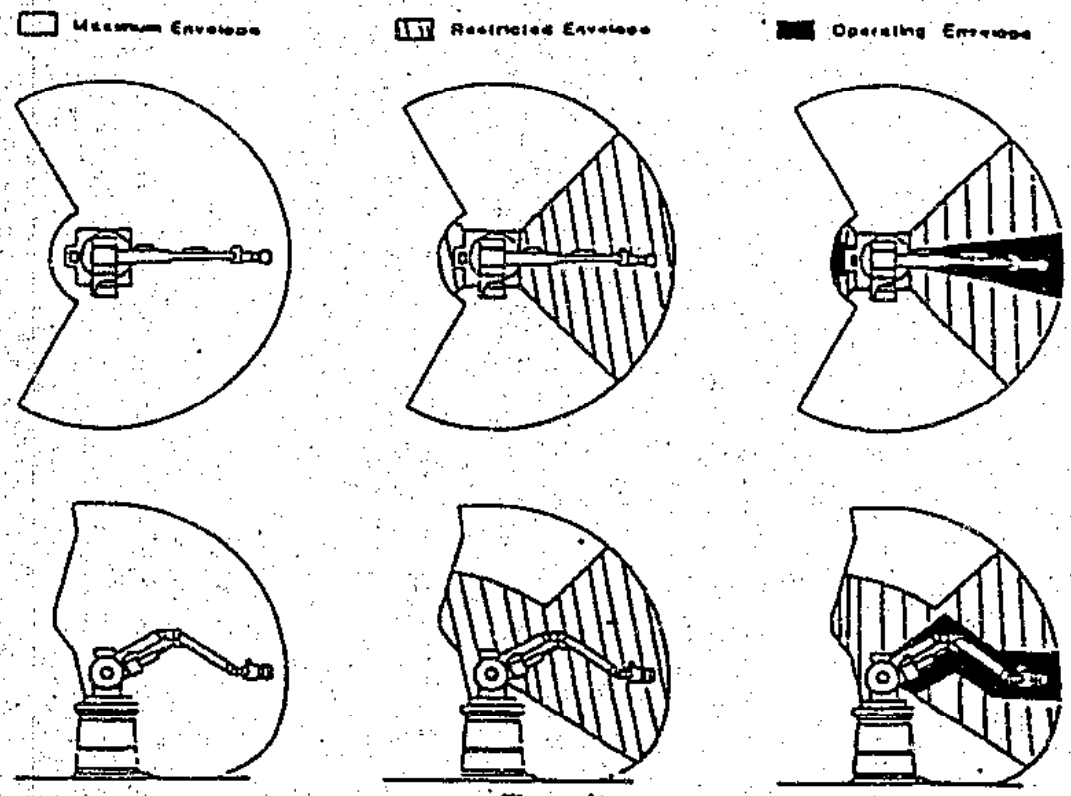

Figure 1

tion of one control or mechanism allows, or prevents the operation of another.

3.26 joint motion: A method for coordinating the movement of the joints such that all joints arrive at the desired location simultaneously.

3.27 limiting device: A device that restricts the maximum envelope (space) by stopping or causing to stop all robot motion and is independent of the control program and the application programs.

3.28 maintenance: The act of keeping the robots and robot systems in their proper operating condition.

3.29 mobile robot: A self propelled and self contained robot that is capable of moving over a mechanically unconstrained course.

3.30 muting: The deactivation of a presence-sensing safeguarding device by design during a portion of the robot cycle.

3.31 operator: The person designated to start, monitor and stop the intended productive operation of a robot or robot system. An operator may also interface with a robot for productive purposes.

3.32 pendant: Any portable control device, including teach pendants, that permits an operator to control the robot from within the restricted envelope (space) of the robot.

3.33 perimeter guarding: A rigid fence-like structure that surrounds the restricted envelope (space) of a system of one or more robots and may have entry openings for process equipment, material, and/or personnel authorized to operate or maintain the robot system.

3.34 presence-sensing safeguarding device: A device designed, constructed and installed to create a sensing field or area to detect an intrusion into such field or area by personnel, robots, or other objects.

3.35 program:

1. (n) A sequence of instructions to be executed by the computer or robot controller to control a robot/robot system.

2. (v) To furnish (a computer) with a code of instructions.

3. (v) To teach a robot system a specific set of movements and instructions to accomplish a task.

4.2.5 Electromagnetic interference, radio frequency interference and electro-static discharge The design and construction of the robot shall incorporate good engineering practices of shielding, filtering, suppression and grounding to prevent hazardous motion due to the effects of Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI), and Electro-Static Discharge (ESD).

4.3 Movement without drive power The robot shall be designed so that each axis is capable of being moved without using drive power. If required, a means to release brakes, solenoids, and the like, shall be provided.

4.4 Actuating controls

4.4.1 Protection from unintended operation Actuating controls that initiate power or motion shall be constructed or located so as to protect against inadvertent operation. For example, a guarded push-button, key selector switch or two-handed control could be used.

4.4.2 Status indication Actuating controls shall include an indication of the operating status.

4.4.3 Labeling Actuating controls shall be labeled to clearly indicate their function.

4.4.4 Remotely located controls A robot that can be controlled from a remote location shall have means that, when used, shall prevent the initiation of robot motion from a remote location.

4.5 Emergency stop

4.5.1 Every robot shall have an emergency stop circuit using hardware-based components. The emergency stop shall override all other robot controls, remove drive power from the robot actuators, and cause all moving parts to stop.

4.5.2 Each operator control station, including pendants, capable of initiating robot motion, shall have an emergency stop device. (See Clauses 5.12.2, 5.12.3 and 5.12.4).

4.5.3 Provision shall be made within the emergency stop circuit to include additional emergency stop devices.

4.5.4 Provision shall be made within the emergency stop circuit to include hardware based output signals.

4.6 Pendant

Where a pendant control is provided to control the robot from within the restricted envelope (space), the requirements in Clauses 4.6.1 through 4.6.5 shall apply.

4.6.1 Automatic It shall not be possible to place the robot into automatic mode using the pendant exclusively.

4.6.2 Motion control All buttons and other devices on the pendant that cause robot motion shall stop motion when the button or device is released.

4.6.3 Pendant emergency stop The pendant shall have an emergency stop Circuit as described in Clause 4.5.

4.6.4 Single point of control The pendant shall be designed so that when the robot is placed under pendant control, initiation of robot motion shall be prevented from any source except the one pendant.

4.6.5 Initiated motion Motion of the robot initiated from the pendant shall be under slow speed control as described in Clause 4.8. An exception that may be permitted is as follows: when full programmed speed is provided for attended program verification, it shall require constant actuation of an enabling device and of the motion controls to continue robot motion.

4.7 Attended continuous operation

Robots having attended continuous operation capability shall meet the following requirements:

4.7.1 Selection of attended continuous operation shall ensure that motion is under slow speed control as described in 4.8.

4.7.2 Selection of attended continuous operation mode shall only be possible from outside the restricted envelope (space).

4.7.3 Attended continuous operation shall require the continuous actuation of an enabling device by the operator. Releasing the enabling device shall stop the robot motion and the operation of associated equipment that may create a hazard.

4.7.4 Single point of control is required with attended continuous operation.

4.8 Slow speed control

All robots with pendants and robots that support attended continuous operation shall provide slow speed control. Settable slow speed velocity limits determine the maximum speed of the robot under slow speed control. These velocity limits shall be applied as follows:

a) When operating in coordinated straight line mode, the speed of the tool center point (TCP) shall not exceed 250 mm/sec (10 inches/sec);

b) When operating in joint mode, the maximum speed of each joint shall be reduced so that the speed of any

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envelopes for restraint of motion of the robots. The limiting devices shall not cause additional hazards in the restricted envelope (space). (See Clause 6.3.1.)

5.8 Environmental conditions

Environmental conditions shall be evaluated to ensure compatibility of the robot with the anticipated operational conditions. These conditions include, but are not limited to, explosive mixtures, corrosive conditions, humidity, dust, temperature, Electromagnetic Interference (EMI), Radio Frequency Interference (RFI) and Electro-Static Discharge (ESD).

5.9 Associated equipment shutdown

The robot system shall be installed so that shutdown of associated equipment shall not result in a hazard.

5.10 Precautionary labels

Where precautionary labels provided on the robot are not visible due to some application or process, other means of precautionary notice shall be provided.

5.11 Restricted envelope (space) identification

The restricted envelope (space) shall be conspicuously identified. For example, by means of signs, barriers, line markings on the floor, railings or the equivalent.

5.12 Dynamic restricted envelope

The safeguarding interlocking logic may be such that the restricted envelope (space) is redefined as the robot performs its application program.

5.13 Robot system emergency stop

Every robot system shall have an emergency stop Circuit using hardware based components. The emergency stop Circuit, when activated, shall override all other controls and cause all motion to stop.

5.13.1 Each robot system operator station shall be provided with a readily accessible, unobstructed emergency stop device.

5.13.2 Pushbuttons that activate an emergency stop Circuit shall be red and unguarded. emergency stop pushbuttons shall be palm or mushroom head type. All emergency stop pushbuttons shall be of the type requiring manual resetting.

5.13.3 Red palm type or red mushroom head type pushbuttons shall not be used for any function except emergency stop.

5.13.4 Following an emergency stop, restarting automatic operation shall require a deliberate action to follow a prescribed start-up procedure outside the restricted envelope (space).

5.14 End-effector power loss/change

End effectors shall be designed and constructed so that loss or change of electrical, hydraulic, pneumatic or vacuum power shall not result in a hazard. If this is not feasible, then other methods of safeguarding shall be provided to protect against hazards.

6. Safeguarding personnel

6.1 Responsibility

The user of a robot system shall ensure that safeguards are provided and used in accordance with Clauses 6, 7 and 8 of this standard. The means and degree of safeguarding, including the reliability of the designated safeguarding shall correspond directly to the assessed risk consistent with the robot application. Safeguarding may include, but not be limited to presence-sensing safeguarding devices, barriers, awareness barriers, awareness signals, designated procedures and training.

6.1.1 Risk assessment. The means of safeguarding shall be based on a risk assessment. The risk assessment shall consider:

a) The size, capacity and speed of the robot;
b) The application/process;
c) Any areas of non-compliance cited in 4.1.3;
d) The anticipated tasks that will be required for continued operation;
e) The hazards associated with each task;
f) Anticipated failure modes;
g) The probability of occurrence and probable severity of injury;
h) The level of expertise of exposed personnel and the frequency of exposure.

6.1.2 Stages of development Safeguarding requirements also vary for the different stages of development of robots and robot systems. The following stages of robot and robot system development are recognized:

a) Integration at the manufacturer or system developer;
b) Verification and buy-off testing;
c) Installation and testing on site of operation;
d) Operation in production.

These stages involve personnel of different levels of skill and require different safeguarding. For example, during integration at the manufacturer, any elaborate safeguarding is likely to impede the development of the system making it impractical to debug; while for opera-

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posted at the entrance, stating that entry by unauthorized personnel is prohibited.

6.4.2 Awareness barrier An awareness barrier shall be constructed and installed so that a person cannot enter the restricted envelope (space) of a robot without sensing the presence of the barrier. The awareness barrier shall be located so as to prevent inadvertent entry into the restricted envelope (space).

6.4.3 Awareness signal An awareness signal shall be constructed and located such that it shall provide a recognizable audible or visual signal to individuals of an approaching or present hazard. When awareness signals in the form of lights are used to warn of hazards in a restricted envelope (space), sufficient devices shall be used and located so that the light can be seen by an individual in the proximity of the maximum envelope (space). Audible awareness devices shall have a distinctive sound greater than the ambient noise level.

6.4.3.1 Failure to reach intended location signal If failure of the robot to reach an intended location presents a hazard, an awareness signal shall be generated to alert other personnel.

6.5 Safeguarding the teacher

6.5.1 The user shall ensure that the teacher is trained in accordance with Clause 9, including the control program and the recommended teach procedures.

6.5.2 Before teaching a robot, the teacher shall visually check the robot and maximum envelope (space) to ensure that conditions which may cause hazards do not exist. The emergency stop and motion controls of the pendant shall be function tested to ensure proper operation. Any damage or malfunction shall be repaired prior to commencing the teaching operation.

6.5.3 Before entering the restricted envelope (space), the teacher shall ensure that all safeguards are in place and functioning as intended in the teach mode.

6.5.4 When the teach mode is selected, the following conditions shall be met:

a) The teacher shall have single point of control of the robot system;

b) When operating under drive power, slow speed control shall be in effect (See Clause 4.8). The limits for slow speed control shall be selected such that the teacher has sufficient time to either withdraw from hazardous motions or stop the robot. The teacher must exercise caution when operating in coordinated straight line mode since the robot is controlling the tool center point and a greater speed may exist at other parts of the robot or axis while in motion. An exception that may be permitted is as follows: when full programmed speed is provided for attended program verification, it shall require constant activation of an enabling device and of the motion controls to continue robot motion;

c) All robot system emergency stop devices shall remain functional;

d) During teaching or program verification, only the teacher should be allowed in the restricted envelope (space). Certain teaching/programming situations may require more than one person in the restricted envelope (space). The teacher shall have sole control of robot motion in accordance with Clause 6.5.4 f). Additional personnel shall be furnished and use an enabling device. Releasing the enabling device shall cause robot motion to stop;

e) The teacher shall have sole control of movement of other equipment in the restricted envelope if such movement would present a hazard.

6.5.5 All personnel shall be required to leave the restricted envelope (space) prior to initiating automatic mode.

6.6 Safeguarding the operator

The user of a robot system shall ensure that safeguards are established for each operation associated with the robot system. Special care should be exercised where an operator is required to interact with the robot on each operating cycle such as to feed parts to the robot for processing, the user of the robot system shall assure that safeguards are established for each operation. The safeguards shall either prevent the operator from being in the restricted envelope (space) during automatic robot motion or stop robot motion while any part of an operator's body is within the restricted envelope (space). Operators of robot systems shall be trained in accordance with Clause 9, including recognizing known hazards associated with each assigned task involving the robot system. Operators shall be instructed in the proper operation of the control actuators for the robot system and shall be instructed in how to respond to recognized hazards.

6.7 Safeguarding during attended continuous operation

Certain robot applications may require one person to be present in or near the restricted envelope (space). The purpose of this clause is to safeguard that person within the restricted envelope (space) while the robot is performing its programmed task under slow speed control. The person shall be safeguarded from the motion of adjacent robots or other associated industrial

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method shall be identified. The bypassed safeguards shall be returned to their original effectiveness when the maintenance task is complete.

7 Maintenance of robots and robot systems

The user of a robot/robot system shall establish a maintenance program as required for the continued safe operation of the robot/robot system. The user should be able to demonstrate that an effective inspection and maintenance program is in place. The inspection and maintenance program shall consider the recommendations of the manufacturer of the robot or the robot system.

8 Testing and start-up of robots and robot systems

This clause defines the procedures that shall be followed during the testing and start-up (including initial start-up) of robots and robot systems after installation or relocation. This clause also applies to robots/robot systems after software/hardware changes and after maintenance or repairs that could affect their safe operation.

8.1 Interim safeguarding

If the intended means of safeguarding are not in place prior to the testing and start-up procedure, an interim means of safeguarding shall be in place before proceeding.

8.2 Restricted envelope (space)

During the testing and start-up, no personnel shall be allowed in the restricted envelope (space) of the robot and/or robot system.

8.3 Manufacturers' instructions

The manufacturers' instructions for testing and start-up of the robot and/or robot system shall be followed.

8.4 Initial start-up procedure

An initial start-up procedure shall include, but not necessarily be limited to, the following:

8.4.1 Before applying power, verify that the following have been installed as intended:

a) Mechanical mounting and stability;
b) Electrical connections;
c) Utility connections;
d) Communications connections;
e) Peripheral equipment and systems;
f) Limiting devices for restricting the maximum envelope (space);
g) All personnel exit the restricted envelope (space) prior to applying drive power.

8.4.2 After applying power, verify:

a) Emergency stop devices are functional;
b) Each axis moves and is restricted as intended;
c) Program executes as intended;
d) Interlocks function;
e) Safeguards function;
f) Slow speed control in accordance with Clause 4.8.

9 Safety training of personnel

9.1 Training requirements

The user shall ensure that any person who programs, teaches, operates, maintains or repairs robots or robot systems is trained and demonstrates competence to safely perform the assigned task. (This training may be accomplished through formal training, on the job training, or a combination of both.)

9.2 Training program content

Training as appropriate to each assigned task should include, but not be limited to:

a) A review of applicable industry safety procedures and standards such as ANSI/RIA R15.06-1992;
b) A review of applicable robot vendor safety recommendations;
c) An explanation of the purpose of the robot system and its operation;
d) An explanation of the specific tasks and responsibilities for each person;
e) The person or persons (by name, location and phone number) to contact when the actions required are beyond the training and responsibility of the person being trained;
f) Identification of the recognized hazards associated with each task;
g) Identification of, and appropriate responses to, unusual operating conditions;
h) An explanation of functions and limitations of all safeguards and their design characteristics;
i) An explanation for function testing or otherwise assuring the proper functioning of safeguarding devices.

9.3 Retraining requirements

Retraining shall be provided to include operating system changes or when the user has reason to believe that additional training is required.

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Annex B
(informative)
Envelope Illustrations

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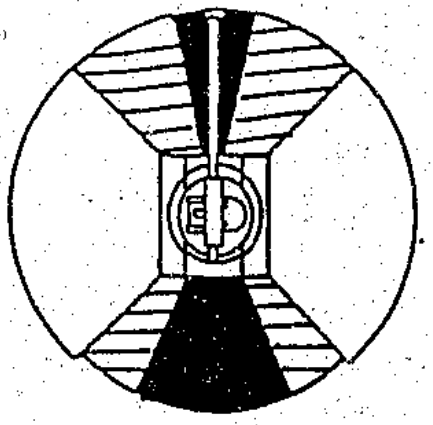
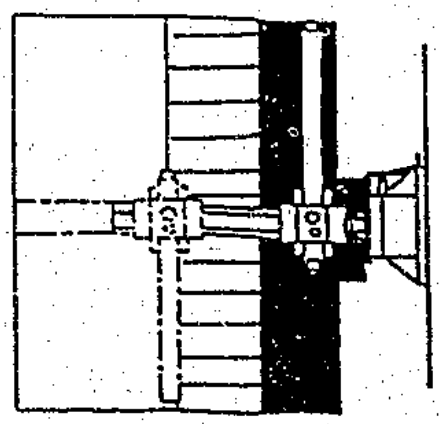
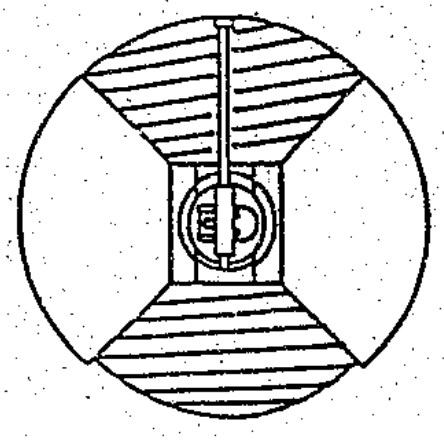
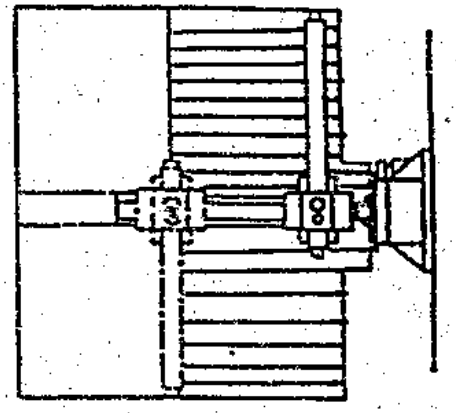




Operating Envelope





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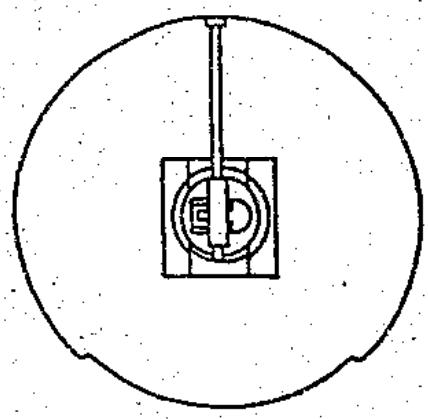

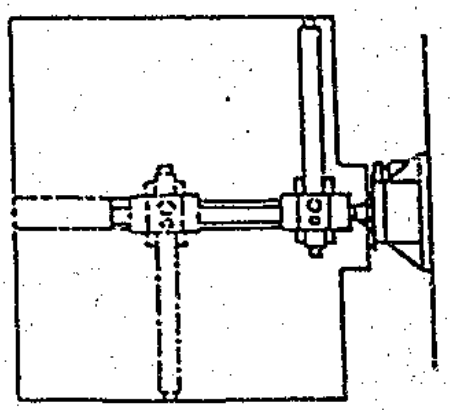

Maximum Envelope

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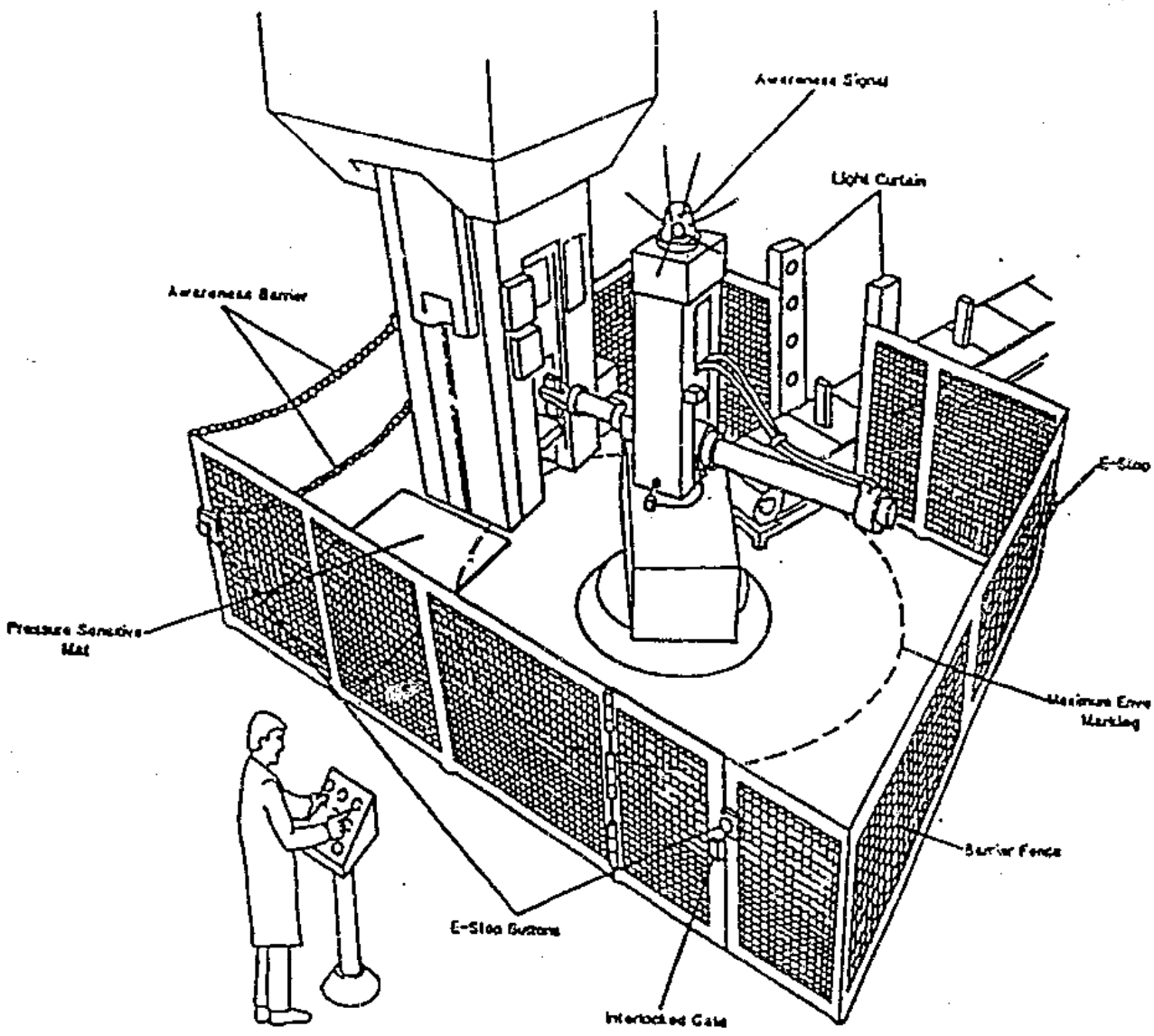
Annex C
(Informative)
Composite Illustration of Robotic Safeguarding Devices



Note - This illustrates various safeguarding devices. Specific safeguarding requirements and methods shall be determined by the user in accordance with Clause 6.

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Annex E
(Informative)

Bibliography

Following is a list of documents which may be of assistance to the user of this Standard. This list is not intended to be all inclusive.

Accident Prevention Manual for Industrial Operations, 2 volumes -
Volume 1: *Administration and Programs*
Volume 2: *Engineering and Technical*
1988 (9th Ed.); National Safety Council, Chicago

Anthropometric Source Book, Volume II. NASA Reference Publication 1024, 1978.
(The Anthropometric Source Book is a compilation by NASA of various body measurements and averages. This book has the dimensions for the shoulder width of the 95th percentile male.)

Product Safety Sign and Label System. FMC Corporation.
(The Product Safety Sign and Label System is a manual developed by FMC Corporation for designing caution, warning and danger signs and labels.)

The following standards contain additional information but are not essential for the completion of the requirements of this standard. These standards may be applicable to the overall application in which robots and robot systems are used. When they are superseded by a revision approved by the American National Standards Institute, Inc. the revision shall apply.

ANSI B11.1-1989, *Mechanical power presses*

ANSI B11.2-1982, *Hydraulic presses*

ANSI B11.3-1982, *Power press brakes*

ANSI B11.4-1983, *Shears*

ANSI B11.6-1984, *Lathes*

ANSI B11.8-1983, *Drilling, milling and boring machines*

ANSI B11.9-1975, *Grinding machines*

ANSI B11.10-1983, *Metal sawing machines*

ANSI B11.11-1985, *Gear-cutting machines*

ANSI B11.13-1983, *Automatic screw/bar and chucking machines*

ANSI B11.15-1984, *Pipe tube and shape bending machines*

ANSI B11.17-1982, *Horizontal hydraulic extrusion presses*

ANSI B11.19-198X *Safeguarding devices*[1]

ANSI B11.20-198X, *Safety requirements for flexible manufacturing systems/cells*[1]

ANSI B151.1-1984, *Horizontal injection molding machines*

ANSI B152.1-1973, *Die casting machines*

ANSI/UL969-1982, *Standard for safety - marking and labeling systems*

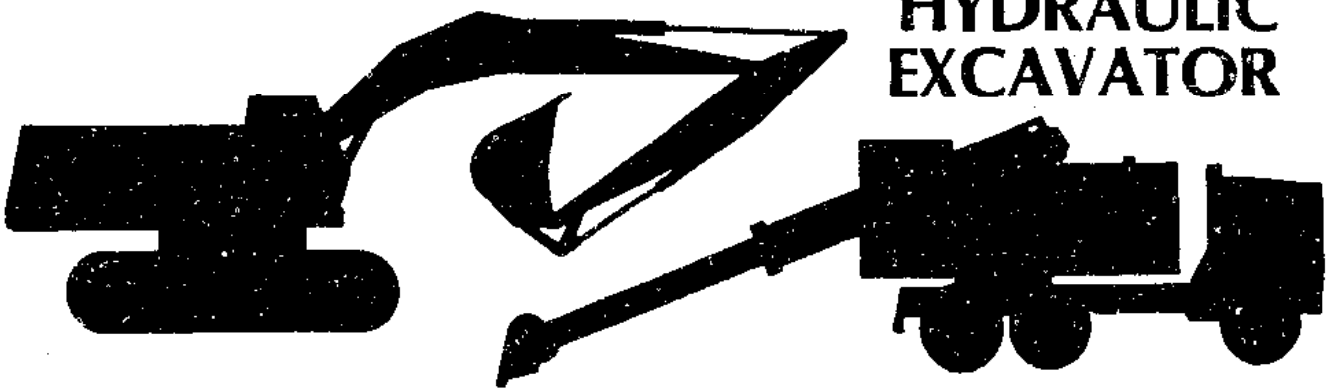
ANSI Z49.1-1983, *Safety in welding and cutting*

ANSI Z136.1-1986, *Safe use of lasers*

Safety Manual

FOR USERS, OPERATORS
AND MAINTENANCE PERSONNEL

HYDRAULIC EXCAVATOR



CONSTRUCTION INDUSTRY
MANUFACTURERS ASSOCIATION
CIMA

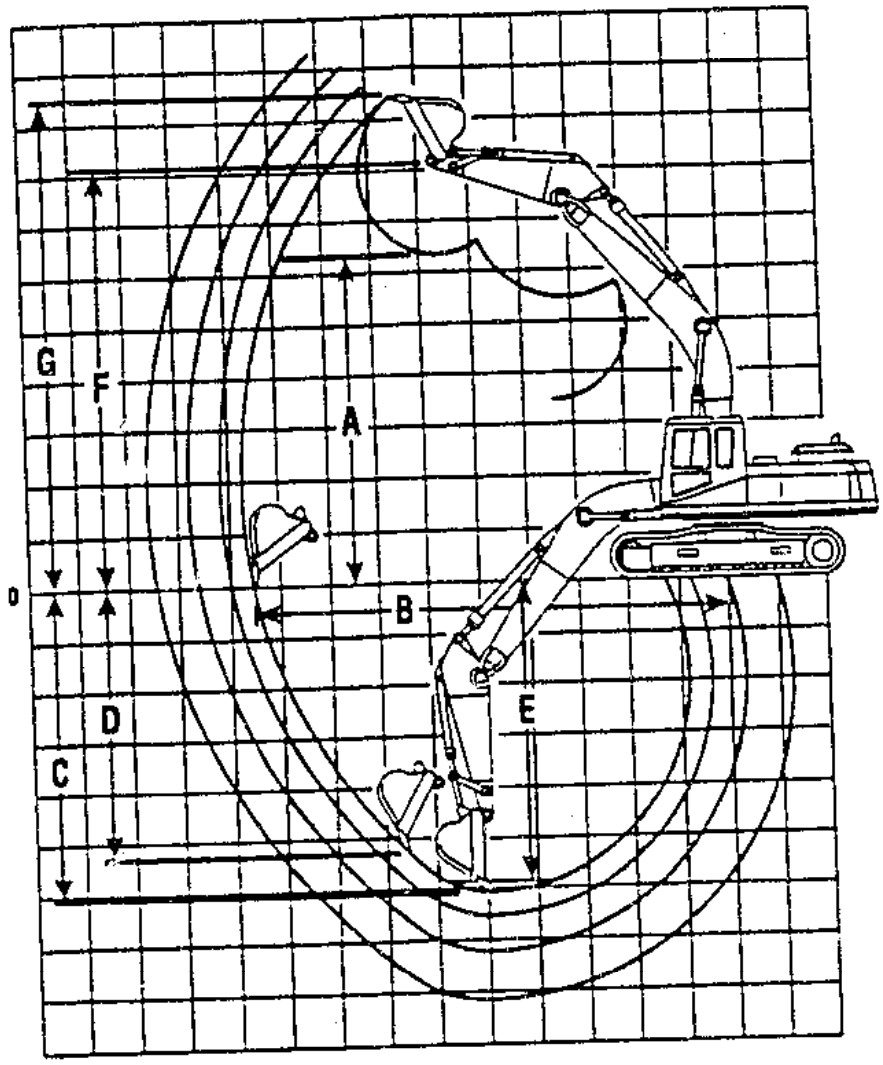
7. Appendices

7.1. Authorized User List

By my signature below, I affirm that I have read and understood the Guidance Document relating to the operation of the Hybrid rEmote Robotic Manipulation and Excavation System (HERMES) and all references called out in the procedural steps, and I agree to operate with in the stated constraints. I also verify that I have completed the requirements as defined under Job Qualifications, sub-section 2.1

Name	Signature	Company	Date	PRINCIPLE USER
Peter Boissiere		BEAR, Inc.		

7.3. Excavator Work Envelop



	(Feet)
A	22' 2"
B	33' 5"
C	21'10"
D	19' 4"
E	21' 3"
F	26' 9"
G	31' 8"

7.5. Shutdown Check List

Date:_____ Time:_____ Operator:_____

Check box if Robot System was Not Required this working Day ☐
(Checklist will not be filled out if robot system is not used)

OK	ERROR	Description
_____	_____	Replace Tools
_____	_____	Manipulator in Stow Position
_____	_____	Hydraulic System disabled
_____	_____	Work Space Clean
_____	_____	Hydraulic Oil Temp.
_____	_____	Hydraulic Oil Level
_____	_____	Hydraulic Oil Filter (Replace ?)
_____	_____	Check for Hydraulic Leaks
_____	_____	Check Wrist Camera Cable
_____	_____	Check Robot Tools
_____	_____	Base Station Mast Retracted
_____	_____	Eject, Label, Store Video Tape
_____	_____	Remote System Turned Off
_____	_____	Base Station Turned off
_____	_____	Log Book Entries Complete
_____	_____	
_____	_____	

Signature:_____

7.7. PC250LC-6 Maintenance Check List

SERVICE ITEM
INITIAL 250 HOURS SERVICE (only after the first 250 hours)
Replace fuel filter cartridge
Check engine valve clearance, adjust
WHEN REQUIRED
Check, clean and replace air cleaner element
Clean inside of cooling system (every 2 years or 2000 hours)
Check and tighten track shoe bolts
Check and adjust track tension
Check engine intake air heater (electrical)
Installation of bucket teeth
Removal of bucket teeth
Adjust bucket clearance
Check window washer fluid level, add fluid
Check and adjust air conditioner
Replace additional breaker filter element
Clean inline filter
CHECK BEFORE STARTING
Check coolant level, add coolant
Check oil level in engine oil pan, add oil
Check fuel level, add fuel
Check oil level in hydraulic tank, add oil
Check for air cleaner clogging
Check electric wiring
EVERY 100 HOURS SERVICE
Lubricating
• Boom cylinder foot pin (2 points)

SERVICE ITEM
EVERY 1000 HOURS SERVICE
Change oil in swing machinery case
Check oil level in damper case, add oil
Check all tightening parts of turbocharger
Check play of turbocharger rotor
Replace corrosion resistor cartridge
EVERY 2000 HOURS SERVICE
Change oil in final drive case
Change oil in hydraulic tank, clean strainer
Clean engine breather
Clean, check turbocharger
Check alternator, starting motor
Check engine valve clearance, adjust
Check vibration damper
EVERY 4000 HOURS SERVICE
Check water pump

ATTACHMENT D

SITE-SPECIFIC HAZARD COMMUNICATION PROGRAM

SITE-SPECIFIC HAZARD COMMUNICATION PROGRAM

Location-Specific Hazard Communication Program/Checklist

To ensure an understanding of and compliance with the Hazard Communication Standard, WESTON will use this checklist/document (or similar document) in conjunction with the WESTON Written Hazard Communication Program as a means of meeting site- or location-specific requirements

While responsibility for activities within this document reference the WESTON Safety Officer (SO), it is the responsibility of all personnel to effect compliance Responsibilities under various conditions can be found within the WESTON Written Hazard Communication Program

To ensure that information about the dangers of all hazardous chemicals used by WESTON are known by all affected employees, the following Hazard Communication Program has been established. All affected personnel will participate in the Hazard Communication Program This written program, as well as WESTON's Corporate Hazard Communication Program, will be available for review by any employee, employee representative, representative of OSHA, NIOSH, or any affected employer/employee on a multi-employer site

- ☒ Site or other location name/address LANL TA-16 Burning Grounds (MDA-P)
- ☒ Site/Project/Location Manager Fred Gray/ Site Manager
- ☒ Site/Location Safety Officer Wendy Litts / RFW SHSC
- ☐ List of chemicals compiled, format: ☐ HASP ☐ Other _____
- ☒ Location of MSDS files: MDA-P Field Trailer
- ☐ Training conducted by: Name: _____ Date _____
- ☐ Indicate format of training documentation ☐ Field Log ☐ Other: _____
- ☒ Client briefing conducted regarding hazard communication _____
- ☐ If multi-employer site (client, subcontractor agency, etc), indicate name of affected companies.

  _____
- ☐ Other employer(s) notified of chemicals labeling, and MSDS information: _____
- ☒ Has WESTON been notified of other employer's or client's hazard communication program(s), as necessary? ☒ Yes ☐ No

List of Hazardous Chemicals

A list of known hazardous chemicals used by WESTON personnel must be prepared and attached to this document or placed in a centrally identified location with the MSDSs. Further information on each chemical may be obtained by reviewing the appropriate MSDS The list will be arranged to enable cross-reference with the MSDS file and the label on the container The SO or Location Manager is responsible for ensuring the chemical listing remains up-to-date

Container Labeling

The WESTON SO will verify that all containers received from the chemical manufacturer, importer, or distributor for use on-site are clearly labeled

The SO is responsible for ensuring that labels are placed where required and for comparing MSDSs and other information with label information to ensure correctness

Material Safety Data Sheets (MSDSs)

The SO is responsible for establishing and monitoring WESTON's MSDS program for the location. The SO will ensure that procedures are developed to obtain the necessary MSDSs and will review incoming MSDSs for new or significant health and safety information. He/she will see that any new information is passed on to the affected employees. If an MSDS is not received at the time of initial shipment, the SO will call the manufacturer and have an MSDS delivered for that product in accordance with the requirements of WESTON's Written Hazard Communication Program.

A log for, and copies of, MSDSs for all hazardous chemicals in use will be kept in the MSDS folder at a location known to all site workers. MSDSs will be readily available to all employees during each work shift. If an MSDS is not available, immediately contact the WESTON SO or the designated alternate. When a revised MSDS is received, the SO will immediately replace the old MSDS.

Employee Training and Information

The SO is responsible for the WESTON site-specific personnel training program. The SO will ensure that all program elements specified below are supplied to all affected employees.

At the time of initial assignment for employees to the work site, or whenever a new hazard is introduced into the work area, employees will attend a health and safety meeting or briefing that includes the information indicated below.

- Hazardous chemicals present at the work site.
- Physical and health risks of the hazardous chemicals.
- The signs and symptoms of overexposure.
- Procedures to follow if employees are overexposed to hazardous chemicals.
- Location of the MSDS file and Written Hazard Communication Program.
- How to determine the presence or release of hazardous chemicals in the employee's work area.
- How to read labels and review MSDSs to obtain hazard information.
- Steps WESTON has taken to reduce or prevent exposure to hazardous chemicals.
- How to reduce or prevent exposure to hazardous chemicals through the use of controls procedures, work practices, and personal protective equipment.
- Hazardous, nonroutine tasks to be performed (if any).
- Chemicals within unlabeled piping (if any).

Hazardous Nonroutine Tasks

When employees are required to perform hazardous nonroutine tasks, the affected employee(s) will be given information by the SO about the hazardous chemicals he or she may use during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps WESTON is using to reduce the hazards. These steps include, but are not limited to, ventilation, respirators, presence of another employee, and emergency procedures.

Chemicals in Unlabeled Pipes

Work activities may be performed by employees in areas where chemicals are transferred through unlabeled pipes. Prior to starting work in these areas, the employee will contact the SO, at which time information as to the chemical(s) in the pipes, potential hazards of the chemicals or the process involved, and the safety precautions that should be taken will be determined and presented.

Multi-Employer Work Sites

It is the responsibility of the SO to provide other employers with information about hazardous chemicals imported by WESTON to which their employees may be exposed, along with suggested safety precautions. It is also the responsibility of the SO and the Site Manager to obtain information about hazardous chemicals used by other employers to which WESTON employees may be exposed. WESTON's chemical listing will be made available to other employers, as requested. MSDSs will be available for viewing, as necessary.

The location, format, and/or procedures for accessing MSDS information must be relayed to affected employees.

Appendix C
Readiness Review Checklist

Readiness Review Check - MDA-R 6/4/00
Fire Extinguish

Excavation Permit - pending - 6/5/00 granted 0855 Roy F. Weston
No. 00X-0317

✓ Health and Safety Plan - RFW

✓ Slope Access completed

✓ Fire Department notification - radio by Bill McC.

✓ Personnel Training / Site Briefing

✓ ESA notification

✓ Robotics System Checks - manipulator arm still has error messages - excavator OK

✓ Brush cleared / consummables + flammables removed

✓ Exclusion Area ID'd w/ barrier Tape - gates

✓ Staging Area complete

✓ Water Truck staged / full

Attendee: Bill McCormick - ESA
Diane Springer RFW
Peter Boissier BEAR Inc.
Fred Gray RFW

14:40
6/5/00
Date

Operational Check conducted by: [signature]
Location TA-16 Bldg 260

Appendix D
Summary Letters of Fire Suppression Activities
Through July 6, 2000

Roy F. Weston, Inc.
195 East Road Suite 104A
Los Alamos, New Mexico 87544
505-662-6445 • Fax 505-662-6635

June 16, 2000

Ms. Mabel Jaramillo
University of California
Los Alamos National Laboratory
P.O. Box 1663, MS M991
Los Alamos, NM 87545

Contract No. TBD
RFW WO No. 02744-070-002

RE: Letter Report -- Fire Suppression at MDA-R, Revised

Dear Ms. Jaramillo:

Since Thursday Morning, June 1, 2000, Roy F. Weston Inc., has been involved with the smoldering fire at Materials Disposal Area R. This letter report provides a summary of our ongoing efforts at MDA-R. The efforts are two-phased. First and foremost is the fire suppression. At least 10 areas of visible smoke were evident when we started. All fires are out at this writing. The second part is the stabilization of the spoils piles and the slopes after the fire is out. This will attenuate further environmental damage from erosion of the exposed landfill materials.

On Wednesday afternoon, May 31, 2000, we were contacted by our client to attend a briefing at TA-16 concerning the ongoing landfill fire at MDA-R. From that meeting, chaired by the Assistant Group Leader from ESA-WMM, we learned that previous attempts to suppress the fire had failed. These had included a surface saturation with low pressure water and two foam blankets. High pressure was deemed inappropriate due to the possibility of washing contaminants downslope. We conducted a site visit and inspection to determine whether Weston could provide immediate services to suppress the smoldering fire. The landfill is located on a steep, north-facing slope, and was thought to contain unknown debris, contaminated with heavy metals, and explosive materials, including TNT. A robotics excavator was deemed necessary to prevent personnel exposures to a potential detonation. Weston and subcontractor Boissiere Engineering and Applied Robotics Inc., had the equipment and personnel with excavation and material handling experience from the ongoing remediation of MDA-P.

Thursday morning, personnel from ESA and EM&R met at the landfill and discussed the potential actions necessary. The EM&R personnel considered the actions to still be under the emergency status. We were instructed us to proceed with preparations, and he would be working on the contract requirements. The preparations included removal of some trees, the installation of the robotics control system to Bay 1, Building 260, and the transportation of the heavy equipment to MDA-R from MDA-P. These activities continued Friday morning.

On Friday morning, an additional meeting was held that determined that the Laboratory did not know the status of work to be performed at the landfill, i.e., was it still an emergency. We were instructed to continue with field preparations so that we could proceed with excavation on Monday, June 5. We were also instructed to compile our corporate health and safety plan to cover the field activities. We would receive additional instructions that afternoon. We continued the field preparations all that day. An ESA Safety Officer informed us that we should order fire hose from a local vender, because he could not assure us that LANL could provide enough. At 2:30 p.m., a field meeting was held with the ESA Division Leader, the LANL Director of Operations, and the Weston Project Manager. We were instructed to proceed with all urgency, and to not wait until Monday to proceed with the excavation. All preparations up to that moment paid off, because we could not have started actual excavation when we did had we not prepared.

Saturday and Sunday morning we completed the installation of the robotics system in Building 260 and performed the systems tests. Saturday, a bench was excavated along the top slope of the landfill. This was required to place the robotics excavator within reach of the landfill materials. The spoils from the access bench were placed in a large pile on the mesa top, south of the landfill within the proposed AOC. After they were staged, we performed a field screening for heavy metals with a field XRF instrument. This indicated that the barium concentration of the bench materials was less than 1,000 ppm, near background for the area.

On Sunday afternoon, we completed the health and safety plan conducted an impromptu readiness review (attached) and started excavation of the landfill. The initial efforts were directed at an open flame fire on the westside. That afternoon and all day Monday, starting on the west part and moving eastward, we removed smoking materials from the landfill. A large tree was pushed over by the excavator to expose burning roots, and very hot materials underneath. Combustible materials included mostly buried trees and timber, with some wire insulation. Charcoal fires from a few feet depth were common and intensely hot. Excavated materials were placed on the bench and doused with water from the fire hose. After wetting, they were moved to the mesa top and staged in piles south of the landfill. By Monday afternoon we had moved approximately one-third of the way across the landfill. We had left landfill materials in place to the west, but these did not contain any obvious smoking materials.

Tuesday and each morning we conducted a visual inspection of the landfill. It appeared that we would need to remove additional materials for access on the east end, as it now appeared that the smoldering fire extended further east than anyone had originally observed. We decided that the area was not in eminent danger and we would continue the robotics excavation systematically eastward. The robotics system then failed its initialization checks. An inspection and diagnosis revealed a failed power supply deep within the onboard computer system on the excavator. A new one was available from Albuquerque the next morning. We utilized the time to excavate the access bench to the lower eastside.

Wednesday morning the robotics system was repaired by the replacement of the power supply We continued the excavation eastward. The landfill through the middle section was exceptionally thin with only scattered surface debris. Scattered charcoal fires were mixed with the debris. Near the east end, the landfill thickness increased slightly and extended further down the slope. These landfill materials contained the largest smoke emanation in the area, but access to this area required additional access excavation. The excavation was additionally extended beyond the apparent east end of the landfill, because of obvious smoke from what turned out to be tree and shrub roots. Work on the east end continued through Thursday, June 8.

On Friday morning we again, conducted an inspection of the entire landfill. No obvious smoke was being emitted, but we could smell something on the west end. We knew that we had left materials in place earlier that week. A surface survey with an infrared thermometer did not reveal any obvious areas of elevated temperature. We moved the excavator back to the west side and proceeded to excavate the access bench to a lower level to gain access to the materials still in place. Friday afternoon the excavator pushed another large tree over to reveal very hot landfill and timber materials that were still on fire. The heat had been retained under the tree and in the loose landfill materials. Rocks were hot enough to break when doused with water from the fire hose. Charcoal and soils were again placed on the bench and doused with water. It took all afternoon to remove and control the fire in a small area

Saturday we continued working on the west end. The access was difficult because bedrock outcrops prevents conventional benching and sloping techniques. Another excavator was moved from the MDA-P project to the area to assist in moving materials on the mesa top. We removed as much landfill materials as we could reach from the upper bench. Much of these materials still contained burning debris that only smoked when exposed to the air. The hottest materials were still too low on the slope to reach from the upper bench, however. We doused the area with a water fog from the fire hose and left the area.

The Monday morning inspection revealed that the lower area on the west end was still very hot. The access excavation proceeded down from a point further east to control the grade. Three certified asbestos workers were deployed to stabilize and containerize exposed asbestos containing materials before they were mixed or dispersed by the excavation activities. We did not want to expose our fire suppression crew to these materials. The asbestos materials were bagged and placed in a 55-gallon for disposal.

The excavation of the access road and landfill materials that followed was difficult at best. This required the judgement and skill of a very experienced excavator operator. Based on visual inspection of the landfill materials and the difficult terrain, we decided to proceed with the excavation manually. The bench access was steep and rocky. Once placed on the lower slope of the landfill, the excavator was operated manually with a continuous water stream to cool the exposed materials and control the ash and dust. One tree was pushed over that retained fire beneath it, another did not. The landfill materials were cast from the lower slopes to staging bench where they were picked up by the second excavator and placed on the mesa top

Approximately one-third of the lower portion of the west end of the landfill was removed on Monday, including about 20 feet of slope area beyond the apparent edge of the landfill. The latter was to ensure that there were no hidden hot spots as there had been on the east end.

On Tuesday, excavation on the lower portion of the west end of the landfill continued. Landfill materials, including incandescent charcoal were removed from the lower slopes and placed on the mesa top and doused with water. Two trees were pushed over and the materials beneath them doused with water and removed. A continuous stream of water was used to control the fire, ash and dust. The excavation remained difficult. The excavator operator backed the equipment up the slope and removed all materials within his reach as he proceeded. A small amount of landfill materials were unavoidably left in place with this procedure. By mid-afternoon Tuesday, we believed that all of the fire at MDA-R had been extinguished.

Wednesday morning, we conducted a walkover of the area for the ESA and ER management, and representatives from DOE LAAO and DOE AL. We agreed at that point that the fire suppression portion was complete and we should proceed with the stabilization efforts. The entire surface area of the MDA-R landfill was inspected by 2 qualified, wildland firefighters on our staff. All areas were observed to be cold with the exception of the western end. On the western end, rocks in the subsurface were observed on Thursday, June 15, to retain a large amount of residual heat from the fire, but are not hot enough to cause ignition. Additionally, little or no fuels remain in the area. These rocks will cool over the weeks to follow.

At this writing, we are demobilizing some equipment and consolidating the spoils piles from the landfill. The robotics excavator has been moved back to MDA-P to complete the work remaining there. By Friday, June 16, we will have evacuated from Building 260. We will continue field work in the area, as we proceed with stabilization efforts On Tuesday afternoon, we met with personnel from ESH-18 to discuss erosion control measures and the resources required. We are currently coordinating with him to have JCNNM cut and place several dead and standing trees on the slopes, and will obtain and place straw bales for silt control. These efforts will be complete next week.

A volume of approximately 1200-1400 cubic yards is estimated to have been removed from the MDA-R landfill during the past week's efforts. These are staged on the mesa top within the proposed AOC boundary and will be stabilized with a berm and a soil surfactant to inhibit erosion and resuspension. Field screening of these soils with a field XRF instrument indicates contamination with barium (5,000-18,000 ppm) and possibly lead. No high explosive chunks or radioactive materials were found during the excavation. No volatile organic contamination was observed by field screening with a direct reading field instrument (PID). Two small, 50 mL glass bottles were removed from the soils that contained unknown liquids. These were moved to a satellite storage area. A 55-gallon drum with bagged asbestos materials was also staged for disposal. All large debris (concrete and steel) is staged separately. All of the debris from the landfill appears to have been burned or flashed. Little combustible waste materials were found in the landfill. The fire appears to have been confined to buried trees and timber and some wire insulation.

Approximately 800 cubic yards of overburden materials were excavated for landfill access. This has been staged separately from the landfill materials and will be used in the days to come for slope stabilization and berms around the landfill spoils pile. Field screening of these materials indicate that barium is below 1,000 ppm.

Recommendations

The following recommendations are made on the basis of the actual conditions observed at MDA-R during the excavation efforts described above.

- The waste piles should be sampled and disposed of properly. Stabilization efforts at this time will be temporary. Additional maintenance efforts will be required if the spoils piles remain more than a few months. It is likely that laboratory analysis will indicate that the soils are hazardous wastes. The timely disposal will be in keeping with best management practices for this type of material.

- The excavation of additional materials from the slopes of MDA-R should be guided by sampling. Some landfill materials remain, but it is estimated that over 90 percent were removed during the fire suppression efforts. Further excavation during the current efforts was not warranted. A small amount of additional landfill material could have been removed, but would have required removal of a large amount of overburden. Future excavation without sampling may result in excess materials being removed and hence, excess costs.

- There is currently no evidence that additional excavation efforts at MDA-R should be performed by a robotic excavator. Inspection of the excavation spoils indicates that no large, intact pieces of high explosives are present that would warrant such efforts. There may very well be high explosives distributed throughout the soils. The portion of the landfill that remains to be excavated appears relatively small and may be difficult to access. Placing a robotics excavator in this difficult situation may be more unsafe that a conventional excavator equipped with blast protection for the operator. An operator sitting in the cab will have a greater feel for the stability of the equipment.

If you have questions, please contact me or Rita Muniz at (505) 884-5050.

Sincerely,

C. William Criswell
Sr. Project Manager

CWC/

pc: K. Bostick EES-15 MS- M992
D. Hickmott EES-1, MS-M992
R. Grace, ESA-FM
A. Sherrard, ESA-FM
R.V. Ortiz, ESA-WMM
P. Boissiere, BEAR Inc
Rita Muniz RFW ABQ

Roy F. Weston, Inc.
195 East Road, Suite 104A
Los Alamos, New Mexico 87544
505-662-6445 • Fax 505-662-6635

July 6, 2000

Ms. Mabel Jaramillo
University of California
Los Alamos National Laboratory
P.O. Box 1663, MS M991
Los Alamos, NM 87545

Contract No. TBD
RFW WO No. 02744-070-002

RE: Letter Report – Fire Suppression at MDA-R - Update

Dear Ms. Jaramillo:

Since Wednesday June 14, 2000, Roy F. Weston Inc., has been involved with the stabilization efforts at Materials Disposal Area R. This letter report provides an updated summary of our ongoing efforts at MDA-R after suppression of the smoldering fire. The recent efforts concentrated on the stabilization of the spoils piles and the canyon slopes, a survey of the remaining concentration and location of heavy metal contamination, and the recourse of a small arroyo that did drain through the landfill. The stabilization efforts have taken a little longer than originally estimated because of the lack of support from JCNNM. That group appears to be overwhelmed by the magnitude of the cleanup after the Cerro Grande fire.

On Thursday June 15, we anticipated that tree cutters would fell the burned snags in the area. We wanted to fell them parallel to the slopes to assist with slope stabilization. The cutters did not arrive until Friday morning. They worked for about an hour, left for lunch and have never returned. We could not place the straw waddles until the trees were felled. Monday we did not work in the area at all. Tuesday we were informed that the cutters would not return and that we would have to arrange for transportation of the straw materials ourselves. We arranged for a truck the following morning and used the day to construct an earthen berm around the spoils pile.

Wednesday through Friday we continued to cut and place the dead and burned trees along the mid-slope below the landfill. We packed and staggered straw waddles along the trees to act as silt control. This construction serves to attenuate silt migration while allowing water to pass. We also replaced the soil removed from the access bench that had been staged on the mesa top. This material was not placed on top of any landfill materials that we are aware of. Straw waddles were also placed along the upper portion of the slope at the break in slope to attenuate silt migration. The top of the bench was left as a generally rough surface to allow infiltration and slow water run-off. This will also allow the area to be reseeded if it is decided to do so.

During this time, we also conducted a contamination survey of the slope exposed by the excavations. We did not perform this screening during the fire suppression activities because the driver was simply fire suppression. The soils must also be dry for an accurate measurement. We performed this survey at this time as an act of environmental stewardship. We used a field X-ray fluorescence instrument that measures heavy metals. Barium and lead are believed to be the principal contaminants at MDA-R, as they have been at MDA-P. This instrument has served well at MDA-P to act as a field screening tool for these metals. We also analyzed samples of the excavated materials after they dried during staging.

The XRF survey of the residual landfill materials and slopes indicates that soils contaminated with barium remain in the central area. Surface concentrations of barium locally exceed 200,000 parts per million (ppm) near the former drainage arroyo, decreasing to a few tens of thousands ppm east and west from the arroyo. The apparent extent of contamination is skewed eastward downslope. A few shallow, subsurface samples, ≤1 foot depth, indicate that contamination >14,000 ppm is present at shallow depth. A crude map of the results is attached. All of the upper slopes were disturbed or excavated during the fire suppression efforts. These efforts may have exposed contaminated soils at the surface where they did not exist before the fire. The contamination also appears to extend downslope into the existing standing, unburned trees. These areas were not disturbed during the fire suppression efforts.

On Friday, during the field screening survey, we discovered numerous intact pieces of barium nitrate. All of these were located within the area of highest barium contamination near the former drainage. These pieces varied in size from an inch or two in diameter to over foot across. Many were masked by a thin coating of soil. Some were partially dissolved and crumbled when handled. These pieces had been overlooked during the fire suppression efforts because they blended in with the many pieces of white plaster in the landfill. We removed these pieces to eliminate further contaminant migration. Approximately 100 pounds of suspect barium nitrate was placed in a lined 55-gallon drum and removed from the area for management.

On Monday June 26, we completed the straw waddle installation on the slopes and around the spoils pile. We also sprayed the spoils pile and the slope area with the elevated barium concentrations with a surfactant to inhibit erosion and resuspension. This surfactant will have to be reapplied every other month or so to maintain its efficacy.

On Tuesday morning, we conducted a walkover inspection of the area. This walkover by Weston management included an inspection of the remaining landfill materials, silt controls, removal of orphan debris, and review of the contamination map. Inspection of the drainage arroyo south of the landfill indicated that a significant rainfall could breach the temporary dam installed and drain through the most contaminated portion of the landfill.

A heavy rainfall did indeed occur midday on Wednesday, June 28, but did not breach the temporary dam. That evening, we placed approximately 50 cubic yards of soil fill at the temporary dam to prevent it from breaching. The following morning we were instructed by ESA and ESH-18 personnel to excavate temporary a drainage ditch from the dam to the canyon edge,

west of the landfill. Our contamination survey indicated that water from this new ditch would not drain through a contaminated area.

The new diversion ditch was completed on Friday June 30. It consists of a simple, unlined ditch approximately 100 yards long, with a local rock re-enforcement. Straw waddles were placed along the ditch to attenuate silt, yet allow water to pass. The spoils from the excavation were placed on the downhill side along the length of the ditch. This ditch now completely replaces the former arroyo that drained through the landfill. The ditch now drains west of the landfill through a relatively clean area that does not exhibit any exposed landfill debris. This will inhibit further contaminant erosion and migration. The landfill will now be affected only by direct precipitation.

On Monday July 3, a small smoke emission was observed on the lower west side of the landfill. This was inspected and found to be small pieces of charcoal. This was not surprising, as it was in an area, identified in the last letter report, that we knew to contain residual heat and small pieces of roots and wood, but no real fuel materials. We have and will continue to monitor this area.

At this writing, we have demobilized all of our personnel and equipment from MDA-R. We will inspect the area after the next rainfall event to ensure that the erosion control devices are working properly. The spoils pile is stable and is currently located within the proposed AOC boundary. The pile has an earthen berm with straw waddles to prevent run-off. The surface was resprayed after the heavy rainfall on June 28, with a surfactant to inhibit run-off and resuspension. The soils removed for the access bench were replaced and are now part and parcel of the landfill slopes. The slopes are protected from run-off by straw waddles, and have been locally sprayed with a surfactant to inhibit run-off and resuspension. Landfill materials are known to remain in place in the central and western portions. The central area appears to be a veneer of residual materials, while the far western part may contain thicker portions of buried landfill. The entire area is identified with caution tape and rope to prevent unauthorized entry.

Recommendations

The following recommendations are made on the basis of the actual conditions observed at MDA-R during the field efforts described above.

- The fire hydrant on the north side of Building 260 should be repaired. During the fire suppression activities the stem seal leaked severely during use causing run-off into the drainage arroyo. This excess water also undermines the stabilization of the fixture.

- The slopes of MDA-R that exhibit elevated concentrations of barium should be removed. A significant volume of contaminated landfill materials remain in place. The fire suppression and stabilization efforts were not directed at removal of the entire landfill, only those portions that were obviously on fire or suspected to cover a buried fire. The contaminated area appears to be largely confined to the central area around the former drainage arroyo. Some contaminated materials were exposed to the surface during the fire suppression. Although run-on water is now diverted westward, it will be difficult to maintain slope stability and therefore it will be difficult to prevent further contaminant migration. It appears that the majority of heavy metal contamination is associated with the central part of the landfill where the barium pieces were found. Buried contamination may also reside in the far western areas.

If you have questions, please contact me or Rita Muniz at (505) 884-5050.

Sincerely,

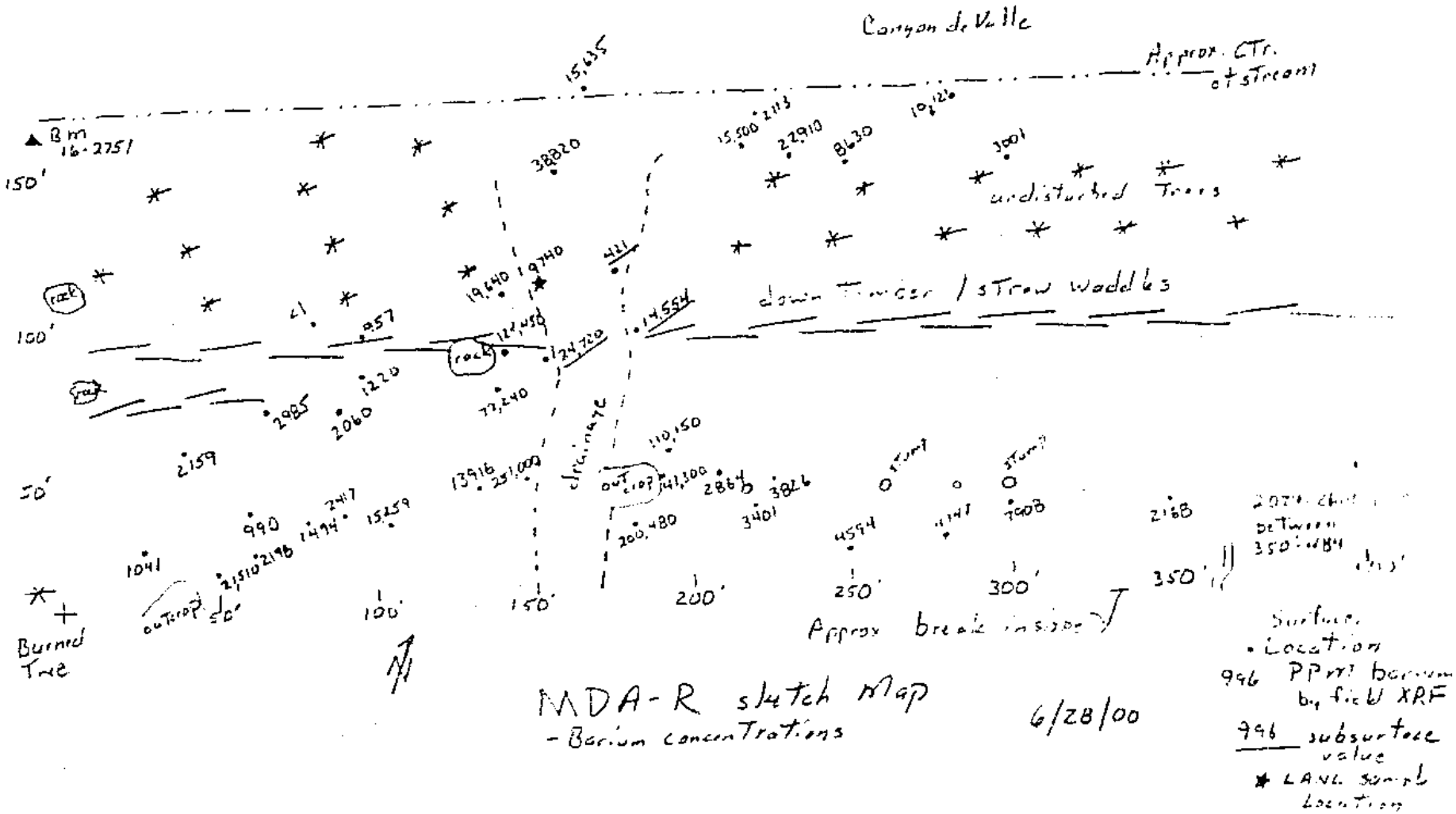
CW Criswell

C. William Criswell
Sr. Project Manager

CWC/
Attachment

pc: K. Bostick EES-15 MS- M992
D. Hickmott EES-1, MS-M992
S. Veenis, ESH-18, MS-M992
R. Grace, ESA-FM
A. Sherrard, ESA-FM
R.V. Ortiz, ESA-WMM
Rita Muniz RFW ABQ

Appendix E
Map Showing Barium Concentrations After Fire Suppression



MDA-R sketch Map
- Barium concentrations

6/28/00

Appendix F
Tailgate Safety Meeting Notes

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ R ~~Clean Closure~~ Date: 06/10/00
Time: 0745 Briefing Location: MDA-P Site Break Trailer
Weather: Clear pass pm Showers Temp. High: _____ Low: _____
Wind Speed: 3 Wind Direction: Varies, primarily out of West Humidity: ____% Barometer: _____

Safety Topic(s) Presented:

Work to be Performed (circle):
- ~~Processing~~ ~~DS~~
- ~~Robotic Excavation~~ ~~DS~~
- Sorting ~~DS~~
- ~~Material Decon~~ ~~DS~~
- excavation
- Brush Clearing
- Slope Stabilization
- Cold Trailer
- Brush Clearing
- Move excavation

Equipment Used: (circle)
- Loader
- Track Hoe
- ~~Robotic Track Hoe~~ ~~DS~~
- ~~End Dump~~ ~~DS~~
- ~~Sky Lift/Fork Truck~~ ~~DS~~
- Backhoe
- ~~High Pressure Water Sprayer~~ ~~DS~~
- ~~Scaffolding~~ ~~DS~~
- Other:
- Water truck
- fire Hydrant

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site - See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list) As Cd
- Other: pass HE

Radiological Hazards:
- Follow ~~current Radiological Work Permit~~ None to date
- Wear TLD Badge
- Other:

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:
- Hand tools

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ L Clean ~~Closure~~ Date: 06/12/00
Time: 0800 Briefing Location: MDA-P Site Break Trailer
Weather: 68 – 90 °F Temp. High: 90 Low: ____
Wind Speed: 5 Wind Direction: Varies, primarily out of West Humidity: ___ % Barometer: ____

Safety Topic(s) Presented:

Work to be Performed: (circle):
- ~~Processing~~ DS
- Robotic Excavation
- ~~Sorting~~ DS
- ~~Material Decon~~ DS
- Acquisition
- Unit Moving
- ____

Equipment Used (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- ~~End Dump~~ DS
- ~~Sky Lift/Fork Truck~~ DS
- Backhoe
- ~~High Pressure Water Sprayer~~ DS
- ~~Scaffolding~~ DS
- Other: Water truck
- Hydrant

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- ____
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list)
- Other: PID

Radiological Hazards:
- Follow current Radiological Work Permit
- Wear TLD Badge NONE to date
- Other: ____

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other: Chain Saw pass

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ R ~~Clean Closure~~ Date 06/13/00
Time 0730 Briefing Location: MDA-P Site Break Trailer
Weather: Temp. High: Low:
Wind Speed: 3 Wind Direction: Varies, primarily out of West Humidity: % Barometer:

Safety Topic(s) Presented:

Work to be Performed: (circle):
- ~~Processing~~ AS
- Robotic Excavation
- ~~Sorting~~ AS
- Material Decon
- Excavation
- Earth Moving
-
-

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer Truck
- Scaffolding
- Other:
- Hydrant
- Hand Tool
-
-
-
-

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
-
- Hearing Protection
-
-
-
-

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer
-
-
-

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list) As Cd
- Other:
-
-

Radiological Hazards:
- ~~Follow current Radiological Work Permit~~ RS None to date
- ~~Wear TLD Badge~~
- ~~Other:~~

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:
- Tools
-
-

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ R ~~Clean Closure~~ Date: 6 / 14 / 00
Time: 0730 Briefing Location: MDA-P Site Break Trailer
Weather: Clear Temp. High: 90 Low: 72
Wind Speed: 3 Wind Direction: Varies, primarily out of West Humidity: ___% Barometer: ___

Safety Topic(s) Presented:

Work to be Performed: (circle):
- Processing
- Robotic ~~Excavation~~ diagnostics
- Sorting
- Material Decon
- earth moving
-
-

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other: water truck
- Hydrant

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
-
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list) As Cd
- Other:

Radiological Hazards:
- Follow current Radiological Work Permit
- Wear TLD Badge
- Other:

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other: Robotic diagnostics
- Chain saw

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ R ~~Clean Closure~~ Date: 6/15/00
Time: 0730 Briefing Location: MDA-P Site Break Trailer
Weather: Clear Temp. High: 92 DS Low: 87
Wind Speed: ____ Wind Direction: Varies, primarily out of West Humidity: ____ % Barometer: ____

Safety Topic(s) Presented:

Work to be Performed: (circle):
- Processing
- Robotic Excavation
- Sorting
- Material Decon
- Earth Moving
- Cold Trailing
- Tree Clearing
- Brush Moving
- Berm Building
- Erosion Control
- Soil Sampling

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water ~~Sprayer~~ Truck
- Scaffolding
- Other
- Hydrant
- Chain Saw

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site - See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list) Pb Be
- Other

Radiological Hazards:
- Follow current Radiological Work Permit
- Wear TLD Badge
- Other:

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ R ~~Clean Closure~~ Date: 6/16/00
Time: Briefing Location: MDA-P Site Break Trailer
Weather: 90°F Clear Temp. High: Low:
Wind Speed: 3 Wind Direction: Varies, primarily out of West Humidity: % Barometer:

Safety Topic(s) Presented:

Work to be Performed: (circle):
- Processing
- Robotic Excavation
- Sorting
- ~~Material Decon~~
- Sampling
- [illegible]
- [illegible]

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other: Water Truck

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list) Ba Pb
- Other:

Radiological Hazards:
- Follow current Radiological Work Permit
- Wear TLD Badge
- Other:

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ R Clean Closure
Date: 6/20/00
Time:
Briefing Location: MDA-P Site Break Trailer
Weather: Partly Cloudy to 90°
Temp. High: 90 Low:
Wind Speed: 3 Wind Direction: Varies, primarily out of West
Humidity: % Barometer:

Safety Topic(s) Presented:

Work to be Performed: (circle).
- Processing
- Robotic Excavation
- Sorting
- Material Decon
- Build Berm
- XRF Stage
- Water/dust Suppr.

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other:

Protective Clothing and Equipment.
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle)
- Asbestos
- Barium
- Heavy Metals (list)
- Other:

Radiological Hazards
- Follow current Radiological Work Permit
- Wear TLD Badge
- Other:

Physical Hazards
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ R ~~Clean Closure~~ Date: 06 / 21 / 06
Time: 0730 Briefing Location: MDA-P Site Break Trailer
Weather: Ptly Cloudy Afternoon Rain Temp. High: 90 Low: 52
Wind Speed:____ Wind Direction: Varies, primarily out of West Humidity:____% Barometer:____

Safety Topic(s) Presented:

Work to be Performed: (circle):
- Processing
- Robotic Excavation
- Sorting
- Material Decon
- Straw bale placement
- Tree Cutting
-
-
-

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other:
- Chain Saw
- Mul

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
-
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list)
- Other:

Radiological Hazards:
- Follow current Radiological Work Permit None to date
- Wear TLD Badge
- Other:

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other: Hand tools

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ R ~~Clean Closure~~ Date: 6/22/00
Time: Briefing Location: MDA-P Site Break Trailer
Weather: Temp. High: 70 Low: 60
Wind Speed: 5 Wind Direction: Varies, primarily out of West Humidity: ___% Barometer: ___

Safety Topic(s) Presented:

Work to be Performed: (circle):
- Processing
- Robotic Excavation
- Sorting
- Material Decon
- TREE Cutting
- Soil Stabilization
-

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other:

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list)
- Other: PID

Radiological Hazards:
- Follow current Radiological Work Permit NONE to date
- Wear TLD Badge
- Other: PD

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:

H & S Daily Briefing
Environmental Restoration Program
MDA-~~P~~ R Landfill Remediation

Task/Project: LANL MDA-~~P~~ R ~~Clean Closure~~ Date: 6/23/00
Time: 0730 Briefing Location: MDA-P Site Break Trailer
Weather: Partly to 85 Chance Rain PM Temp. High: 85 Low: 60
Wind Speed: 5 Wind Direction: Varies, primarily out of West Humidity: ___ % Barometer: ___

Safety Topic(s) Presented:

Work to be Performed: (circle):
- Processing
- Robotic Excavation
- Sorting
- Material Decon
- Erosion Control
- XRF
- Berm Fill on

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other:

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list)
- Other:

Radiological Hazards:
- Follow current Radiological Work Permit
- Wear TLD Badge None to date
- Other:

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:

H & S Daily Briefing
Environmental Restoration Program
MDA-P Landfill Remediation

Task/Project: LANL MDA-P ~~Clean Closure~~
Time: 1030
Weather: Pty Cloudy
Wind Speed: 3 Wind Direction: Varies, primarily out of West

Date: 06/26/00
Briefing Location: MDA-P Site Break Trailer
Temp. High: 87 Low: 60
Humidity: ___% Barometer: ___

Safety Topic(s) Presented:

Work to be Performed (circle):
- Processing
- Robotic Excavation
- Sorting
- Material Decon
- Soil Stabilization
- earth moving
- XRF
- Soil Cement

Equipment Used (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other:
- water truck

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list) Cd Pb
- Other:

Radiological Hazards:
- Follow current Radiological Work Permit
- Wear TLD Badge
- Other:

Physical Hazards
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:

H & S Daily Briefing
Environmental Restoration Program
MDA-P Landfill Remediation

Task/Project: LANL MDA-~~P~~ R ~~Clean Closure~~ Date: 27 ~~Oct~~ Sept 06
Time: 0730 Briefing Location: MDA-~~P~~ Site Break Trailer
Weather: Temp. High: 90 Low: 66
Wind Speed: ____ Wind Direction: Varies, primarily out of West Humidity: ____ % Barometer: ____

Safety Topic(s) Presented:

Work to be Performed: (circle):
- Processing
- Robotic Excavation
- Sorting
- Material Decon
- Fencing
- Cleanup
- ____

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other:

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list)
- Other:

Radiological Hazards:
- Follow current Radiological Work Permit NONE today
- Wear TLD Badge
- Other:

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:

H & S Daily Briefing
Environmental Restoration Program
MDA-P Landfill Remediation

Task/Project: LANL MDA-P ~~Clean Closure~~ Date: 6/13/00
Time: 0800 Briefing Location: MDA-P Site Break Trailer
Weather: Clear Temp. High: 85 Low: 60
Wind Speed: 5 Wind Direction: Varies, primarily out of West Humidity: ___% Barometer: ___

Safety Topic(s) Presented:

Work to be Performed (circle)
- Processing
- Robotic Excavation
- Sorting
- Material Decon
- Trenching
- Roll Work
- Erosion Control

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other:

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards
- Asbestos
- Unknowns
- Barium
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer

Air Monitoring (circle)
- Asbestos
- Barium
- Heavy Metals (list)
- Other:

Radiological Hazards:
- Follow current Radiological Work Permit
- Wear TLD Badge
- Other:

None to date

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:

H & S Daily Briefing
Environmental Restoration Program
MDA-P Landfill Remediation

Task/Project: LANL MDA-P ~~Clean Closure~~ Date: 6/29/00
Time: 0430 Briefing Location: MDA-P Site Break Trailer
Weather: Cloudy / Rain Temp. High: 71 Low: 58
Wind Speed: 5 Wind Direction: Varies, primarily out of West Humidity: ___% Barometer: ___

Safety Topic(s) Presented:

Work to be Performed: (circle):
- Processing
- Robotic Excavation
- Sorting
- Material Decon
- Trenching
-
-

Equipment Used: (circle)
- Loader
- Track Hoe
- Robotic Track Hoe
- End Dump
- Sky Lift/Fork Truck
- Backhoe
- High Pressure Water Sprayer
- Scaffolding
- Other:

Protective Clothing and Equipment:
- Hard Hats when exposure
- Safety Toed Boots
- Safety Vests
- Safety Glasses w/ side shields
- Hearing Protection

Chemical Hazards:
- Asbestos
- Unknowns
- Chemicals brought on-site – See MSDS Chemical Inventory in Safety Trailer
- Barium

Air Monitoring (circle):
- Asbestos
- Barium
- Heavy Metals (list)
- Other:

Radiological Hazards:
- Follow current Radiological Work Permit
- Wear TLD Badge — None to date
- Other:

Physical Hazards:
- Uneven Walking Surfaces
- Heavy Equipment
- Slick (ice/mud) surfaces
- Lifting material
- Housekeeping
- Biological
- Noise Exposure
- Cold/Heat Stress
- Other:

Appendix G
ESA-SSO's Project Status Reports

X-Sender: rvortiz@popmail.esa.lanl.gov
X-Mailer: QUALCOMM Windows Eudora Pro Version 4.0.2
Date: Wed, 07 Jun 2000 08:31:14 -0600
To: dburick@lanl.gov
From: "Ricardo \"Tino\" Ortiz" <rvortiz@lanl.gov>
Subject: MDA-R Update
Cc: ars@lanl.gov, smyounger@lanl.gov, dhemphill@lanl.gov, EMHANSON@lanl.gov, elson@lanl.gov, hatler@lanl.gov, mac@lanl.gov

This is an update on the work performed on Tuesday, June 6 at MDA-R

The remote-controlled excavator had some mechanical problems after about an hour of operating on Tuesday. It is expected to be fixed today, Wednesday. The debris that was excavated on Monday has been sorted for processing. HE pieces were **not** found in the rubble. Periphery work took place the remainder of the day with other equipment present at the excavation site. Additional updates will be provided as the work continues.
Thanks
Tino

X-Sender: rvortiz@popmail.esa.lanl.gov
X-Mailer: QUALCOMM Windows Eudora Pro Version 4.0.2
Date: Thu, 08 Jun 2000 07:34:33 -0600
To: rburick@lanl.gov
From: "Ricardo \"Tino\" Ortiz" <rvortiz@lanl.gov>
Subject: MDA-R Update
Cc: bob_gtace@lanl.gov, ars@lanl.gov, smyounger@lanl.gov, dhemphill@lanl.gov, EMHANSON@lanl.gov, elson@lanl.gov, hatler@lanl.gov, mac@lanl.gov

This is an update on the work performed on Wednesday, June 7 at MDA-R

The remote-controlled excavator is back in operation. Two additional excavations have been performed. Approximately 75% of the length of the landfill has been cleared of smoldering activity. The crew expects to extinguish the remaining areas today and tommorrow. They intend on going back and removing those trees in the landfill that have a potential of reigniting. Saturday will be used to restabilize the area for erosion control and runoff. An update will be provided upon completion of this activity.
Thanks
Tino

X-Sender: rvortiz@popmail.esa.lanl.gov
X-Mailer: QUALCOMM Windows Eudora Pro Version 4.0.2
Date: Wed, 14 Jun 2000 14:35:43 -0600
To: rburick@lanl.gov
From: "Ricardo \"Tino\" Ortiz" <rvortiz@lanl.gov>
Subject: MDA-R Update
Cc: bob_grace@lanl.gov, ars@lanl.gov, smyounger@lanl.gov, EMHANSON@lanl.gov, dhemphill@lanl.gov, hatler@lanl.gov, mac@lanl.gov

Dick, this is a quick update on MDA-R as of Wednesday morning.:

All smoke/fire/smolder activity has been extinguished. Weston is now working on erosion control and stabilization of the area. This should be completed by the end of the week. Formal documentation is being generated on the activities that have taken place. The documentation will be forwarded as appropriate. A meeting will take place with EM to determine at what level this assignment will be deemed as having been completed until formal restoration takes place.
Tino

Appendix H
VOC Sampling Report and Analytical Results

MEMORANDUM

TO: Jean Dewart (LANL, ESH-17) and Margie Stockton (URS/Radian)

FROM: Bart Eklund (URS/Radian)

DATE: July 17, 2000

SUBJECT: Results of Ambient Air Monitoring for VOCs at MDA-R

BACKGROUND

Material Disposal Area (MDA) R is located at Los Alamos National Laboratory (LANL), Technical Area (TA)-16. MDA-R is a high explosives burning area dating from the 1940's, that is approximately 600 feet long by 60 feet wide (about 3,300 m^2). Limited characterization of the area has been performed in the past and residues of high explosives, particularly RDX and TNT, were found, along with above-background concentrations of barium, cobalt, lead, silver and zinc.

The landfill began smoldering when the Cerro Grande fire reached the site on May 10 and 11, 2000. It was reported that tree roots, railroad ties, and cabling within the MDA-R were burning. The smoldering materials were extinguished on June 14 after contractors used a remote robotic excavator to scoop up chunks of smoldering debris, move them to a nearby clear area, and douse them with water.

The burning material had the potential to release air emissions, so LANL conducted an ambient air monitoring (AAM) program to address concerns about the impact on human health and the environment from these air emissions. This memorandum addresses the sampling for volatile organic compounds (VOCs) that was performed. Additional air measurements were made by the ESH-17 Air Quality Group and are reported on the LANL air quality web page (http://www.air-quality.lanl.gov/airnet.htm). The monitoring included a particulate matter monitoring station for inhalable particles (PM-10), with the samples analyzed for metals and radionuclides. In addition, two total suspended particulate (TSP) monitors were used to collect samples in conjunction with the VOC samples. The TSP samples will also be analyzed for metals and radionuclides.

SCOPE OF WORK

The work involved several days of monitoring for volatile organic compounds (VOCs) at two locations around the MDA. The samplers were placed at the approximate western and eastern ends of the MDA. These locations were selected based on local winds, availability of power, and the need to remain clear of the earth moving equipment. In addition, one background sample was collected at TA-16, Building 900.

The monitoring was performed on June 2, 5, 6, 8, and 12 by personnel from LANL and from the DOE facility in Carlsbad, NM (WIPP), using equipment provided by WIPP. The schedule of excavation work performed during this time period is given in Table 1. Time-integrated 24-hour VOC samples were collected and the canister samples were submitted to Air Toxics Ltd. laboratory in Folsom, CA for GC/MS analysis for a target analyte list of 60 compounds using EPA Method TO-14. The samples are identified in Table 2.

RESULTS

Meteorological data are continuously collected at several locations at LANL, including TA-6 and TA-49, which are only a few miles from MDA-R. The primary weather data for LANL is collected at TA-6. The meteorological parameter of most importance in interpreting the monitoring results is wind direction. The wind direction data defines which monitoring sites are upwind of the emission source and which monitoring sites are downwind. Wind speed data provides information about the amount of dilution air present during the monitoring period. Rainfall data are meaningful because rainfall can remove ("scrub") pollutants from the atmosphere.

The meteorological conditions during the sampling periods can be found at www.weather.lanl.gov. Ambient temperatures averaged about 80 °F for daily highs, with lows in the 50's. About 0.7 in. of rain fell on June 2 and about 0.15 in. of rain fell on June 9. Typical winds in the area are from the west, making the East sampling location the downwind location under typical conditions and the West sampling location the upwind location.

The complete VOC monitoring results are given in Attachment 1 and are summarized in Table 3. A total of 11 compounds were detected in the sample set, with approximately 5-10 compounds detected in each sample. The compounds include two alcohols (ethanol and isopropyl alcohol); two ketones (acetone and MEK); one furan (tetrahydrofuran), three aromatics (toluene, m/p-xylene, and o-xylene), two chlorinated organics (chloromethane and methylene chloride) and one freon (Freon 12). Five of the 11 compounds contain oxygen (oxygenated compounds are relatively difficult to quantify from an analytical chemistry standpoint). Only two compounds were detected at concentrations above 5 ppbv (acetone and ethanol). The highest measured concentrations were 230 ppbv for ethanol and 26 ppbv for acetone.

DISCUSSION OF RESULTS

In general, there were no data trends of note. The concentrations measured upwind and downwind of the MDA were comparable, indicating that the area was not a net source of air emissions. Furthermore, the concentrations measured at either side of the MDA tended to be equal to or lower than the concentrations measured at the background site. Natural smoke typically contains a number of VOCs, such as ethane, ethene, methyl chloride, benzene, toluene, xylenes, and hexane. The lack of this characteristic "fingerprint" of natural smoke in the samples

collected at the MDA indicates that the smoldering materials did not generate large quantities of smoke. This is consistent with observations made in the field by sampling personnel.

As previously noted, the compounds measured in the highest concentrations were ethanol and acetone. Both acetone and ethanol are commonly measured in ambient air samples. They may be emitted from both biogenic and anthropogenic sources. One likely source is the decomposition of organic matter through natural soil processes. The quantitation of highly polar organic compounds - such as acetone and ethanol - using EPA Method TO-14 has greater uncertainty than the quantitation of non-polar compounds. This is because it is necessary to remove water vapor during the sample preparation and the water management systems tend to affect low molecular-weight polar compounds to a variable extent.

The 11 compounds detected in the samples are summarized in Table 4. As shown in Table 4, all of the VOCs were present at concentrations at least three orders of magnitude (i.e., more than 1,000 times) below the applicable occupational exposure limit, the 8-hr time-weighted average (TWA). Occupational exposure limits are typically adjusted by a factor of 100x to develop screening levels to assess short-term exposure of off-site receptors (Eklund, et al., 1993). The safety factor is used to take into account the differences between occupational and residential exposures. Even with a safety factor applied, none of these compounds exceed the screening level and therefore are not of concern from a human health or risk standpoint.

Table 4 also includes data for each compound on its odor detection threshold; i.e., the lowest concentration of the gas in the air that can be detected by the average, healthy person. None of the compounds were detected at concentrations at or near the odor detection threshold.

The quality control data indicate that the VOC data are reliable and defensible. The laboratory blank samples showed some relatively minor contamination of methylene chloride ($\lesssim$1.5 ppbv). Sample 3954 was analyzed in duplicate and in both analyses the same two compounds were detected (acetone and ethanol). The results were within ±25% for both compounds, which is considered to be good agreement. The surrogate recoveries also indicate that no analytical problems were present.

CONCLUSIONS

The measurement data provides a point-in-time evaluation of emissions from the smoldering material at the MDA-R under sammertime conditions. The VOC monitoring data show that small amounts of VOCs are present in the air around the MDA. The levels upwind of the MDA, however, are comparable to the downwind levels, indicating that the MDA is not the source of most or all of the VOCs present in the air. The VOCs are all far below the applicable occupational exposure limits and are far below the applicable odor detection thresholds. Based on the available data, VOCs at MDA do not contribute to local odors and are not of concern from a human health or risk standpoint.

REFERENCES

Amoore, J.E. and E. Hautala. Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatiles for 214 Industrial Chemicals in Air and Water Dilution. Journal of Applied Toxicology, Vol. 3, No. 6. 1983.

Eklund, B., C. Thompson, and S. Mischler. Estimation of Air Impacts for Solidification and Stabilization Processes Used at Superfund Sites. EPA-451/R-93-006. April 1993.

OSHA. 58 CFR 35338-35351, Part 1910, Subpart Z. June 30, 1993.

Ruth, J.H. Odor Threshold and Irritation Levels of Several Chemical Substances: A Review. Am. Ind. Hyg. Assoc. J., Vol. 47. March 1986.

Table 1. Schedule of Excavation Work at MDA-R

Date	Activity
May 26-30	Fire crews used hoses to apply water/foam to the site.
June 2 -June 3	Contractors began site preparation, including use of non-robotic heavy equipment
June 4 (Sun)	Site preparation performed during morning. Robotic excavation began during afternoon.
June 5 (Mon)	Excavation work continued.
June 6 (Tue)	Excavation work performed during morning.
June 7 (Wed)	Excavation work performed during afternoon.
June 8 (Th)	Excavation work continued. Robotic excavation continued at east end of landfill.
June 9 (Fri)	Robotic excavator was moved back to the west end of landfill. Excavation continued using robotic machine and some hands-on excavation. Smoldering material on east side of MDA-R was completely extinguished.
June 10 (Sat)	Excavation work continued at west end of landfill with robotic operation and hands-on equipment. Another excavator was moved to the site.
June 12 (Mon)	Excavation work continued at west end of landfill.
June 13 (Tue)	Earth moving operations continued with both hands-on equipment and the robotic excavator.
June 14 (Wed)	Robotics operations completed. Use of hands-on equipment continued. Smoldering material on west side of MDAR was completely extinguished
June 15 (Th)	Earth moving operations were performed. Soils and debris found in the landfill were separated into two piles.
June 16 (Fri)	Site stabilization activities were performed. Soil was compiled at one central location. Soil samples were collected from the contaminated pile for analysis.

Table 2. Summary of VOC Monitoring Locations

Location	Sample ID	Sampling Start Date	Total Elapsed Sampling Time (hr)	Comments
MDAR West	3464	June 2	19:50	
MDAR West	3458	June 5	22:30	
MDAR West	3459	June 6	22:35	
MDAR West	10922	June 8	23:27	
MDAR West	3954	June 13	23:41	
MDAR East	3460	June 2	20:55	
MDAR East	3462	June 5	3:00	Lost power to sampler
MDAR East	3457	June 6	12:13	Lost power to sampler
MDAR East	3953	June 8	24:05	
TA-16, Bldg 900	3454	June 5	67:35	Background

Table 3a. Results of VOC Analysis for Air Samples (West Site)

Analyte	Approx. Detection Limit[a] (ppbv)	Measured Concentration (ppbv)					
		June 2	June 5	June 6	June 8	June 13	Background Site[b]
Acetone	2.0 - 8.0	15	11	5.5	10	9.3	16
2-Butanone (MEK)	2.0 - 8.0	ND	ND	ND	ND	ND	2.8
Chloromethane	0.5 - 2.0	1.4	ND	1.6	ND	ND	1.2
Ethanol	2.0 - 8.0	56	20	9.0	7.2	16	190
Freon 12	0.5 - 2.0	ND	ND	ND	ND	ND	0.64
Methylene Chloride	0.5 - 2.0	4.2	ND	3.0	0.83	ND	1.4
2-Propanol	2.0 - 8.0	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	2.0 - 8.0	ND	ND	4.0	ND	ND	ND
Toluene	0.5 - 2.0	ND	ND	ND	ND	ND	0.68
m/p-Xylene	0.5 - 2.0	ND	ND	ND	ND	ND	2.2
o-Xylene	0.5 - 2.0	ND	ND	ND	ND	ND	0.80

ND = Not Detected

a - Detection limits shown are the range over the days analyses were performed. Specific detection limits for each sample may be found in Attachment 1.
b - One background sample was taken during the program.

Table 3b. Results of VOC Analysis for Air Samples (East Site)

Analyte	Approx. Detection Limit[a] (ppbv)	Measured Concentration (ppbv)					
		June 2	June 5	June 6	June 8		Background Site[b]
Acetone	2.0 - 8.0	26	22	18	13		16
2-Butanone (MEK)	2.0 - 8.0	3.6	4.4	3.7	ND		2.8
Chloromethane	0.5 - 2.0	1.2	ND	0.98	ND		1.2
Ethanol	2.0 - 8.0	230	54	19	43		190
Freon 12	0.5 - 2.0	0.73	1.2	ND	0.85		0.64
Methylene Chloride	0.5 - 2.0	2.0	1.2	1.0	ND		1.4
2-Propanol	2.0 - 8.0	2.6	ND	ND	ND		ND
Tetrahydrofuran	2.0 - 8.0	ND	ND	ND	ND		ND
Toluene	0.5 - 2.0	ND	0.55	ND	0.75		0.68
m/p-Xylene	0.5 - 2.0	0.58	ND	ND	ND		2.2
o-Xylene	0.5 - 2.0	ND	ND	ND	ND		0.80

Table 4. Comparison of Measured Values with Odor Threshold and Worker Exposure Levels

Compound	CAS No.	Highest Measured Concentration (ppbv)	Concentration Minus Background Value (ppbv)	Odor Detection Threshold[a] (ppbv)	OSHA TWA (ppbv) (8 hr/day, 40 hr/week)[c]
Acetone	67-64-1	26	10	13,000	1,000,000
2-Butanone (Methy Ethyl Ketone)	78-93-3	4.4	1.6	5,400	200,000
Chloromethane (methyl chloride)	74-87-3	1.6	0.4	10,000[b]	100,000[d]
Ethanol	64-17-5	230	40	84,000	1,000,000
Freon 12	--	1.2	0.6	--	--
Methylene Chloride	75-09-2	4.2	2.8	250,000	25,000
2-Propanol (isopropyl alcohol)	67-63-0	2.6	2.6	22,000	400,000
Tetrahydrofuran	109-99-9	4.0	4.0	2,000	200,000
Toluene	108-88-3	0.75	0.07	2,900	200,000
m/p-Xylene	108-38-3/ 106-42-3	0.58	<0	1,100	100,000
o-Xylene	95-47-6	0	<0	--	100,000

a - Amoore and Hautala, 1983.
b - Ruth, 1986
c - OSHA, 2000 (www.osha-slc.gov).
d - OSHA, 1993.

ATTACHMENT ONE

Report From Analytical Laboratory

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0006127

Work Order Summary

CLIENT:	Mr. Jean Dewart Los Alamos National Laboratories Mail Stop J978 P.O. Box 1663 Los Alamos, NM 87545	BILL TO:	Mr. Jean Dewart Los Alamos National Laboratories Mail Stop J978 P.O. Box 1663 Los Alamos, NM 87545
PHONE:	505-665-0239	P.O. #	17548-REO-001
FAX:	505-665-8855	PROJECT #	Los Alamos Fire
DATE RECEIVED:	6/8/00		
DATE COMPLETED:	6/14/00		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	3454	TO-14	2.0 psi
02A	3457	TO-14	0.4 psi
03A	3458	TO-14	14.4 psi
04A	3459	TO-14	14.4 psi
05A	3460	TO-14	6.4 psi
06A	3462	TO-14	8.0 "Hg
07A	3464	TO-14	14.6 psi
08A	Lab Blank	TO-14	NA
08B	Lab Blank	TO-14	NA
08C	Lab Blank	TO-14	NA

CERTIFIED BY: Debbie Pearcy
Laboratory Director

DATE: 6/14/00

Certification numbers: CA ELAP - 1149, NY ELAP - 11291, UT ELAP - E-217

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 , (800) 985-5955 , FAX (916) 985-1020

LABORATORY NARRATIVE
TO-14
Los Alamos National Laboratories
Workorder# 0006127

The laboratory performed analysis via EPA Method TO-14 using GC/MS in the full scan mode. The method involves concentrating up to 0.5 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis. See the data sheets for the reporting limits for each compound.

During the five point calibration, two low-level standards are used. The low-level standard for TO-14 compounds is spiked at 0.5 ppbv and represents the reporting limit for these compounds. The low-level standard for the non-TO-14 compounds is spiked at 2.0 ppbv and represents the reporting limit for these compounds. The TO-14 compounds are present in both standards but are excluded from reporting in the 2.0 ppbv standard since a lower level is already included in the curve.

Method modifications taken to run these samples include:

Requirement	*TO-14*	*ATL Modifications*
Dilutions for internal calibration.	Dynamic or static dilutions using canisters.	Syringe and flow controller dilutions.
Internal standard recoveries.	Not specified.	Within 40% of the daily CCV internal standard area for blanks and samples.
Internal standard retention times.	Not specified.	Within 0.50 minutes of most recent daily CCV internal standards
Internal calibration criteria.	Not specified.	RSD of 30% or less for standard compounds, 40% or less for non-standard and polar compounds
Continuing calibration verification criteria	Not specified.	70 - 130% for at least 90% of standard compounds, 60 - 140% for at least 80% of non-standard and polar compounds
Response factor for quantitation.	Average response factor (ICAL).	Average response factor (ICAL).

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Methylene Chloride was detected in the laboratory blank analyzed on 6/12/00 and 6/13/00 at less than 5X the reporting limit. Associated sample results are reported as qualified.

The recovery of internal standard Bromochloromethane in samples 3458 , 3459 and 3464 was outside control limits due to the presence of high level matrix interference which may consist of elevated levels of carbon dioxide or water. A representative number of samples was re-analyzed to confirm the interference. Dilution of the samples was required to meet method acceptance limits. Data is reported as qualified.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit(background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

N - The identification is based on presumptive evidence.

AIR TOXICS LTD.

SAMPLE NAME : 3454

ID#: 0006127-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061210	Date of Collection:	6/2/00
Dil. Factor:	1.18	Date of Analysis:	6/12/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Freon 12	0.59	3.0	0.64	3.2
Freon 114	0.59	4.2	Not Detected	Not Detected
Chloromethane	0.59	1.2	1.2	2.4
Vinyl Chloride	0.59	1.5	Not Detected	Not Detected
Bromomethane	0.59	2.3	Not Detected	Not Detected
Chloroethane	0.59	1.6	Not Detected	Not Detected
Freon 11	0.59	3.4	Not Detected	Not Detected
1,1-Dichloroethene	0.59	2.4	Not Detected	Not Detected
Freon 113	0.59	4.6	Not Detected	Not Detected
Methylene Chloride	0.59	2.1	1.4 B	4.9 B
1,1-Dichloroethane	0.59	2.4	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.59	2.4	Not Detected	Not Detected
Chloroform	0.59	2.9	Not Detected	Not Detected
1,1,1-Trichloroethane	0.59	3.3	Not Detected	Not Detected
Carbon Tetrachloride	0.59	3.8	Not Detected	Not Detected
Benzene	0.59	1.9	Not Detected	Not Detected
1,2-Dichloroethane	0.59	2.4	Not Detected	Not Detected
Trichloroethene	0.59	3.2	Not Detected	Not Detected
1,2-Dichloropropane	0.59	2.8	Not Detected	Not Detected
cis-1,3-Dichloropropene	0.59	2.7	Not Detected	Not Detected
Toluene	0.59	2.2	0.68	2.6
trans-1,3-Dichloropropene	0.59	2.7	Not Detected	Not Detected
1,1,2-Trichloroethane	0.59	3.3	Not Detected	Not Detected
Tetrachloroethene	0.59	4.1	Not Detected	Not Detected
Ethylene Dibromide	0.59	4.6	Not Detected	Not Detected
Chlorobenzene	0.59	2.8	Not Detected	Not Detected
Ethyl Benzene	0.59	2.6	Not Detected	Not Detected
m,p-Xylene	0.59	2.6	2.2	10
o-Xylene	0.59	2.6	0.80	3.5
Styrene	0.59	2.6	Not Detected	Not Detected
1,1,2,2-Tetrachloroethane	0.59	4.1	Not Detected	Not Detected
1,3,5-Trimethylbenzene	0.59	2.9	Not Detected	Not Detected
1,2,4-Trimethylbenzene	0.59	2.9	Not Detected	Not Detected
1,3-Dichlorobenzene	0.59	3.6	Not Detected	Not Detected
1,4-Dichlorobenzene	0.59	3.6	Not Detected	Not Detected
Chlorotoluene	0.59	3.1	Not Detected	Not Detected
1,2-Dichlorobenzene	0.59	3.6	Not Detected	Not Detected
1,2,4-Trichlorobenzene	0.59	4.4	Not Detected	Not Detected
Hexachlorobutadiene	0.59	6.4	Not Detected	Not Detected
Propylene	2.4	4.1	Not Detected	Not Detected
1,3-Butadiene	2.4	5.3	Not Detected	Not Detected
Acetone	2.4	5.7	16	40

AIR TOXICS LTD.

SAMPLE NAME : 3454

ID#: 0006127-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061218	Date of Collection:	6/2/00
Dil. Factor:	1.18	Date of Analysis:	6/12/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	2.4	7.5	Not Detected	Not Detected
2-Propanol	2.4	5.9	Not Detected	Not Detected
trans-1,2-Dichloroethene	2.4	9.5	Not Detected	Not Detected
Vinyl Acetate	2.4	8.4	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.4	7.1	2.8	8.3
Hexane	2.4	8.4	Not Detected	Not Detected
Tetrahydrofuran	2.4	7.1	Not Detected	Not Detected
Cyclohexane	2.4	8.2	Not Detected	Not Detected
1,4-Dioxane	2.4	8.6	Not Detected	Not Detected
Bromodichloromethane	2.4	16	Not Detected	Not Detected
4-Methyl-2-pentanone	2.4	9.8	Not Detected	Not Detected
2-Hexanone	2.4	9.8	Not Detected	Not Detected
Dibromochloromethane	2.4	20	Not Detected	Not Detected
Bromoform	2.4	25	Not Detected	Not Detected
4-Ethyltoluene	2.4	12	Not Detected	Not Detected
Ethanol	2.4	4.5	190	360
Methyl tert-Butyl Ether	2.4	8.6	Not Detected	Not Detected
Heptane	2.4	9.8	Not Detected	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	95	70-130

AIR TOXICS LTD.

SAMPLE NAME : 3457

ID#: 0006127-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061219	Date of Collection:	6/2/00
Dil. Factor:	1.30	Date of Analysis:	6/12/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	2.6	8.2	Not Detected	Not Detected
2-Propanol	2.6	6.5	Not Detected	Not Detected
trans-1,2-Dichloroethene	2.6	10	Not Detected	Not Detected
Vinyl Acetate	2.6	9.3	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.6	7.8	3.7	11
Hexane	2.6	9.3	Not Detected	Not Detected
Tetrahydrofuran	2.6	7.8	Not Detected	Not Detected
Cyclohexane	2.6	9.1	Not Detected	Not Detected
1,4-Dioxane	2.6	9.5	Not Detected	Not Detected
Bromodichloromethane	2.6	18	Not Detected	Not Detected
4-Methyl-2-pentanone	2.6	11	Not Detected	Not Detected
2-Hexanone	2.6	11	Not Detected	Not Detected
Dibromochloromethane	2.6	22	Not Detected	Not Detected
Bromoform	2.6	27	Not Detected	Not Detected
4-Ethyltoluene	2.6	13	Not Detected	Not Detected
Ethanol	2.6	5.0	19	36
Methyl tert-Butyl Ether	2.6	9.5	Not Detected	Not Detected
Heptane	2.6	11	Not Detected	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	96	70-130

AIR TOXICS LTD.

SAMPLE NAME : 3458

ID#: 0006127-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	c061410	Date of Collection:	6/2/00
Dil. Factor:	4.00	Date of Analysis:	6/14/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Freon 12	2.0	10	Not Detected	Not Detected
Freon 114	2.0	14	Not Detected	Not Detected
Chloromethane	2.0	4.2	Not Detected	Not Detected
Vinyl Chloride	2.0	5.2	Not Detected	Not Detected
Bromomethane	2.0	7.9	Not Detected	Not Detected
Chloroethane	2.0	5.4	Not Detected	Not Detected
Freon 11	2.0	11	Not Detected	Not Detected
1,1-Dichloroethene	2.0	8.1	Not Detected	Not Detected
Freon 113	2.0	16	Not Detected	Not Detected
Methylene Chloride	2.0	7.1	Not Detected	Not Detected
1,1-Dichloroethane	2.0	8.2	Not Detected	Not Detected
cis-1,2-Dichloroethene	2.0	8.0	Not Detected	Not Detected
Chloroform	2.0	9.9	Not Detected	Not Detected
1,1,1-Trichloroethane	2.0	11	Not Detected	Not Detected
Carbon Tetrachloride	2.0	13	Not Detected	Not Detected
Benzene	2.0	6.5	Not Detected	Not Detected
1,2-Dichloroethane	2.0	8.2	Not Detected	Not Detected
Trichloroethene	2.0	11	Not Detected	Not Detected
1,2-Dichloropropane	2.0	9.4	Not Detected	Not Detected
cis-1,3-Dichloropropene	2.0	9.2	Not Detected	Not Detected
Toluene	2.0	7.6	Not Detected	Not Detected
trans-1,3-Dichloropropene	2.0	9.2	Not Detected	Not Detected
1,1,2-Trichloroethane	2.0	11	Not Detected	Not Detected
Tetrachloroethene	2.0	14	Not Detected	Not Detected
Ethylene Dibromide	2.0	16	Not Detected	Not Detected
Chlorobenzene	2.0	9.4	Not Detected	Not Detected
Ethyl Benzene	2.0	8.8	Not Detected	Not Detected
m,p-Xylene	2.0	8.8	Not Detected	Not Detected
o-Xylene	2.0	8.8	Not Detected	Not Detected
Styrene	2.0	8.6	Not Detected	Not Detected
1,1,2,2-Tetrachloroethane	2.0	14	Not Detected	Not Detected
1,3,5-Trimethylbenzene	2.0	10	Not Detected	Not Detected
1,2,4-Trimethylbenzene	2.0	10	Not Detected	Not Detected
1,3-Dichlorobenzene	2.0	12	Not Detected	Not Detected
1,4-Dichlorobenzene	2.0	12	Not Detected	Not Detected
Chlorotoluene	2.0	10	Not Detected	Not Detected
1,2-Dichlorobenzene	2.0	12	Not Detected	Not Detected
1,2,4-Trichlorobenzene	2.0	15	Not Detected	Not Detected
Hexachlorobutadiene	2.0	22	Not Detected	Not Detected
Propylene	8.0	14	Not Detected	Not Detected
1,3-Butadiene	8.0	18	Not Detected	Not Detected
Acetone	8.0	19	11	28

AIR TOXICS LTD.

SAMPLE NAME : 3458

ID#: 0006127-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	c061410	Date of Collection:	6/2/00
Dil. Factor:	4.00	Date of Analysis:	6/14/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	8.0	25	Not Detected	Not Detected
2-Propanol	8.0	20	Not Detected	Not Detected
trans-1,2-Dichloroethene	8.0	32	Not Detected	Not Detected
Vinyl Acetate	8.0	29	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	8.0	24	Not Detected	Not Detected
Hexane	8.0	29	Not Detected	Not Detected
Tetrahydrofuran	8.0	24	Not Detected	Not Detected
Cyclohexane	8.0	28	Not Detected	Not Detected
1,4-Dioxane	8.0	29	Not Detected	Not Detected
Bromodichloromethane	8.0	54	Not Detected	Not Detected
4-Methyl-2-pentanone	8.0	33	Not Detected	Not Detected
2-Hexanone	8.0	33	Not Detected	Not Detected
Dibromochloromethane	8.0	69	Not Detected	Not Detected
Bromoform	8.0	84	Not Detected	Not Detected
4-Ethyltoluene	8.0	40	Not Detected	Not Detected
Ethanol	8.0	15	20	38
Methyl tert-Butyl Ether	8.0	29	Not Detected	Not Detected
Heptane	8.0	33	Not Detected	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroetnane-d4	106	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	88	70-130

AIR TOXICS LTD.

SAMPLE NAME : 3459

ID#: 9006127-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061314	Date of Collection:	6/2/00
Dil. Factor:	2.00	Date of Analysis:	6/13/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	4.0	13	Not Detected	Not Detected
2-Propanol	4.0	10	Not Detected	Not Detected
trans-1,2-Dichloroethene	4.0	16	Not Detected	Not Detected
Vinyl Acetate	4.0	14	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.0	12	Not Detected	Not Detected
Hexane	4.0	14	Not Detected	Not Detected
Tetrahydrofuran	4.0	12	4.0	12
Cyclohexane	4.0	14	Not Detected	Not Detected
1,4-Dioxane	4.0	15	Not Detected	Not Detected
Bromodichloromethane	4.0	27	Not Detected	Not Detected
4-Methyl-2-pentanone	4.0	17	Not Detected	Not Detected
2-Hexanone	4.0	17	Not Detected	Not Detected
Dibromochloromethane	4.0	35	Not Detected	Not Detected
Bromoform	4.0	42	Not Detected	Not Detected
4-Ethyltoluene	4.0	20	Not Detected	Not Detected
Ethanol	4.0	7.7	9.0	17
Methyl tert-Butyl Ether	4.0	15	Not Detected	Not Detected
Heptane	4.0	17	Not Detected	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	127	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	91	70-130

AIR TOXICS LTD.

SAMPLE NAME : 3460

ID#: 0006127-05A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061222	Date of Collection:	6/2/00
Dil. Factor:	1.00	Date of Analysis:	6/13/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	2.0	6.3	Not Detected	Not Detected
2-Propanol	2.0	5.0	2.5	6.2
trans-1,2-Dichloroethene	2.0	8.0	Not Detected	Not Detected
Vinyl Acetate	2.0	7.2	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	6.0	3.6	11
Hexane	2.0	7.2	Not Detected	Not Detected
Tetrahydrofuran	2.0	6.0	Not Detected	Not Detected
Cyclohexane	2.0	7.0	Not Detected	Not Detected
1,4-Dioxane	2.0	7.3	Not Detected	Not Detected
Bromodichloromethane	2.0	14	Not Detected	Not Detected
4-Methyl-2-pentanone	2.0	8.3	Not Detected	Not Detected
2-Hexanone	2.0	8.3	Not Detected	Not Detected
Dibromochloromethane	2.0	17	Not Detected	Not Detected
Bromoform	2.0	21	Not Detected	Not Detected
4-Ethyltoluene	2.0	10	Not Detected	Not Detected
Ethanol	2.0	3.8	230 E	440 E
Methyl tert-Butyl Ether	2.0	7.3	Not Detected	Not Detected
Heptane	2.0	8.3	Not Detected	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

E = Exceeds instrument calibration range.

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	126	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	97	70-130

AIR TOXICS LTD.

SAMPLE NAME : 3462

ID#: 0006127-06A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061223	Date of Collection:	6/2/00
Dil. Factor:	1.83	Date of Analysis:	6/13/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	3.7	12	Not Detected	Not Detected
2-Propanol	3.7	9.1	Not Detected	Not Detected
trans-1,2-Dichloroethene	3.7	15	Not Detected	Not Detected
Vinyl Acetate	3.7	13	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.7	11	4.4	13
Hexane	3.7	13	Not Detected	Not Detected
Tetrahydrofuran	3.7	11	Not Detected	Not Detected
Cyclohexane	3.7	13	Not Detected	Not Detected
1,4-Dioxane	3.7	13	Not Detected	Not Detected
Bromodichloromethane	3.7	25	Not Detected	Not Detected
4-Methyl-2-pentanone	3.7	15	Not Detected	Not Detected
2-Hexanone	3.7	15	Not Detected	Not Detected
Dibromochloromethane	3.7	32	Not Detected	Not Detected
Bromoform	3.7	38	Not Detected	Not Detected
4-Ethyltoluene	3.7	18	Not Detected	Not Detected
Ethanol	3.7	7.0	54	100
Methyl tert-Butyl Ether	3.7	13	Not Detected	Not Detected
Heptane	3.7	15	Not Detected	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	95	70-130

AIR TOXICS LTD.

SAMPLE NAME : 3464

ID#: 0006127-07A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061315	Date of Collection:	6/2/00
Dil. Factor:	2.00	Date of Analysis:	6/13/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	4.0	13	Not Detected	Not Detected
2-Propanol	4.0	10	Not Detected	Not Detected
trans-1,2-Dichloroethene	4.0	16	Not Detected	Not Detected
Vinyl Acetate	4.0	14	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.0	12	Not Detected	Not Detected
Hexane	4.0	14	Not Detected	Not Detected
Tetrahydrofuran	4.0	12	Not Detected	Not Detected
Cyclohexane	4.0	14	Not Detected	Not Detected
1,4-Dioxane	4.0	15	Not Detected	Not Detected
Bromodichloromethane	4.0	27	Not Detected	Not Detected
4-Methyl-2-pentanone	4.0	17	Not Detected	Not Detected
2-Hexanone	4.0	17	Not Detected	Not Detected
Dibromochloromethane	4.0	35	Not Detected	Not Detected
Bromoform	4.0	42	Not Detected	Not Detected
4-Ethyltoluene	4.0	20	Not Detected	Not Detected
Ethanol	4.0	7.7	56	110
Methyl tert-Butyl Ether	4.0	15	Not Detected	Not Detected
Heptane	4.0	17	Not Detected	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	133 Q	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	94	70-130

AIR TOXICS LTD.

SAMPLE NAME : Lab Blank

ID#: 0006127-08A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061209	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 6/12/00	

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Freon 12	0.50	2.5	Not Detected	Not Detected
Freon 114	0.50	3.6	Not Detected	Not Detected
Chloromethane	0.50	1.0	Not Detected	Not Detected
Vinyl Chloride	0.50	1.3	Not Detected	Not Detected
Bromomethane	0.50	2.0	Not Detected	Not Detected
Chloroethane	0.50	1.3	Not Detected	Not Detected
Freon 11	0.50	2.8	Not Detected	Not Detected
1,1-Dichloroethene	0.50	2.0	Not Detected	Not Detected
Freon 113	0.50	3.9	Not Detected	Not Detected
Methylene Chloride	0.50	1.8	0.72 B	2.5 B
1,1-Dichloroethane	0.50	2.0	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.50	2.0	Not Detected	Not Detected
Chloroform	0.50	2.5	Not Detected	Not Detected
1,1,1-Trichloroethane	0.50	2.8	Not Detected	Not Detected
Carbon Tetrachloride	0.50	3.2	Not Detected	Not Detected
Benzene	0.50	1.6	Not Detected	Not Detected
1,2-Dichloroethane	0.50	2.0	Not Detected	Not Detected
Trichloroethene	0.50	2.7	Not Detected	Not Detected
1,2-Dichloropropane	0.50	2.3	Not Detected	Not Detected
cis-1,3-Dichloropropene	0.50	2.3	Not Detected	Not Detected
Toluene	0.50	1.9	Not Detected	Not Detected
trans-1,3-Dichloropropene	0.50	2.3	Not Detected	Not Detected
1,1,2-Trichloroethane	0.50	2.8	Not Detected	Not Detected
Tetrachloroethene	0.50	3.4	Not Detected	Not Detected
Ethylene Dibromide	0.50	3.9	Not Detected	Not Detected
Chlorobenzene	0.50	2.3	Not Detected	Not Detected
Ethyl Benzene	0.50	2.2	Not Detected	Not Detected
m,p-Xylene	0.50	2.2	Not Detected	Not Detected
o-Xylene	0.50	2.2	Not Detected	Not Detected
Styrene	0.50	2.2	Not Detected	Not Detected
1,1,2,2-Tetrachloroethane	0.50	3.5	Not Detected	Not Detected
1,3,5-Trimethylbenzene	0.50	2.5	Not Detected	Not Detected
1,2,4-Trimethylbenzene	0.50	2.5	Not Detected	Not Detected
1,3-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
1,4-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
Chlorotoluene	0.50	2.6	Not Detected	Not Detected
1,2-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
1,2,4-Trichlorobenzene	0.50	3.8	Not Detected	Not Detected
Hexachlorobutadiene	0.50	5.4	Not Detected	Not Detected
Propylene	2.0	3.5	Not Detected	Not Detected
1,3-Butadiene	2.0	4.5	Not Detected	Not Detected
Acetone	2.0	4.8	Not Detected	Not Detected

AIR TOXICS LTD.

SAMPLE NAME : Lab Blank

ID#: 0006127-08A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061209	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 6/12/00	

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	2.0	6.3	Not Detected	Not Detected
2-Propanol	2.0	5.0	Not Detected	Not Detected
trans-1,2-Dichloroethene	2.0	8.0	Not Detected	Not Detected
Vinyl Acetate	2.0	7.2	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	6.0	Not Detected	Not Detected
Hexane	2.0	7.2	Not Detected	Not Detected
Tetrahydrofuran	2.0	6.0	Not Detected	Not Detected
Cyclohexane	2.0	7.0	Not Detected	Not Detected
1,4-Dioxane	2.0	7.3	Not Detected	Not Detected
Bromodichloromethane	2.0	14	Not Detected	Not Detected
4-Methyl-2-pentanone	2.0	8.3	Not Detected	Not Detected
2-Hexanone	2.0	8.3	Not Detected	Not Detected
Dibromochloromethane	2.0	17	Not Detected	Not Detected
Bromoform	2.0	21	Not Detected	Not Detected
4-Ethyltoluene	2.0	10	Not Detected	Not Detected
Ethanol	2.0	3.8	Not Detected	Not Detected
Methyl tert-Butyl Ether	2.0	7.3	Not Detected	Not Detected
Heptane	2.0	8.3	Not Detected	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

Container Type: NA

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	91	70-130

AIR TOXICS LTD.

SAMPLE NAME : Lab Blank

ID#: 0006127-08B

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061306	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 6/13/00	

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Freon 12	0.50	2.5	Not Detected	Not Detected
Freon 114	0.50	3.6	Not Detected	Not Detected
Chloromethane	0.50	1.0	Not Detected	Not Detected
Vinyl Chloride	0.50	1.3	Not Detected	Not Detected
Bromomethane	0.50	2.0	Not Detected	Not Detected
Chloroethane	0.50	1.3	Not Detected	Not Detected
Freon 11	0.50	2.8	Not Detected	Not Detected
1,1-Dichloroethene	0.50	2.0	Not Detected	Not Detected
Freon 113	0.50	3.9	Not Detected	Not Detected
Methylene Chloride	0.50	1.8	1.5 B	5.3 B
1,1-Dichloroethane	0.50	2.0	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.50	2.0	Not Detected	Not Detected
Chloroform	0.50	2.5	Not Detected	Not Detected
1,1,1-Trichloroethane	0.50	2.8	Not Detected	Not Detected
Carbon Tetrachloride	0.50	3.2	Not Detected	Not Detected
Benzene	0.50	1.6	Not Detected	Not Detected
1,2-Dichloroethane	0.50	2.0	Not Detected	Not Detected
Trichloroethene	0.50	2.7	Not Detected	Not Detected
1,2-Dichloropropane	0.50	2.3	Not Detected	Not Detected
cis-1,3-Dichloropropene	0.50	2.3	Not Detected	Not Detected
Toluene	0.50	1.9	Not Detected	Not Detected
trans-1,3-Dichloropropene	0.50	2.3	Not Detected	Not Detected
1,1,2-Trichloroethane	0.50	2.8	Not Detected	Not Detected
Tetrachloroethene	0.50	3.4	Not Detected	Not Detected
Ethylene Dibromide	0.50	3.9	Not Detected	Not Detected
Chlorobenzene	0.50	2.3	Not Detected	Not Detected
Ethyl Benzene	0.50	2.2	Not Detected	Not Detected
m,p-Xylene	0.50	2.2	Not Detected	Not Detected
o-Xylene	0.50	2.2	Not Detected	Not Detected
Styrene	0.50	2.2	Not Detected	Not Detected
1,1,2,2-Tetrachloroethane	0.50	3.5	Not Detected	Not Detected
1,3,5-Trimethylbenzene	0.50	2.5	Not Detected	Not Detected
1,2,4-Trimethylbenzene	0.50	2.5	Not Detected	Not Detected
1,3-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
1,4-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
Chlorotoluene	0.50	2.6	Not Detected	Not Detected
1,2-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
1,2,4-Trichlorobenzene	0.50	3.8	Not Detected	Not Detected
Hexachlorobutadiene	0.50	5.4	Not Detected	Not Detected
Propylene	2.0	3.5	Not Detected	Not Detected
1,3-Butadiene	2.0	4.5	Not Detected	Not Detected
Acetone	2.0	4.8	Not Detected	Not Detected

AIR TOXICS LTD.

SAMPLE NAME : Lab Blank

ID#: 0006127-08B

EPA METHOD TO-14 GC/MS Full Scan

File Name:	g061306		**Date of Collection: NA**
Dil. Factor:	1.00		**Date of Analysis: 6/13/00**

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	2.0	6.3	Not Detected	Not Detected
2-Propanol	2.0	5.0	Not Detected	Not Detected
trans-1,2-Dichloroethene	2.0	8.0	Not Detected	Not Detected
Vinyl Acetate	2.0	7.2	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	6.0	Not Detected	Not Detected
Hexane	2.0	7.2	Not Detected	Not Detected
Tetrahydrofuran	2.0	6.0	Not Detected	Not Detected
Cyclohexane	2.0	7.0	Not Detected	Not Detected
1,4-Dioxane	2.0	7.2	Not Detected	Not Detected
Bromodichloromethane	2.0	14	Not Detected	Not Detected
4-Methyl-2-pentanone	2.0	8.3	Not Detected	Not Detected
2-Hexanone	2.0	8.3	Not Detected	Not Detected
Dibromochloromethane	2.0	17	Not Detected	Not Detected
Bromoform	2.0	21	Not Detected	Not Detected
4-Ethyltoluene	2.0	10	Not Detected	Not Detected
Ethanol	2.0	3.8	Not Detected	Not Detected
Methyl tert-Butyl Ether	2.0	7.3	Not Detected	Not Detected
Heptane	2.0	8.3	Not Detected	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

Container Type: NA

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	117	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	91	70-130

AIR TOXICS LTD.

SAMPLE NAME : Lab Blank

ID#: 0006127-08C

EPA METHOD TO-14 GC/MS Full Scan

File Name:	c061404	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 6/14/00	

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Freon 12	0.50	2.5	Not Detected	Not Detected
Freon 114	0.50	3.6	Not Detected	Not Detected
Chloromethane	0.50	1.0	Not Detected	Not Detected
Vinyl Chloride	0.50	1.3	Not Detected	Not Detected
Bromomethane	0.50	2.0	Not Detected	Not Detected
Chloroethane	0.50	1.3	Not Detected	Not Detected
Freon 11	0.50	2.8	Not Detected	Not Detected
1,1-Dichloroethene	0.50	2.0	Not Detected	Not Detected
Freon 113	0.50	3.9	Not Detected	Not Detected
Methylene Chloride	0.50	1.8	Not Detected	Not Detected
1,1-Dichloroethane	0.50	2.0	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.50	2.0	Not Detected	Not Detected
Chloroform	0.50	2.5	Not Detected	Not Detected
1,1,1-Trichloroethane	0.50	2.8	Not Detected	Not Detected
Carbon Tetrachloride	0.50	3.2	Not Detected	Not Detected
Benzene	0.50	1.6	Not Detected	Not Detected
1,2-Dichloroethane	0.50	2.0	Not Detected	Not Detected
Trichloroethene	0.50	2.7	Not Detected	Not Detected
1,2-Dichloropropane	0.50	2.3	Not Detected	Not Detected
cis-1,3-Dichloropropene	0.50	2.3	Not Detected	Not Detected
Toluene	0.50	1.9	Not Detected	Not Detected
trans-1,3-Dichloropropene	0.50	2.3	Not Detected	Not Detected
1,1,2-Trichloroethane	0.50	2.8	Not Detected	Not Detected
Tetrachloroethene	0.50	3.4	Not Detected	Not Detected
Ethylene Dibromide	0.50	3.9	Not Detected	Not Detected
Chlorobenzene	0.50	2.3	Not Detected	Not Detected
Ethyl Benzene	0.50	2.2	Not Detected	Not Detected
m,p-Xylene	0.50	2.2	Not Detected	Not Detected
o-Xylene	0.50	2.2	Not Detected	Not Detected
Styrene	0.50	2.2	Not Detected	Not Detected
1,1,2,2-Tetrachloroethane	0.50	3.5	Not Detected	Not Detected
1,3,5-Trimethylbenzene	0.50	2.5	Not Detected	Not Detected
1,2,4-Trimethylbenzene	0.50	2.5	Not Detected	Not Detected
1,3-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
1,4-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
Chlorotoluene	0.50	2.6	Not Detected	Not Detected
1,2-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
1,2,4-Trichlorobenzene	0.50	3.8	Not Detected	Not Detected
Hexachlorobutadiene	0.50	5.4	Not Detected	Not Detected
Propylene	2.0	3.5	Not Detected	Not Detected
1,3-Butadiene	2.0	4.5	Not Detected	Not Detected
Acetone	2.0	4.8	Not Detected	Not Detected

AIR TOXICS LTD.

SAMPLE NAME : Lab Blank

ID#: 0006127-08C

EPA METHOD TO-14 GC/MS Full Scan

File Name:	c061404		Date of Collection: NA
Dil. Factor:	1.00		Date of Analysis: 6/14/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	2.0	6.3	Not Detected	Not Detected
2-Propanol	2.0	5.0	Not Detected	Not Detected
trans-1,2-Dichloroethene	2.0	8.0	Not Detected	Not Detected
Vinyl Acetate	2.0	7.2	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	6.0	Not Detected	Not Detected
Hexane	2.0	7.2	Not Detected	Not Detected
Tetrahydrofuran	2.0	6.0	Not Detected	Not Detected
Cyclohexane	2.0	7.0	Not Detected	Not Detected
1,4-Dioxane	2.0	7.3	Not Detected	Not Detected
Bromodichloromethane	2.0	14	Not Detected	Not Detected
4-Methyl-2-pentanone	2.0	8.3	Not Detected	Not Detected
2-Hexanone	2.0	8.3	Not Detected	Not Detected
Dibromochloromethane	2.0	17	Not Detected	Not Detected
Bromoform	2.0	21	Not Detected	Not Detected
4-Ethyltoluene	2.0	10	Not Detected	Not Detected
Ethanol	2.0	3.8	Not Detected	Not Detected
Methyl tert-Butyl Ether	2.0	7.3	Not Detected	Not Detected
Heptane	2.0	8.3	Not Detected	Not Detected

Container Type: NA

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	93	70-130

0006124 - 01 - 3454

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control 3454

R/A Control No. _____

Shipping Document No _____

Serial/ID No 10420

Cal. Due Date N/A

Time 6:00

Date of Receipt: 2/15/00

Equipment Type: VOC Summa Canister

Cleaning Cert. Date: N/A

Storage Location: 918B C2 R2 S6 Date: 2/15/00

Installation Location: _____ Date: / /

Time: _____

1. Received By: [signature] 2/15/00 (Signature / Date)
   Relinquished By: [signature] 2/15/00 (Signature / Date)
2. Received By: [signature] 6/2/00 (Signature / Date)
   Relinquished By: [signature] 6/2/00 (Signature / Date)
3. Received By: [signature] 6/4/00 (Signature / Date)
   Relinquished By: [signature] 6/5/00 (Signature / Date)
4. Received By: Jean Dewart 6/6 (Signature / Date)
   Relinquished By: Jean Dewart 6/7 (Signature / Date)
5. Received By: Allen Freudenberg 6/07/00 (Signature / Date)
   Relinquished By: Allen Freudenberg 6/07/00 (Signature / Date)
6. Received By: Daniel Burgess 6/8/00 (Signature / Date)
   Relinquished By _____ (Signature / Date)

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below.

NAME (print)	SIGNATURE	DATE
[signature]	[signature]	2/15/00 6/2/00

Init. Pres.
~~4 Hr~~
4/10 6/10/00
2.0 psi
LW 6/10/00

Remarks: TA-16-900 START 6/2/00 14 MDT
Air tem readout (on) 6.4 sample pressure 7 pump head pressure 20.5
time elapsed 191 Timer 9:40 (end time 9:35)

This record has been reviewed and is found to be complete.

Name (print) _____ Signature _____ Date _____

Completion of this step constitutes validation of this record.

Name (print) _____ Signature _____ Date _____

Form WP 12-VC.02-1

WHITE COPY (Original) - To accompany samples

YELLOW COPY - VOC Monitoring Program

0006127-02A 3457

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control 3457

R/A Control No. _____

Shipping Document No. _____

Serial/ID No. 05659

Cal. Due Date: N/A

Date of Receipt: 2/15/00

Equipment Type: VOC SUMMA Canister

Cleaning Cert. Date: N/A

Storage Location: 918B C2 R2 S8 Date: 2/15/00

Time: 6:15

Installation Location: _____ Date: / /

Time: _____

1. Received By: [signature] 2/15/00 (Signature / Date)
Relinquished By: [signature] 2/15/00 (Signature / Date)

2. Received By: [signature] 6/2/00 (Signature / Date)
Relinquished By: [signature] 6/2/00 (Signature / Date)

3. Received By: Jean Dewart 6/2/00 (Signature / Date)
Relinquished By: Jean Dewart 6/6/00 (Signature / Date)

4. Received By: Allen Freadaway 6/06/00 (Signature / Date)
Relinquished By: Allen Freadaway 6/07/00 (Signature / Date)

5. Received By: Danielle Burgess 6/8/00 515 (Signature / Date)
Relinquished By: _____ (Signature / Date)

6. Received By: _____ (Signature / Date)
Relinquished By: _____ (Signature / Date)

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below.

NAME (print)	SIGNATURE	DATE
Wesley Bentwright	[signature]	2/15/00 6/2/00

Initial Pres. 4/10 6/10/00
~~4.0 Hg~~
0.4 psi
6/10/00

Remarks: MDA-R NEAR 260 OUTFALL STOP ~ 6/07/00 @ 00:18
START 6/06/00 1205 MDT TIMER = 12.3
TIMER = 0000 FLOW UNKNOWN
FLOW = 6.4 cc/min GFI TRIPPED — NO POWER

This record has been reviewed and is found to be complete.

Name (print) Signature Date

Completion of this step constitutes validation of this record.

Name (print) Signature Date

Form WP 12-VC.02-1 WHITE COPY (Original) - To accompany samples YELLOW COPY - VOC Monitoring Program

000612 -03A 3453

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control 3458

R/A Control No _____

Shipping Document No _____

Serial/ID No 11011

Cal Due Date N/A

Time 6 21

Date of Receipt 2 / 15 / 00

Equipment Type: VOC SUMMA Canister

Cleaning Cert Date: N/A

Storage Location: 918B E2 E3 S2

Date 2 / 15 / 00

Installation Location: _____

Date: / /

Time: _____

1. Received By: [signature] 2/15/00 (Signature / Date)
   Relinquished By: [signature] 2/15/00 (Signature / Date)
2. Received By: [signature] 6/2/00 (Signature / Date)
   Relinquished By: [signature] 6/2/00 (Signature / Date)
3. Received By: Jean M Dewart 6/2/00 (Signature / Date)
   Relinquished By: Jean M Dewart 6/6/00 (Signature / Date)
4. Received By: Allen Freedman 6/06/00 (Signature / Date)
   Relinquished By: Allen Freedman 6/07/00 (Signature / Date)
5. Received By: [signature] 6/8/00 1515 (Signature / Date)
   Relinquished By: _____ (Signature / Date)
6. Received By: _____ (Signature / Date)
   Relinquished By: _____ (Signature / Date)

Performers responsible for data entry or step complet on SHALL enter their printed names, signatures and date below

NAME (print)	SIGNATURE	DATE
[signature]	[signature]	[illegible] 6/2/00

Init. Pres.
4 Oktg
6/10/00
JLO
14.4 psi
JLO
6/10/00

Remarks MDAR WEST START 6/5/00 1505 MDT
START FLOW = 6.4
TIMER = 0000
6/06/00 1135 MDT
STOP FLOW = ~~0.01~~ 0.1
TIMER = 2245

This record has been reviewed and is found to be complete.

Name (print) _____ Signature _____ Date _____

Completion of this step constitutes validation of this record

Name (print) _____ Signature _____ Date _____

Form WP 12-VC.02-1

WHITE COPY (Original) - To accompany samples

YELLOW COPY - VOC Monitoring Program

DAAC26

0006127-04A 3459

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control 3459

R/A Control No. _____

Shipping Document No. _____

Serial/ID No. 05666

Cal. Due Date: N/A

Date of Receipt: 2 / 15 / 00

Equipment Type: VOC SUMMA Canister

Cleaning Cert. Date: N/A

Storage Location: 918B C2 K3 S1 Date: 2 / 15 / 00 Time: 6.20

Installation Location: _____ Date: / / Time: _____

1. Received By: [signature] 2/15/00 (Signature / Date)
   Relinquished By: [signature] 2/15/00 (Signature / Date)
2. Received By: [signature] 6/2/00 (Signature / Date)
   Relinquished By: [signature] 6/2/00 (Signature / Date)
3. Received By: [signature] 6/2/00 (Signature / Date)
   Relinquished By: [signature] 6/6/00 (Signature / Date)
4. Received By: Allen Freedaway 6/06/00 (Signature / Date)
   Relinquished By: Allen Freedaway 6/07/00 (Signature / Date)
5. Received By: Danielle Burgess 6/8/00 1515 (Signature / Date)
   Relinquished By: _____ (Signature / Date)
6. Received By: _____ (Signature / Date)
   Relinquished By: _____ (Signature / Date)

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below.

NAME (print)	SIGNATURE	DATE
Wesley Bentwright	[signature]	2/15/00 6/2/00

Init. Pres. 14.4 psi dw 6/10/00

Remarks: MDA-R WEST STOP: 6/07/00 1015 MDT
START: 6/06/00 1140 MDT FLOW: 6.3
START FLOW = 6.3 TIMER: 22.47
TIMER = 0000

This record has been reviewed and is found to be complete.

Name (print)	Signature	Date

Completion of this step constitutes validation of this record.

Name (print)	Signature	Date

Form WP 12-VC.02-1 WHITE COPY (Original) - To accompany samples YELLOW COPY - VOC Monitoring Program

0006124-05A 7 (4 fil)

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control 3460 ~~[illegible]~~ MP 3/21/00

R/A Control No. _____

Shipping Document No. _____

Serial/ID No. C5478

Cal. Due Date: N/A

Time: 1015

Date of Receipt: 3 / 21 / 00

Equipment Type: VOC SUMMA CANISTER

Cleaning Cert. Date: N/A

Storage Location: 918B C2 R3 S3 Date 3 / 21 / 00

Installation Location: _____ Date: / /

Time: _____

1. Received By: [signature] 3/21/00 (Signature / Date)
   Relinquished By: [signature] 3/21/00 (Signature / Date)
2. Received By: [signature] 6/2/00 (Signature / Date)
   Relinquished By: [signature] 6/2/00 (Signature / Date)
3. Received By: [signature] 6/2/00 (Signature / Date)
   Relinquished By: [signature] 6/5/00 (Signature / Date)
4. Received By: Jean Dewart 6/5/00 (Signature / Date)
   Relinquished By: Jean Dewart 6/7/00 (Signature / Date)
5. Received By: Allen Treadaway 6/07/00 (Signature / Date)
   Relinquished By: Allen Treadaway 6/07/00 (Signature / Date)
6. Received By: [signature] 6/8/00 (Signature / Date)
   Relinquished By: _____ (Signature / Date)

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below

NAME (print)	SIGNATURE	DATE
[signature]	[signature]	3/21/00, [illegible]

Init. Press. 6.4 psi [initials] 6/10/00

Remarks: START: 6/2/00 1310 MDT MDAR EAST 6/3/00 [illegible]

This record has been reviewed and is found to be complete.

Name (print) _____ Signature _____ Date _____

Completion of this step constitutes validation of this record.

Name (print) _____ Signature _____ Date _____

Form WP 12-VC.02-1

WHITE COPY (Original) - To accompany samples

YELLOW COPY - VOC Monitoring Program

0006124-02A 7 3464

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control: 3464

R/A Control No. _____

Shipping Document No. _____

Serial/ID No. 11080

Cal. Due Date: N/A

Date of Receipt: 3 / 21 / 00

Equipment Type: Vcc Summa Canister

Cleaning Cert. Date: N/A

Storage Location: 918B 2C 3R 6S. Date: 3 / 21 / 00 Time: 10:20

Installation Location: _____ Date: / / Time: _____

1. Received By: [signature] 3/21/00 (Signature / Date)
Relinquished By: [signature] 3/21/00 (Signature / Date)

2. Received By: [signature] 6/2/00 (Signature / Date)
Relinquished By: [signature] 6/2/00 (Signature / Date)

3. Received By: [signature] 6/2/00 (Signature / Date)
Relinquished By: [signature] 6/5/00 (Signature / Date)

4. Received By: Jean Dewart 6/5/00 (Signature / Date)
Relinquished By: Jean Dewart 6/7/00 (Signature / Date)

5. Received By: Allen Freedaway 6/07/00 (Signature / Date)
Relinquished By: Allen Freedaway 6/07/00 (Signature / Date)

6. Received By: Danielle Burgess 6/8/00 1515 (Signature / Date)
Relinquished By: _____ (Signature / Date)

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below.

NAME (print)	SIGNATURE	DATE
Wesley Fontenot	[signature]	3/21/00, 6/2/00

Init. Pres 146psi JW 6/10/00

Remarks: Location = MDA R WEST
START = 6/2 1300 MDT end 6/2 2:50 Elapsed time 1700
Flow [illegible] 3.5 when [illegible]
Sample pressure 17 pump head pressure 19

This record has been reviewed and is found to be complete.

Name (print)	Signature	Date

Completion of this step constitutes validation of this record.

Name (print)	Signature	Date

Form WP 12-VC.02-1 WHITE COPY (Original) - To accompany samples YELLOW COPY - VOC Monitoring Program

0006124-06 3462

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control 3462

R/A Control No. _____

Shipping Document No. _____

Serial/ID No. 10884

Cal. Due Date: N/A

Date of Receipt: 3 / 21 / 00

Equipment Type: VOC SUMMA CANISTER

Cleaning Cert. Date: N/A

Storage Location: 918B 2C 3R 4S Date: 3 / 21 / 00 Time: 10:20

Installation Location: _____ Date: / / Time: _____

1. Received By: [signature] 3/21/00 (Signature / Date)
   Relinquished By: [signature] 3/21/00 (Signature / Date)
2. Received By: [signature] 6/2/00 (Signature / Date)
   Relinquished By: [signature] 6/2/00 (Signature / Date)
3. Received By: Jean M Dewart 6/5/00 (Signature / Date)
   Relinquished By: Jean M Dewart 6/6/00 (Signature / Date)
4. Received By: Allen Fuadanay 6/06/00 (Signature / Date)
   Relinquished By: Allen Fuadanay 6/07/00 (Signature / Date)
5. Received By: Danielle Burgess 6/8/00 1515 (Signature / Date)
   Relinquished By: _____ (Signature / Date)
6. Received By: _____ (Signature / Date)
   Relinquished By: _____ (Signature / Date)

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below.

NAME (print)	SIGNATURE	DATE
Wesley [illegible]	[signature]	3/21/00, 6/2/00

Init Pres. 8 Oct 9 [illegible] 6/10/00

Remarks: MDA R START 6/5/00 1235 MDT
Near 260 Outfall
timer = 0000 Start flow = 6.4 STOP DATE/TIME = 6/06/00 1155 PLUG
STOP TIMER = 3.1 STOP FLOW = 0 FOUND WITH PWR OFF - GFI TRIPPED @ 4 OUTLET

This record has been reviewed and is found to be complete.

Name (print)	Signature	Date

Completion of this step constitutes validation of this record.

Name (print)	Signature	Date

Form WP 12-VC.02-1

WHITE COPY (Original) - To accompany samples

YELLOW COPY - VOC Monitoring Program

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0006242

Work Order Summary

CLIENT:	Mr. Jean Dewart Los Alamos National Laboratories Mail Stop J978 P.O. Box 1663 Los Alamos, NM 87545	BILL TO:	Mr. Jean Dewart Los Alamos National Laboratories Mail Stop J978 P.O. Box 1663 Los Alamos, NM 87545
PHONE:	505-665-0239	P.O. #	17548-REO-00
FAX:	505-665-8858	PROJECT #	Los Alamos Fire
DATE RECEIVED:	6/14/00		
DATE COMPLETED:	6/16/00		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	10922	TO-14	3.0 "Hg
02A	03953	TO-14	1.4 psi
03A	03954	TO-14	6.0 "Hg
03AA	03954 Duplicate	TO-14	6.0 "Hg
04A	Method Spike	TO-14	NA
05A	Lab Blank	TO-14	NA

CERTIFIED BY: John Swanton for: DATE: 6-16-00

Laboratory Director

Certification numbers: CA ELAP - 1149, NY ELAP - 11291, UT ELAP - E-217, AZ ELAP - AZ0567

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 , (800) 985-5955 FAX (916) 985-1020

LABORATORY NARRATIVE
TO-14
Los Alamos National Laboratories
Workorder# 0006242

Three 6 Liter Summa Canister samples were received on June 14, 2000. The laboratory performed analysis via EPA Method TO-14 using GC/MS in the full scan mode. The method involves concentrating up to 0.5 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis. See the data sheets for the reporting limits for each compound.

During the five point calibration, two low-level standards are used. The low-level standard for TO-14 compounds is spiked at 0.5 ppbv and represents the reporting limit for these compounds. The low-level standard for the non-TO-14 compounds is spiked at 2.0 ppbv and represents the reporting limit for these compounds. The TO-14 compounds are present in both standards but are excluded from reporting in the 2.0 ppbv standard since a lower level is already included in the curve.

Method modifications taken to run these samples include:

Requirement	*TO-14*	*ATL Modifications*
Dilutions for internal calibration.	Dynamic or static dilutions using canisters.	Syringe and flow controller dilutions.
Internal standard recoveries.	Not specified.	Within 40% of the daily CCV internal standard area for blanks and samples.
Internal standard retention times.	Not specified.	Within 0.50 minutes of most recent daily CCV internal standards
Internal calibration criteria.	Not specified.	RSD of 30% or less for standard compounds, 40% or less for non-standard and polar compounds
Continuing calibration verification criteria	Not specified.	70 - 130% for at least 90% of standard compounds, 60 - 140% for at least 80% of non-standard and polar compounds
Response factor for quantitation.	Average response factor (ICAL).	Average response factor (ICAL).

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit(background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
N - The identification is based on presumptive evidence.

AIR TOXICS LTD.

SAMPLE NAME : 10922

ID#: 0006242-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	r061515	**Date of Collection:**	6/9/00
Dil. Factor:	1.49	**Date of Analysis:**	6/15/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	3.0	9.4	Not Detected	Not Detected
2-Propanol	3.0	7.4	Not Detected	Not Detected
trans-1,2-Dichloroethene	3.0	12	Not Detected	Not Detected
Vinyl Acetate	3.0	11	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.0	8.9	Not Detected	Not Detected
Hexane	3.0	11	Not Detected	Not Detected
Tetrahydrofuran	3.0	8.9	Not Detected	Not Detected
Cyclohexane	3.0	10	Not Detected	Not Detected
1,4-Dioxane	3.0	11	Not Detected	Not Detected
Bromodichloromethane	3.0	20	Not Detected	Not Detected
4-Methyl-2-pentanone	3.0	12	Not Detected	Not Detected
2-Hexanone	3.0	12	Not Detected	Not Detected
Dibromochloromethane	3.0	26	Not Detected	Not Detected
Bromoform	3.0	31	Not Detected	Not Detected
4-Ethyltoluene	3.0	15	Not Detected	Not Detected
Ethanol	3.0	5.7	7.2	14
Methyl tert-Butyl Ether	3.0	11	Not Detected	Not Detected
Heptane	3.0	12	Not Detected	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	122	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	95	70-130

AIR TOXICS LTD.

SAMPLE NAME : 03953

ID#: 0006242-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	r061516	Date of Collection:	6/9/00
Dil. Factor:	1.22	Date of Analysis:	6/15/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Freon 12	0.61	3.1	0.65	3.2
Freon 114	0.61	4.3	Not Detected	Not Detected
Chloromethane	0.61	1.3	Not Detected	Not Detected
Vinyl Chloride	0.61	1.6	Not Detected	Not Detected
Bromomethane	0.61	2.4	Not Detected	Not Detected
Chloroethane	0.61	1.6	Not Detected	Not Detected
Freon 11	0.61	3.5	Not Detected	Not Detected
1,1-Dichloroethene	0.61	2.4	Not Detected	Not Detected
Freon 113	0.61	4.8	Not Detected	Not Detected
Methylene Chloride	0.61	2.2	Not Detected	Not Detected
1,1-Dichloroethane	0.61	2.5	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.61	2.4	Not Detected	Not Detected
Chloroform	0.61	3.0	Not Detected	Not Detected
1,1,1-Trichloroethane	0.61	3.4	Not Detected	Not Detected
Carbon Tetrachloride	0.61	3.9	Not Detected	Not Detected
Benzene	0.61	2.0	Not Detected	Not Detected
1,2-Dichloroethane	0.61	2.5	Not Detected	Not Detected
Trichloroethene	0.61	3.3	Not Detected	Not Detected
1,2-Dichloropropane	0.61	2.9	Not Detected	Not Detected
cis-1,3-Dichloropropene	0.61	2.8	Not Detected	Not Detected
Toluene	0.61	2.3	0.75	2.9
trans-1,3-Dichloropropene	0.61	2.8	Not Detected	Not Detected
1,1,2-Trichloroethane	0.61	3.4	Not Detected	Not Detected
Tetrachloroethene	0.61	4.2	Not Detected	Not Detected
Ethylene Dibromide	0.61	4.8	Not Detected	Not Detected
Chlorobenzene	0.61	2.8	Not Detected	Not Detected
Ethyl Benzene	0.61	2.7	Not Detected	Not Detected
m,p-Xylene	0.61	2.7	Not Detected	Not Detected
o-Xylene	0.61	2.7	Not Detected	Not Detected
Styrene	0.61	2.6	Not Detected	Not Detected
1,1,2,2-Tetrachloroethane	0.61	4.2	Not Detected	Not Detected
1,3,5-Trimethylbenzene	0.61	3.0	Not Detected	Not Detected
1,2,4-Trimethylbenzene	0.61	3.0	Not Detected	Not Detected
1,3-Dichlorobenzene	0.61	3.7	Not Detected	Not Detected
1,4-Dichlorobenzene	0.61	3.7	Not Detected	Not Detected
Chlorotoluene	0.61	3.2	Not Detected	Not Detected
1,2-Dichlorobenzene	0.61	3.7	Not Detected	Not Detected
1,2,4-Trichlorobenzene	0.61	4.6	Not Detected	Not Detected
Hexachlorobutadiene	0.61	6.6	Not Detected	Not Detected
Propylene	2.4	4.3	Not Detected	Not Detected
1,3-Butadiene	2.4	5.5	Not Detected	Not Detected
Acetone	2.4	5.9	13	31

AIR TOXICS LTD.

SAMPLE NAME : 03953

ID#: 0006242-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	r061516	Date of Collection:	6/9/00
Dil. Factor:	1.22	Date of Analysis:	6/15/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	2.4	7.7	Not Detected	Not Detected
2-Propanol	2.4	6.1	Not Detected	Not Detected
trans-1,2-Dichloroethene	2.4	9.8	Not Detected	Not Detected
Vinyl Acetate	2.4	8.7	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.4	7.3	Not Detected	Not Detected
Hexane	2.4	8.7	Not Detected	Not Detected
Tetrahydrofuran	2.4	7.3	Not Detected	Not Detected
Cyclohexane	2.4	8.5	Not Detected	Not Detected
1,4-Dioxane	2.4	8.9	Not Detected	Not Detected
Bromodichloromethane	2.4	17	Not Detected	Not Detected
4-Methyl-2-pentanone	2.4	10	Not Detected	Not Detected
2-Hexanone	2.4	10	Not Detected	Not Detected
Dibromochloromethane	2.4	21	Not Detected	Not Detected
Bromoform	2.4	26	Not Detected	Not Detected
4-Ethyltoluene	2.4	12	Not Detected	Not Detected
Ethanol	2.4	4.7	43	82
Methyl tert-Butyl Ether	2.4	8.9	Not Detected	Not Detected
Heptane	2.4	10	Not Detected	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	118	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	95	70-130

AIR TOXICS LTD.

SAMPLE NAME : 03954

ID#: 0006242-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	r061517	Date of Collection:	6/9/00
Dil. Factor:	1.68	Date of Analysis:	6/15/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Freon 12	0.84	4.2	Not Detected	Not Detected
Freon 114	0.84	6.0	Not Detected	Not Detected
Chloromethane	0.84	1.8	Not Detected	Not Detected
Vinyl Chloride	0.84	2.2	Not Detected	Not Detected
Bromomethane	0.84	3.3	Not Detected	Not Detected
Chloroethane	0.84	2.2	Not Detected	Not Detected
Freon 11	0.84	4.8	Not Detected	Not Detected
1,1-Dichloroethene	0.84	3.4	Not Detected	Not Detected
Freon 113	0.84	6.5	Not Detected	Not Detected
Methylene Chloride	0.84	3.0	Not Detected	Not Detected
1,1-Dichloroethane	0.84	3.4	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.84	3.4	Not Detected	Not Detected
Chloroform	0.84	4.2	Not Detected	Not Detected
1,1,1-Trichloroethane	0.84	4.6	Not Detected	Not Detected
Carbon Tetrachloride	0.84	5.4	Not Detected	Not Detected
Benzene	0.84	2.7	Not Detected	Not Detected
1,2-Dichloroethane	0.84	3.4	Not Detected	Not Detected
Trichloroethene	0.84	4.6	Not Detected	Not Detected
1,2-Dichloropropane	0.84	3.9	Not Detected	Not Detected
cis-1,3-Dichloropropene	0.84	3.9	Not Detected	Not Detected
Toluene	0.84	3.2	Not Detected	Not Detected
trans-1,3-Dichloropropene	0.84	3.9	Not Detected	Not Detected
1,1,2-Trichloroethane	0.84	4.6	Not Detected	Not Detected
Tetrachloroethene	0.84	5.8	Not Detected	Not Detected
Ethylene Dibromide	0.84	6.6	Not Detected	Not Detected
Chlorobenzene	0.84	3.9	Not Detected	Not Detected
Ethyl Benzene	0.64	3.7	Not Detected	Not Detected
m,p-Xylene	0.84	3.7	Not Detected	Not Detected
o-Xylene	0.84	3.7	Not Detected	Not Detected
Styrene	0.84	3.6	Not Detected	Not Detected
1,1,2,2-Tetrachloroethane	0.84	5.9	Not Detected	Not Detected
1,3,5-Trimethylbenzene	0.84	4.2	Not Detected	Not Detected
1,2,4-Trimethylbenzene	0.84	4.2	Not Detected	Not Detected
1,3-Dichlorobenzene	0.84	5.1	Not Detected	Not Detected
1,4-Dichlorobenzene	0.84	5.1	Not Detected	Not Detected
Chlorotoluene	0.84	4.4	Not Detected	Not Detected
1,2-Dichlorobenzene	0.84	5.1	Not Detected	Not Detected
1,2,4-Trichlorobenzene	0.84	6.3	Not Detected	Not Detected
Hexachlorobutadiene	0.84	9.1	Not Detected	Not Detected
Propylene	3.4	5.9	Not Detected	Not Detected
1,3-Butadiene	3.4	7.6	Not Detected	Not Detected
Acetone	3.4	8.1	9.3	22

AIR TOXICS LTD.

SAMPLE NAME : 03954

ID#: 0006242-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	r061517	Date of Collection:	6/9/00
Dil. Factor:	1.68	Date of Analysis:	6/15/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	3.4	11	Not Detected	Not Detected
2-Propanol	3.4	8.4	Not Detected	Not Detected
trans-1,2-Dichloroethene	3.4	14	Not Detected	Not Detected
Vinyl Acetate	3.4	12	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.4	10	Not Detected	Not Detected
Hexane	3.4	12	Not Detected	Not Detected
Tetrahydrofuran	3.4	10	Not Detected	Not Detected
Cyclohexane	3.4	12	Not Detected	Not Detected
1,4-Dioxane	3.4	12	Not Detected	Not Detected
Bromodichloromethane	3.4	23	Not Detected	Not Detected
4-Methyl-2-pentanone	3.4	14	Not Detected	Not Detected
2-Hexanone	3.4	14	Not Detected	Not Detected
Dibromochloromethane	3.4	29	Not Detected	Not Detected
Bromoform	3.4	35	Not Detected	Not Detected
4-Ethyltoluene	3.4	17	Not Detected	Not Detected
Ethanol	3.4	6.4	16	30
Methyl tert-Butyl Ether	3.4	12	Not Detected	Not Detected
Heptane	3.4	14	Not Detected	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	123	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	97	70-130

AIR TOXICS LTD.

SAMPLE NAME : 03954 Duplicate

ID#: 0006242-03AA

EPA METHOD TO-14 GC/MS Full Scan

File Name:	r061518	Date of Collection:	6/9/00
Dil. Factor:	1.68	Date of Analysis:	6/15/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	3.4	11	Not Detected	Not Detected
2-Propanol	3.4	8.4	Not Detected	Not Detected
trans-1,2-Dichloroethene	3.4	14	Not Detected	Not Detected
Vinyl Acetate	3.4	12	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.4	10	Not Detected	Not Detected
Hexane	3.4	12	Not Detected	Not Detected
Tetrahydrofuran	3.4	10	Not Detected	Not Detected
Cyclohexane	3.4	12	Not Detected	Not Detected
1,4-Dioxane	3.4	12	Not Detected	Not Detected
Bromodichloromethane	3.4	23	Not Detected	Not Detected
4-Methyl-2-pentanone	3.4	14	Not Detected	Not Detected
2-Hexanone	3.4	14	Not Detected	Not Detected
Dibromochloromethane	3.4	29	Not Detected	Not Detected
Bromoform	3.4	35	Not Detected	Not Detected
4-Ethyltoluene	3.4	17	Not Detected	Not Detected
Ethanol	3.4	6.4	13	24
Methyl tert-Butyl Ether	3.4	12	Not Detected	Not Detected
Heptane	3.4	14	Not Detected	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	94	70-130

AIR TOXICS LTD.

SAMPLE NAME : Method Spike

ID#: 0006242-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	r061502	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 6/15/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	% Recovery
Carbon Disulfide	2.0	6.3	105
2-Propanol	2.0	5.0	103
trans-1,2-Dichloroethene	2.0	8.0	101
Vinyl Acetate	2.0	7.2	114
2-Butanone (Methyl Ethyl Ketone)	2.0	6.0	95
Hexane	2.0	7.2	102
Tetrahydrofuran	2.0	6.0	100
Cyclohexane	2.0	7.0	103
1,4-Dioxane	2.0	7.3	110
Bromodichloromethane	2.0	14	121
4-Methyl-2-pentanone	2.0	8.3	111
2-Hexanone	2.0	8.3	106
Dibromochloromethane	2.0	17	116
Bromoform	2.0	21	120
4-Ethyltoluene	2.0	10	112
Ethanol	2.0	3.8	95
Methyl tert-Butyl Ether	2.0	7.3	113
Heptane	2.0	8.3	109

Q = Exceeds Quality Control limits.

Container Type: NA

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	102	70-130

AIR TOXICS LTD.

SAMPLE NAME : Lab Blank

ID#: 0006242-05A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	r061509	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	6/15/00

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Freon 12	0.50	2.5	Not Detected	Not Detected
Freon 114	0.50	3.6	Not Detected	Not Detected
Chloromethane	0.50	1.0	Not Detected	Not Detected
Vinyl Chloride	0.50	1.3	Not Detected	Not Detected
Bromomethane	0.50	2.0	Not Detected	Not Detected
Chloroethane	0.50	1.3	Not Detected	Not Detected
Freon 11	0.50	2.8	Not Detected	Not Detected
1,1-Dichloroethene	0.50	2.0	Not Detected	Not Detected
Freon 113	0.50	3.9	Not Detected	Not Detected
Methylene Chloride	0.50	1.8	Not Detected	Not Detected
1,1-Dichloroethane	0.50	2.0	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.50	2.0	Not Detected	Not Detected
Chloroform	0.50	2.5	Not Detected	Not Detected
1,1,1-Trichloroethane	0.50	2.8	Not Detected	Not Detected
Carbon Tetrachloride	0.50	3.2	Not Detected	Not Detected
Benzene	0.50	1.6	Not Detected	Not Detected
1,2-Dichloroethane	0.50	2.0	Not Detected	Not Detected
Trichloroethene	0.50	2.7	Not Detected	Not Detected
1,2-Dichloropropane	0.50	2.3	Not Detected	Not Detected
cis-1,3-Dichloropropene	0.50	2.3	Not Detected	Not Detected
Toluene	0.50	1.9	Not Detected	Not Detected
trans-1,3-Dichloropropene	0.50	2.3	Not Detected	Not Detected
1,1,2-Trichloroethane	0.50	2.8	Not Detected	Not Detected
Tetrachloroethene	0.50	3.4	Not Detected	Not Detected
Ethylene Dibromide	0.50	3.9	Not Detected	Not Detected
Chlorobenzene	0.50	2.3	Not Detected	Not Detected
Ethyl Benzene	0.50	2.2	Not Detected	Not Detected
m,p-Xylene	0.50	2.2	Not Detected	Not Detected
o-Xylene	0.50	2.2	Not Detected	Not Detected
Styrene	0.50	2.2	Not Detected	Not Detected
1,1,2,2-Tetrachloroethane	0.50	3.5	Not Detected	Not Detected
1,3,5-Trimethylbenzene	0.50	2.5	Not Detected	Not Detected
1,2,4-Trimethylbenzene	0.50	2.5	Not Detected	Not Detected
1,3-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
1,4-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
Chlorotoluene	0.50	2.6	Not Detected	Not Detected
1,2-Dichlorobenzene	0.50	3.0	Not Detected	Not Detected
1,2,4-Trichlorobenzene	0.50	3.8	Not Detected	Not Detected
Hexachlorobutadiene	0.50	5.4	Not Detected	Not Detected
Propylene	2.0	3.5	Not Detected	Not Detected
1,3-Butadiene	2.0	4.5	Not Detected	Not Detected
Acetone	2.0	4.8	Not Detected	Not Detected

AIR TOXICS LTD.

SAMPLE NAME : Lab Blank

ID#: 0006242-05A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	r061509	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 6/15/00	

Compound	Det. Limit (ppbv)	Det. Limit (uG/m3)	Amount (ppbv)	Amount (uG/m3)
Carbon Disulfide	2.0	6.3	Not Detected	Not Detected
2-Propanol	2.0	5.0	Not Detected	Not Detected
trans-1,2-Dichloroethene	2.0	8.0	Not Detected	Not Detected
Vinyl Acetate	2.0	7.2	Not Detected	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	6.0	Not Detected	Not Detected
Hexane	2.0	7.2	Not Detected	Not Detected
Tetrahydrofuran	2.0	6.0	Not Detected	Not Detected
Cyclohexane	2.0	7.0	Not Detected	Not Detected
1,4-Dioxane	2.0	7.3	Not Detected	Not Detected
Bromodichloromethane	2.0	14	Not Detected	Not Detected
4-Methyl-2-pentanone	2.0	8.3	Not Detected	Not Detected
2-Hexanone	2.0	8.3	Not Detected	Not Detected
Dibromochloromethane	2.0	17	Not Detected	Not Detected
Bromoform	2.0	21	Not Detected	Not Detected
4-Ethyltoluene	2.0	10	Not Detected	Not Detected
Ethanol	2.0	3.8	Not Detected	Not Detected
Methyl tert-Butyl Ether	2.0	7.3	Not Detected	Not Detected
Heptane	2.0	8.3	Not Detected	Not Detected

Container Type: NA

Surrogates	% Recovery	Method Limits
1,2-Dichloroethane-d4	122	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	104	70-130

0006242

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control 3466

R/A Control No. _____

Shipping Document No. _____

Serial/ID No. 10932

Cal. Due Date: N/A

Date of Receipt: 3 / 21 / 00

Equipment Type: VOC Summa Canister

Cleaning Cert. Date: N/A

Storage Location: 918B 2C 3R 8S

Date: 3 / 21 / 00 Time: 10:25

Installation Location: _____

Date: / / Time: _____

1. Received By: [signature] 3/21/00 (Signature / Date)

Relinquished By: [signature] 3/21/00 (Signature / Date)

2. Received By: [signature] 6/2/00 (Signature / Date)

Relinquished By: [signature] 6/2/00 (Signature / Date)

3. Received By: [signature] 6/2/00 (Signature / Date)

Relinquished By: [signature] 6/08/00 (Signature / Date)

4. Received By: _____ Signature / Date

Relinquished By: _____ Signature / Date

5. Received By: [signature] 6/11/00 (Signature / Date)

Relinquished By: _____ Signature / Date

6. Received By: _____ Signature / Date

Relinquished By: _____ Signature / Date

A

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below.

NAME (print)	SIGNATURE	DATE
Wesley Pantaight	[signature]	3/21/00, 6/2/00

JD 6-15-00 3.0" Hg

Remarks: MDA-R WEST STOP: 6/09/00 7:37 MDT
START: 6/08/00 0810 TIMER = 2337
FLOW = 6.4 cc/min CONNECTION WAS NOT TIGHT
TIMER = 0000 ~~OFF TIMER 2337 7:37 MDT~~ SMD ON CYLINDER

This record has been reviewed and is found to be complete.

Name (print) _____ Signature _____ Date _____

Completion of this step constitutes validation of this record.

Name (print) _____ Signature _____ Date _____

Form WP 12-VC.02-1 WHITE COPY (Original) - To accompany samples YELLOW COPY - VOC Monitoring Program

Seal intact? Y N None Temp.

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control: [illegible]

R/A Control No. _____

Shipping Document No. _____

Serial/ID No [illegible]

Cal. Due Date N/A

Date of Receipt: 3 / 21 / 00

Equipment Type: VOC Summa Canister

Cleaning Cert. Date: N/A

Storage Location 918B 2C 3R 5S

Installation Location _____

Date: 3 / 21 / 00 Time: [illegible]

Date: / / Time: _____

1. Received By [illegible] 6/2/00 (Signature / Date)

Relinquished By [illegible] 6/2/00 (Signature / Date)

2. Received By [illegible] 6/2/00 (Signature / Date)

Relinquished By [illegible] 6/2/00 (Signature / Date)

3. Received By Allen Headaway 6/02/00 (Signature / Date)

Relinquished By Allen Headaway 6/12/00 (Signature / Date)

4. Received By _____ (Signature / Date)

Relinquished By: _____ (Signature / Date)

5. Received By Danielle Burgess 6/12/00 (Signature / Date)

Relinquished By _____ (Signature / Date)

6. Received By _____ (Signature / Date)

Relinquished By _____ (Signature / Date)

02A

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below.

NAME (print)	SIGNATURE	DATE
[illegible]	[illegible]	3/21/00 [illegible]

JD 6-15-00 1.4 psi

Remarks MDA-R EAST NEAR OUTFALL
START : 6/08/00 0755
FLOW = 6.4 cc/min
TIMER = 0000

STOP: 06/09/00 0500 MST
FLOW = 6.4 cc/min
TIMER = 24.0

This record has been reviewed and is found to be complete.

Name (print)	Signature	Date

Completion of this step constitutes validation of this record

Name (print)	Signature	Date

Form WP 12-VC.02-1

WHITE COPY (Original) - To accompany samples

YELLOW COPY - VOC Monitoring Program

Seal intact? Y N None Temp. ____

0006242

3456

Environmental VOC Chain-of-Custody Record

SAMPLE NUMBER _____

C/C Control 3456

R/A Control No. _____

Shipping Document No. _____

Serial/ID No. 03954

Cal. Due Date: N/A

Date of Receipt: 2/15/00

Equipment Type: VOC Summa Canister

Cleaning Cert. Date: N/A

Storage Location: 918B C2 R2 S7 Date: 2/15/00 Time: 6:15

Installation Location: _____ Date: / / Time: _____

1. Received By: [signature] 2/15/00 (Signature / Date)
Relinquished By: [signature] 2/15/00 (Signature / Date)

2. Received By: [signature] 6/2/00 (Signature / Date)
Relinquished By: [signature] 6/2/00 (Signature / Date)

3. Received By: Jean Dewart 6/2/00 (Signature / Date)
Relinquished By: Jean Dewart 6/13/00 (Signature / Date)

4. Received By: Allen Treadaway 6/13/00 (Signature / Date)
Relinquished By: _____ (Signature / Date)

5. Received By: D Burgess 6/14/00 (Signature / Date)
Relinquished By: _____ (Signature / Date)

6. Received By: _____ (Signature / Date)
Relinquished By: _____ (Signature / Date)

03A

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below.

NAME (print)	SIGNATURE	DATE
Wesley Brantwright	[signature]	6/12/00

JD 6-15-00 6.0 Hrs

Remarks: MDA R WEST
FLOW = 64 cc/min
START: 6/12/00 7:45
TIMER = 0000
6/12/00

MDA-R WEST
START = 6/12/00 @ 0751
TIMER = 0000
FLOW = 6.4 cc/min

@ 732
STOP = 6/13/00
TIMER = 2371
FLOW = 6.3

This record has been reviewed and is found to be complete.

Name (print) Signature Date

Completion of this step constitutes validation of this record.

Name (print) Signature Date

Form WP 12-VC.02-1

WHITE COPY (Original) - To accompany samples

YELLOW COPY - VOC Monitoring Program

Y N None Temp.

Appendix I
Waste Characterization Strategy Forms

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling

All Waste Types or Wastestreams: Soil, PPE, Decontamination Water, Spot-Test Kit Wastes, Barium Nitrate, HE, Containers with Unknown Contents, Return Soil Samples.

Completed By: John M. Tymkowych	Date: August 25, 2000
FPL: Don Hickmott	WMC: John M. Tymkowych

Type of Activity (site investigation, EC, etc.): Soil excavation related to fire response, sampling investigation.

Description of the Activity: This project was in response to the Cerro Grande Fire during which the subject MDA caught fire requiring the emergency excavation and extinguishing of burning material from the site. As a result, soil with debris was staged in 100 cubic yard lots. Soils were screened for HE and radioactive contamination, sampled and sent for analysis. Once the analytical results are returned, the soils will be profiled and sent for disposal at a permitted facility approved by LANL. Asbestos and barium nitrate will be managed appropriately and disposed of at a permitted facility approved by LANL. Any HE chunks found will be burned at the ESA burning grounds. Containers of unknown contents will be haz-catted, profiled and sent for disposal at a permitted, LANL approved facility. If any decontamination water is generated it will be managed in accordance with LANL policy if within the allowable quantities for discharge or it will be sampled, characterized and disposed of at a permitted, LANL approved facility. PPE used in the course of this activity will be profiled based on the analytical results of the soil.

The sampling phase of this project will follow the sampling scheme of the RFI Work Plan for OU 1082. This sampling event will take place in the delineated area of the SWMU/excavated area. Wastes generated from the sampling portion of this project will consist of return soil samples, spot test wastes and PPE.

Acceptable Knowledge: The site history, operations and description of this unit are summarized in LANL RFI Work Plan for OU 1082. This site was a material disposal area and HE burning ground for Bldg. 260, which is adjacent to this site on the south side and dates back to the time period immediately following WWII. However the Work Plan does not address the most recent event of the Cerro Grande Fire and its impact. Specifically, the fire ignited not only the trees and underbrush in the area but debris in the dispsoal area and it is uncertain what exactly burned with regards to the expected contaminants, i.e. HE and SVOC's to the point that they may not be detected or will be below regulatory limits. Sampling will still be in concurrence with the approved plan.

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling

Specific Waste Type: Soils and Return Soil Samples

Waste Description

Description of Waste Type, Potential Contaminants, Volume Estimate, and Waste Packaging:

Waste Type Description: Soil
Potential Contaminants: Barium, SVOC's, HE, depleted uranium
Volume Estimate: 2000 cubic yards
Packaging: Staged in piles within the AOC pending packaging for direct off site shipment, return samples within an SAA

Characterization Strategy

Description of Strategy:

This waste stream represents the bulk of the material to be generated for this area. Soils will be remotely excavated and staged in 100 cubic yard lots. Each lot had 10 grab samples taken and composited. Each composited sample will be analyzed for PCB's, SVOC's, VOC's, RCRA metals, Dioxins, Asbestos, High Explosives and Radioactive constituents. Based on the results of these analytical tests, the soils will be profiled and transported directly offsite for disposal. Return soil samples will be included with the corresponding soil lot for disposal.

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Material	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Volatile Organic Constituents	SW846 8260	Unknown	X	X	
Semivolatile Constituents	SW846 8270	Yes	X	X	
Organic Pesticides		Unknown	X		
Organic Herbicides		Unknown	X		
Pesticides and PCBs	SW846 8080	Unknown	X		
PCBs		Unknown	X		
Total Metals	SW846 EPA 6010A/7471	Yes		X	
Total Cyanide		No		X	
Other Inorganic Constit.(specify) – Nitrate		No		X	
High Explosive Constit.		Yes		X	
Asbestos		Unknown	X		

WASTE CHARACTERIZATION STRATEGY FORM

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Material	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
TPH		Unknown	X		
TCLP Metals	1311/SW846 6010	Yes	X		
TCLP Organics	1311/SW846 8260/8270	Unknown	X		
TCLP Pesticides and Herbicides		Unknown	X		
Gross Alpha	900.0/9310	Unknown	X		
Gross Beta	900.0/9310	Unknown	X		
Gross Gamma	901.1	No		X	
Tritium[1]	906.0	No		X	
Gamma Spectro.	HASL-300	Uknown	X		
Isotopic Plutonium	Alpha spec	No		X	
Total Plutonium		No		X	
Isotopic Uranium	Alpha spec	Unknown	X		
Total Uranium		Unknown	X		
Strontium-90		No		X	
Americium-241	Gamma spec	Unknown	X		
Dioxins/Furans		Unknown	X		

Preliminary RCRA Determination

Based on available information, indicate the waste and whether it could potentially be any of the wastes as defined in 40 CFR 261. List the F-, D-, K-, P-, or U- category and number: .

It is anticipated that 20% to 50% of this waste stream will be characteristic for Barium (D005). No listed hazardous constituents are anticipated.

Preliminary RCRA Status

__X__ Non-RCRA: (No 90-Day Storage Requirement)
Describe how waste will be stored/handled:

Waste will be profiled and appropriately staged in piles within the AOC until transported and disposed of at a permitted facility approved by LANL.

__X__ RCRA: (Satelite and 90-Day Storage Requirements)

Any waste determined to be RCRA hazardous or mixed waste will be staged in piles within the AOC until packaged and transported directly off site in accordance with 20 NMAC 4.1 Generator Requirements and LANL LIR 404-00-03, to a permitted facility approved by LANL can be provided.

[1] If tritium is not expected, attach a statement signed by the FPL stating that, based on a review of the available information and professional judgment, it is not necessary to sample for tritium at this site.

WASTE CHARACTERIZATION STRATEGY FORM

Preliminary Determination for Radioactivity

Based on available information, indicate the amount and type of radiation contamination expected in the waste.

It is not anticipated that this waste will be radioactive however it will be analyzed for radioactive constituents. If found to be radioactive they would be considered low level.

Preliminary Radioactivity Status

_X_ Material is not radioactive

Describe how waste will be stored/handled

Non radioactive waste will be profiled and disposed of at a permitted disposal facility.

____ Material is radioactive

Any waste determined to be radioactively contaminated will be labeled as radioactive waste and placed in a radioactive waste storage area, which will be cordoned off, posted, and managed in a protective manner, within the boundary of the SWMU or work area as described in LANL-ER -SOP-1.06, R1, Management of Environmental Restoration Project Wastes.

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/TU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling

Specific Waste Type: PPE

Waste Description Description of Waste Type, Potential Contaminants, Volume Estimate, and Waste Packaging:
Waste Type Description: PPE
Potential Contaminants: Barium, HE, SVOC's
Volume Estimate: 55 gallons
Waste Packaging: Drums

Characterization Strategy

Description of Strategy: Acceptable knowledge based on the analytical results of the soil.

Waste Sampling: This waste stream will be generated from the decontamination of equipment and the sampling efforts and will be characterized based upon analytical results of the soils. As with the PPE generated at MDA-P, twenty percent of the analytical value for constituents found in the soils will be used to characterize this waste. Any PPE that is not visibly soiled will be considered non-hazardous.

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Volatile Organic Constituents	SW846 8260	Unknown		X	
Semivolatile Constituents	SW846 8270	Unknown		X	
Organic Pesticides		No		X	
Organic Herbicides		No		X	
Pesticides and PCBs	SW846 8080	Unknown		X	
PCBs		Unknown		X	
Total Metals	SW 846 EPA 6010, 7471	No		X	
Total Cyanide		No		X	
Other Inorganic Constit.(specify) – Reactive cyanide and sulfide		No		X	
High Explosive Constit.		Yes		X	
Asbestos		Unknown		X	
TPH		No		X	
TCLP Metals	1311/SW846 6010	Yes		X	

WASTE CHARACTERIZATION STRATEGY FORM

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
TCLP Organics	1311/SW846 8260/8270	Unknown		X	
TCLP Pesticides and Herbicides		No		X	
Gross Alpha	900.0/9310	Unknown		X	
Gross Beta	900.0/9310	Unknown		X	
Gross Gamma	901.1	No		X	
Tritium[2]	906.0	No		X	
Gamma Spectro.	HASL-300	Unknown		X	
Isotopic Plutonium	Alpha spec	No		X	
Total Plutonium		No		X	
Isotopic Uranium	Alpha spec	Unknown		X	
Total Uranium		Unknown		X	
Strontium-90		No		X	
Americium-241	Gamma Spec	Unknown		X	
Dioxins/Furans		Unknown		X	

Preliminary RCRA Determination

Based on available information, indicate the waste and whether it could potentially be any of the wastes as defined in 40 CFR 261. List the F-, D-, K-, P-, or U- category and number.

It is not anticipated that this stream will be considered hazardous.

Preliminary RCRA Status

_X_ Non-RCRA: (No 90-Day Storage Requirement)
Describe how waste will be stored/handled:
PPE that is generated and is not visibly contaminated will be considered non-hazardous and disposed of as solid waste at a permitted solid waste landfill.

_X_ RCRA: (Satelite and 90-Day Storage Requirement)
Waste will be stored/handled in accordance with 20 NMAC 4.1 Generator Requirements and LANL LIR 404-00-03 within an approved SAA or <90 day facility.

[2] If tritium is not expected, attach a statement signed by the FPL stating that, based on a review of the available information and professional judgment, it is not necessary to sample for tritium at this site.

WASTE CHARACTERIZATION STRATEGY FORM

Preliminary Determination for Radioactivity
Based on available information, indicate the amount and type of radiation contamination expected in the waste. The waste may be characterized as low level radioactive waste
Preliminary Radioactivity Status
__X__ Material is not radioactive Describe how waste will be stored/handled. Non radioactive waste will be segragated, containerized and disposed of at a permitted facility.
__X__ Material is radioactive Describe the controlled area, labeling, and protection against inadvertent contamination Any waste determined to be radioactively contaminated will be labeled as radioactive waste and placed in a radioactive waste storage area, which will be cordoned off, posted, and managed in a protective manner, within the boundary of the AOC or work area as described in LANL-ER –SOP-1.06, R1, Management of Environmental Restoration Project Wastes and LANL LIR 404 series on waste management

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling

Waste Types or Wastestreams: Decontamination water

Waste Description Description of Waste Type, Potential Contaminants, Volume Estimate, and Waste Packaging:
Waste Type Description: Water from the decontamination of equipment
Potential Contaminants: Barium (D005), HE
Volume Estimate: 100 gallons
Waste Packaging: 55 gallon containers or portable tank

Characterization Strategy

Description of Strategy: Directly sample water after all decontamination processes have been accomplished.

Waste Sampling: If generated above allowable discharge limits, grab samples of water from the containers will be performed and the samples submitted for analyses of VOC's, SVOC's, RCRA Total Metals, PCB's, dioxins, HE, uranium and asbestos.

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Volatile Organic Constituents	SW846 8260	Unknown	X		
Semivolatile Constituents	SW846 8270	Unknown	X		
Organic Pesticides		No		X	
Organic Herbicides		No		X	
Pesticides and PCBs	SW846 8080	No		X	
PCBs		Unknown	X		
Total Metals	SW 846 EPA 6010, 7471	Yes	X	X	
Total Cyanide		No		X	
Other Inorganic Constit.(specify) – Reactive cyanide and sulfide		No		X	
High Explosive Constit.		Unknown	X	X	
Asbestos		Unknown	X	X	

WASTE CHARACTERIZATION STRATEGY FORM

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
TPH		Unknown		X	
TCLP Metals	1311/SW846 6010	Unknown		X	
TCLP Organics		No		X	
TCLP Pesticides and Herbicides		No		X	
Gross Alpha	900.0/9310	Unknown	X		
Gross Beta	900.0/9310	Unknown	X		
Gross Gamma	901.1	No	X		
Tritium[3]	906.0	No		X	
Gamma Spectro.	HASL-300	Unknown	X		
Isotopic Plutonium	Alpha spec	No		X	
Total Plutonium		No		X	
Isotopic Uranium	Alpha spec	Unknown	X		
Total Uranium		Unknown	X		
Strontium-90		No		X	
Americium-241	Gamma Spec	Unknown	X		
Dioxins/Furans		Unknown	X		

Preliminary RCRA Determination

Based on available information, indicate the waste and whether it could potentially be any of the wastes as defined in 40 CFR 261. List the F-, D-, K-, P-, or U- category and number.

The decon water may be characteristic for Barium (D005). It is not anticipated that any SVOC's or VOC's will be found as listed constituents.

Preliminary RCRA Status

__X__ Non-RCRA: (No 90-Day Storage Requirement)
Describe how waste will be stored/handled:
All waste will be managed in a protective manner, within the boundary of the AOC or a secure storage area as described in LANL-ER -SOP-1.06, R1, Management of Environmental Restoration Project Wastes

__X__ RCRA: (90-Day Storage Requirement)
Waste will be stored and managed within a SAA or a 90 day accumulation area in accordance with 20 NMAC 4.1 Generator Requirements.

[3] If tritium is not expected, attach a statement signed by the FPL stating that, based on a review of the available information and professional judgment, it is not necessary to sample for tritium at this site.

WASTE CHARACTERIZATION STRATEGY FORM

Preliminary Determination for Radioactivity
Based on available information, indicate the amount and type of radiation contamination expected in the waste. It is not anticipated that this waste will be radioactive.
Preliminary Radioactivity Status
__X___Material is not radioactive Describe how waste will be stored/handled: The decon water will be stored in containers or a tank within the AOC until it is profiled and sent for disposal through the HEWTF or an approved, permitted facility.
__X___Material is radioactive Describe the controlled area, labeling, and protection against inadvertent contamination: The decon water will be stored in containers or a tank within the AOC until it profiled and sent to the rad waste water facility at TA-50 or an appropriate facility.

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling

Specific Waste Type: Spot-Test Wastes

Waste Description

Description of Waste Type, Potential Contaminants, Volume Estimate, and Waste Packaging:

Waste Type Description: Kits contain vials of methanol, acetone and/or sulfuric acid, the waste will contain the remains of the solvents and acid mixed with water and small quantities of soil.
Potential Regulatory Status: RCRA Hazardous Waste or Solid Waste
Volume Estimate: 3 gallons
Waste Packing: Methanol, acetone and sulfuric acid solutions will be segregated and stored onsite in a container, in a Satellite Accumulation Area (SAA) if applicable. Empty test kit ampules will be managed as solid waste in a separate container.

Characterization Strategy

Description of Strategy:

The liquid sampling kit wastes, unused solvent, solvent with soils, and sampling vials will be managed as RCRA hazardous waste in a SAA or as solid waste

Waste Sampling:

The sampling kit wastes will be sampled if MSDSs for the kits are not detailed enough to determine the regulatory status of the waste. Grab samples will be analyzed only for ignitability and corrosivity.

- Grab sampling is appropriate for wastes that are fairly homogeneous, such as liquid wastes.
- Composite sampling is appropriate for wastes that are heterogeneous, such as soil, sediment, and debris.

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste *	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Volatile Organic Constituents		Yes	X	X	
Semivolatile Constituents		No		X	
Organic Pesticides		No		X	
Organic Herbicides		No		X	
Pesticides and PCBs		No		X	
PCBs		No		X	

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling
Specific Waste Type: Spot- Test Wastes		

Analytical Strategy (Continued)					
Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Total Metals		No		X	
Total Cyanide		No		X	
Other Inorganic Constituents (specify)		No		X	
High Explosive Constituents		Yes	X	X	
Asbestos		No		X	
TPH		No		X	
TCLP Metals		No		X	
TCLP Organics		No		X	
TCLP Pesticides and Herbicides		No		X	
Gross Alpha		No		X	
Gross Beta		No		X	
Gross Gamma		No		X	
Tritium[4]		No		X	
Gamma Spectroscopy		No		X	
Isotopic Plutonium		No		X	
Total Plutonium		No		X	
Isotopic Uranium		No		X	
Total Uranium		No		X	
Strontium-90		No		X	
Americium-241		No		X	

- Spot test kit wastes will only be sampled if the MSDS sheets are not detailed enough to make a regulatory determination. If sampling is necessary, pH will also be performed.

[4] If tritium is not expected, attach a statement signed by the FPL stating that, based on a review of the available information and professional judgment, it is not necessary to sample for tritium at this site.

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
OU1082	16-019	MDA-R Cleanup and Sampling

Specific Waste Type: Spot-Test Wastes

Preliminary RCRA Determination

Based on available information, indicate the waste and whether it could potentially be any of the wastes as defined in 40 CFR 261. List the F-, D-, K-, P-, or U- category and number.

Wastes will contain methanol or acetone (F003, D001), sulfuric acid (D002), and rinse solutions containing soil. The pH will be determined, and, if greater than 2, the D002 characteristic can be removed. Based on these materials, these waste appear to be RCRA regulated however the quantity of stop solutions and rinsate may render this waste non-RCRA.

Preliminary RCRA Status

__X__ Non-RCRA: (No 90-Day Storage Requirement)
Describe how waste will be stored/handled:
If this waste stream is determined to be non-hazardous, it will be managed as non-RCRA waste water and disposed of at a permitted, LANL approved facility.

__X__ RCRA: (90-Day Storage Requirement)
Waste will be stored/handled in accordance with 20 NMAC 4.1 Generator Requirements
Wastes will be stored in containers in an on-site Satellite Accumulation Area if applicable.

Preliminary Determination for Radioactivity

Based on available information, indicate the amount and type of radiation contamination expected in the waste.
Although depleted uranium is suspected to be present in the soils tested, no radioactive constituents above background levels are expected in the wastes.

Preliminary Radioactivity Status

__X__ Material is not radioactive
Describe how waste will be stored/handled
Waste will be managed and disposed of at a permitted, LANL approved facility based on characterization of the soil

_____ Material is radioactive
Describe the controlled area, labeling, and protection against inadvertent contamination

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling

Specific Waste Type: HE

Waste Description

Description of Waste Type, Potential Contaminants, Volume Estimate, and Waste Packaging:

Waste Type Description: HE chunks and scraps
Potential Contaminants: RDX, HMX, TNT
Volume Estimate: 5 gallons
Packaging: 5 gallon bucket

Characterization Strategy

Description of Strategy:

Acceptable knowledge of this waste stream is extensive in that it is readily identified by personnel familiar to the operations of the area. Based on this knowledge it will be containerized and managed in a <90 day storage area until it can be burned at the faciltiy burning ground or will be taken directly to the burning grounds. If a material is found and is not readily identied it will be spot tested or sampled and analyzed.

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Volatile Organic Constituents	SW846 8260	No		X	
Semivolatile Constituents	SW846 8270	No		X	
Organic Pesticides		No		X	
Organic Herbicides		No		X	
Pesticides and PCBs	SW846 8080	No		X	
PCBs		No		X	
Total Metals	SW846 EPA 6010A/7471	No		X	
Total Cyanide		No		X	
Other Inorganic Constit.(specify) – Nitrate		No		X	
High Explosive Constit.		Yes		X	
Asbestos		No		X	
TPH		No		X	
TCLP Metals	1311/SW846 6010	No		X	

WASTE CHARACTERIZATION STRATEGY FORM

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
TCLP Organics	1311/SW846 8260/8270	No		X	
TCLP Pesticides and Herbicides		No		X	
Gross Alpha	900.0/9310	No		X	
Gross Beta	900.0/9310	No		X	
Gross Gamma	901.1	No		X	
Tritium[1]	906.0	No		X	
Gamma Spectro	HASL-300	No		X	
Isotopic Plutonium	Alpha spec	No		X	
Total Plutonium		No		X	
Isotopic Uranium	Alpha spec	No		X	
Total Uranium		No		X	
Strontium-90		No		X	
Americium-241	Gamma spec	No		X	
Dioxins/Furans		No		X	

Preliminary RCRA Determination

Based on available information, indicate the waste and whether it could potentially be any of the wastes as defined in 40 CFR 261. List the F-, D-, K-, P-, or U- category and number:

This waste stream will only be considered D003 reactive.

Preliminary RCRA Status

_____ Non-RCRA: (No 90-Day Storage Requirement)
Describe how waste will be stored/handled:

__X__ RCRA: (Satelite and 90-Day Storage Requirements)

This waste will be stored/handled within a <90 day accumulation area in accordance with 20 NMAC 4.1 Generator Requirements and LANL LIR 404-00-03 until disposal at the burning grounds can be provided.

[1] If tritium is not expected, attach a statement signed by the FPL stating that, based on a review of the available information and professional judgment, it is not necessary to sample for tritium at this site

WASTE CHARACTERIZATION STRATEGY FORM

Preliminary Determination for Radioactivity
Based on available information, indicate the amount and type of radiation contamination expected in the waste. It is not anticipated that this waste will be radioactive however it will be field screened for radioactive contamination.
Preliminary Radioactivity Status
_X_ Material is not radioactive Describe how waste will be stored/handled Non radioactive waste will be profiled and disposed of at a permitted disposal facility.
____ Material is radioactive

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/TU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling

Specific Waste Type: Barium Nitrate

Waste Description Description of Waste Type, Potential Contaminants, Volume Estimate, and Waste Packaging:
Waste Type Description: Barium Nitrate Chunks
Potential Contaminants: Barium
Volume Estimate: 55 gallons
Waste Packaging: 55 gallon drums

Characterization Strategy

Description of Strategy: Acceptable knowledge based on generator processes. This waste is readily identified visually and by XRF. It will be collected as soils are screened, containerized and placed into storage.

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Volatile Organic Constituents	SW846 8260	No		X	
Semivolatile Constituents	SW846 8270	No		X	
Organic Pesticides		No		X	
Organic Herbicides		No		X	
Pesticides and PCBs	SW846 8080	No		X	
PCBs		No		X	
Total Metals	SW 846 EPA 6010, 7471	Yes		X	
Total Cyanide		No		X	
Other Inorganic Constit.(specify) - Reactive cyanide and sulfide		No		X	
High Explosive Constit.		No		X	
Asbestos		No		X	
TPH		No		X	
TCLP Metals	1311/SW846 6010	Yes		X	
TCLP Organics	1311/SW846 8260/8270	No		X	

WASTE CHARACTERIZATION STRATEGY FORM

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
TCLP Pesticides and Herbicides		No		X	
Gross Alpha	900.0/9310	No		X	
Gross Beta	900.0/9310	No		X	
Gross Gamma	901.1	No		X	
Tritium[2]	906.0	No		X	
Gamma Spectro.	HASL-300	No		X	
Isotopic Plutonium	Alpha spec	No		X	
Total Plutonium		No		X	
Isotopic Uranium	Alpha spec	No		X	
Total Uranium		No		X	
Strontium-90		No		X	
Americium-241	Gamma Spec	No		X	
Dioxins/Furans		No		X	

Preliminary RCRA Determination

Based on available information, indicate the waste and whether it could potentially be any of the wastes as defined in 40 CFR 261. List the F-, D-, K-, P-, or U- category and number.

This waste stream is considered characteristic hazardous waste for (D005) barium.

Preliminary RCRA Status

_____ Non-RCRA: (No 90-Day Storage Requirement)
Describe how waste will be stored/handled:

__X__ RCRA: (Satelite and 90-Day Storage Requirement)
Waste will be stored/handled in a <90 day accumulation area in accordance with 20 NMAC 4.1 Generator Requirements and LANL LIR 404-00-03 until transportation and disposal at a permitted facility approved by LANL can be arranged.

[2] If tritium is not expected, attach a statement signed by the FPL stating that, based on a review of the available information and professional judgment, it is not necessary to sample for tritium at this site.

WASTE CHARACTERIZATION STRATEGY FORM

Preliminary Determination for Radioactivity
Based on available information, indicate the amount and type of radiation contamination expected in the waste. This waste is not anticipated as being radioactive
Preliminary Radioactivity Status
__X__ Material is not radioactive. Describe how waste will be stored/handled. Waste will be containerized and disposed of at a permitted facility approved by LANL.

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling
Waste Types or Wastestreams: Containers with Unknown Contents		

Waste Description Description of Waste Type, Potential Contaminants, Volume Estimate, and Waste Packaging:
Waste Type Description: Containers of various size with unknown contents.
Potential Contaminants: Radionuclides, RCRA Metals, HE, VOC's, SVOC's
Volume Estimate: 50 gallons
Waste Packaging: Segregated by compatability and overpacked.

Characterization Strategy

Description of Strategy: Segregate containers from soils during screening.

Waste Sampling: Haz-Cat unknowns after puncturing by Haz-Mat Team. If necessary send containers off for full analysis if haz-cat cannot identify sufficiently for profiling and TSD acceptance.

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste *	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
Volatile Organic Constituents	SW846 8260	Unknown	X		
Semivolatile Constituents	SW846 8270	Unknown	X		
Organic Pesticides		Unknown	X		
Organic Herbicides		Unknown	X		
Pesticides and PCBs	SW846 8080	Unknown	X		
PCBs		Unknown	X		
Total Metals	SW 846 EPA 6010, 7471	Unknown	X		
Total Cyanide		Unknown	X		
Other Inorganic Constit.(specify) – Reactive cyanide and sulfide		Unknown	X		
High Explosive Constit.		Unknown	X		
Asbestos		Unknown	X		
TPH		Unknown	X		
TCLP Metals	1311/SW846 6010	Unknown	X		

WASTE CHARACTERIZATION STRATEGY FORM

Analytical Strategy

Analyte Category	Analytical Method	May be Present (yes, no, unknown)	Direct Sampling of Containerized Waste *	Acceptable Knowledge Existing Information	Acceptable Knowledge Data from Proposed Site Characterization
TCLP Organics		Unknown	X		
TCLP Pesticides and Herbicides		Unknown	X		
Gross Alpha	900.0/9310	Unknown	X		
Gross Beta	900.0/9310	Unknown	X		
Gross Gamma	901.1	Unknown	X		
Tritium[3]	906.0	Unknown	X		
Gamma Spectro.	HASL-300	Unknown	X		
Isotopic Plutonium	Alpha spec	Unknown	X		
Total Plutonium		Unknown	X		
Isotopic Uranium	Alpha spec	Unknown	X		
Total Uranium		Unknown	X		
Strontium-90		Unknown	X		
Americium-241	Gamma Spec	Unknown	X		
Dioxins/Furans		Unknown	X		

* Haz Cat info will be used as appropriate to determine the applicable hazardous catagory

Preliminary RCRA Determination

Based on available information, indicate the waste and whether it could potentially be any of the wastes as defined in 40 CFR 261. List the F-, D-, K-, P-, or U- category and number.

Since these containers have unknown contents, it is anticipated that some of these containers will have contents regulated under RCRA.

Preliminary RCRA Status

_X_ Non-RCRA: (No 90-Day Storage Requirement)
Describe how waste will be stored/handled:
All waste will be managed in a protective manner, within the boundary of the AOC until punctured by Haz-Mat and then will be sent for haz-catting. Upon return non- hazardous waste will be managed as described in LANL-ER SOP-1.06, R1, Management of Environmental Restoration Project Wastes

_X_ RCRA: (90-Day Storage Requirement)
Waste will be stored and managed the same as the above described waste however after return from haz-catting, RCRA wastes will be managed in a <90 day accumulation area or an SAA in accordance with 20 4.1 NMAC Generator Requirements.

[3] If tritium is not expected, attach a statement signed by the FPL stating that, based on a review of the available information and professional judgment, it is not necessary to sample for tritium at this site

WASTE CHARACTERIZATION STRATEGY FORM

Preliminary Determination for Radioactivity

Based on available information, indicate the amount and type of radiation contamination expected in the waste.

It is not anticipated that this waste will be radioactive, however it will be rad screened before release to Haz-Mat for puncturing.

Preliminary Radioactivity Status

__X__ Material is not radioactive

Describe how waste will be stored/handled: The unknown containers will be managed as either solid or hazardous waste.

__X__ Material is radioactive

Describe the controlled area and storage: The unknowns will be punctured by Haz-Mat and then haz-catted onsite to determine if they are RCRA regulated hazardous waste. If so, they will then be placed into a RCRA hazardous waste storage area and profiled for appropriated mangement and/or disposal. Any waste determined to be radioactively contaminated will be labeled as radioactive waste and managed in a protective manner within the AOC or work area as described in LANL-ER-SOP-1.06, R1, Management of Environmental Restoration Project Wastes and LANL LIR 404 series on waste management.

WASTE CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
OU 1082	16-019	MDA-R Cleanup and Sampling

Waste Types or Wastestreams: Soil, PPE, Decontamination Water, Spot-Test Kit Wastes, Barium Nitrate, High Explosives, Containers with Unknown Contents, Return Soil Samples.

Signatures:

Project Leader _____ 9/11/00

ER Project Waste Management Coordinator _____ 9/11/00

Waste Services Representative _____ 9/11/00

08-31-00 Thursday Craig Dodd
0600 arrive at W. gate —
0615 arrive at MDA R —
0630 safety briefing —
decays - stops trips falls
bios heat stress
lifting bricks w/ care
and wearing gloves when
lifting bricks,
0645 Bill McCormick here
wants to take excavator
and crew to dig up
~~smoke~~ smoke over at MDA R
0715 Water truck and
Kobelco excavator over
to to MDA R at smoke
to remove smoke — this
operation has been arranged
by Fred Gray
0745 Water truck and
Kobelco are on station
at MDA R above smoke
note: Rick Trujillo + I
prep area by moving
waddels out of
operation zone

0810 Rick Trujillo begins
operation by positioning
himself over burn spot I
he begins digging by cutting
in well below smoke hole
excavation begins —
soil & debris is layed up
on top alongside excavator
Fred Gray positions water
truck near by and sprays
down hot material comes
from excavation — note
as materials brought
up it is cooled down
w/ water — large burning
pieces of a tree are brought
up to cool off, old stump
or tree appear to be the
burning material from
below
0900 fire dept is on
scene to help extinguish
fire — material continues
to ~~cooler~~ come up hot or
on fire — is cooled and

08-31-00 (Cont) Craig Dodd
mixed w/ soil
0950 Last of excavation
taking place. There appears
to be a great deal of
material remaining in dump
~~tit~~ There was ~~anot~~ an other
cap over it - some
of the debris appears
to have burned but
has been removed and
cooled - Rick Trujillo
estimates 30 yrs of
material removed
from side of canyon -
1000 material is mixed
and wet down one
more time
1020 Exit area - fire
appears to be extinguished
1110 Return w/ Ann
to photograph fire excavation
and debris ~~pile~~ pile
1315 Work w/ brick crew
down at 388 bp in
wall construction
1510 end of day - Craig Dodd

09-05-00 Tuesday Craig Dodd
0600 arrive at W gate
note: Gerald Begay has
forgotten his badge at home
will use gov't truck to
go to badge office when
it opens - I ride in w/
Rick Trujillo in expedition
0615 arrive at MDA-P
0620 Safety Briefing
- discuss - slips trips falls
- stay hydrated - wear
gloves when handling bricks
- note - we have just come
off of 4 day holiday -
0600 response ✓ M139 #3566 w/ source
#2698 @ 3000 cpm BKg <1 cpm
response ✓ ESP1 #7425 w/ source
#4698 @ 557 Kdpm BKg 280 dpm
0900 mixed up batch of
gatorade and put out
water - am missing
3 gal cooler will continue
to look for it
1310 Put together security list for Bill
1600 exit site
1620 end of day Craig Dodd

08-29-00 Tuesday Craig Dodd
0600 arrive @ W-gate
0616 arrive @ MDA-P
0620 Safety briefing
discuss Steps trips falls
/ heat stress - drink
plenty of fluids / watch
for bios / wear gloves
while handling bricks
0645 go w/ Bill McKermick
to look at st. burning
stump hole at MDA-R
0655 upon investigation
I noted that the hole
was still hot / warm
earth and steam escaping
out a upper vent hole
I suggested to Bill that
we get shovels and
dig it out to look
for source of heat
and then put water
on it. He called
the fire dept for
water and I said
I would get some

help and dig w/ shovels
0715 Fred tells me I'm
committed to go dig and
sends me and Gary Stoops
out to dig
0725 Gary and I dig
a trench across the
slope face and try to
expose the heat source
upon completion of the
of the trench we are
unable to locate source
I advised Bill Mc. to
have fire department fill
trench w/ water. I feel
that repeated fillings
may eventually soak
into source and extinguish
it. Or if not he should
call Bill Criswell or Fred G.
to bring an excavator
and dig it out
0750 exit MDA-R
0830 response v M139 #3566
w/source 2698 @ 3000 cpm Bkg <1 cpm

64

08-29-00

~~0615~~ responsev ESP-1 #7425 w/ source #2698 @ 543K dpm Bkg 278 dpm

0845 take pictures of broken brick on pallet to burnpad crew

1100 exit site for burning

1310 Return to site

1515 Wash and rinse off sample spoons (units) packaged and standing

1550 take picture of broken brick on pallet

1610 exit site

1620 end of day

Craig Dodd

Craig Dodd

65

08-30-00 Wednesday Craig Dodd

0600 arrive @ W-gate

0610 arrive @ MDA-P

0625 Safety briefing — discuss slips trips falls stay hydrated — pinch points — wear your gloves

0755 escort Mike Dake in to deliver roll off

0750 escort Rick Zrujillo out for his Red Worker Hat

0820 Fred + Wendy sample 447 NW — <16 ppm RDX

447 S — 351 ppm RDX

Sample results passed on to Fred Gray

1015 escort Rick T. from gate to site

1045 responsev of M139 #3569 w/ source #2698 @ 3000 cpm Bkg <1 cpm — responsev of ESP-1 #7425 w/ source #2698 @ 542K dpm Bkg 319 dpm

1620 end of day

Craig Dodd

Craig Dodd

Los Alamos National Laboratory
Environmental Restoration Program
TA-16 Landfills Remediation
Contract No. 2982-U0017-8M

DAILY EQUIPMENT CHECKLIST

DATE

8-31-00

0600 ARRIVE AT TA-16
START MORNING BRIEF
0700 B.11 McCORMICK - CALLS
MDA-R HAS HOT SPOT SMOKING
REQUEST WESTON TAKE CARE OF
IT. WILL USE TRACKHOE & WATER
TRUCK TO DIG HOT SPOT OUT
0800 D-CON 690 JOHN DEERE - MACHINE
NO GOOD SEND BACK.
HARVEY, SCOTT, FRITZ WORK ON 388
BURN PAD.
1100 HOT SPOT AT MDA-R OUT
1130 LUNCH
12.0 CONTINUE WORK 388 BURN PAD &
EXC. SOILS IN OLD - 4 DOWN
AREA.
1530 . STOP WORK LEAVE SITE
68 yds SOIL STOCKPILE
0 yds ROCK
68 yds TOTAL
1219 yds TOTAL WK.

8-31-00

7-7-00

0600 ARRIVE TA-16
START MORNING BRIEF
ENTER AREA CONTINUE TO
CLEAN BURN PAD (387)
0900 SAMPLE w/ XRF. DIANE
CHECK ON HOT SPOT AT
MDA-R - NO HOT SPOTS
FOUND.
1100 REMOVE LINER FROM
TRENCH 3 ON EAST SIDE
BACKFILL TRENCH.
1300 PLACE STRAW ON LOWER
BENCH.
MOVE PC 250 TO D-CON
FOR FINAL RELEASE.
1530 STOP WORK - LEAVE SITE

7-7-00

7-10-00

0600 ARRIVE TA-16
START MORNING BRIEF
COMPLETE 387 BURN PAD
XRF FINAL SWIPE.
0800 SURVEY ENTIRE AREA
CONTINUE TALLY OUT GRITS.
1000 ENGINEER & SURVEY WESTON
LOOKS AT 388 BURN PAD.
1130 LUNCH - LIGHTNING IN AREA
1230 OK TO GO BACK TO WORK.
HARVEY & FRITZ. DROP
STICK AT INCENERATOR.
CLEAN UP CORNER INSIDE
AREA.
FINISH D-CON 250 PC TRANSFER
RELEASE REPORT. HIE.
1610 STOP WORK - LEAVE SITE

7-10-00

7-5-00

0600 ARRIVE TA-16
START MORNING BRIEF
0710 PETER SET-UP TO DIG ROBOTIC
HARVEY & FRITZ RE-CEMENT SOILS
AT MDA-R.
1030 NO HE FOUND - DIANE TO
SAMPLE SOILS/W XRF.
MARK, SCOTT TRANS SOILS TO
UPPER PAD IN 100yd LOTS
PETER GOES MANUAL EXC.
DIANE WILL CONTINUE TO
SAMPLE
D-LON JOHN DEERE BACKHOE &
HAMMER FOR FINAL RELEASE
1400 STOP WORK - LEAVE SITE

[signature]
7-5-00

7-6-00

0600 ARRIVE AT TA-16
START MORNING BRIEF
0700 ENTER AREA CONTINUE TO
REMOVE SOILS FROM DURN PAD
TEST W/ XRF.
0830 SURVEYOR ARRIVES - RICK
WILL ACCESS.
1100 HARVEY & FRITZ TO CHECK OUT
INCINERATOR ("BILL BUYS LUNCH")
JOHN T. PICKS UP TWO RAD
DRUMS & B25 BOX.
WINDY & GARY TAKE TWO FIVE
GAL. BUCKETS TO SANTEFE FOR
SAMPLE.
USE BOTH WATER TRUCKS FOR
DUST CONTROL.
~~BILL~~
1400 STOP WORK LEAVE SITE

[signature]
7-6-00

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6-29-00

0600 ARRIVE TA-16
START MORNING BRIEF.
0710 SET-UP TO PROCESS SOILS
1030 All SOILS PROCESSED "YES"

D-CON DEBRIS HAULTO 90S
SHIP (6) TRUCKS TO TX
FROM LOTS# 12202-2-1-R-1216
RELEASE DRUM BARIUM
300 pds. RELEASE (10) METAL
ITEMS.
1230 MEET WITH ANN S. - STEVE V.
DISCUSS DRAIN TRENCH
MDA-R - OK TO START
1400 START TRENCH.
BRAKE CONCRETE ON
BURN PAD
1600 LEAVE SITE
32 yds soil STOCKPILE
44 yds DEBRIS
76 yds TOTAL

6-29-00

6-30-00

0600 ARRIVE TA-16
START MORNING BRIEF.
CONTINUE TO BRAKE CONCRETE ON
BURN PAD.
MDA-R COMPLETE DRAIN TRENCH
RIP RAP CORNER. GARY CHECKS &
FIXES BPs AT MDA-R
EOD CHECKS BURN PAD FOR
HE & UNKNOWNS. NONE FOUND.
CRAIG CHECKS FOR RAD.
SCOTT TRAMS BROKEN CONCRETE
TO UPPER PAD. (old storm pad water)

1530 STOP WORK LEAVE SITE
Holiday - 31 - 4

6-30-00

270
~~249~~ yds. TOTAL
WK.

6-27-00

0800 ARRIVE AT TA-16
START MORNING BRIEF
0910 ENTER AREA SET-UP TO
PROCESS SOILS
GERRY & FRITZ MDA-R
POLICE AREA - PUT UP ROPE &
SIGNS.
11:00 MDA-R COMPLETE
13:00 LOAD TRUCKS FOR TA
FROM LOTS # 1218 & 1221
1510 STOP WORK (9) TRUCKS
SMALL CREW WILL WORK
LATE ON BURN pad.
REMOVE FENCE.
1800 STOP ALL WORK LEAVE SITE
824 yds SOIL STOCKPILE
0 yds DEBRIS
82 yds TOTAL

6-27-00

6-28-00

0600 ARRIVE AT TA-16
START MORNING BRIEF
0910 ENTER AREA MOVE DEBRIS TO
D-CON. SMALL AMOUNT SOILS
TO PROCESS PLUS CLEAN UP
D. ZNE, MARK FRITZ MDA-R
FINAL WALK AROUND.
RICK CONTINUE TO BREAK CONCRETE
ON BURN PAD.
1200 HEAVY RAINS & LIGHTNING DELAY
1330 BACK TO WORK, GARY TO
CHECK BPS "OK"
1600 STOP WORK - BILL C. CALLS
NEED DIRT MDA-R TO PREVENT
WATER FROM BREECHING BERM
HAUL 5 LOADS - TO SHORE UP
BERM - TEMPORARY.
1800 LEAVE TA-16
52 SOILS STOCKPILE
0 DEBRIS
52 yds TOTAL

6-28-00

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Environmental Restoration

6-21-00

0600 ARRIVE AT TA-16
START MORNING BRIEF
0710 ENTER AREA SET UP TO PROCESS
SOILS & MOVE SOILS TO BE
SHIPPED TO TX.
BERNARD RICK, MARK DIANE HAVE
300 STRAW WAPPLES TO MDA-K
1130 LUNCH
1215 CONTINUE TO PROCESS SOILS
DIANE RICK CUT TREES - MDA-K
MARK, GERALD PLACE STRAW
ON SLOPES.
WOODY & KEN VISIT BOTH
SITES - LOOK GOOD
1600 STOP WORK
HERTZ SWITCHES OUT
LOADERS - VOLVO FOR 821
68 yds SOIL STOCKPILE
0 yds DEBRIS
68 yds TOTAL

[illegible]

6-22-00

0600 ARRIVE AT TA-16
START MORNING BRIEF.
0710 ENTER AREA SET-UP TO
PROCESS SOILS.
0740 LOAD TRUCKS FOR TX FROM
LOTS # 1215 & 1214 (7) TRUCKS
1000 DIANE, GERALD, MARK, RICK & ME
[illegible] TREES & START
[illegible] SOIL ON BENCH (MDA-K)
1130 LUNCH
1215 CONTINUE [illegible] WITH ABOVE
TASK AT BOTH SITES
1600 STOP WORK - MDA-K
1700 LIGHTNING STOP WORK - MDA-K
72 yds SOIL STOCKPILE
0 yds DEBRIS
72 yds TOTAL

[illegible]

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6-19-00

0600 ARRIVE AT TA-16
START MORNING BRIEF
NO WORK - MDA-R WAITING ON TREE
CUTTERS & STRAW BALES
0710 ENTER AREA SET-UP TO PROCESS
SOILS
0810 LOAD TRUCKS FOR TX FROM
LOTS # 1210 & 1216. DELAY
NO LINERS MCT, MECHANIC FIXES AIR CONDITIONER
1130 LUNCH - HERTZ FIXES GEN.
1210 RE-ENTER AREA CONTINUE
TO PROCESS SOILS & PETER
CLEANING UP EAST SIDE
1600 STOP WORK
1610 LEAVE SITE
80 yds soil STOCKPILE
0 yds DEBRIS
80 yds TOTAL

6-19-00

6-20-00

0600 ARRIVE AT TA-16
START MORNING BRIEF
0710 ENTER AREA SET UP TO
PROCESS SOILS. PETER PULLS
RAMP & LOOSE SOILS OUT.
0800 DIRUE, MARK, RICK, GERALD - MDA-R.
Build BURM AROUND STOCKPILE,
XRF SLOPE, RELEASE (2) DRUMS
BARIUM 300pds. 20.
11:30 LUNCH
12:10 CONTINUE TO PROCESS SOILS
13:45 LOAD TRUCKS FOR TX.
LOTS # 10172. (3) TRUCKS
1600 STOP WORK
1615 LEAVE SITE
64 yds soil STOCKPILE
- yds DEBRIS
64 yds TOTAL

6-20-00

6-15-00

0600 ARRIVE AT TA-6
START MORNING BRIEF
0700 SET-UP TO PROCESS SOILS
MDA-R FINISH MOVING SOILS
TO STAGING AREA BLADE & RICK
COLD TRAIL WEST SIDE - SOME
HOT ROCKS - NO FUEL - MOVE
TREES & STUMPS
1130 LUNCH
1210 CONTINUE WITH ABOVE TASK
RELEASE 10 yds H.E.
RICHARD ROMERO & BILL LOOK AT
CYLINDER
1600 STOP WORK MDA-P
1730 STOP WORK MDA-R
72 yds SOIL STOCKPILE

[signature] 6-15-00

6-16-00

0600 ARRIVE AT TA-6
START MORNING BRIEF.
0700 ENTER AREA SET UP TO PROCESS
SOILS.
0730 LOAD TRUCKS FOR TX FROM LOTS
1204 + 1211 9 TRUCKS
SAMPLE SOIL PILE AT MDA-R
AND MOVE SOIL OFF BENCH.
1030 TREE CUTTERS START CUTTING
TREES
1130 LUNCH
1200 CONTINUE WITH ABOVE TASK.
MOVE SOIL AT MDA-P TO
LOAD TRUCKS ON MONDAY
1500 STOP WORK
LEAVE SITE - TREE CUTTERS
NEVEL CAME BACK
34 yds SOIL STOCKPILE
306 yd TOTAL WK.

[signature] 6-16-00

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TA-16 Landfills Remediation

6-10-00

0330 ARRIVE AT TA-16
SAFETY BRIEF FOR MDA-R.
WORK TODAY ON EAST SIDE
CRAIG & DIANE WILL COLD TRAIL
EAST END LANDFILL.
MARK & RICK & FRED WILL
MOVE SOIL FROM WEST END
BERALD DUST & FIRE CONTROL
EAST SIDE APPEARS TO BE
COMPLETE.
FOUND HOT SPOT ON
WEST END. UNDER CONTROL
CAN NOT REACH BOTTOM OF
LANDFILL. HAVE TO CUT ROAD
DOWN TO IT.
1530 STOP WORK
1545 LEAVE SITE

[signature]
6-10-00

6-12-00

[illegible] ARRIVE AT TA-16
TAIL MORNING BRIEF
0100 ENTER AREA SET-UP TO PROCESS
SOIL.
0280 LOAD TRUCKS FOR TX FROM LOTS
1206 (3) + 1205 (3) 8 TRUCKS
PETER & DIANE AT MDA-R TO MOVE
SOILS FROM WEST SIDE.
0950 MDA-R START TO CUT ROAD DOWN
TO BOTTOM OF WEST SIDE LANDFILL
1130 LUNCH
1210 CONTINUE WITH ABOVE TASK.
1430 COMPLETE ROAD DOWN TO BOTTOM.
START TO PULL LANDFILL BACK.
1600 STOP WORK
1610 LEAVE SITE
72 yds SOIL STOCKPILE
0 DEBRIS
72 TOTAL

[signature]
6-12-00

6-8-00

0600 ARRIVE AT TA-16
START MORNING BRIEF
0820 ENTER AREA SET-UP TO
PROCESS SOILS.
0900 ARRIVE AT MDA-R MOVE
SOIL PILES & CUT EAST BENCH
~~1130~~ PR GROUP ENSITE TO VIDEO
TAPE WORK IN PROGRESS.
1130 LUNCH
1200 CONTINUE TO PROCESS - MDA-P
1230 CUT TREE AT MDA-R
ROBOTIC DIG - MDA-R
1450 STOP DIG - MOVE SOILS
1630 STOP WORK AT MDA-R
1700 LEAVE SITE
66 yds SOIL STOCKPILE
28 yds DEBRIS
94 yds TOTAL

[signature]
6-8-00

6-9-00

0600 ARRIVE AT TA-16
START MORNING BRIEF
0820 START TO LOAD TRUCKS FOR T2
FROM LOTS # 1209 + 1208 8 TRUCKS
0930 LIGHTNING & HEAVY RAINS SHUT
DOWN 35 MINUTES
1030 CHECK ON MDA-R - PETER & DIANE
HAS BEEN MOVING DIRT & XRF PILES
1130 LUNCH
1210 CONTINUE TO PROCESS SOILS
MDA-R CLEAN UP SLOPE EAST
END ALL FIRES APPEAL TO BE OUT.
1400 MOVE TO EAST SIDE STILL SMOKING
PLT OUT 1 LARGE ROOT BALL
1600 STOP WORK
1610 LEAVE SITE
12 yds SOIL STOCKPILE
0 yds DEBRIS

371 TOTAL WK.

[signature]
6-9-00

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TA-16 Landfills Remediation

5-4-00

0800 ARRIVE AT MDA-R
WENDY ARRIVES WITH 5TH
PLAN ON SITE - FRED, PETER, DIANE,
SCOTT, GERALD, BILL B., BILL MC. WENDY
PETER WORKS ON ROBOTIC.
I WILL COMPLETE BENCH
SCOTT & DIANE TO MOVE TREES
BRUSH, MOVE DIRT PULLED
FROM BENCH.
1230 BENCH & BRUSH COMPLETE,
WAITING ON PETER'S ROBOTIC
1500 PETER START ROBOTIC DIG
ON WEST END DEBRIS PULLED UP
SOLK WITH WATER - FILE IS
PUT OUT IN AREA. Good Job.
1630 STOP WORK - LEAVE SITE

[signature]
5-4-00

5-5-00

0600 ARRIVE AT TA-16
START MORNING BRIEF - WILL HAVE
A CREW AT MDA-R & MDA-P.
PROCESS SOILS AT MDA-P. DUSTY
& HAZMAT TEAM ON SITE FOR UNANOUNCED
USE ROBOTIC TO PUT FILE OUT AT
MDA-R - 5 SMOKERS PUT OUT &
WILL AIR SAMPLE SITE. ALSO
ANN HAS AIR MONITORS ON SITE

MDA-R	MDA-P
FRED, MARK	JOHN & SONNY, PETE T.
GERALD, DIANE	CRAIG, HARVEY, PRINZ, RICK.
PETER, WENDY	SALY - ACTING SITE MANAGER.

BOTH SITE DID A GREAT JOB TODAY
HAD TWO FIREFIGHTERS ON SITE
FOR BACKUP AT MDA-R.
1630 STOP WORK LEAVE SITE
MDA-P → 72 [illegible] yds SOIL STOCKPILE
→ 4 yds DEBRIS
72 yds TOTAL

[signature]
5-5-00

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5-31-00

0700 ARRIVE AT TA-16
START MORNING BRIEF.
0745 ENTER CONTINUE TO PLACE
STRAW BALES. VERY DRY
AGAIN TODAY LOTS OF WATER
FOR DUST CONTROL.
START TO SPRAW SITE WITH
LIQUID CEMENT. ESP. EAST
LOPE LOWER SECTION - FIRE
DAMAGED.
1130 BREAK FOR LUNCH
1200 RE-ENTER AREA CONTINUE WITH
ABOVE TASK. CRAIG FOUND SOME
HOT SPOTS ON WEST LOPE.
1400 MEET WITH KEN R. & ANN
SHEERARD & TAMES STAPLESON &
OTHER. DISCUSS FEE IN MDA-R
RECLAIMED ROBOTIC SYSTEM
TO BE USED & OTHER EQUIP.
EVERYONE FILLS WESTON COULD
DO THE BEST JOB. WAIT FOR
1630 FINAL ANSWER. LEAVE SITE

[signature] 5-31-00

6-1-00

0700 ARRIVE AT TA-16
START MORNING BRIEF - DISCUSS
MOVING ROBOTICS TO MDA-R. PETER
BILL & ME.
0735 CREW ENTER AREA CONTINUE
RECOVERY WORK ON SITE.
START TO D-CON PC 250 TO
MOVE TO MDA-R.
0840 BILL M & BILL C & ME GO TO MDA-R
LOOK SITE OVER MEET ANN & CO.
EVERYTHING & GO. SCI WILL DO
THE BRUSHING & TREE CUTTING. TRY TO
START MON.
1500 MOVE PETERS ROBOTIC SYSTEM
TO MDA-R.
1630 LEAVE SITE

[signature] 6-1-00

	BA	Pb
REF #1	55845	160
REF #2	72610	271
REF #20	45750	205
F #3	79308	311
F #4	57576	169
F #5	53814	255
F #6	101146	430

N interstate 35
TX 78664

Greenbaum

Property of Dane Spengler
Roy F Weston Inc

Address 195 East Road Ste 104A
Los Alamos NM 87544

Phone 505 662 6445
FAX 505 662 6635
ABQ 505 884 5050

Diane Spengler
response MN.002
3 Analytical
all elements
in 5SD

13

	Lot	RRU	UNK	Time
Cd 149	1222	0	1	0753
20 Pb 116 Cd 209		0	0	0849
Cd 95		0	0	0955
50		0	0	1050
e point E Cal	1223	11		1215
		"		1335
		"		1435
		"		520

w/ DUST devils DO DU
e) $B_xNO_3)_2$

Diane J Spengler

5 May 00 Diane Spengler (77)

Element X-RAY MN .002 Fe .980 Co 002

E Cal 6.4095 Kev ✓ Analytical
Background all elements of Concern
w/in 5SD Soil from DE 11-13
Weather to 80°F Clear
~~SLB 050500~~

#	Bappm	SD	other
0505-1	16757	72.9	Cd 142
2	20005	86.9	Cd 134
3	30990	116	Cr 940 Cd 172
4	Lost Power		
5	19617	75.3	Cr 940 Cd 116
11	14898	60.8	Cr 780 Cd 173
7	22791	76.1	Cd 151

Lot	RRU	UNK	Time
1223	0	1	0839
	0	1	0957
	0	0	1026
	0	0	1130
	0	0	1308
	0	0	1345
	0	0	1438

Controlled Burn from Bandolier Visible from
west of site Visible $B_xNO_3)_2$ in soil
fire does not appear to be contained
No HE alot of metal debris

Diane J Spengler

(A) 3 June 00 DIANE SPENGLER MDA-R

Element X-Ray response Mn .000 Fe .975 Co .000
Analytical Background all elements of Concern
w/in 5 SD Ref 2D. Proceed to MDA-R
to Check soil from bench 1 of landfill
emergency cleanup due to fire. Weather Cloudy
w/ Rain Pass PM 78°F

#	Bappm	SD	Other	distinction	Time
1	731	10	As Not an affect of Pb	Pile to be returned to bench upon completion of fire suppression activities	
2	1214	13			
3	505	8.5			
4	5218	37			
5	929	12			
6	4892	34			
7	1177	13			
8	2245	19			
9	1155	13			

Note Return to work @ MDA-P and Emergency ~~Cleanup~~ fire suppression @ MDA-R due to Cerro Grande fire started May 5 as prescribed Burn. Clear SNags and Trees + Brush from upper level of MDA-R w/ Gary Stoops 1, 2 June + PID 100 13L04

Diane Spengler

4 June-00 DIANE SP

No XRF today - Timber Cutting of Hot Spots @ MDA-R Note cutting to 3 June for Bench BEAR Robotic excavator. Assume positive results piles due to overwhelming of Solid $Ba(NO_3)_2$ in Soil ME. Begin Robotic excav PID = 100 13L04 HAZ

Diane Spengler

DIANE SPENGLER MDA-R
ONSE MN.000 Fe.975 Co.000
all elements of Concern
D. Proceed to MDA-R
bench 1 of landfill
ue to fire. Weather Cloudy

distinction Time
Pile to be returned
to bench upon
completion of fire
suppression activities

@ MDA-P and Emergency
e to Cerro Grande fire
scribed Burn. Clear SNags
sh from upper level of
Loops 1,2 fune + PID 100 13604

4 fune-00 [illegible]
No XRF today - Timber cutting ~~and~~ for ps excavation
of Hot Spots @ MDA-R Note previous Timber
cutting to 3 fune for Bench access for
BeAR Robotic excavator. MDA-P Continues
assume positive results for Barium
piles due to overwhelming amount
of Solid $Ba(NO_3)_2$ in soil as well as
HE. Begin Robotic excavation of fire MDAR
PID = 100 13604 HAZCO

Diane J Spengler

(8) 5 June 00 DANE SPENGLER MDAR

MN. 000 Fe. 988 Co. 000 analytical
BKg all elements of concern w/in SSD

Sample SLB 050500-1223 ECal 6407
HAZCO 13204 = 100 ppm (58522 LOT)

MDA-P

#	assume BA	Lot	UNO	RRU	Time
1		1224	0	0	0800
2			1	0	0846
3			1	0	0935
4			0	0	1038
5			0	0	1124
6			0	0	1258
7			1	0	1344
8			0	0	1429

72 pts TOT

0845 Hazmat to process UNK's.
Continue Robotic excavation of fire MDA-R
Check more of the bench material & some of the landfill - fire extinguished w/Hose - Hydrant.

#	Ba	SD	other	location	Some As No Sig Pb!	NO PID
1	1578	15	NA	Bench 1		
2	102	42				
3	-2.5	3.7				
4	798	11				
5	1653	16		landfill w end		
6	4001	29				

6 June - 00 DANE

MN. 002 Fe. 986. Co. 00
analytical Background all ele
w/in 5 SD HAZCO PID 13204

SLB 050600 - 1224

MDA-P

#	assume Pos	UNK	RRU
1		0	0
2		0	
3		1	
4		0	
5		0	
6		2	
7		0	

1222/1223 Ready to Be Sampled By

MDA-R. Check dirt + debris
Readings above background
(other than smoke)

#	Ba	SD	Other
MDA-R-1	1578	15	Stock p
UNK	798	11	Appears to b
2	1653	16	Stock p
3	4001	29	

Some metal debris include
Pails cabel etc alot of tree
etc on fire.

DANE SPENGLER MDAR

3 Co .005 analytical

5 of concern w/in SSD

050500-1223 ECal 6.407

= 100 ppm (58522 LOT)

	UNO	RRU	Time
4	0	0	0800
	1	0	0846
	1	0	0935
	0	0	1038
	0	0	1124
	0	0	1258
	1	0	1344
	0	0	1429

72 pts TOT

to process UNK's

c excavation of fire MDA-R

e bench material & some of

ire extinguished w/ Hose - Hydrant

Other NA | location Bench 1 | Some As No Sig Pb! | NO PID

landfill w end.

to fire

MN .002 Fe .986 Co .002 = Element X-Ray

analytical Background all elements of concern

w/in 5 SD HARCO PID 13604 = 100 58522

SLB 050600 - 1224 Sample

MDA-P

#	Some Pos	UNK	RRU	LOT	Time
1		0	0	1224	0803
2		0			0900
3		1			1000
4		0			1059
5		0		1225	1305
6		2			1400
7		0			1503

1222/1223 Ready to Be Sampled By Leo Johnny

MDA-R Check dirt + debris w/ GM No Readings above background No PID Readings (other than Smoke)

#	Ba	SD	Other
MDAR-1	1578	15	Stock pile
UNK	798	11	Appears to be plaster of Paris
2	1453	16	Stockpile
3	4002	29	

Some metal debris including building mat Pails cabel etc alot of tree Slash timbers etc on fire

(32) 9 June 00 Diane Spengler MDA-R

MN .001 .969 .001

HAZCO PD 13664 = 99.6 (58522)

Ship 1 truck $\boxed{1197}$, 2 trucks $\boxed{1209}$ & 5 trucks $\boxed{1202}$ @ MDA-P

Hold for RAD 1207 MDA-P 1203 1213 1219

MDA-P	assume	Lot	UNK	RRC	Time
1	Be	1225	0	0	1107
2	↓	↓	↓	↓	1247
3	↓	↓	↓	↓	1339
4	↓	↓	↓	↓	1431
5	↓	↓	↓	↓	1523

Alot of White $BaNO_3)_2$

Leo Johnny Sample 1222 1223

Excon E-F 8-14 + Scrape D 12-13

element X-ray response MN .002.

Analytical Background all.

Concern w/in 5SD Robotic

@ MDA-R [illegible] from W end [illegible]

#	Bappm	Other
1	3[illegible]	
[illegible]	—	
2	7[illegible]	
3	8	

[illegible]

MD #	Time
1	0820
2	0919
3	1038
4	1408
5	1445
6	1524

Alot of $BaNO_3)_2$ + HE

DIANE SPENGLER MDA-R

'09 . 001

3604 = 99.6 (58522)

7, 2 trucks 1209 3 5 trucks

@ MDA-P

AD 1207 1203 1213 1219
MDA-P

ot	UNK	RRO	Time
225	0	0	1107
			1247
			1339
			1431
			1523

$_2$ $Ba(NO_3)_2$

ample 1222 1223

= 8-14 + Scrape D12-13

8 June 00 DIANE SPENGLER MDA-R (83)

element X-ray response Mn .002 Fe .983 Co .002

analytical Background all elements of concern w/in 5SD Robotic excavation @ MDA-R. Soil from W end MDA-R

#	Bappm	Other
1	3053	
UNK		Suspect plaster of Paris
2	7662	Cd105
3	8689	Cd107

finish lot SLB060800 - 1225

MDA-P

#	Bx	Lot
1	assumed	1225
2		
3		
4		
5		
6		
7		

HAZCO PID 13604 = 100
Lot 58522

(8) 9 June 00 DIANE SPENGLER E Col 6.404 Kn
MN .001 Fe .979 Co .001 - analytical
Background all elements of Concern w/in 5SD.

Ship lots 1208, 1209 part
@ MDA-P today

Soil from wind East of gully
HAZCO PID = 100 # B204 (58522)

MDA-R

#	Bappm	SD	Other
1	18721	94	Col in blank as well Soil from W
2	2794	22	
3	2819	23	

MDA-P

#	Bx	Lot	UNK	RRU	Time
1	Assume Pos	1224	0	0	0815
2					0941
3 *					1055
4					1300
5					1344
6					1432

Sample S2B060900-1226 72 yds TOT

* found lecture Bottle 13" long Blue on green Body Package in Kills lit No RRU to UNK Stripe.

12 June 00 DIANE J

Ship 1206, 1205 @ MDA

MDA-P

#	Bx	Lot	UNK
1	Assume Pos	1227	0
2			0
3			1
4			0
5			0
6			0
7			0

S 72 yds TOT NOTE HAZCO Lot 58522

DS

12 June 00 DIANE J SPENGLER

SPENGLER - Cal 6.404 Km
Co. 001 - Analytical
ements of Concern w/in 550.
, 1209 part

East of gully
B604 (58522)

other
Cal in blank as well Soil from

Spip 1206, 1205 @ MDA-P to TX

MDA-P

#	Bx	Lot	UNK	RRU	0817
1	Assume	1227	0	0	0922
2	Pos		0		1022
3			1		1117
4			0		1306
5			0		1407
6			0		1514
7			0		

S 72 yds TOT NOTE: MAZCO B604 = 100ppm
Lot 58522

UNK	RRU	Time
0	0	0815
		0941
		1055
		1300
		1344
		1432

0900-1226 72 yds TOT

Bottle 13" long Blue on green
Kelly lit No RRU to UNK

(88) 15 June 00 Diane Spengler

MDA-R 296 on pump + 30 min excur

HAZCO 13604 PID = 100 (58522)

@ MDA-P 7 laydowns assume pos Results on all Visible $BaNO_3)_2$ (large pieces) in all. Sample SLB 061500 1228 found Yellow cake Robert picked up 10 lbs HE

Process 72 yds.

#	assume	LOT	UNK	RRU	Time
1	BA	1229	0	0	0805
2					0904
3					1008
4					1103
5					1300
6					1400
7					1509

Hazmat in Spects lecture Bottle

DS

16 June 00 Diane Spe

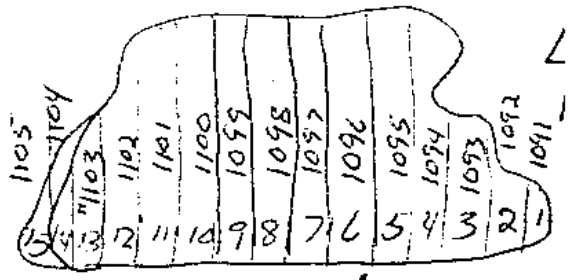
HAZCO 13604 PID = 100

MDA-P three laydown ass

Results Visible $BaNO_3)_2$

Total SLB 061600 12

MDA-R Sample Stockpil



Remove remaining landfill

three cutters in for snags.

Ship 1204 to TX p12

#	LOT	UNK	RRU
1	1229	1	0
2		0	0
3		0	0

DS

Diane Spengler

1 pump + 30 min excur

PID = 100 (58522)

NS assume pos Results

$NO_3)_2$ (large pieces) in

B 061500 1228 found

it picked up 10 lbs HE

LOT	UNK	RRU	Time
1229	0	0	0805
			0904
			1008
			1103
			1300
			1400
			1509

s lecture Bottle

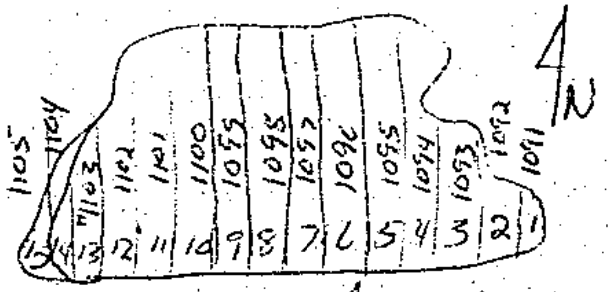
16 June 00 Diane Spengler 85

HAZCO 1300 PID = 100 (58522)

MDA-P three laydown assume positive results visible $BaNO_3)_2$ in all 3 yields

Total SLB 061600 1229

MDA-R - Sample Stockpile 15 samples



Remove remaining landfill on west end

tree cutters in for snags.

Ship 1204 to TX | P1211

#	LOT	UNK	RRU	Time
1	1229	1	0	0807
2		0	0	0907
3		0	0	1007

DIANE SPENGLER

20 June 00 DIANE SPENGLER 91

HACCO 13604 PID = 100 (58522)

Ship 1215 LANL 1017 to TX

To TX

Fire watch process Samples

1230 Sample

same Ba

RRU	Time
0	0839
	0940
	1040
	1220
	1327
	1418
	1505

80 yds TOT

100 ppm @ Cal (58522)

MDA-R XRF - Slope of original landfill

MN .001 .982 Fe Co .002 for element X-Ray Response. analytical Background all elements of concern w/in SSD. MDA-R post EXCAV

#1	X-	Y	Ba ppm	SD	Time other
1	24	21	1041	12.8	
2	21	46	21510	110	As 113
3	26	62	2198	18.7	As 12.
4	38	72	494	14.0	
5	62	62	2985	23.9	As 95
6	59	34	2159	18.5	
7	43	52	990	11.6	
8	57	89	2060	19.3	

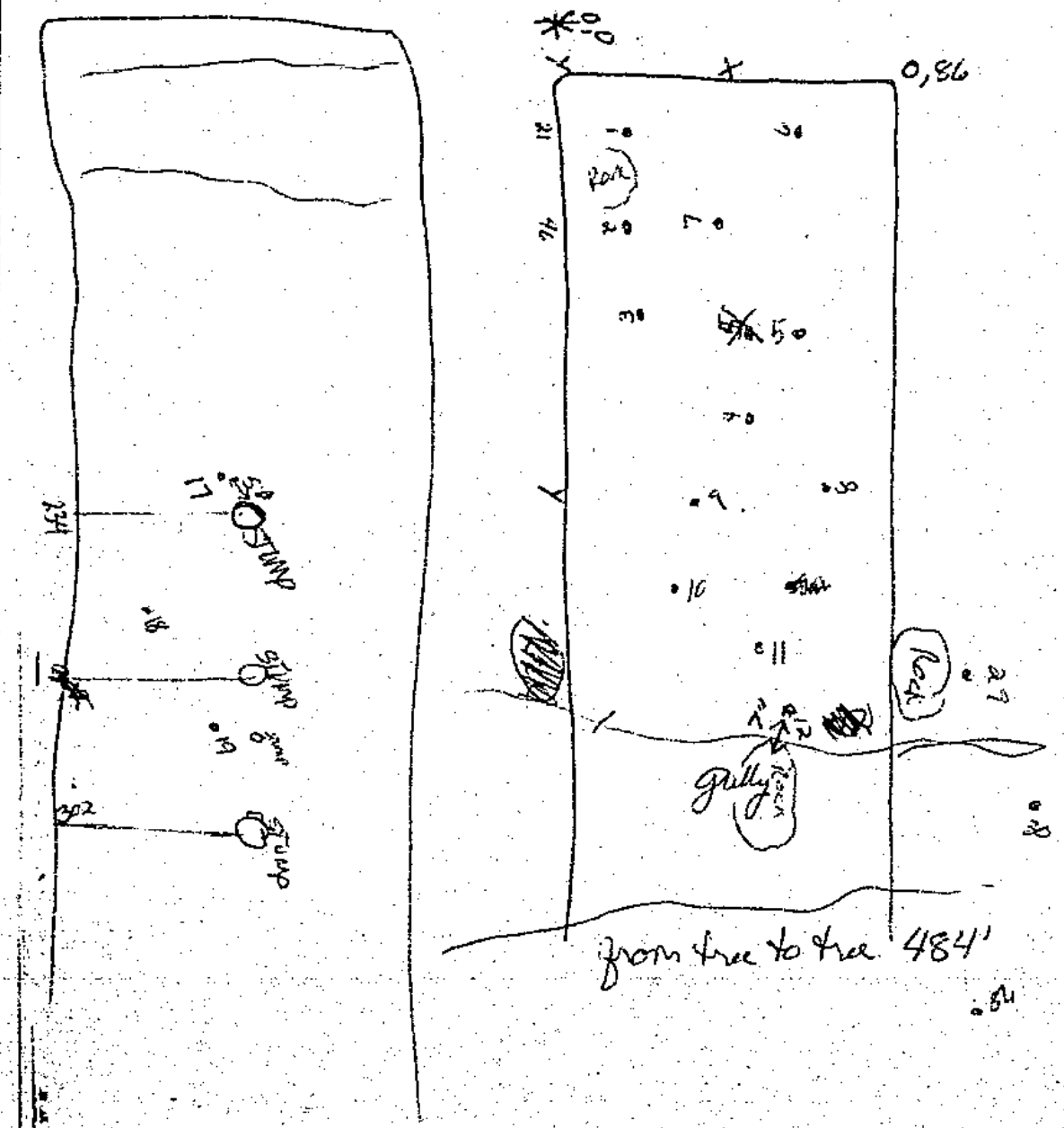
MDA-P

#	LOT	UNK	RRU	Time
1	1230	0	0	0820
2				0919
3				1038
4				1408
5	1231			1445
6				1524

64 yds TOT

Note Alot of $BaNO_3$ + HE

(92)



21 June 00

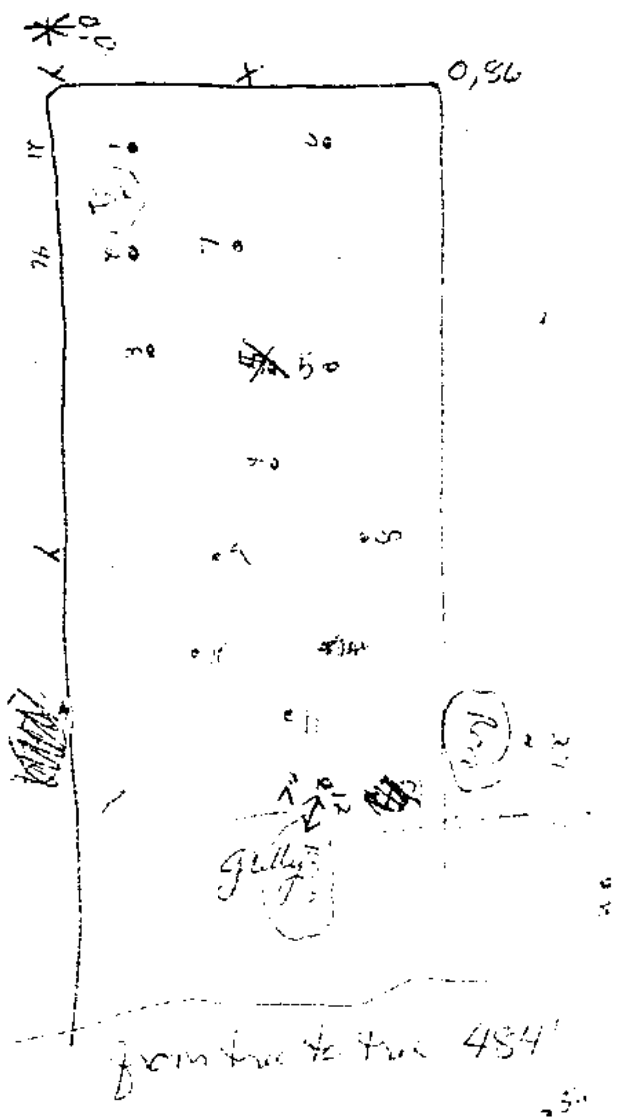
PB Tree Cutting, Waddle
@ MDA-R HAZCO 13
(Lot 58522)

@ MDA-P

#	LOT	UNK	RRU	Tu
1	1231	0	0	0
2		0		09
3		1		105
4		0		12
5		0		
6				133
7				142
				1526

~~SLB0621001231 Sample~~

full drum of $BaNO_3)_2$
Sold from F 8-



21 June 00

DS Tree Cutting, Waddle Bails today
@ MDA-R HAZCO 13604 PID=100
(Lot 58527)

@ MDA-P

#	LOT	UNK	RRU	Time
1	1231	0	0	0840
2		0		0942
3		1		1053
4		0		1235
5		0		1332
6				1424
7				1520

68 yds TOT

SLB0621001231 Sample 03

Full drum of $Ba(NO_3)_2$
Sold from F 8-9-10

(14) 22 June 00

DS tree cutting today

Ship 1214 1215 to TX 9 trucks

HAZCO PID 13604 = 100 58522

MDA-P assume $Ba(NO_3)_2$

#	LOT	UNK	RRU	Time	Soil from
1	1232	0	0	0831	F 8-9-10
2		1		0929	
3		0		1018	
4				1114	
5				1257	
6				1338	
7				1425	
8				1510	72 yds TOT

found alot of $Ba(NO_3)_2$ some HE

23 June 00 Lot 58522 PID = 100 ppm SN 13604

MDA-P

	LOT	UNK	RRU	
1	1232	0	0	0817
2				0915
3	1233			1005
4				1050
5				1259
6				1337
7				1417

Note problems w/ PID fixed pm

X-RF MN .002 Fe 97

HAZCO PID 13604 = 100

analytical Brg all elements g

5 SD. SUB OL 2300 12.

MDA-B Post excavation St

#	X	Y	Ba ppm	
9	39	89	2417	
10	34	112	15259	K
11	43	134	13916	
12	46	151	251000	
13	47	152	41300	
14	32	187	200480	
15	48	189	110150	
16	49	211	2864	
17	50	228	3626	
18	27	257	4594	
19	31	281	4747	As
20	41	307	7908	
21	43	336	2168	Pb
22	35	360	2079	
23	33	393	2967	Pb
24	37	429	2328	
25	41	461	2600	

23 June 00 Diane Spengler

X-RF Mn .002 Fe .977 Co .001
HAZCO PID 13604 = 100 (58522)
analytical Brg all elements of concern w/in
5 SD. SUB CL 2300 1231

MOR-B1 Post excavation Slope of Hill Dec

#	X	Y	Bc ppm	
9	39	89	2417	
10	34	112	15259	Pb 100
11	43	134	13916	Cr 920
12	46	151	251000	Cr 6530 As 214 Pb 45
13	47	152	41300	Cr 2370 Pb 130
14	32	187	200480	Cr 6940 Pb 870
15	48	189	110150	Cr 2760 Pb 134
16	49	211	2864	
17	50	228	3626	
18	27	257	4594	
19	31	281	4747	Pb 62
20	41	307	7905	
21	43	336	2165	Pb 266
22	35	360	2079	
23	33	393	2967	Pb 115
24	37	428	2328	
25	41	461	2600	

today
15 to TX 9 trucks
13604 = 100 58522
$3(NO_3)_2$

Time	Soil from
0831	F 8-9-10
0929	
1018	
1114	
1251	
1338	
1425	72 yds TOT

15-10
$3)_2$ Some ME

522 PID = 100 ppm SN 13604

2 RU
0 0817
0915
1005
1050
1259
1337
1417
PID fixed pm

28 June 00.

MN .001 Fe .978 CO .000

Return to MDA-R for samples under surface. Note Heavy rains have filled up the bermed Culvert, add additional soil to berm well divert later

#	X	Y	d	Bc ppm	
43	86	[illegible]	11"	14554	R [illegible]
44	92	174	11"	421	R
45	94	147	12"	24720	L

@ MDA-P process final soil from Scrape up of areas on E Lobe

Note floor of E lobe level w trench.

5 landowns 52 yds 1234 complete

Sample 062800-1233

Start 1234 lot HAZCO PID 13604 = 100

Lot 55522

DS

SLB-030800
1203
1032
Confirm RAD
1050 1051

SLB042100
1218
#1070

SLB 042700
1221
1073

Sus RAD

Released
WPN 32232

SLB
061300
1227
#1084

SLB
060900
1226
#1083

SLB
060800
1225
#1082

SLB
060600
1224
#1081

SLB 021500
1195
#1025

SLB021700
1196
#1026

.011100

Confirmed RAD

B 040700
D13
1061

(100) 29 June 00 DIANE SPENGLER

Ship 1218 1220 1221 to TX

Error in E Cal will run today -

MDA-R - Begin building trench for diverting water around site

Sample 062900-1234

NO XRF 2 laydowns MDA-P 0828 + 0937 for lot 1235 destroy Burn PAD387

30 June 00

EOD sweep EAST + we

PIT + canyon find Ba HE.

West Lope POS on DX2 wil

Sample 063000-1

Note NOT a full

NO XRF today

SPENGLER

	X	Y	D
Sthn	34	44	1.5
S111	8	42	6"
	15	23	6"
	74	63	0
	96	79	0
	73	92	0
	~~63~~	~~91~~	0
80	8	43	1
	18	42	1
	2	38	1.5
	8	11	1
	23	11	1
	10	72	5"
	70	79	GRADE
	88	60	"
	80	68	"
	70	62	"
	60	52	1
	28	52	1
	14	52	2

7 July 00 DIANE SPENGLER

F Sandoval D Spengler to MDA-R report of small smoker on west. Shovel under

MN .002 Fe .968 Co .002 Element X-Ra

analytical BKG < 550

MAZCOAD B604 = 100 5852.2

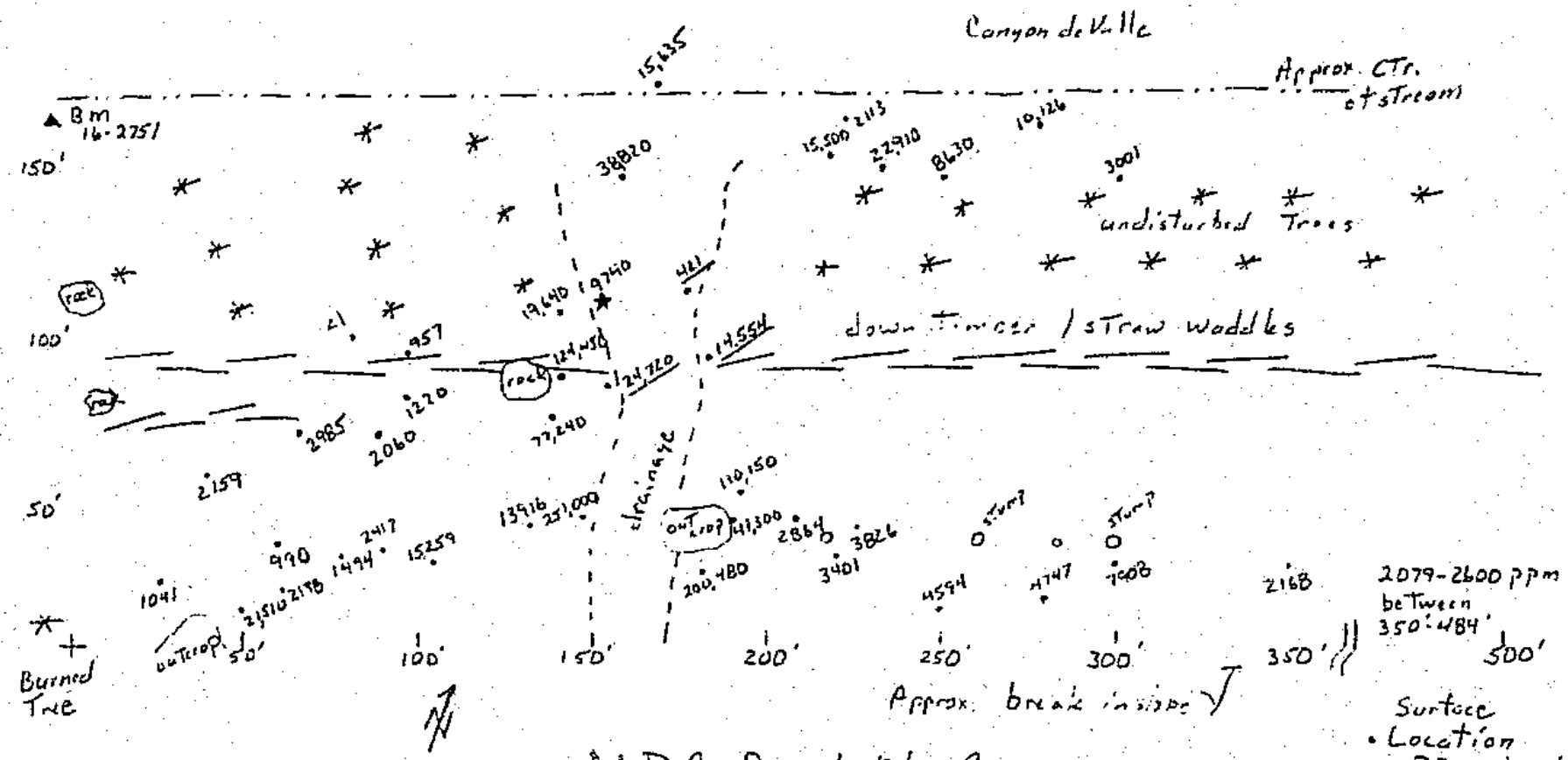
debris Pad

	BC	SD
DEBP	1094	12.4
A	4007	31.1
B	1105	12.5

Take soil Samples 1236, 1237, 1238 1239 1240 SLB070700 from 387 BURN Pad

Lanl #s = 1110 1111 1112 1113 1114

RG



MDA-R sketch Map
- Barium concentrations

6/28/00

Property of:
Roy F. Weston, Inc.
6501 Americas Parkway NE, Suite 800
Albuquerque, NM 87110
(505) 884-5050

(TYPE OR PRINT)

Client Name: LANL

Project Number: 02744-070-002-0300

Project Manager: C. William Criswell

Logbook Number: 562

Date Issued: 3/31/2000

Issued To: GARY STOOPES

Signature: Gary Stoopes

Issued By: Terry Whalen

Signature: Terry Whalen

This Book is manufactured of a High Grade 50% Rag Ledger Paper having a Water Resistant Surface, and is sewed with Nylon Waterproof Thread.

11/17/00 G Stoppes

123

Finished 1 Barium Lot
SL-B-111700-1382
GRds 484-486
Shipped 23 loads From MDA-R
To Rio Rancho
(Load) Lot #
(5) MDA-R1 # 1091
(5) MDA-R2 # 1092
(5) MDA-R3 # 1093
(5) MDA-R4 # 1094
(3) MDA-R5 # 1095

Property of:
Roy F. Weston, Inc.
6501 Americas Parkway NE, Suite 800
Albuquerque, NM 87110
(505) 884-5050

(TYPE OR PRINT)

Client Name

Project Number

Project Manager

Logbook Number

Date Issued

Issued To

Signature

Issued By

Signature

This Book is manufactured of a High Grade 50% Rag Ledger Paper having a Water Resistant Surface, and is sewed with Nylon Waterproof Thread.

(2) 12/15/00 C. Stoopes

shipped 24 loads from
MDA-R to Rio Rancho

(loads)	Lot #
(2)	MDA-R5
(5)	MDA-R6
(5)	MDA-R7
(5)	MDA-R8
(5)	MDA-R9
(2)	MDA-R10

1/4/86 G. STOEPES

Shipped 24 loads from MDA-R
to Rio Rancho
(Loads) lot #
(3) MDA-R10
(5) MDA-R11
(5) MDA-R12
(6) MDA-R13
(5) MDA-R14

10

1/5/01 G Stoopes

Shipped 23 loads From
MDA-R to Rio Rancho

(Loads)	Lot #
(12)	MDA-R15
(2)	MDA-R14
(2)	MDA-R13
(2)	MDA-R12
(2)	MDA-R11
(2)	MDA-R10
(1)	MDA-R9

1/8/01 G. Stoopes

shipped 4 loads from MDA-R
(loads) Lot #
(1) MDA-R9
(2) MDA-R8
(1) MDA-R7

completed MDA-R shipments
Berm Knocked down AREA
Smooth out, Natural Rock (Tuff)
Used for erosion control per
Bill Rosemark.

shipped 4 loads from 90's line
PAD 1
(4) ESL-AF-101299-0137
PAD 1 Clean.

From: excavation@lanl.gov
To: <mac@lanl.gov>
Subject: Excavation Review Request 00X-0320
Date: Fri, 9 Jun 2000 16:25:37 -0600

SUBJECT: Excavation Review Request 00X-0320
REQUEST #: 00X-0320
TITLE: MDA-R FIRE SUPPRESSION ACTIVITIES

THIS E-MAIL NOTIFICATION IS NOT AN EXCAVATION PERMIT.

This is only the excavation permit review and must be attached to the EXCAVATION PERMIT. For further information on the status of the Excavation Permit issuance, please call 5-1051, referencing the above Request Number.

Your request for an Excavation Permit Review has been reviewed, approved, and forwarded to JCNNM for issuance of an Excavation Permit. ESH-3 does not issue the excavation permit.

The reviewers had the following comments:

- - - - - - - - - - - - - - - -
Reviewer: Kari Garcia, ESH-20, MS M887
Phone/Fax: 5-6093/7-0731
E-mail: manzk@lanl.gov
(6/5/2000) by Gerald Martinez
No cultural resource concerns.
- - - - - - - - - - - - - - - -
Reviewer: David Lee, ESH-12, MS K483
Phone/Fax: /
E-mail: lee_david_w@lanl.gov
(6/6/2000)
As noted, an emergency. Contact ESH-1 Team Leader, ph 5-4224 or pg 104-3813, for radiological monitoring services as required....Copy of excavation request/map faxed to Sarah.
- - - - - - - - - - - - - - - -
Reviewer: David Nochumson, ESH-18, MS K497
Phone/Fax: 5-7890/5-9344
E-mail: nochumsond@lanl.gov
(6/5/2000)
(6-5-2000):

Contact Mike Alexander, ESH-18, at 665-4752 or 699-1336 for assistance concerning requirements for erosion control, Storm Water Pollution Prevention (SWPP), and Best Management Practices (BMPs). Contact Marc Bailey, ESH-18, at 665-8135 or 699-4926 for assistance concerning regulatory agency notifications and reporting and requirements for and obtaining approved 404 Dredge and Fill Permit and a 401 Water Quality

Certification from NMED. This project is covered under an emergency NOI (Notice of Intent) to Discharge. Continue to keep Harvey Decker, ESH-18, at 665-2014 or 699-0161, informed with all necessary information, including the total volume of water used, concerning this activity. Limit the water application rate so that there will not be any water discharges to the nearby watercourse. If there is a water discharge to the nearby watercourse, then contact Harvey Decker, ESH-18, so that he can prepare the necessary notifications to the appropriate regulatory agencies.

- - - - - - - - - - - - - - - -

Reviewer: Phil Romero, ESH-5, MS K403
Phone/Fax: 5-8503/5-7384
E-mail: philr@lanl.gov
(6/5/2000)
Contact Roger Goldie ESH-5 regarding explosive safety issues, protection shall be afforded for any excavation greater than 5 feet. Hazards need to be characterized prior to exposing personnel to potential hazardous environments.

- - - - - - - - - - - - - - - -

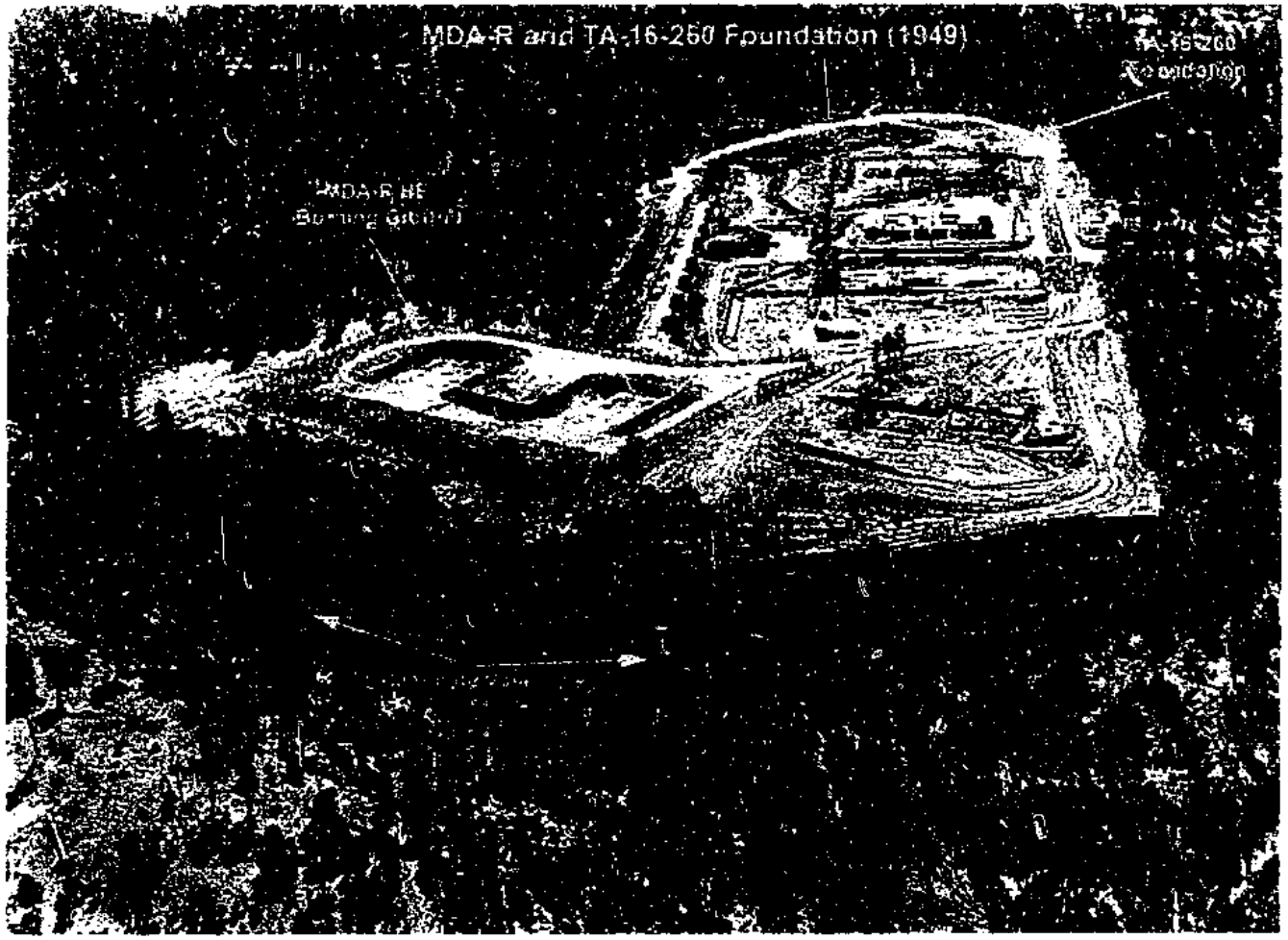
Reviewer: SWMU Review, ESH-3, MS M768
Phone/Fax: /
E-mail: swmuteam@lanl.gov
(6/5/2000) by Nina Gallegos, ESH-3
Based on the provided information on the project, there are significant SWMU issues with this excavation. However, the Environmental Restoration program have been working directly with the FMU and the excavation contractor to ensure that everything is done properly from a SWMU perspective. The remote excavator will be used for safety purposes. All excavated material will be placed on a level portion of the SWMU, to minimize any runoff concerns. Therefore the project can proceed as planned as long as the above comments are followed. Any and all changes or deviations will invalidate the provided comments. We request that any new or changed information be resubmitted for appropriate review.

- - - - - - - - - - - - - - - -

This is NOT an Excavation Permit. For further information on the status of the Excavation Permit issuance, please call 5-1051, referencing the above Request Number.

Appendix J
Photographs of MDA R

1949 Aerial Photo of MDA R



MDA R Following the Cerro Grande Fire

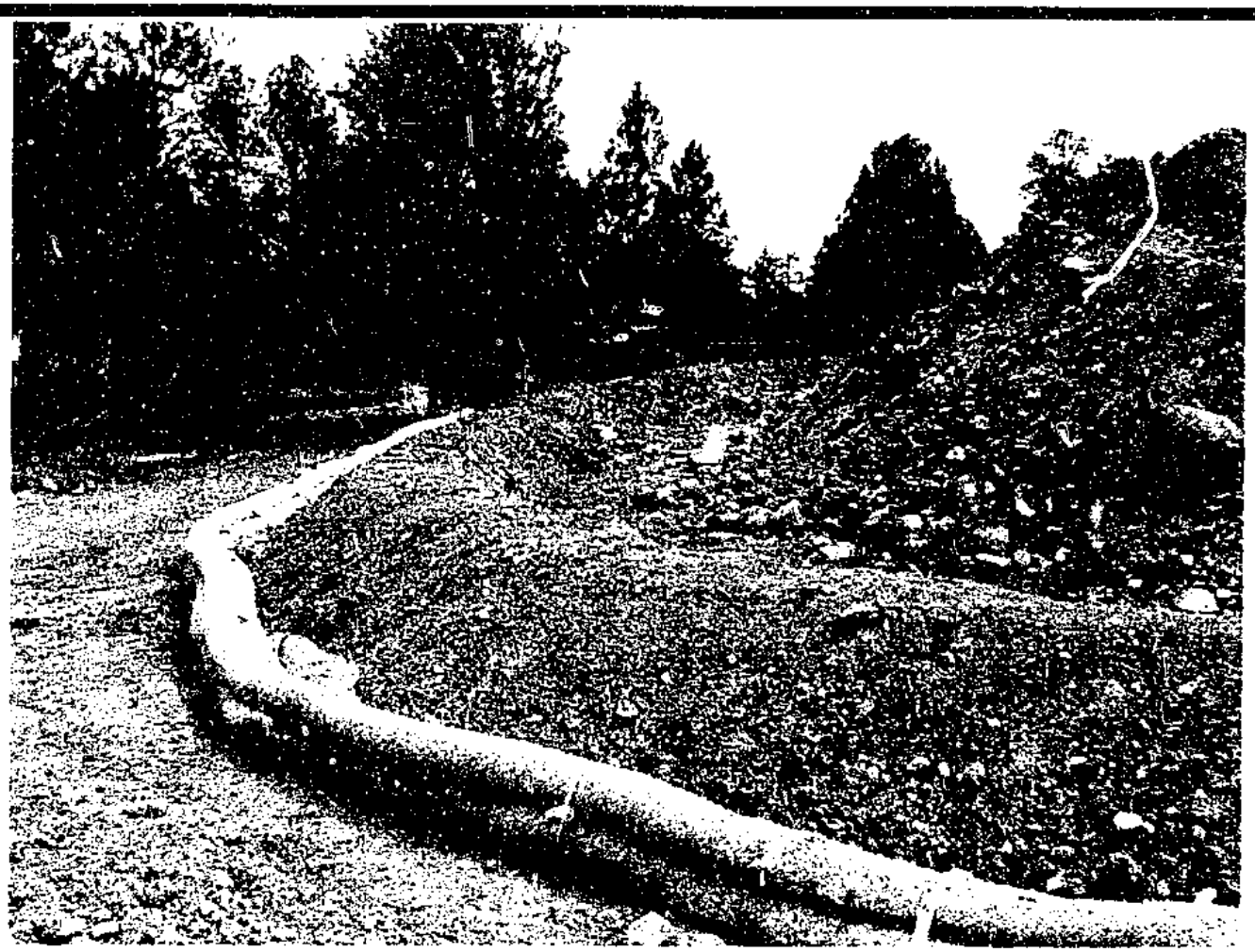
MDA R Following the Cerro Grande Fire

Operating Remotely Controlled Excavator at MDA R

The operator is assessing site conditions and excavating waste based on information displayed on the monitor. The monitor displays moving images from cameras mounted on the track-hoe.

Extinguishing Burning Debris at MDA R

Erosion Control Wattles and berm at MDA R Waste Storage Area



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