LANL ER PROJECT

SITE-SPECIFIC HEALTH AND SAFETY PLAN (SSHASP)

58704

Project Title MDA B and U Site Characterization

TA(s) TA-21 MDA B and U

This plan addresses the health and safety criteria to be followed during investigation, remediation or decommissioning activities associated with the Environmental Restoration (ER) Project at the Los Alamos National Laboratory (LANL)

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SSHASP No.: 209

July 6, 1998

10473

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LIST OF ACRONYMS and ABBREVIATIONS

ACGIH ..... American Conference of Governmental Industrial Hygienists
ALARA ..... As Low As Reasonably Achievable
AL ..... Action Level
ANSI ..... American National Standard Institute
APR ..... Air-Purifying Respirator
AR ..... Administrative Requirements
ATM ..... Atmosphere
°C ..... Degrees Centigrade
CFR ..... Code of Federal Regulations
CGI ..... Combustible Gas Indicator
CP ..... Competent Person
CPR ..... Cardiopulmonary Resuscitation
CRZ ..... Contamination Reduction Zone
DAC ..... Derived Air Concentration
dBA ..... Decibels (A-Weighted Scale)
DOE ..... U.S. Department of Energy
DOT ..... U.S. Department of Transportation
DPL ..... Decommissioning Project Leader
EAP ..... Emergency Action Plan
EPA ..... U.S. Environmental Protection Agency
ER ..... Environmental Restoration
ESH ..... Environmental, Safety and Health
ESH-1 ..... Health Physics Operations Group
ESH-2 ..... Occupational Medicine Group
ESH-5 ..... Industrial Hygiene and Safety Group
ESH-12 ..... Policy and Program Analysis Group
eV ..... Electron Volts
EZ ..... Exclusion Zone
°F ..... Degrees Fahrenheit
Fibers/cc ..... Fibers Per Cubic Centimeter
FID ..... Flame Ionization Detector
FPL ..... Field Project Leader
FTL ..... Field Team Leader
FTM ..... Field Team Manager
FWM ..... Field Waste Manager
GET ..... General Employee Training
GFCI ..... Ground Fault Circuit Interrupter
HAR ..... Hazard Assessment Rating
HASP ..... Health and Safety Plan
HAZWOPER ..... Hazardous Waste Operations

HEPA ..... High Efficiency Particulate Air
HPT ..... Health Protection Technician
HS ..... Health and Safety
IARC ..... International Agency for Research on Cancer
IDLH ..... Immediately Dangerous to Life or Health
IHT ..... Industrial Hygiene Technician
IP ..... Ionization Potential
JS ..... Job Superintendent
kV ..... kilovolts
LAMC ..... Los Alamos Medical Center
LANL ..... Los Alamos National Laboratory
LEL ..... Lower Explosive Limit
LP ..... Laboratory Procedure
MDA ..... Material Disposal Area
mg/Kg ..... Milligrams Per Kilogram
mg/M^3 ..... Milligrams Per Cubic Meter
mm ..... Millimeters
MSDS ..... Material Safety Data Sheet
MUC ..... Maximum Use Concentration
NIOSH ..... National Institute for Occupational Safety and Health
NRR ..... Noise Reduction Rating
OSHA ..... Occupational Safety and Health Administration
PAH ..... Polycyclic Aromatic Hydrocarbons
PEL ..... Permissible Exposure Limit
PF ..... Protection Factor
PID ..... Photoionization Detector
PNA ..... Polynuclear Aromatics
PPE ..... Personal Protective Equipment
PRS ..... Potential Release Site
QA/QC ..... Quality Assurance/Quality Control
RCA ..... Radiation Controlled Area
RCT ..... Radiological Control Technician
RMMA ..... Radioactive Materials Management Area
RSP ..... Radiological Screening Personnel
RWP ..... Radiological Work Permit
RWSA ..... Retrievable Waste Storage Area

SC ..... Spill Containment
SLM ..... Sound Level Meter
SOP ..... Standard Operating Procedures
SSHASP ..... Site-Specific Health and Safety Plan
SSO ..... Site Safety Officer
SUP ..... Supervisor
SWMU ..... Solid Waste Management Unit
SWP ..... Special Work Permit
SZ ..... Support Zone
TA ..... Technical Area
TLD ..... Thermoluminescent Dosimeter
TLV ..... Threshold Limit Value
TRU ..... Transuranic Waste
TWA ..... 8-Hour Time-Weighted Average

1.0 INTRODUCTION

This Site-Specific Health and Safety Plan (SSHASP) has been developed for the Environmental Restoration (ER) Project at the Los Alamos National Laboratory (LANL) to comply with applicable federal and state occupational health and safety (HS) requirements, including those of the U.S. Department of Energy (DOE). The DOE requires LANL to comply with the federal Occupational Safety and Health Administration (OSHA) requirements, although operations at LANL are not subject to the jurisdiction of OSHA. The ER Project has developed a generic Health and Safety Plan, the ER Project HASP, which establishes HS information and requirements applicable to ER field operations project wide. In addition to the HASP, this SSHASP establishes site-specific HS information and requirements applicable to the scope of work described in Section 2.

ER participants are responsible for conducting work in accordance with applicable regulations. The term "ER participants" refers to anyone performing ER work, including LANL, subcontractors to LANL and their lower-tier contractors, consultants, and agents. In some cases in this document, LANL has chosen to invoke OSHA and LANL requirements which ordinarily may not apply to ER field operations (e.g., OSHA's general industry standards in Part 1910 of Title 29 of the Code of Federal Regulations [29 CFR 1910]). These choices were made on a case-by-case basis to maintain consistency with LANL's ALARA policy and to clarify LANL's expectations with regard to interpretable requirements of the multiple agencies governing ER work. Where there is concern that implementation of work orders or HS requirements would conflict with contract terms, or could unreasonably compromise the safety or health of an individual or the environment, such concerns should be brought to the attention of the Contract Administrator and the Field Unit HS Representative immediately. Failure to comply with terms of HS plans may constitute cause to stop activity or for issuance of a stop work order as specified in Section 3.5 of the HASP without cost or penalty to LANL.

This SSHASP shall be reviewed and approved in accordance with Section 1.2 of the HASP. Once this SSHASP has been approved, revisions will be tracked using a SSHASP modification form (Appendix C of the HASP) per Section 1.3 of the HASP. Modifications to this SSHASP may result in a change to the terms or scope of a subcontract. Completion of a SSHASP modification form is <u>not</u> the means for modifying the scope or terms of the project contract. To modify a contract, the Subcontractor shall notify the Contract Administrator and Field Unit HS Representative under the changes clause and shall not proceed with the change until a change order has been mutually agreed between the parties, or unless unilateral direction is given by the Contract Administrator.

2.0 BACKGROUND INFORMATION

Project Title:	MDA Focus Area, MDA B and MDA U
TA:	21
Objective:	Site charaterization
Classification of Work:	Intrusive(drilling, surface soil sampling) **HAZWOPER**

TABLE 2-1.1 SITE DESCRIPTION

Location and Description: MDA-B

Material Disposal Area B (MDA-B) is located on the mesa top at DP East, TA-21 (site map in Appendix A). This site is approximately 6.03 acres and consists of two separate areas of concern:

- Paved fenced western area which contains an unknown, but thought to contain four solid waste disposal pits.
- Unpaved eastern area which contains an unknown, but thought to be three pits, one or more of which may be a chemical disposal pit.

Relevant History:

In 1945, pits at MDA A were being filled at such a rate that additional waste disposal pits were necessary. MDA B was a favorable location because sufficient space was available. The exact number of pits is not known but based on interviews with laboratory employees the following information was obtained.

- 4 disposal pits 300-ft long, 15-ft wide, and 12-ft deep were located parallel to the fence line along DP road.
- 2 pits of uncertain length were located in the north-south leg of MDA B at the western end of the site.
- At least one trench was dug in the eastern end of MDA B for chemical disposal. The dimensions of this trench may have been 2-ft wide, 40 -ft long and 3-ft to 4-ft deep.

A fire at MDA B in 1948 forced the closing of the MDA.

Location and Description: MDA-U

MDA U is located at TA-21 west, north of the TSTA facility. MDA U covers an area of 0.2 acre and contains two absorption beds[PRSs 21-017(a) and (b)] that were used for subsurface disposal of radioactively contaminated liquid wastes from 1948 to 1968. As constructed, the two absorption beds had a surface area of approximately 1,800 square feet with an estimated volume of about 18,000 cubic feet. The drainage area associated with MDA U is to the north into DP canyon.

MDA U became inactive in 1968; however the absorption beds remained uncovered until 1985 and received cooling water effluent until sometime after 1976.

This site description (and the hazard assessment in Section 4) was developed using the following documents:

- *History and Environmental Setting of LASL Near-Surface Land Disposal Facilities for Radioactive Wastes (Areas A, B, C, D, E, F, G, and T),* by Margaret Anne Rogers, June 1977, LA-6848-MS, Vol. I
- *History of Waste Disposal at TA-21, 1943-1978,* prepared by S. Merrill, March 1990
- *Plutonium Processing at the Los Alamos Scientific Laboratory,* by Eldon Christensen and William Maraman, February 1968, LA-3542

TABLE 2-1.1 SITE DESCRIPTION
• *TA-21 Operable Unit RFI Work Plan For ER*, dated May 1991, LAUR-91-962

	SITE(s)	
	MDA B	MDA U
	Characteristics	
Adjacent Facilities/Structure		
Roads/Highways		
Buildings/Foundation		
UST		
Below Ground Utilities (excavation permit review will be completed prior to intrusive work)	X	X
Other(identified by excavation permit)	X	X
Above Ground Electric:		
<50kV	X	X
Topography		
Mesa Top	X	
Pathway of Release	*[for land and water indicate direction, e.g., N, NE, etc.]*	
Land	SE	SE
Water	SE	SE
Air	X	X
Emergency	*[indicate "Y" or "N"]*	
Land	Y	Y
Air	Y	Y
Water	N	N
Previous ER Information and/or Data Available		
Knowledge of Process	X	X
Initial Scoping/ Reconnaissance	X	X
Phase I		
Phase II		
Analytical Data (screening)	X	X
Analytical Data (validated)	X	X
Risk Assessment	X	X

TABLE 2-1.2

Previous Substances disposed of or detected at MDA B AND MDA U

Listed below are the documented substances that may have been disposed of at MDA B, and those that may have been constituents of the associated waste effluents that were disposed of in MDA-U. This list also includes the radionuclides, metals, and organics that have been detected during excavation and environmental screening activities associated with MDA-B and MDA U.

MDA B

	Radionuclides Detected	DETECTED INORGANICS Cont.	DETECTED ORGANICS Cont.
RADIONUCLIDES	Americium-241	Mercury	Diethyl phthalate
Plutonium	Cesium-137	Silver	Fluoranthene
Polonium	Strontium-90	Zinc	Indeno[1,2,3-cd]pyrene
Uranium	Uranium-235	**DETECTED ORGANICS**	Phenanthrene
Americium	Radium-226	Benzo[a]anthracene	Pyrene
Curium	Plutonium-239	Benzo[a]pyrene	
Lanthanium	Plutonium-238	Benzo[b]fluoranthene	
Actinium	**DETECTED INORGANICS**	Benzo[k]fluoranthene	
Mixed Fission Products(MFP)	Beryllium	Bis(2-ethylhexyl)phthalate	
CHEMICALS	Lead	Butyl benzyl phthalate	
Though chemicals are known to have been disposed of at MDA B, there is no record of types or amounts.	Manganese	Chrysene	
Other Previously Detected or Tentatively Identified Compounds	90% of the waste in MDA B consisted of radioactively contaminated paper, rags, rubber gloves, glassware, and small metal apparatus in cardboard boxes. The remainder of the material consisted of metal, including air ducts and large metal apparatus. At least one truck contaminated with fission products from the Trinity test is buried in MDA B.		

MDA U
Radionuclides used
Po-210($T^{1/2}$ 138 days)
Ac-227
Plutonium
Detailed records of the volume and composition of the waste discharged to MDA U do not exist
Radionuclides Detected
Tritium
Pu-239/240
Uranium

TABLE 2-2
SCOPE OF WORK

MDA-B

The MDA B investigation involves site characterization work that will include geophysical and geodetic surveying, surface sampling, drilling and subsurface pore gas and soil sampling, and waste management. A hollow-stem auger drilling rig will be used to drill and sample up to 7 boreholes. Surface sampling will consist of samples 0"-12" taken on a grid both in the eastern unpaved area, through the asphalt paved western area and north of MDA B. Angled boreholes will be drilled so as to pass close but not intercept the trench. The angled boreholes will be approximately 100 linear feet each. Boreholes will be drilled beneath the pits to determine the presence and vertical extent of both radiological and chemical contamination.

MDA U

The MDA U investigation involves site characterization work that will include geodetic surveying, surface sampling, drilling and subsurface sampling, and waste management. A hollow-stem auger drilling rig will be used to drill and sample up to 7 boreholes. Surface sampling will consist of samples 0"-12" taken on a grid. Vertical boreholes, 50 feet deep, will be drilled around the perimeter of the beds and in the location of the distribution box. A trench will be dug using a back hoe to locate the bed and sample the material in the bed.

Task ID	Task Description	Site ID(s)	Anticipated Dates/Duration
Task 1 **Site Preparation**	Task includes surveying and the mobilization of mobile trailers, a portable generator, sanitation facilities, and drilling equipment. Associated subtasks include: **1-A Geodetic and Geophysical surveying:** A subcontractor will perform a geodetic survey to identify the locations of the disposal pits. A geophysical contractor will perform a geophysical survey to identify the locations and depths of thedisposal pits. **1-B Mobilization:** Mobilization of drilling equipment and supplies, set up of site control boundaries, and set up of waste storage areas. Stewart Brothers Drilling Inc. will be responsible for mobilizing all drilling equipment to the site.	**MDA B, MDA U**	**Summer/Fall 1998**

TABLE 2-2 SCOPE OF WORK			
Task 2 - Site Characterization	This task will involve drilling within the boundaries of the MDA to characterize types and extent of contamination present at various site locations. Associated subtasks, some of which occur simultaneously, include: **2-A:** **2-A.1 Drilling:** 14 boreholes(7 at MDA B, 7 at MDA U) using a hollow stem auger drill rig. During all drilling operations, the cuttings will be collected in an enclosed box located around the auger flight. A vacuum pump will remove dust from the box and discharge the air through a filter away from the immediate work area. Drill cuttings will be removed from the box by hand shovel. At that time, the dust will be suppressed by continuously wetting the cuttings with a portable, 2- to 3-gallon pressure sprayer. At MDA B a packer system will be used on some of the bore holes to obtain VOC samples. **2-A.2 Trenching:** A backhoe will be used to intersect the beds at MDA U. The trench will be deep enough to uncover the plastic sheet that was laid to mark the extent of a previous clean up activity. The plastic will be pulled back to uncover the bed materials and a sample of the material will be taken. The trench will then be backfilled. **2-A.3 Equipment Maintenance and Repair:** May involve use of fuels, and/or compressed/flammable gases during maintenance and/or welding operations. **2-A.4 Borehole Completion:** Boreholes will be completed by backfilling with cuttings, filling with a bentonite/cement grout, or a combination of the two. All boreholes will have a grout cap of at least 2 feet in thickness. The bentonite/cement slurry will be mixed in a grout pump and pumped into the boreholes through a tremie pipe such that the boreholes are backfilled from the bottom up. **2-B Exposure Monitoring:** Use of real-time and integrated monitoring equipment to screen for employee exposures to radiological, chemical, and physical hazards in the EZ. **2-C Soil Sampling:** Screening and sampling of soils from core and preparation of samples for shipment and analysis. **2-D Equipment Decontamination:** An Alconox®/tap water mix and deionized water rinse (wet decontamination) or Fantastik® and paper towels (dry decontamination) will be used to clean potentially/actually contaminated equipment in the EZ. **2-E Demobilization:** Removal of site control boundaries, equipment, and supplies. Demobilization of drilling equipment and supplies by Stewart Brothers.	**MDA B/ MDAU** **2-A.2 MDA U only**	**Summer/FALL 1998**

Task 3- Surface Sampling	Surface samples will be obtained from both MDA B and MDA U to determine extent of the contamination of the current soil on each site. Samples will be obtained by hand. This task will also involve removing patches of asphalt from the western area of MDA B.	**MDA B/ MDA U**	**Summer/Fall 1998**
Task 4 - Waste Management	On-site waste management will be controlled by the site-specific Waste Characterization Strategy.	**MDA B/ MDA U**	**Summer/Fall 1998**
Task 5 - Incident Response	Response to an incident (i.e., rendering first-aid/CPR, hazardous substance release, fire, and spill containment). Tasks will be performed as necessary and in accordance with Sections 7, 9 and 10 of the HASP and this SSHASP. This task includes the following subtasks: **Incident Response(29CFR 1926.65(q)(6)(ii)** **Spill Containment(29CFR1926.65(q)(6)(ii)** **5-A First-aid/CPR** **5-B Fire extinguishing**	**MDA B/ MDA U**	**Summer/Fall 1998**

TABLE 3 KEY PERSONNEL HAVING HS RESPONSIBILITY			
Title	**Name**	**Organization**	**Phone/Pager**
Facility Contacts			
FMU-80 Coordinator	Charles Trujillo	FMU-80	667-0491
Facility Manager	David Padilla	FMU-80	667-2408
Facility IH & H&S	Rick Eddelman	FMU-80	665-5364
Field Project Management			
Focus AreaProject Leader	Allyn Pratt	EES-13	667-4308
Focus Area Operations Manager	Gary McMath	EM/ER	665-4969 104-3653
Waste Management	Troy Eshleman	GTS/Duratech	661-6621
Field Team Manager (FTM)	John Hopkins	MK/PMC	662-1327
Field Team			
Field Team Leader (FTL)	Jayne Jones	MK/PMC	662-1307
Site Safety Officer (SSO)	Raymond Wright	MK/PMC	662-1325
Drilling Supervisor	Paul Garcia	Stewart Brothers	(505)287-2986 469-0305 (cel.)
Health PhysicsTechnician(HPT)	Raymond Wright	MK/PMC	662-1325
Support Personnel			
Radiological Control Technician (RCT), ESH-1	John Elliott	ESH-1	665-7461 104-6649[1]
Field Unit HS Representative	Trung Nguyen	ESH-5	667-7264

1 - LANL pager access phone number: 665-9800

4.0 HAZARD ANALYSIS

Provided in this section are the task-specific hazard analysis information and requirements in accordance with Section 4 of the HASP.

4.1 PROJECT PERSONNEL

The personnel identified below by role are expected to perform the task(s) indicated.

TABLE 4-1
PROJECT PERSONNEL BY TASK

PERSONNEL ROLE	TASK(s)												
	1-A	1-B	2-A.1	2-A.2	2-A.3	2-A.4	2-B	2-C	2-D	2-E	3	4	5 all
FTM/FTL	X	X	X	X		X		X	X	X	X	X	
SSO	X	X	X	X	X	X	X	X	X	X	X	X	X
RCT	X	X	X	X	X	X	X	X	X	X	X	X	X
Onsite Waste Manager			X	X							X	X	
Geologist		X	X	X				X		X	X	X	
Sampler		X	X	X				X	X	X	X	X	
Geophysical Surveyor	X												
Geodetic Surveyor	X												
Driller		X	X		X	X			X	X			X
Heavy Equip. Operator				X									
Driller's Asst.		X	X		X	X			X	X			

The SSO will be a "rover" between active sites. The SSO will be present for the tailL`gate briefing and for any evolution that the SSO or FTL feels that the SSO should be present for.

4.2 HAZARDOUS SUBSTANCES OF OCCUPATIONAL HEALTH CONCERN

Not all chemical products used to accomplish a task or contaminants at a particular site may pose an occupational health threat. The hazardous substances of occupational health concern are identified in this section by task and by class of substance, in accordance with Section 4.1 of the HASP. Results of a health hazard assessment of each chemical product and site contaminant identified in Table 2-1 and associated rationales are provided in Appendix B. Substances that have a hazard assessment resulting in either "possibly could occur", "probably will occur", or "likely to occur" and which are expected to result in injury or illness having a hazard severity of "minor", "major", or "catastrophic" are considered to pose an occupational health threat to personnel who may be exposed to these substances, and are included in Table 4-2. The key to the hazard assessment ratings is provided below. The chemical, physical and toxicological properties for each hazardous chemical substance of occupational health concern are provided in Appendix C. For each class of substances included in Table 4-2, the most hazardous substance is identified in Table 4-3 together with corresponding administrative and engineering controls.

Key to hazard assessment ratings (HAR):

Hazard Severity	Mishap Probability			
	Likely to Occur	Probably will Occur	Possibly could Occur	Unlikely to Occur
Catastrophic(C) (i.e., death or life-threatening injury/illness from a single encounter)	Imminent	Imminent	Serious	Minor
Major(Ma) (i.e., significant injury/illness resulting in irreversible harm)	Imminent	Serious(S)	Moderate	Minor
Minor(M) (i.e., injury or illness resulting in reversible harm - not likely to threaten mobility, vision)	Serious	Moderate	Minor	Negligible
Negligible(N)	Minor	Minor	Negligible	Negligible

TABLE 4-2

HAZARDOUS SUBSTANCES OF OCCUPATIONAL HEALTH CONCERN

Hazardous Chemical Products to be Used During Field Operations

The chemical products listed below are likely to be used for the tasks indicated, onsite or at satellite locations where field support operations occur. MSDSs for each product shall be kept readily available to users of these products, and shall be shared with other employer's employees onsite who may be affected by the hazardous products in accordance with 29 CFR 1926.65(b)(1)(iv) and (v) and 1926.65(i) and Section 4.2.2.3 of the HASP. It is LANL's policy that whenever feasible a less toxic product should be substituted for a more toxic product, especially for products having a carcinogen constituent.

HAZARDOUS SUBSTANCE	TASK(s)												
	1-A	1-B	2-A.1	2-A.2	2-A.3	2-A.4	2-B	2-C	2-D	2-E	3	4	5
Compressed Gases													
Isobutylene (PID)			N	N			N	N			N	N	N
Acetylene (welding)					N								
Oxygen (welding)					N								
Fuels/Lubricants (Petroleum-Based Hydrocarbons)													
Diesel		N	N	N	N	N				N			
Gasoline		N	N	N	N	N				N			
Hydraulic Fluid		N	N	N	N	N				N			
Oil		N	N	N	N	X				N			
Other													
Cement						N							
Bentonite						N							
Site Contaminants													
Radionuclides *[indicate isotopes]*													
Americium(241)			M	M		M	M	M	M		M		M
Cesium(137)			M	M		M	M	M	M		M		M
Plutonium(238,239)			M	M		M	M	M	M		M		M
Uranium (234, 235, 238)			M	M		M	M	M	M		M		M
Tritium			S	S		S	S	S	S		S		S
Ra-226			M	M		M	M	M	M		M		M
Strontium(90)			M	M		M	M	M	M		M		M
OTHER	Since inventory of all pits and shafts is not known, a full suite of analysis will be performed to accurately characterize MDA B and MDA U												

4.3 HAZARD ASSESSMENT AND ADMINISTRATIVE AND ENGINEERING CONTROLS

Hazards included in this section are those expected to result in one of the hazard assessment ratings defined below and could pose an occupational health threat to workers performing the associated task(s). The hazard assessments and rationales are indicated below with the corresponding administrative and engineering controls for protection from and mitigation of the hazards.

Administrative and engineering controls shall be implemented as the first line of defense for mitigating personnel exposure to hazards, and shall be implemented in accordance with the Subcontractor's HS program, which has been approved by LANL, and with applicable DOE and OSHA requirements. In some cases task-specific standard operating procedures (SOPs) may be required to detail compliance with applicable requirements.

TABLE 4-3
HAZARD ASSESSMENT and ADMINISTRATIVE and ENGINEERING (A&E) CONTROLS

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
Hazardous Waste Operations (HAZWOPER) Sites				
General	ALL	Minor to Serious	Significant irreversible illness/injury could occur from exposure to radiological, health, and safety hazards associated with HAZWOPER work	Compliance with OSHA HAZWOPER Standard (29 CFR 1926.65) for tasks involving PRSs and SWMUs and where there is reasonable possibility of exposure to HS hazards. Refer also to requirements for exposure monitoring, PPE, decon, emergency response planning, training, and medical surveillance.
Buried Drums or Containers	2-A.1, 2-A.2	Minor to Serious	Significant irreversible illness/injury could occur from accidental release or explosion of buried containers	Compliance with 29 CFR 1926.65, especially paragraph (j). OSHA requires ground-penetrating system or device be used to estimate location and depth of buried drums or containers (29 CFR 1926.65[j][1][x]). Refer also to "Excavation/Trenching" section. Soil or covering material shall be removed with caution to prevent drum or container ruptere.
Safety Hazards				
FIRE and HAZARDOUS SPILLS/RELEASES				
Fire	All	Minor to Serious	Fire could result in reversible or irreversible injury or even death	Compliance with 29 CFR 1926 Subpart F and 1926.250 and 252 as applicable. Equipment specified in Section 9 (e.g., fire extinguishers) shall be maintained readily accessible onsite and ready for use.
Release of Hazardous Substance	2-A, 2-C, 3,	Minor to Serious	Accidental release of hazardous substance(s) could result in reversible or irreversible injury or even death	Compliance with 29 CFR 1926.152, 1926.65(l) or (q), HASP Section 9, and Site-Specific Spill Prevention and Control Plan.

TABLE 4-3
HAZARD ASSESSMENT and ADMINISTRATIVE and ENGINEERING (A&E) CONTROLS

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
EXCAVATION/ TRENCHING	**COMPLIANCE WITH PERMIT No. 9.** For excavating/trenching > 1 foot; A&E controls shall be implemented in accordance with applicable LANL excavation permit (per LANL AR 1-12) and as specified below.			
Underground Utilities	2-A.1,2-A.2	Minor to Serious	Hazard severity could be catastrophic resulting in irreversible harm or death, and although unlikely to occur, possibly could occur	Refer also to "Electrical" section of this table. Determine estimated locations of utilities (i.e., sewer, telephone, gas, electric, water lines, etc.) prior to drilling. Notify utility owners of intended work and request they demarcate on ground surface location(s) of underground utilities; have field team member accompany utility owner rep. to identify intended excavation location(s) and to find out specifics of utility location(s). If utility owner cannot establish exact location of utility installation(s), drilling may proceed with caution, provided detection equipment or other acceptable means to locate utility installation(s) are used. As drilling operations approach estimated location of underground utility, exact location of installation shall be determined by safe and acceptable means (i.e., using hand held excavating equipment). While excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard site personnel
MOTORIZED / MECHANIZED EQUIPMENT OPERATION				
DRILLING/HEAVY EQUIPMENT OPERATION				

TABLE 4-3
HAZARD ASSESSMENT and ADMINISTRATIVE and ENGINEERING (A&E) CONTROLS

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
General controls	♦ Mobile Cranes shall be inspected, tested, operated, and maintained in accordance with Section 4 of the DOE Hoisting and Rigging Manual(DOE/ID-10500), April 1993 ♦ Per DOE (Drilling safety manual, 1983 and Construction Safety Reference Guide, 1993), drilling rigs shall be designed, manufactured, erected, used, and maintained in accordance with appropriate American Petroleum Institute (API) Specifications and Recommended Practices, as a minimum, and with applicable sections of 29 CFR 1926.251, Subpart N of 29 CFR 1926, and Title 8 of the California Administrative Code (8 CAC). ♦ Hoists, hooks, wires, ropes, slings, and rigging accessories shall be designed, installed, operated, inspected, and tested in accordance with applicable requirements of the DOE hoisting and Rigging Manual (April 1993, DOE/ID- 10500), and with applicable sections of 29 CFR 1926.251 and Subpart N of 29 CFR 1926. ♦ There shall be no apparent damage , excessive wear, or deformation of any part of the drilling equipment. Equipment shall be inspected by a qualified person according to Section 12.1 and the frequencies indicated below. Defective equipment shall be removed from service and any defects shall be corrected or repaired prior to the equipment returning to service. Records of each inspection shall be kept at the rig readily available for review. Reduction of original strength shall be noted and taken in account for determining when equipment shall be taken out of service. ⇒ Rigs and Masts shall be inspected at least weekly. ⇒ Hoists, hooks, wires, ropes, slings, and rigging accessories shall be inspected at the beginning of each shift in which they are to be used and as necessary during use to ensure safety. ⇒ Hoisting lines shall be inspected visually each day, and thoroughly at a minimum of 30 day intervals. ⇒ Guy wires in use shall be thoroughly inspected at least once a year. ⇒ Anchors shall be pull-tested along an angle approximating the wind-guy working plane within 12 months prior to use; test shall be made at poundage determined by anchor location. ♦ Each derrick or mast, and hoist shall be permanently marked with its rating capacity. ♦ Drill rigs must be leveled, anchored, and guyed in accordance with manufacturer's recommendations or where there are none, with API Specification 4E. ♦ Pressure-hose connections shall be secured with safety chains or clamped to prevent whipping in the event of a break. ♦ When engaged in work at a location 10 feet or more above the derrick floor or other working surface, the worker shall wear a safety belt with attached lanyard secured to the derrick, except during rig-up/rig-down when workers other than the rig operator shall stand clear. Safety belts, lifelines, and lanyards shall be used in accordance with 29 CFR 1926.104.			
Hoisting and Rigging Equipment - 2-A.1, 2-A.4	• A qualified person-in-charge (PIC) shall classify each lift into one of the DOE categories (ordinary, critical, or preengineered production) prior to the lift in compliance with Chapter 2 of DOE Handbook Hoisting and Rigging (DOE-HDBK-1090-95, June 1995). • Hoisting and rigging equipment shall be designed, installed, inspected, tested, operated, and maintained by qualified personnel in compliance with applicable sections of 29 CFR 1926.251 and Subpart N of 29 CFR 1926 and DOE Handbook Hoisting and Rigging (DOE-HDBK-1090-95, June 1995) requirements indicated below: - Preengineered Production Lifts ..... Chapters 3, 5, 6, and 15 - Personnel Lifts ..... Chapters 4, 5, 6, and 15 - Overhead and Gantry Cranes..... Chapters 7, 5, 6, and 15 - Hoists ..... Chapters 8, 5, 6, and 15 - Mobile Cranes ..... Chapters 9, 5, 6, and 15 - Wire Ropes, and Slings..... Chapters 11, 5, 6, and 15 - Rigging Accessories..... Chapters 12, 5, 6, and 15 - Load Hooks..... Chapters 13, 5, 6, and 15 - Below-the-Hook Lifting Devices ..... Chapters 14, 5, 6, and 15			
Equipment Operation/ Maintenance	1-B, 2-A., 2-E	Minor to Serious	Hazard severity resulting in irreversible injury or death possibly could occur	Motorized vehicles and heavy equipment; engineering controls and equipment operation shall comply with applicable sections of 29 CFR 1926.201 and Subparts N and O, including vehicle inspections and use of seatbelts and provision of rollover protection.

TABLE 4-3
HAZARD ASSESSMENT and ADMINISTRATIVE and ENGINEERING (A&E) CONTROLS

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
Overhead elec. hazard	2-A.1, 2-A.3, 2-A4	Minor to Serious	Hazard severity resulting in irreversible injury or death possibly could occur	During stationary operation, minimum clearance between live lines and any part of equipment or load: 10 ft for lines rated 50 kV; 10 ft + 0.4 in. for each 1 kV over 50 kV, or twice the length of line insulator, whichever is greater. In transit with no load and boom lowered, min. clearance: voltages < 50 kV: ..... 4 ft min voltages 50 kV< x ≤345 kV:..... 10 ft min voltages 345 kV< x ≤750 kV:..... 16 ft min
Rotating Parts/Pinch Points	2-A	Minor to Serious	Hazard severity resulting in irreversible injury or death possibly could occu.	Guard rotating parts and pinch points in compliance with 29 CFR 1926 Subparts I, J, N, and O as applicable. Personnel must be observant and careful when near pinch-points and rotating parts.
Refueling Vehicles	1-B, 2-A, 2-E	Minor to Serious	Hazard severity resulting in irreversible injury or death possibly could occur.	Compliance with 29 CFR 1926.152, especially paragraphs (d), (e), and (f).
ELECTRICAL				
Electrocution - working with energized lines or equipment (including below ground utilities)	2-A	Minor to Serious	Irreversible injury or death possibly could occur	Compliance with 29 CFR 1926 Subpart K and NEC recommendations, as applicable; refer also to "Underground Utilities" section under "Excavation/Trenching". Disconnect all electrical power sources prior to initiating work and verify power disconnection. GFCI required for electrical equipment. Implement preventative measures and identify and correct deficiencies to comply with 29 CFR 1926 Subpart K and HASP Sections 4.2.2.1 and/or 4.2.2.8, as applicable.
Spark/flame source	2-A.2	Minor to Serious	Irreversible injury or death possibly could occur	For equipment that cannot be grounded (e.g., welding equipment), spark/flame-producing permit required. Generate and abide by spark/flame-producing permit per HASP Section 4.2.2.12; contact Field Unit HS Representative to initiate permit process if not already accomplished.
WELDING, CUTTING, BRAZING	**COMPLIANCE WITH PERMIT No. TBD** Implement A&E controls per applicable LANL special work permit (SWP) for spark/flame-producing operations, HASP Section 4.2.2.12, and as specified below; contact Field Unit HS Rep. to initiate permit process.			
Fire/explosion/burn hazards	2-A.2	Minor to Serious	Irreversible injury possibly could occur	Compliance with applicable permit and Subpart J of 29 CFR 1926. Use PPE specified in SSHASP and in compliance with 29 CFR 1910 Subpart I.. Handle cylinders with care, compliance with 29 CFR 1926 Subpart J, as applicable. Refer also to Safe Handling of Compressed Gases in Containers (CGA P-1-1984).
WORKING AT HEIGHTS				

TABLE 4-3
HAZARD ASSESSMENT and ADMINISTRATIVE and ENGINEERING (A&E) CONTROLS

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
Fall Protection	2-A	Minor to Serious	Hazard severity could result in irreversible injury or death.	Where personnel must work from elevated surface and may fall 6-ft. or more, fall protection required using guardrails, safety net, temporary flooring or floor covering, personal fall arrest system, and/or other suitable engineering controls in compliance with applicable OSHA standards (29 CFR 1926.104, 105, and Subpart M) and ANSI Z359.1-1992. PPE to be selected in accordance with ER-HSM-2, "Personal Protective Equipment," [LANL ER Project *Health and Safety Activities Manual*] or comparable method.
HAND AND POWER TOOLS				
Operation and Maintenance	All	Minor to Serious	Irreversible injury or death possibly could occur.	Compliance with 29 CFR 1926 Subpart I, particularly sections 300, 301, and 302 as applicable. Refer also to "Electrical" section as applicable.

MISCELLANEOUS				
Sanitation	All	Minor to Serious	Unsanitary working conditions possibly could result in reversible or irreversible injury/illness.	Compliance with OSHA housekeeping standards (29 CFR 1926.25 and 250[c]). Subcontractor to provide and maintain sanitary potable water supply and portable toilet facilities at clean location onsite; compliance with 29 CFR 1926.51. Personnel to wash hands and face (as necessary) prior to eating, drinking, smoking, or chewing and after using toilet facilities.
Uneven terrain, slips, trips, falls	All	Minor	Variable terrain - working conditions could possibly result in "minor" injury.	Use caution and be observant while moving in areas of potential concern; minimize threat of slick surfaces; use appropriate PPE..
Radiological Hazards				
Alpha Radiation	All	Minor to Serious	Although unlikely, reversible illness possibly could occur from over exposure to low levels of radiation above background. OR Significant irreversible illness unlikely though possibly could occur from over exposure to radiation.	Minimize exposure and maximize distance to source. Perform radiological monitoring per Section 6. **RADIOLOGICAL WORK PERMIT REQUIRED:** Implement applicable RWP requirements. Contact Field Unit ESH-1 Rep. to initiate permit process. ALARA job review by ESH-1, ESH-12, and FPL or DPL required per LANL LP-107-09.0, "ALARA Review of Radiological Jobs."
Beta/Gamma Radiation	All	Minor to Serious	Although unlikely, reversible illness possibly could occur from over exposure to low levels of radiation above background. OR Significant irreversible illness unlikely though possibly could occur from over exposure to radiation.	Minimize exposure and maximize distance to source. Perform radiological monitoring per Section 6. **RADIOLOGICAL WORK PERMIT REQUIRED:** Implement applicable RWP requirements. Contact Field Unit ESH-1 Rep. to initiate permit process. ALARA job review by ESH-1, ESH-12, and FPL or DPL required per LANL LP-107-09.0, "ALARA Review of Radiological Jobs."

Biological Hazards				
General	All	Refer to HASP Table 1 for information concerning general hazards associated with occupational exposure to hazardous biological agents		
Hanta Virus	All	Minor to Serious	Exposure to Hanta Virus is possible by inhalation and ingestion (including transfer by skin contact) and could result in serious illness or death	APP. G OF HASP. Minimize disturbance of rodent nests or feces. Minimize generation of airborne dust by using engineering controls (e.g., wet-methods, HEPA vacuuming). Workers should use rubber gloves and wash exposed skin thoroughly to avoid direct contact with infectious matter. Use of Level C respiratory protection (equipped with HEPA cartridges) may be required at discretion of SSO.
Occupational Exposure to Bloodborne Pathogens	5	Refer to APP. G of the HASP		
Physical Health Hazards				
Lightning Strikes, Altitude Sickness, Sunburn, Animal Attacks	Refer to Table 1 of the HASP for indications of exposure and response actions.			
Airborne Dust	All	Minor	Reversible illness possibly could occur if exposure to excessive airborne nuisance (non-toxic) dust occurs	As first line of defense implement engineering controls (e.g., wet methods, dust suppression agent, HEPA vacuuming, and/or local ventilation) in compliance with 29 CFR 1926.55(b), 1926.57, and/or 1910.1000, as applicable, to prevent/minimize dispersion of dust in air.
Ergonomics	All	Minor to Serious	Irreversible injury possibly or probably could occur	Implement appropriate training and precautionary measures in accordance with Subcontractor's ergonomics program.
Heat Stress	All	Minor to Serious	Life-threatening illness or death likely to occur if extreme hot or cold ambient temperatures occur	Inform personnel of signs and symptoms of heat/cold stress (Table 1 of HASP). Monitor personnel for indications of stress. Strive to prevent exposure by implementing appropriate work regimen, including work breaks so personnel can warm up or cool down and intake fluids as necessary. Install barriers or facilities to provide personnel protection from weather extremes.
Excessive Noise	2-A	Minor to Serious	Irreversible hearing loss possibly or probably could occur	Compliance with 29 CFR 1910.95. As appropriate, implement engineering controls to reduce excessive noise levels. Whenever voice(s) must be raised to communicate between persons located within approximately 3 feet or less of each other noise level likely exceeding PEL; unless previous representative data has been assessed, conduct noise monitoring. Refer to HASP Section 4.2.2.7 for additional requirements.

Chemical Hazards				
Chemical Splash	2-C	Minor to Serious	Irreversible injury possibly could occur depending upon the chemical(s) involved	Use appropriate PPE (chemical protective clothing and/or eye/face protection) specified for the corresponding task(s)/site(s). Portable emergency eyewashes and/or showers (as necessary based upon site- and task-specific chemical hazards) shall be located within 10 seconds and ≤100 feet travel distance of any source of chemical splash that may be corrosive or moderately to severely irritating to body tissue. Units must have capacity to provide continuous flushing for duration of time necessary to sufficiently flush most hazardous substance for which device is being specified. Inspect and flush units at least weekly. Refer also to ANSI Z358.1-1990.

5.0 SITE CONTROLS

In accordance with Section 5 of the HASP, the required site control measures are specified below for each task or group of tasks having different requirements. Any exceptions or deviations from requirements of the HASP are noted below. Site map(s) are provided in Appendix A to show where the following site control measures will be located. Since some zone or facility locations may change as site work progresses due to daily variability in site conditions and/or operations (e.g., wind or access), actual locations are to be explained to field team members by the SSO, or the FTL during daily HS tailgate meetings and documented in the logbook kept by the ER SSO.

TABLE 5
SITE CONTROL MEASURES

CONTROL MEASURES	ALL TASKS
	The entire area of MDA B and MDAU is controlled as a Controlled Area. There will be no eating, drinking, smoking, chewing, or applying cosmetics or lip balm while in MDA B or MDA U.
Exclusion Zone (EZ) and Contamination Reduction Zone(CRZ)	In accordance with 29 CFR 1926.65(d)(3), the entire area of MDA-B and MDA U will be controlled as the EZ. Areas within the boundaries may be established at work sites to control contamination spread. The CRZ will be established at the entrance to MDA-B and MDA U. Site personnel will be briefed daily or as needed on the site controls in use that day
Support Zone (SZ) and Muster Area	In accordance with 29 CFR 1926.65(d)(3), the SZ and muster area will be located up wind of EZ/CRZ in uncontrolled area. Demarcation unnecessary. Site personnel will be briefed daily or as needed on the location of the muster area.
Equipment staging area	Located at work site in SZ in uncontrolled area. Postings IAW Subpart G of 29 CFR 1926
Support Trailers	Located at work site in SZ in uncontrolled area. Demarcation unnecessary. Postings IAW Subpart G of 29 CFR 1926.
Hand Wash Facility	Located on work site in CRZ per 29 CFR 1926.65(n) or 1926.51. Postings IAW Subpart G of 29 CFR 1926
Equipment Decon Pad/Facility	Decon facilities provided by drilling company. Decon will be performed on site in EZ. Alternative decon facilities will be provided at the TA-50 decon facility. Decon performed IAW LANL-ER-SOP-1.08.RO, 29 CFR 1926.65(k), and site specific procedures.
Temporary Waste Storage Area	Waste storage IAW site-specific Waste Characterization Strategy (27 Sept. 1996).
Toilet Facility	Portable toilet located adjacent to crew trailer IAW 29 CFR 1926.65(n)(3)(ii).
Shower Facility	If required, will use facilities at TA-21 IAW 29 CFR 1926.65 (k)(8), (n)(7) and ESH-1-09-05.1 External Personnel Contamination
Clothes Changing Facility	Storage provided for work boots and non-disposable PPE in support trailer IAW 29 CFR 1926.65(n)(7).
Wind Direction Indicator(s)	Directional flag located on derrick. Wind socks are also located throughout TA-21

6.0 EXPOSURE MONITORING AND CORRESPONDING ACTIONS

In accordance with Section 6 of the HASP, personnel exposure monitoring requirements, action levels, and the corresponding actions to be taken are specified in the tables in this section (Tables 6-1, 6-2, and 6-3) for each task or group of tasks having different requirements.

6.1 DIRECT-READING INSTRUMENTS

Requirements for exposure monitoring using direct-reading instruments and the corresponding action levels and response actions are specified in Table 6-1 for each task or group of tasks having different requirements, action levels or responses. These requirements, levels, and actions are set in accordance with Section 6 of the HASP. Any exceptions or deviations from requirements of the HASP are noted where applicable.

TABLE 6-1
DIRECT-READING INSTRUMENT REQUIREMENTS

Hazardous Condition/ Substance	Task(s)	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)	Response Action(s)	Action Level Rationale
HEALTH PHYSICS							
				Direct reading of:	Action levels based on volumetric soil contamination		
Radiation Gross- α, gross-β/γ, and tritium contamination	ALL	β/γ Eberline ESP-1 with HP-260 probe or equivalent α-Ludlum 139 with air proportional probe or equivalent	Per LANL RadCon Manual and training and associated ESH-1 procedures and ER addendums Radiologicacal Surveleillance Authorization Agreement (RSAA)	Drilling: As sample barrel comes out of borehole; after sample barrel is opened and prior to sampling core	Action Level 1 Background	Field team member trained in ESH-1 procedures performs surveys (soil, core, personnel, etc.) Intermittent ESH-1 coverage Large area swipes for α (2000 cm^2) counted using field alpha screening instrument; direct frisk for β/γ Tritium smears shall be taken routinely on each core barrel and any other equipment that comes in contact with the soil in MDA B/U. Smears will be counted on an LSC. Gas Tritium levels shall be monitored periodically at each borehole opening at each opening using a tritium sniffer. NOTE: Monitoring for tritium shall continue until enough data is acquired to indicate that tritium is not a problem.	Standard levels set by ESH-1

TABLE 6-1
DIRECT-READING INSTRUMENT REQUIREMENTS

Hazardous Condition/ Substance	Task(s)	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)	Response Action(s)	Action Level Rationale
		Dose Rate- Eberline RO-2 Ion Chamber Tritium- Tritium sniffer, LSC for Smears		Personnel: Prior to exiting EZ and/or RCA Equipment: Prior to decon and for release	Action Level 2 > Background, but α< 500 cpm/probe area β/γ< 5,000 cpm/probe area Any smearable contamination on equipment and any detectabity on personnel above MDA Tritium Contamination > Bkgd.<10,000 dpm/100cm2 Tritium airborne >Bkgd.<20μCi/m3	Notify ESH-1 of elevated readings Dedicated field team member trained in ESH-1 procedures performs surveys (soil, core, personnel, etc.) Increased intermittent ESH-1 coverage α swipes counted using Ludlum 2000 tray counter or equivalent; direct frisk for β/γ	Standard levels set by ESH-1
					Action Level 3 α > 500 cpm/probe area β/γ > 5,000 cpm/probe area Dose Rate- >5mR/hr Triitium contamination >10,000 dpm/100cm2 Tritium airborne >20μCi/m3	Work may only proceed according to approved RWP and with full-time onsite ESH-1 technician (or equiv.) in accordance with Sections 3.2.4 and 3.3.4 of the HASP.	Standard levels set by ESH-1
PHYSICAL CONDITIONS							
Airborne Dust	All, but at discretion of SSO	MINI-RAM		Activities that could generate dust at work site.	2.5 mg/m³	Reduce dust by wetting or by local ventilation	Implemnting contols will insure that no levels listed in Appendix B will not be exceeded and will mitigate nucance dust

TABLE 6-1
DIRECT-READING INSTRUMENT REQUIREMENTS

Hazardous Condition/ Substance	Task(s)	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)	Response Action(s)	Action Level Rationale
Noise	2A, but at discretion of SSO	Noise level meter	IAW LANL-ER-HSM-1G	Only monitor non-LANL employees; contact Field Unit HS Rep. if any LANL employees need monitoring Unless representative exposure data has already been assessed, noise measurements will be required when voice must be raised to communicate between two persons located ≤3 feet of each other; monitor hearing zone(s) of employees affected by excessive noise 1st day of occurrence & whenever operations change warranting monitoring: Monitoring frequency per SSO discretion.	85 dBA (Non-LANL employees only) 80 dBA (Hearing Conservation Program - LANL employees only) 84 dBA (Hearing protection required - LANL employees only)	≥ Action Level: Implement appropriate engineering control(s) **per Table 4-3**; if unable to lower noise levels below AL, demarcate/post zones of excessive noise and limit access only to employees having sufficient hearing protection training, medical surveillance, and hearing protection per this SSHASP. Appropriate NRR of PPE must be determined based upon monitoring results and the resulting necessary noise reduction to achieve compliance.	OSHA 29 CFR 1910.95 for non-LANL employees Per DOE and LANL requirements for LANL employees-LANL AR 8-2
Heat Stress	All tasks, as applicable	Ear-canal thermometer and clock/watch with second hand	Per ER Project *Health and Safety Activities Manual*	At beginning of each rest period (immediately following each work period) monitor: radial pulse and ear canal temperature Monitoring frequency based on ambient air temperature for employees wearing <u>breathable</u> protective clothing:: T ≥ 90°F every 45 to 60 - min T ≥ 85°F every 60 to 90 - min T ≥ 80°F every 90 to 120-min Wearing <u>nonbreathable</u> protective clothing: T ≥ 90°F every 15 to 30 - min T ≥ 85°F every 30 to 60 - min T ≥ 80°F every 60 to 90-min T ≥ 75°F every 90 to 120-min	Body Temp.: > 99.6°F Heart Rate (measure ≥ 30-seconds): Initial > 110 beats per minute (bpm) or Recovery (3-min later) still ≥ 80 bpm	> Action Level: Shorten next work cycle by one third Refer also to Table 4-3, *HASP* Table 1, and/or *ER Project HS Activities Manual* Chapter 11.	Potential for high heat levels during summer-time operations Increased core body temp. is primary indicator of heat stress; increased heart rate is secondary indicator

TABLE 6-1
DIRECT-READING INSTRUMENT REQUIREMENTS

Hazardous Condition/ Substance	Task(s)	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)	Response Action(s)	Action Level Rationale
INDUSTRIAL HYGIENE (CHEMICALS)							
Organic Vapors	2-A.1, 2-B, 2-C, 3	PID with 11.8 eV lamp	Per LANL ER-HSM-1C "Direct-Reading Monitoring Method Using GCs, PIDs and FIDs" or equivalent	Primarily for environmental sample screening purposes and at discretion of SSO as precautionary screening for OSHA purposes: Periodically near contaminant source at point(s) of excavation/sampling, in employees' breathing zones, and downwind/upwind as necessary to characterize source/dispersion	≥ 3 ppm above background in the breathing zone for up to 15-min.`	Allow area(s) of concern to vent naturally. If condition persists ≥ 5 ppm, limit access to EZ to exposure monitoring personnel only. Notify Field Unit HS Rep - SSHASP Modification necessary to monitor using colorimetric tubes and/or determine appropriate PPE level based upon direct-read monitoring.	Screening is precautionary measure and action level is based on lowest exposure limit of suspect organics at site (refer to Table 2-1.2). None of the organic chemicals listed in Table 2-1.2 are likely to be present in significant quantity, would be expected to vaporize to the extent to pose an inhalation exposure hazard, or warrant an action level trigger as low as 1 ppm. If one were to use the rationale that of the organics listed that would not be expected to have decomposed and that could possibly (although unlikely) exist in the vapor phase, none have an IDLH or PEL/TLV near or less than 10 ppm. Since ability to detect halogenated compounds (if any, although unlikely, are present) is desirable for precautionary purposes, and since vinyl chloride (one of the most toxic decomposition products of typical chlorinated hydrocarbons) has a 15-min. ceiling limit of 5 ppm, an action level of 5 ppm sustained in the breathing zone for up to 5 or 10 minutes would be reasonable. However, since the PID response factor for the more common halogenated substances enountered at LANL can be as low as 60% using an 11.7 or 11.8 eV lamp, then an action level of 3 ppm sustained in the BZ of affected workers for 5 to 10 minutes would appropriately protective.

TABLE 6-1
DIRECT-READING INSTRUMENT REQUIREMENTS

Hazardous Condition/ Substance	Task(s)	Instrument	Procedure	Location and Frequency of Monitoring		Action Level(s)	Response Action(s)	Action Level Rationale
		Draeger pump and colori-metric tubes: *[specific applicable tubes to be determined by SSO]*	Per LANL ER-HSM-1A "Direct-Reading Monitoring Method Using Colorimetric Detector Tubes" or equivalent	When action level for PID is met or exceeded monitor to identify airborne contaminant(s) and to determine appropriate PPE, then monitor periodically in breathing zone(s) of affected personnel as long as elevated levels detected with PID	Action level specific to tube(s) in use to be determined by SSO prior to use of tubes	Action level in breathing zone triggering implementation of engineering controls. If engineering controls not successful in reducing airborne levels below action level, respiratory protection required: *[indicate level(s) of PPE and action level(s) triggering use and maximum use concentration(s)]:*	PID cannot indicate what type of substance is present. Colorimetric tubes can at least qualitatively classify substance as halogenated, petroleum based, alcohol, etc.	

6.2 PERSONAL DOSIMETRY

Requirements for personal dosimetry and the corresponding action levels and response actions are specified in Table 6-2 for each task or group of tasks having different requirements, action levels or responses. These requirements, levels, and actions are set in accordance with Section 6 of the HASP and with the chemical-specific standards listed in Table 2 of the HASP. Any exceptions or deviations from requirements of the HASP are noted where applicable.

TABLE 6-2
PERSONAL DOSIMETRY REQUIREMENTS

Hazardous Substance/ Condition	Task(s)	Action Level(s)	Dosimetry Requirement	Action Level(s) Rationale
HEALTH PHYSICS (RADIATION) *[Refer to Section 6 of the HASP.]*				
External Sources of Radiation Exposure	All	Potential to exceed 100 mREM/year dose limit	Monthly TLD Badge	10 CFR 835
Internal Sources of Radiation exposure	All	Potential to exceed 100 mREM/year dose limit	Urinalysis-In Vitro bioassays may be required if conditions warrent and shall be specified by ESH-1/ESH-12 in theRWP. In Vivo- Baseline and Termination	10CFR835
Noise	All at discretion of SSO	Potential to exceed 85dBA	Personal noise dosimeter in hearing zone	29CFR1910.95

TABLE 6-3
HEALTH PHYSICS (AIRBORNE RADIOACTIVITY)

Hazardous Condition	TASKS	INSTRUMENTS/ SUPPLIES	LOCATION AND DURATION OF MONITORING	SAMPLING/ ANALYTICAL METHOD	ACTION LEVELS/ RATIONAL	RESPONSE ACTIONS
Gross α, β/γ contamination	Drilling and Backfill operations and at the discretion of ESH-1 and/or the RWP	Low volume air sampler (giraffe), filter paper	Downwind and at borehole opening	Per section 6 of the SSHASP and ESH-1-05-02, "Air Monitoring Procedure" and ER addendums.	10% of DAC/10 CFR 835	Stop work, Contact ESH-1 immediately

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

In accordance with Section 7 of the HASP, PPE requirements are specified below for each task or group of tasks having different requirements. Only personnel who are trained and qualified to use the equipment in accordance with Section 7 of the HASP and Section 10 of the HASP and SSHASP are allowed to use the equipment specified. Any exceptions or deviations from requirements of these sections are noted below.

TABLE 7
PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE REQUIREMENTS	TASK(s)												
	1-A	1-B	2-A.1	2-A.2	2-A.3	2-A.4	2-B	2-C	2-D	2-E	3	4	5
Head	Hard hats are required where overhead hazard exists [e.g. within a radius around the drill rig equivalent to the height of the mast when it is in the raised position (per 29 CFR 1910.135, ANSI Z89.1-1986, or Z89.2 for electrical shock protection)]												
Eyes	All tasks(at SSO discreation)Safety glasses (with side shields); (per 29 CFR 1910.133, ANSI Z87.1-1989)												
Face													
Welding Helmet					X								
Lens Shade No. 12					X								
Body	All tasks while in active EZ, breathable cloth coveralls, which will be laundered in accordance with BUS-4 procedures. Coveralls will be changed when they become visibly soiled and/or contamination is suspected. Contaminated coveralls will be packaged and transported in accordance with applicable ESH-1 standards. During welding operations the welder shall wear a protective apron.												
Hands													
INNER GLOVES:													
None	X	X		X						X			
Nitrile			X		x	X	X	X	X		X	X	X
OUTER GLOVES:													
None							X	X				X	
Work gloves	X	X	X	X	x	X			X	X	X		X
Feet	All tasks: Steel-toed shoes (per 29 CFR 1910.136, ANSI Z41-1991). At SSOs discretion.												
Ears	Based on data collected at other LANL drilling sites, single ear protection(ear plugs, or muffs, with a min. NRR of 25) is adequate for all anticipated situations. Ear protection requirements will be evaluated as additional noise monitoring data is collected.												

PPE requirements for radioactive contamination will be specified in the RWP.

PPE requirements will be constantly reviewed based on the most recent hazard constituents and concentrations. If a major change to PPE (i.e., change to level C or higher) is required, a modification to this portion of the SSHASP will be required.

8.0 DECONTAMINATION

In accordance with Section 8 of the HASP, personnel and/or equipment decontamination requirements are specified below. Any exceptions or deviations from Section 8 of the HASP are noted below.

TABLE 8 PERSONNEL AND EQUIPMENT DECONTAMINATION
Personnel and Environmental Monitoring Equipment (EME)
Standard Approach Level D
Commercial soap. Aqueous rinse. Personnel will wash hands and face prior to breaks or leaving RCA for the day. Separate areas may be established within the RCA to prevent the spread of contamination. Site personnel will be briefed on the proper procedures to follow for leaving these areas. In the event contamination is encountered decontamination procedures of ESH-1- 09-05.1 (External Personnel Contamination) will be followed.
Sampling and Heavy Equipment
Hand-held equipment is deconned at EZ using contractor supplied equipment per LANL-ER-SOP-1.08-RO. The equipment will first be washed with an Alconox®/tap water wash, then rinsed with tap water, and rinsed again with deionized water. Decontaminanation rinsate will be handled IAW site-specific Waste Characterization Strategy. Augers may also be decontaminated at the TA-50 decon facility, utilizing facility personnel and procedures. The augers will be released by an ESH-1 RCT, or equivalent, wrapped in plastic sheeting, and transported to TA-50.

9.0 EMERGENCY/INCIDENT ACTION PLAN

Incident/emergency action requirements, equipment, and supplies are specified below for each task or group of tasks having different requirements. Response to an incident or emergency shall occur according to Section 9 of the HASP and this section. Any exceptions or deviations from requirements of the HASP are noted below.

In the event of an incident or emergency, the FTL will function as the site emergency/incident coordinator, as necessary, and will arrange for immediate notification of LANL emergency response personnel to take control of the scene and/or arrange for immediate notification of appropriate authorities. Other key onsite incident/emergency response personnel are identified below. Only personnel who are trained and certified in accordance with Sections 7, 9, and 10 of the HASP and SSHASP are allowed to respond and use the equipment specified. Incident/emergency contacts and telephone numbers and a map indicating the route to the nearest hospital and medical clinic from each investigation site are included in Appendix D. Both these items shall be posted on-site where readily accessible to field team personnel. Site-specific muster areas shall be determined by the SSO prior to the start of field operations each day and shall be communicated to individuals on-site during the HS Tailgate meeting and as other individuals arrive at the site. Location(s) of muster areas may vary from day-to-day depending upon variable site operations and conditions, and shall be documented daily by the SSO or FTL.

9.1 ADJACENT FACILITIES OF CONCERN

At MDA B the adjacent facilities of concern are the businesses on the north side of DP road. These businesses will be contacted prior to starting work .

At MDA U TSTA is the closest facility. Work will be coordinated with that facility to ensure no interference with their operations.

All radiological incidents will be handled as described in Laboratory procedure "LP 107-01.0, Notification and Reporting of Radiological Incidents". The ESH-1 Oversight Technician will be contacted in the event of any incident or emergency.

TABLE 9
INCIDENT/EMERGENCY ACTION REQUIREMENTS

First-Aid/CPR Provider(s):, Raymond Wright; SSO/HPT, JOHN HAYES, ALT.

REQUIREMENTS	ALL TASKS
Communications	Air horns and voice communication. Description of air horn signals: One long blast means work crew is to evacuate area and muster in the designated area.
Incident Response Equipment	First-aid kit that complies with 29 CFR 1926.50(d); Biological pathogen and waste disposal kit that complies iwth 29 CFR 1910.1030(c) and (d); Portable emergency eyewash[1]
Refueling	Refueling will be conducted in accordance with 29 CFR 1926.152(d),(e), and (f).
Fire Extinguishing Equipment	A:B:C Fire extinguishers: 20 lb. capacity, located on drill rig and in support trailer
Spill Containment Equipment	Absorbent pads and vermiculite may be kept on-site in case of release of material (i.e., hydraulic fluid).

1 Emergency eyewashes must be located within 10 seconds travel time and not more than 100 feet of travel distance of any source of chemical splash that may be corrosive or moderately to severely irritating to body tissue. They must have a capacity to be able to provide continuous flushing for the duration of time necessary to sufficiently flush the most hazardous substance for which the device is being specified. They also shall be inspected as per manufacturers directions by the SSO or designee. Refer to ANSI Z358.1-1990 for further information.

10.0 TRAINING

Training requirements are specified below by job title for each task or group of tasks having different requirements. Personnel shall be trained in accordance with Section 10 of the HASP and as specified below. Any exceptions or deviations from requirements of the HASP are noted below. Personnel performing the roles indicated below shall have completed and have current documentation of the training specified. The SSO, or the FTL, shall verify that personnel have met the training requirements prior to authorizing individuals to enter controlled zones of the work site.

TABLE 10
TRAINING REQUIREMENTS

(Sup = Supervisors; CP = Competent Person for that subject, which in some cases may be the user only; R = Read training; C = Classroom training; F = Field training; AN = As needed per the HASP or applicable regulatory requirement; ER = Employer required)

Applicable Task(s): All

Training Requirement	FTM/FTL	SSO	RCT/RSP	SAMP	GEOL	Geophys & Geodetic Surveyors	Driller	Drill Asst	Heavy equip Operator	FWM
HASP	R	R	R	R	R	R or F	R or F	R or F	R or F	R
SSHASP	R	R	R	R	R	R or F	R or F	R or F	R or F	R
LANL Safety Commitment	R	R	R	R	R		R	R	R	R
Pre- Job Start HS Briefing (per Section 10.1 of HASP)	F or C	F or C	ForC	F or C	F or C	F or C	F or C	F or C	F or C	F or C
aily HS Tailgate Mtgs (per Section 10.2 of HASP)	F	F	F	F	F	F	F	F	F	F
General Employee Training (GET) - LANL provided only. [Required for anyone onsite >10 consecutive work days]	C	C	C	C	C	AN	C	C	F	C
Conduct of Operations & Occurrence Reporting	R	R	R	R	R	R	R	R	R	R
OSHA Rights & Responsibilities	R	R	R	R	R	R	R	R	R	R
Health Physics Checklist Indoctrination	C	C	C	C	C	C	C	C	C	C
Rad. Worker II (LANL or equiv.)	C	C	C	C	C	C	C	C	C	C
40 hr. HAZWOPER [per 29 CFR 1926.65(e)(3)(i)]	C	C	C	C	C		C	C	C	C
24 hr. Supervised Fieldwork [per 29 CFR 1926.65(e)(3)(i)]	F	F	F	F	F		F	F	F	F
24 hr. HAZWOPER [per 29 CFR 1926.65(e)(3)(ii-iv)]						C				
8 hr. Supervised Fieldwork [per 29 CFR 1926.65(e)(3)(ii-iv)]						F				
8 hr. Annual Refresher [per 29 CFR 1926.65(e)(8)]	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN
hr. HAZWOPER Supervisor [per 29 CFR	C	C								

Training Requirement	FTM/FTL	SSO	RCT/RSP	SAMP	GEOL	Geophys & Geodetic Surveyors	Driller	Drll Asst	Heavy equip. Operator	FWM
1926.65(e)(4)]										
SSO [per Section 10.1.1.5 of the HASP]		R, F, or C								
Health Physics Personnel (per ESH-1 RSAA)			Cert.							
1st Aid (Amer. Red Cross or equiv.)[per 29 CFR 1926.50(c)])		Cert.								
CPR (Amer. Red Cross or equiv.)		Cert.								
Employer's Hazard Communication Program [29 CFR 1926.59(e)]	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C
First Responder Awareness Level [per 1926.65(6)(i)(Athru F)]	C	C	C	C	C	C	C	C	C	C
Fire Extinguisher Use[per 29 CFR 1926.150(c)(1)(xi)]		F or C					F or C	F or C		
LANL Waste Documentation Forms Training (per Sect 10.4.5 of the HASP)										C
Waste Generation Overview(per Sect 10.4.5 of the HASP)										C
Hazardous Materials Packaging and Transportation (per 49 CFR 172.700-704; HASP Sect. 10.6)							C			
PPE (per Section 7.1 of HASP)	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C
Hearing Conservation [Per Section 4.2.2.7 of HASP]	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C
Sanitation [29 CFR 1926.51]		R								
Materials Handling, Storage, Use, Disposal [29 CFR 1926.250 and 252]		R								
Signs, Signals, Barricades, [29 CFR 1926.200]		R								
Stairways, Ladders [29 CFR 1926.1060(a) and 1053(b)(15) and 32(f)]		R								
Tools - Hand and Power [29 CFR 1926.302(e)(1)]		R								
Electrical Safety Awareness [Subpart K of 29 CFR 1926]		R					R	R	R	
Motor Vehicles, Mechanized Equipment,		R					R	R	R	

Training Requirement	FTM/FTL	SSO	RCT/RSP	SAMP	GEOL	Geophys & Geodetic Surveyors	Driller	Drill. Asst	Heavy equip. Operat or	FWM
and/or Material Handling Equipment.										
Crane/Rigging Operator Safety [ANSI B30]		R					R	R		
Crane/Rigging Safety [29 CFR 1926.251, 406, 550(a)]		R					R	R		
Hoists [29 CFR 1926.406, 552]		R					R	R		
Welding and Cutting [29 CFR 1926.350(d) and 351(d) and 354(a)]		R					R	R		
Bloodborne Pathogens [29 CFR 1910.1030]		C								

11.0 MEDICAL SURVEILLANCE

The medical surveillance requirements of this section have been established in accordance with Section 11 of the HASP, unless noted otherwise below.

TABLE 11
MEDICAL SURVEILLANCE REQUIREMENTS

Hazard	Task(s)	Action Level	Requirement
Hazardous Waste Operations	ALL	Potential for exposure to hazardous substances or health hazards ≥ PELs or published exposure limits during HAZWOPER work	29 CFR 1926.65(f)
Bloodborne Pathogens (Or Potentially Infectious Materials)	4-A	Any occupational exposure	29 CFR 1910.1030(f)
Hearing Protection	Depending on noise exposure assessment	≥ 85 dBA	29 CFR 1910.95(g)

12.0 QUALITY CONTROL & QUALITY ASSURANCE (QC/QA)

12.1 SITE INSPECTIONS

In accordance with Section 12 of the HASP, the FTL shall see that the following inspections are conducted and documented, and that appropriate actions are taken and documented to rectify identified deficiencies, if any.

TABLE 12
INSPECTION REQUIREMENTS

Inspection	Inspector	Task(s)
Job Site, Material and Equipment (in accordance with 29 CFR 1926.20(b)(2))	SSO	ALL
General Sanitation (i.e., potable and non-potable water, toilets, washing facilities, eating and drinking areas, vermin control, and/or change rooms; in accordance with 29 CFR 1926.51)	SSO	ALL
Materials handling, storage, use and disposal (in accordance with 29 CFR 1926.250 and 252)	SSO	ALL
Signs, Signals and Barricades (in accordance with 29 CFR 1926.200)	SSO	ALL
Motor vehicles and mechanized equip. (in accordance with Subpart O of 29 CFR 1926)	SSO or CP	ALL
PPE (Section 7 and 29 CFR 1926.95)	User	ALL
Weekly inspection of cutting and waste storage areas	FWM	ALL
Incident/emergency response equipment (prior to each use and at least according to manufactures instructions)	SSO	5
Fire extinguishing equipment (per 29 CFR 1926.150(a) and (c))	SSO	5
Heavy Equipment(per 29CFR1926.201 and Subparts N and O)	CP	2-A.2
Derricks (e.g., drill rigs) and Cranes (per 29 CFR 1926.550(a)(5),(6) and 406(a))	CP	2-A.1, 2-A.4
Rigging (per 29 CFR 1926.251(a))	CP	2-A.1, 2-A.4
Tools - hand and power (in accordance with Subpart I of 29 CFR 1926)	User and SSO	ALL
Welding and cutting equipment (in accordance with Subpart J of 29 CFR 1926)	CP	2-A.3
Electrical equipment (per 29 CFR 1926.403(b) and/.or 416(f)(8))	CP	ALL

13.0 RECORDKEEPING

In addition to recordkeeping requirements of Section 13 of the HASP, the HS records specified below shall be completed in accordance with Section 13 of the HASP and kept onsite as indicated below.

TABLE 13
RECORDKEEPING REQUIREMENTS

Record/Form	Requirement Reference	Keep Onsite
HASP	HASP Section 1	X
This SSHASP	HASP Section 1	X
Completed SSHASP Modification forms	HASP Section 1	X
SSOs Daily Logbook	HASP Section 13.1	X
Documentation of Training Requirements	HASP Section 10	X
Documentation of Medical Surveillance	HASP Section 11	X
Exposure Monitoring Records	Section 6 of the HASP and Applicable Methods in ER Project Manual for Site H&S Activities	X
HS Inspection Records	HASP Section 12.1	X

APPENDIX A

MAP(S) OF SITE LOCATIONS, ADJACENT FACILITIES AND SITE CONTROL ZONES/FACILITIES

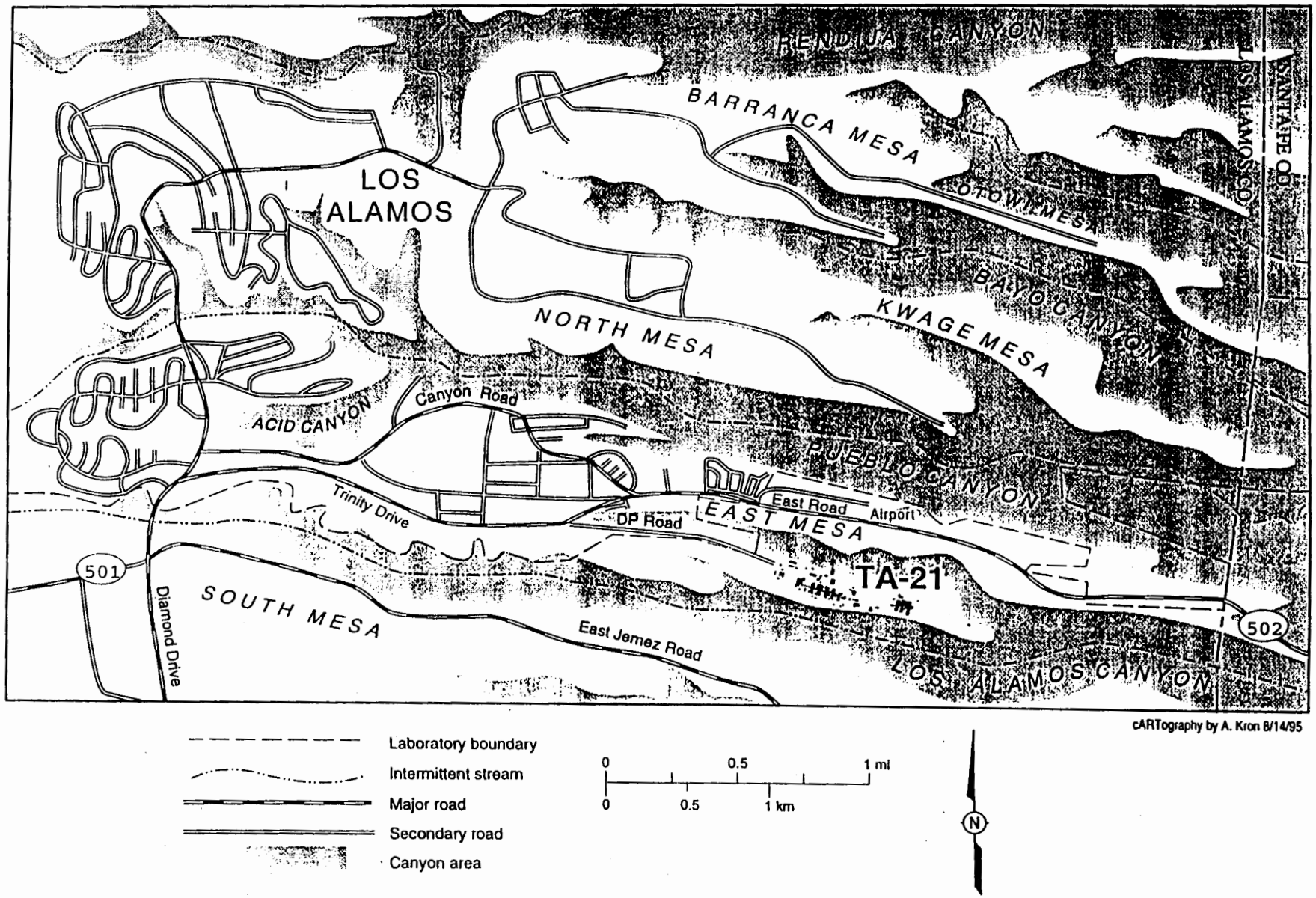


Fig. 1.1-1. General location of TA-21 (DP-site).

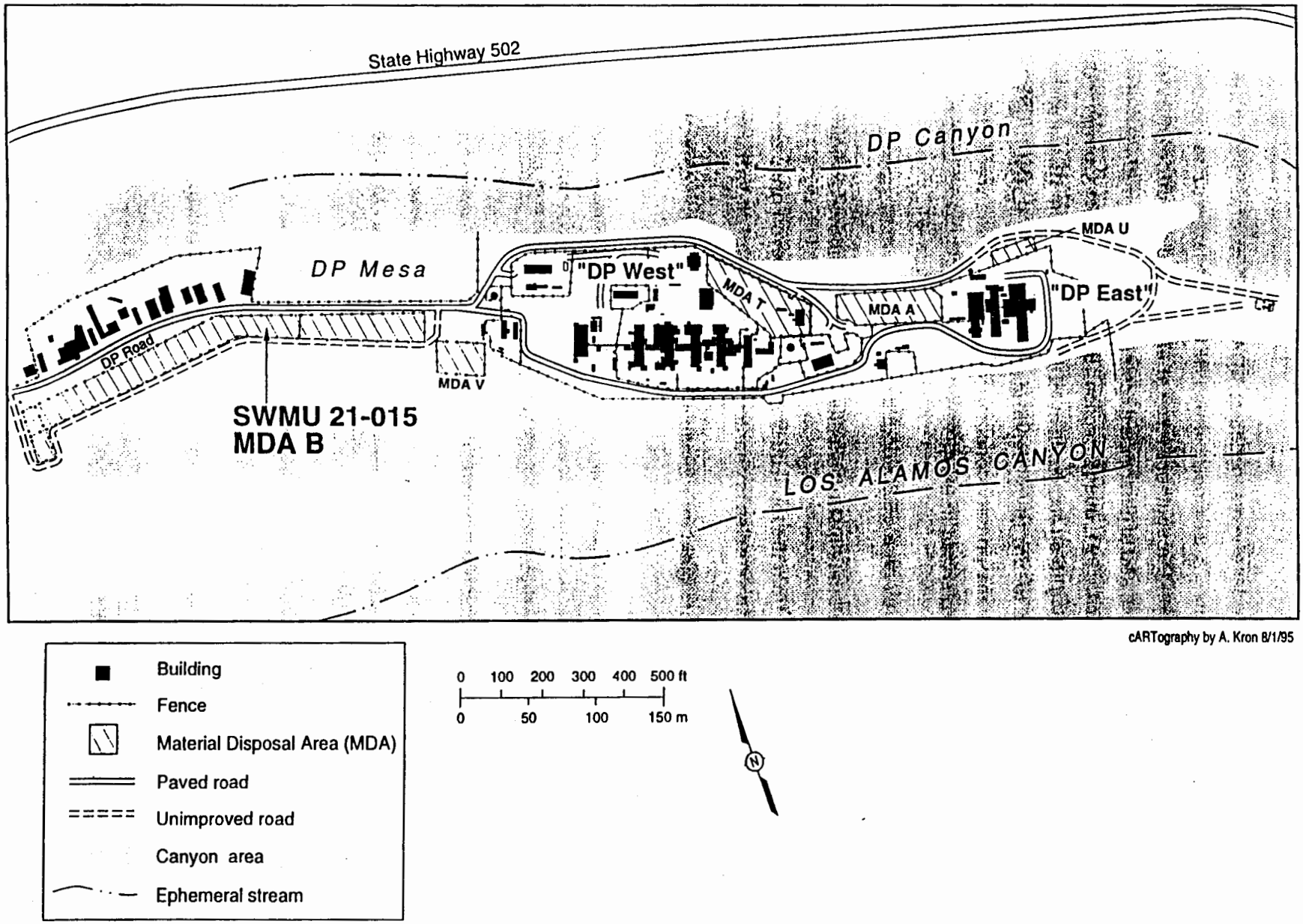


Fig. 1.1-2. Location of MDA B at TA-21.

APPENDIX B

HAZARDOUS SUBSTANCE - HAZARD ASSESSMENT

APPENDIX B
Hazard Assessment of Detected Radiological and Chemical Contaminants at MDA-B and MDA U

MDA B

As stated in table 2, the amount and type of chemical and radiological waste disposed of at MDA B is not known. Since its closure many surface and subsurface sampling programs have been conducted. The results of these sampling programs is summarized below.

RADIONUCLIDES

NUCLIDE	HIGHEST DETECTED CONCENTRATION pCi/g	HAZARD ASSESSMENT
Am-241	3	**MINOR**-Given the planned activities at MDA B, there is a minor chance of irreversible injury due to these radionuclides. Results of the monitoring performed IAW Table 6.1 will be continuously evaluated to ensure proper hazard assessments are in place.
Cs-137	46.4	
Pu-238	0.144	
Pu-239	87.2	
Sr-90	8	
Total U	11.92	
U-235	0.54	
Ra-226	6.44	

Tritium	4,740,000(Sample date 1982)	**SERIOUS-** due to this high level of tritium there is a chance of irreversible harm with no engineering controls in place.

MDA U

The exact amount of liquid waste disposed of at MDA U is not known. The types of nuclides and the exact amount of one nuclide(Ac-227) is known. The following sample results have been obtained through various activities since the site closure in 1985.

Radionuclides	Concentration	Exposure Limit	Hazard Assessment and Rationale
Po-210	unknown	100mrem/yr	Neg.-138 day half life
Tritium	11,100 pCi/l	100mrem/yr	Neg.-Exposure of <0.01 DAC possible
Pu-239	1.040 pCi/g	100mrem/yr	Neg.-Exposure of <0.01 DAC possible
total U	750 µg/g	100mrem/yr	Neg.-Exposure of <0.01 DAC possible

Metals, Volatile, and Semivolitals

There is no record of sampling for metals, volatile or semivolitals at MDA U. There is information in the site history that precipitator oil was discharged to the beds and that in 1980 tar was sampled in the beds. The beds have since been covered with fill material.

Due to the information available a HAR of MINOR for metals, volitals and semivolitals. The monitoring IAW Table 6.1 will be closely evaluated to ensure proper health and safety of personnel.

Dust Action Level Calculation For lead levels at 21-MDA B

This Calculation will show the dust level necessary to exceed the exposure limit for lead during work at 21-24(I). The following assumptions are made.

Highest detected lead level- 56.6 mg/kg

Safety Factor(SF)- 4

Lead exposure limit-0.05 mg/ m^3

The equation used is: Dust Action Level(DAL) = (10^6 mg/kg conversion factor) (Exposure limit mg/m^3) ÷ (concentration in soil mg/kg) (SF)

Using the numbers for 21-MDA B the equation becomes:

DAL_{lead}= (10^6 mg/kg) (0.05 mg/m^3) ÷ (56.6 mg/kg) (4)

DAL_{lead}= 220.8 mg/m^3

Dust is visible at ≈ 2 mg/m^3 therefor. as long as we control dust to under visible levels there will not be a real chance of lead exposure.

The lead at 24(I) is located in the sludge . The chances of this material drying enough to become a airborne problem is negligible

Dust Action Level Calculation For Beryllium levels at 21-MDA B

This Calculation will show the dust level necessary to exceed the exposure limit for beryllium during work at 21-MDA B. The following assumptions are made.

Highest detected beryllium level- 5.04 mg/kg

Safety Factor(SF)- 4

Benzene exposure limit- 0.002 mg/ m^3

The equation used is: Dust Action Level(DAL) = (10^6 mg/kg conversion factor) (Exposure limit mg/m^3) ÷ (concentration in soil mg/kg) (SF)

Using the numbers for 21-MDA B the equation becomes:

$DAL_{benzene}$= (10^6 mg/kg) (0.002 mg/m^3) ÷ (5.04 mg/kg) (4)

$DAL_{benzene}$= 99.2 mg/m^3

Dust is visible at ≈ 2 mg/m^3 therefor, as long as we control dust to under visible levels there will not be a real chance of beryllium exposure.

Dust Action Level Calculation For Manganese levels at 21-MDA B

This Calculation will show the dust level necessary to exceed the exposure limit for manganese during work at 21-MDA B. The following assumptions are made.

Highest detected manganese level- 759 mg/kg

Safety Factor(SF)- 4

manganese exposure limit- 1.0 mg/ m^3

The equation used is: Dust Action Level(DAL) = (10^6 mg/kg conversion factor) (Exposure limit mg/m^3) ÷ (concentration in soil mg/kg) (SF)

Using the numbers for 21-MDA B the equation becomes:

$DAL_{manganese}$= (10^6 mg/kg) (1.0 mg/m^3) ÷ (759 mg/kg) (4)

$DAL_{manganese}$= 329.3 mg/m^3

Dust is visible at ≈ 2 mg/m^3 therefor, as long as we control dust to under visible levels there will not be a real chance of manganese exposure.

Dust Action Level Calculation For Zinc levels at 21-MDA B

This Calculation will show the dust level necessary to exceed the exposure limit for zinc during work at 21-MDA B. The following assumptions are made.

Highest detected zinc level- 137 mg/kg

Safety Factor(SF)- 4

zinc exposure limit- 1.0 mg/ m^3

The equation used is: Dust Action Level(DAL) = (10^6 mg/kg conversion factor) (Exposure limit mg/m^3) ÷ (concentration in soil mg/kg) (SF)

Using the numbers for 21-MDA B the equation becomes:

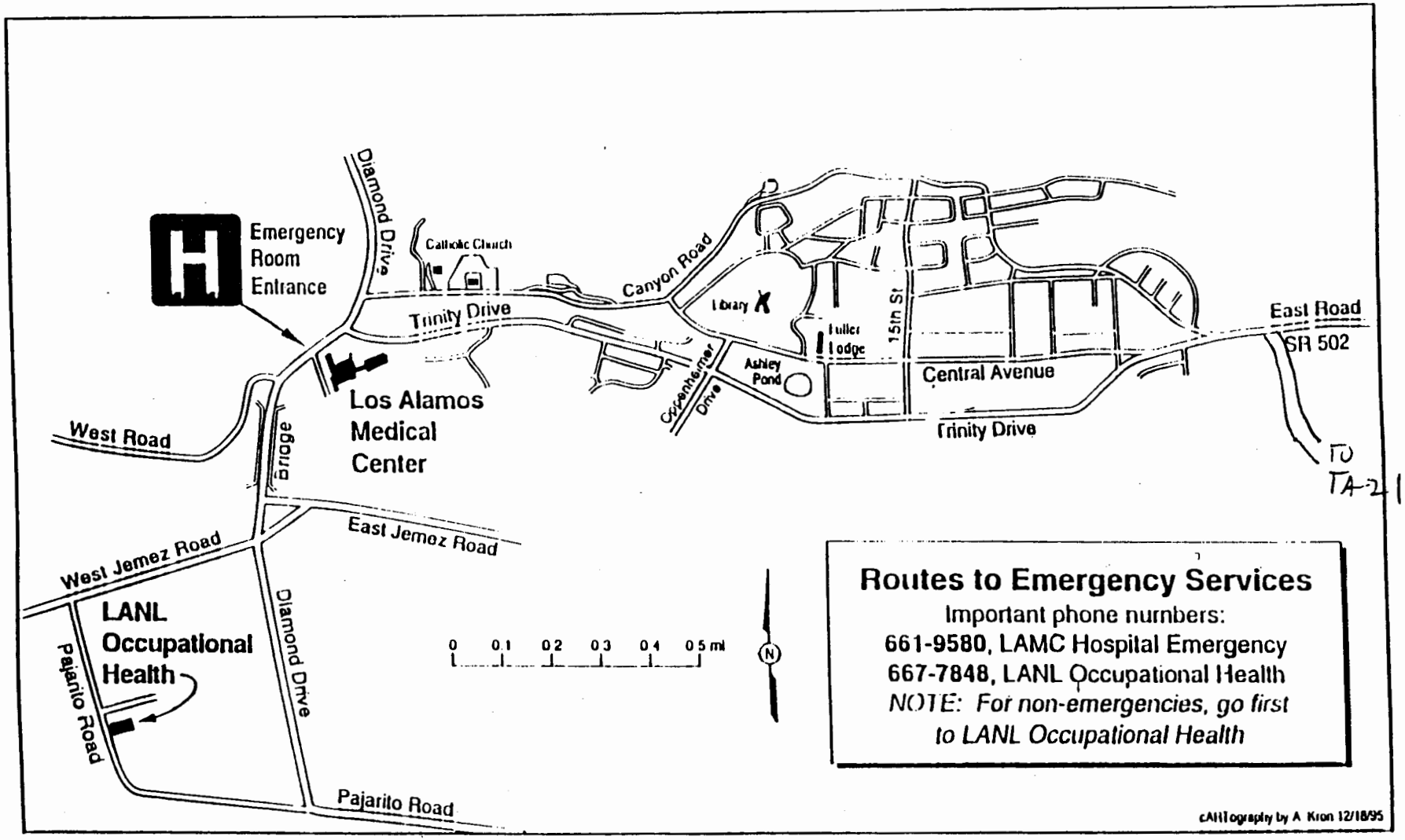
DAL_{zinc}= (10^6 mg/kg) (1.0 mg/m^3) ÷ (137 mg/kg) (4)

DAL_{zinc}= 1825mg/m^3

Dust is visible at ≈ 2 mg/m^3 therefor, as long as we control dust to under visible levels there will not be a real chance of zinc exposure.

APPENDIX C

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES OF HAZARDOUS CHEMICAL SUBSTANCES


Emergency Room Entrance
Diamond Drive
Catholic Church
Trinity Drive
Canyon Road
Library
Fuller Lodge
15th St
East Road
SR 502
Ashley Pond
Central Avenue
Trinity Drive
Los Alamos Medical Center
West Road
Bridge
East Jemez Road
West Jemez Road
LANL Occupational Health
Pajarito Road
Diamond Drive
Pajarito Road
0 0.1 0.2 0.3 0.4 0.5 mi
N
Routes to Emergency Services
Important phone numbers:
661-9580, LAMC Hospital Emergency
667-7848, LANL Occupational Health
NOTE: For non-emergencies, go first to LANL Occupational Health
cAHtography by A. Kron 12/18/95

TO TA-21

EMERGENCY CONTACTS AND PHONE NUMBERS

(Post on-site in Support Zone)

MEDICAL EMERGENCY/FIRE:

Los Alamos Fire Dept.....LANL phone: **911**

Cellular phone.....**667-7080**

HAZARDOUS RELEASE/SPILL:

LANL EM&R (FSS-20).....**667-6211**

LANL Occupational Medicine Clinic (ESH-2)...**667-0660**

Los Alamos Medical Center Hospital.....**662-4201**

Security/PTLA.....**667-6534**

Los Alamos Police.....**662-8224**

LANL Health and Safety - ESH-5.....**665-7221**

ESH-1 Health Physics Operations.....**665-7461**

FMU-80 Facility Manager-David Padilla.....**667-2408**

FMU-80 Facility Coordinator-Charles Trujillo.....**667-0491**

FMU-80 Health and Safety-Rick Eddeiman.....**665-5364**

FAPL:Allyn Pratt.....**667-4308**

FAOM:Gary McMath..... **665-4969**

FTM:John Hopkins.....**662-1327**

FTL:Jayne Jones.....**662-1307**

Focus area HS Rep.: Trung Nguyen.....**667-7905**

FA ESH-1 Oversight Tech.: John Elliott.....**665-7461/104-7264**

EMERGENCY CONTACTS AND PHONE NUMBERS

Management Contacts:

MK/PMC H&S Rep: Ken McFadden.....**662-1302**

Stewart Brothers Drilling: Paul Garcia.....(505)287-2986/469-0305 **(cel)**

MK/PMC Principals: Clark Judy 662-3700

Al Funk.....662-1323

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 employees
- Actions taken and assistance required

PRE-JOB START HEALTH & SAFETY BRIEFING / HASP & SSHASP ACKNOWLEDGMENT FORM

ect Title: Site characterization MDA B / MDA U Date: 7-14-98

s): 21 SSHASP No.: 209

ducted by:

IGHT, RAYMOND	550	EM/ER	117303
ted Name	Title	Employer or LANL Group	Z Number

Signature Date 7-14-98

I acknowledge that I understand the ER Project HASP requirements to this fieldwork and have read or been briefed on the contents of this SSHASP in accordance with requirements of Sections 1.2.2 and 10.1.1 of the ER Project HASP.

NAME	EMPLOYER/GROUP	Z NUMBER	SIGNATURE/DATE
y Wright	PMC	117303	7-14-98
OTT MCQUEEN	Bay Geophysics	116813	7-14-98
N KISIEL	SEA	115286	
AYNE JONES	PMC	115285	
KENT CALDER	SURV-TEK	115656	
M. H. ADAMS	SURV-TEK	585-56-9107	
illie J. Cordova	SG Western	112907	
by Williams	SG Western	117125	

PRE-JOB START HEALTH & SAFETY BRIEFING / HASP & SSHASP ACKNOWLEDGMENT FORM

ject Title: _____ Date: _____

s): _____ SSHASP No.:_____

nducted by:

nted Name | Title | Employer or LANL Group | Z Number

Signature | Date

I acknowledge that I understand the ER Project HASP requirements to this fieldwork and have read or been briefed on the contents of this SSHASP in accordance with requirements of Sections 1.2.2 and 10.1.1 of the ER Project HASP.

NAME	EMPLOYER/GROUP	Z NUMBER	SIGNATURE/DATE