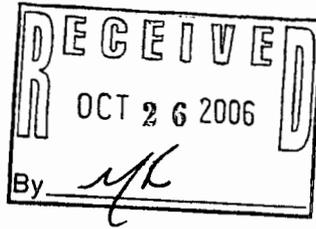


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May 5, 2005
ER-2005-0268

**Site-Specific Health & Safety
Plan (SSHASP)
Interim Measure and
Investigation of SWMU 21-018(a)-
99, MDA-V at TA-21**



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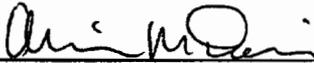
Los Alamos National Laboratory
ENVIRONMENTAL STEWARDSHIP (ENV) – ENVIRONMENTAL REMEDIATION AND
SURVEILLANCE (ERS) PROGRAM
SITE-SPECIFIC HEALTH & SAFETY PLAN (SSHASP)
Project Name: Interim Measure and Investigation of SWMU 21-018(a)-99, at TA-21

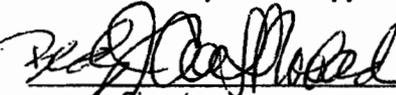
SSHASP Number: 05-00X

Addendum Number: 0

The Los Alamos National Laboratory (LANL) RRES-R Program Health and Safety Requirements Manual (HSRM) is a supplement to this SSHASP 05-00X and shall be complied with as applicable. Copies of the HSRM and this SSHASP are to be readily accessible for review on-site by individuals who may be exposed to hazards resulting from work conducted under the scope of this SSHASP. Personnel performing work under the scope of this SSHASP are required to sign the LANL ENV Work Authorization and Health & Safety (H&S) Briefing Acknowledgement page. The signature indicates that they are aware of the hazard information documented herein and will abide by requirements of these plans to eliminate or lessen the risk of injury or illness from exposure to the identified hazards.

APPROVALS/CONCURRENCE


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 5/5/05
ENV-ERS Group Leader Approval


 Signature Name/Title ENV LANL Group Date
 5/5/05
~~MoA~~ **Remedial Action Focus Area Project Leader Approval**


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Portage Environmental Inc. H&S Manager or Designee Approval


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 5/5/05
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ER/ESH-5 Representative Concurrence


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LIST OF ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Standards Institute
AOC	Area of Concern
ATV	all-terrain vehicle
BBP	bloodborne pathogen
BMP	best management practice
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
dBA	decibels (A-weighted scale)
DOE	U.S. Department of Energy
ENV	Environmental Stewardship Division
ERS	Environmental Remediation and Surveillance Program
ESA	Engineering Sciences and Applications
ES&HP	Portage Environmental, Safety and Health Plan
EZ	exclusion zone
ft	feet or foot
FTL	Field Team Leader
FWO	Facility Waste Operations
HAR	hazard assessment rating
HAZWOPER	Hazardous Waste Operations and Emergency Response
HE	high explosive
HEPS	HE Production Sites
H&S	Health and Safety
HSR	Health, Safety, and Radiation Group
HSR-1	Health Physics Operations Group
HSR-2	Occupational Medicine Group
HSR-5	Industrial Hygiene and Safety Group
HSRM	Health and Safety Requirements Manual
in.	inch or inches
IMP	implementation procedure
ISM	Integrated Safety Management
IWD	Integrated Work Document
IWM	Integrated Work Management
JSA	job safety analysis
kV	kilovolt
lbs.	pounds

LAMC	Los Alamos Medical Center
LANL or Laboratory	Los Alamos National Laboratory
LIR	Laboratory Implementation Requirement
LPR	Laboratory Performance Requirement
mg/m ³	milligrams per cubic meter
MSDS	material safety data sheet
NRR	noise reduction rating
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure limit
PIC	person in charge
PM	project manager
Portage	Portage Environmental, Inc.
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
RCT	radiation control technician
RFI	RCRA Facility Investigation
RLM	responsible line manager
Shaw	Shaw Environmental, Inc.
SSHASP	Site-Specific Health and Safety Plan
SSO	site safety officer
SVOC	semi-volatile organic compound
SWMU	Solid Waste Management Unit
TA	technical area
THA	Task Hazard Analysis
TLD	thermoluminescent dosimeter
TLV	threshold limit value
UXO	unexploded ordinance
VOC	volatile organic compound

1.0 INTRODUCTION

The Los Alamos National Laboratory (LANL or Laboratory) Environmental Stewardship-Environmental Remediation and Surveillance (ENV-ERS) Program, formerly Risk Reduction and Environmental Stewardship-Remediation (RRES-R) Project, is participating in a national effort by the U.S. Department of Energy (DOE) to clean up sites and facilities formerly involved in weapons research and development. The scope of the ENV-ERS Program is largely performed by members of the ENV Division's Environmental Characterization and Remediation (ENV-ECR) Group and its subcontractors. The goal of ENV-ERS Program is to ensure that past operations under the DOE do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, ENV-ERS is preparing to remediate sites potentially contaminated by past Laboratory operations. These sites under remediation are designated as solid waste management units (SWMU) or areas of concern (AOC).

This section contains a description of the site, a brief overview of general ENV-ERS field activities, the objectives of this Site-Specific Health and Safety Plan (SSHASP), a description of how the SSHASP is organized, a description of how the SSHASP will be implemented, and a description of how this SSHASP meets the functions and guiding principles of Integrated Safety Management (ISM).

This SSHASP in conjunction with the site specific Integrated Work Document (IWD) provides project personnel a comprehensive project overview in order to define, understand, and manage Health & Safety (H&S) issues (hazards) associated with remedial cleanup activities located in Technical Area (TA) 21, Solid Waste Management Unit (SWMU) 21-018(a)-99 which includes Material Disposal Area (MDA)-V. LANL's ENV Division is directing cleanup and investigation activities at this Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) site.

SWMU 21-018(a)-99 is a consolidated unit comprised of the following SWMUs and AOC:

SWMU 21-018(a), MDA-V (three wastewater absorption beds)

SWMU 21-018(b), a former laundry facility for radioactively contaminated clothing

SWMU 21-023(c), a waste treatment laboratory septic system and outfall

SWMU 21-013(b), a surface disposal area consisting of building debris

AOC 21-013(g), a surface disposal area consisting of debris of unknown origin

SWMU 21-018(a)-99 is located on land currently owned by the DOE. While current land use is classified as industrial, it is proposed that this land will be transferred from DOE to a new owner; therefore, future land use is unknown. SWMUs 21-018(a) and 21-018(b) are mesa-top sites with direct drainage into BV Canyon and subsequent drainage into Los Alamos Canyon. SWMU 21-023(c) is partially on the mesa top (septic system) and partially on the canyon slope (outfall). SWMU 21-013(b) and AOC 21-013(g) are located on the south-facing slope of BV Canyon below MDA-V.

Several radionuclides and inorganic chemicals have been detected above background values at SWMU 21-018(a)-99. Organic chemicals, although not as prevalent, have also been detected.

Radionuclides and inorganic chemicals exceed screening action level (SAL) or soil screening level (SSL) in absorption bed 1 at MDA-V. Several radionuclides also exceed SALs on the outfall slope at SWMU 21-023(c). A few organic compounds exceed SSLs on the slope at SWMU 21-013(b).

This SSHASP is designed to fulfill the requirements and intent of the following:

The RRES-R Program Health and Safety Requirements Manual (HSRM)

The DOE and LANL (Integrated Safety Management) ISM System

1.1 Project Description

Characterization activities prescribed in the Investigation Work Plan for SWMU 21-018(a)-99, MDA-V, at Technical Area 21 (LANL 2004, 87358): Characterization fieldwork includes sampling of surface soils along the outfall 21-023(c) that runs down to BV Canyon from the southwest side of MDA-V, and drilling and sampling core from 15 boreholes. Two of the planned boreholes will be located within the fence of MDA-V. One borehole will be located between absorption beds #1 and #2, drilled down to ~380 ft below ground surface (bgs). Another borehole will be drilled to the west of absorption bed #3, down to ~40 ft bgs. The remaining 13 boreholes will be located around the perimeter of MDA-V; each drilled down to ~40

ft bgs. The core will be immediately screened and sampled according to target depths and screening levels. Cuttings will be placed in 55-gal drums and disposed of off-site. The field portion of this project will be conducted between May 2005 and the end of November 2005.

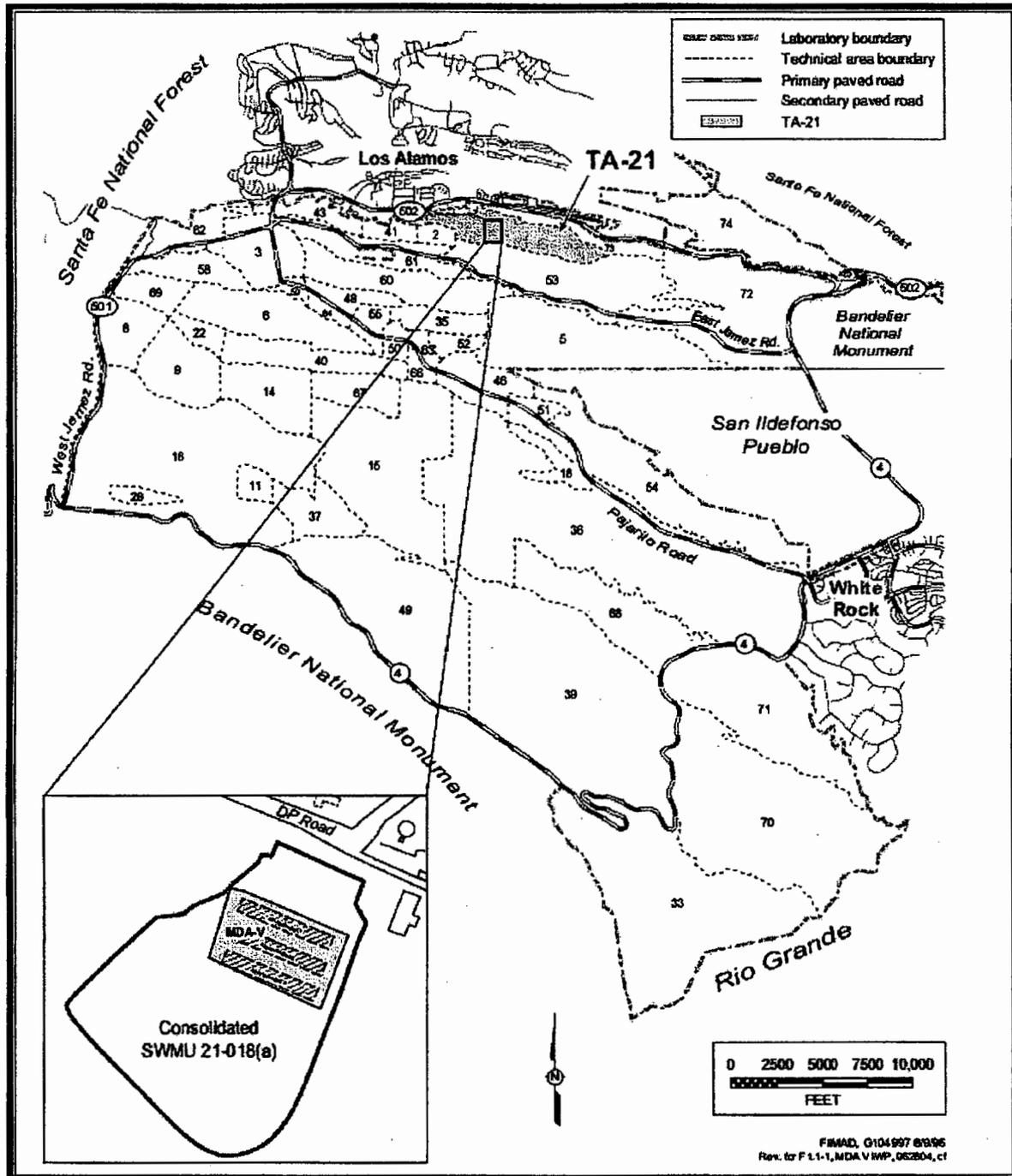


Figure 1.1-1. TA-21 Site location map

Remediation activities prescribed in the Investigation Work Plan for SWMU 21-018(a)-99, MDA-V, at Technical Area 21 (LANL 2004, 87358): Remediation field work includes removing the remaining infrastructure within MDA-V (distribution pipes leading to the absorption beds from former building 21-20 and distribution pipes in the absorption beds) and excavating a portion of the absorption bed fill material.

Trench samples will be taken from backhoe buckets during distribution line removal activities in the absorption beds to guide material removal activities. Also included in the remediation portion of this project is the removal of inlet and outlet lines to the septic system in 21-023(c) just west of MDA-V, removing surface debris south of MDA-V along the edge of DP Mesa and down the slope to BV Canyon, and removing soil in the area of the septic system outfall in 21-023(c). Generated waste will be handled in accordance with an approved Waste Characterization Strategy Form. The field portion of this project will be conducted between May and November of 2005.

The site will utilize HAZWOPER designated work zones as outlined in 29 CFR 1910.120. The area containing contamination is designated as the exclusion zone. Personnel leaving the exclusion zone (EZ) will pass through the contamination reduction zone (CRZ). The support zone is the area where supplies, office trailers, break areas and other support operations occur.

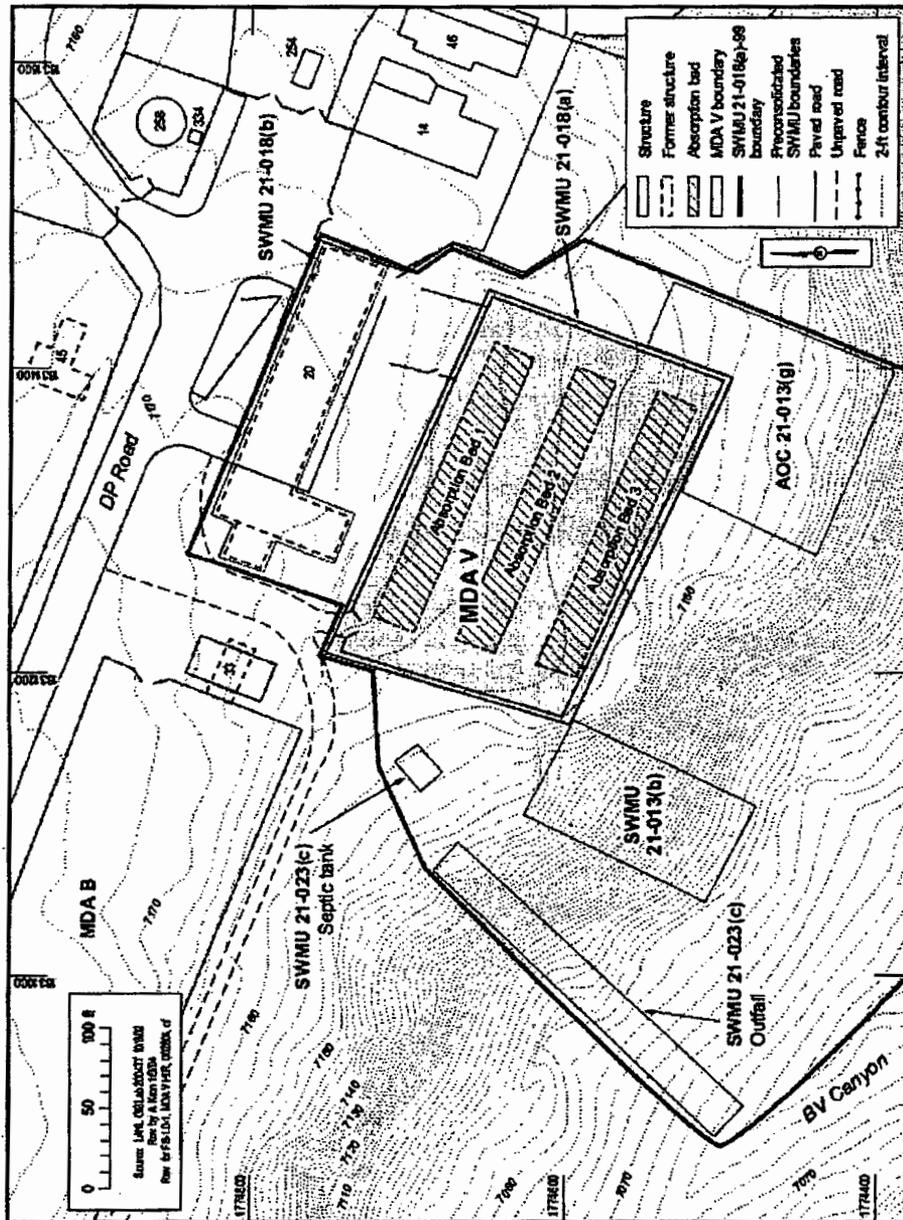


Figure 1.1-2. TA-21 SWMU 21-018(A)-99 Site map

1.2 SSHASP Objectives

This SSHASP and the associated IWD provides project personnel with a comprehensive project overview in order to define, understand, and manage health and safety issues (hazards) associated with remediation activities. This SSHASP is designed to fulfill the requirements and intent of HSRM, and the DOE and LANL ISM system. LANL ISM guidance (LA-UR-98-2837, Rev. 4, February 2003, "Integrated Safety Management") is designed to:

Define the characteristics of each site and each activity that could pose a hazard to site workers.

Individually evaluate the hazards to site workers specific to each characteristic of each site activity.

Define the hazard controls required to mitigate individual hazards.

Inform site workers of the hazards and the required hazard controls specific to each site task.

Provide a mechanism for continuous improvement of worker safety throughout the project.

1.3 SSHASP Organization

This SSHASP is divided into six chapters as follows:

Chapter 1 is the Introduction and describes the purpose and method of SSHASP implementation.

Chapter 2 describes General Institutional Requirements for the ENV-ERS Program Office, LANL, DOE, and Occupational Safety and Health Administration (OSHA) H&S requirements.

Chapter 3 addresses General Hazards.

Chapter 4 addresses Hazards specific to Solid Waste Management Unit (SWMU) and Area of Concern (AOC) including chemical and metal exposures.

Chapter 5 site specific Task Hazards are described in Integrated Work Documents (IWD) ER-2005-0269.

Chapter 6 provides Appendices.

1.4 SSHASP Approach to Hazard Identification

To meet the objectives defined for this SSHASP and the IWD, hazards were grouped into the following three distinct categories:

1. Hazards that are common to all activities conducted in any area (general hazards)
2. Hazards specific to areas where tasks will be performed (SWMU/AOC-specific hazards)
Site-specific hazards are due to intrinsic properties and physical characteristics of the individual areas.
3. Hazards that are specific to performing individual tasks (task-specific hazards)

1.4.1 General Hazards

General hazards are those posed to site workers that are present at all areas and are common to all tasks. Examples of hazards in this category include heat and cold stress, sunburn, flooding, and vehicle accidents. General hazards are described in Chapter 3 of this SSHASP.

1.4.2 Site-specific (SWMU/AOC) Hazards

Site-specific hazards are hazards identified at the above-mentioned SWMUs/AOC that relate to the site's operational history and potential contamination identified on site. Examples of hazards in this category include, but are not limited to: exposure to certain chemical contaminants, external radiation and nuisance dust. SWMU/AOC hazards and the associated mitigation controls are presented in Chapter 4 of this SSHASP.

This SSHASP addresses four SWMUs and one AOC. For each SWMU and AOC, the corresponding hazard analysis section of this SSHASP (Chapter 3) describes in detail the contaminants and their levels (if of concern), the hazard assessments for operations within that area, and the required hazard controls.

This SSHASP can be modified to address additional Areas of Operation including SWMU/AOCs by preparing a SSHASP, and if necessary the IWD, modification that specifies the contaminants, the hazard assessments for operations, and the required hazard controls for any new area of operation.

1.4.3 Task Specific Hazards

The hazards posed to site workers by tasks are due to the intrinsic hazards associated with performing the tasks, independent of the hazards posed by the Area of Operation. Task hazards are specific to the operation, e.g., drilling, excavation, etc.

Thirteen separate tasks have been identified. Each poses different risks to site workers based on the unique inherent hazards of the activities to be performed. These are:

Task 1: Equipment and Supplies Mobilization/Demobilization and Site Preparation

Task 2: Support Vehicle Operations

Task 3: Borehole Drilling

Task 4: Sample Activities

Task 5: Radiological Field Screening

Task 6: Borehole Geophysical Surveys

Task 7: Pore Gas Sampling

Task 8: Excavation Operations

Task 9: Hillside Debris Collection

Task 10: Waste Management

Task 11: Equipment Decontamination

Task 12: Best Management Practice (BMP) Installation and Site Restoration

The site specific IWD ER-2005-0269 presents an individual task description, and the preventative actions or requirements specific to each of the tasks listed above. The tasks listed above have been combined in the IWD, in some cases, where tasks performed and hazards associated with each task are similar.

The hazards identified through the hazard analysis process conducted in preparation of chapters 3, 4, and 5 (IWD) are summarized in the following list.

- **Accidental contact with moving equipment:** This hazard is defined as the impact causing injury to a site worker due to the normal operation of heavy equipment.
- **Alpha radiation:** This hazard is defined as a site worker illness or injury due to exposure to alpha radiation at the work site.
- **Beta/gamma radiation:** This hazard is defined as a site worker illness or injury due to exposure to beta or gamma radiation at the work site.
- **Blindness due to welding/cutting:** This hazard is defined as a site worker eye injury caused by infrared and ultraviolet radiation from welding.
- **Cave-in/personnel entrapment:** This hazard is defined as site worker injury or death due to the collapse of an excavation at the work site.
- **Chainsaw injury:** This hazard is defined as a site worker cut or amputation due to the operation of a chainsaw at the work site.
- **Electrocution – working with energized equipment (e.g. generator):** This hazard is defined as a site worker suffering an electrical shock or burn at the work site due to contact with an energized circuit during normal operations.
- **Electrocution – equipment maintenance:** This hazard is defined as a site worker suffering an electrical shock or burn at the work site due to contact with an energized circuit during equipment maintenance.
- **Equipment malfunction:** This hazard is defined as an equipment failure that could cause an injury to a site worker.
- **Excessive noise:** This hazard is defined as injury to the hearing of a site worker due to loud noises generated at the work site.
- **Exposure to on-site chemicals:** This hazard is defined as a site worker illness or injury due to exposure to chemicals at the work site needed to accomplish the task.

- **Exposure to contamination during equipment decontamination:** This hazard is defined as a site worker illness due to exposure to contamination at the work site.
- **Explosive/flammable environment:** This hazard is defined as site worker injury or death due to the unexpected combustion of gasses at the work site.
- **Falls:** This hazard is defined as a site worker injury due to a fall.
- **Fire:** This hazard is defined as the unexpected combustion of fuel or materials at the work site that could cause an injury to a site worker.
- **Heavy equipment operation:** This hazard is defined as the crushing of a site worker by moving heavy equipment from one location to another.
- **Heavy lifting:** This hazard is defined as a site worker injury due to lifting at the work site.
- **Injury from contact with a rapid release of compressed gas:** This hazard is defined as the unexpected release of or rapid pressurization of high-pressure systems resulting in system failure or explosion or the inadvertent contact with rapidly expanding gasses resulting in a low temperature contact injury (e.g. frostbite).
- **Injury from falls of greater than 6 feet (ft):** This hazard is defined as a site worker injury due to falling a distance of greater than 6 ft from equipment at the work site.
- **Injury from hand tools:** This hazard is defined as a site worker injury due to the operation of hand tools at the work site.
- **Injury from pinch points and rotating parts:** This hazard is defined as the capture of a body part or clothing by operating equipment at the work site that could cause an injury to a site worker.
- **Injury from underground utilities (electrical/fire/explosion hazards):** This hazard is defined as site worker injury or death due to contact with an underground-energized circuit or the combustion or detonation of materials due to an unexpected disturbance of underground utilities during excavation at the work site.
- **Mechanical lift systems, hoisting, and rigging operations:** This hazard is defined as a site worker injury due to improper use and/or application of mechanical lift systems or failure of inadequate mechanical lift systems.
- **Metals Contamination:** This hazard is defined as a site worker illness due to exposure to inorganic constituent contamination at the work site.
- **Overhead electrical hazard:** This hazard is defined as site worker injury or death due to contact with an overhead-energized circuit.
- **Particulates/dust:** This hazard is defined as a site worker illness due to exposure to particulates/dust at the work site that contains site contaminants.
- **Semi-volatile organic compounds (SVOCs):** This hazard is defined as a site worker illness due to exposure to SVOC constituent contamination at the work site.
- **Toxic substances in breathing zone:** This hazard is defined as a site worker illness or injury due to exposure to toxic welding gasses at the work site.
- **Unauthorized use of equipment:** This hazard is defined as operations unauthorized persons of site equipment by that could result in an injury to a site worker.
- **Volatile organic compounds (VOCs):** This hazard is defined as a site worker illness due to exposure to VOC constituent contamination at the work site.

1.5 Implementation

1.5.1 Daily Tailgate Safety Meeting

A daily tailgate safety meeting will be conducted before beginning each work day. The daily topics will be compiled from the general hazard analysis, the THA, and the IWD for those tasks that will be performed.

The Field Team Leader (FTL) or the Site Safety Officer (SSO) will prepare and present the Daily Tailgate Health and Safety Briefing Form (see Appendix A of this SSHASP) and record the meeting in each day's entry in the field notebook. Each field team member, as well as site visitors will sign each day's tailgate

safety briefing, acknowledging participation in the meeting. During the tailgate safety meeting, site workers and the FTL will review the previous day's activities to identify any new hazards and to discuss "lessons learned." In addition, the IWD prepared for fieldwork activities for SWMU 21-018(a)-99 will also be reviewed at this time. The IWD shall be discussed to ensure that everyone involved understands and agrees with the task/steps, hazards, and controls. The briefing shall include a discussion of stop work responsibilities and safe shutdown measures. Any suggested improvements to H&S or to implementation of the SSHASP and/or IWD will be documented and incorporated into this SSHASP by modification if deemed appropriate. If changes in the work or workers have occurred, then a reevaluation of the work, hazard, or controls may be needed. If changes to the IWD are needed, then the FTL may make editorial field changes to the IWD. Field changes cannot result in increases of scope beyond that which was originally approved in the work plan.

The daily tailgate safety meetings, in conjunction with IWD, and this SSHASP, will effectively communicate hazard controls to all site workers. Workers are expected to understand their responsibilities for implementing and working within the defined controls prior to beginning work.

1.6 Integrated Safety Management

This SSHASP is designed explicitly to incorporate all DOE and LANL ISM requirements and enhance the ISM process. In accordance with the following guidance for worker involvement published in the ISM Description Document (LA-UR-98-2837, Rev. 4, February 2003, "Integrated Safety Management"), managers, H&S professionals, and field team members jointly participated in the development of the SSHASP design and the SSHASP content.

1.6.1 ISM Functions

The five ISM functions are summarized below along with how these functions have been implemented in this SSHASP.

- 1. Define scope of work**
 - ◆ Translate the scope of the project into work.
 - ◆ Set performance expectations.
 - ◆ Prioritize tasks and allocate resources.
- 2. Analyze hazards**
 - ◆ Identify and analyze the hazards.
 - ◆ Categorize the hazards.
- 3. Develop and implement hazard controls**
 - ◆ Identify appropriate standards and requirements.
 - ◆ Identify and implement needed controls to prevent and control hazards.
 - ◆ Establish a safety envelope.
- 4. Work within the controls**
 - ◆ Confirm operational readiness.
 - ◆ Perform the work safely.
- 5. Provide feedback and continuous improvements**
 - ◆ Seek and collect feedback from employees.
 - ◆ Identify opportunities for improving performance.
 - ◆ Implement changes to improve performance.
 - ◆ Reinforce smart work practices.
 - ◆ Hold employees accountable for their performance.

1.6.2 ISM Guiding Principles

ISM Guiding Principles are summarized below along with how these principles have been implemented in this SSHASP.

- **Guiding principle 1, line management responsibility for safety:** This SSHASP defines a responsible line-management chain for all University of California and subcontractor employees and managers who supervise or perform work for the ENV-ERS Project.
- **Guiding principle 2, clear roles:** This SSHASP defines clear lines of authority, responsibility, and accountability at all organizational levels. These lines are defined and illustrated in Figure 1.6-1.
- **Guiding principle 3, competency commensurate with responsibilities:** Every field team member possesses the experience, knowledge, skills, and abilities necessary to discharge his or her responsibilities.
- **Guiding principle 4, balanced priorities:** No work will be performed under this SSHASP unless it can be performed safely, in an environmentally responsible manner, and in full compliance with applicable laws and regulations.
- **Guiding principle 5, identified safety and environmental standards and requirements:** This SSHASP has evaluated the associated hazards and has established requirements or controls which, when properly implemented, provide adequate assurance that the workers, the public, and the environment are protected from adverse consequences.
- **Guiding principle 6, work-tailored hazard controls:** The design of this SSHASP ensures that hazards and corresponding administrative and engineering controls are tailored to the specific areas where work will be performed and the specific tasks to be performed in those areas.
- **Guiding principle 7, authorized operation:** The conditions and agreements for operations to be initiated and conducted under this SSHASP have been clearly established and agreed upon.

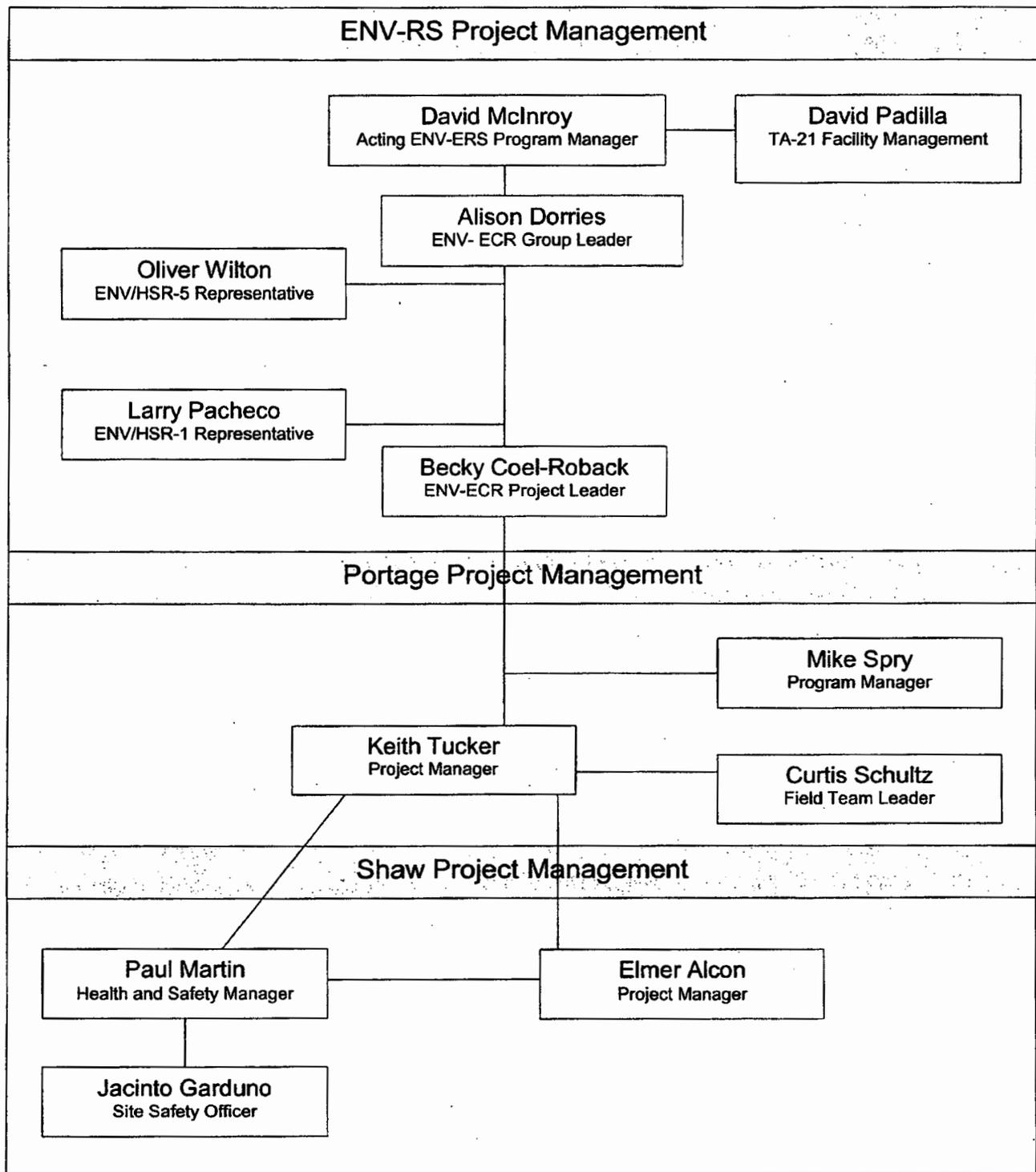


Figure 1.6-1. Safety and environmental responsibility line-management chain

1.7 Integrated Work Management for Work Activities

This SSHASP is designed explicitly to incorporate the Integrated Work Management (IWM) for Work Activities Process for doing work in a manner that protects workers and the public, the environment, property, and the security of the nation in accordance with "Integrated Work Management for Work Activities" (IMP 300-00-00.2, February 9, 2005). The most important aspects of this process are the direct involvement of workers in controlling the risks, and the accountability of Responsible Division Leaders and Responsible Line Managers (RLM) for safety, security, and environmental protection.

Workers must be actively engaged throughout the IWM process to provide the practical knowledge needed to fully identify the hazards and to ensure that controls are effective and procedures are workable. Workers must perform their work within established control systems and continually evaluate these systems to ensure they are adequate for the work they perform. RLMs authorize workers based on the worker's competence and commitment to perform their assignments in a safe, secure, and environmentally responsible manner. The process that ensures this level of worker participation is the IWD. The IWD preparer is an individual assigned by the RLM with the responsibility and authority to establish and document the risk management envelope for a work activity. The preparer assembles a team made up of subject matter experts, the Person-in-Charge, and workers to develop IWD.

By using the Hazard Grading Matrix the team determines the hazard level (Low-, Moderate-, or High-Hazard), with moderate- or high-hazard levels requiring IWD. The IWD consist of four parts.

- Activity-specific information.
- Work-area information.
- Validation and release information (followed by work execution).
- Closeout information.

2.0 GENERAL INSTITUTIONAL REQUIREMENTS

This chapter addresses the general H&S requirements that apply to all ENV-ERS Project field activities as specified by the HSRM. This includes the designation of key project H&S personnel and an emergency contact list, the presentation of the project Emergency Action Response and Spill Containment Plans, and maps of the emergency routes to the hospital. Additional HSRM requirements addressed in this chapter include the specification of project personnel training requirements, inspection requirements, documentation and record keeping requirements, hazard communication requirements, and other institutional requirements.

2.1 Key Sub-contractor Personnel Having Project Health and Safety Responsibility

Becky Coel-Roback, the LANL Project Leader for the SWMU 21-018(a)-99 project, is the designated single point of contact representing the project. Table 2.1-1 identifies personnel having H&S responsibilities for all areas of operations and all tasks associated with the general ENV-ERS activities conducted under this SSHASP.

Table 2.1-1
Key Personnel Identified for TA-21 SWMU 21-018(A)-99 Field Operations

Team Member	Role and Responsibility	Contact Information (Phone/Cellular/Pager)
Alison Dorries, EVN-ERS	LANL ENV-ECR Group Leader	665-6952/699-1979/664-5313
Becky Coel-Roback	LANL ENV-ECR Project Leader	665-5011/699-0297/ NA
Keith Tucker	Portage Project Manager	753-8676/699-3264/NA
Mike Spry	Portage Program Manager	505-753-8676/505-577-3495/NA
Curtis Schultz	Portage Field Team Leader	505-753-8676/927-7085/NA
Elmer Alcon	Shaw Project Manager	661-5216/412-1626/NA
Scott den Baars	Shaw Program Manager	661-5259/505-695-9504/NA
Paul Martin	Shaw H&S Manager	661-5271/412-1826/NA
Jacinto Garduno	Shaw SSO	661-5275/412-2147/664-7517
Dave McInroy	Acting ENV-ERS Program Manager	667-0819/NA/NA
Oliver Wilton	ENV/HSR-5 Representative	665-0731/231-4605/996-0877
Larry Pacheco	ENV/HSR-1 Representative	667-5185/699-1205/
David Padilla	NWIS-UI, Facility Contact	667-2408/669-2816/996-4583
Charles Trujillo	NWIS-UI, Facility Contact	667-0491/669-1363/996-1084

Key project personnel, facility, management, and emergency contacts are identified in Figure 2.2-1.

MEDICAL EMERGENCY/FIRE**Access Control Office (Business hours 7 a.m. until 5:00 p.m.)** 665-2005Los Alamos Fire Dept..... LANL Phone: 911
Cellular Phone: 667-7080**HAZARDOUS RELEASE/SPILL**LANL HAZMAT TEAM:(If spill occurs on SWMU/AOC report to 1st Responders) ... 667-6211

LANL Safety- HSR-5 665-7221

LANL Radiation Safety- HSR-1 667-7171

MEDICAL NOTIFICATION

Los Alamos Medical Center: 662-4201

LANL Occupational Medicine Clinic: 667-7848

SECURITY

Los Alamos Police: 662-8222

PTLA/LANL Security: 667-6534

FACILITY

	<u>Phone</u>	<u>Pager</u>
David Padilla, NWIS-UI	667-2408	996-4583
Charles Trujillo, NWIS-UI	667-0491	996-1084

MANAGEMENT

	<u>Phone</u>	<u>Pager</u>	<u>Cell</u>
Becky Coel-Roback, ENV-ECR PM	665-5011	664-4968	699-0297
Keith Tucker, Portage Project Manager	753-8676	NA	699-3264
Mike Spry, Portage Program Manager	753-8676	NA	577-3495
John Martin, Portage H&S Manager		NA	
Scott den Baars, Shaw Program Manager	661-5259	NA	695-9504
Elmer Alcon, Shaw Project Manager	661-5216	664-4329	412-1626
Paul Martin, Shaw H&S.....	661-5271	NA	412-1826
Oliver Wilton, HSR-5	665-0731	996-0877	231-4605
Larry Pacheco, HSR-1	667-5185	996-0504	699-1205
David McInroy, ENV-ERS	667-0819	996-3548	699-1183
Gabriela Lopez Escobedo, ENV-ERS.....	665-7352	699-1637	664-2371
Alison Dorries, ENV-ECR.....	665-6952	664-5313	699-1979
John Martin, Portage Project Manager	753-8676	NA	699-3264

Figure 2.2-1. Key project personnel and emergency contacts**2.2 Project Emergency Action/Response Plan**

An incident response decision matrix, emergency notification list and route map/directions to the Health, Safety, and Radiation Protection Division (HSR) Occupational Medicine Group (HSR-2)/Los Alamos Medical Center (LAMC) can be found in Appendices B and C of this SSHASP.

Radiological incidents shall be handled as described in LPR-402-00-00.5, "Performance Requirement: Worker Health and Safety."

Incident/emergency action requirements, equipment, and supplies shall apply to all field activities as specified. Response to an incident or emergency shall occur according to Chapter 9.0 of the RRES-R HSRM and this chapter of the SSHASP. In the event of an incident or emergency, the SSO or FTL will function as the site emergency/incident coordinator, as necessary, and will arrange for the immediate

notification of LANL emergency response personnel to take control of the scene and/or arrange for immediate notification of the appropriate authorities. If a spill occurs on a SWMU or AOC it will be reported to first responders and the facility manager so that appropriate actions can be taken to ensure personnel safety and environmental controls. The site will be posted with emergency contacts and emergency routes to medical services, including the LAMC Emergency Room and HSR-2 Occupational Medicine Health Clinic.

First Aid/Cardiopulmonary Resuscitation (CPR): At least one field team member who is properly trained in first-aid and CPR must be present during site activities occurring at sites where emergency responders (e.g., fire department) are not within four minutes travel distance (access time). Only qualified providers will be allowed to render CPR and first aid.

Fire extinguishing equipment: A 10-pound ABC fire extinguisher is required for all brush clearing activities involving a chainsaw as well as welding operations. Only fire extinguisher-trained personnel will be allowed to use fire extinguishers. Each site passenger vehicle will be equipped with a five-pound ABC fire extinguisher. Each site trailer will be equipped with a 10-pound ABC fire extinguisher.

Emergency response equipment: Portable eyewash bottles, first aid kit, and a bloodborne pathogen (BBP) kit will be available on-site in each passenger vehicle and equipment trailer. Only first aid and BBP trained personnel will be allowed to use the first aid or BBP kits.

Facility specific training: All personnel shall complete facility specific training as required by the TA in which the SWMU/AOC is located.

Muster area location: Will be determined and posted at the site.

Communications Equipment: At least one field team member will have a cellular telephone with the field team at all times.

2.3 Project Spill Containment Plan

A spill kit will be kept on-site. Field personnel will only handle spills of hazardous material that the FTL and SSO have determined to be controllable. LANL Emergency Management and Response (Figure 2.2-1) will handle all spills of hazardous materials deemed uncontrollable by the FTL and SSO. If the uncontrollable spill occurs on non-LANL property, the Los Alamos Fire Department will be contacted at 911 on a landline phone or 667-7080 on a cellular/digital phone. If a spill occurs on a SWMU or AOC it will be reported to responding personnel.

2.4 Medical/Radiological Surveillance

All workers entering SWMUs/AOCs that are designated as Hazardous Waste Operations and Emergency Response (HAZWOPER) Zones must be approved for Hazardous Waste Operations, 29 CFR 1910.120 Paragraph F, "Medical Surveillance." An "Employee Health Physics Checklist" or "Temporary Identification Card" will be completed and a thermoluminescent dosimeter (TLD) issued. An HSR Health Physics Operations Group (HSR-1) Radiological control technician (RCT) will provide on-site radiological surveillance. The Radiological Work Permit (RWP) for SWMU 21-018(a)-99 and associated documents are provided HSR-1.

2.5 Applicable Laboratory Implementation and Performance Requirements

The following Laboratory Implementation Requirements (LIR), Laboratory Performance Requirements (LPR), and Implementation Procedures (IMP) apply to this project:

- LIR 402-130-01.3, Abnormal Events
- IMP 300-00-00.2, Integrated Work Management for Work Activities
- LIR 300-00-03.1, Laboratory Institutional Operational Programs
- LIR 300-00-04.3, Laboratory Training: Essential Requirements
- LIR 307-01-03.2, Management Safety Walk-Around
- LIR 310-00-00.1, Conduct of Operations
- LIR 401-10-01.2, Stop Work and Restart

- LIR 402-10-01.8, Hazard Analysis and Control for Facility Work
- LIR 402-10-03.2, ES&H Management of Contractor Performed Facility Construction/ Maintenance, Environmental Restoration/Decontamination and Decommissioning and Related Drilling Operations.
- LIR 402-100-01.2, Signs, Labels, and Tags
- LIR 402-100-02.1, Hazardous Waste Operations and Emergency Response Training Requirements
- LIR 402-600-01.3, Electrical Safety
- LIR 402-700-01.2, Occupational Radiation Protection Requirements
- LIR 402-820-01.1, Noise and Temperature Stresses
- LIR 402-840-01, Welding, Cutting, and Other Spark-Flame Producing Activities
- LIR 402-860-01.1, Lockout/Tagout for Personal Safety
- LIR 402-870-01.0, Ergonomics
- LIR 402-880-01.5, Excavation/Soil Disturbance Permit Process
- LIR 402-1000-01.1, Personal Protective Equipment
- LIR 402-1320-01.2, Vehicular and Pedestrian Safety
- LIR 403-00-01.3, Los Alamos National Laboratory Emergency Management
- LIR 405-10-01.2, Packaging and Transportation
- LPR 402-00-00.5, Performance Requirement: Workers Health and Safety

2.6 Training Requirements

Table 2.6-1 lists the general training requirements for personnel performing field activities associated with TA-21 SWMU 21-018(a)-99 fieldwork. Additional training requirements for specific tasks and/or equipment are listed in IWD ER-2005-0269.

Table 2.6-1
General Training Requirements

Training Requirement	TYPE ^A	Personnel to be Trained ^B
HSRM (LA-UR-03-1508)	R	All
Pre-Job Start H&S / SSHASP Briefing (HSRM Section 10.1.1)	F or C	All
H&S Tailgate Mtgs. (daily) (HSRM Section 10.1.2)	F	All
General Employee Training – LANL provided (HSRM Section 10.2.1)	C	All on site for >10 consecutive days
Radiation Worker II (HSRM Section 10.2.3)	C	All workers who will enter HAZWOPER exclusion zones
40 hr. HAZWOPER Class and 24 hr. Supervised Fieldwork (HSRM Section 10.5.1) or equivalent	C	All workers who will enter HAZWOPER exclusion zone

**Table 2.6-1
General Training Requirements (continued)**

8-Hour Annual Refresher (HSRM Section 10.5.4)	C	All - If > 1 year from the previous 40-hour HAZWOPER or 8-hour refresher training
8-Hour HAZWOPER Supervisor (HSRM Section 10.5.3)	C	FTL, SSO, PIC
SSO (HSRM Section 10.1.4)	C	SSO, PIC
First Aid/CPR (Amer. Red Cross or equiv.; compliance with HASP Section 10.1.3)	C	At least one field team member
Personal Protective Equipment (PPE) (Employer's program & HASP Section 7.1)	F	All
Employer's Hazard Communication Program (Employer's program & 29 CFR 1910.1200)	R	All
Sanitation (29 CFR 1926.51 or 65(n))	R	SSO, PIC
Postings (29 CFR 1926.200 & ANSI Z535.2 and .3)	R	SSO, PIC
Portage Hearing Conservation Program	C	All, if noise action levels are reached
Fall Protection (Appendix E)	F	As Needed
Gross Alpha and Gamma Radiation Testing	F	User
Excavation/Trenching Protective Systems Competent Person (29 CFR 1926.651 (k))	C	Person acting as the Competent Person or certifying agent for excavations.
Fire Extinguisher	F	All
Heavy Equipment Operation/Drill Rig	F	Equipment operator
^a Types of training: R = Read training; C = Classroom training; F = Field training		
^b FTL= Field Team Leader; SSO = Site Safety Officer; PIC = Person in Charge, SAMP = Sampler		

2.7 Inspection Requirements

Table 2.7-1 lists the required site inspections and identifies the responsible person for conducting the inspections. The activities of the day will dictate which inspections will be required. The inspections will be recorded on the appropriate forms and/or in the field logbook.

**Table 2.7-1
Inspection Requirements**

Inspection	Frequency	Inspector	Task(s)
Job Site, Material and Equipment [in accordance with 29 CFR 1926.20(b)(2)]	Daily during use	SSO or PIC designee	All
General Sanitation (e.g., 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)	Daily during use	SSO or PIC designee	All
Materials handling, storage, use and disposal (in accordance with 29 CFR 1926.250 and 252)	Before Use	SSO or PIC designee	All
Signs, Signals, and Barricades (in accordance with 29 CFR 1926.200)	Daily during use	SSO or PIC designee	All
Motor vehicles and Mechanized Equipment (in accordance with Subpart O of 29 CFR 1926)	Before Use	SSO, QP, or CP, as required	All

Table 2.7-1
Inspection Requirements (continued)

Inspection	Frequency	Inspector	Task(s)
Material Handling equipment [e.g., rubber-tired backhoe, loader, and bulldozers equipped with rollover protective structures and overhead protection (in accordance with Subpart W of 29 CFR 1926)] and Portage Environmental, Safety and Health Plan (ES&HP) Section 6 (Construction Safety)	Before Use	QP or CP, as required	1,3,4,5, and 10
Excavations/Trenches [per 29 CFR 1926.65 (k) and LIR 402-880-01] (for excavations greater than 4 feet deep) and Portage ES&HP Section 6 (Construction Safety)	Before Entry & After Storms	QP or CP, as required	4
PPE (HSRM Section 7 and 29 CFR 1926.95) and Portage ES&HP Section 9 (Personal Protective Equipment)	Daily during use	User	All
Incident/emergency response equipment: Eyewash Kit First aid kit, BBP kit	Monthly Weekly	SSO or PIC designee	All
Fire fighting equipment [per 29 CFR 1926.150(a) and (c)]	Monthly	SSO	All
Rigging [in accordance with 29 CFR 1926.251(a)] and Portage ES&HP Section 6 (Construction Safety)	Before Use	QP or CP, as required	1, 3
Tools – hand and power (in accordance with Subpart I of 29 CFR 1926) and Portage ES&HP Section 4.4 (power and Hand-Operated Tools)	Before Use	User and SSO	All
Portage Daily Heavy Equipment Inspection	Daily during use	QP	3
Portage Equipment Inspection	On equipment arrival to site	QP	
Portage Weekly Heavy Equipment Inspection	Weekly during use	QP	
Portage Weekly Vehicle Inspection	Weekly during use	QP	
Management Safety Inspection	Monthly	Portage/Shaw PM	All
Electrical equipment [per 29 CFR 1926.403(b) and/or 416 (f)(8)] and Portage ES&HP Section 7 (Electrical Safety)	Before Use & Daily during use	QP or CP, as required	All
QP = Qualified Person; CP = Competent Person [per 29 Code of Federal Regulations (CFR 1926.32(f) or (m)]			

2.8 Documentation and Records to be Maintained

In addition to record keeping requirements of Chapter 13 of the HSRM, the H&S records specified in Table 2.8-1 shall be completed in accordance with Chapter 13 of the HSRM and kept on-site for the duration of TA-21 SWMU 21-018(a)-99 fieldwork.

**Table 2.8-1
Record Keeping Requirements**

Record/Form	Requirement Reference	Keep On-Site
HSRM	HSRM Chapter 1	Yes
This SSHASP	HSRM Chapter 1	Yes
Completed Modification Forms	HSRM Chapter 1	Yes
Technical Field Notebook/SSO Daily Notebook	HSRM Chapter 13.1	Yes
Documentation of Training Requirements	HSRM Chapter 10	No
Documentation of Medical Surveillance	HSRM Chapter 11	No
Exposure Monitoring Records	Chapter 6 of the HSRM and applicable exposure monitoring methods in the ENV-R Project Guidance Manual	Yes
H&S Inspection Records	HSRM Chapter 12.1	Yes

2.9 Hazard Communication

Individuals who may be exposed to hazardous substances must be informed of the physical, chemical, and toxicological properties of the substances. Individuals must be instructed in the means and methods for preventing, detecting, mitigating, and/or protecting themselves from exposure before they are allowed to access an area or perform a task where exposure may occur. It is Portage's policy that, whenever feasible, a less-toxic product should be substituted for a more toxic one, especially for products containing a carcinogen.

Material Safety Data Sheets for each hazardous chemical product brought to the project site are to be kept readily available to anyone who may be exposed to the product and shall be shared with all other employees on-site who may be affected by the hazardous product. As deemed necessary by the SSO to administer requirements of this SSHASP and for compliance with applicable requirements (e.g., Hazardous Communications, HAZWOPER, and/or employee H&S briefing), some or all of the following resources are to be kept readily available for reference by project personnel:

- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices (published annually).
- U.S. Department of Transportation Emergency Response Guidebook (most recent publication).
- Guide to Occupational Exposure Values (compiled by ACGIH, published annually).
- National Institute for Occupational Safety and Health Pocket Guide to Chemical Hazards (most recent publication).

3.0 GENERAL HAZARD ANALYSIS

The hazard assessment process has identified a number of hazards that are universal to all activities and work areas for the SWMU 21-018(a)-99 Project. These are the general project hazards that are inherent to conducting SWMU 21-018(a)-99 and are not a result of working in a specific area or performing a specific task.

The objectives of this chapter are to

- Identify the general conditions that could potentially pose a risk to site workers (e.g., weather).
- Evaluate these conditions in order to identify the hazards that pose a H&S risk requiring control.
- Define the controls that will ensure the protection of worker H&S.

Much of the information presented in this chapter is generic to this SSHASP. The generic information includes, but is not limited to a General Hazard Assessment, Exposure Monitoring, Medical/Radiological Surveillance, Personal Protective Equipment (PPE), and Decontamination.

In the hazard assessment process, all activities, substances, or conditions that have the potential to pose a risk to site workers are first identified. Second, an HAR for each identified hazard is determined. The HAR is established by considering both the probability that an accident or mishap could occur, and the consequences or severity of the mishap for each identified hazard. Professional judgment is used to finalize the HAR. Table 3.0-1 is used to guide the selection of an appropriate HAR.

**Table 3.0-1
Hazard Assessment Rating**

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

Administrative and engineering controls are established to mitigate hazards that receive an HAR of minor, moderate, serious, or imminent.

- The Administrative and Engineering Controls sections of this chapter and Chapters 4 define control measures that are designed to mitigate the general, SWMUS/AOCS. Task hazards associated with the general SWMU 21-018(a)-99 activities are described in IWD ER-2005-0269.
- Exposure Monitoring sections of this chapter and in Chapters 4 define monitoring that will be conducted to ensure that the administrative and engineering controls are performing as designed or intended.
- The Medical/Radiological Surveillance sections of this chapter and Chapters 4 and IWD ER-2005-0269 define the personal monitoring that will be conducted to ensure that the administrative and engineering controls were effective in mitigating the hazards.
- The monitoring defined in both the Exposure Monitoring and Medical/Radiological Surveillance sections may also be used to evaluate the impacts to site workers in case of an accidental exposure or failure of an administrative or engineering control.
- The PPE sections of this chapter and Chapters 4 and IWD ER-2005-0269 define the PPE required to protect site workers from all hazards that cannot be fully mitigated through administrative and engineering controls.
- The Decontamination sections of this chapter and Chapters 4 and IWD ER-2005-0269 define the requirements necessary to ensure the control of site contamination.
- The Site Control sections of this chapter and Chapters 4 and IWD ER-2005-0269 define the site operational zones and procedures that will be used to control access to those zones.

3.1 General Hazard Assessment

The hazard analysis and the HAR for the general hazards associated with the SWMU 21-018(a)-99 Project do not comprise a complete Activity Hazard Analysis. As defined in Chapter 3 of this SSHASP, a complete Activities Hazard Analysis is achieved by combining task-specific hazards associated with the planned task (IWD) and the hazards associated with the consolidated SWMU (Chapter 4) with the General Hazards described in this chapter. The combined hazard controls, PPE requirements, and

monitoring requirements will mitigate the hazards described in IWD ER-2005-0269. Additionally, all activities must comply with the general institutional requirements specified in Chapter 2.

Table 3.1-1 lists the hazards, the corresponding HAR, and the Hazard Assessment Rationale for the SWMU 21-018(a)-99 Project hazards. The table also lists the administrative and engineering controls that will be implemented to control these hazards. As these controls do not completely mitigate the hazards, PPE and monitoring requirements are established in subsections of this chapter. The general hazards associated with the SWMU 21-018(a)-99 Project have been defined as described in sections 3.1.1 through 3.1.4.

**Table 3.1-1
General Hazard Assessment and Administrative and Engineering Controls for General
SWMU 21-018(a)-99 Activities**

Hazard	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
<i>Physical Hazards</i>			
Unsanitary conditions	Minor	Mishap probability: possibly could occur Hazard severity: minor	Personnel shall wash hands and face prior to eating or drinking, following the use of restroom facilities, and before leaving the site regardless of whether they worked in a controlled zone or not. Inspections of work areas and toilets, washing facilities, eating and drinking areas, and/or change rooms will be performed in accordance with 29 Code of Federal Regulations (CFR) 1926.51 in order to ensure that sanitary conditions are maintained.
Slips, trips, and falls	Moderate	Mishap probability: probably will occur Hazard severity: minor	Site workers will be informed of slips, trips, and falls risks. Site workers will use caution and be observant while moving in areas of potential concern. Workers will not conduct activities within 3 feet (ft) of a 6-ft or greater fall hazard. Good housekeeping practices will be adhered to in all work areas to reduce the risk of slips, trips, and falls.
	For icy conditions: Serious	Mishap Probability: likely to occur Hazard severity: minor	All slick footpaths will be sanded.
Falls from heights and work on steep slopes	Minor	Mishap Probability: likely to occur Hazard severity: major	Site workers will be informed of slopes greater than 30° and cliff edges. An observer will be appointed to observe and warn workers when they are within 8 ft of a cliff edge.
Heavy lifting	Serious	Mishap Probability: probably could occur Hazard severity: Major	Workers will not manually lift loads in excess of 50 pounds; two (or more) people or mechanical lift assist equipment will be used to lift and carry bulky, awkward, or heavier loads.
Partially burned trees	Minor	Mishap probability: unlikely to occur Hazard severity: major	Personnel will walk the work area; all partially burned trees and limbs will be cut or knocked down.
Limited visibility	Moderate	Mishap probability: possibly could occur Hazard severity: major	Work area shall be provided with a minimum illumination intensity of 5-ft candles as specified in Table D-65.1 of 29 CFR 1926.65. Illumination intensities shall be verified by monitoring when additional illumination is required to read this document when held at arms length.
Lightning strikes	Minor	Mishap probability: unlikely to occur Hazard severity: catastrophic	Operations will be shut down if electrical storm is within 6 miles and workers will move away from metal objects and grounding systems components (e.g. electrical power substations and large buildings) and take cover in a vehicle or small dwelling. Workers will not remain upright in an open area or seek shelter near a tall upright object (e.g., a tree). Proximity of the storm will be determined by timing the difference between the observation of lightening and hearing thunder; this time difference is equivalent to 5 seconds per mile. If lightening injures someone the Site Safety Officer or the Field Team Leader will be notified and appropriate action implemented.

**Table 3.1-1
General Hazard Assessment and Administrative and Engineering Controls for General
SWMU 21-018(a)-99 Activities (Continued)**

Hazard	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
High winds	Minor	Mishap probability: unlikely to occur Hazard severity: major	If operations are being conducted in areas effected by past forest fires, with many trees effected, with the possible to fall or have limbs fall, work will be stopped and personnel should leave the area of died/effected trees.
Hail storms	Minor	Mishap probability: unlikely to occur Hazard severity: major	Operations will be shut down if hail begins to fall and works need to seek shelter.
Passenger vehicle operation/ Vehicular traffic accident	Minor	Mishap probability: unlikely to occur Hazard severity: catastrophic	All site workers exposed to vehicular traffic while executing field activities will wear reflective vests.
Off-Road Vehicle	Moderate	Mishap probability: possibly could occur Hazard severity: major	Only trained operators will be allowed to operate all terrain vehicles. Helmets, eye protection, and gloves will be required for operation.
Injuries from hand tools and knives	Minor	Mishap probability: possibly could occur Hazard severity: minor	All hand tools will be inspected for integrity before use. Personnel will be instructed to use hand tools in the intended manner.
Biological Hazards			
General	Refer to Appendix G of the HSRM for information concerning various general hazards associated with occupational exposure to toxic and/or hazardous biological agents.		
Hantavirus	Minor	Mishap probability: unlikely to occur Hazard severity: Major	Workers will look for and avoid rodent droppings and nests. If droppings or nests must be disturbed to complete work, a mixture of Clorox® and water (10% Clorox®/90% water) will be sprayed to the suspect area or the facility manager and/or KSL will be notified for disinfecting.
Plague	Negligible	Mishap probability: unlikely to occur Hazard severity: minor	All personnel will be informed to avoid animals (dead or alive) that may potentially harbor plague-carrying fleas.
Rabies	Minor	Mishap probability: unlikely to occur Hazard severity: major	All personnel will be informed to avoid animals (dead or alive) and all liquids from unknown animals. If exposure is suspected, medical attention will be sought as soon as possible.
Snakes	Negligible	Mishap probability: unlikely to occur Hazard severity: minor	All personnel will be informed to avoid turning over obstacles unnecessarily in the field such as rocks, wood, or anything else under which rattlesnakes, insects, or spiders may be present. Personnel will also be instructed to walk only on established trails and paths as much as practicable to avoid rattlesnakes.
Insect bites	Minor	Mishap probability: possibly could occur Hazard severity: minor	
Aggressive wildlife	Minor	Mishap probability: unlikely to occur Hazard severity: major	All personnel will be informed to be alert for and cautious of aggressive wildlife such as fire-displaced bears or mountain lions. Workers will not approach potentially dangerous wildlife. Food sources will be minimized near work areas. Workers will be instructed to not run from or turn their backs on aggressive wildlife and to muster in a safe place, if possible, and call for reinforcements.
Occupational exposure to BBP	Minor	Mishap probability: unlikely to occur Hazard severity: major	All personnel, who encounter blood or other potentially infectious material from other persons, must be medically monitored according to BBP or Potentially Infectious Materials, 29 CFR 1910.1030(f).

Table 3.1-1
General Hazard Assessment and Administrative and Engineering Controls for General
SWMU 21-018(a)-99 Activities (Continued)

Hazard	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
<i>Physiological Health Hazards</i>			
Heat/cold stress	Minor	Mishap probability: unlikely to occur Hazard severity: major	Personnel will be informed of the signs and symptoms of heat and cold stress. Field team members will observe/monitor each other for signs of heat or cold stress.
	At Temp. >80 or <35 °F, Moderate	Mishap probability: possibly could occur Hazard severity: major	Restricted Temperature Ranges: Workers will implement appropriate work rest/regime. Personnel will be provided shelter from weather extremes. Workers will follow the Portage heat/cold stress guidelines and American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values/ Biological Exposure Indices (ACGIH 1999, pp. 159-181).
Sunburn	Serious	Mishap probability: likely to occur Hazard severity: minor	Personnel will be offered the use of sunscreen (SPF ≥ 15) and will be instructed to wear a hat/cap to aid in keeping the sunlight from burning the skin.
<i>Physiological Health Hazards</i>			
Skin dermatitis	Minor	Mishap probability: possibly could occur Hazard severity: minor	Contact with poison ivy and stinging nettles is possible in forested areas and in wetlands. Personnel will be instructed to wear long trousers, sleeved shirts, and work gloves. Washing soon after exposure may lessen the symptoms of poison ivy exposure.
Noise	Moderate	Mishap probability: possibly could occur Hazard severity: major	Workers will comply with 29 CFR 1926.52, "Occupational Noise Exposure." Whenever voice(s) must be raised to communicate between two or more persons located = 3 ft of each other, noise level is likely exceeding the Permissible Exposure Limit of 90 decibels; noise monitoring will be conducted with a sound level meter
<i>Chemical Hazards</i>			
Total dust	Minor	Mishap probability: possibly could occur Hazard severity: minor	Airborne dust shall be suppressed by application of a water-based mist, as necessary, to keep airborne dust concentrations below the action level of 2.0 milligrams per cubic meter.
Solvents, Hydraulic oils	Minor	Mishap probability: possibly could occur Hazard severity: minor	PPE (chemical protective clothing and/or eye/face protection shall be used as specified in Section 3.4. Emergency eyewashes must be located within 10 seconds and not more than 100 ft 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 and flushed at least weekly by the SSO or designee. Provide proper storage of chemicals. All spills shall be cleaned up as soon as possible. Personnel will be instructed to stand upwind of refueling operations. In the event of unprotected contact with chemical, follow first aid measures on MSDS.

3.1.1 Physical Health and Safety Hazards

Unsanitary conditions: this hazard is defined as conditions of personal hygiene or general sanitation of the work environment that could cause illness in a site worker.

Slips, trips, and falls: this hazard is defined as work site physical conditions such as obstacles or ice that could cause a site worker to slip, trip, or fall and become injured.

Falls from height: this hazard can occur along the edge of sharp drop-offs and includes tumble falling along steep slopes. Slopes with down angles as shallow as 30° are suspect for a tumbling fall. Ground cover may cause unstable footing, which can result in a fall.

Heavy lifting: this hazard is defined as a site worker injury due to lifting at the work site.

Partially burned trees: this hazard is defined as a work site physical condition such that partially burned trees and tree limbs could fall and cause injury to workers.

Holes created by burned stumps: As a result of the Cerro Grande Fire of 2000, underground fires may have resulted in hidden holes that would pose additional risk to workers.

Limited visibility: this hazard is defined as the condition of insufficient illumination for a site worker to adequately monitor the environment at the work site thus leading to an injury.

Lightning strikes: this hazard is defined as a site worker suffering an electrical shock or burn at the work site due to lightning.

Hail: During large thunderstorms it is possible that conditions may arise that can cause hailstorms.

High winds: During storms high winds can be created. Personnel will need to take great care when working in areas affected by the Cerro Grande Fire storm, as limbs and trees falling will pose a hazard.

Passenger vehicle operation/vehicular traffic accident: this hazard is defined as an injury to a site worker due to a vehicular accident at the work site.

Off-road vehicle accident: this hazard is defined as an injury to a site worker due to an off-road vehicle accident at the work site.

Flash flood: Flash flooding may occur during severe rain events in the Jemez Mountains and within Los Alamos County. All canyons on LANL property may be subject to flooding.

3.1.2 Biological Hazards

Hantavirus: this hazard is defined as a site worker illness due to contracting Hantavirus at the work site.

Plague: this hazard is defined as a site worker illness due to contracting plague at the work site.

Snakes: this hazard is defined as a site worker illness due to snakebite at the work site.

Insect Bites: this hazard is defined as a site worker illness due to an insect bite at the work site.

Aggressive wildlife: this hazard is defined as a site worker illness or injury due to inadvertent contact with aggressive wildlife at the site.

Bloodborne pathogens: this hazard is defined as a site worker illness due to an occupational exposure to BBPs.

3.1.3 Physiological Hazards

Heat/cold stress: this hazard is defined as a site worker illness or injury due to exposure to heat or cold at the work site.

Sunburn: this hazard is defined as a site worker illness or injury due to exposure to sun at the work site.

Skin dermatitis: this hazard is defined as contact with various poisonous plants that can cause dermatological reactions. These plants include poison ivy and stinging nettles.

3.1.4 Chemical Health Hazards

Total Dust: this hazard is defined as a site worker illness from exposure to fugitive dust emissions that contain site contaminants at the work site. Analytical results from previous sampling events have shown that hazards associated with VOCs and SVOCs are negligible.

3.2 Exposure Monitoring for General Hazards

Lightning will be monitored according to the LANL HSRM.

Heat stress and cold stress will be monitored according to the Portage ES&HP Section 3 (Industrial Hygiene) and LA-UR-03-1508, "RRES-R Program Health and Safety Requirements Manual", and in accordance with LANL LIR 402-820-01.1 "Noise and Temperature Stresses" as detailed in Table 3.2-1.

If visible dust is in the vicinity for more than 2 minutes at a time, it will be monitored with a Miniram[®]. Action levels for dust will be 2.0 milligrams per cubic meter (mg/m³).

Table 3.2-1
Exposure Monitoring

GENERAL ACTIVITIES					
Hazardous Condition/Substance	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)/Rationale	Response Action(s)
Nuisance dust	Miniram [®]	Per manufacturer's recommended procedure.	In work areas with potential of generating dust.	2 milligrams per cubic meter.	Application of water mist. Minimize disturbance of soils.
Heat stress	Thermometer, physiological screening.	Heat stress work/rest regime and monitoring and Portage Environmental, Safety and Health Plan Section 3.9 and LIR 402-820-01.1 "Noise and Temperature Stresses,"	At various work locations and continuously when ambient air temperature is >90°F. If wearing impermeable clothing, monitoring will begin at 78°F.	Heat stress monitoring will be required when employees are working in temperatures >90°F. A heat stress work/rest regime will be initiated.	All employees should be acclimated to the work site elevation and temperature. As indicated in Table C-1 of "Permissible Heat Exposure TLVs," S&H-208, Heat Stress Work/Rest Regime and Monitoring.
Cold stress	Thermometer	Follow LIR 402-820-01.1 "Noise and Temperature Stresses,"	At various work locations and continuously when thermometer temperature drops below 40°F. Employee deep core body temperature should not fall below 96.8°F.	Workers will be instructed to wear insulated clothing, socks, gloves and head cover. A warm area will be provided for breaks. Warm liquids will be provided in the break area. The buddy system will be practiced to observe for signs of cold stress. Outside work will be scheduled during warmer times of the day. Work will be arranged so that periods of inactivity outside are minimized.	At signs of cold stress individual will be moved to a warm environment and warm liquids will be provided. Extreme heat will not be used for warming. Only sips of warm liquids will be allowed. If frostbite is apparent or suspected then the individual will be transported to the Los Alamos Medical Center.

3.3 Medical/Radiological Surveillance

All personnel entering any Hazardous Waste Operations (HAZWOPER) Area, Exclusion Zone (EZ), or Contamination Reduction Zone (CRZ) must be approved for HAZWOPER per 29 CFR 1910.120(f) and have a current HAZWOPER Physical per 29 CFR 1926.65(f). For non-HAZWOPER work areas a "Fitness for Duty Statement" will be required.

All personnel shall complete an "Employee Health Physics Checklist" or "Temporary Identification Card" and have been issued a TLD which will be worn at all times.

3.4 Personnel Protective Equipment

PPE is defined as the equipment required to protect site workers from hazards that cannot be fully mitigated through administrative and engineering controls.

Head: A cap or hat is required for fieldwork for protection from sun exposure. A hard hat will be required when working around heavy equipment and where overhead hazards are present. The hardhat will meet 29 CFR 1910.135 and American National Standards Institute (ANSI) Z89.1 1986 standards. Equipment operators in enclosed or protected caps are not required to wear hardhats when operating equipment.

Body: Long trousers and long-sleeved shirts in good condition and safety vests are required for fieldwork.

Hands: Leather work gloves are required for all field operations.

Feet: For all field activities, safety shoes or boots meeting 29 CFR 1910.136, ANSI Z41-1991 are required. For inspections at locations requiring substantial hikes, sturdy hiking boots are allowed.

Eyes: Safety glasses with side shields or other ANSI approved safety glasses for all site work operations. (29 CFR 1910.133, ANSI Z87.1-1989)

Downgrading of PPE requirements may also be implemented with the concurrence of the Project Manager, Facility Management Contact, radiological control technician and Industrial Hygiene and Safety Group representative.

3.5 Decontamination

Equipment decontamination: Refer to the corresponding section in the site specific IWD for details.

Personnel decontamination: Refer to the corresponding section in the SWMUS/AOCS Aggregate Hazard Analysis chapter for details. Personnel shall wash hands and face prior to eating or drinking, following the use of restroom facilities, and before leaving the site.

3.6 Site Control

Operations will be conducted by groups of at least two people who will maintain visual contact with each other at all times. Administrative controls will be used to control hazards and work zones on site. Designation of HAZWOPER zones will be based upon task specific operations. Refer to the THA for site control requirements.

4.0 SWMU HAZARD ANALYSIS

The objectives for each SWMU/AOC Hazard Analysis in this chapter are to identify the site characteristics that could potentially pose a risk to site workers (e.g., contamination, topography), to evaluate site hazards, and to define hazard controls.

The SWMU/AOC description section presents information on site conditions and the maximum concentration of all contaminants detected during previous investigations (if data exists). The hazard assessment sections identify area of operation hazards that could potentially pose a risk to site workers and present a HAR and hazard control measures for each identified hazard.

4.1 Hazard Analysis for SWMU 21-018(a)-99

The hazard analysis for SWMU 21-018(a)-99 is not designed for implementation as a complete activity hazard analysis. This hazard analysis will be implemented only in conjunction with the general hazard analyses and applicable task- and area-specific hazard analyses as outlined in the site specific IWD.

4.1.1 Description

The area of operations is SWMU 21-018(a)-99, located on land currently owned by the DOE. SWMUs 21-018(a) and 21-018(b) are mesa-top sites with direct drainage into BV Canyon and subsequent drainage into Los Alamos Canyon. SWMU 21-023(c) is partially on the mesa top (septic system) and partially on the canyon slope (outfall). SWMU 21-013(b) and AOC 21-013(g) are located on the south-facing slope of BV Canyon below MDA-V.

Based on the expected chemical and radiological hazards, the tasks performed in this area of operation are regulated by the HAZWOPER standard (29 CFR 1926.65). In addition, an SSO and RCT are required to be present during execution of tasks within the area of operation.

4.1.2 Contamination of Potential Concern at SWMU 21-018(a)-99

Chemical and radionuclide data was extracted from "Investigation Work Plan for Solid Waste Management Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21", LA-UR-04-3699, June 2004, ER2004-0278. Table 4.1-1 lists the chemical hazards specific to the SWMU 21-018(a)-99 area of operations and the maximum concentration encountered. Sample location 21-04509 is located in the area where an in-situ vitrification technology demonstration occurred, which resulted in a glass block being formed from contaminated absorption bed materials contamination. Currently LANL has a process to remove analytical data for samples from databases when the area has undergone excavation, but does not remove analytical data for sample locations from databases when contaminated materials have been treated on site. Theoretically, the vitrification process stabilizes the contamination and makes it non-bioavailable, as well as homogenizes contaminant concentrations due to convective mixing. Therefore, analytical data from the area of the vitrification demonstration may not be representative of current site conditions. Table 4.1-1 lists the high concentration of contamination encountered as well as the next highest level when the highest sample represents sample locations within the boundary of the vitrification process.

Table 4.1-1
Chemicals of Potential Concern at SWMU 21-018(a)-99

Chemical Name	Maximum Detected Concentration (mg/kg)	Sample Depth (ft)	Sampled Media (Tuff/Soil)	Location ID/SWMU Location	Laboratory BV (mg/kg), or Soil Screening Level (mg/kg)
Acetone	0.028	55-60	Qbt 3	21-02518/21-018(a)	70,400
Aluminum	40,800	4-5	Qal	21-11021/NW of 21-018(a)99	15,400
Antimony	84	3-3.5	Fill	21-04509/21-018(a)	0.83
Antimony	6.8	(J-) 5	Fill	21-11111/21-018(a)	0.83
Arsenic	32.1	2.5-5	Qbt 3	21-02517/21-018(a)	2.79
Barium	887	4-5	Qal	21-11022/NW of 21-018(a)	46
Benzo(a)pyrene	0.88	(J) 6.5-7	Fill	21-04509/21-018(a)	0.621
Benzo(a)pyrene	0.62	0-0.5	Soil	21-01906/ SW of 21-018(a)	0.621
Benzo(b)fluoranthene	1.4	(J) 5-5.5	Fill	21-04509/21-018(a)	6.21
Benzo(b)fluoranthene	0.64	0-0.5	Soil	21-01906/ SW of 21-018(a)	6.21
Beryllium	2.9	3-3.5	Fill	21-04509/21-018(a)	1.31
Beryllium	2.3	4-5	Qal	21-11021/NW of 21-018(a)	1.31
Butanone[2-]	0.037	7.5-100	Qbt 3	21-02818/21-018(a)	573
Butylbenzylphthalate	0.44	0-2.5	Fill	21-01519/21-018(a)	240
Cadmium	50.1	6.5-7	Fill	21-04509/21-018(a)	0.4
Cadmium	9.5	5	Fill	21-11111/21-018(a)	0.4
Chromium	158	0-0.25	Fill	21-01339/21-027(d)	19.3
Cobalt	16.1	3-3.5	Fill	21-04509/21-018(a)	4.73
Cobalt	10.2	4-5	Qal	21-11021/ NW of 21-018(a)	4.73
Diethylphthalate	17	7.5-10	Qbt 3	21-02518/21-018(a)	48,000
Di-n-butylphthalate	20	5-5.5	Fill	21-04509/21-018(a)	6,000
Di-n-butylphthalate	0.15	(J) 7-7.5	Fill	21-04506/21-018(a)	6,000
Fluoranthene	0.79	(J) 6.5-7	Fill	21-04509/21-018(a)	2,250
Fluoranthene	0.052	(J) 7-7.5	Fill	21-04507/21-018(a)	2,250
Indeno(1,2,3-cd)pyrene	0.71	(J) 3-3.5	Fill	21-04509/21-018(a)	6.21
Indeno(1,2,3-cd)pyrene	ND				6.21
Lead	1090	(J-) 6.5-7	Fill	21-04509/21-018(a)	22.3
Lead	323	20-25	Fill	21-02519/21-018(a)	22.3
Lithium	10.4	0-0.5	Soil	21-01331/21-027(d)	1,600
Mercury	139	(J) 5-5.5	Fill	21-04509/21-018(a)	0.1
Mercury	8.1	(J+) 5	Fill	21-11111/21-018(a)	0.1
Phenanthrene	0.51	(J) 3-3.5	Fill	21-04509/21-018(a)	1,800
Phenanthrene	0.41	7.5-8	Qbt3	21-11.36/21-018(b)	1,800
Pyrene	0.72	(J) 6.5-7	Fill	21-04509/21-018(a)	2,300
Pyrene	0.04	(J) 7-7.5	Fill	21-0450/21-018(a)	2,300
Selenium	1.4	4-5	Qal	21-11021/NW of 21-018(a)	0.3
Uranium	132	2.5-5	Qbt 3	21-02517/SE of 21-018(a)	0.72
Zinc	4970	6.5-7	Fill	21-04509/21-018(a)	48.8
Zinc	210	5	Fill	21-11111/21-018(a)	48.8

BV = Background Value (LANL 1998, 59730).

ND = Not Detected.

(J) = The chemical was positively identified and the result is estimated.

(J+) = The chemical was positively identified and the result is likely biased high.

(J-) = The chemical was positively identified and the result is likely biased low.

Bold/italic - Sample value located in in-situ vitrification area, and not representative of current site conditions.

Table 4.1-2 lists the contaminants of potential concern (COPCs) encountered at the SWMU 21-018(a)-99 area of operations, the OSHA permissible exposure limits (PEL) and the dust action level need to protect site workers.

Table 4.1-2
Individual PELs and Dust Action Levels for COPCs Identified at SWMU 21-018(a)-99

Chemical Name	Max. Detected Concentration (mg/kg)	Sample Depth (ft)	OSHA Permissible Exposure Level (mg/m ³)	Dust Action Level (mg/m ³)*
Acetone	0.028	55-60	2,400	2.86E+10
Aluminum	40,800	4-5	15	1.23E+02
Antimony	84	3-3.5	0.5	1.98E+03
Antimony	6.8	5	0.5	2.45E+04
Arsenic	32.1	2.5-5	0.01	1.04E+02
Barium	887	4-5	0.5	1.88E+02
Benzo(a)pyrene	0.88	6.5-7	0.2	7.58E+04
Benzo(a)pyrene	0.62	0-0.5	0.2	1.08E+05
Benzo(b)fluoranthene	1.4	5-5.5	<i>na</i>	<i>na</i>
Benzo(b)fluoranthene	0.64	0-0.5	na	na
Beryllium	2.9	3-3.5	0.002	2.30E+02
Beryllium	2.3	4-5	0.002	2.90E+02
Butanone[2-]	0.037	7.5-100	200	1.80E+09
Butylbenzylphthalate	0.44	0-2.5	590	4.47E+08
Cadmium	50.1	6.5-7	0.005	3.33E+01
Cadmium	9.5	5	0.005	1.75E+02
Chromium	158	0-0.25	1	2.11E+03
Cobalt	16.1	3-3.5	0.1	2.07E+03
Cobalt	10.2	4-5	0.1	3.27E+03
Diethylphthalate	17	7.5-10	na	na
Di-n-butylphthalate	20	5-5.5	<i>na</i>	<i>na</i>
Di-n-butylphthalate	0.15	7-7.5	na	na
Fluoranthene	0.79	6.5-7	<i>na</i>	<i>na</i>
Fluoranthene	0.052	7-7.5	na	na
Indeno(1,2,3-cd)pyrene	0.71	3-3.5	<i>na</i>	<i>na</i>
Indeno(1,2,3-cd)pyrene	ND		na	na
Lead	1090	6.5-7	0.05	1.53E+01
Lead	323	20-25	0.05	5.16E+01
Lithium	10.4	0-0.5	na	na
Mercury	139	5-5.5	0.1	2.40E+02
Mercury	8.1	5	0.1	4.12E+03
Phenanthrene	0.51	3-3.5	0.02	1.31E+04
Phenanthrene	0.41	7.5-8	0.02	1.63E+04
Pyrene	0.72	6.5-7	0.02	9.26E+03
Pyrene	0.04	7-7.5	0.02	1.67E+05
Selenium	1.4	4-5	0.2	4.76E+04
Uranium	132	2.5-5	0.25	6.31E+02
Zinc	4970	6.5-7	5	3.35E+02
Zinc	210	5	5	7.94E+03

na = none available.

Dust Action Level (Marlowe equation) = $[(10^6 \text{ mg/kg conversion factor}) \times (\text{Exposure Limit mg/m}^3)]$
 $[(\text{Concentration in soil mg/kg}) \times (\text{SF})]$

SF = Safety Factor; a factor of 3 was used in all the calculations. Concentrations are from laboratory data.

Bold/italic – Sample value located in in-situ vitrification area, and not representative of current site conditions.

Table 4.1-3 presents the maximum concentration of radionuclides encountered at SWMU 21-018(a)-99 and soil background values for Los Alamos. Sample location 21-04509 is located in the area where an in-situ vitrification technology demonstration occurred, which resulted in a glass block being formed from contaminated absorption bed materials contamination. Table 4.1-3 lists the high concentration of

radionuclides encountered as well as the next highest level when the highest sample represents samples located in the vitrification process area.

Table 4.1-3
Radionuclides of Potential Concern at SWMU 21-018(a)-99

Chemical Name	Max. Detected Concentration (pCi/g)	Sample Depth (ft) Below Ground Surface	Sampled Media (Tuff/Soil)	Location ID/SWMU Location	Soil Background Value ^a (pCi/g)
Americium-241	213.4	0-0.5	Soil	21-01339/21-023(c)	0.013
<i>Cesium-137</i>	<i>7.14</i>	<i>5-5.5</i>	<i>Fill</i>	<i>21-04509/21-018(a)</i>	<i>1.65</i>
Cesium-137	2.65	0-0.5	Soil	21-01613/21-023(c)	1.65
<i>Plutonium-238</i>	<i>51.2</i>	<i>5-5.5</i>	<i>Fill</i>	<i>21-04509/21-018(a)</i>	<i>0.023</i>
Plutonium-238	17.2	5	Fill	21-11111/21-018(a)	0.023
<i>Plutonium-239</i>	<i>9110</i>	<i>5-5.5</i>	<i>Fill</i>	<i>21-04509/21-018(a)</i>	<i>0.054</i>
Plutonium-239	2640	5	Fill	21-11111/21-018(a)	0.054
<i>Strontium-90</i>	<i>220</i>	<i>6.5-7</i>	<i>Fill</i>	<i>21-04509/21-018(a)</i>	<i>1.31</i>
Strontium-90	12.1	7	Fill	21-11111/21-018(a)	1.31
<i>Tritium</i>	<i>388</i>	<i>6.5-7</i>	<i>Fill</i>	<i>21-04509/21-018(a)</i>	<i>0.766</i>
Tritium	54.68	12.5-15	Fill	21-02520/21-018(a)	0.766
<i>Uranium-234</i>	<i>5820</i>	<i>6.5-7</i>	<i>Fill</i>	<i>21-04509/21-018(a)</i>	<i>2.59</i>
Uranium-234	277	5	Fill	21-11111/21-018(a)	2.59
<i>Uranium-235</i>	<i>238</i>	<i>6.5-7</i>	<i>Fill</i>	<i>21-04509/21-018(a)</i>	<i>0.2</i>
Uranium-235	16.2	5	Fill	21-11111/21-018(a)	0.2
<i>Uranium-238</i>	<i>2590</i>	<i>5-5.5</i>	<i>Fill</i>	<i>21-04509/21-018(a)</i>	<i>2.29</i>
Uranium-238	149	5	Fill	21-11111/21-018(a)	2.29

^a - Background values are from LANL (1998, 59730).

Bold/italic - Sample value located in in-situ vitrification area, and not representative of current site conditions.

4.1.3 Hazard Assessment

Table 4.1-4 identifies and evaluates the hazards associated with the presence of potential chemical and radiological contamination at SWMU 21-018(a)-99 and lists the Administrative and Engineering Controls that will be implemented to control these hazards. As these controls do not completely mitigate the hazards, additional mitigation with PPE and monitoring, described in the following subsections, will also be implemented. The hazards specific to the presence of potential chemical and radiological contamination at SWMU 21-018(a)-99 have been defined as follows.

Alpha and Beta/Gamma Radiation: This hazard is due to non-acute occupational exposures to radiation at the work site.

Nuisance Dust: This hazard is defined as a site worker illness due to exposure to fugitive dust emissions at the work site that contain high concentrations of site contaminants.

Metals: This hazard is defined as a site worker illness due to exposure to elevated levels of metals in soils, fills and rocks.

Semi-volatile Organic Chemicals: This hazard is defined as a site worker illness due to exposure to fugitive emissions of semi-volatile organics chemicals at the work site.

Volatile Organic Chemicals: This hazard is defined as a site worker illness due to exposure to fugitive emissions of volatile organics chemicals at the work site.

**Table 4.1-4
Hazard Assessment and Administrative and Engineering Controls for SWMU 21-018(a)-99**

Hazard	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
<i>Radiological Hazards</i>			
Alpha and Beta/Gamma Radiation	Moderate	Mishap Probability: Possibly could Occur Hazard Severity: Major	All employees involved in on site soil disturbing activities will be Radiation Worker trained and abide by as-low-as-reasonably-achievable (ALARA) principles. A Health Physics Operations Group (HSR-1) radiation control technician (RCT) will be available to monitor operational areas, and conduct radiological surveys. The RCT will determine if radiological hazards exist and will determine the appropriate controls to be implemented during field activities. All on site personnel will wear proper PPE, as determined by the SSO or specified by the RSAA, for all ACA activities.
<i>Chemical Health Hazards</i>			
Nuisance/Particulate Dust	Minor	Mishap probability: possibly could occur Hazard severity: minor	Airborne dust shall be suppressed by application of a water-based mist, as necessary, to keep airborne dust concentrations below the action level of 2 mg/m ³ .
Metals in soil	Negligible	Mishap probability: unlikely to occur Hazard severity: minor	None required due to the low probability of occurrence.
Semi-volatile organic chemicals in soil and water	Negligible	Mishap probability: unlikely to occur Hazard severity: minor	None required due to the low probability of occurrence.
Volatile organic chemicals in soil and water	Negligible	Mishap probability: unlikely to occur Hazard severity: minor	None required due to the low probability of occurrence.

4.1.4 Exposure Monitoring

Table 4.1-5 presents OSHA PELs and individual dust action levels for inorganic COPCs identified at SWMU 19-001-99. If available, OSHA PELs and individual dust action levels for organic COPCs are also presented. Individual dust action levels are based on the site's historical maximum detected concentrations and are calculated using the Marlowe Equation and a safety factor (SF) of three (3). However, due to the presence of multiple chemicals on site, a site-wide dust action level of 2 mg/m³ is assigned to account for the additive affects of multiple contaminants upon a single target organ or system. Mini-ram dust meters will be used to monitor dust levels during dust producing operations. For non-producing dust operations, if visible dust persists in the work the vicinity for more than 2 minutes, it will be monitored with a Mini-ram.

**Table 4.1-5
Exposure Monitoring Requirements for General ACA Activities at SWMU 19-001-99**

Hazardous Condition/ Substance	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)/ Rationale	Response Action(s)
Radiation	Portable alpha, beta/gamma survey instruments	Occupation Radiation Protection Requirements, LIR 402-700-01.2	As needed on samples.	Occupation Radiation Protection Requirements, LIR 402-700-01.2	Occupation Radiation Protection Requirements, LIR 402-700-01.2
Nuisance Dust	Mini-Ram	Per manufacturer's recommended procedure.	In work areas with potential of generating dust.	2 mg/m ³	Application of water mist. Minimize disturbance of soils.

4.1.5 Medical/Radiological Surveillance

All personnel conducting work in support of fieldwork in the SWMU 21-018(A)-99 area of operation must have a medical fit for duty statement.

4.1.6 Personal Protective Equipment

Head: A cap or hat is required for fieldwork for protection from sun exposure. A hardhat will be required when working around heavy equipment and where overhead hazards exist. The hardhat shall meet 29 CFR 1910.135 and ANSI Z89.1-1986 standards. Equipment operators in enclosed or protected cabs are not required to wear hardhats when operating equipment.

Body: Long trousers and long-sleeved shirts in good condition and safety vests are required for fieldwork.

Hands: Leather work gloves are required general field operations and nitrile gloves are required for chemical hazards.

Feet: For all field activities, safety shoes or boots meeting 29 CFR 1910.136, ANSI Z41-1991 are required.

Eyes: None required

Respiratory: None

4.1.7 Decontamination

Equipment decontamination: All potentially contaminated equipment will undergo dry decontamination. Residual dry soil adhering to equipment will be removed by hand. This can be performed within the area of operation or at the CRZ; contaminated soils will be managed appropriately.

Personnel decontamination: Personnel will wash hands and face after completing field activities in SWMU 21-018(a)-99 area of operation, prior to eating or drinking (in designated areas only), as is required under the general hazards section of this document. Any visible dirt or mud will be removed from coveralls, footwear, and gloves (if worn).

4.1.8 Site Control

Site control to reduce the spread of contamination is not necessary due to the low concentrations of contaminants expected in SWMU 21-018(a)-99. The site will utilize HAZWOPER designated work zones as outlined in 29 CFR 1912.120. The area containing contamination is designated as the exclusion zone. Personnel leaving the exclusion zone (EZ) will pass through the contamination reduction zone (CRZ). The support zone is the area where supplies, office trailers, break areas and other support operations occur.

During all heavy equipment activities the work area will be administratively controlled (in low traffic areas) or controlled with barrier tape, cones, or other stanchions (in high traffic areas) to prevent unauthorized entry to work areas. Operations within the EZ will be conducted by groups of at least two people who will maintain visual contact with each other at all times. Entrance into the CRZ or EZ will be documented in an access control log. Zones are not required for non-intrusive activities.

5.0 TASK HAZARD ANALYSIS

Site specific task hazards, concerns and potential accidents or incidents, along with their controls, preventive measures, and bounding conditions are described in IWD ER-2005-0269.

Appendix A

*Site Specific Health and Safety Briefing Form and Daily
Tailgate Safety Meeting Form*

SITE SPECIFIC HEALTH & SAFETY BRIEFING FORM

The individuals who sign this acknowledgement are authorized by their respective health and safety responsible line manager (who has signed approval of the SSHASP) to perform this task.

Project Title: Interim Measure and Investigation of SWMU 21-018(a)-99, at TA-21

SSHASP No.: ER-2005-0268

Date: _____

TA(s)/Location(s): TA-21

Conducted by:

Printed Name	Title	Employer or Group	LANL Z Number
--------------	-------	-------------------	---------------

Signature

Date

I acknowledge that I understand this Site-Specific Hazard Analysis (SSHA), including the hazards related to performing this task and the ways I can eliminate the hazards or protect myself from injury or illness on the job.

NAME	EMPLOYER/GROUP	Z NUMBER	SIGNATURE/DATE
Elmer Alcon	Shaw Environmental	119437	<i>[Signature]</i> 5/10/05
Douglas C. Hopinkah	Shaw Environmental	192466	<i>[Signature]</i> 5/10/05
Curtis Schwartz	Portage Env.	174299	<i>[Signature]</i>
Angela Bowman	Shaw Environmental	209704	<i>[Signature]</i>
Bernadette Gonzales	Butler HSR-1	194165	<i>[Signature]</i>
JAMI MORGAN	HSR-1 LANL	086090	<i>[Signature]</i>
Larry W. Pacheco	UC/LANL/HSR-1	092415	<i>[Signature]</i>
Crystal Terrezas	Comforce / HSR-1	189051	<i>[Signature]</i> 5/10/05
DAVID BULLOCK	UC/LANL/HSR-1	196973	<i>[Signature]</i> 5/10/05
Daniel A. Sandoz	LANL / HSR-5	078047	<i>[Signature]</i> 5/10/05
KEITH TUCKER	PORTAGE ENVTL	174862	<i>[Signature]</i> 5/10/05
ANDREW E. FAILES	OS ECR/HSR	118331	<i>[Signature]</i> 5/10/05
Mike Towler	Portage Env.	208635	<i>[Signature]</i> 10/10/05
RALPH WHEELER	PORTAGE ENVTL	208636	<i>[Signature]</i>
Jared Lyman	LANL / ENV	116018	<i>[Signature]</i> 5/10/05

SITE SPECIFIC HEALTH & SAFETY BRIEFING FORM

The individuals who sign this acknowledgement are authorized by their respective health and safety responsible line manager (who has signed approval of the SSHASP) to perform this task.

Project Title: Interim Measure and Investigation of SWMU 21-018(a)-99, at TA-21

SSHASP No.: ER-2005-0268

Date: _____

TA(s)/Location(s): TA-21

Conducted by:

Printed Name	Title	Employer or Group	LANL Z Number

Signature

Date

I acknowledge that I understand this Site-Specific Hazard Analysis (SSHA), including the hazards related to performing this task and the ways I can eliminate the hazards or protect myself from injury or illness on the job.

NAME	EMPLOYER/GROUP	Z NUMBER	SIGNATURE/DATE
Shawn Henio	Spectrum	206522	Shawn Henio 5/10/05
David Starnes	Spectrum	181125	David Starnes
Russell Lyon	Shaw	205842	Russell Lyon 5/18/05
James Vigerust	Shaw	48	James Vigerust
Jamie Gardner	Shaw	175234	Jamie Gardner
Pattie Paulcom	Apogen	2069107	Pattie Paulcom 7/14/05
Matt Hartmann	Apogen	192241	Matt Hartmann 7/14/05
Candace Christensen	Apogen	197849	Candace Christensen 7-14-05
David Wykoff	Apogen	147729	David Wykoff 7-14-05
Jeff Rathbun	Shaw	211453	Jeff Rathbun 7-18-05
Callie Rathbun	Shaw	211454	Callie Rathbun 7-18-05
JAY WILDE	Shaw	211797	JAY WILDE 7-18-05
Frank Visk	Shaw	211334	Frank Visk 7-18-05
MARCO LASKY	Portage ENV.	211711	MARCO LASKY 7-21-05
Heidi Hall	Portage	211710	Heidi Hall 7/21/05

SITE SPECIFIC HEALTH & SAFETY BRIEFING FORM

The individuals who sign this acknowledgement are authorized by their respective health and safety responsible line manager (who has signed approval of the SSHASP) to perform this task.

Project Title: Interim Measure and Investigation of SWMU 21-018(a)-99, at TA-21
 SSHASP No.: ER-2005-0268 Date: _____

TA(s)/Location(s): TA-21

Conducted by:

Printed Name	Title	Employer or Group	LANL Z Number
Signature		Date	

I acknowledge that I understand this Site-Specific Hazard Analysis (SSHA), including the hazards related to performing this task and the ways I can eliminate the hazards or protect myself from injury or illness on the job.

NAME	EMPLOYER/GROUP	Z NUMBER	SIGNATURE/DATE
Jarell Pompeo	Shaw	149233	[Signature] 8-7-05
RUSSELL SHUMAKER	APOGEN	212073	[Signature] 10-11-05
Anthony P. Martinez	Shaw	168908	[Signature] 10-12-05
BRAD SCHULING	Portage	210081	[Signature] 10-14-05
John Montañ	Portage		[Signature] 10-31-05
David A. Luna	Portage		[Signature] 10-31-05
Pat Wolfe	Lamoureux Crane	128087	[Signature] 1-18-06
ERIC TUSA	Portage	192180	[Signature] 1-24-06
Gabriel Gallegos	Portage	217084	[Signature] 1-30-06
SERAFIN VIGIL	Portage	217142	[Signature] 1-30-06
John Sandoval	Portage		[Signature] 2-27-06
David Regis	Lamoureux / Advantage ^{Crane}		[Signature] 3/7/06

ATTACHMENT 2

TAILGATE SAFETY MEETING FORM

Project Name/Number: _____ Date: _____ Time: _____

Client: _____

Work Activities: _____

Hospital Name/Address: _____

Hospital Phone No.: _____ Ambulance Phone No.: _____

Safety Topics Presented

Chemical Hazards: _____

Physical Hazards: _____

Personal Protective Equipment:

Activity: _____ PPE Level: _____

New Equipment: _____

Other Safety Topic(s): _____

Attendees

NAME PRINTED

SIGNATURE

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Meeting conducted by:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Appendix B

Incident Notification Process

INCIDENT NOTIFICATION PROCESS

CONTACTS AND PHONE NUMBERS

EMERGENCIES

If the incident is an emergency that involves:

- A Medical Emergency;
- Fire;
- Police;
- Security; or
- Hazardous Device

CALL:911

Cellular Phone667-7080

(If you are calling from a cell phone, you must tell the 911 operator that the emergency is in Los Alamos)

If you are calling from a cell phone, contact the Access Control Office.

If the incident is not an emergency that does not involve the items above:

CALL: (EM&R)667-6211

Facility, Management, and Emergency Contacts and Telephone Numbers

HAZARDOUS RELEASE/SPILL (If spill occurs on SWMU or AOC report to First Responder and Facility Manager)

LANL HAZMAT TEAM: 667-6211
LANL Safety- HSR-5 665-7221
LANL Radiation Safety- HSR-1 667-7171

MEDICAL NOTIFICATION

Los Alamos Medical Center: 662-4201
LANL Occupational Medicine Clinic: 667-7848

SECURITY

Los Alamos Police: 662-8222
PTLA/LANL Security: 667-6534

FACILITY

	<u>Phone</u>	<u>Pager</u>
David Padilla	667-2408	996-4583
Charles Trujillo	667-0491	996-1084

MANAGEMENT

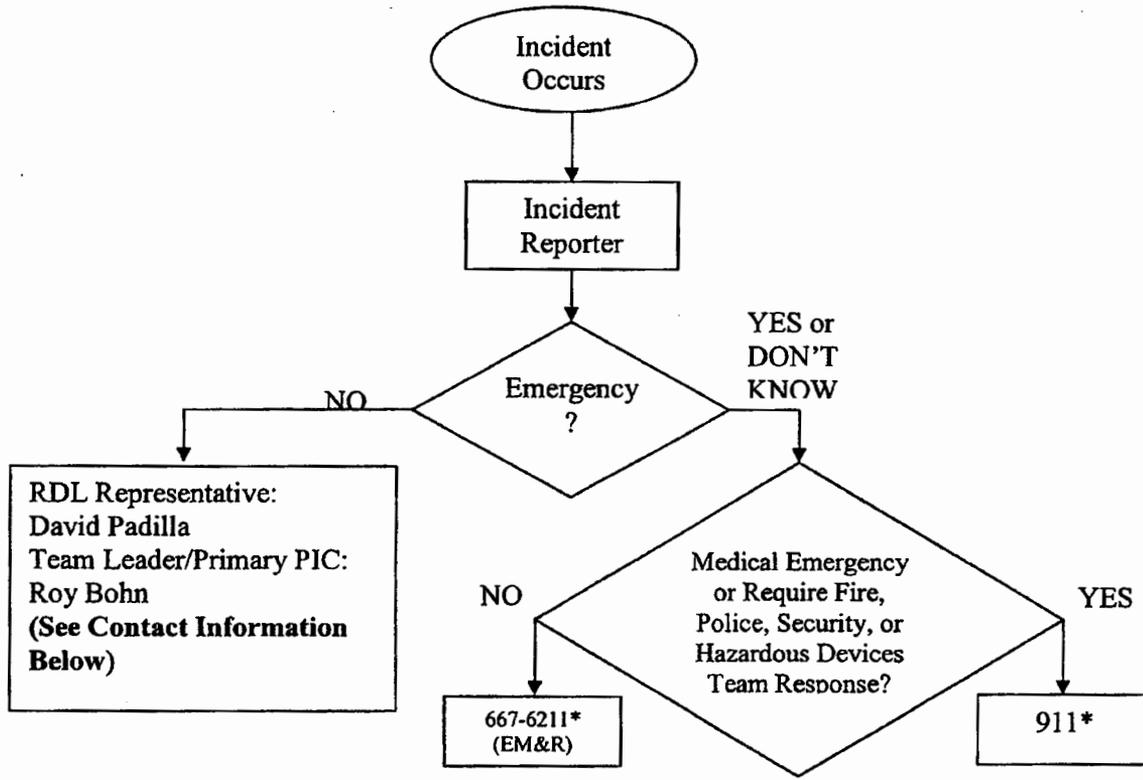
	<u>Phone</u>	<u>Pager</u>	<u>Cell</u>
Becky Coel-Roback, ENV-ERS PM	665-5011	NA	699-0297
Keith Tucker, Portage Project Manager	753-8676	NA	699-3264
Mike Spry, Portage Program Manager	753-8676	NA	577-3495
Scott den Baars, Shaw Program Manager	661-5259	NA	505-695-9504
Elmer Alcon, Shaw Project Manager	661-5216	664-4329	412-1626
Paul Martin, Shaw H&S	661-5271	NA	412-1826
Oliver Wilton, HSR-5	665-0731	996-0877	231-4605
Larry Pacheco, HSR-1	667-5185	996-0504	699-1205
David McInroy, ENV-ERS	667-0819	996-3548	699-1183
Gabriela Lopez Escobedo, ENV-ERS	665-7352	699-1637	664-2371
Alison Dorries, EVN-ERS	665-6952	664-5313	699-1979
John Martin, Portage Project Manager	753-8676	NA	699-3264

EMERGENCY REPORTING INFORMATION

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

- 1) Site name/location/phone # 2) Name and condition of affected employees 3) Number of personnel involved 4) Nature of emergency Caller ID 5) Actions taken and assistance required**

INCIDENT NOTIFICATION PROCESS



EMERGENCY REPORTING INFORMATION

- If You Dial 911 From a Cell Phone, You Must Tell the Operator That the Emergency is in Los Alamos
- Site Name/Location/Callers Phone #
- Callers Name
- Nature of Emergency (Include hazards that responders may encounter)
- Number of Personnel Involved
- Condition of Affected Personnel (Age/Gender/Nature of Injury)
- Actions Taken and Assistance Required

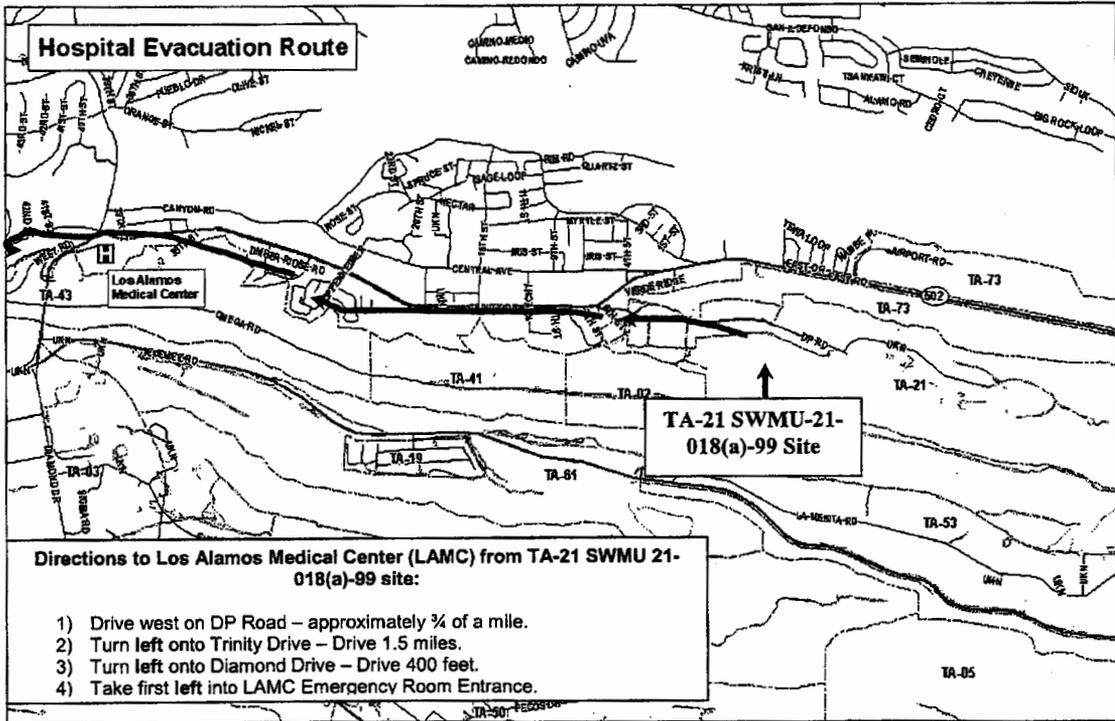
* After the Initial Incident Notifications have been made, the following project contacts shall be notified as soon as possible as applicable:

	Phone / Pager / Cell
RDL Representative/Group Leader (David Padilla).....	667-2408/996-4583/699-2816
Responsible Line Manager (Alison Dorries)	665-6952/664-5313/699-1979
Team Leader/Primary Person-In-Charge (Roy Bohn)	665-5138/996-3547/699-1387
Alternate Person-In-Charge (Dan Thompson)	662-1332/ NA /780-2898
HSR-1 Rep: (Larry Pacheco).....	667-5185/996-0504/699-1205
HSR-5 Rep: (Oliver Wilton)	665-0731/996-0877/231-4605
HSR-5 Rep: (Daniel Sandoval).....	665-3380/664-3281/

Subcontractor notifications shall be in accordance with the individual company policies. Management contacts and phone/cell/pager numbers are also listed in section 1.2 of this SSHASP.

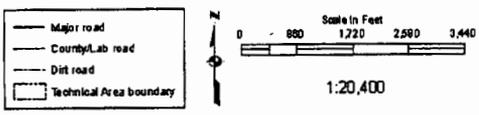
Appendix C

Route Map to Los Alamos Medical Center



Directions to Los Alamos Medical Center (LAMC) from TA-21 SWMU 21-018(a)-99 site:

- 1) Drive west on DP Road – approximately ¼ of a mile.
- 2) Turn left onto Trinity Drive – Drive 1.5 miles.
- 3) Turn left onto Diamond Drive – Drive 400 feet.
- 4) Take first left into LAMC Emergency Room Entrance.



Source: LANL GIS Database
 R.A. Lyon 03/16/05
 State Plane Coordinate System
 New Mexico Central, NAD 83

Appendix D

Hillside/Slope Fall Protection Plan

APPENDIX D

HILLSIDE/SLOPE FALL PROTECTION PLAN

Interim Measure and Investigation of SWMU 21-018(a)-99, MDA-V at TA-21

OVERVIEW

This appendix outlines equipment, training and certifications for fall protection, prior to and during soil sampling and debris removal that will take place on the hillsides of SWMU 21-018(a)-99.

The physical character of the work location and the type of planned field activities are not specifically addressed under OSHA. It is OSHA policy that in these cases the most applicable regulations will be utilized. The fall protection plan will be reviewed and approved by appropriate LANL, HSR-5 Occupational Health and Safety personnel. In all cases, adequate fall protection will be provided to employees. The Solid Waste Regulatory Compliance Group (SWRC) has selected Subpart M of 29 CFR 1926 (construction) as the guideline for fall protection, keeping in mind that this specific activity is quite different from the activity described in CFR 1926. The guidelines will be interpreted, and the activity will be assessed by LANL HSR-5 Occupational Health and Safety Professionals in conjunction with the expertise of representatives of The Los Alamos Search and Rescue Association and LANL HAZMAT High Angle Rescue Team. The objective of this plan is to ensure worker safety, given the nature and environment anticipated during the proposed interim measures and investigation activities at SWMU 21-018(a)-99.

The purpose of this Fall Protection Plan (the Plan) is (1) to supplement the Site Specific Health and Safety by providing safety standards specifically designed to address fall protection on this project and (2) to ensure that each employee is trained and made aware of the safety provisions which are to be implemented by this Plan prior to the start of sampling activities. This Plan addresses the use of other-than-conventional fall protection during the following activities:

- Surface soil sampling and debris removal on the cliffs and steep hillsides south of MDA-V.

This plan is designed to enable employers and employees to recognize the potential fall hazards on this project and to establish the procedures to be followed in order to prevent any fall that could result in serious injury. Each employee at the work site will be trained in these procedures and will abide by them as warranted.

RESPONSIBILITIES

It is the responsibility of the Field Team Leader (FTL), with the assistance of the Site Safety Officer (SSO), to implement this Fall Protection Plan. Field team members will receive fall protection training and a "Competent Person" will be onsite during the implementation and use of the fall protection system. The competent person is responsible for continual observational safety checks and to enforce the safety policies and procedures. It is the responsibility of each employee to bring to the attention of the competent person any unsafe or hazardous conditions, or acts of negligence that may cause injury to themselves or others.

SITE DESCRIPTION

SWMU 21-018(a)-99 is a consolidated unit comprised of the following SWMUs and AOC:

SWMU 21-018(a), MDA-V (three wastewater absorption beds)

SWMU 21-018(b), a former laundry facility for radioactively contaminated clothing

SWMU 21-023(c), a waste treatment laboratory septic system and outfall

SWMU 21-013(b), a surface disposal area consisting of building debris

AOC 21-013(g), a surface disposal area consisting of debris of unknown origin

SWMU 21-018(a)-99 is located on land currently owned by the DOE. While current land use is classified as industrial, it is proposed that this land will be transferred from DOE to a new owner; therefore, future land use is unknown. SWMUs 21-018(a) and 21-018(b) are mesa-top sites with direct drainage into BV Canyon and subsequent drainage into Los Alamos Canyon. SWMU 21-023(c) is partially on the mesa top (septic system) and partially on the canyon slope (outfall). SWMU 21-013(b) and AOC 21-013(g) are located on the south-facing slope of BV Canyon below MDA-V.

Several radionuclides and inorganic chemicals have been detected above background values at SWMU 21-018(a)-99. Organic chemicals, although not as prevalent, have also been detected.

Radionuclides and inorganic chemicals exceed screening action level (SAL) or soil screening level (SSL) in absorption bed 1 at MDA-V. Several radionuclides also exceed SALs on the outfall slope at SWMU 21-023(c). A few organic compounds exceed SSLs on the slope at SWMU 21-013(b).

The eastern portion of the work area has steep cliffs where debris consisting of concrete, metal, and asphalt were bulldozed over the cliff sides with many pieces of debris rolling to the bottom of the canyon. The western portion of the operational area is mostly asphalt dumped over the edge of a steep slope.

SCOPE OF WORK

The sampling activities will be performed primarily on the soils associated with the cliffs and steep slopes as well as debris sampling. During sampling activities, occasional foot travel will be required to reach the canyon bottom. The canyon bottom is accessible by walking down the eastern and western boundaries of the waste pile. These boundaries or corridors are relatively clear of large brush and trees. The western corridor does not exceed a slope of 40 degrees and the eastern corridor does not exceed a slope of 60 degrees. It is these corridors that are addressed under the fall protection system described below. Hillside debris removal activities will also take place using heavy equipment that may include spotters that will need to follow this Fall Protection Plan.

A dirt road may be constructed to the bottom of BV canyon to allow for transportation of personnel and equipment to the canyon bottom for those sampling activities requiring larger scale mobilization.

PERSONAL FALL ARREST SYSTEM

The equipment to be utilized during sampling activities has been selected to meet or exceed specifications outlined in Subpart M of 29 CFR 1926. This equipment has been selected with great care to allow for simplicity and ease of use while maintaining the highest degree of safety possible.

The equipment will be purchased and maintained by the Portage Environmental Inc. and will include:

Lifeline Rope - NFPA certified 1/2 inch static line, kernxnanle, rescue-grade rope of not less than 9,000 lb. tested braking strength. Approximately 200 ft of static line will be securely anchored to a ponderosa pine of large piece of equipment at the top of each corridor and stretched the length of the corridor to the canyon bottom.

Seat Harness - basic rescue harness, commercially sewn waist belt with reinforced/attached leg loops. Based upon the low angle of the slope, the use of a seat harness is more appropriate than the use of a full body harness. A full body harness would provide no added protection and may in fact place the employee at greater risk of entanglement.

Figure Eight (with ears) - descending/frictioning device.

Locking carabineer - NFPA certified steel locking 'D'.

Prusik loop.

Helmet - Petzl climbing helmet with three point chin strap.

Leather gloves.

Level D PPE will be worn as described in the main body of the SSHASP.

The lifeline will be anchored to the tree using a tensionless hitch (several wraps around the tree or a piece of heavy equipment and a figure-eight tie off).

ANCHORAGE ALTERNATIVE OPTION

Anchorage for the fall protection system could utilize objects such as a dead man or large boulder capable of supporting 5000 lbs.

The employee will be attached to the fixed static line, by using the locking carabineer to dip his/her harness to the figure-eight frictioning device. The employee will use the figure-eight on static line to descend the slope using rappelling technique. During decent the Prusik loop will operate as a backup. The Prusik will be used as the main fall arrest device on ascent of the slope. Field team members will be trained by the competent person in the use of the fall protection equipment. During the actual use of the fall protection equipment, the competent person will assist employees in "tying in" and will oversee the use of the equipment and ascending/descending techniques. At no time will sampling activities occur whereby employees will be working above ground level. This fall protection plan only addresses occasional foot travel and sampling on moderate to steep dirt slopes.

SAFETY MONITORING SYSTEM

The safety monitoring system provides a means of allowing the competent person visual and audible access to the work environment. In this manner, the competent person may identify and warn employees of potential additional or increased hazards. The competent person shall:

1. Be competent in recognizing fall hazards.
2. Maintain clear visual and audible contact with employees working in fall arrest systems. Note: Should weather conditions (e.g. wind) inhibit audible contact, operations will be halted.
3. Before each use, equipment inspections using the LANL Environmental Restoration Project standard Fall Protection/Rescue Equipment Checklist will be performed.
4. Warn employes of dangerous situations (e.g. approaching weather), if the employees are working in an unsafe manner, or if employees appear to be tiring or feeling unfit to continue work.

5. Do not allow other responsibilities to encumber monitoring. If the competent person can no longer safely monitor workers, the competent person shall a) stop work and retrieve employees from fall arrest systems, or b) surrender responsibility for monitoring to an alternate competent person.

6. If, for any reason any field team member uses his/her stop work authority, the competent person, Field Team Leader, Site Safety Officer and the concerned employee will collectively resolve the issue of concern prior to initiation of sampling activities.

PERSONNEL TRAINING AND CERTIFICATION

Sampling team members working under the protection of the personal fall arrest systems shall be trained by a competent person in accordance with the requirements of 29 CFR 1926.503. This training shall include:

- The nature of fall hazards in the work area
- Correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used
- The role of each team member in the safety monitoring system when the system is in use
- Limitations of the use of the equipment
- Correct procedures for handling and storing of the fall protection equipment and materials
- The applicable OSHA standards

Completion of training shall be documented by the preparation of a written certification record by the employer, Portage Environmental. Additional training may be necessary due to:

- Changes in work scope or work conditions
- Changes in equipment utilized
- Changes in personnel

CHANGES TO THIS FALL PROTECTION PLAN

Any changes to this plan shall be approved by SSO prior to implementation. SSHASP addendum forms will be utilized and will contain:

- Description of the change
- Justification for the change
- Hazard Assessment and Evaluation of the change on other aspects of this Plan and the SSHASP
- Approval signatures of ESH-5 representative and competent person

PRE-JOB CONFERENCE

Sampling team members will be required to attend mandatory fall protection training to be provided by the competent person before work is initiated. Issues and concerns related to fall protection will be addressed at this time.

POST OPERATION REVIEW

A review of the slope activities performed at SWMU 21-018(a)-99 will be held. Items discussed will include effectiveness of the fall protection system, its ease of use, and procedures/guidance describing decisions when fall protection equipment becomes unsafe and places employees at greater risk rather than protecting them. A review of sample and personnel retrieval techniques, recommendations for future related activities, and fulfilling competent personnel requirements including training and certifications will also be a part of the Post Operation Review.

FALL PROTECTION/RESCUE EQUIPMENT CHECKLIST

SSHASP ER-2005-0268 Date 05/05/ 2005

Project Title: Interim Measure and Investigation of SWMU 21-018(a)-99, MDA-V at TA-21

Instruction for use: The manufacture's inspection procedures and recommendations should always be consulted and used when performing inspections of fall protection equipment. The following checklist may be used u an additional guide when performing inspections of this type of equipment. This checklist may be used for both daily and periodic inspections.

1.0 Safety Harness

	Yes	No
Does the harness material show any visible defects such as:	_____	_____
Fraying at tearing?	_____	_____
Stretching?	_____	_____
Mildew or mold?	_____	_____
Broken or pulled stitches?	_____	_____
Does the hardware (rings, snaplinks, etc.) show any sign of wear or deterioration?	_____	_____
Cracks	_____	_____
Sharp edges	_____	_____
Deformation?	_____	_____
Corrosion?	_____	_____
Chemical attack?	_____	_____
Excessive wear?	_____	_____
Is each belt rivet secure and intact?	_____	_____
Are the product information and warning labels firmly attached to the harness?	_____	_____