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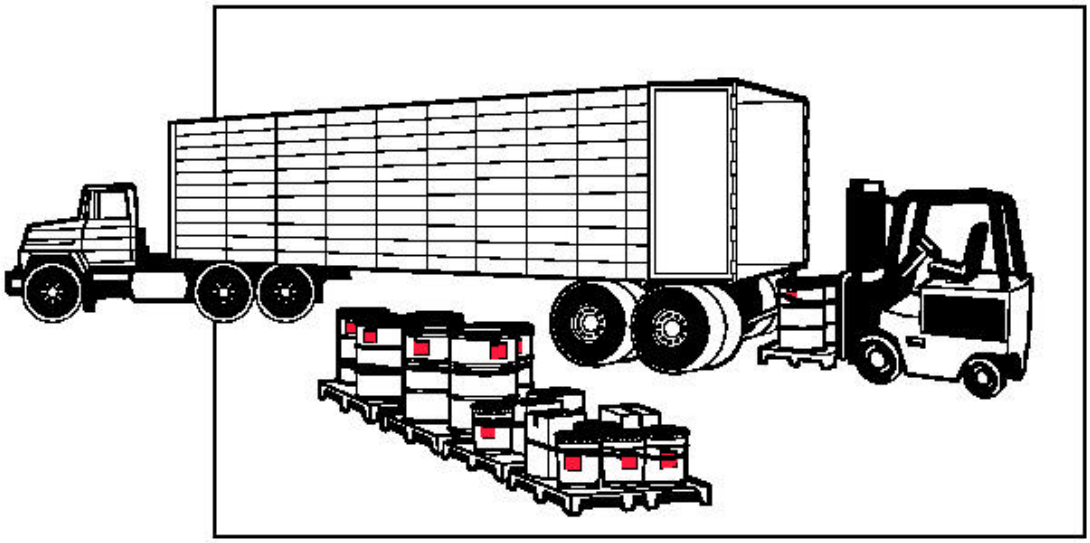
Onsite Packaging and Transportation Safety Manual

April 2004



LAWRENCE LIVERMORE NATIONAL LABORATORY

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Onsite Packaging and Transportation Safety Manual

UCRL-MA-108269, Rev. 2
April 2004

Approved by the PATS Working Group

Approved:

Dennis K. Fisher, 5/3/04

Dennis K. Fisher,
Associate Director,
Safety and Environmental Protection Directorate

Date

PATS Onsite Manual
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1. Introduction

1.1 Purpose and Objective

LLNL's Compliance Requirements

Lawrence Livermore National Laboratory (LLNL) at both its Main Site in Livermore, California, and at its Experimental Test Site—Site 300 near Tracy, California—must comply with a variety of applicable federal, state, and local laws; U.S. Department of Energy (DOE) Orders; and policies concerning the receipt, transport, identification, and handling of hazardous materials.

Applicable DOT Regulations

Onsite packaging and transportation operations that are performed within the geographically contiguous private property under the control of LLNL at the Main Site or at Site 300 are exempt from U.S. Department of Transportation (DOT) regulations. However, DOT regulations, although not applicable to onsite packaging and transportation activities at LLNL, may be considered as a source document.

LLNL Policy: Onsite Transfers of Hazardous Materials

The LLNL Packaging and Transportation Safety Program (PATS) must ensure that LLNL operations involving the packaging and the transportation of hazardous materials on site shall be conducted to:

- Protect the health and safety of employees, subcontractor employees, and onsite visitors.
- Protect the health and safety of the public.
- Protect the hazardous materials during onsite transfer.
- Protect the environment.
- Comply with applicable federal, state, and local requirements.

1.2 The *Onsite PATS Safety Manual*

Scope of the *Onsite PATS Safety Manual*

The *Onsite Hazardous Materials Packaging and Transportation (PATS) Safety Manual* establishes LLNL policy for the onsite transfers of hazardous materials, substances, and wastes within the geographically contiguous property of LLNL, including Site 300. Such onsite transfers shall be performed in a manner that minimizes potential risks to the health and safety of employees, the public, and the environment. The *Onsite PATS Safety Manual*:

- Specifies responsibilities, requirements, and controls for the onsite movement of hazardous materials, substances, and wastes.
- Provides internal policies for compliance with applicable DOE Orders and other regulations governing onsite transfers of such materials.
- Provides guidance on packaging and transfer of hazardous materials, substances, and wastes on site.
- Provides documentation demonstrating safety of onsite transfers of hazardous materials, substances, and waste.

***Onsite PATS Safety Manual* Control**

The *Onsite PATS Safety Manual* and each revision shall be:

- Reviewed and recommended for approval by the PATS Program Manager, members of the PATS Working Group, and other affected Laboratory organizations.
- Approved by the Laboratory Deputy Director for Strategic Operations.

Revision Schedule

The *Onsite PATS Safety Manual* will be reviewed and revised every three years as necessary. Minor revisions shall be made on an as-needed basis.

1.3 Compliance with 10 CFR Part 830 Nuclear Safety Management

LLNL Compliance with Nuclear Safety Management

The *Onsite PATS Safety Manual* will be reviewed and revised every three years as necessary. Minor revisions shall be made on an as-needed basis.

2. Site Description

2.1 Lawrence Livermore National Laboratory

Description of LLNL Sites

LLNL is located about 40 miles east of San Francisco at the southeast end of the Livermore Valley in southern Alameda County. See **Figure 2-1**.

LLNL consists of two sites. The Main Site is located 3 miles east of the city of Livermore adjacent to the site of Sandia National Laboratories, California (**Figure 2-2**). Site 300 is 12 miles to the southeast in the Diablo Range near the city of Tracy (**Figure 2-3**).

Definition: On Site

For hazardous materials packaging and transportation activities, or hazardous waste generation, "on site" is any activity performed within the geographically contiguous private property under the control of LLNL.

2.2 Main Site

Location of LLNL Main Site

The LLNL Main Site occupies approximately 1 square mile bounded by East Avenue to the south, Greenville Road to the east, Patterson Pass Road to the north, and Vasco Road to the west.

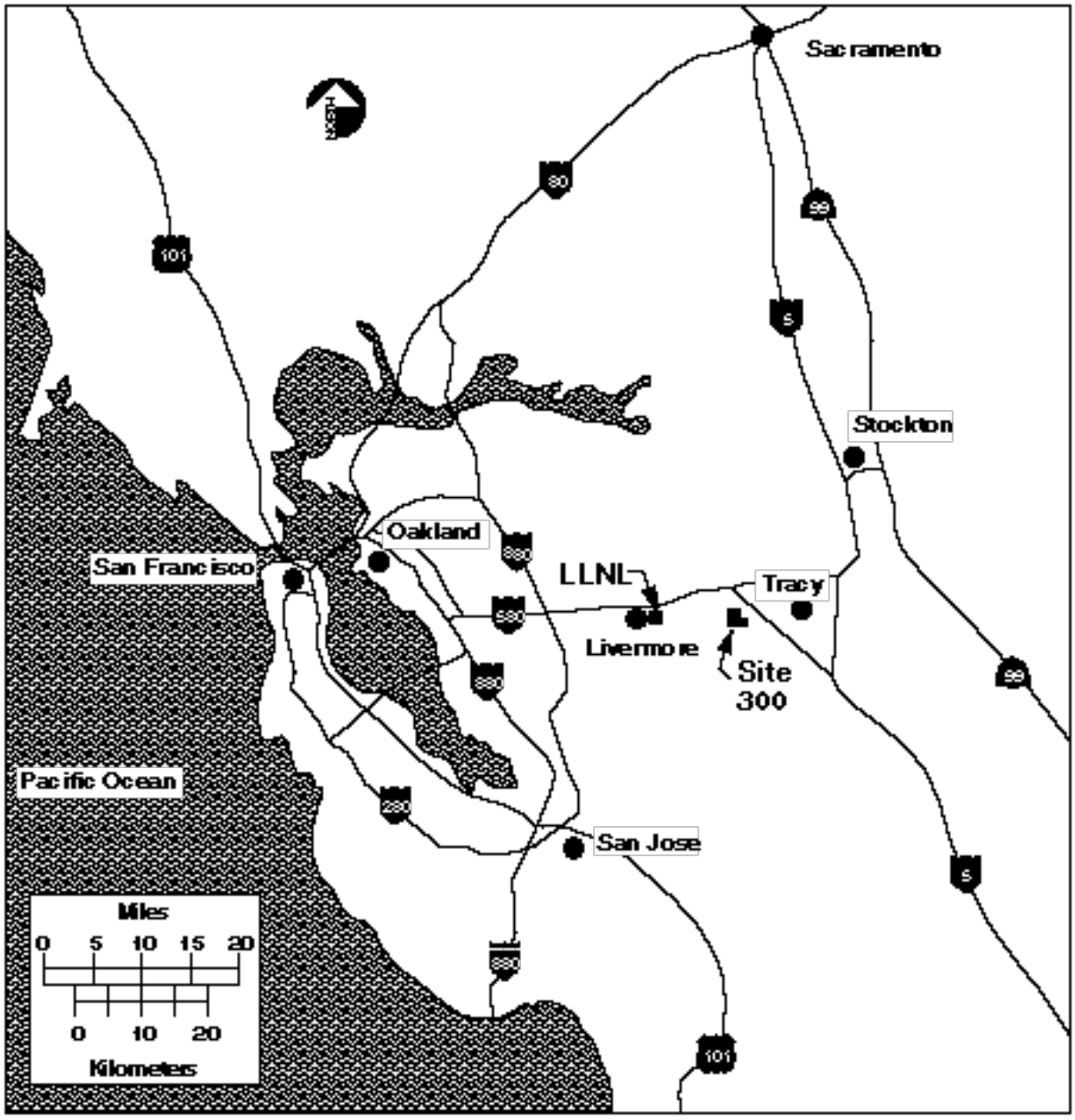

Figure 2-1. The regional location of Lawrence Livermore National Laboratory

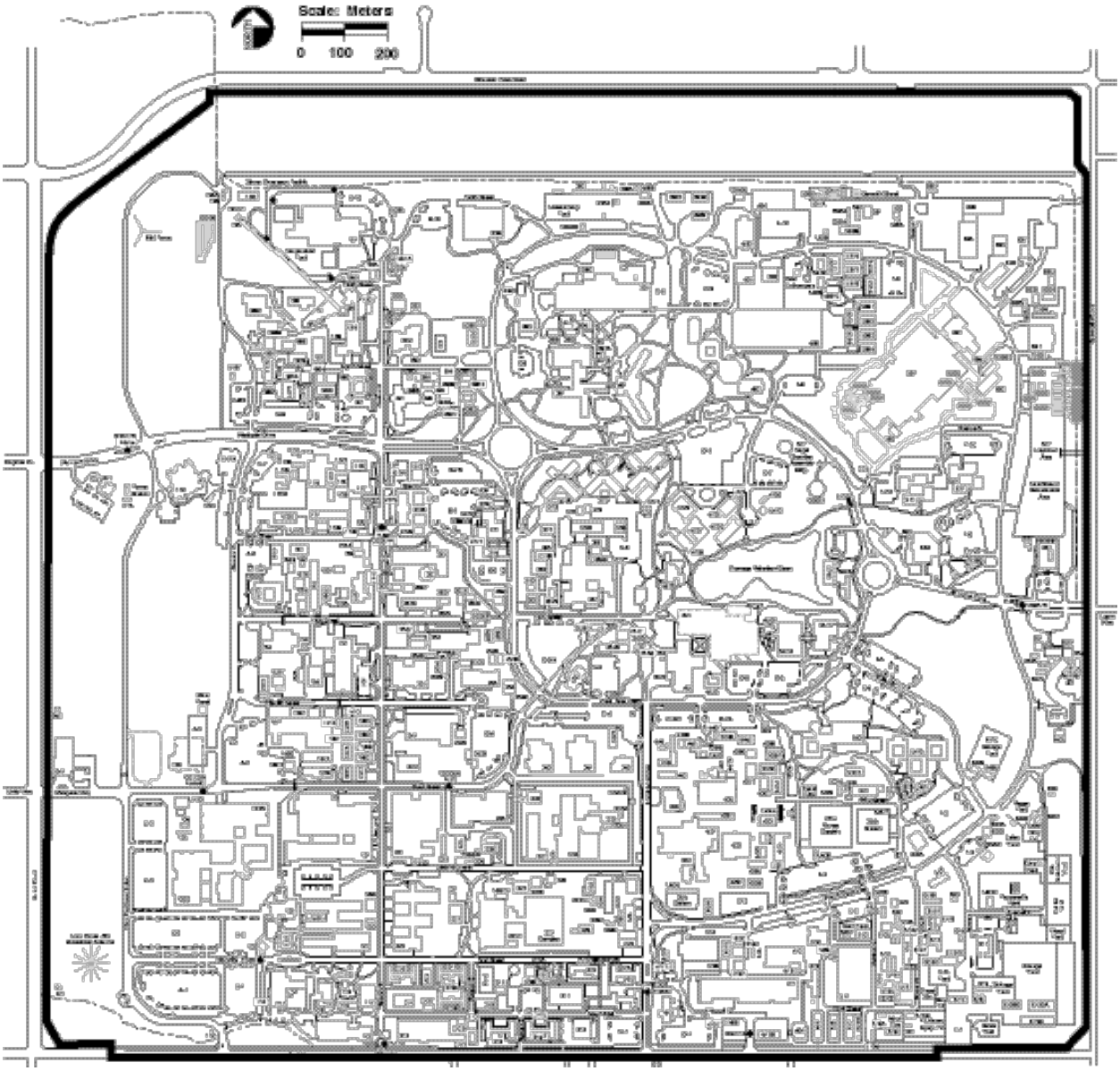

Figure 2-2. The Main Site of Lawrence Livermore National Laboratory.

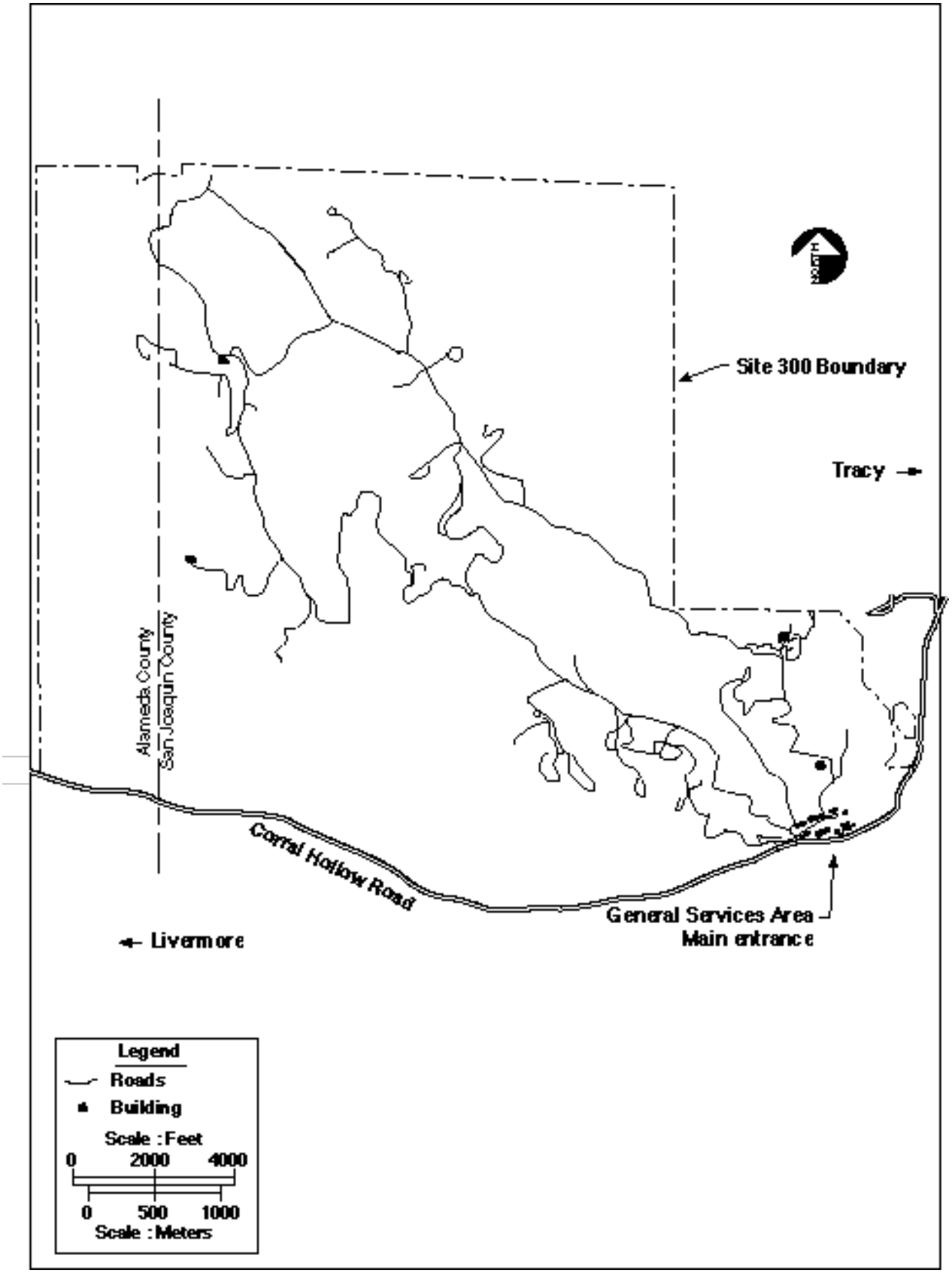

Figure 2-3. The location of Site 300 in the Diablo Range

Access to Main Site

To gain access to the Main Site, employees, subcontractors, and visitors are required to obtain and display a security badge.

2.3 Site 300

Description of Site 300

Site 300, covering an area of about 10 square miles, is roughly rectangular in shape with its southern boundary being adjacent to Corral Hollow Road. About one-sixth of the site lies in Alameda County; the remainder is in San Joaquin County.

Access to Site 300

To gain access to the Site 300, employees, subcontractors, and visitors are required to obtain and display a security badge.

To assure the health and safety of personnel at Site 300, LLNL has developed a required safety class, HS-0095. To gain access beyond the Site 300 gate, visitors and LLNL personnel must have one of the following requirements:

- Successfully completed the HS-0095 class within the current calendar year.
- Be escorted by an individual who has successfully completed HS-0095.
- Made prior arrangements with the Site 300 Manager's Office.

Personal vehicles are restricted in all areas of Site 300 except for areas located near the entrance.

3. Categories of Hazardous Materials, Substances, and Wastes

3.1 Categories of Hazardous Materials

There are three LLNL categories of hazardous materials, substances, and wastes described in the *Onsite Hazardous Materials Packaging and Transportation Safety (PATS) Manual*.

Category 1

Category 1 Hazardous Materials are "controlled materials" that also fit the definition for hazardous materials given in 49 CFR 171.8 (e.g., hazardous classified material, classified waste, non-waste quantities of fissionable and other radioactive materials, accountable nuclear materials, explosives, and nuclear components and special assemblies). See **Section 7**.

Category 2

Category 2 Hazardous Materials are unclassified hazardous or radioactive materials, substances, and wastes of negligible economic value, i.e., hazardous, explosive, and radioactive wastes. See **Section 8**.

Category 3

Category 3 Hazardous Materials are all hazardous material and substances other than those identified in Categories 1 and 2. See **Section 9**.

3.2 Explosives Storage Compatibility/Handling Control System

LLNL uses an explosives storage compatibility/ handling control (SC/HC) system to group explosives according to their form or composition, ease of ignition, and susceptibility to detonation. The control system facilitates the identification of the type(s) of explosives permitted in an approved explosives work area.

Definition of SC/HC System

The SC/HC system utilized by the United Nations Organization (UNO) system contains storage compatibility groupings (SCGs) and categorizes explosives by their form or composition, ease of ignition, or ease of detonation.

UNO Storage Compatibility Grouping

The UNO storage compatibility grouping is the handling control system used to control the group of explosives permitted in an approved explosives work area. Different types of explosives may be transported together or stored in the same storage magazine if they are compatible.

For More Information

LLNL's explosives safety program is described in greater detail in the *LLNL ES&H Manual*, Volume II, Part 9: Transportation.

4. Organization of the LLNL Packaging and Transportation Safety Program

4.1 LLNL Management Organization

Introduction

This section discusses the responsibilities of LLNL line management and organizations for setting and implementing policies related to the packaging and the transportation on site of hazardous materials, substances, and wastes.

Ultimate responsibility for the LLNL Packaging and Transportation Safety (PATS) Program rests with the Laboratory Director. The Deputy Director for Strategic Operations, with overall responsibility for the Integrated Safety Management Program (ISM), has approval authority for the *Onsite PATS Safety Manual.* The Associate Director of the Safety and Environmental Protection (SEP) Directorate, the PATS Executive Council, the PATS Program Manager, and the PATS Working Group members are responsibility for directing the hazardous materials packaging and transportation operations at the Laboratory and assuring compliance with local, state, and federal regulations and Laboratory policies.

The Laboratory Director

The Director of LLNL is the Laboratory's Chief Executive Officer and is also an official of the University of California. As Chief Executive Officer, the Director manages and is accountable for all Laboratory operations and activities, including the packaging and transportation of hazardous materials, substances, and wastes. The Director establishes Laboratory policy for the PATS Program.

The Deputy Director for Strategic Operations

The Laboratory Deputy Director for Strategic Operations approves the *Onsite PATS Safety Manual.*

Line Management

From the Director's Office, the chain of management extends downward to the Associate Directors (ADs) and then to those appointed by them to manage staff and budgets, direct the work performed at LLNL, and oversee environment, safety, and health (ES&H) responsibilities for that work.

Associate Directors

Each major LLNL organization is headed by an appropriate programmatic Associate Director (AD) or Program Leader. The Director holds the ADs accountable for implementing LLNL policies as an integral part of their management responsibilities, including assurance that:

- Laboratory ES&H policies are integrated into program plans and activities, and the activities comply with applicable ES&H requirements.
- Required ES&H documentation is prepared and maintained.
- Training requirements are documented. The Program AD shall notify the Payroll AD of program-specific training requirements. ADs are responsible for assuring that personnel assigned to the work activities in their areas of responsibility have received the proper job-related ES&H training.
- Appropriate Safety Plans (SPs), Integrated Worksheets (IWSs), and procedures are prepared and followed, and programmatic activities follow applicable Facility Safety Plan (FSP) requirements.

Associate Director for Safety and Environmental Protection

The major institutional support organization for the PATS Program is the Safety and Environmental Protection (SEP) Directorate (see **Figure 4-1**). The Associate Director for the SEP Directorate oversees the effectiveness of the PATS Program, including responsibility for:

- Approving this *Onsite PATS Safety Manual* and any major revisions.
- Approving the PATS Quality Assurance (QA) Plan and any major revisions (See Section 14.4).
- Assuring that resources necessary for the PATS Program are provided.
- Monitoring and supporting the PATS Program Office in its management of the PATS Program.

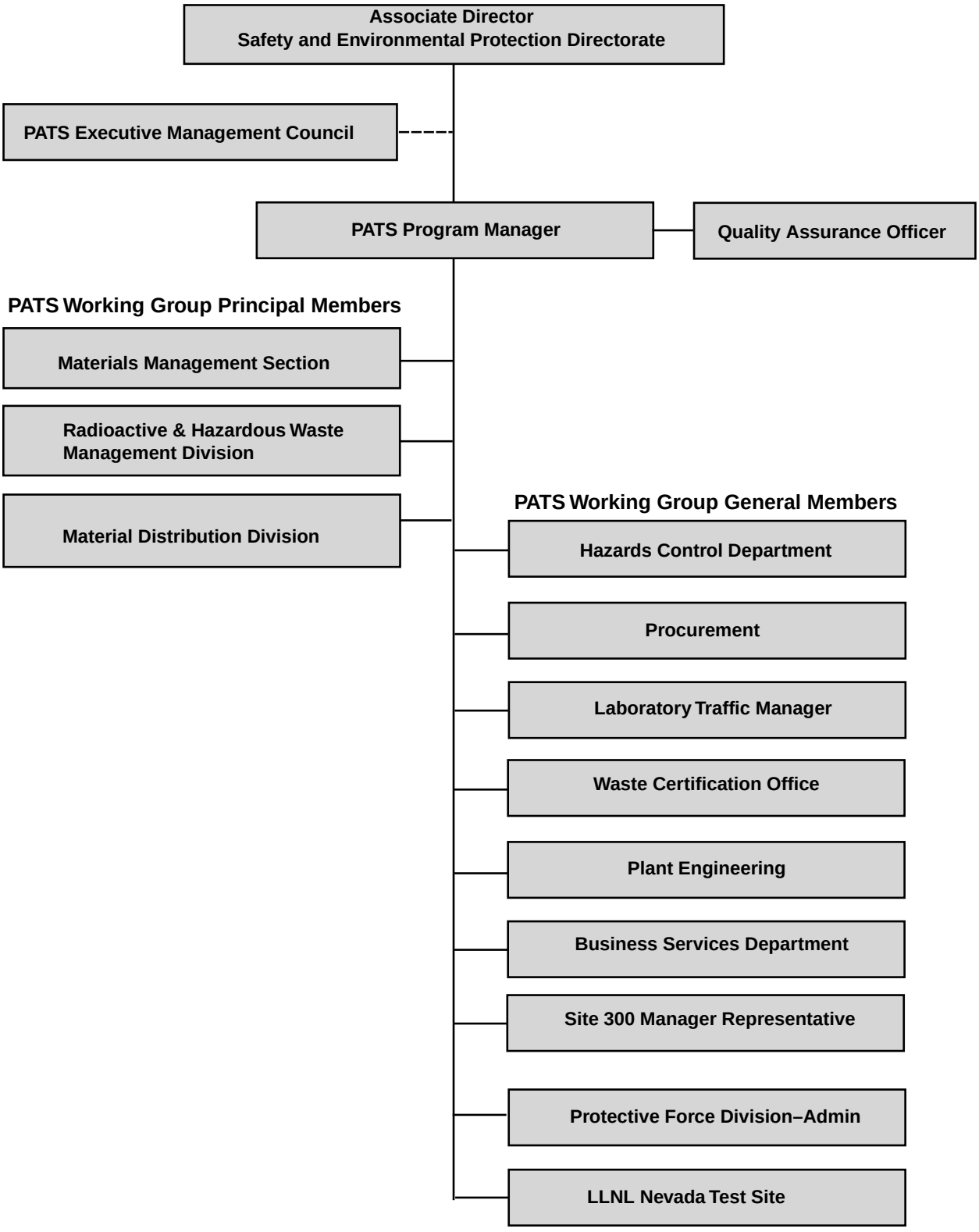

Figure 4-1. The PATS Program organization

PATS Executive Management Council

The PATS Executive Management Council represent institutional concerns for hazardous materials packaging and transportation activities. They are responsible for:

- Providing direction and oversight of PATS activities.
- Addressing issues and providing resources within the member organizations to ensure safety and security of the PATS Program activities.
- Keeping Laboratory management appraised of the state of the PATS Program through the issuance of minutes and action items resulting from the Council's meetings.

Members of the PATS Executive Management Council

Members of the PATS Executive Management Council are the:

- Associate Director of the SEP Directorate.
- PATS Program Manager.
- Associate Director of Laboratory Services Directorate.
- Deputy Associate Director of Mechanical Engineering Department.

PATS Executive Management Council Meetings

The PATS Executive Management Council meets quarterly to fulfill its responsibilities.

4.2 PATS Program Office

PATS Program Manager

Coordinating the PATS Program Laboratory-wide is responsibility of the PATS Program Manager (see **Figures 4-1** and **4-2**). In addition to participating in the PATS Executive Management Council, the PATS Program Manager chairs the PATS Working Group and oversees its effectiveness. The PATS Program Manager is responsible for performing and conducting activities that contributing to various phases of hazardous materials, hazardous substances, and hazardous waste. In addition, the PATS Program Manager:

- Issues the *Onsite PATS Safety Manual* and any revisions.
- Approves the PATS Quality Assurance (QA) Plan and any revisions.
- Apprises the SEP Associate Director of the state of the PATS Program.
- Approves new and revised supporting procedures.

The PATS Program Manager reports directly to the SEP Associate Director.

PATS Quality Assurance Officer

The PATS Program Manager is assisted by a full-time Quality Assurance Officer who assists in the implementation of the quality assurance aspects of the PATS Program.

4.3 PATS Working Group

Purpose of the PATS Working Group

From the SEP Associate Director and PATS Program Manager, responsibility for implementing PATS policies flows to the PATS Working Group members. To ensure coordination and consistency in the implementation of PATS policies, Working Group members have established the functional relationships and responsibilities shown in **Figure 4-2**.

Responsibilities of the PATS Working Group

The PATS Working Group oversees the preparation of a formal PATS Program and effects the coordination and the implementation of this program in member organizations. The PATS Working Group oversees the preparation of formal onsite hazardous material packaging and transportation operations in order to assure LLNL's compliance with regulations that govern packaging integrity and transportation of hazardous materials, substances, and wastes, both on site and off site. It also assesses the effectiveness of the Laboratory's overall PATS Program.

How the PATS Working Group Carries Out Its Responsibilities

To carry out its responsibilities, the PATS Working Group:

- Initiates internal and external appraisals and safety appraisals of all LLNL hazardous material packaging and transportation operations.
- Tracks and assesses the effectiveness of any corrective actions taken to address identified concerns or deficiencies.
- Oversees the revision of the this *Onsite PATS Safety Manual,* the PATS Quality Assurance Plan, and the Nuclear Materials Onsite Manual.
- Reviews and assures that individual Specific Quality Assurance Plans within the member organizations coordinate fully with the *Onsite PATS Safety Manual.*

- Serves as a reviewer for all newly established and/or revised procedures within the member organizations pertaining to the packaging or movement of hazardous material, if requested.

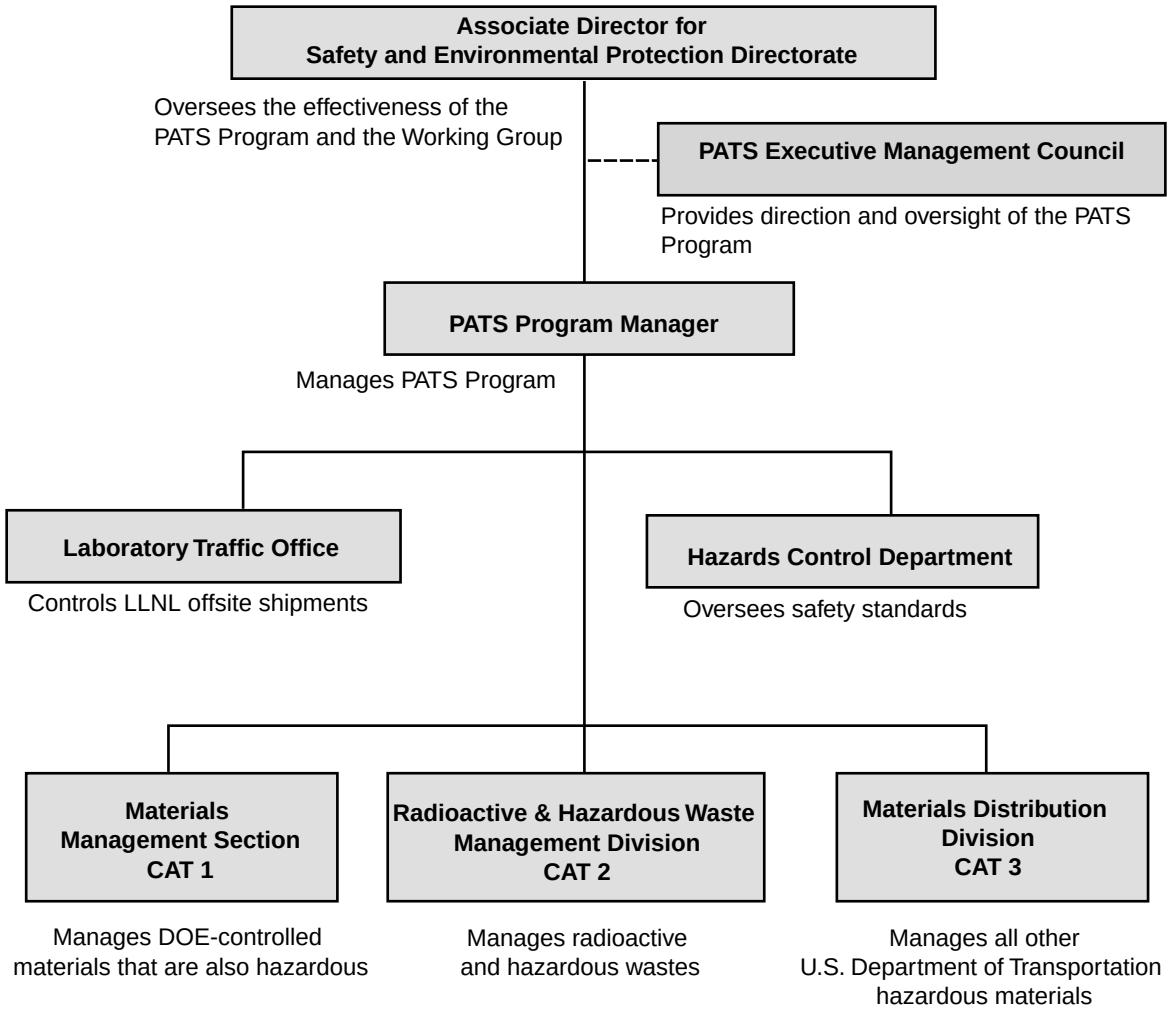

Figure 4-2. Functional responsibilities of the PATS Working Group

Principal Members of the PATS Working Group

The Working Group is comprised of both PATS Principal Members and General Members. The **PATS Principal Members** consist of managers from the three LLNL organizations charged with responsibility for packaging and transporting hazardous materials, substances, and waste. These three managers and their organizations are:

- Section Leader of the Materials Management Section (MMS).

- Division Leader of the Radioactive and Hazardous Waste Management (RHWM) Division of the Environmental Protection Department (EPD).
- Division Leader of the Material Distribution Division (MDD) of the Office of Procurement and Materiel Department.

Authority of the Principal Members

PATS Principal Members have the authority to stop any phase of the PATS operation when an unsafe condition or a situation detrimental to container quality or transportation quality has been identified.

General Members of the PATS Working Group

In addition, the following **PATS General Members** are also represented on the PATS Working Group:

- Hazards Control (HC) Department management representative.
- Laboratory Traffic Manager.
- Procurement and Materiel Department management representative.
- EPD/Waste Certification Office.
- Business Services Department management representative.
- Plant Engineering Department management representative.
- Site 300 management representative.
- Protective Force Division–Administration.
- LLNL Nevada Test Site.

Meeting Schedule of the PATS Working Group

The Working Group meets once a month or more often if needed to fulfill its responsibilities.

4.4 PATS Program Organizations

LLNL Organizations Responsible for Hazardous Materials

The LLNL organizations responsible for the onsite packaging and transportation of the three categories of hazardous materials, substances, and wastes are:

- MMS in the Mechanical Engineering Department has principal responsibility for packaging and transfer of Category 1 Hazardous Materials on site (see **Section 7**).

- The RHWM Division in the Environmental Protection Department has principal responsibility for the transfer of Category 2 Hazardous Materials on site (see **Section 8**).
- The MDD of the Procurement and Materiel Organization has principal responsibility for the packaging and transfer of Category 3 Hazardous Materials on site (see **the TSD**).
- Plant Engineering Department is responsible for packaging and transfer of Category 3 Hazardous Materials required for normal Plant Engineering operations (materials of trade), assisting with special transfer, and performing vehicle inspections (see **Sections 5.5, 5.11, 7.4, 10.2,** and **13**)
- Programmatic personnel, researchers, and other users of hazardous materials and generators of hazardous waste are responsible for waste characterization and appropriate packaging of hazardous waste (see **Sections 5.10** to **5.12** and **Section 8.5**).

4.5 Integrated Safety Management

ISM and PATS

Integrated Safety Management (ISM) is a systematic approach to integrating safety into work planning and execution. In the ISM context, the term "safety" is synonymous with the LLNL term "Environment, Safety, and Health (ES&H)." It encompasses protection of employees, the public, and the environment.

Operational personnel and their management are responsible to ensure that onsite PATS activities are performed using the ISM process by defining the scope of work, analyzing the hazards, developing and implementing appropriate controls, performing the work within the controls, and providing a means for feedback and improvement.

Relationship to *ES&H Manual*

The *Onsite PATS Safety Manual* is part of the Laboratory's *Environment, Safety, and Health (ES&H) Manual.*

5. Principal PATS Organizations

5.1 Introduction

PATS Working Group Member Organizations

The functions of the PATS Working Group organizations and other organizations providing support for PATS Program are described in this section and shown in **Figure 4-2**.

All member organizations of the PATS Program are responsible and accountable for different aspects of onsite hazardous materials packaging and transportation. The three principal members of the PATS Working Group are the Materials Management Section (MMS), the Radioactive and Hazardous Waste Management (RHWM) Division, and the Materials Distribution Division (MDD). The Plant Engineering Department, the Hazards Control Department, and Site 300 also have management representatives on the PATS Working Group. The Traffic Manager is staff to the Material Distribution Division Leader.

5.2 Materials Management Section

MMS and Category 1 Hazardous Materials

MMS is responsible for developing and maintaining guidance for the onsite packaging and transfer of Category 1 Hazardous Materials. MMS manages the material control and accountability system for the Laboratory's DOE controlled materials.

As part of the PATS Program, MMS is responsible for and authorized to:

- Provide packaging and transfer services for Category 1 Hazardous Materials.
- Provide technical guidance to LLNL Programs and personnel for the packaging of Category 1 materials for onsite transfer.
- Receive and distribute Category 1 hazardous materials.

MMS Onsite Packaging and Transportation Safety Responsibilities

For the onsite packaging and transfer of Category 1 Hazardous Materials, MMS:

- Establishes a system of procedures and controls for the safe and efficient transfer of controlled materials in the possession of LLNL.
- Performs packaging and transfer of Category 1 materials.
- Provides technical guidance to Laboratory personnel involved in packaging and onsite transfer operations for Category 1 Hazardous Materials.
- Assures that controlled materials to be transported are correctly packaged for transfer.
- Approves onsite transfer policies developed and issued by LLNL.
- Provides overall management for accountability and day-to-day control of Category 1 Hazardous Materials.
- Reviews operational and facility procedures governing packaging and onsite transfers of Category 1 Hazardous Materials.
- Ensures safe operation of the commercial motor vehicles under its control.
- Issues and implements the MMS QA Plan for Hazardous Material Packaging and Transportation (see **Section 14.4**).
- Trains MMS personnel.

5.3 Radioactive and Hazardous Waste Management Division

RHWM Division and Category 2 Hazardous Materials

The RHWM Division in the Environmental Protection Department (EPD) is responsible for developing and maintaining guidance for packaging of Category 2 Hazardous Materials. Operationally, RHWM Division staff processes wastes for temporary storage, treats the waste, or transports the waste that is disposed of or recycled off site.

As part of the PATS Program, the RHWM Division is responsible for and authorized to:

- Provide guidance on packaging to generators of Category 2 Hazardous Materials.
- Provide packaging and/or transfer services for Category 2 Hazardous Materials.

- Transfer Category 2 Hazardous Materials by the MMS.
- Package and transfer wastes generated by the RHWM Division during waste processing activities.

RHWM Division's Onsite Packaging and Transportation Safety Responsibilities

For onsite packaging and transfer of these materials, the RHWM Division:

- Establishes a system of procedures and controls for safe and efficient transfer of Category 2 Hazardous Materials in the possession of LLNL.
- Provides technical guidance to LLNL personnel involved in packaging and onsite transfer operations of Category 2 Hazardous Materials.
- Performs packaging and transfer of Category 2 Hazardous Materials.
- Assures that Category 2 Hazardous Materials to be transported are correctly packaged for transfer before pickup.
- Approves onsite transfer policies developed and issued by LLNL for Category 2 Hazardous Materials.
- Provides overall management and day-to-day control of Category 2 Hazardous Materials at RHWM Division facilities.
- Reviews operational and facility procedures governing packaging and onsite transfers of Category 2 Hazardous Materials.
- Ensures safe operation of the commercial motor vehicles under its control.
- Issues and implements the RHWM Division QA Plan which addresses Hazardous Material Packaging and Transportation (see **Section 14.4**).
- Trains RHWM Division personnel.
- Provides Field Hazardous Waste Technicians to support and provide guidance to programmatic personnel in the packaging of Category 2 Hazardous Materials.

5.4 Materials Distribution Division

MDD and Category 3 Hazardous Materials

MDD has the responsibility and authority for:

- Providing transportation services to MMS for the transfer of Category 1 Hazardous Materials, if requested.
- Providing transportation services to the RHWM Division for the transfer of Category 2 Hazardous Materials when requested.
- Receiving and distributing Category 3 Hazardous Materials.

MDD's Onsite Packaging and Transportation Safety Responsibilities

For onsite packaging and transfer of these hazardous materials, MDD is responsible for:

- Establishing a system of procedures and controls for the safe and efficient receipt and distribution of Category 3 Hazardous Materials on site.
- Assuring that Category 3 Hazardous Materials received from off site meet DOT containment and communication requirements so that they can be transferred safely.
- Approving onsite transfer policies developed and issued by LLNLfor Category 3 Hazardous Materials.
- Providing transportation services to users of Category 3 Hazardous Materials.
- Ensuring safe operation of the commercial motor vehicles under its control.
- Issuing and implementing the MDD *Specific Quality Assurance Plan for Hazardous Material Packaging and Transportation* (see **Section 14.4**).
- Training MDD personnel.

5.5 Plant Engineering Department

Plant Engineering's Packaging and Transportation Safety Responsibilities

The Plant Engineering Department has responsibility and authority for:

- Transferring on site Category 3 Hazardous Materials required for normal Plant Engineering operations (materials of trade [see the Glossary in **Appendix A**]).
- Ensuring safe operation of the commercial motor vehicles under its control.
- Providing assistance to other PATS Program member organizations in moving large or heavy items that require special handling equipment.
- Providing onsite transportation services at the request of programmatic representatives.

5.6 Hazards Control Department

Hazards Control's Packaging and Transportation Safety Responsibilities

The Hazards Control Department (HCD) is responsible for developing and maintaining safety standards for onsite transfer of hazardous materials, substances, and wastes, and for providing guidance in their application.

HCD is responsible for:

- Monitoring packaging and transfer operations for compliance with occupational safety regulations.
- Responding to emergency situations and incidents involving hazardous materials, substances, and wastes.
- Providing liaison, safety guidance, and safety services to personnel involved with packaging and transfer operations.
- Providing and coordinating Hazards Control's ES&H Teams.
- Coordinating with the LLNL Fire Department.
- Training LLNL and Hazards Control safety personnel.
- Selecting, obtaining, calibrating, distributing, and maintaining all portable radiation detecting instruments.
- Monitoring radiation and other hazardous materials, substances, and wastes.
- Operating analytical laboratories.
- Collecting and reporting safety data.

HCD also maintains programs for monitoring the work environment to assure the doses remain below applicable radiation-protection standards. These monitoring programs include monitoring and sampling for airborne radioactivity, surveying for surface contamination, and monitoring ambient radiation fields.

Role of ES&H Teams

HCD, through its ES&H Teams, assists supervisors and employees in maintaining safe work areas and practices by providing information on the hazardous properties of materials, recommending methods for mitigating the hazards, and monitoring the work environment.

Composition of ES&H Teams

ES&H Teams in the HCD directly interface with programmatic personnel, researchers, other users of hazardous materials, substances, and wastes, and waste generators. Five ES&H Teams are each composed of a Safety Team Leader who coordinates the team's activities, Health and Safety

Technicians, a Hazardous Waste Technician, and one or more discipline representatives from the following environmental and safety disciplines:

- Criticality Safety.
- Explosives Safety.
- Fire Protection Engineering.
- Health Physics.
- Industrial Hygiene and Toxicology.
- Industrial Safety.
- Environmental Protection.

5.7 Traffic Manager

Responsibilities for Hazardous Materials Shipments

Control of LLNL's offsite shipments of hazardous materials, substances, and wastes via LLNL, contract, and common carriers is the responsibility of the LLNL Traffic Manager. The Traffic Manager also interfaces with jurisdictional authorities and commercial carriers in the offsite shipment of hazardous materials, substances, and wastes.

The Traffic Manager has "go/no-go" authority for offsite shipments of hazardous materials, substances, and wastes but has no direct operational responsibility for the onsite transportation of hazardous materials, substances, and wastes but may provide regulatory guidance.

5.8 Protective Force Division–Administration

Responsibilities for Hazardous Materials Shipments

In addition to enforcing traffic policies on site, the Protective Force Division within Safeguards and Security provides escorts for onsite transfers of some LLNL Category I materials performed by the Materials Management Section.

5.9 LLNL Nevada Test Site

Responsibilities for Hazardous Materials Movements at Nevada Test Site

LLNL Nevada Test Site has onsite P&T responsibilities. These responsibilities are performed in accordance with applicable DOE Nevada and contractor requirements established at the Nevada Test Site.

5.10 Environmental Protection Department

Compliance Role of EPD

In addition to the RHWM Division, EPD provides other support to LLNL. It ensures that the Laboratory can meet its environmental responsibilities as stipulated in environmental legislation, regulations, and DOE Orders, and collaborates with LLNL programs to maintain adequate protection for the environment.

Other EPD responsibilities related to the PATS Program include:

- Developing and maintaining LLNL environmental policies, plans, guidelines and practices.
- Representing the Laboratory to the public and to federal, state, and local regulatory agencies on environmental issues.
- Educating and training LLNL employees on environmental issues and responsibilities.
- Informing management about pending changes in regulations impacting the Laboratory.
- Guiding programs in complying with environmental laws and regulations.
- Helping programs manage and minimize hazardous and radioactive waste.
- Performing environmental monitoring of LLNL operations.
- Determining the extent of environmental contamination from past activities.
- Cleaning up environmental contamination to acceptable standards.
- Responding to emergencies that impact the environment and providing guidance for cleanup, sampling, and reporting.
- Auditing programs and facilities for compliance with LLNL, federal, state, and local environmental policies and regulations.

End's Environmental Analysts

EPD provides Environmental Analysts to the Hazards Control's ES&H Teams (see **Section 5.6**) and may provide guidance to programmatic personnel in the packaging of Category 2 Hazardous Materials and in compliance with environmental regulations.

As members of the ES&H Teams, Environmental Analysts respond to emergency situations and incidents involving hazardous materials, substances, and wastes.

For More Information

LLNL's environmental protection program is described in greater detail in the *ES&H Manual,* Volume III: Environment—Hazards and Controls.

5.11 Other Organizations Supporting PATS Activities

LLNL Assurance Office

If requested, the LLNL Assurance Office may provide guidance to the PATS Working Group on management of QA appraisals and corrective action. If requested, the Assurance Office also provides guidance to MMS, MDD, RHWM Division, and MDD on preparation and maintenance of individual quality assurance and quality control programs. (See **Section 14**.)

Riggers from the Plant Engineering Department

The transfer of hazardous materials, substances, and wastes may require transportation within heavy shielding and/or shipping containers. Also, the removal of large waste items, such as discarded tanks, requires special moving equipment. The riggers from the Plant Engineering Department use cranes, hoists, or forklifts to move heavy items when requested by, and under the guidance of, the MMS or the RHWM Division. The guidelines for use of these lifting devices are contained in the *LLNL ES&H Manual*.

Container Design, Modification, or Repair Services from Plant Engineering

MMS, MDD, or RHWM Division, in an emergency, may request Plant Engineering to assist in the design, modification, or repair of containers for non-routine hazardous material transfers. The requesting organization must approve these containers prior to their use.

Business Services Department's Fleet Management

The Fleet Management Group provides routine maintenance on all transportation vehicles. The Fleet Management Group also inspects and approves new explosives transportation vehicles prior to placing the vehicle in service and inspects incoming commercial vehicles delivering explosives to Site 300.

5.12 Users and Generators of Hazardous Material, Substances, and Waste

Responsibilities of Users and Generators of Hazardous Materials

Programmatic personnel, researchers, and other users of hazardous materials and substances, and hazardous wastes; and waste generators are responsible for:

- Notifying MMS concerning transfers of Category 1 Hazardous Materials (except explosives at Site 300) and providing MMS with the required information and documentation. MMS either packages the material, supplies the container, or advises the user as to correct packaging methods.
- Providing personnel qualified to handle explosives, as per the *LLNL ES&H Manual.*
- Packaging and transporting explosives in explosives-qualified vehicles, according to the provisions of the Site 300 requirements, the *LLNL ES&H Manual,* and this *Onsite PATS Safety Manual.*
- Packaging Category 2 Hazardous Materials in accordance with the *LLNL ES&H Manual,* Volume III: Environment—Hazards and Controls, Part 6: Waste, 9.0 Waste Management Requirements.
- Packaging and transferring Category 3 Hazardous Materials that are required for research and normal operations in quantities above 1 gal (unless otherwise specified) in accordance with this Manual and the *LLNL ES&H Manual.*
- Packaging and transferring Category 3 Hazardous Materials required for research and normal operations in quantities of 1 gal or below (unless otherwise specified) in accordance with regulations of the Occupational Safety and Health Administration (OSHA) and good management practices.

6. Safety Methodology

6.1 LLNL Safety Policies

Policy: Safety

LLNL safety policies are stated in the *LLNL ES&H Manual*. The focus of LLNL's safety methodology is to take every reasonable precaution in the performance of work to protect the health and safety of employees, the public, and the environment.

Applicable DOE Orders, prescribed standards, and state and federal regulations in the area of health and safety and the environment are to be complied with.

Policy: Packaging and Transportation Safety

Onsite packaging and transportation activities of hazardous materials, substances, and waste are to be performed in a manner that ensures health and safety of employees, the public, and the environment.

Employee's Responsibility for Safety

No LLNL employee is expected to perform a task that he or she considers unsafe, nor is any employee to knowingly commit an unsafe act. Employees are responsible for adhering to LLNL, facility, and operational policies and procedures.

Management's Responsibility for Safety

Management's safety responsibility is fulfilled by:

- Ensuring that all equipment, experiments, and operations meet the requirements as stated in the *LLNL ES&H Manual*, and an approved Facility Safety Plan (FSP), Integrated Worksheets/Safety Plan (IWS/SP), or other safety documents or procedures.
- Observing the work environment and establishing measures to control or eliminate risks associated with any experiment, operation, or equipment.
- Taking appropriate corrective action whenever an incident occurs that results, or could result, in a serious accident, personnel exposure, or release of contamination to the environment.
- Training employees according to the requirements of their job.

Achieving a Safe Work Environment

An optimum safe work environment can be achieved most effectively by early identification and understanding of safety issues; close interaction among managers, employees, and safety specialists; and adherence to the policy and guidance of the *LLNL ES&H Manual* and ISM principles.

Limiting Exposure to Hazardous Agents

With respect to hazardous agents, both radioactive and nonradioactive, this protection is provided by limiting exposures of people and contamination of property to levels that are As Low As Reasonably Achievable (ALARA). It is the policy of LLNL to plan and conduct its radiological activities in a manner that protects the health and safety of all its employees, contractors, the general public, and the environment. In achieving this policy, LLNL shall ensure that efforts are taken to reduce radiological exposures and releases to as low as reasonably achievable, taking into account social, technical, economic, practical, and public policy considerations (*ES&H Manual*, Volume 1, Part 3, ES&H Policies).

Definition: ALARA

The approach to hazardous agent (e.g., radiation, chemical, physical, or carcinogen) protection to manage and control exposures (both individual and collective) to the work force, the general public, and the environment to as low as is reasonable, taking into account social, technical, economic, practical, and public policy considerations. ALARA is not a dose limit but a process that has the objective of attaining doses as far below the applicable limits as is reasonably achievable (*ES&H Manual*, 5.1, Glossary of ES&H Terms).

Programmatic Receipt of Radioactive Materials

Programmatic responsibilities for the receipt of radioactive materials are in accordance with the *LLNL ES&H Manual*, Volume II, Part 2: Chemical, "Acquisition, Receipt, Transportation, and Tracking of Hazardous Material."

For More Information

Safety criteria for performing tasks at the Main Site and Site 300 are included in the *LLNL ES&H Manual* and the *Site 300 Safety and Operational Manual.*

6.2 Containment, Communication, and Controls

Specifically, health, safety, and environmental protection is effected by:

- Providing ***adequate containment*** of hazardous materials, substances, and wastes during each transfer to ensure retention of materials under normal onsite transport operations.
- Providing ***adequate communication*** to personnel who handle the material and to emergency responders so that the hazards of the material can be assessed.
- Adhering to ***controls,*** including documented procedures and other administrative and/or physical control requirements, that:
  - Are appropriate for the level of containment and communication provided and
  - Take into account the possibility and consequences of credible accidents.

Definition: Containment

For purposes of this Manual, ***containment*** is defined as the features of the package that prevent the release of the material in an uncontrolled manner to the environment during normal, onsite transport operations.

Definition: Communication

Communication is defined as any labeling, marking, placarding, or written material used to convey information about the hazard and the contents of the package to package handlers, transport personnel, and emergency responders. Communication can be:

- Affixed to a package or container involved in the onsite transport of hazardous material.
- In possession of the responsible individual.
- Electronically transmitted.
- In or on the transport vehicle or in possession of the individual transporting the material.

Definition: Controls

Controls are defined as the administrative and/or physical controls that are applied to the transfer of hazardous materials, substances, and wastes, and which serve to mitigate risk during transport.

For More Information

Containment, ***communication***, and ***controls*** for Categories 1, 2, and 3 Hazardous Materials are summarized in **Sections 7, 8,** and **9**.

6.3 Chemical Safety and Health Hazards Communication

Material Safety Data Sheets

Federal chemical hazards communication laws require chemical manufacturers to provide Material Safety Data Sheets (MSDSs) which provide detailed information about on the physical, chemical, and physiological properties of a particular chemical and on recommended control procedures to be used during handling.

Users of chemicals are required to keep a file of MSDSs on hand near the point of use. HCD also maintains a central database of MSDSs.

If an MSDS cannot be located, a supplemental MSDS is prepared by an LLNL Industrial Hygienist. When a material of unknown toxicity (MOUT) is developed at LLNL, an MSDS is also prepared.

For More Information

LLNL's chemical safety program is described in greater detail in the *LLNL ES&H Manual*, Volume II, Part 2, Chemical.

6.4 Guidelines for Traffic Management Safety

Compliance with Traffic Laws

Persons who operate vehicles (U.S. government, LLNL, rented, or private) on site are required to comply with all general provision traffic laws of the State of California as defined by the California Vehicle Code. Drivers who are cited for onsite traffic violations while operating their personal vehicle or engaged in official business are held responsible for the citations and may be subject to disciplinary action by LLNL.

Current Driver's License

Drivers of vehicles on site at LLNL must have a current driver's license from their resident state for the class of motor vehicle being operated and the type of cargo to be carried unless explicitly excepted.

Speed Limits

On Main Site, the maximum onsite speed limit is 40 km/h (25 mph) unless otherwise posted. At Site 300, the maximum onsite speed limit is 56 km/h (35 mph) unless otherwise posted.

Internal Traffic Citations

LLNL issues internal citations to employees cited for traffic violations on site and may revoke an employee's onsite driving privileges. Employees who are cited for moving violations will be disciplined according to the procedure described in the *LLNL ES&H Manual,* Volume II, Part 9: Transportation.

For More Information

Refer to the *LLNL ES&H Manual,* Volume II, Part 9: Transportation, for more detail on LLNL policy regarding traffic control and transportation safety.

6.5 Guidelines for Radiation Safety

Policy: Onsite Transfers of Radioactive Materials

LLNL operations involving the onsite packaging and transportation of radioactive materials must be planned and performed using the ISM process as identified in *LLNL ES&H Manual,* Volume I, Part 1. LLNL operations involving the onsite transfer of radioactive material must be planned to prevent exposure of personnel to radiation in excess of the limits stated in the *LLNL ES&H Manual,* Volume II, Part 8: Ionizing Radiation/ Nonionizing Radiation, Document 20.1,"LLNL Radiological Safety Program for Radioactive Materials."

Policy: Authorization to Receive Specific Radionuclide

The transfer of radioactive material from one facility to another must be made in accordance with **Section 7** of this Manual unless specifically excepted by this Manual and the *LLNL ES&H Manual,* Volume II, Part 2: Chemical, "Acquisition, Receipt, Transportation, and Tracking of Hazardous Material." Personnel requesting or performing onsite transfers of radioactive materials must assure that the receiving organization and facility are authorized to possess the specific radionuclide in the quantity to be transferred.

6.6 Guidelines for Explosives Safety

Policy: Explosives Handling

Because of the serious consequences that can occur if explosives are handled improperly, LLNL's policy on handling explosives is that no operation involving explosives may be performed unless it is authorized by an Integration Worksheet (IWS).

For More Information

The primary DOE-prescribed standard for explosives operations and facilities is the *DOE Explosives Safety Manual* and Section 7 of this Manual. Contact the LLNL Hazards Control Explosives Safety Engineering staff for more information.

6.7 Guidelines for Chemical Safety

Management's Responsibility for Safe Chemical Handling

Supervisors are responsible for establishing safe procedures and providing the necessary protective equipment for personnel who handle chemicals.

Chemical User's Responsibility

The chemical user must evaluate each onsite transportation activity in which chemicals are used before beginning the activity. This evaluation must include a consideration of the properties and reactivity of the chemicals or combination of chemicals before they are transported on site.

6.8 Safety of Visitors and Non-LLNL Personnel

Responsibilities of LLNL Hosts

LLNL employees who host visitors (students, participating guests, contract labor, vendors, etc.) are responsible for ensuring that non-LLNL personnel receive initial training and continuing information regarding applicable safety policies. Non-LLNL personnel must follow LLNL regulations governing the safe and orderly conduct of operations.

Contractors and Safety

Contracts with outside vendors and subcontractors must specify the necessary requirements and guidance needed to extend the Laboratory's safety policy to contractors who perform work at the Main Site and at Site 300.

LLNL's Construction Subcontractor ES&H Program in the *ES&H Manual*, Volume II, Part 3, addresses the identification, classification, documentation, review, acceptance, and inspection of hazards and controls to ensure construction subcontractor safety. When selected, each subcontractor shall submit the required ES&H documentation before beginning work. LLNL is required to check subcontractors' documentation to ensure that it complies with all ES&H provisions of the contract.

LLNL's stop-work procedure (*ES&H Manual*, Volume 1) applies to all work done at the Laboratory. Each construction worker is empowered to stop work if there is an unsafe or unapproved condition.

LLNL provides fire-fighting and emergency services for all activities performed at LLNL.

6.9 ES&H Audits and Inspections

Management Safety Reviews

Periodically, several levels of LLNL management review the Laboratory's safety procedures and broader aspects of Laboratory operations to ensure their continued effectiveness.

Assurance Review Office

The LLNL Assurance Review Office (ARO) may conduct routine assessments of Laboratory operations. Assessment findings are forwarded to the appropriate line managers for review and action. Assessment records, resulting comments, and corrective actions are tracked by the ARO. (See **Section 14.5** for more information on appraisals and corrective action.)

Hazards Control Reviews

The Hazards Control Department may perform reviews of programs, facilities, and buildings. Records of these reviews, resulting comments, and corrective actions are maintained by the directorates and tracked by the LLNL Assurance Review Office.

Review of the *Onsite PATS Safety Manual*

The PATS Program Manager and PATS Working Group perform periodic reviews of this Manual to ensure its continued effectiveness. This may be included as part of the PATS management assessments performed by the PATS Program Office.

6.10 Onsite Transfer of Nuclear Materials

Onsite Transfer of Nuclear Materials

When nuclear materials are transported on site, the transfer must be performed in accordance with the

7. Category 1 Hazardous Materials

7.1 Introduction

LLNL has policies established to mitigate the risks from hazardous materials. This chapter provides LLNL's containment, communication, and control policies and their implementation requirements for onsite handling and transport of Category 1 Hazardous Materials. It identifies organizational responsibility and the hazards associated with Category 1 Hazardous Materials. **Section 8** provides those requirements for Category 2 Hazardous Materials, and **Section 9** for Category 3.

7.2 Responsibility

Materials Management Section

MMS is responsible for and authorized to control and account for Category 1 Hazardous Materials.

7.3 Identification of Category 1 Hazardous Materials

Types

Category 1 Hazardous Materials are both hazardous and "controlled" materials. The four types are:

- Accountable Nuclear Materials.
- Explosives, including Mock High Explosives (Mock HE).
- Radioactive materials, including Class III and IV Sealed Sources.
- Other controlled materials that are defined as hazardous materials.

Table 7-1 lists hazard class numbers, division numbers, class or division names, and those sections of the DOT regulations (49 CFR) that contain definitions for classifying hazardous materials, including forbidden materials.

Table 7-1. DOT hazardous materials classes and index to hazard class definitions

Class	Division No. (if any)	Name of Class or Division	49 CFR reference for definitions
None	—	Forbidden materials	173.21
None	—	Forbidden explosives	173.54
1	1.1	Explosives (with a mass explosion hazard)	173.50
1	1.2	Explosives (with a projection hazard)	173.50
1	1.3	Explosives (with predominately a fire hazard)	173.50
1	1.4	Explosives (with no significant blast hazard)	173.50
1	1.5	Very insensitive explosives substances	173.50
1	1.6	Extremely insensitive explosive articles	173.50
2	2.1	Flammable gas	173.115
2	2.2	Non-flammable compressed gas	173.115
2	2.3	Poisonous gas	173.115
3	—	Flammable and combustible liquid	173.120
4	4.1	Flammable solid	173.124
4	4.2	Spontaneously combustible material	173.124
4	4.3	Dangerous when wet material	173.124
5	5.1	Oxidizer	173.127
5	5.2	Organic peroxide	173.128
6	6.1	Poisonous materials	173.132
6	6.2	Infectious substance (Etiologic agent)	173.134
7	—	Radioactive material	173.403
8	—	Corrosive material	173.136
9	—	Miscellaneous hazardous material	173.140
None	—	Other regulated material: ORM-D	173.144

Note: The hazard class of a hazardous material is indicated either by its class (or division) number, its class name, or by the letters “ORM-D.”

7.4 Receiving and Transfer Operations for Category 1 Hazardous Materials

Delivery Requirements of Category 1

When Category 1 Hazardous Materials are delivered to either the Main Site or Site 300, they must meet DOT regulatory requirements.

Onsite Delivery Points

Shipments of hazardous materials are ordinarily delivered directly to the MMS Vaults. On occasion, however, Category 1 Hazardous Materials that arrive through commercial channels (except explosives) may be delivered to the Main Site Receiving Group of the Material Distribution Division.

Receiving's Storage Responsibilities

When the Receiving Group takes delivery of Category 1 Hazardous Materials, the containers are to be stored as follows:

- Place small containers of controlled materials into a Receiving cage area.
- Store large containers in a controlled area supervised by a lead Receiving employee.

All Category 1 Hazardous Materials are to be load listed by Purchase Order number or by other identifying means in LLNL's Procurement Accounting Receiving Information System (PARIS) upon arrival at LLNL.

Caution: MDD Receiving personnel are prohibited from repackaging damaged containers of Category 1 Hazardous Materials or removing container labels or markings.

Transferring Category 1 Materials to MMS

The Receiving Group must contact MMS to arrange the transfer of Category 1 Hazardous Materials (except explosives at Site 300) to MMS control points for distribution to the user.

Using Riggers to Transport Large Packages

For packages too large for transport in MMS vehicles, MMS contacts the Riggers Group in Plant Engineering for assistance. Riggers personnel transport containers in approved vehicles to MMS control points under MMS supervision.

Transferring Packages between Buildings

LLNL personnel who want to transfer Category 1 Hazardous Materials between buildings on site (except explosives at Site 300) must contact MMS prior to final packaging. MMS either packages the material, supplies the container, or advises the user concerning correct packaging methods. MMS transports the material in its vehicles or authorizes the package to be hand carried according to the MMS Handcarry Procedure, # MM-VI-10.

Programmatic Responsibilities for Receipt and Transfer of Radioactive Materials

Programmatic responsibilities for the receipt and transfer of radioactive materials is in accordance with the *LLNL ES&H Manual,* Volume II, Part 2: Chemical, "Acquisition, Receipt, Transportation, and Tracking of Hazardous Material."

7.5 Receiving and Transport of Explosives

Delivering Explosives at Site 300

All explosives are delivered directly to MMS at Site 300 from off site.

Handling Explosives

When handling explosives, MMS:

- Uses LLNL-approved tote boxes with Kimpack lining and dunnage to repackage explosives for transfer and storage.

  Or stores and transfers explosives in their original shipping containers.
- Returns empty, reusable shipping containers to the vendor.
- Affixes proper LLNL Explosives Identification Labels to the containers.

Transferring Explosives at Site 300

Site 300 personnel who handle explosives have been qualified to handle explosives in accordance with the *LLNL ES&H Manual,* Volume II, Part 5: Explosives. They may transfer explosives at Site 300 between buildings without the assistance of MMS.

However, transfers must be made in explosives qualified vehicles in accordance with the *LLNL ES&H Manual,* Volume II, Part 9: Transportation, and this Manual (see the "Vehicle Requirements" section).

LLNL Organizations Approved to Transfer Explosives

LLNL organizations approved for transferring explosives at Site 300 in approved vehicles and packages are:

- MDD.
- MMS.
- W-Division, Military Applications Directorate.
- B-Division, Nuclear Design Directorate.
- Materials Manufacturing Engineering Division (MMED), Engineering Directorate.
- Chemistry and Materials Science Directorate.
- RHWM Division (waste only).

Refer to **Figure 4-1** in **Section 4** for the PATS Program organization chart.

Handling Explosive Wastes

Explosive wastes generated at LLNL are packaged per DOT requirements and shipped to Site 300 for waste treatment and disposal. Explosive wastes generated at the Main Site may be shipped directly to an offsite commercial Treatment, Storage, Disposal Facility (TSDF) for treatment and disposal. Explosive wastes generated at Site 300 are packaged in approved containers and transferred to an approved Waste Accumulation Area (WAA) for disposal at Site 300 or shipped off site for disposal.

Disposing of Explosive Waste

The approved disposal method for explosive waste is burning. No material other than explosives and explosives contaminated combustible waste and fuel to support combustion may be burned.

7.6 Containment, Communication, and Control Policies and Implementation Requirements for Explosives

This section provides containment, communications, and control policies and implementation requirements for explosives. Explosives are considered Category 1 Hazardous Materials.

Hazards from Explosives

Explosives hazards include blast, fragments, and thermal effects.

Containment Policy for Explosives

At the Main Site explosives are packaged in DOT- or DOE-approved containers. DOT packaging requirements are followed. At Site 300, explosives are packaged in DOT-, DOE-, or LLNL-approved containers.

Containment Requirements for Explosives at Site 300

At Site 300, explosives are:

- Packaged in approved tote boxes, DOT- or DOE-approved, or other LLNL-approved containers and packages
- Cushioned with Kimpack liners, wrappings, and dunnage to preclude movement of the material inside the container.
- The lids of large- and medium-sized tote boxes must be fastened down with cable-ties.

Communication Policy for Explosives

At the Main Site, explosives are packaged, labeled, and marked in conformance with DOT requirements. At Site 300, explosives or packaged and labeled to comply with the *Site 300 Safety and Operations Manual*.

Communication Requirements for Explosives at Main Site

During transport of explosives at the Main Site, vehicles carrying explosives are placarded with the standard DOT placards, if required per DOT. The containers must:

- Use DOT marking and labeling requirements to communicate explosive hazards.
- Be identified with LLNL Explosive ID Labels.
- Be accompanied by a Controlled Material Identification (CMID) Tag.
- Be marked or labeled according to the appropriate hazard.

Communication Requirements for Explosives at Site 300

At Site 300, vehicles transporting explosives are placarded with standard DOT placards, if required by DOT. The explosives containers must:

- Be identified with LLNL Explosives ID Labels.
- Accompanied by a Part Movement Tag.

Controls Policy for Explosives

The use of trained and qualified personnel greatly reduces the probability of personnel error that could lead to an accident.

Control Requirements at the Main Site for Explosives

The following administrative and/or physical controls are in effect at Main Site to mitigate the risk from explosives during onsite packaging transport:

- Only qualified explosives handlers are allowed to handle explosives.
- Explosives must be packaged by MMS, or be under the control of MMS or personnel qualified to handle explosives in accordance with the *LLNL ES&H Manual*, Volume II, Part 5: Explosives.
- All vehicles used to transport explosives must be inspected using the Vehicle Inspection Form in **Figure 13-1.**
- MMS supplies the container and verifies that the container is approved.
- MMS transports explosives in approved vehicles in accordance with the *LLNL ES&H Manual,* Volume II, Part 9: Transportation.
- Access to explosives are strictly controlled by procedures.
- Hazards Control Explosives Safety maintains a current list of qualified explosives handlers.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed the onsite speed limit of 40 km/h (25 mph).
- DOT compatibility requirements are strictly followed. Fissile materials and explosives cannot be transported in the same vehicle.
- Explosives cannot be transported during a lightning alert.
- The LLNL Fire Department can respond to any emergency at the Main Site within 3 minutes.

Control Requirements at Site 300 for Explosives

The following administrative and/or physical controls are in effect at Site 300 to mitigate the risk from explosives during onsite packaging transport:

- Only MMS and other explosives handlers who are qualified as per the *LLNL ES&H Manual*, Volume II, Part 5: Explosives, are permitted to package and transport explosives.
- Explosives can only be transported in approved vehicles in accordance with the *LLNL ES&H Manual*, Volume II, Part 9: Transportation.
- Access to explosives are strictly controlled by procedures.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed an onsite speed limit of 40 km/h (25 mph) at Site 300.

- DOT-compatibility requirements are strictly followed.
- Drivers are trained to understand and use DOT compatibility charts when loading vehicles.
- Fissile materials and explosives cannot be transported in the same vehicle. **Note:** Fissile materials are not allowed at Site 300 unless specifically authorized.
- Explosives cannot be transported during a lightning alert.
- The Site 300 Fire Department can respond to any emergency at Site 300 within 15 minutes.

7.7 Containment, Communication, and Control Policies and Implementation Requirements for Accountable Nuclear Materials, Safeguards Categories I and II

This section provides containment, communication, and control policies and implementation requirements for Accountable Nuclear Materials, Safeguards Categories I and II. These Safeguards Categories are considered Category I Hazardous Materials.

Hazards from Safeguards Categories I and II

Some Accountable Nuclear Materials are radioactive and fissionable. Accountable Nuclear Materials are given Safeguards classifications that range from large quantities of attractive material (Category I) to small quantities of low attractive materials (other nuclear materials [Category IV]).

Containment Policy for Categories I and II

Radiological hazards are controlled through the use of proper shielding and containment to limit personnel exposures to ALARA levels.

Containment Requirements for Categories I and II

Accountable Nuclear Materials, Safeguards Categories I and II, are packaged in Nuclear Regulatory Commission- (NRC-) or DOE-approved Type B containers or other MMS-approved containers. DOT, NRC, and DOE-approved containers are criticality approved for specific quantities of fissile materials. Packaging requirements for certified containers are delineated in the container Certificate of Compliance, and/or Safety Analysis Report on Packaging (SARP), or materials are packaged to provide adequate safety, limit radiation exposure, control contamination, and limit the movement of the material inside the package.

Devices transferred on site may also undergo an in-depth criticality analysis as part of their initial design.

Communication Policy for Categories I and II

Accountable Nuclear Materials are packaged to provide adequate safety and labeled or marked in a manner to properly communicate the identified hazard.

Communication Requirements for Categories I and II

During onsite transport of containers of Accountable Nuclear Materials, Safeguards Categories I and II, the containers must be accompanied by a:

- Controlled Materials Identification Tag (CMID Tag).
- Transfer Form for Accountable Material.

The Certificate of Compliance, and/or SARP for each container may also describe criticality control measures.

Controls Policy for Categories I and II

The use of trained and qualified material handlers and MMS personnel greatly reduces the probability of personnel error that could lead to an accident.

Control Requirements for Categories I and II

The following administrative and/or physical controls are in effect to mitigate the risk from Accountable Nuclear Materials, Safeguards Categories I and II, during transport:

- Accountable Nuclear Materials must be packaged by or be under the control of MMS.
- MMS either supplies the container or verifies that the container is appropriate.
- A Protective Force Division escort is required at all times during loading, unloading, and transfer operations.
- Fissile materials are not allowed at Site 300 unless specifically authorized.
- Two MMS personnel on the DOE Personnel Assurance Program are required to accompany the material at all times.
- MMS transports Accountable Nuclear Materials, Safeguards Categories I and II, in MMS-owned or MMS-approved vehicles.
- Access to Accountable Nuclear Materials, Safeguards Categories I and II, is strictly controlled by MMS material control procedures.
- No handcarrying is authorized.

- DOT compatibility requirements are followed. Fissile materials and explosives cannot be transported in the same vehicle.
- Packages shall not be lifted or transported higher than 4 ft above the ground unless specifically authorized.
- Drivers must not exceed an onsite speed limit of 28 km/h (15 mph).
- The Main Site Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The Site 300 Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

7.8 Containment, Communication, and Control Policies and Implementation Requirements for Accountable Nuclear Materials, Safeguards Categories III and IV, and Radioactive Materials

This section provides the containment, communication, and control policies and implementation requirements for Accountable Nuclear Materials, Categories III and IV, and other non-sealed source radioactive materials.

LLNL's *ES&H Manual,* Vol. II, Part 8: Ionizing Radiation/Nonionizing Radiation, discusses how sealed sources are handled at the Laboratory.

Hazards from Safeguards Categories III and IV

Some Accountable Nuclear Materials are radioactive and fissionable.

Containment Policy for Categories III and IV

Radiological hazards are controlled through the use of proper shielding and containment to limit personnel exposures to levels that are ALARA.

Containment Requirements for Categories III and IV

Accountable Nuclear Materials, Safeguards Categories III and IV, and other non-sealed source radioactive materials are packaged in Nuclear Regulatory Commission- (NRC) or DOE-approved containers or other MMS-approved containers. DOT, NRC, and DOE-approved containers are criticality approved for specific quantities of fissile materials.

Packaging requirements for certified containers are delineated in the container Certificate of Compliance, and/or SARP; or materials are packaged to provide adequate safety, limit radiation exposure, control contamination, and limit the movement of the material inside the package.

Devices transferred onsite may also undergo an in-depth criticality analysis as part of their initial design.

Communication Policy for Categories III and IV

Accountable Nuclear Materials are packaged to provide adequate safety and labeled or marked in a manner to properly communicate the identified hazard.

Communication Requirements for Categories III and IV

During onsite transport of containers of Accountable Nuclear Materials, Categories III and IV, the containers must be accompanied by:

- Controlled Materials Identification Tag (CMID Tag).
- Transfer Form for Accountable Material.

The Certificate of Compliance, and/or SARP for each container may also describe criticality control measures.

Controls Policy for Categories III and IV

The use of trained and qualified material handlers and MMS personnel greatly reduces the probability of personnel error that could lead to an accident.

Control Requirements for Categories III and IV

The following administrative and/or physical controls are in effect to mitigate the risk from Accountable Nuclear Materials, Safeguards Categories III and IV, and other non-sealed source radioactive materials during transport:

- Materials must be packaged by or be under the control of MMS.
- MMS either supplies the container or verifies that the container is appropriate.
- MMS transports Accountable Nuclear Materials, Categories III and IV, in MMS-owned or MMS-approved vehicles. Note: Handcarrying a package is allowed on a one-time basis for some Category IV materials (e.g., depleted uranium).
- Access to materials is strictly controlled by MMS material control procedures.
- Fissile materials and explosives cannot be transported in the same vehicle.
- Fissile materials are not allowed at Site 300 unless specifically authorized.
- No more than 399 g of plutonium are packaged within a single container.
- Packages shall not be lifted or transported higher than 4 ft above the ground unless specially authorized by MMS.

- Drivers must not exceed the onsite speed limit of 40 km/h (25 mph) at the Main Site and 56 km/h (35 mph) at Site 300.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The Site 300 Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

7.9 Containment, Communication, and Control Policies and Implementation Requirements for Other Category 1 Hazardous Materials

Hazards from Other Category 1 Hazardous Materials

Some Category 1 Hazardous Materials as identified in **Section 7.3** may require controls to ensure protection of LLNL personnel, the public, and the environment.

Containment Policy for Other Category 1 Materials

Controlled materials received from off site are delivered in DOT packages by MMS.

Other Category 1 Hazardous Materials are packaged to provide adequate safety, limit exposure to hazardous materials, control contamination, and limit the movement of the material inside the package.

Containment Requirements for Other Category 1 Materials

These materials, when transferred between buildings, are transported in DOT or DOE-approved packages whenever possible, or the controlled materials are transferred in approved containers and handled by personnel under the supervision of MMS.

Communication Policy for Other Category 1 Materials

On site hazardous and controlled materials may be packaged, labeled, and marked in conformance with DOT requirements.

Communication Requirements for Other Category 1 Materials

During onsite transport of other Category 1 Hazardous Materials, the containers must:

- Be accompanied by a CMID Tag.
- Be marked or labeled to identify the appropriate hazard.

Controls Policy for Other Category 1 Materials

The use of trained and qualified material handlers and MMS personnel greatly reduces the risks associated with other Category 1 Hazardous Materials.

Control Requirements for Other Category 1 Materials

The following administrative and/or physical controls are in effect to mitigate the risk from other Category 1 Hazardous Materials during onsite transport:

- Category 1 Hazardous Materials must be packaged by or under the control of MMS.
- MMS either supplies the container or verifies that the container is a DOT-approved or DOE-approved, or is a container packaged to provide adequate containment.
- Personnel packaging and handling Category 1 Hazardous Materials must comply with the *LLNL ES&H Manual* requirements for hazardous materials.
- If an operation is not covered under the existing MMS procedures, an IWS/SP or an FSP must be prepared to address hazards, basic controls, and safety ground rules to be followed.
- Access to Category 1 Hazardous Materials are strictly controlled by MMS control procedures.
- MMS transports Category 1 Hazardous Materials in MMS-owned or MMS-approved vehicles.
- Handcarry authority may be authorized only in accordance with the *MMS Material Control and Accountability Manual*.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- DOT compatibility requirements are strictly followed. Drivers who are DOT HazMat employees are trained to understand and use DOT compatibility charts when loading vehicles.
- Drivers must not exceed the onsite speed limits of 40 km/h (25 mph) at the Main Site and 56 km/h (35 mph) at Site 300.
- The Main Site Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The Site 300 Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

8. Category 2 Hazardous Materials

8.1 Introduction

This Section identifies organizational responsibility and the hazards associated with the primary types of Category 2 Hazardous Materials at LLNL. **Section 7** provides those requirements for Category□I Hazardous Materials, and **Section 9** provides them for Category 3 Hazardous Materials.

LLNL Policies for Hazardous Material

LLNL has established policies to mitigate the risks from hazardous materials. This Section provides LLNL's containment, communication, and control policies and implementation requirements for onsite handling and transport of Category 2 Hazardous Materials. At LLNL most Category 2 Hazardous Materials consist of hazardous, radioactive, or mixed waste. See **Section 8.4** for a description of Category 2 Hazardous Materials.

8.2 Responsibility

Radioactive and Hazardous Waste Management Division

The Radioactive and Hazardous Waste Management (RHWM) Division has the responsibility and authority for providing guidance to waste generators on packaging Category 2 Hazardous Materials, and for transferring wastes generated at RHWM Division facilities.

The RHWM Division treats, packages, and prepares for shipment hazardous, transuranic (TRU), low-level (LLW) radioactive, and mixed wastes.

Category 2 Hazardous Materials that are transferred to the RHWM Division or transferred between RHWM Division facilities may be liquid or solid. Gas cylinders containing residual hazardous materials identified as hazardous waste are also handled by the RHWM Division. Explosive wastes may be shipped directly to an offsite commercial TSDF.

Explosives as Waste

Explosives and explosives wastes are not handled routinely by the RHWM Division. Explosives wastes are considered Category 2 Hazardous

Materials and are to be managed according to the policies and controls

specified in **Sections 7.5** and **7.6** of this document. The RHWM Division prepares shipping manifests for explosive waste shipments off site.

8.3 RHWM Division Facilities

Description of RHWM's Main Site Facilities

There are three active RHWM Division facilities at the Main Site (another facility, Building 419 Facility, is inactive and currently used for office space and/or non-waste storage):

- Area 514 Facility.
- Area 612 Facility.
- Building 693 Facility.

The Area 514 Facility and the Area 612 Facility include a total of 30 waste management units where hazardous, radioactive, and mixed waste is stored and treated. Area 514 contains processing equipment and storage areas for radioactive liquids. Area 612 has solid radioactive waste processing equipment and storage for radioactive wastes. Building 625 is the primary storage location for TRU mixed waste. Hazardous wastes are also processed in the Building 693.

RHWM's Waste Handling Operations

The following waste handling operations are performed at RHWM Division facilities:

- LLNL Building 513—Solidification/waste storage.
- LLNL Building 514—Liquid waste treatment.
- LLNL Building 612—Receiving/segregation/drum storage/container crushing.
- LLNL Building 614—Eight-cell storage for hazardous wastes.
- LLNL Building 625—Polychlorinated biphenyls (PCBs), TRU, asbestos waste storage.
- LLNL Building 693—Chemical waste storage.

Description of RHWM's Site 300 Facility

The RHWM Division also has a Site 300 facility, a covered container storage area adjacent to Building 883. This Treatment, Storage, and Disposal Facility (TSDF) is primarily used to hold hazardous waste before it is transferred to Main Site.

8.4 Identification and Hazards of Category 2 Hazardous Materials

This section below provides more information on the hazards associated with various types of Category 2 Hazardous Materials.

Types of Category 2 Hazardous Materials

Category 2 Hazardous Materials can be hazardous, radioactive, or mixed (radioactive and hazardous). Category 2 Hazardous Materials include solid and liquid hazardous, radioactive, and mixed wastes; pressurized gases; hazardous waste samples; and sludge and liquid from wastewater retention tanks. **Table 8-1** identifies LLNL waste streams that require routine chemical and radiological analyses to monitor specific contaminants, components, and characteristics of Category 2 Hazardous Materials.

Table 8-1. Waste streams containing Category 2 Hazardous Materials

Waste Stream	Category 2 Hazardous Material
Acids and Bases	pH, normality
Plating or Heavy Metal Solutions	Metal concentrations; cyanides, where cyanides are being used
Non-chlorinated or Mixed Organic Solvents	Flash point; volatile halocarbon solvents
Oils	Volatile halocarbon solvents; PCBs; percent oil or water; flash point (if volatile components)
Coolants	Volatile halocarbon solvents; percent oil; metal contaminants
Radioactive Materials	Curies or grams of radioactive material
Reactive Materials	Explosives, peroxide formers, etc.
Solid Wastes and Sludges	Extraction test for metals

Hazardous Solid and Liquid Wastes

Hazardous wastes are those listed by:

- U.S. Environmental Protection Agency (EPA).
- California Department of Toxic Substances Control (DTSC).

Hazardous liquid and solid wastes are nonradioactive but may be characterized as carcinogenic, toxic, poisonous, corrosive, reactive, flammable, or ignitable.

Solid and Liquid Low-level Radioactive Wastes

The types of radionuclides handled at LLNL are numerous and the associated activity varies.

Radioactive wastes are those waste materials with that contain radioactivity, as defined by the LLNL document, *Criteria and Procedures for the Certification of Non-Radioactive Hazardous Wastes.*

Transuranic Wastes

The radionuclides present in TRU waste vary; however, by volume, 95% is contaminated primarily by plutonium isotopes. The remaining 5%, by volume, is contaminated by (but not limited to) Am-241, Np-237, Cm-244, Cm-248, Cf-250, Cf-252, and fission products.

Mixed Wastes

Mixed wastes are wastes that are both radioactive and contaminated with nonradioactive hazardous wastes. Mixed wastes can be liquid or solid. They may also be carcinogenic, toxic, corrosive, reactive, pyrophoric, or ignitable; and they may be held in pressurized containers.

Pressurized Gas Cylinders

Pressurized gases can be flammable, toxic, corrosive, reactive, or cryogenic. A small spill can produce a large volume of gas that can displace air in a confined space.

Hazardous Waste Samples

Hazardous waste samples are taken by waste generators or the RHWM Division waste generating services group, normally at the waste generation sites. They are transferred to the onsite Chemistry Environmental Services Laboratory for analysis. Hazardous waste samples are typically corrosive liquids, aqueous/organic liquids, contaminated oils, PCB-contaminated oils, aqueous liquids contaminated with metals and/or organics, coolants, solids, sludges, and unknown substances. They may be either radioactive or nonradioactive.

Samples are considered low hazard because of the small quantity of material present and adherence to strict chain-of-custody procedures. See **Section 8.10** for the policies and implementation requirements concerning hazardous waste samples.

Liquid Waste Retention Tanks

Aboveground retention tanks are used throughout the Main Site and Site 300 to collect large volumes of wastewater. This wastewater may contain constituents that exceed sanitary sewer discharge limits. Retention tank wastewaters are analyzed to determine whether they can be discharged to the sanitary sewer, either directly or after pH adjustment, or whether they must be disposed of as hazardous waste.

8.5 Waste Generator's Responsibilities in Packaging and Transferring Category 2 Hazardous Materials

This section describes the responsibilities of the waste generator to package hazardous waste for onsite transfer to a RHWM facility.

The Generator's Responsibilities

Waste generators are programmatic personnel, researchers, and other users who generate hazardous waste as a byproduct of their activities. They are responsible for packaging their Category 2 Hazardous Materials and properly identifying these materials. Their responsibilities in these tasks are described below.

Packaging Hazardous Waste for Transfer

Waste generators are responsible for packaging Category 2 Hazardous Materials for onsite transfer to RHWM Division facilities. The waste generator must:

- Plan ahead for waste disposal by considering other options, such as recycling, re-use, waste minimization, on-line treatment, and material substitution.
- Determine the waste type, i.e., hazardous, radioactive, or mixed.
- Segregate the wastes as they are generated to prevent mixing incompatible materials or wastes that are difficult to dispose of.
- Package wastes in containers approved for transfer by the RHWM Division.
- Provide proper identification of the waste package contents.
- Remain current in the required training.

- Separate incompatible waste packages from each other and separate radioactive waste packages from nonradioactive waste packages in the process areas

Waste Pickup and Onsite Transfers

WAAs are located at or near the waste generation site. Hazardous waste that has been properly segregated, identified, and packaged may be stored in a WAA for up to 90 days. Within that period of time, the waste is removed by the RHWM Division for storage, treatment, and/or disposal.

For More Information

Guidance on the responsibilities of the waste generator is found in:

- *LLNL ES&H Manual,* Volume III, Management of Satellite and Waste Accumulation Areas.
- *LLNL ES&H Manual,* Volume III, Part 6: Waste.
- RHWM Division's Waste Acceptance Criteria (WAC).

Training requirements for waste generators are described in **Section 11**.

For more information and guidance on packaging of Category 2 Hazardous Materials, waste generators can contact RHWM Field Technicians, and Environmental Analysts from the Operations and Regulatory Affairs Division (ORAD).

8.6 Transport of Category 2 Hazardous Materials

This section provides requirements for the transport of Category 2 Hazardous Materials at Site 300, Main Site, and between LLNL facilities.

Waste Transport and Schedule at Main Site

At the Main Site, hazardous wastes are transported from waste generating sites to waste management facilities by RHWM Division personnel in RHWM Division vehicles.

Transfers between RHWM Division's Main Site Facilities

Category 2 Hazardous Materials received at RHWM facilities can be transferred by RHWM Division in RHWM Division vehicles to another RHWM facility for treatment, storage, or preparation for offsite storage.

Waste Transport at Site 300

At Site 300, hazardous wastes are transported from the waste-generating Facilities to the Site 300 TSDF by RHWM Division personnel in RHWM Division vehicles on a request basis.

Wastes located at a WAA within 500 feet of the TSDF are transported to the TSDF in forklifts by RHWM Division.

Waste Transport from Site 300

Category 2 Hazardous Materials are shipped from Site 300 to RHWM Division facilities at the Main Site or to other offsite licensed disposal facilities.

Caution: Category 2 Hazardous Materials shipped from Site 300 to the Main Site are shipped over public roads and, therefore, must meet DOT requirements.

8.7 Containment Policy and Implementation Requirements for Category 2 Hazardous Materials

This section provides containment policy and implementation requirements for Category 2 Hazardous Materials.

Containment Policy for Category 2 Materials

Radiological hazards are controlled through the use of proper packaging and containment to limit personnel exposures to levels that are ALARA.

Containment Requirements for Category 2 Hazardous Materials

Containment requirements for Category 2 Hazardous Materials at LLNL Main Site are delineated in *The Preparation Guide for Generators of Hazardous Chemicals and Radioactive Waste at LLNL* in the *LLNL ES&H Manual*. Containment requirements for Site 300 are delineated in the *Site 300 Safety and Operational Manual,* Procedures #4404 and 406. RHWM Division's Waste Acceptance Criteria also provides containment requirements for Category 2 Hazardous Materials.

Containment Requirements for Radioactive Materials

Radioactive materials are packaged onsite in DOT, NRC, DOE, or LLNL-approved containers with following restrictions:

- To protect from an accidental nuclear criticality, the combination of fissile materials at a RHWM Division facility shall not exceed 120 g in each 55-gal drum.
- For fissile materials stored in containers other than 55-gal drums, any combination of 233U, 235U, and 239U at a RHWM facility (Area 612 Facility) must not exceed 120 g aggregate total.

Containment Requirements for Pressure Vessels and Cylinders

Pressure vessels and cylinders are managed under the Hazards Control pressure safety program as described in the *LLNL ES&H Manual*, Volume II, Part 6: Pressure, Noise, Hazardous Atmospheres. Waste gases are transported in cylinders adequately tied down to the transport vehicle.

Transport of Liquid Waste

Nonsewerable wastes are pumped from the retention tanks to portable containers and placed in the WAAs. Large volumes of wastes are pumped into tanks. RHWM flatbed trucks transfer the tanks directly to RHWM Division facilities for treatment or shipment preparation, or the wastes are shipped directly off site.

8.8 Communication Policy and Implementation Requirements for Category 2 Hazardous Materials

This section provides the communications policy and requirements for Category 2 Hazardous Materials, including required placards on transport vehicles and container labels.

Communication Policy for Category 2 Materials

Category 2 Hazardous Materials must be packaged, labeled, and marked in conformance with the RHWM Division's Waste Acceptance Criteria (WAC) (current revision).

Communication Requirements for Category 2 Materials

Waste containers and packages are inspected by RHWM Division prior to waste pickup and transfer.

RHWM vehicles shall be placarded onsite with either "Hazardous Materials" or "Radioactive Materials" as appropriate.

Labeling Requirements for Category 2 Materials

Containers of Category 2 Hazardous Materials, including vacuum tankers and portable tanks, must also be clearly labeled as follows:

Low-level Radioactive Waste (LLW) Labels: At the Main Site and at Site 300, LLW containers are identified with Radioactive Waste Labels.

Transuranic (TRU) Waste Labels: At the Main Site, transuranic containers are identified with Radioactive Waste Labels.

Hazardous Waste Labels At Main Site and Site 300, Category 2 Hazardous Material containers are identified with Hazardous Waste Labels.

Mixed Waste Labels: At the Main Site and at Site 300, mixed waste containers are identified with Mixed Waste Labels.

Pressurized Gas Cylinder Labels: At the Main Site and at Site 300, Category 2 Hazardous Material containers are identified with Hazardous Waste Labels.

8.9 Control Policy and Implementation Requirements for Category 2 Hazardous Materials

This section provides the control policy and requirements for Category 2 Hazardous Materials, including personnel authorized to handle and transport Category 2 Materials, transport conditions, limitations, and constraints.

Control Policy for Category 2 Materials

The use of trained and qualified material handlers and RHWM Division personnel greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for Category 2 Materials

The following administrative and/or physical controls are in effect to mitigate risk during onsite transport:

- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- LLNL employees who generate hazardous or radioactive waste must complete the required EPD training for these activities.
- Waste requisitions are reviewed by RHWM Division prior to pick up on the waste run.

- A RHWM Division technician performs the transfer operations.
- The RHWM Division technician inspects all packages prior to transport to RHWM Division facilities.
- Wastes are segregated for chemical compatibility on the truck bed, according to the DOT compatibility matrix table.
- Drivers must not exceed a 40-km/hr (25-mph) speed limit at LLNL and a 56-km/hr (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department must be able to respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department must be able to respond to any emergency at Site 300 within 15 minutes.

8.10 Containment, Communication, and Control Policies and Implementation Requirements for Hazardous Waste Samples

This section provides containment, communication, and control policies and requirements for hazardous waste samples.

Containment Policy for Hazardous Waste Samples

Hazards associated with hazardous waste samples are controlled through the use of proper packaging and containment to limit personnel exposures to levels that are ALARA.

Containment Requirements for Hazardous Waste Samples

Hazardous waste samples are packaged as follows:

- Waste samples (liquid or solid) are collected in sample bottles appropriate for the sample type.
- The bottles are placed in a plastic bottle carrier, an ice chest, or other appropriate containers.
- Individual samples may be transported to the analytical laboratory in ziplock polyethylene bags.

Communication Policy for Hazardous Waste Samples

Hazardous waste samples are packaged, labeled, and marked in conformance with RHWM Procedure 410, Sampling Solid Wastes, and 411, Sampling Liquid Waste (current revision).

Communication Requirements for Hazardous Waste Samples

During onsite transfers of hazardous waste samples, the following requirements are in effect:

- The sample bottles are labeled with a unique number (generally a WDR or container identification number).
- Sample numbers which correspond to a sample log are written on each sample bottle, as well as the sample date and location.
- A chain-of-custody form accompanies the transfer.
- A copy of the WDR or sample request form or sample strategy form accompanies the transfer.

Control Policy for Hazardous Waste Samples

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to an accident.

Control Requirements for Hazardous Waste Samples

Waste samples are controlled by strict chain-of-custody procedures provided in RHWM 418, "Fingerprint Verification Process" (current revision), and "Chemistry and Material Sciences Environmental Services," SPP-SM-9510 (current revision), Sample Login.

9. Category 3 Hazardous Materials

9.1 Introduction

LLNL has established policies to mitigate the risks from hazardous materials. This Section provides LLNL's containment, communication, and control policies and implementation requirements for on-site handling and transport of Category 3 Hazardous Materials. It identifies organizational responsibility and the hazards associated with the primary types of Category 3 Hazardous Materials. **Section 7** provides those requirements for Category 1 Hazardous Materials, and **Section 8** provides them for Category 2 Hazardous Materials.

9.2 Responsibility

Materials Distribution Division

The Materials Distribution Division (MDD) has responsibility and authority for receiving and distributing Category 3 Hazardous Materials and provides explosives and other transportation support for both Site 300 and Main Site. MDD may, on occasion, provide transportation to MMS for transfer of Category 1 Hazardous Materials.

9.3 Identification and Hazards of Category 3 Hazards Materials

Types of Category 3 Hazardous Materials

Category 3 Hazardous Materials include compressed and refrigerated liquid gases, polychlorinated biphenyls (PCBs), mercury and its compounds, acids, bases, and other toxic substances. Category 3 Hazardous Materials can fall into any DOT Hazard Class except radioactive materials or explosives. (See **Table 7-1** for DOT Hazard Classes references to 49 CFR.) The paragraphs below present more information on the hazards associated with various Category 3 Hazardous Materials.

Compressed Gases

Compressed gases can be flammable, toxic/poison, corrosive, or refrigerated liquid. A small spill can produce a large volume of gas that can displace air in a confined space.

Pressure vessels and cylinders are managed under the Hazards Control pressure safety program as described in the *LLNL ES&H Manual*, Volume II, Part 6: Pressure, Noise, and Hazardous Atmospheres. Compressed materials are transported in DOT containers adequately secured to the transport vehicle.

LLNL uses its ChemTrack system to track all cylinders on site at the Laboratory. The Industrial Gases Section of MDD affixes barcodes to incoming cylinders and documents their initial delivery points at the Main Site and Site 300.

Polychlorinated Biphenyls (PCBs)

Contact with PCBs can cause skin irritation and/or acne-like cysts. Eye contact causes severe eye irritation. Smoke and mist from burning PCBs can cause respiratory irritation. PCBs are extremely persistent in the environment and tend to accumulate in food chains.

EPD tracks the location of PCBs on site. PCBs are managed according to *LLNL ES&H Manual,* Volume II, Part 2: Chemical, "Management of Polychlorinated Biphenyls."

Mercury and Its Compounds

Metallic mercury vapor is readily absorbed from inhaled air and can also pass through intact skin. Chronic exposure will affect the nervous system. Some mercury salts can irritate the skin and cause kidney damage. Other mercury compounds can be explosive or oxidizers.

Mercury and compounds are managed according to *LLNL ES&H Manual,* Volume II, Part 2: Chemical, "Safe Handling of Mercury and Mercury Compounds."

Acids and Bases

Acids and bases are corrosive and can cause burns on contact with the skin. Vapors, mists, and dusts, when inhaled, may cause irritation of the respiratory system and may be absorbed into the blood stream through the lungs. When mixed with other chemicals, severe reactions can occur.

Acids and bases are managed according to *LLNL ES&H Manual,* Volume II, Part 2: Chemical, "Safe Handling of Acids and Bases."

Other Toxic and Hazardous Materials

Other Category 3 Hazardous Materials may be classed as pyrophoric liquids, flammable solids, oxidizers, organic peroxides, poisons, irritating materials, or etiological agents and may have toxic properties. Toxic and hazardous materials are managed according to *LLNL ES&H Manual,* Volume II, Part 2: Chemical.

9.4 Transport of Category 3 Hazardous Materials

Receiving and Transfer of Compressed Gases, Alcohol, Oils, and Solvent Drums

Compressed gas cylinders and drums arriving at either Main Site or at Site 300 are required to meet DOT requirements. Cylinders and drums are delivered to the LLNL Industrial Gas area of MDD.

MDD transports gas cylinders to the user in the original DOT packages in MDD vehicles.

No repackaging or removal of labeling or markings is permitted.

Toxic/poison gases are delivered the same day directly to the user who signs for release of the cylinder.

User Pickup of Gas Cylinders

As an alternative, the user may also pick up and transport Category 3 Hazardous Materials from the Industrial Gas area in a government vehicle. The vehicle must have a transport area that is separate from the driver's cab, such as a pickup truck. Cylinders must be adequately secured before Industrial Gas personnel will allow users to transport the cylinders. Note: Users cannot pick up poison gases.

Empty Compressed Gas Cylinders

MDD picks up empty gas cylinders and transports them to the Industrial Gas Area for return to the vendor; or if the cylinder is LLNL-owned, MDD returns it to a vendor for to be refilled. The MDD Industrial Gas Section is responsible to ensure cylinders are qualified before use.

Cargo Tanks

Cargo tanks are used to transport gasoline, diesel fuel, and other hazardous liquids at the Main Site and at Site 300. Tank vessels are required to conform to DOT requirements on site. Because no additional containment, communication, or controls are required, hazardous materials transported in tank vessels are not discussed below.

Receiving and Transfer of Packaged Chemicals

Category 3 Hazardous Material packages arriving at Main Site or at Site 300 are required to meet DOT requirements. Packages are delivered to the LLNL Receiving Group of MDD and are then load listed in the LLNL PARIS computer system.

MDD transports Category 3 Hazardous Materials to the user in the original DOT packages in MDD vehicles. No repackaging or removal of labeling or markings is permitted. Damaged containers are repackaged by MDD in DOT-Specification containers or other approved containers.

User Pickup of Packaged Materials

The user may pick up and transport Category 3 Hazardous Materials from the receiving area in a pickup truck. MDD is responsible for ensuring that packages are adequately secured.

Break-Bulk Transfers between LLNL Facilities

Category 3 Hazardous Material (liquids) in quantities greater than 1 gal are packaged and transferred between LLNL facilities in accordance with the controls in this plan, as provided in the *LLNL ES&H Manual,* and incorporated into individual Facility Safety Plans (FSPs) and Safety Plans (SPs) as written or revised.

Research Quantities

Research quantities (quantities less than 1 gal) of Category 3 Hazardous Materials, unless otherwise specified, are handled, packaged, and transported in accordance with OSHA requirements and good management practices. Proper containment, communication, and controls must be provided to ensure safety during normal transport consistent with the hazards posed by the material being transported.

9.5 Containment, Communication, and Control Policies and Requirements for Compressed Gases

Containment Policy for Compressed Gases

Category 3 Hazardous Materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Compressed Gases

Compressed gases are contained and transferred in DOT-specification cylinders or vessels. Nonconforming containers are not permitted on site. Damaged or modified containers are disposed of as hazardous waste or sold as salvageable material.

Communication Policy for Compressed Gases

Gas cylinders and dewars must be marked or labeled according to the appropriate hazard and in accordance with DOT regulations.

Communication Requirements for Compressed Gases

DOT markings and labels are required on compressed gas cylinders and vessels:

- All gas cylinders are barcoded and tracked internally by LLNL's ChemTrack system.
- A vehicle (except a user vehicle) carrying toxic/poison compressed gas cylinders is placarded as per DOT requirements.

Additional Control Policy for Compressed Gases

Trained and qualified material handlers must be used to reduce the probability of personnel error that could lead to accidents.

Control Requirements for Compressed Gases

Stock gas cylinders are normally transported by truck. Large quantities are sometimes delivered to the users on a flatbed trailer. Refer to **Table 9-1** for other vehicles used to transport compressed gases.

The following administrative and/or physical controls are in effect to mitigate risk during transport of compressed gas cylinders or dewars:

- Gas cylinders must be properly secured.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.

- While transferring Category 3 Hazardous Materials, drivers must not exceed a 40-km/h (25-mph) speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300.
- The user may transport quantities of gas cylinders in a pickup truck, provided the cylinders are properly secured.
- The LLNL Fire Department can respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department can respond to any emergency at Site 300 within 15 minutes.

Table 9-1. MDD vehicles

Vehicle type	Onsite Transport Use for Category 3 Hazardous Materials
Semis	Toxic gas cylinders, 55-gal drums, safety cans
Flatbed truck	Stock gas cylinders
Flatbed trailers	55-gal drums, DOT-specification packages, safety cans, stock gas cylinders, hazardous waste
Pickup	5-gal safety cans, gas cylinders
MDD RDS Vans	Hazardous materials in DOT-approved packaging

9.6 Containment, Communication, and Control Policies and Requirements for Flammable and Combustible Liquids

Containment Policy for Flammable and Combustible Liquids

Category 3 Hazardous Materials must be contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Flammable and Combustible Liquids

Flammable and combustible liquids must be transported in DOT-specification 55-gal drums, DOT 5-gal drums, or LLNL-approved 5-gal safety cans or other DOT-approved containers.

Communication Policy for Flammable and Combustible Liquids

Packages must be marked or labeled according to the appropriate hazard, and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for Flammable and Combustible Liquids

Flammable and combustible liquids must be labeled during transport as follows:

- DOT-specification containers that are delivered to the user by Receiving or from Industrial Gases are labeled using DOT labels.
- DOT packages and/or safety cans must be labeled, "For Flammable Liquids Only."
- Ethyl alcohol must be labeled with an ethyl alcohol label.
- Vehicles (except user vehicles) carrying flammable and combustible liquids are placarded as per DOT requirements.

Control Policy for Flammable and Combustible Liquids

Trained and qualified material handlers must be used to reduce the probability of personnel error that could lead to accidents.

Control Requirements for Flammable and Combustible Liquids

Flammable and combustible liquids are delivered to the users on MDD vehicles.

The following administrative and/or physical controls are in effect to mitigate risk during transport:

- The user may only handcarry quantities less than 1 gal.
- The user may transport quantities greater than 1 gal in safety cans, but the cans must be secured to a truck bed.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at Main Site and a 56-km/h (35-mph) speed limit at Site 300 while transporting Category 2 Hazardous Materials.
- The LLNL Fire Department can respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department can respond to any emergency at Site 300 within 15 minutes.

9.7 Containment, Communication, and Control Policies and Requirements for Polychlorinated Biphenyls (PCBs)

Containment Policy for PCBs

Category 3 Hazardous Materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for PCBs

Leaking containers must be drained and then repackaged in a secondary container such as a drum.

PCBs and PCB-containing equipment must be transported in sealed containers to prevent leakage to the environment.

Note: A capacitor or transformer that is not leaking is considered an acceptable container.

Communication Policy for PCBs

Packages are marked or labeled according to the appropriate hazard, and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for PCBs

Equipment containing PCBs are labeled with a LLNL PCB Label.

A CMID tag prepared by the Hazards Control technician assigned to the operational area must also be used whenever PCB-containing materials are transferred on-site.

Vehicles are placarded in accordance with DOT regulations.

Control Policy for PCBs

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for PCBs

The following administrative and/or physical controls are in effect to mitigate risk during on-site transport:

- The user may transport PCB materials in a pickup truck, provided the PCBs are not intended for waste, the containers are leak-tight, and they are adequately secured.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.

- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department can respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department can respond to any emergency at Site 300 within 15 minutes.

9.8 Containment, Communication, and Control Policies and Requirements for Mercury and Its Compounds

Containment Policy for Mercury and Its Compounds

Category 3 hazardous materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Mercury and Its Compounds

Mercury and its compounds must be transported in either DOT-specification containers or sealed, double-contained, impact-resistant containers, regardless of the amount.

The outer containers should be filled with packing, such as Kimpack or bubble pack. Sweeping compounds may be used as packing material if oil or other contaminants are also present.

Communication Policy for Mercury and Its Compounds

Packages are marked or labeled according to the appropriate hazard and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for Mercury and Its Compounds

DOT-specification containers delivered to the user from Receiving are labeled using DOT labels.

Regardless of the amount, a “Mercury” label must be affixed to each container.

Vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Control Policy for Mercury and Its Compounds

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for Mercury and Its Compounds

The following administrative and/or physical controls are in effect to mitigate risk during on-site transport:

- The user may only handcarry quantities less than 1 gal.
- The user may transport quantities greater than 1 gal, but the containers must be secured to a truck bed.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department can respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department can respond to any emergency at Site 300 within 15 minutes.
- MDD vehicles are used to deliver mercury and its compounds to the users.
- The user may handcarry or transport small quantities of mercury and its compounds in pickup trucks or in LLNL Cushman carts as long as proper containment and communication controls are adhered to.

9.9 Containment, Communication, and Control Policies and Requirements for Acids and Bases

Containment Policy for Acids and Bases

Category 3 hazardous materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Acids and Bases

Acids and bases are delivered to the users in bulk DOT containers or DOT-specification containers on MDD vehicles. Bulk containers meet DOT requirements.

The user may transport research quantities (1 gal or less) of materials provided the containers are adequate for normal transport and are adequately labeled.

Communication Policy for Acids and Bases

Packages are marked or labeled according to the appropriate hazard and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for Acids and Bases

DOT-specification containers delivered to the user from Receiving or Industrial Gases are labeled using DOT labels.

Materials not labeled with DOT labels and markings must have either the original manufacturer's label or the chemical name and strength, and approximate hazard classification affixed to the container.

Vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Control Policy for Acids and Bases

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for Acids and Bases

The following administrative and/or physical controls which serve to mitigate risk during on-site transport are also in effect:

- The user may only handcarry quantities less than 1 gal.
- The user may transport quantities greater than 1 gal, but these must be secured to a truck bed.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.
- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department can respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department can respond to any emergency at Site 300 within 15 minutes.

9.10 Containment, Communication, and Control Policies and Requirements for Other Category 3 Hazardous Materials

Containment Policy for Other Category 3 Hazardous Materials

Category 3 hazardous materials are contained and transported in accordance with federal, state, and local requirements.

Containment Requirements for Other Category 3 Hazardous Materials

Other toxic and hazardous materials are delivered to the users in DOT-Specification containers on MDD vehicles. Research quantities (1 gal or less) of other Category 3 hazardous materials may be transported in non-DOT-Specification containers in the user's pickup trucks provided the containers are adequate for normal transport and are adequately labeled.

Communication Policy for Other Category 3 Hazardous Materials

Packages are marked or labeled according to the appropriate hazard and vehicles (except user vehicles) are placarded in accordance with DOT regulations.

Communication Requirements for Other Category 3 Hazardous Materials

DOT-specification containers delivered to the user from Receiving or Industrial Gases are labeled using DOT labels. Materials not labeled with DOT labels and markings must have either the original manufacturer's label or the chemical name and approximate hazard label (DANGER, WARNING, CAUTION) affixed to the container.

Control Policy for Other Category 3 Hazardous Materials

The use of trained and qualified material handlers greatly reduces the probability of personnel error that could lead to accidents.

Control Requirements for Other Category 3 Hazardous Materials

The following administrative and/or physical controls are in effect to mitigate risk during on-site transport:

- The user may only handcarry quantities less than 1 gal.
- The user may transport quantities greater than 1 gal, but these must be tied down to a truck bed.
- Packages shall not be lifted or transported higher than 4 ft above the ground, unless authorized.

- Drivers must not exceed a 40-km/h (25-mph) onsite speed limit at LLNL and a 56-km/h (35-mph) speed limit at Site 300 while transferring Category 2 Hazardous Materials.
- The LLNL Fire Department can respond to any emergency at the Main Site within 3 minutes.
- The LLNL Fire Department can respond to any emergency at Site 300 within 15 minutes.

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10. General Controls for Hazardous Material Transportation

10.1 Atypical Hazardous Materials, Substances, and Wastes Transfers

Arrangements for Atypical Transfers

Onsite transfer of some atypical hazardous materials may require special handling. The group responsible for moving the material (MMS, RHWM Division, or MDD) may arrange the following:

- Blockading and access control of onsite or offsite roadways,
- PSO escorts.
- Use of specialized personnel and operating equipment.
- Use of additional Laboratory support (safety, environmental, transportation, criticality, materials accountability, and emergency response)
- Use of outside consultants and specialists.
- Transfer during off-shift hours.

Atypical hazardous materials, substances, and waste transfers meeting criteria specified in the *LLNL ES&H Manual*, Volume I, may require an Unreviewed Safety Question (USQ) review, prior approval, and review by the HCD Safety Team.

10.2 Transfer of Oversized Equipment and Packages

Use of the Riggers Group

Packages too large to transport in designated Laboratory transport vehicles are transferred by the Riggers Group in the Plant Engineering Department.

Transfer Requests from Responsible Groups

Transfers are made at the request of the PATS responsible group (MMS, RHWM Division, or MDD) to assure that containment, communication, and controls are adequate to provide safe transfer of the material.

10.3 Vehicle Requirements

Vehicles That Cannot Be Used to Transport Hazardous Materials

Hazardous materials, substances, and/or wastes, excluding analytical samples, may not be transported in bicycle baskets, lab carts, automobiles, or personal vehicles.

Restrictions on Use of Vehicles

Vehicles used to transport hazardous materials, substances, and/or wastes at the Main Site and/or at Site 300 must meet the following minimum restrictions and requirements:

- No maintenance or refueling is permitted on any vehicle carrying hazardous materials except for emergency situations and only after being reviewed by Hazards Control.
- Vehicles shall not be loaded in excess of their rated weight limit.
- Personnel are permitted to ride in the cab section only.
- No hazardous materials, substances, or wastes are permitted in the cab section.
- DOT hazardous materials compatibility requirements or other LLNL compatibility requirements must be followed.

Use of Forklifts

Forklifts used to transport hazardous materials, substances, and/or wastes at the Main Site and/or at Site 300 must meet the following minimum requirements:

- Forklifts must be approved for the load and inspected according to the *LLNL ES&H Manual,* Volume II, Part 3: Construction/Maintenance/ Mechanical Equipment/Working Surfaces, "Powered Industrial Truck Safety."
- Forklifts used to transport hazardous materials, substances, and/or wastes shall not exceed their rated lift capacity or loaded in excess of their rated weight limit. No more than two 55-gal waste drums containing liquids on wooden pallets or four 55-gal waste drums on plastic pallets may be transported on one forklift at a time.
- Only trained and qualified forklift driver is permitted to ride in the vehicle.
- DOT hazardous materials compatibility requirements or the Compatibility Matrix Table requirements must be followed.

Periodic Surveying of Vehicles

Vehicles used to transport radioactive materials and wastes at Main Site or at Site 300 must be periodically surveyed by Hazards Control for radioactive contamination.

Loading and Unloading Vehicles

Extreme care must be taken in the loading or unloading of any hazardous material. Except for explosives at Site 300, only MMS, MDD, or Plant Engineering personnel under the supervision of MMS can load and unload Category 1 Hazardous Materials.

At Site 300, explosives may be loaded or unloaded by personnel who have been trained and qualified as described in the *LLNL ES&H Manual,* Volume II, Part 5: Explosives/Firearms.

Vehicles shall not be loaded or unloaded unless the vehicle motor is turned off, and the parking brake is set.

Large and/or heavy packages must be positioned so that the weight is equally distributed over the width and length of the conveyance. All hazardous materials shall be secured in a manner that assures that it will not move or shift in transit. See the section, "Vehicle Tiedowns" below.

Smoking is not permitted during loading and unloading operations.

Vehicle Tiedowns

Packages shall be secured to the vehicle during transportation.

Personnel are required to use tiedowns to secure material anytime while transporting it on site. Individual components of a tie-down system must be used in the manner for which they were intended and may not exceed their rated capacities. Defective components may not be used, and all slack must be removed before transport.

Hazardous materials must be sufficiently blocked, braced, and/or tied down to prevent any change in position during transport. Packages must be secured in a manner that does not compromise the integrity of the packaging. During delivery operations, tiedowns must be rechecked and, if necessary, re-secured whenever a package is unloaded or the integrity of the tiedown is compromised.

10.4 Stock Chemical Transfers

Stock Chemicals from Bulk Issue

MDD orders and issues chemicals on systems-contracting basis (i.e., orders chemicals from a supply vendor and delivers chemicals in DOT packages directly to the user). MDD's Bulk Issue can be issued to users as long as chemicals in aggregate quantities of 5 gal or more are packaged in DOT-approved containers marked and labeled according to the hazard.

Break-Bulk Quantities

Break-bulk quantities of chemicals in aggregate quantities less than 5 gal must be from pre-packaged case lots and:

- Packaged in strong, tight containers.
- Packaged to prevent inner receptacles from moving.
- Marked and labeled according to the hazard.
- Accompanied by a Material Safety Data Sheet (MSDS).

10.5 Firearms Transfers

Exemption for Armed Weapons

Armed weapons are exempt from normal containment, communication, and control requirements. When transferred, ammunition is packaged separately from weapons in secure, strong, tight boxes. The contents of the packages must also be labeled in a conspicuous manner.

DOE Requirements

When firearms are transferred, all requirements of the most current DOE Standard for Firearms Safety must be observed.

10.6 Transfers of Explosive Shot Assemblies

Onsite transfers of explosive shot assemblies (including Nuclear Explosive Like Assemblies [NELAs]) between approved facilities may require deviations from existing procedures. Because of their configuration and size, explosive shot assemblies may be exempt from normal packaging, compatibility, and placarding requirements.

Packaging	Shot assemblies too large to package in approved containers may be transferred without being packaged if hazardous materials are protected within the assembly from an outside direct impact. Also, assemblies containing initiating devices must be shorted when transferred.
Compatibility	Shot assemblies may contain multiple hazards which may be forbidden to be transported together on the same vehicle off site according to DOT regulations; however, those assemblies may be transferred on site if individual noncompatible hazards cannot be separated due to the configuration of the assembly.
Placarding	Shot assemblies may contain multiple hazards that may require multiple vehicle placarding according to DOT regulations; however, those assemblies may be transported in vehicles displaying only the Explosive A placard, if applicable.
Applicability of Other Requirements	Except for the special conditions listed above, all other requirements concerning vehicle operations, communication, and controls must be observed to provide for the safe transfer of the material.

11. Personnel Qualifications and Training

11.1 PATS Training Requirements

Minimum PATS Safety Training Requirements

The minimum PATS training consists of on-the-job training under the supervision of a trained and qualified employee, supplemented by Hazards Control safety courses. Minimum personnel training requirements are identified in the individual responsible organization's policies and procedures.

11.2 Training and Qualifications of Explosives Handlers

Management's Responsibility for Explosives Handlers

Supervisors bear the primary responsibility for ensuring that personnel who handle explosives possess the knowledge and skills needed to perform their work.

Training Requirements

Before an employee is authorized to handle explosives at LLNL or Site 300, the employee must understand the hazards and safe practices associated with the work.

In addition to the training required by their own organization, all explosives handlers must, at minimum, complete two Hazards Control courses—HS-2016, Explosives Safety Orientation, and HS-2120, Explosives Transportation Safety.

Annual Review of Explosives Handlers

The supervisor must annually review each explosives handler's qualifications and work assignment to ensure that the person is still capable of performing this job safely. In addition, the review should include discussion of recent changes in pertinent procedures and other matters of concern.

If a supervisor determines that an employee is no longer able to perform explosives handling safely, that employee is not permitted to continue working with explosives.

11.3 Training for Handlers of Radioactive Materials

Training Requirements for Handlers of Radioactive Materials

All personnel who handle radioactive materials must complete HS6300, "Contamination Control." Retraining is required every 24 months.

11.4 Training Requirements for Users and Generators of Hazardous Materials

Training for Hazardous Waste Generators

LLNL employees who generate hazardous or radioactive waste must complete EP-0006, Hazardous Waste Handling, and EP-0110, LLW Generation and Certification.

Training for Category 3 Users

Any user of Category 3 Hazardous Materials must, at minimum, complete the course, HS-4050, Health Hazard Communication.

12. Emergency Response, Occurrence Reporting, and Incident Analysis

12.1 Emergency Response

LLNL Emergency Personnel

LLNL maintains a large staff of emergency response personnel, including a Fire Department, Protective Service Officers, a fully staffed medical facility, and ambulatory services.

Emergency Phone Numbers

The telephone number for LLNL's emergency dispatch is 911 and is posted on each telephone at LLNL and Site 300. The Hazards Control telephone number is posted throughout LLNL and Site 300 facilities.

Emergency Communications

There is an onsite communications system specifically for emergency control purposes. It consists of:

- A continuously operated emergency dispatch center for receiving and relaying emergency information.
- Reserved telephone lines for reporting emergencies from any onsite telephone to the Emergency Dispatcher.
- An automatic signal at the Emergency Dispatch Center to indicate when a local warning system has been activated.
- An automatic signal at the Emergency Dispatch Center that indicates when a fire-protection system has been activated.
- Systems for notifying emergency response personnel in an emergency.
- An emergency Public Address system to relay vital information and instructions to LLNL personnel.

Emergency Response Groups

During an emergency, an LLNL emergency dispatcher (Main Site) or a Protective Services dispatcher (Site 300) uses reserved telephone lines to promptly relay emergency information to the following emergency response groups:

- LLNL Fire Department.
- LLNL Security Department.
- Hazards Control Safety Team.

- Plant Engineering.
- Medical facility personnel.

Personnel from these organizations go to the scene of emergencies.

Who's in Charge at the Emergency Scene

At the emergency scene, the Senior Fire Officer is the Incident Commander and coordinates the response of other departments. The Laboratory Emergency Duty Officer (LEDO) is the Emergency Director who coordinates LLNL's emergency activities with outside agencies. (The LEDO is always a senior management representative who is on-call to the emergency response organization.) Other departments perform support services as requested by the Incident Commander.

LLNL Fire Department

The LLNL Fire Department and other personnel respond to emergencies and incidents involving fires and spills of hazardous materials, substances, and wastes.

Protective Services Officers

Protective Services Officers control traffic, guard the scene, and perform other tasks requested by the Incident Commander.

Hazards Control Safety Team

The Hazards Control Safety Team provides guidance on hazards and their control methods and proceeds with control measures as directed.

The Role of Hazards Control at an Emergency Scene

To assist line management, Hazards Control Safety Teams secure the incident scene to preserve accident conditions while line management notifies the proper organizations and agencies and assembles the Incident Analysis Team.

Self-help Zones and the Zone Supervisor

The Laboratory is divided into approximately 15 self-help zones. Managers are required to develop self-help plans to be effected during these emergencies. A Zone Supervisor for each zone coordinates and manages emergency activities within that zone.

Assembly Points and Assembly Point Leaders

Within each zone, pre-designated assembly areas have been established where Assembly Point Leaders take local control for ensuring the safety of personnel and facilities.

Periodic Emergency Exercises

To ensure that all LLNL personnel know what to do in the case of an emergency, emergency exercises are conducted periodically.

Laboratory Emergency Preparedness Plan

The *Laboratory Emergency Preparedness Plan* addresses actions for handling large-scale emergencies, such as earthquakes and other natural disasters that might overtax the Emergency Response Team. LLNL's emergency response program is also detailed in the *LLNL ES&H Manual,* Volume II, Part 10: Emergencies/Earthquakes/Fire, and the LLNL Fire Department's *Procedures Manual*.

12.2 Occurrence Reporting

Sources for Occurrence Reporting

LLNL procedures for occurrence reporting and incident analysis comply with DOE Order 231.1A. They are documented in LLNL implementing procedures and the *LLNL ES&H Manual,* Volume I, Part 5: Feedback and Improvement, "Incident Analysis Manual." These occurrence reporting procedures are summarized below.

Occurrence Reporting Procedure

After an incident occurs, employees must notify their line managers. Line managers gather preliminary information related to the event or condition and notify higher line management. Line managers also interface with the appropriate organizations to categorize the occurrence in sufficient time to meet DOE requirements.

Role of the LLNL Occurrence Reporting Office

The Laboratory Occurrence Reporting Office of the Laboratory Emergency Preparedness and Response Program assists line management to categorize occurrences, assigns occurrence report numbers, works with the LEDO in making initial or follow-up verbal occurrence reports, and assists line management in submitting the occurrence reports.

12.3 Incident Analysis

Assembling the Incident Analysis Team

An Incident Analysis Team is assembled whenever the incident or accident conforms to parameters identified in the *LLNL ES&H Manual,*

Volume I, Part 5: Feedback and Improvement, "Incident Analysis Manual." Team appointment is made in writing as soon as possible and the scope of the investigation is identified. Normally, an Incident Analysis Team is appointed by the line Department Head (or higher level of management) in whose area the incident has occurred or for whom the injured person worked.

The Role of the Incident Analysis Team

The Incident Analysis Team conducts its investigation and submits a written report to line management in accordance with the guidelines described in the "Incident Analysis Manual." Line management reviews the report, formulates and prepares a written plan of corrective action, forwards the plan to the appropriate organizations, and corrects any deficiencies noted in the report.

Types of Investigative Boards

The type of investigating board that may be required by *LLNL ES&H Manual,* Volume I, Part 5: Feedback and Improvement, "Incidents—Notification, Analysis, and Reporting," is summarized below:

1. Type A—Boards are appointed by DOE, contain only DOE or other federal employees, and operate under DOE-prescribed procedures.
2. Type B—Boards are appointed by DOE, may contain either DOE employees or DOE-contractor employees, and operate under DOE-prescribed procedures
3. Type C—Incident Analysis Teams are appointed by Laboratory management and operate under the guidance of *LLNL ES&H Manual,* Volume I, Part 5: Feedback and Improvement, "Incident Analysis Manual."

Incident Analysis Manual

The *LLNL ES&H Manual,* Volume I, Part 5: Feedback and Improvement, "Incident Analysis Manual," describes the procedure for investigating incidents and documenting recommendations to avoid similar occurrences.

12.4 Categories of Spills and Emergencies

LLNL Policy on Spills and Emergency Response

Spill and emergency response must protect human health and safety and the environment.

Definition: "Small" Emergency

LLNL separates spills and emergencies into two categories: "small" and "large." LLNL personnel may clean up small spills or respond to minor emergencies, including small fires. A small spill or emergency is defined as (1) the release of material whose nature and potential hazards are known; (2) the release presents no actual or potential threat to human health or safety or the environment; (3) the spill can be cleaned up by one or two people in less than one hour; and (4) the release results in no more than minor injury requiring simple first aid.

Definition: "Large" Emergency

A large spill involves (1) potential contamination of soil or groundwater; or (2) a fire or an explosion. A large spill or major emergency is (1) unsafe to manage without Fire Department assistance; (2) type of material released is unknown; (3) it cannot be cleaned up by two people in less than one hour; (4) injuries require more than simple first aid; and (5) the release migrates to the soil, stormwater, or the sanitary sewer system.

Note: Employees who are uncertain about their ability to safely manage a spill or fire should dial 911 immediately for help.

12.5 Vehicular Accidents and Emergencies Where Explosive Materials Are Present

Emergencies

In the event of a fire or accident involving a vehicle carrying explosives off-site, the "Special Instructions For Motor Vehicle Drivers" must be followed.

In the event of a fire or accident involving a vehicle carrying explosives on-site, notify the Emergency Control Personnel as soon as possible by radio or telephone, Extension 33 (Site 300) or Extension 2-7333 (Livermore) and adhere to the following procedures as appropriate.

For a Vehicle Accident with Spilled Explosives and No Fire

If you are involved in a vehicular accident where explosives are spilled but there is no fire:

- Shut off ignition of the vehicles involved.
- **Do NOT smoke** or use highway flares within 50 ft of vehicles or the explosives.
- Set up road warnings using signs or available personnel.
- Give aid and assistance to any injured people.

- Prevent people and vehicles from moving through spilled explosives. Close a lane or the entire roadway as required.
- Avoid rough handling of explosives containers.
- Gather any spilled explosives, place them in an isolated spot away from people and vehicles, and identify the explosives by any available method.
- In the event of a time delay in obtaining another vehicle, the person responsible for the explosives may do the following if the damaged vehicle creates a hazardous situation:
  - Remove the explosives from the damaged truck and carry them to an isolated, safe location.
  - Block off the area around the explosives, and identify the explosives with signs.
  - Have the damaged vehicle removed.

For a Vehicle Fire or Accident with Fire

If you are involved in an vehicular fire or an accident where explosives are present:

- Act promptly to extinguish electrical fires in the motor compartment if it can be done with minimum risk.
- If the fire is outside the motor compartment involves fuel or rear tires, or if the fire is threatening the explosives cargo, evacuate all personnel to the appropriate distance and notify the Fire Department. **DO NOT ATTEMPT TO FIGHT THIS FIRE.**
- Give all available information concerning the weight and types of explosives involved to responding emergency personnel.

For an Accident with No Fire and No Spill

If you are involved in a vehicular accident where explosives are present, but there is no fire and no spill of explosives:

- Shut off the ignition of the vehicles involved.
- **Do NOT smoke** or use highway flares within 50 ft of explosives-carrying vehicle.
- If any containers are broken or are leaking, treat as described above for a vehicle accident with spilled explosives.

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13. Transportation Vehicle Operations

13.1 Transportation Operations

MMS Transport of Category 1 Materials

At the Main Site and at Site 300, MMS transports Category 1 Hazardous Materials in MMS vehicles or authorizes hand carrying of small quantities of Category 1 Material in accordance with MMS Handcarry Procedure MM-VI-10. MMS is responsible for assuring proper containment, communication (i.e., labeling and placarding), and packaging.

RHWM Transport of Category 2 Materials

Category 2 Hazardous Materials can only be transferred in a RHWM-owned truck driven by RHWM technicians except at Site 300.

At Site 300 wastes located at a WAA within 500 feet of RHWM Division's TSDF may be transported by forklift by RHWM personnel. The RHWM Technician is responsible for assuring proper containment, communication (i.e., labeling and placarding), packaging, and palletizing the wastes before transfer.

MDD Transport of Category 3 Materials

At the Main Site and Site 300, MDD transports Category 3 Hazardous Materials in the original DOT packages to the user from the Receiving Area using MDD vehicles and observing the following conditions:

- No repackaging or removal of labeling or markings is permitted.
- Damaged containers are repackaged in DOT-specification containers or other approved containers.

Table 9-1 lists the MDD vehicles used to transfer hazardous materials onsite.

User Transport of Category 3 Materials

The user may pick up and transport Category 3 Hazardous Materials from the receiving area in a pickup truck. MDD ensures that packages are adequately tied down.

13.2 Loading and Unloading Operations

Policy: Loading and Unloading Hazardous Materials

LLNL employees must take extreme care when any hazardous material is loaded or unloaded from vehicles.

Responsibility for Loading/ Unloading Category 1 Materials

Except for explosives at Site 300, only MMS, MDD, or Plant Engineering personnel under the supervision of MMS can load and unload Category 1 Hazardous Materials.

At Site 300, explosives may be loaded or unloaded by personnel who are trained and qualified, as described in the *LLNL ES&H Manual,* Volume II, Part 5: Explosives/Firearms.

Responsibility for Loading/ Unloading Categories 2 and 3 Materials

Only RHWM or MDD personnel who are trained and qualified as described in the *LLNL ES&H Manual,* Volume II, Part 5: Explosives/Firearms, can load and unload Category 2 and 3 hazardous materials from MDD vehicles.

Loading/ Unloading Requirements

Drivers and transport personnel are responsible for ensuring the following requirements are observed during loading and unloading operations of hazardous materials:

- Smoking is not permitted during loading and unloading operations.
- Vehicles shall not be loaded or unloaded unless the vehicle motor is turned off, and the parking brake is set.
- Explosives vehicles parked on a grade must also use a wheel chock.
- Large and/or heavy packages must be positioned so that the weight is equally distributed over the width and length of the conveyance.
- Forklifts used to transport hazardous materials, substances, and/or wastes shall not exceed their rated lift capacity.

13.3 Vehicle Safety Requirements

Minimum Vehicle Safety Requirements

Vehicles used to transport hazardous materials, substances, and/or wastes at the Main Site and/or at Site 300 must meet the following minimum safety requirements:

- Daily vehicle inspection must be performed as per **Section 13.5.**
- Vehicles (except user vehicles and forklifts) used to transport hazardous materials and substances must, at a minimum, be equipped with a fire extinguisher and spill kits for emergencies.
- Vehicles (except user vehicles and forklifts) must be supplied with DOT compatibility charts and emergency response information from the guide book.
- Vehicles transferring hazardous materials on site shall be placarded as per the applicable DOT requirements.
- No maintenance or refueling is permitted on any vehicle carrying hazardous materials except for emergency situations and only after being reviewed by Hazards Control.
- Vehicles shall not be loaded in excess of their rated weight limit.
- Personnel are permitted to ride in the cab section only unless otherwise approved by the Division Leader of the responsible division.
- No hazardous materials, substances, or wastes are permitted in the cab section.
- DOT hazardous materials compatibility requirements must be followed.
- The user may transport only those packages assigned to him or her.

Note: Vehicles used to transport Category 1 Hazardous Materials shall not be left unattended during the transportation process.

Vehicles Used to Transport Explosives

Vehicles used to transport explosives at the Main Site and/or at Site 300 must also meet the following additional minimum requirements:

- Vehicles must be equipped, approved, and inspected according to the *LLNL ES&H Manual,* Volume II, Part 9: Transportation, "Shipping Explosives Offsite."
- Before new vehicles are placed into service, they shall be inspected by Fleet Management and Hazards Control Explosives Safety personnel.

- Routine vehicle maintenance is required as per the automotive fleet service schedule.
- Explosive-contaminated waste water must be handled according to Site 300 Procedure #403, "Operation of Tank Truck Carrying Waste Water from Explosives Processing and Photo Rinse Operations."

Vehicles Used to Transport Radioactive Materials

Drivers and vehicles used to transport radioactive materials and wastes at the Main Site and/or at Site 300 must also meet the following additional minimum requirements:

- Drivers transporting radioactive materials must be trained to use emergency supplies. **Note:** A driver on the hazardous waste run does not require training if the accompanying Hazardous Waste Technician is trained.
- Vehicles must be swiped by Hazards Control for radioactive contamination on a routine basis after transport of radioactive materials or wastes.

Forklift Requirements

Forklifts used to transport hazardous materials, substances, and/or wastes at the Main Site and/or at Site 300 must meet the following minimum requirements:

- Forklifts must be approved for the load and inspected according to the *LLNL ES&H Manual,* Volume II, Part 3: Construction/ Maintenance/Mechanical Equipment/Working Surfaces, "Powered Industrial Truck Safety."
- Forklifts used to transport radioactive materials and/or wastes are swiped routinely by Hazards Control or after use.
- Forklifts shall not be loaded in excess of their rated weight limit. No more than two 55-gal waste drums containing liquids on wood pallets or four 55-gal waste drums on PDQ plastic pallets may be transported on one forklift at a time.
- Only the forklift driver is permitted to ride in the vehicle.
- DOT hazardous waste compatibility requirements must be followed.
- Forklifts used to transport industrial gases are equipped with turn signals and gases are transported in special loading cages.
- Forklifts used for explosives must be approved and stenciled "High Consequence/HE Approved."

13.4 Vehicle Tiedowns

All material, including hazardous materials, must be sufficiently blocked, braced, and/or tied down to prevent any change in position during transport. Packages must be secured in a manner that does not compromise the integrity of the packaging. During delivery operations, tiedowns must be rechecked and, if necessary, re-secured whenever a package is unloaded or the integrity of the tiedown is compromised.

Minimum Requirements for Tiedowns

Tiedowns used on vehicles that transport Categories 1, 2, or 3 materials at the Main Site and/or at Site 300 must also meet the following minimum requirements:

- Vehicles used to transport hazardous materials, substances, and/or wastes are equipped with tiedowns that meet or exceed DOT requirements.
- Personnel are required to use these tiedowns whenever possible.
- Individual components of a tiedown system must be used in the manner for which they were intended and may not exceed their rated capacities.
- Defective components may not be used.
- All slack must be removed from the tiedowns before transport.
- Packages shall be secured to the vehicle during transportation.

Preparation Requirements for Category 2 Hazardous Materials

The waste generator is responsible for palletizing Category 2 Hazardous Materials prior to transport by strapping, blocking, bracing, and taping packages together to prevent any shifting during transport. RHWM Division inspects packages and pallets prior to waste pickup.

13.5 Maintenance and Inspection

Fleet Management Inspection Schedule

LLNL has established a routine inspections for all vehicles used to transport any material, including hazardous materials. **Table 13-1** provides the inspection schedule for these vehicles and indicates who performs the inspection. The results of all LLNL vehicle inspection are maintained by the Fleet Management Group.

Table 13-1. Inspection schedule and inspection responsibilities for vehicles used to transport hazardous materials

	Minimum Inspection Schedule/Inspection Responsibility				
	Daily	**Every 3 months[b]**	**Every 6 months[c]**	**Every 12 months[d]**	**Once a Year ALL CMVs[e]**
MMS Vehicles	Driver[a, f]	Not Applicable	"K" Inspection/ Fleet Mgmt. Group	Not Applicable	"I" Inspection/ Fleet Mgmt. Group
RHWM Vehicles	Driver[a, f]	Not Applicable	"K" Inspection/ Fleet Mgmt. Group	"G" Inspection/ Fleet Mgmt. Group	"I" Inspection/ Fleet Mgmt. Group As Applicable
MMS Site 300 Vehicles	Driver[a, f]	"H" Inspection/ Fleet Mgmt. Group	Not Applicable	Not Applicable	"I" Inspection/ Fleet Mgmt. Group
MDD Vehicles	Driver[a, f]	Not Applicable	"K" Inspection/ Fleet Mgmt. Group	"G" Inspection/ Fleet Mgmt. Group	"I" Inspection/ Fleet Mgmt. Group As Applicable
User Vehicles	Driver[f]	Not Applicable	"K" Inspection Fleet Mgmt. Group	"G" Inspection Fleet Mgmt. Group	Not Applicable
Main Site "CMV"	Driver[a, f]	Not Applicable	"K" Inspection/ Fleet Mgmt. Group	Not Applicable	"I" Inspection/ Fleet Mgmt. Group As Applicable

[a] All drivers must inspect their vehicles daily before the vehicle is used to transport hazardous materials. Inspections are to be documented on a Commercial Motor Vehicle Inspection Form (Figure 13-1).
[b] A "H" Inspection is a 90-day high explosive schedule maintenance inspections performed by Fleet Management.
[c] A "K" Inspection is a six-month safety inspection performed by Fleet management.
[d] A "G" inspection is a twelve – month manufacturer's inspection performed by Fleet Management.
[e] An "I" inspection is an annual commercial motor vehicle inspection performed by Fleet management.
[f] All drivers who transport hazardous materials onsite must complete the "Hazardous Material Loading Checklist—Transporting Onsite" each time these materials are transported onsite (Figure 13-2).

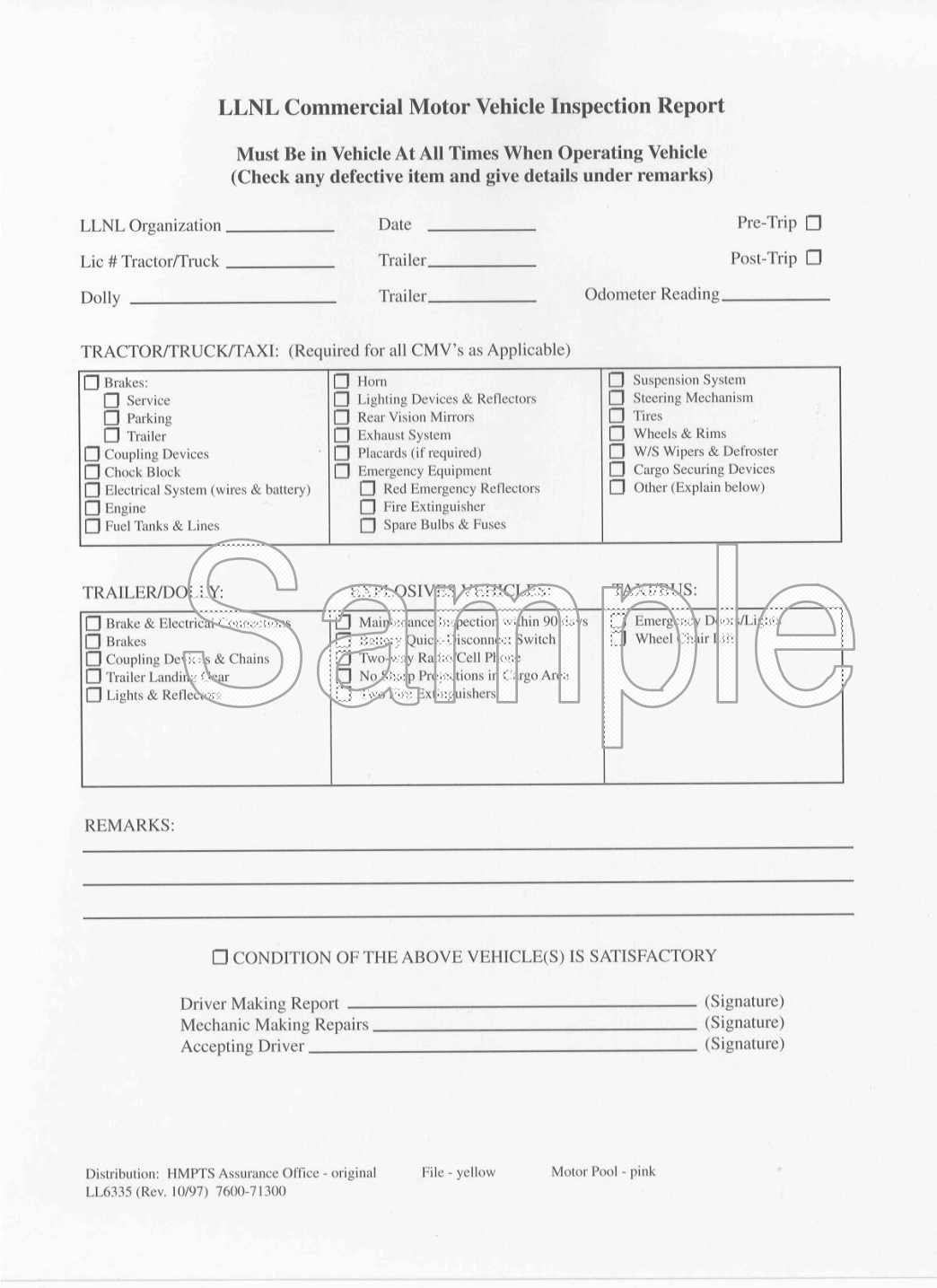
Daily Vehicle Inspection Forms

Daily vehicle inspections are also performed before material transfers are conducted. The results are documented on the Vehicle Inspection Form (**Figure 13-1**). A sample of the Vehicle Inspection Form must remain in the cab when the vehicle is in use. Copies of the multi-part form are available through Stores.

Hazardous Materials Loading Checklist

Drivers must complete a Hazardous Materials Loading Checklist (**Figure 13-2**) for onsite transfers of hazardous materials (except on vendor or private carrier vehicles used to pick up one-time receivables from the Receiving or Industrial Gas areas). The inspection includes

checking individual packages for damage or leaks. Adherence to tiedown requirements and communication requirements are also noted on the form. Transfers not conforming to requirements are rejected and noted.



LLNL Commercial Motor Vehicle Inspection Report

Must Be in Vehicle At All Times When Operating Vehicle
(Check any defective item and give details under remarks)

LLNL Organization _____ Date _____ Pre-Trip ☐

Lic # Tractor/Truck _____ Trailer _____ Post-Trip ☐

Dolly _____ Trailer _____ Odometer Reading _____

TRACTOR/TRUCK/TAXI: (Required for all CMV's as Applicable)

☐ Brakes: ☐ Service ☐ Parking ☐ Trailer ☐ Coupling Devices ☐ Chock Block ☐ Electrical System (wires & battery) ☐ Engine ☐ Fuel Tanks & Lines	☐ Horn ☐ Lighting Devices & Reflectors ☐ Rear Vision Mirrors ☐ Exhaust System ☐ Placards (if required) ☐ Emergency Equipment ☐ Red Emergency Reflectors ☐ Fire Extinguisher ☐ Spare Bulbs & Fuses	☐ Suspension System ☐ Steering Mechanism ☐ Tires ☐ Wheels & Rims ☐ W/S Wipers & Defroster ☐ Cargo Securing Devices ☐ Other (Explain below)

TRAILER/DOLLY: EXPLOSIVES VEHICLE: TAXI BUS:

☐ Brake & Electrical Connections ☐ Brakes ☐ Coupling Devices & Chains ☐ Trailer Landing Gear ☐ Lights & Reflectors	☐ Maintenance Inspection within 90 days ☐ Battery Quick Disconnect Switch ☐ Two-way Radio/Cell Phone ☐ No Sleep Provisions in Cargo Area ☐ Two Fire Extinguishers	☐ Emergency Door/Light ☐ Wheel Chair Lift

REMARKS:

_____

_____

_____

☐ CONDITION OF THE ABOVE VEHICLE(S) IS SATISFACTORY

Driver Making Report _____ (Signature)
Mechanic Making Repairs _____ (Signature)
Accepting Driver _____ (Signature)

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Figure 13-1. Vehicle inspection form

Hazardous Materials Loading Checklist
Transporting On-Site

Vehicle No.:_____ **Date:** _____ **Quantity**_____

Shipping Paper No.: _____ **Pickup Location** _____

Material Type: _____ **Delivery Location**_____

Prior to Loading Vehicle	**Yes**	**No**	**Remarks**
1. Vehicle safety inspection performed			
2. Container **not** damaged or leaking			
3. Container cover secured			
4. Container contents identified			
5. Weight within vehicle rating limit			

After Loading Vehicle	**Yes**	**No**	**Remarks**
6. Weight is properly distributed			
7. Load is secured to prevent movement			

Documents to be Carried with Driver	**Yes**	**No**	**Remarks**
8. Motor vehicle inspection			
9. Hazardous material loading checklist			
10. Shipping papers (identifies material)			
11. Emergency Response Guidebook			
12. DOT Compatibility chart			

[ ] Accepted

[ ] Rejected

Vehicle Loaded by: _____ Organization:_____

If rejected, explain below:

Comments

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Figure 13-2. Hazardous materials loading checklist

14. Additional Environment, Safety, and Health Functions

14.1 ES&H Working Group

The ES&H Working Group is composed of:

- An Assurance Officer from each programmatic directorate.
- The heads of the Environmental Protection, Hazards Control, and Health Services Departments.
- The Assurance Review Office.
- Price Anderson Amendment Assurance (PAAA) Office.
- Environmental counsel.

The Working Group is chaired by one of its members. The Working Group's broad membership provides a key mechanism for review proposed ES&H policies and implementing effective ES&H guidance.

Activities and Functions

The Working Group helps to identify and address policy issues concerning environmental protection, safety, health, and quality assurance at LLNL. It provides a means for communicating policy issues to the Laboratory programs and providing a forum for program input.

The activities of the Working Group include but are not limited to:

- Responding to requests for reviews and studies from the ES&H Council.
- Addressing ES&H issues raised by the programs and preparing recommendations for consideration by the ES&H Working Group.
- Reviewing generic or institutional ES&H issues, and bringing these to the attention of the ES&H Working Group with recommendations for policy change.

14.2 Programmatic Assurance Offices

Each AD appoints an Assurance Manager who oversees ES&H activities within the directorate and reports to the AD or Deputy AD with direct access to the AD. The Assurance Manager provides oversight of the directorate's ES&H activities and assists the Program in developing plans

and procedures to ensure all directorate activities comply with Laboratory and directorate ES&H policies. The Assurance Managers are members of the ES&H Working Group.

Assurance Review Office

The Assurance Review Office (ARO) conducts independent, internal ES&H appraisals to assure that Laboratory ES&H policies and their implementation are consistent with Laboratory requirements, DOE Orders, and ES&H regulations. The ARO head reports to the Laboratory Deputy Director for Operations.

14.3 Packaging and Transportation Quality Assurance and Control

LLNL has a Laboratory-wide Assurance Program that covers all hazardous materials, substances, and wastes, including their onsite transfer. The Laboratory's Assurance Program is documented in the *LLNL Quality Assurance Manual*. The *PATS Quality Assurance Plan (QA)* defines the overall management of the LLNL QA Program for Hazardous Material Packaging and Transportation Safety (i.e., PATS Program). This *PATS QAP* makes quality assurance a systematic approach to work-management as required by the *LLNL QA Manual*. As implemented, the *PATS QAP* provides confidence that the PATS Program objectives for packaging and transporting hazardous materials are achieved with due consideration for ES&H protection.

Objective of the *PATS Quality Assurance Plan*

The objective of the *PATS QAP* is to ensure Laboratory-wide compliance with applicable regulations and provide confidence that hazardous materials, substances, and wastes will be safely packaged:

- For shipping by commercial carrier, DOE, other government agencies, or LLNL.
- As received at LLNL.
- During onsite transfer.

How the PATS Program and the *PATS QAP* Work Together

The PATS Program and *PATS QAP* apply to all activities at Livermore and Site 300 that can affect the containment of hazardous materials, substances, and wastes in transportation. They apply to:

- The integrity of containers for shipping hazardous materials, substances, and wastes in the public domain.
- The integrity of packaging in onsite transfers of hazardous materials, substances, and wastes custody.

- The identification of hazardous materials, substances, and wastes in containers and packaging.

Note: The PATS Program does not apply to processing or storage of hazardous materials, substances, and wastes.

Principal Participants of the PATS Working Group

MMS, RHWM Division, and MDD are the principal participants of the Packaging and Transportation Safety Working Group.

Responsibilities of the Principal Participants

Each principal participant is responsible for performing PATS Program work in accordance with a specific QAP. The Plans have been written as prescribed in the *PATS QAP* to address the organization's PATS Program responsibilities, functions and requirements. (Refer to M-078-91, *Materials Management QAP for Hazardous Material Packaging and Transportation*; M-078-92, *Radioactive and Hazardous Waste Management QAP*; and M-078-92, *Materials Distribution QAP for Hazardous Material Packaging and Transportation*.)

Principal participants are responsible for monitoring activities related to their assigned categories of hazardous material to promote PATS Program compliance. As requested, they will advise participating LLNL groups on program and regulatory requirements and provide guidance in obtaining technical assistance (e.g., container design and design reviews).

MMS's Responsibilities

Specifically, MMS is responsible for:

- Applying for Category 1 Hazardous Materials container certification and shipping classifications for new explosives.
- Packaging selected Category 1 Hazardous Materials hazardous materials.
- Category 1 Hazardous Materials transportation per established practice and as requested.
- Container selection.
- Serving as the Laboratory interface with the DOE for DOE-furnished shipping of nuclear components and special assemblies.

RHWM Division's Responsibilities

The RHWM Division is responsible for:

- Applying for Category 2 Hazardous Materials container certification.
- Packaging RHWM Division-generated Category 2 Hazardous Materials.

- Transferring Category 2 Hazardous Materials from Waste Accumulation Areas (WAAs) and Satellite Accumulation Areas (SAAs).
- Container selection.
- Releasing loaded Category 2 Hazardous Material containers to the Traffic Manager for shipping.

MDD's Responsibilities

MDD is responsible for:

- Applying for Category 3 Hazardous Materials container certification.
- Receiving, packaging, and the transfer of Category 3 hazardous materials.
- Providing transportation services for other categories, on a request basis.

Other PATS Support Groups

Other LLNL groups that might design, modify, request to procure, fabricate, maintain, or load a container for shipping, or package hazardous materials, substances, and wastes for transfer, must do so in accordance with the *PATS QAP* and referenced regulations and standards. These functions are performed in accordance with a specific QAP, written as prescribed the *PATS QAP*. However, a Plan is not required if container procurement is the only PATS Program activity.

Specific requirements for principal participant QAPs are specified in the *PATS QAP*. Document control of QAPs and supporting documents and procedures are also addressed in the participant QAPs.

14.4 Quality Assurance Appraisals

Purpose and Timing of QA Appraisals

The PATS Working Group conducts QA appraisals of PATS Safety Program participants to evaluate the state of the Program throughout the Laboratory. Each participant is investigated as often as stipulated in applicable regulatory documents and, as a minimum, once every four years.

QA Appraisal Teams

QA appraisals are planned, performed and reported (in writing) by teams of at least two members, who, as teams, have the appraisal (or auditing) experience and understanding of management necessary to perform credible investigations and evaluations of participants' PATS Program activities.

Written Appraisal Reports

Upon completion of investigations, the team submits a written Appraisal Report of its findings and observations (and any recommendations) to the PATS Working Group, with a copy to the individual(s) responsible for the investigated work.

Responding to the Appraisal Report

The PATS Working Group ensures that the individuals responsible for the investigated work document and execute acceptable plans of corrective action. The PATS Program Manager closes out each QA appraisal in writing when the Appraisal Report has been accepted by the PATS Working Group.

Corrective Action

The PATS Working Group follows up on corrective actions to ensure execution, documentation, and results as planned. The Working Group reviews and accepts the documentation and results of each action, and may initiate independent verification of results. When an action item has been completed and accepted, the PATS Program Manager closes out that item in writing.

PATS Program Appraisals

The PATS Working Group will periodically arrange for qualified personnel from other institutions to perform appraisals of selected parts of the PATS Program. The purpose is to strengthen the LLNL PATS Program through interactions with experts working in hazardous material packaging and transportation, but under different institutional management systems. The PATS Working Group ensures that the individuals responsible for work investigated by external appraisal teams document and execute acceptable plans of corrective action.

Inter-Laboratory Peer Reviews

The Los Alamos National Laboratory (LANL) and LLNL have agreed through a Memorandum of Understanding (MOU) to perform periodic reciprocal appraisals of the hazardous materials packaging and transportation programs. The appraisals shall be documented in a written report, and shall include recommendations or suggestions for improvement, when warranted. The PATS Working Group ensures

the individuals responsible for work investigated by external appraisal teams are corrected. The MOU is currently inactive as requested by LANL.

14.5 Quality Assurance Records Control

Types of QA Records

Records meeting the definition of "Quality Assurance Records" (see **Appendix A, Glossary**) are controlled under the Quality Assurance (QA) Plans for MMS, RHWM Division, and MDD. Below is a summary of the QA records referred to the QAPs:

- Approved current revision documents.
- Evidence of formal work controls and QAP and System upkeep.
- Results of work.
- Other documentation as designated by the appropriate Division Leader.

Retention Period for QA Records

In general, QA records are retained for a minimum of three years. The Division Leader, however, may issue directives limiting or extending the record retention period for specific records. Requirements for QA records are provided in the individual QAPs.

14.6 Quality Assurance Records Files and File Maintenance

MMS QA Records

For MMS, the Division Leader establishes QA records files, specifies the types of QA records to be kept in each file, and designates the "Responsible Person" to maintain the QA Records File.

RHWM Division QA Records

The RHWM Division Leader is responsible for all QA records compiled by RHWM. The Division Leader may delegate this responsibility to Group Leaders, as appropriate. Each Group Leader may designate a "Responsible Person" to maintain a QA Records File.

MDD QA Records

For MDD, Group Leaders are responsible for the QA records related to their assigned work, and the Division Leader is responsible for all other

QA records. Each Group Leader establishes a QA Records File and designates a "Responsible Person" to maintain the file.

QA Duties of the Responsible Person

The "Responsible Person" who maintains the QA Records File, must at minimum:

- Check submitted records for date and issuer's signature, and identify or accept documents as QA records.
- Index and file QA records in a manner that facilitates retrieval and prevents damage or loss.
- Control the removal of QA records from the file.

Additional requirements are described in the individual PATS QAPs (M-078-91, M-078-92, M-078-93).

15. References

This Reference section provides a listing of work standards and other resources for more information, including LLNL manuals and guidance documents, DOE Orders, federal and state regulations, industrial and government standards, government and industrial guidelines, and waste acceptance criteria which apply to the PATS Safety Program. In each instance, reference is made to the latest edition.

Work Standards and Government Orders for Packaging and Transportation Safety

13 CCR, Motor Vehicles.

22 CCR 66263, Standards Applicable to Transporters of Hazardous Waste.

10 CFR 830, Nuclear Safety Rule.

29 CFR, OSHA Regulations and Health Hazards Communication.

40 CFR 115, 116, and 262, Resource Conservation and Recovery Act (RCRA).

49 CFR 100-180, Research and Special Programs Administration, Department of Transportation.

DOE Type A Test Program.

DOE. *Explosive Safety Manual*. M 440.1-1. U.S. Department of Energy, Washington, D.C.,

DOE O 232.1A, *Occurrence Reporting and Processing of Operations Information*. U.S. Department of Energy, Washington, D.C.

DOE O 414.1A, *Quality Assurance*. U.S. Department of Energy, Washington, D.C.

DOE O 460.2, *Departmental Materials Transportation and Traffic Management*. U.S. Department of Energy, Washington, D.C.

DOE-STD-1027-92. Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety analysis Reports.

Lawrence Livermore National Laboratory. *LLNL Onsite Packaging and Transportation Safety Standard*. Livermore, CA: Lawrence Livermore National Laboratory. UCRL-AR-130204.

National Nuclear Safety Administration-Oakland (NNSA-OAK). *Safety Evaluation Report for LLNL Interim Onsite Transportation*. Oakland, California. April 5, 2001, Revision 0.

State of California Vehicle Code.

LLNL Procedures Manuals and Planning Documents

Lawrence Livermore National Laboratory. *LLNL Environment, Safety and Health Manual (ES&H Manual).* Lawrence Livermore National Laboratory, Livermore. UCRL-M-133867.

Lawrence Livermore National Laboratory. *Radioactive and Hazardous Waste Management Quality Assurance Plan.* Lawrence Livermore National Laboratory, Livermore, CA, M-078-92.

Lawrence Livermore National Laboratory. *LLNL Emergency Preparedness Plan.* Lawrence Livermore National Laboratory, Livermore, CA, February, M-014, Rev. 3.

Lawrence Livermore National Laboratory. *LLNL Onsite Packaging and Transportation Safety Standard.* Lawrence Livermore National Laboratory, Livermore. UCRL-AR-130204.

Lawrence Livermore National Laboratory. *LLNL Quality Assurance Program for Hazardous Material Packaging and Transportation,* Supplement 1. Lawrence Livermore National Laboratory, Livermore, CA, M-078-90.0 and Supplement 1.

Lawrence Livermore National Laboratory. *Materials Control and Accountability Manual.* Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Materials Distribution Quality Assurance Plan for Hazardous Material Packaging and Transportation.* Lawrence Livermore National Laboratory, Livermore, CA, M-078-93.

Lawrence Livermore National Laboratory. *Materials Management Division Sealed Source Program and Procedures Manual.* Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Materials Management Quality Assurance Plan for Hazardous Material Packaging and Transportation.* Lawrence Livermore National Laboratory, Livermore, CA, M-078-91.

Lawrence Livermore National Laboratory. *Packing and Transportation Safety Program. Lawrence Livermore National Laboratory,* Livermore, CA,UCRL-AR-144736.

LLNL Operational Safety Plans and Facility Safety Plans

Facility Safety Plan (FSP) for Buildings 231 Vault, 232 Fenced Compound, 233, 234 General Operations, FSP-233.

Contains the facility safety plan for Materials Management Division facilities. FSP 233, Appendix D, is a procedure for loading and transportation of explosives at the Main Site.

Lawrence Livermore National Laboratory. *Radioactive and Hazardous Waste Management Division Operational Procedures*. Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. Radioactive and Hazardous Waste Management Division. *Radioactive and Hazardous Waste Management Division Facility Safety Plan (FSP)*. Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. Radioactive and Hazardous Waste Management Division. *Radioactive and Hazardous Waste Management Division Operational Safety Plan (OSP)*. Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Packaging and Transportation Safety Quality Assurance Plan*. Lawrence Livermore National Laboratory, Livermore, CA, UCRL-M-078-90.0. Rev. 2.

Lawrence Livermore National Laboratory. *Site 300 Safety and Operational Manual*. Lawrence Livermore National Laboratory, Livermore, CA.

Lawrence Livermore National Laboratory. *Supply and Distribution Department Procedures Manual*. Volumes 2 through 4. Lawrence Livermore National Laboratory, Livermore, CA.

16. Acronyms

AD — Associate Director

ALARA — As Low As Reasonably Achievable

ANSI — American National Standards Institute

CCR — California Code of Regulations

CFR — Code of Federal Regulations

CHP — California Highway Patrol (State)

CMID — Controlled Material Identification (Tag)

CSO — Council for Strategic Operations

DOE — Department of Energy (Federal)

DOT — Department of Transportation (Federal)

DTSC — Department of Toxic Substances Control (State)

EBW — Exploding bridgewire

EDO — Environmental Duty Officer

EPA — Environmental Protection Agency (Federal)

EPD —Environmental Protection Department

ES&H — Environment, Safety, and Health

FSP — Facility Safety Plan

HCD — Hazards Control Department

HE — High Explosive

HMX — Tetranitro tetrazacycloctane

ID — Identification

IOTSD — *Safety Evaluation Report for Lawrence Livermore National Laboratory Interim Onsite Transportation*

ISM — Integrated Safety Management

IWS — Integrated Worksheet

LEDO — Laboratory Emergency Duty Officer

LEI — Low energy initiator

LLNL — Lawrence Livermore National Laboratory

LLW — Low Level Waste

MDD — Materials Distribution Division

MMED — Materials Manufacturing Engineering Division

MMS — Materials Management Section

MOU — Memorandum of Understanding

MOUT — Material of Unknown Toxicity

MSDS — Material Safety Data Sheet

NELA — Nuclear Explosive Like Assembly

NET — Net explosives weight

NNSA-OAK — National Nuclear Security Administration, Oakland

NRC — Nuclear Regulatory Commission

NTS Nevada Test Site

ORM — Other regulated materials

OSHA — Occupational Safety and Health Administration (Federal)

PAAA — Price Anderson Amendment Assurance

PARIS — Procurement Accounting Receiving Information System

PATS — Packaging and Transportation Safety Program

PCB — Polychlorinated Biphenyl

PETN — Pentaerythritol tetranitrate

PSO — Protective Services Officer

Q — Refers to a level of security clearance

QA — Quality Assurance

RCRA — Resource Conservation and Recovery Act

RDX — Trinitro triazacyclohexane

RHWM — Radioactive and Hazardous Waste Management Division

RQU — Research Quantity, internal to LLNL and Site 300

SARA — Superfund Amendments and Reauthorization Act

SARP — Safety Analysis Report on Packaging

SC/HC — Storage Compatibility/Handling Control

SCG — Storage compatibility grouping

SDD — Services and Distribution Department

SNM — Special Nuclear Materials

SP — Safety Plan

SSEP — Safety, Security, and Environmental Protection Directorate

TNT — Trinitrotoluene

TRU — Transuranic

TSDF — Treatment, Storage, and Disposal Facility

UHP — Ultra-high purity

UNO — United Nations Organization

USQ — Unreviewed Safety Question

WAA — Waste Accumulation Area

WAC — Waste Acceptance Criteria

WDR — Waste Disposal Requisition

Appendix A. Glossary

Access control — A means of limiting access by providing either temporary or permanent physical access control barriers, for example, fences, controlled guard gates, and security road blocks. As it applies to this Manual, "access control" is defined as any area within Lawrence Livermore National Laboratory (LLNL) that is defined as private property. This includes all areas within the fence line identified as private property.

Accountable Nuclear Materials — A collective term, which includes all materials designated by the U.S. Department of Energy (DOE), to which the provisions of DOE Order 474.1 apply.

Approved container — A U.S. Department of Transportation (DOT) container; a DOE-, DOT- or Nuclear Regulatory Commission- (NRC-) approved container with an accompanying Certificate of Compliance; a container designed and constructed according to ASTM standards; a mil-spec container; a container approved for international shipments; or a container approved by LLNL management for use on site in conjunction with controls specified in this document.

As Low as Reasonably Achievable (ALARA) — The approach to hazardous agent (e.g., radiation, chemical, physical, or carcinogen) protection to manage and control exposures (both individual and collective) to the work force, the general public, and the environment to as low as is reasonable, taking into account social, technical, economic, practical, and public policy considerations. ALARA is not a dose limit but a process that has the objective of attaining doses as far below the applicable limits as is reasonably achievable.

Break-Bulk — Removal of the inner packaging(s) from a combination package of pre-packaged case lots of hazardous materials.

Category — A designation (Category I, II, III, or IV) of a quantity of Special Nuclear Material (SNM) or of an SNM location based on the attractiveness level of the material and the amount of material present.

Category 1 Hazardous Materials — "Controlled Materials" that also fit the definition for hazardous materials in 49 CFR 171.8 (e.g., hazardous classified material, classified waste, non-waste quantities of fissionable and other radioactive materials, accountable nuclear materials, explosives, and nuclear components and special assemblies).

Category 2 Hazardous Materials	Unclassified hazardous materials, substances, and wastes of negligible economic value; i.e., hazardous and radioactive wastes.
Category 3 Hazardous Materials	All hazardous materials and/or substances other than those in Categories I and II.
Category Quantities of Accountable Nuclear Materials (Safeguards Categories I, II, III, and IV)	A category of Nuclear Materials (NM) for the graded safeguards program, prescribed in DOE Order 474.1.
Category Quantities of SNM	A categorization of SNM for the graded safeguards program, prescribed in DOE Order 474.1.
Certificate of Compliance	A DOE or NRC document that provides certification that a specific packaging design for specified quantities and types of nuclear materials meets the applicable regulatory requirements.
Classes of Sealed Sources (Class I, II, III, and IV	An LLNL hazard classification of sealed sources which takes into consideration total integrated inhalation dose, gamma/neutron dose rate beta dose rate, and contamination control. Sealed sources are classified as per the *LLNL ES&H Manual*.
Combination packaging	Packaging that consists of one or more inner packaging(s) secured inside a single, non-bulk outer package.
Communication	Any labeling, marking, placarding, or written information affixed to a hazardous material package, or electronically transmitted, which is used to convey information as to the hazard and contents of the package to package handlers, transport personnel, and emergency responders.
Composite Packaging	Packaging that consists of an inner receptacle and an outer packaging that, when assembled, becomes an integral, single unit, and is filled, stored, shipped, and emptied as such, e.g., 55-gal, 1A2 galvanized drum with a rigid poly liner.
Confirmatory measurement	A measurement made to test whether some attribute or characteristic of nuclear materials is consistent with the expected attribute or characteristic for that material.

Container The component(s) of the packaging whose function is to retain the package contents during transport.

Containment Features of the package used to ensure that the material is not released in an uncontrolled manner to the environment during normal transport operations.

Contractor Any DOE prime contractor or subcontractor subject to the contractual provisions of 48 CFR 970.5204-2 or other specific negotiated provisions indicating the DOE's decision to enforce environmental protection, safety, and health protection requirements.

Control The administrative and/or physical controls applied to the transfer of hazardous materials, substances, and wastes, which serve to mitigate risk during transport.

Controlled access A means of limiting access by providing either temporary or permanent physical access control barriers, e.g., fences, controlled guard gates, and security road blocks. Use of passive barriers, such as signs, is not considered controlled-access. See **Access control**.

Controlled materials Materials that are classified, hazardous, of national interest, or of high monetary value. Several categories of controlled materials have been defined as follows:

- Accountable nuclear materials.
- Explosives.
- Radioactive materials, including Class II, III, and IV Sealed Sources.
- Material contaminated with or containing controlled materials.
- Valuable materials, such as gems and precious metals.
- Classified parts and material.
- Any other material specified by LLNL or the DOE requiring control.
- Mock High Explosive.

DOE-approved Approval by the DOE of relief from one or more provisions of the DOT regulations.

DOT-approved Approval by the DOT of relief from one or more provisions of the DOT regulations.

DOT labels The DOT labels specified by 49 CFR 172.400 that indicate the hazard classification associated with the material being transported.

DOT markings Letters indicating the DOT proper shipping name and ID number as specified in 49 CFR 172.300, Subpart D.

DOT Placards The DOT placards on vehicles as specified by 49 CFR 172.500 that represent the hazard associated with the material being transported.

Explosive Any substance or article, including a device, which is designed to function by explosion (i.e., an extremely rapid release of gas and heat) or which, by chemical reaction within itself, is able to function in a similar manner even if not designed to function by explosion, unless the substance or article is otherwise classed under another provision as allowed by DOT.

Explosives in Class 1 are divided into six divisions as follows:

1. ***Division 1.1*** consists of explosives that have a mass explosion hazard. A mass explosion is one that affects almost the entire load instantaneously.
2. ***Division 1.2*** consists of explosives that have a projection hazard but not a mass explosion hazard.
3. ***Division 1.3*** consists of explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.
4. ***Division 1.4*** consists of explosives that present a minor explosion hazard. The explosive effects are largely confined to the package, and no projections or fragments of appreciable size or range are to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.
5. ***Division 1.5*** consists of very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.
6. ***Division 1.6*** consists of extremely insensitive articles that do not have a mass explosive hazard. This division is comprised of articles which contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

Facility Distinct DOE or Contractor buildings, plants, storage areas, laboratories, and test ranges that are fenced or otherwise access-controlled operating areas within the boundaries of a site.

Facility Safety Plan (FSP) An LLNL internal procedure documenting hazards within a facility and basic controls and safety ground rules to be followed by all personnel present within a building or area. Facility Safety Plans are reviewed every three years.

Fissile material A material defined as fissile by 49 CFR 173.403 (j), specifically, any material consisting of or containing one or more fissile nuclides. Fissile radionuclides are all plutonium isotopes, uranium-233, and uranium-235. Neither natural nor depleted uranium are fissile material.

Hazardous material All hazardous materials as defined by the DOT Hazardous Materials Regulations, 49 CFR 171.8.

Hazardous substances All hazardous substances as defined by the DOT Hazardous Materials Regulations, 49 CFR 171.8.

Hazardous waste All nonradioactive hazardous wastes as defined by the Environmental Protection Agency (EPA) regulations, 40 CFR 115, 116, and 262; and the State of California regulations, Title 22, Chapter 30, Articles 9 and 11.

Labels (and Labeling) A general term used to describe any label affixed to a package to indicate the hazard associated with the material being transported.

Low Level Waste (LLW) As defined by DOE Order 435.1, waste that contains radioactivity and is not classified as high-level waste, transuranic waste, or spent nuclear fuel or 11e (2) byproduct material as defined by DOE Order 435.1. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level waste, provided the concentration of transuranic is less than 100 nanocuries per gram.

Markings DOT proper shipping name and identification number and any other information as specified.

Material of Trade A hazardous material, other than a hazardous waste, that is carried on a motor vehicle—(1) for the purpose of protecting the health and safety of the motor vehicle operator or passengers; (2) for the purpose of supporting the operation or maintenance of a motor vehicle (including its auxiliary equipment); or (3) by a private motor carrier (including vehicles operated by a rail carrier) in direct support of a principal business that is other than transportation by motor vehicle.

Material Safety Data Sheet (MSDS) Detailed information and data on a particular chemical provided by hazardous material manufacturers. MSDSs describe physical, chemical, and physiological properties, safety and handling procedures, and appropriate emergency responses.

Mixed waste — As defined by DOE Order 435.1, waste containing both radioactive and hazardous components as defined by the Atomic Energy Act and the Resource Conservation and Recovery Act (40 CFR 115, 116, and 262), respectively.

Non-routine transfers — Onsite transfers of hazardous materials, substances, and/or wastes, between facilities within the access-controlled boundaries of a site, which are required to meet an "emergency" or unique "one-time" need or where special conditions exist that require deviations from existing approvals.

Nonsewerable wastes — Wastes that exceed site discharge limits and, therefore, cannot be discharged directly to the sanitary sewer.

NRC-approved — Approval by the NRC of relief from one or more provisions of the DOT regulations.

Nuclear materials — A collective term that includes all materials designated by DOE to which the provisions of DOE Order 474.1 apply. At present, these materials are:

- Americum
- Berkelium
- Californium 252
- Curium
- Depleted uranium
- Deuterium
- Enriched uranium
- Lithium-6
- Neptunium 237
- Normal uranium[a]
- Plutonium 238-242
- Plutonium 239-241
- Thorium
- Tritium
- Uranium-233.

Off site — For hazardous materials packaging and transportation activities, or hazardous waste generation, "off site" is any activity performed outside of the geographically contiguous private property owned by or under the control of LLNL.

On site — For hazardous materials packaging and transportation activities, or hazardous waste generation, "onsite" is any activity performed within the geographically contiguous private property owned by or under the control of LLNL.

Package — The package, together with its contents, as presented for transport.

Packaging — The assembly of containers and any other components attached thereto, including inner receptacles, absorbent materials, supporting structure, thermal insulation, and supplementary attached equipment.

PARIS — The LLNL computer system linking transactions for incoming materials with procurements and accounting.

Personal vehicle	A general term used to describe any transport vehicle that is owned or leased by an individual and is operated for the private use of that person.
Placards	The DOT placards as specified by 49 CFR 172.500 placed on vehicles to represent the hazard associated with the material being transported.
Protective Services Officer (PSO)	An LLNL employee or contractor employee from the Protective Force Division of the Safeguards and Security Department who escorts uncleared personnel and onsite hazardous material transfers of Accountable Nuclear Materials as part of his or her job description.
Quality Assurance	A system of administrative and technical checks and balances initiated to ensure the specified requirements for an operation are met. The term includes other related terms such as "quality control" and "compliance inspection."
QA Record	A completed document that furnishes evidence of the quality items and/or activities affecting quality as defined in the participant Quality Assurance plans. Also referred to as "Record."
Radioactive material	Any material having a specific activity greater than 0.002 microcuries per gram, as defined by 49 CFR 173.403 (y). Some materials containing a specific activity less than 0.002 microcuries per gram may be treated as radioactive for contamination control purposes.
Radioactive waste	As defined by DOE Order 435.1, waste that is solid, liquid, or gaseous material that contains radionuclides regulated under the Atomic Energy Act of 1954, as amended, and is of negligible economic value considering costs of recovery.
Research Quantity (RQU)	A quantity of less than 1 gal of a Category 3 Material to which the requirements of Occupational Safety and Health Administration (OSHA) (29 CFR), and not this Manual, apply.
Safeguard Categories of Accountable Nuclear Materials (Safeguards Categories I, II, III, and IV)	A category of SNM for the graded safeguards program, prescribed in DOE Order 474.1.

SARP—Safety Analysis Report (Packaging)

A document that provides a comprehensive technical evaluation and review of the design, testing, operational procedures, maintenance procedures, and quality assurance program to demonstrate compliance with the NRC regulatory safety standards, as issued in 10 CFR, Part 71, or the equivalent standards established by the DOE for approving packaging and issuing certificates of compliance.

Sealed source

A radioactive material sealed in a protective container, embedded in plastic or ceramic, or fused on the surface of a metal planchet (small disk). A sealed source may also just be coated with a resin or plastic. Radioactive materials sealed by these methods are not easily dispersed under normal use, nor are they altered chemically or physically through handling or use. Sealed sources are generally used to supply a material that has a known radiation intensity or a specific type of radiation. Nuclear material (generally for use in test and calibration), which has been packaged to be environmentally and critically safe.

Sealed Sources Classes (Class I, II, III, and IV)

Sealed sources are given a hazard classification that ranges from Class I (low hazard) to Class IV (high hazard). (**Note:** $Q_{(A)}$ values for each radionuclide are given in *LLNL ES&H Manual*.)

Shipment

Any offsite transportation of hazardous materials, substances or wastes, and includes activities such as package loading, marking and labeling, securing the package on the vehicle, placarding, and preparation of shipping documents in addition to the actual transportation of the load by the carrier.

Site

An area of land that contains a DOE facility or facilities and is either owned or leased by the DOE or the Federal Government. For purposes of this Manual, the two sites addressed are the LLNL Site and Site 300.

Source material

Depleted uranium, normal uranium, thorium, or any other material determined, pursuant to the provisions of Section 61 of the Atomic Energy Act of 1954, as amended, to be source material or ores containing one or more of the foregoing materials in such concentration as may be determined by regulation.

Special Nuclear Material (SNM)

Plutonium, uranium-233 or uranium enriched in the isotope-235, and any other material which, pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954, as amended, has been determined to be special nuclear material, but does not include source material; it also includes any material artificially enriched by any of the foregoing, but not including source material.

Transport or transportation	The onsite transportation of hazardous materials, substances, or wastes, which includes such activities as package loading, marking, and labeling, securing the package on the vehicle, placarding, and preparing communication documents as appropriate, in addition to the actual transportation of the load by the carrier or transporter.
Transuranic (TRU) waste	As defined by DOE Order 5820.2A, waste that without regard to source or form, is contaminated with alpha-emitting transuranium radionuclides with half lives greater than 20 years and concentrations greater than 100 nanocuries per gram at the time of assay.
Treatment, Storage, and Disposal Facility (TSDF)	A facility permitted by the Environmental Protection Agency for treatment, storage, and/or disposal of hazardous waste.
Type A Packaging	Any packaging that meets the requirements 49 CFR 173.403.
Type B Packaging	Any packaging that meets the requirements 49 CFR 173.403.
User vehicles	LLNL and/or government vehicles operated by Laboratory personnel trained and qualified to perform assigned tasks where hazardous materials will be used or consumed by that person or organization. User vehicles include those operated by research personnel.
Waste Accumulation Area (WAA)	An officially designated area where Category 2 Hazardous Materials (hazardous wastes) are stored, for up to 90 days, until they can be picked up for transfer to a Treatment, Storage, and Distribution Facility (TSDF).
Work in progress	Onsite movements of hazardous materials, substances, and wastes that are exempt from the requirements of this Manual. Specifically, those transfers within boundaries of a facility, and covered by Operational Safety Procedures, Facility Safety Procedures and/or standards of the OSHA. Also, transfers by a trained and qualified person in the course of performing an assigned task where the material will be used and consumed by that person in the course of completing the task (e.g., painter moving supplies to a job site) and where OSHA standards and/or operating procedures are followed.