

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

TRANSPORTATION SAFETY MANUAL

1.0 APPROVAL RECORD

- Reviewed by: Training & Documents QA Coordinator (Molly Granseth)
- Reviewed by: Manager, ESH&A (Sean Whalen)
- Approved by: Manager, Purchasing & Property Services (Andrea Spiker)
- Approved by: Chief Operations Officer (Mark Murphy)
- Approved by: Contracting Officer, Ames Site Office (Jennifer Stricker)

The official approval record for this document is maintained by Training & Documents, 105 TASF.

2.0 REVISION/REVIEW INFORMATION

The revision description for this document is available from and maintained by the author. This document will be reviewed by the Materials and Transportation supervisor annually and go through the official approval process no less than every three (3) years.

3.0 PURPOSE, SCOPE AND APPLICABILITY

This manual encompasses hazardous material shipments. It is the policy of the Ames Laboratory to prepare, handle, package and offer materials for transport in a manner which, within the context of incidental to normal transportation activities, will communicate applicable hazards and provide containment of materials which may be capable of posing an unreasonable risk to health, safety, the environment, and/or property when transported.

This Transportation Safety Manual (TSM) has been prepared in accordance with the regulations and requirements of the U.S. Department of Energy (DOE) and other government regulatory agencies as directed by the DOE Prime Contract (DE-AC02-07CH11358) following site shipment requirements under DOE Order 460.1C Section 4.b.2 and off-site shipments which comply with the DOT 49 CFR parts 171-181 and/or IATA.

Transportation safety is a line responsibility extending from the Laboratory Director to the Associate Laboratory Directors, Program Directors, managers, and all other employees.

3.1 Definitions and Acronyms

Administrative control is the use of an operating procedure or a checklist, for example, as a control to ensure that operations are conducted safely and consistently.

Carrier is an individual or company engaged in transporting passengers or goods for profit.

Commercial Driver's License (CDL) is a driver's license required in the United States to operate certain types of larger or heavier than average vehicles, or for vehicles requiring placard for the transportation of hazardous materials.

Commercial Motor Vehicle (CMV) is defined as a motor vehicle that has a gross vehicle weight rating of more than 10,001 pounds or carries 8 or more passengers for compensation, or 15 or more passengers not for compensation, or that carries

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

hazardous materials in types and amounts that require vehicle placards (49 CFR subtitle B, chapter 1, subchapter C/FMCSA 390.5).

Dewar is a cryogenic container for liquid gases.

Excepted quantity is where certain dangerous goods in small quantities are subject to less stringent transportation regulations.

Hazardous material is a substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, or property when transported in commerce, and which has been so designated.

Hazardous waste is any material that is subject to the hazardous waste manifest requirements of the EPA specified in 40 CFR part 262 or would be subject to these requirements absent an interim authorization to a State under 40 CFR part 123, subpart F.

Hazmat employee is an employee who directly affects hazardous material transportation safety by preparing hazardous materials for transportation, loads, unloads or handles hazardous materials, is responsible for the safety of transporting hazardous materials or operates a vehicle used to transport hazardous materials.

Intra-building movements are the movement(s) of hazardous materials within a single building or inter-connecting set of buildings. Intra-building movement(s) are not subject to the set of requirements of this TSM; however, they shall be administratively controlled by Environmental, Safety, Health and Assurance.

Non-routine transfer is an exception to the routine site shipments, which requires approval using the Readiness Review process.

Off-site shipment is the transport of hazardous materials beyond the Ames Laboratory facilities by commercial carriers, Ames Lab personnel or an Ames Lab-owned or leased vehicle.

Originator or **Requester** is the person or organization who requests a transport of materials, on-site or off-site.

Package is a single container of a hazardous material prepared in final condition for shipment, in required packaging.

Packaging is the shipping container and other components (absorbents and cushioning) necessary to complete a safe package that is ready for transportation.

Packaging requirements are the DOT regulations for transportation that specify how packages of hazardous material shipments must be designed, manufactured, filled and sealed.

Personal property includes all equipment, material, and supplies not classified as real

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

property, intellectual property, internal use software, motor vehicles, federal government records, special nuclear material, or atomic weapons as defined by Section 11 of the Atomic Energy Act of 1954 (42 U.S.C. 2014 as amended). Refer to the Ames Laboratory Property Policy 48300.001 for more information on Laboratory property management.

Public access areas are any areas that do not have controlled access.

Quality assurance (QA) is a system of administrative and technical checks and balances initiated to ensure that the specified requirements for an operation are met. The term includes other related terms such as "quality control" and "compliance inspection."

Routine transfer is a hazardous shipment routinely transferred on-site and off-site.

Shipment (definition for this TSM) is any on-site or off-site transportation of hazardous materials and includes such activities as packaging, marking and labeling, cargo loading and unloading, cargo securement, placarding, preparation of shipping papers, and transporting the package or giving it to a carrier.

Shipper is the organization and/or person who offers a shipment to a carrier for transportation.

Shipping description includes only the proper shipping name, hazard class/division UN or NA numbers and packing group. All other information is referred to as notes and relative supplemental information (i.e., packaging information) and must be entered below/after the shipping description.

Shipping paper is a bill of lading, manifest or other shipping document serving a similar purpose and containing the information required by 49 CFR 172.202 through 204 and IATA 8.0.

Site shipment is the transport of hazardous materials between buildings or locations on the Iowa State University campus, which encompasses the Ames Laboratory permanent site and other leased space from Iowa State University, by an Ames Lab commercial vehicle.

United Nations identification numbers (UN) (REF: 49 CFR 172.101[e]) are found in Column 4 of the Hazardous Materials Table, 49 CFR 172.101 and column A in IATA 4.2, and are used for emergency response.

Placards are diamond-shaped hazard communication devices mounted on transport vehicles carrying hazardous materials to identify the nature of the hazard. Vehicle placarding requirements are addressed in TSM Section 7.3.

Acronyms

| | |
|-----|------------------------------|
| ASC | Applied Science Center (ISU) |
| AL | Ames Laboratory |
| CDL | Commercial Driver's License |
| CFR | Code of Federal Regulations |

| | | | |
|----------------|--------------------------------|----------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

| | |
|-------|---|
| CGA | Compressed Gas Association |
| CH | Chicago Site Manager |
| DOE | US Department of Energy |
| DOT | US Department of Transportation |
| EPA | US Environmental Protection Agency |
| ESH&A | Environment, Safety, Health and Assurance |
| FMCSR | Federal Motor Carrier Safety Regulations (see 49 CFR 383 to 399) |
| GSA | General Services Administration |
| GVWR | Gross Vehicle Weight Rating |
| HMR | DOT Hazardous Materials Regulations (see 49 CFR 100 to 179) |
| IAC | Iowa Administrative Code |
| IMO | International Maritime Organization |
| LLW | Low Level Radioactive Waste |
| NA | North American (used in hazardous materials identification numbers) |
| NFPA | National Fire Protection Association |
| OSHA | Occupational Safety and Health Administration |
| PEL | Permissible Exposure Limit |
| QA | Quality Assurance |
| RCRA | Resource Conservation and Recovery Act |
| RQ | Reportable Quantity |
| RSO | Radiation Safety Officer |
| SC | Site Coordinator |
| SDS | Safety Data Sheet |
| TSM | Transportation Safety Manual (this document) |
| UN | United Nations |

4.0 SITE DESCRIPTION

The Ames Laboratory site (for purposes of defining site) is unfenced and includes roadways to which the public has unlimited access. The site is located on the campus of Iowa State University, in the City of Ames, Story County, Iowa.

The term "site" is used in this TSM to define transport on the campus. Since there are no controls on public access to the Ames Laboratory facilities, the term "on-site" is not applicable.

Ames Laboratory is part of Iowa State University. The University is a political subdivision of the State of Iowa and is exempt from certain transportation-related hazardous material regulation.

As stated in a letter from Edward Bonekemper, Assistant Chief Counsel for the U.S. Department of Transportation (DOT), Research and Special Programs Administration, to Jo Ann Williams, DOE office of Chief Counsel, regarding University of California: "Were the University of California not itself a government agency, its transportation of hazardous materials in the performance of its contractual duties would be subject to the HMTA (Hazardous Materials Transportation Act), to the extent transportation occurred on public roads. However, because the University is a governmental body, its hazardous materials transportation as the operator of the Los Alamos National Laboratory, on public roads or not, is not subject to the HMTA, provided that transportation is by government personnel and for a governmental purpose."

As related to Ames Laboratory, the above paragraph provides precedent that when Ames

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

Laboratory transports hazardous materials, utilizing Ames Laboratory (DOE and/or General Services Administration) equipment, and operated by Ames Laboratory personnel, it is not required to comply with the federal regulations as promulgated in 49 Code of Federal Regulations (CFR) parts 100-180. When the Laboratory places shipments in-commerce with a for-hire motor, rail, air, or water carrier, then these shipments must comply with all applicable regulations found in 49 CFR Parts 100-180.

The packaging and transportation procedures described by this TSM apply to all shipments, and all exceptions and regulations set forth in 49 CFR are applicable.

The site map is located on the Web: <http://www.fpm.iastate.edu/maps/>

The vehicles used at the Laboratory are found on the Web: <https://www.ameslab.gov/operations/materials/fleet-vehicles>

5.0 ROLES AND RESPONSIBILITIES

5.1 Environment, Safety, Health and Assurance Group

- Carries out intra-building movement of radioactive and hazardous waste
- Arranges for the packaging and transportation of hazardous waste per pre-arranged subcontract
- Provides technical assistance, maintains radiation survey instruments, and conducts radiation surveys
- Retains appropriate records on each radioactive and hazardous waste shipment

5.2 Facilities & Engineering Services

- Maintains the Laboratory's Emergency Plan

5.3 Group Leader

- Assists with the shipment/transportation of hazardous materials which originate in their programs and service area(s)

5.4 Originator/Requester

- Identifies the material, the amount of material being shipped, the hazards associated with the material, and provides this information to the Materials Transportation Services department with a completed [Shipping Order Form](#) (48303.005)

5.5 Materials and Transportation Trained Personnel

- Classifies shipments (using IATA), packages shipments, and ships all material including hazardous materials (including radioactive material) leaving the Laboratory
- Receives, stores and distributes inbound packages including hazardous and non-hazardous materials
- Maintains GSA vehicle gas receipts
- Operates the Laboratory storeroom and the compressed gas storage area in the Laboratory warehouse
- Retains appropriate records on each hazardous material shipment/transport by Ames Laboratory personnel (with the exception of radioactive and hazardous

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

waste shipments performed by the contracted waste vendor, overseen by ESH&A)

- Operates the Laboratory vehicle designated for use in hazardous and non-hazardous materials transportation

5.6 Supervisor of Materials and Transportation:

- Establishes, updates and maintains the Transportation Safety Manual
- Signs DOT/IATA shipping papers for the Laboratory and may delegate this responsibility to trained materials and transportation personnel
- Informs the Ames Laboratory fleet users when scheduled preventive maintenance is required for vehicles
- Maintains all logs for fleet gas costs, gas consumption and mileage utilization
- Tracks and ensures all Hazardous Materials training is completed for Materials and Transportation personnel
- Supervises and manages the Materials Handling program

6.0 SITE-SPECIFIC SHIPMENT STANDARDS AND REQUIREMENTS

Site shipments should be transported to the shipping department via walking or by AL Materials handling truck only.

Use of a private vehicle is prohibited for site shipments unless the item has been approved and packaged (excepted quantities only) by the AL shipping department.

Ames Laboratory adheres to the following established standards from 49 CFR regulations:

| | |
|--|--|
| Packaging Standards: | 49 CFR 178 and 173.4 |
| Performance Criteria: | 49 CFR 173.3 Packaging and Exceptions or IATA 2.6.6.6 and (excepted package testing) 2.7.6 (limited package testing) |
| Packaging Quality: | Performance Oriented Packaging and radioactive material packaging quality will be assured by complying with 10 CFR 830, Subpart A |
| Load Compatibility: | Shall meet the safety requirements of 49 CFR 177.848 |
| Radiation Level Limitations: | Radiation levels of packages of radioactive materials shall not exceed the limits specified in 49 CFR 173.441 and IATA 10.0. |
| Placarding: | Requirement of 49 CFR 172.500 |
| Security: | Ames Laboratory hazardous material facilities will be secured at such a level as required by the security level issued by ESH&A. Special security checks for drivers and vehicles will be conducted during the initiation of transport and recorded in quality records for shipments of radioactive materials, wastes and placardable shipments. |
| Hazardous Materials Site Shipment Forms: | The driver of site vehicles carrying hazardous materials shall carry a hazardous material Site Shipment Form (48303.001; acquire from |

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

Materials & Transportation) and must be kept within arm's reach while restrained by the lap belt and visible to persons entering the vehicle. When the driver is not in the vehicle, shipping papers must be on the driver's seat and recognizable to authorities in the event of an accident or inspection. The list shall contain: quantity, type of container (box, drum, cylinder), proper shipping name, hazard class/division, and ID number. Packing group number, gross mass (pounds), Emergency Response Guide Number and Local Emergency Telephone Number.

| | |
|---------------------|--|
| Speed Limit: | Vehicles carrying hazardous materials on the site shall be limited to the posted speed limit, or 25 mph, whichever is less. |
| Vehicles: | Drivers shall inspect vehicles daily to be certain that they are in good operating condition. Inspection results shall be recorded on the Driver's Daily Commercial Vehicle Inspection Checklist and filed daily in the Ames Laboratory warehouse. |
| Private Vehicles: | Use of private vehicles, including bicycles, is prohibited for the transportation of hazardous materials in quantities exceeding correctly packaged small quantities (49 CFR 173.4)/excepted (IATA 2.7) quantities. |
| Passenger Aircraft: | Hazardous materials may not be hand carried on or checked in baggage on commercial flights (IATA 2.3A). |
| Annual Physical: | Transportation performed by the Federal government, a state, or any political subdivision of a state, or an agency established under a compact between states that has been approved by the Congress of the United States are exempt from the FMCSRs, if the political entity chooses. |

7.0 SAFETY ASSESSMENT METHODOLOGY

Hazardous material packaging and transportation operations conducted by contractor personnel require containment, communication, and control measures commensurate with the hazard of materials being transported.

7.1 Packaging used for shipment of hazardous materials, shall meet the requirements of 49 CFR 173.24(a) and IATA 5.0; i.e., each package shall be so designed and constructed and its contents so limited, that under conditions normally incident to transportation:

- There will be no significant release of the hazardous materials to the environment,
- The effectiveness of the packaging will not be substantially reduced, and
- There will be no mixture of gases or vapors in the package which could, through any credible spontaneous increase of heat or pressure, or through an explosion, significantly reduce the effectiveness of the packaging.

Additionally:

- There will be no approval of non-certified packaging for materials required to have certified packaging.
- A separate line item (standard text) will be entered on purchase requisitions or

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

specified so that flowdown for package certifications is included.

- ESH&A will select packaging for hazardous waste.

7.2 Communication (in the form of marking, labeling, or placarding) to personnel handling the material and to emergency responders, will be such that the hazards of the materials being transferred can be assessed prior to transfer, as well as during and after incident response. The marking, labeling or placarding shall describe the hazards to alert bystanders or others who are not directly involved with the shipment.

7.3 Controls (including procedures) will be appropriate for the level of containment and communication when taking into account the probability and consequences of accidents, as well as the route and time of transit. For all materials, personnel exposure shall be minimized in accordance with As Low As Reasonably Achievable (ALARA) principles. Control shall include the use of properly maintained vehicles operated by trained operators.

8.0 SHIPMENTS

8.1 Site Shipments

8.1.1 Categories:

- Gases transport from AL warehouse to AL destination sites such as a dock or laboratory
- Packages from internal or external source which are communicated to contain a hazard and/or will be picked up from or delivered to any AL personnel

8.1.2 Communication: Complete Site Shipment Form (48303.001; acquire from Materials Handling), which requires the following information:

- Quantity and physical attribute, such as cylinder, box etc.
- Identified by the UN number, proper shipping name, hazard class, and corresponding Emergency Response Guide number

8.1.3 Packaging:

- Packaged in accordance with the requirements of 49 CFR 173.5
- Packages must be properly marked and labeled with appropriate signage found in the following references:
 - Package markings: 49 CFR 172.300
 - Package labels: 49 CFR 172.400

8.2 Off-Site Shipments

8.2.1 Categories:

- Packages from internal sources which are communicated to contain a hazard

8.2.2 Communication: Complete [Shipping Order Form](#) (48303.005), which requires the following information:

- Quantity and physical attribute, such as rod, powder etc.
- Identification stating all hazardous elements contained in the shipment
- SDS – from the AL researcher who created the item/sample or an SDS from a reputable source which lists all the hazardous elements in the specific form
- Shipments over an excepted quantity are required to have a Shipper Declaration generated by the DG FEDEX system and signed by certified personnel (IATA

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

Sec 8)

- AL Guards , are trained to relay pertinent information to authorities and contact AL researchers in the event of an emergency. The AL guard desk phone number is noted on the shippers declaration as the 24 hour emergency number, AL guards receive copies of the following documents when the shipment is above an excepted quantity: Shipper Declaration, [Shipping Order Form](#) (48303.005) and SDS. Once the shipment has reached its destination, shipping personnel retrieve these documents.

8.2.3 Packaging:

- Packaging must be in accordance with the requirements of IATA Sec 5
- Packages must be properly marked and labeled with appropriate signage found in the IATA Sec 7.0

8.3 Hazardous Waste Shipments

Ames Laboratory has the responsibility under 40 CFR 262 to ensure that hazardous wastes generated at Ames Laboratory are transported to an authorized treatment, storage, or disposal facility. Hazardous wastes that are transported are required to be described on a special shipping paper, known as a hazardous waste manifest (EPA form 8700-22 or 8700-22A), in accordance with 40 CFR 262. This manifest creates a record that helps assure that the wastes are properly disposed of. This manifest serves as the shipping paper required by 49 CFR 172.200 through 172.205 and no other shipping paper is required.

Ames Laboratory ESH&A personnel shall forward DOT-required Emergency Response Information (ref: 49 CFR 172.600) to Plant Protection Services in G34-TASF.

ESH&A or Shipping personnel will observe vehicles prior to loading hazardous materials for foreign or suspect packages already on the vehicle prior to loading packages. Waste and HR Haz Mat checklist, Form 48303.002 will be completed prior to loading. Security of hazardous waste during packaging, loading and shipment is described in the ESH & A Transportation Security Plan (10200.004; acquire from ESH&A).

8.4 Non-Routine Shipments

All non-routine shipments must be addressed to ESH&A and the Packaging and Transportation Supervisor for approval. This may include a Readiness Review being performed depending on the services needed or items being shipped or transported.

9.0 TRANSPORTATION OF PERSONAL PROPERTY

Personal property with a six digit barcode shall be reviewed by Property Services prior to shipment and noted for property tracking purposes on the [Shipping Order Form](#) (48303.005).

9.1 Commercial Transportation

Laboratory personal property may be transported to off-site locations via commercial sources including UPS, FEDEX or another freight carrier. Requestors should complete the [Shipping Order Form](#) (48303.005) to initiate the shipment. Shipments referencing a purchase order require approval from a Laboratory purchasing agent prior to shipment.

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

9.2 Non-Commercial Transportation

Property may be transported non-commercially using a private vehicle or rented vehicle. Requestors should complete the [Non-Commercial Transportation Order](#) (Form 48303.006) to initiate approval for non-commercial transportation. All Laboratory property must be listed on the non-commercial transportation form or on an attached list to the form, as long as the guidelines outlined below are followed:

- Outbound samples and/or chemicals shall be cleared by a Laboratory-certified hazardous materials employee. If the samples and/or chemicals are considered hazardous according to 49 CFR 173.4, non-commercial transportation will only be authorized if the material is within the excepted quantity guidelines. If the sample and/or chemical is greater than the excepted quantity, the package(s) must be shipped commercially. The hazardous materials must be packaged by an AL-certified hazardous materials employee.
- Outbound AL equipment and tools shall be reviewed, scanned and cleared for contamination concerns.
- Shipments referencing a purchase order require approval from a Laboratory purchasing agent prior to shipment.

9.3 Transportation of Incoming Property

Inbound property may be transported commercially using UPS, FEDEX or other freight carrier. The Laboratory [Shipping Order Form](#) (48303.005) is required when using Laboratory commercial shipping accounts. Inbound property may be transported non-commercially using a private vehicle or rented vehicle as long as the outlined guidelines below are followed:

- Inbound samples and/or chemicals must be cleared by a Laboratory-certified hazmat employee. If the materials are considered a hazard according to the 49 CFR 173.4, the requestor shall make arrangements with the off-site facilities shipping department to send the samples and/or chemicals to Laboratory via a commercial carrier.
- Inbound equipment and tools must be cleaned to remove any and all contamination concerns (will also need to be scanned by off-site facility for any radioactivity).

For large pieces of equipment, a [Readiness Review](#) should be performed prior to the return of personal property from an off-site location. This includes, but is not limited to laboratories and research facilities. Equipment on loan will also be reviewed, prior to returning to AL, to evaluate whether a Readiness Review is required. Readiness Reviews are not required when equipment is returning following off-site repair.

9.4 Automated Data Processing (ADP) Property

Any Laboratory ADP property (e.g. computers, monitors, tablets, hard drives) taken off-site must have an approved [Off-Site Use of ADP Equipment Form](#) (48301.005) on file with the Property Services office.

10.0 PERSONNEL QUALIFICATION AND TRAINING

- 10.1 The Materials Handling Training program** is required to provide Laboratory employees with sufficient information for performing work in a manner which protects the health and safety of all Ames Lab employees and the public, as well as the

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

environment.

10.2 General Packaging and Transportation Training requirements are established by the Ames Laboratory, the DOE, the DOT, OSHA, the State of Iowa, and the Carrier Association. ESH&A is responsible for providing support to the Packaging and Transportation Training program in its inclusion to the General Employee Training (GET) module and the Training Needs Questionnaire (TNQ) for identifying hazmat employees and notifying hazmat employees of recurrent training due.

10.3 Personnel Training

Personnel, including forklift operators, packagers, guards and truck drivers must have completed and passed required training prior to assuming unsupervised responsibilities. Training requirements are tracked by the Training Office and may be reoccurring dependent on the specific area of testing such as hazardous materials training.

Personnel must be trained on applicable portions of:

- operating procedure(s) to be used,
- documentation and record keeping,
- this Transportation Safety Manual,
- 49 CFR, 10 CFR, 40 CFR, ICAO/IATA, IMO/IMDG (as appropriate), and
- DOE Orders.

Certified hazardous waste employees will be trained via the Laboratory for the use of special permitted packaging.

11.0 DOCUMENTATION AND RECORDKEEPING

All quality records shall be maintained as required by appropriate DOE Orders, federal regulation, or this TSM. Records shall be available for review by oversight personnel.

Records of routine site-to-site shipments, including the required hazardous materials Site Shipment Form (48303.001; acquire from Materials Handling), shall be retained until a shipment is complete.

DOT shipping documents will be retained and available for 36 months.

Hazardous waste manifests will be retained and available for 36 months.

Purchasing & Property Services will retain a copy of purchase orders, DOT-UN certificates of compliance, and receiving inspection checklists for three (3) years.

Driver requirements are found in the [ESH&A Program Manual, Sections 5.0 and 5.21](#).

12.0 OCCURRENCE REPORTING AND EMERGENCY RESPONSE

Investigation and reporting of accidents is performed by ESH&A. They will also review and coordinate proper corrective actions with program directors and department heads.

Occurrence reporting shall be in accordance with DOE and Ames Laboratory policy (see DOE 232.1A *Occurrence Reporting and Processing of Operations Information* and Ames Laboratory

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

[ESH&A Program Manual, Section 1.6, Reporting of Events](#)). State and federal reporting will be completed by procedures outlined in [Ames Laboratory's Emergency Plan](#) (46300.001).

Off-site shipments shall comply with the emergency response information requirement of 49 CFR 172.600, if applicable.

12.1 The Plant Protection Section has procedures for receipt and handling of incoming calls requesting information and/or assistance with Ames Laboratory shipments. At a minimum, these procedures shall include, and provide guidance for:

- Providing appropriate emergency response information.
- Contacting key personnel.
- Obtaining technical support.

12.2 Site shipments by Ames Laboratory vehicles shall be in compliance with the following emergency response information requirements:

In the event of a transportation incident, such as a traffic accident, packaging incident, or leaking package or security concern, the driver or other person(s) observing the incident shall promptly notify emergency response personnel via radio or by calling 515-294-3483. The driver shall assist any injured personnel, give any requested information to emergency response personnel, and warn/attempt to keep persons away from any spill or containment breach.

The driver of a vehicle carrying site shipments of hazardous materials shall have the Hazardous Material Shipping Form immediately available in the cab of the transport vehicle. The purpose of the Hazardous Material Form is to identify the hazardous material on the truck at that specific time.

12.3 Packaging and Transportation incidents not meeting (less than) the reporting requirements of Ames Laboratory and DOE policy shall be noted and forwarded to the Packaging and Transportation Supervisor for review. It is important to review "near miss" or unusual occurrences situations to uncover aspects of the situation that, if not identified and corrected, can cause recurrence of the event, possibly with more serious consequences. The Packaging and Transportation Supervisor shall review "near miss" situations, as well as reported occurrences, not to place blame, but to recommend operational changes, etc., to reduce the possibility of additional occurrences.

13.0 DRIVER REQUIREMENTS

13.1 Ames Laboratory vehicles used for shipment of hazardous materials shall be in compliance with the safety requirements of 49 CFR 171-180, 383-399.

13.2 Prior to daily operation, each vehicle used for hazardous material shipments shall be inspected to be certain they are in safe operating condition. The inspection shall be recorded on a Driver's Daily Commercial Vehicle Inspection Checklist (Form 48303.014; acquire from Materials & Transportation). The completed form shall be retained in the Ames Laboratory Warehouse. If any operational deficiencies are noted, the vehicle shall not be used until deficiencies are corrected.

13.3 When transporting items to the Sensitive Instrument Facility or to the Applied Science Complex buildings, Laboratory drivers will use the main entrance on Scholl

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

Road except in the case of an emergency. Laboratory vehicles should not rely solely upon the presence of warning signals, gates, or flagmen to warn of approaching trains. Drivers of Laboratory vehicles are required to stop and survey for oncoming trains at the train crossing prior to starting across the tracks.

- 13.4** Drivers will inspect packages for damage or leaks. If in doubt, the driver shall not load the cargo and ESH&A shall be called at (515) 294-7923.
- 13.5** Drivers shall take the following precautions to protect containers of hazardous materials:
- Set parking brakes to assure vehicle cannot move during the loading process.
 - Do not use equipment which will damage containers while loading.
 - Watch for signs of leaking or damaged containers. Do not transport leaking or damaged packages/containers (see 17.0 References: Whom to Call).
 - In accordance with ISU and Ames Lab policy, smoking is not permitted when loading hazardous materials.
 - Secure all packages/containers in an upright position to prevent movement during transportation.
 - Never open a hazardous materials package between point of origin (loading) and destination.
- 13.6** Drivers will take the following precautions while loading:
- Never load corrosive liquids next to explosives, flammable solids, or oxidizing materials.
 - When loading compressed gases/cryogenic liquids, always place cylinders/dewars in upright position and fasten securely to the vehicle. Off-site shipments of cylinders may require special bracing, dependent on carriers' requirements.
 - Never transport poisons or irritants on trucks with interconnections or in the driver's cab with food material for human or animal consumption.
 - Never load radioactive materials with a combined transport index exceeding "50." This index indicates the degree of control needed during transportation.
- 13.7** Provide for proper Segregation and Separation in storage of Hazardous Materials (see 49 CFR 174.81, Segregation Table for Hazardous Materials).
- 13.8** Shipping papers must be readily distinguishable from other papers and accessible during transportation. Shipping papers required under 49 CFR 172.200 to 172.205, the regulations of 49 CFR 177.817(e) must be kept within arm's reach while restrained by the lap belt and visible to persons entering the vehicle. When the driver is not in the vehicle, shipping papers must be on the driver's seat and recognizable to authorities in the event of an accident or inspection.
- 13.9** The vehicle is to be regularly checked for foreign or suspect packages before loading packages. During periods when SECON 1 or 2 is declared, all vehicle doors (passenger and cargo) are to be locked while vehicle is unattended.
- 13.10** Passengers are not allowed in vehicles carrying hazardous material, except as noted in 49 CFR 392.60.

14.0 RECEIVING HAZARDOUS MATERIALS SHIPMENTS

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

When receiving any hazardous material shipment, evaluation/confirmation of proper shipping name, hazard class, UN/NA number, marking, and labeling should be completed on receipt of materials so proper storage and/or site shipment can be completed properly.

14.1 Inspection and Acceptance of Hazardous Materials Shipments

Packages containing hazardous materials delivered by outside carriers must be inspected by an Ames Laboratory hazardous material employee before signing the accompanying paperwork and accepting delivery. Packages that are leaking or damaged should not be accepted from the carrier, but should be handled in accordance with TSM Section 10.3. In every case, damage is to be photographed immediately. Visible damage must be noted on the carrier's delivery receipt prior to signing for receipt of goods. All goods must be inspected for concealed damage and the carrier notified within 15 days of receipt to ensure the carrier retains the burden of proof for claim settlements.

Hazardous materials packages transported in Ames Laboratory vehicles should be inspected as they are loaded onto the vehicle and as they are unloaded from the vehicle for delivery to the user. Any packages found to be leaking at any stage of delivery should be handled in accordance with TSM Section 14.4.

14.2 Inspection and Acceptance of Gases and Pyrophoric Materials

Special receiving procedures are used for packages containing gases or pyrophoric materials. Such packages may include cylinders of compressed and liquefied gases and containers of solids or non-compressed liquids. All such packages should be checked for leaks before accepting the delivery from the carrier.

Leaking cylinders should not be accepted from the carrier, but should be handled in accordance with TSM 14.4.

Packages containing gases or pyrophoric materials that are delivered to the Ames Laboratory Warehouse must be either delivered to their user or placed in the gas storage area. Transportation of these materials must be conducted in compliance with the applicable requirements of this TSM.

14.2.1 *Special Procedure for Hydrogen Fluoride:* (ESH & A Guide 46200.006, Section 6.2.3.)

Before accepting the shipment of an HF gas cylinder, the warehouse shall: (1) verify that the HF cylinder contains only the amount of HF that is specified on the purchase order (25 lbs or less), and (2) check the cylinder for leaks using the portable HF detector. Any HF cylinder that arrives with an amount exceeding the allowable limit of 25 pounds or presents a detectable leak shall not be accepted from the shipper/carrier and immediately returned to the carrier/vendor.

14.3 Handling Compressed Gases and Cryogenic Liquids

All cylinder movement should be done with Materials Handling equipment. Dewars of cryogenic materials must be on a base platform or cart with rollers. All cylinders must be securely fastened when in storage or transport. A cylinder may not be transported if the cylinder cap is missing, the cylinder is visually damaged in any way, or the valve is not closed tightly (see 16.0 References, Whom to Call).

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

14.4 Handling of Hazardous Materials Packages Discovered to Be Leaking

Ames Laboratory must never knowingly transport or permit others to transport a package of hazardous materials that is leaking. Ames Laboratory procedures for dealing with leaking packages are based on 49 CFR 177.854.

If an outside carrier delivers a leaking package containing hazardous materials, Ames Laboratory should not accept the package from the carrier. However, Ames Laboratory personnel should not permit the package to be put back into transportation. Instead, Ames Laboratory should allow the carrier to move its truck to the nearest safe place on Ames Laboratory's property and remain there until the leak is stopped or the material repackaged. Ames Laboratory personnel should call (515) 294-7923 to report the situation. The carrier is responsible for dealing with such a leak, but Ames Laboratory should provide assistance. The package should not be permitted to leave until it can be transported in conformance with DOT regulations. Carrier equipment that is contaminated should not be permitted to leave until properly decontaminated. Observations for damaged and suspect packages which may pose a security threat are to be made prior to unloading and accepting packages on Ames Lab property.

The same procedure described above should be followed if an Ames Laboratory employee or a carrier employee discovers any leaking package on the carrier's truck while the truck is on Ames Laboratory property, even if the leaking package is not being delivered to Ames Laboratory. Ames Laboratory must not knowingly permit such a leaking package to re-enter transportation. Report all such situations by calling (515) 294-7923.

If a damaged package is received, and Ames Laboratory concludes that the package can be accepted without significant or undue hazard to Ames Laboratory personnel and property, Ames Laboratory may accept the package "as damaged." An exception describing the damage should be noted on the freight bill.

Both the carrier and the shipper should be notified as soon as possible in case of any package damage and/or apparent shipper violations, including any defective conditions of the transport vehicle.

15.0 RADIOACTIVE MATERIALS TRANSPORTATION

15.1 Surveying, Classification, and Preparation

The surveying, classification, and preparation of radioactive materials is completed by ESH&A personnel.

15.2 Packaging and Package Procurement

Packaging of radioactive materials will be determined using 49 CFR 173.410 through 173.428 and IATA requirements. Selection of packaging is made jointly by ESH&A and Materials Handling personnel following IATA Section 10.7 requirements. Definitions, limitations, and exceptions listed for shipment by highway and air will be adhered to. Package specification for LLW package specifications will be reviewed prior to requisition of packages to assure they will meet criteria specified by receiving burial site requirements, and that they meet DOT requirements. Requestors will verify packaging upon receipt at the Laboratory. Packaging certifications are to be entered as a separate

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

line item on the requisition form. Package certifications are to be filed with the purchase order. All certified packages are to be reviewed with Packaging and Transportation prior to requisitioning. Packaging must be determined by using 49 CFR 173.427.

15.3 Document Preparation

The packaging, package procurement, labeling and shipping documents are prepared by the Materials Handling personnel.

15.4 Labeling

Each package shall be marked in accordance with the requirements of 49 CFR 172.300-308. The proper label to be used is established by using the table in 49 CFR 172.403(c) and 172.441 (fissile) if applicable. The transport index, radiation level at package surface and fissile criteria are used to determine label category. The contents, activity and transport index must be entered on the label by either manual or mechanical means by ESH&A personnel.

15.5 Transporting

Transport vehicles need to be visually inspected prior to loading to ensure they are acceptable for the intended use. The vehicles should also be radiologically surveyed by ESH&A before loading for pre-use contamination, when using commercial highway carriers specializing in radioactive transport. Transport of large volumes of LLW radioactive material by non-DOE vehicles should be "exclusive use" to prevent commingling of DOE and other commercial shipments.

15.6 Receiving

Upon receipt of a radioactive shipment, a visual inspection of the packages should be performed to identify dents, flaking paint, debris, package orientation and any indication of leakage. A comparison of package count to the shipping papers should be made to ensure accuracy.

The receiving address for all Ames Laboratory radioactive materials is:

*Ames Laboratory
Radiation Safety Officer
ISU Campus, 2416 Pammel Drive
Ames, IA 50011-2416*

* Small package delivery of radioactive materials may be delivered to the Spedding Dock. Upon arrival, the Radiation Safety Officer is contacted to oversee the transaction.

15.7 Reporting

Reporting LLW shipments to the state of Iowa, including prepayment of fees, should be completed by ESH&A prior to shipping.

15.8 Security (other than Exempt Concentrations and Exempt Consignments [49 CFR 173.435])

Radioactive materials over "Exempt Concentrations" and over "Exempt Consignment" levels and less than Type A activities require notification (FYI) to the Site Office Manager. Type A activities require approval from the Site Office Manager, which must be obtained by the Radiation Safety Officer.

| | | | |
|----------------|--------------------------------|----------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

15.9 Notification and Approval Requirements:

15.9.1 *SECON-3: (Department of Homeland Security [DHS] Threat Condition YELLOW):*

- Excepted, Limited Quantity and Type A activities require FYI notification to the SC Site Office Manager.
- Type B activities require SC Site Office Manager formal written approval.

15.9.2 *SECON-2: (DHS Threat Condition ORANGE):*

ANY quantity of activity (exempt, Limited quantities, Type A and Type B) being shipped requires approval of the Site Office Manager (request by email at least THREE days prior to shipment). The Site Office Manager is to notify the Chief Operating Officer (SC-3) at least TWO days prior to departure of shipments approved by the Site Office Manager. The Site Office Manager is to be notified by Ames Laboratory of package departure and arrival at destination. Additional tracking and communication with shipments enroute may be required as directed by the DOE Emergency Operations Center (EOC). Type B packages require formal written approval.

15.9.3 *SECON-1: (DHS Threat Condition RED):*

ALL shipments if radioactive materials are FROZEN. Exceptions may be made on a case by case basis with Headquarters (SC-3) approval. Shipments in transit are to be located, but can proceed to the planned destination unless otherwise directed by the Site Office Manager (CH), DHS, or the DOE EOC.

Complete Safety & Security Check **form 48303.015**, to secure the following information:

1. CH and/or SC shipment authorization
2. Carrier name
3. Carrier Driver's name and address
4. Assure U.S. citizenship of driver
5. Obtain copy of Driver's CDL (or confirmation by carrier)
6. Assure CDL is hazmat endorsed
7. Security inspection of vehicle
8. Cell phone or communication is available
9. Tracking number assigned to shipment
10. Other tracking devices, as necessary

Take digital pictures of completed package.

Complete Package Closure Quality Control Form (48303.009; acquire from Materials & Transportation).

Complete Hazardous Waste Shipment & Security Checklist (Form 48303.002; acquire from Materials & Transportation).

16.0 REFERENCES

Transportation Security Plan (10200.004)

| | | | |
|-----------------------|--------------------------------|-----------------------|------------|
| Contact Person | Sallie Spencer | Revision | 2.0 |
| Document | Manual 48303.001 | Effective Date | 05/01/2016 |
| | | Review Date | 05/01/2019 |

WHOM TO CALL

| <u>In the event of:</u> | <u>Contact Department:</u> | <u>Phone Number:</u> |
|---|-----------------------------|----------------------|
| On-site emergency | | 911 |
| On-site spill | Plant Protection Section | (515) 294-3483 |
| Transportation emergency | Plant Protection Section | (515) 294-3483 |
| Radioactive material (not waste) | ESH&A | (515) 294-2153 |
| Hazardous and mixed waste | ESH&A | (515) 294-2153 |
| Hazardous materials non-radioactive waste | Materials Handling Services | (515) 294-6083 |
| Packaging and transportation | Materials Handling Services | (515) 294-6083 |