

## CHAPTER 60 - HAZARDOUS MATERIALS

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## CHAPTER 60 - HAZARDOUS MATERIALS

61 - HAZARDOUS MATERIALS. Hazardous materials consist of a wide variety of substances that may be solid, liquid, or gas. Characteristically, they may be corrosive, explosive, flammable, radioactive, reactive, toxic, or a combination, and they require specific cautionary procedures to permit their safe use, transport, and storage. The unique properties of hazardous materials require that all employees who work with these materials have a general awareness of the dangers they present to life, safety, and health.

### 61.01 - Authority.

1. The authority for flammable/combustible liquids, hazardous waste operations, respiratory protection, specifications for accident prevention signs and tags, and toxic and hazardous substances is in Title 29, Code of Federal Regulations (29 CFR), sections 1910.106, 1910.120, 1910.134, 1910.145, 1910.1000 - 1910.1450.

2. The authority for ventilation, lead, and OSHA safety standards is in 29 CFR 1926.57 and 1926.62 and Part 1960, Subpart C.

3. The authority for hazardous waste management is in 40 CFR Subchapter C.

4. The authority for pesticides programs is in 40 CFR Subchapter E. Additional agency direction is in FSM 2150 and FSH 2109.14.

5. The authority for underground storage tank standards is in 40 CFR Subchapter I, Part 280.

6. The authority for general and specific information on hazardous materials, commercial driver's license standards, and hazardous materials transportation is in 49 CFR Parts 171, 173, 175-177, 383, and 397.

7. Agency direction on hazardous materials, in addition to this chapter, is in FSM 2160 and 6740. For management of asbestos-containing materials refer to FSM 2167.13; for radon, FSM 2167.14a; for polychlorinated biphenyls (PCBs) and restricted wood preservatives commonly used in buildings and structures, FSM 2167.16; and for lead, FSM 2167.17.

8. The Interagency Aviation Transport of Hazardous Materials document (January 1999) establishes the USDA Forest Service and the Department of the Interior interagency aviation transport of hazardous materials program, as authorized in FSM 5700, Aviation Management. This document can be ordered from the National Interagency Fire Center, Great Basin Cache Supply Office, 3833 South Development Avenue, Boise, Idaho 83705. Order NFES no. 1068.

## 61.05 - Definitions.

Chemical. Any element, chemical compound, or mixture of elements and/or compounds.

Combustible Liquids. Any liquids having a flash point at or above 100 °F (38 °C). Kerosene is an example.

Compressed Gas. A gas stored under pressure, that has the potential for explosive action if suddenly released and may irritate eyes, skin, and lungs.

Corrosive Material. Material that burns on contact, causing visible damage and/or irreversible changes to body tissues and also burns through inert materials. Hydrochloric acid is an example.

Cryogenic Material. Material that has the potential for explosion and also freezes body tissues on contact.

Etiologic Agent. A microorganism that causes a disease or disorder as determined by medical diagnosis.

Explosive. Chemical material that can undergo a sudden and violent release of pressure and heat causing injuries, death, and damage.

Explosive Material. Material with the potential for explosion.

Exposure Routes. Ways that chemicals enter a person's body. There are four main routes of exposure: inhalation, skin/eye contact, skin absorption, and ingestion.

Flammable Liquids. Any liquid having a flash point below 100 °F (38 °C). Alcohol is one example.

Flammable Compressed Gas. A very highly flammable or explosive material when mixed in air at ambient temperature and pressure. Ignition of even a small leak may cause the material to ignite.

Flammable Solid. Solid material that ignites easily and burns vigorously.

Flash Point. Lowest temperature at which a liquid gives off enough vapor to ignite in the presence of an ignition source.

Hazardous Chemical. Any chemical having either a physical or health hazard associated with its use.

Hazardous Waste. Any solid, liquid, or contained gaseous material that because of its quantity, concentration, or physical, chemical, or infectious characteristics may:

- a. Cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
- b. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Incompatible Materials. Materials that could cause dangerous reactions when in direct contact with each other.

Irritating Materials. Materials that release dangerous fumes on contact with water, fire, or air, and that react with body tissues at the point of contact causing reddening, itching, tearing, irritation, and/or minor inflammation.

Oxidizing Material. Any material that yields oxygen to stimulate combustion.

Poison. A material that adversely affects systems of the body.

Pyrophoric Liquid. Liquid that ignites spontaneously in air at 130 °F (54 °C) or lower temperatures.

Radioactive Material. A substance containing an element that emits ionizing radiation upon decay.

Toxic Material. Material that may cause systemic damage when taken into the body.

#### 61.06 - References.

1. National Fire Protection Association. NFPA issues standards for use and management of various hazardous materials and related topics as follows: NFPA 30, Flammable and Combustible Liquids Code; NFPA 43A, Storage of Liquid and Solid Oxidizers; NFPA 43B, Storage of Organic Peroxide Formulations; NFPA 43C, Storage of Gaseous Oxidizing Materials; NFPA 43D, Storage of Pesticides; NFPA 58, Storage and Handling of Liquefied Petroleum Gases; NFPA 70, National Electrical Code; NFPA 80, Fire Doors and Windows; NFPA 251, Building Construction and Materials; NFPA 325M, Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids; NFPA 395, Storage of Flammable and Combustible Liquids at Farms and Isolated Sites; NFPA 491M, Hazardous Chemical Reactions; and NFPA 704, Identification of the Fire Hazards of Materials for Emergency Response. Quincy, MA.

2. U.S. Department of Transportation, Research and Special Programs Administration. 1993. Emergency Response Guidebook. U.S. Government Printing Office, Washington, DC.

## 61.1 - General Safety Requirements.

61.11 - Personnel Qualifications. Line officers shall ensure that all employees involved in the use, storage, transportation, and disposal of hazardous materials receive training specified in 29 CFR 1910.120, 29 CFR 1910.1200, and 49 CFR Part 172. At a minimum, this shall be general awareness training for handling hazardous materials and shall extend to function-specific, safety, and driver training, when warranted.

In accordance with FSM 2161.41a, line officers shall ensure that all employees, including seasonal workers and volunteers who are likely to discover a hazardous material release, receive Emergency Response Awareness Training.

Operators of Government vehicles transporting hazardous materials for noncommercial purposes in quantities that require placarding, shall obtain a commercial driver's license with a hazardous materials endorsement. Refer to 49 CFR Part 383 for requirements. Drivers shall receive general awareness, safety, driving, and function-specific training.

61.12 - Personal Protective Equipment. Appropriate personal protective equipment (PPE) shall be provided and used to protect employees from exposure to chemicals. For specific information, refer to the material safety data sheet (MSDS), job hazard analysis (JHA) (FS 6700-7), and specific product labels.

61.13 - Procedures. The Occupational Safety and Health Administration (OSHA) hazard communication standard (29 CFR 1910.1200) requires manufacturers to provide on their chemical product labels specific guidelines on its hazards, uses, PPE, and disposal techniques. Provide this information to employees by means of a written hazard communication program, JHA, other forms of warning, MSDS, and training. Maintain employee exposure and medical records in accordance with 29 CFR 1910.20.

The JHA shall address site-specific hazards associated with drug dumps, methamphetamine labs, and so forth, that employees may discover on National Forest System Lands.

61.14 - Safety Practices. A hazard communication training program provides information related to general awareness, hazard chemical inventory, and MSDSs.

1. A hazardous chemical inventory shall be maintained and shall be readily accessible to all employees.
2. Employees shall not handle hazardous chemicals that do not have an MSDS. An MSDS is required from the manufacturer/supplier of each chemical used on site. MSDS's shall be readily accessible to employees at all times.

3. Emergency response awareness training shall address:

- a. Hazardous material releases by third parties on National Forest System lands and lands leased by the Forest Service; and
- b. Releases from Forest Service facilities or operations that are beyond the ability of the employees in the immediate work area to clean up.

Response to these situations should be limited to collecting as much information as possible from a safe distance and to notifying the appropriate Environmental Protection Agency, State, and local emergency response authorities.

**61.15 - Use.** Research and identify the hazards and properties of chemicals before purchase. Order only enough of each chemical to meet current needs. Chemical-specific information shall be available through labels and the MSDS.

**61.15a - Marking and Labeling.** The Forest Service uses two primary labeling systems:

1. National Fire Protection Association (NFPA) Hazard Rating System (ex. 01). This system identifies the hazards of a material in terms of four categories: Health Hazard, Flammability, Reactivity, and Special Hazard, using the following hazard signal marking arrangement:

**61.15a - Exhibit 01**

2. Department of Transportation (DOT) labeling/placarding system (ex. 02). International regulations require that packages (all quantities) to be transported shall carry content labels unless otherwise provided by 49 CFR. Marine, highway, rail, and air transportation labeling may differ. Labels are 4 inches (102 mm) square, with lettering across the face. DOT requires these labels for interstate shipment via rail or highway carrier, and a label must appear on at least two opposing sides or two opposing ends of a package (excluding the bottom).

Except as otherwise provided by 49 CFR, each bulk package, freight container, unit load device, and transport vehicle shall be placarded on each side and each end. Placards are at least 10-3/4 inch (273 mm) square, with lettering across the face. Refer to 49 CFR 172.400 through 172.560 for additional requirements on labeling/placarding.

Except for size, required labels and placards have similar physical characteristics. Individual differences are identified in exhibit 02.

**61.15a - Exhibit 02**

61.16 - Storage. Plan the storage area with personnel safety and health in mind, so that:

1. All personnel know how to and are able to get out of the storage area in case of accident or fire.
2. There are no obstructions preventing ready access to exits or to emergency equipment, such as fire extinguishers, safety showers, and eyewash stations.
3. Emergency materials for dealing with spillages are readily available.
4. Work area storage for excess chemicals is adequate.
5. Employees know about the hazardous chemical inventory, where it is kept, who is responsible for maintaining it, and how they can add to the inventory.

61.17 - Transportation. All containers (safety cans, drums, tanks, or tank trucks) used for transporting hazardous materials must be correctly labeled or placarded to ensure quick identification of the materials in an emergency. Refer to FSM 5714.2 for agency direction; 49 CFR Parts 71-173, 175, and 177-178 for further requirements; 49 CFR Part 383 for vehicle operation requirements; and 49 CFR Part 397 for hazardous materials driving and parking rules.

At an accident scene involving hazardous materials, exercise caution to prevent being injured and initiate measures without delay to protect life. Consult the Emergency Response Guidebook (sec. 61.06), if necessary.

61.18 - Disposal. Disposal of many hazardous waste products is controlled by the Environmental Protection Agency (EPA) and/or a State agency. To assure proper disposal procedures, a competent person, knowledgeable in EPA and State guidelines, shall be appointed as the unit hazardous materials coordinator to oversee the hazardous waste disposal program.

1. All disposal methods shall comply with Federal, State, and local laws and regulations. Never flush hazardous waste products into drains and sewers.
2. Mercury spills or waste must be collected in a special receptacle and recycled.
3. Containers previously used for toxic chemicals shall not be used for trash barrels, water storage tanks, or feed troughs.

61.2 - Laboratory Safety. This section applies to any room, building, or area used for scientific or technical research, testing, and analysis, or small-scale preparation or storage of toxic or hazardous materials.

**61.21 - Qualifications.** Employees shall receive OSHA Hazardous Communications (Right-to-Know) Standard initial training and refresher courses. They shall be familiar with the chemicals, equipment, and procedures for an assigned task, demonstrate the ability to recognize potential hazards, know how to prevent accidents, and know what steps to take in the event of an accident, spill, exposure, or other emergency.

**61.22 - Personal Protective Equipment.** To reduce the spread of contaminants to offices, lunchrooms, meeting rooms, and homes, never wear PPE outside the laboratory.

1. The JHA shall identify appropriate PPE to be provided and used in the laboratory (ex. 01). Some examples are gloves, foot wear, and body protection (aprons, coveralls, or air-supplied suits).

**61.22 - Exhibit 01**

2. When the JHA identifies a respiratory hazard (sec. 21.13), approved and appropriate respiratory protective equipment shall be provided (ex. 02). Maintain a written respiratory protection program in accordance with OSHA Respiratory Standard (29 CFR 1934).

**61.22 - Exhibit 02**

For certain hazardous chemicals, such as perchloric acid or hydrogen fluoride, specially designed fume hoods must be used. Do not store or use organic materials in the perchloric hood. (Exception: store or use organic materials in the perchloric hood only when needed for prescribed reactions. Label perchloric fume hoods, "Perchloric Acid Fume Hood--Use Only Prescribed Organic Materials.")

Provide an auxiliary power supply for fume hoods for toxic gases or volatile chemicals to maintain ventilation in case of utility failure.

3. The laboratory safety and health officer shall identify and post excessive noise areas (85 dB or above). When possible, use engineering controls to reduce noise or relocate the process.

4. Safety eyewear that meets or exceeds the ANSI Standard Z87.1-1989 is the minimum eye protection required for laboratory work.

a. Always use goggles and a face shield when there is increased risk of eye damage, such as when handling corrosives.

b. Clean lenses often. Always flush abrasive dirt from lenses with running water; do not clean with abrasive soap.

c. Inspect lenses for chips or scratches that weaken hardened lenses. Replace damaged lenses immediately.

d. Use special lenses for work with nonionizing radiation sources, such as lasers, welding and burning equipment, and ultraviolet/infrared light (ex. 03).

### **61.22 - Exhibit 03**

**61.23 - Procedures.** JHAs developed for laboratory activities shall include potential hazardous procedures from time of purchase to disposal. Discuss each procedure thoroughly with all involved personnel and plan how to prevent accidents. In addition, the JHA shall identify specific PPE for each functional area or task.

Activities involving high-risk procedures, hazardous materials, or toxic substances shall be reviewed by a laboratory director or Forest Supervisor representative. Correct all problems before the work begins. All potential hazards shall be addressed and preventive measures taken before work begins.

Basic procedures alone do not ensure a safe and healthful workplace. Application of the rules must be accompanied by careful consideration of every action. Maintain current references on laboratory safety. Consult them and apply their guidelines.

1. Prohibit unnecessary ignition sources within 50 feet (15-1/4 m) of flammable storage or work areas.
2. When transferring flammable liquids from metal containers, ground and bond the containers to prevent static charges.
3. Ensure that refrigerators for flammable chemical storage are explosion proof (NFPA 70 - article 500). Tight-fitting covers for containers must be used for storing flammable liquids in refrigerators.
4. Mark compressed cylinders with DOT labels (sec. 61.15a, ex. 02).
  - a. Move cylinders by handtrucks. Secure the cylinder in an upright position with a safety chain.
  - b. Ensure that cylinders are equipped with an approved pressure regulator for the specific gas being used.

**61.24 - Chemical Hygiene Plan.** Every research laboratory shall have a written Chemical Hygiene Plan (CHP) as required by 29 CFR 1910.1450 (OSHA Standard on Occupational Exposure to Hazardous Chemicals in Laboratories). Training and education of employees should be a regular, continuing activity, not simply an annual presentation.

The JHA must contain the following information concerning each chemical to be used:

1. Chemical name (common and International Union of Chemists name).
2. MSDS.
3. Quantity on hand, stored, and to be handled at any one time.
4. Shelf-life (useful time frame for storage).
5. Frequency of use (exposure in terms of calendar days or months).
6. People designated to handle and dispose of materials. Include personal qualifications for disposal.
7. Emergency procedures and equipment, such as for spills.
8. Storage facilities (main building, in transit, in the field).
9. Handling procedures (main building, in transit, in the field).

It is vital that employees inspect their equipment and work areas for hazards and defects every work day and that they correct or repair hazards and defects as they occur.

In any area where personnel may be exposed to hazardous levels of chemicals, it is the duty of supervisors to monitor the environment at regular intervals consistent with 29 CFR 1910.1001.

#### 61.25 - Emergency Planning.

1. Conspicuously post telephone numbers for emergency assistance near each phone in laboratory work areas. Include names and telephone numbers of employees trained in first aid.
2. Make an appropriate first aid kit readily available for each laboratory. Maintain emergency equipment and locate it along normal paths of travel where it is readily accessible.
3. Locate emergency showers in or near all laboratory rooms with access unobstructed. Shower valves shall be easily activated, and the shower head shall be the deluge type that delivers 30 to 60 gallons per minute at pressures of 20 to 50 pounds per square inch (psi) at the head. Every laboratory room or area shall have ready access to low pressure, aerated water for removing contaminants from the

eyes and, where possible, with the eyewash fountain co-located with the emergency shower.

4. Maintain all eyewash stations (ex. 01) in accordance with ANSI Z358.1 and inspect them per the manufacturer's instructions. Squeeze bottles also require frequent inspection and maintenance since they lose water to evaporation, become contaminated, and are easily misplaced (sec. 21.22).

### **61.25 - Exhibit 01**

61.25a - Emergency Evacuation Procedures and Communications Plan. Employees shall be familiar with the Emergency Evacuation Procedures and Communications Plan, and of their duties in:

1. Sounding the alarm.
2. Operating emergency equipment.
3. Evacuating to shelters or assembly points.
4. Notifying emergency response crews.
5. Having skills in rescue and first aid.

Include provisions for advising emergency response crews of potential dangers when such crews are summoned.

61.25b - Emergency Guidelines.

1. Provide guidelines for all conceivable emergencies during which laboratory activities might be interrupted and for utility failures. Include provisions for:

- a. Emergency ventilation and lighting.
- b. Cooling of chemical reactions.
- c. Personnel evacuation.
- d. Advising emergency response crews of potential dangers when such crews are summoned.

2. Conduct emergency drills at least twice a year. Ensure that the drills do not create hazards themselves.

61.26 - Safety Practices. Management shall ensure the safety and health of employees and the visiting public.

Some chemical combinations are very reactive and can produce heat, generate gas, or detonate. Such reactivity generally can be predicted. Sometimes chemicals must be combined in specific sequences. Before working with chemicals, laboratory employees shall review the applicable MSDS to know and recognize the potential reactions of the chemicals being used and to know how to control these reactions.

The toxicity of many chemicals has not been completely investigated. Lethal doses of some chemicals can be absorbed through the skin, inhaled into the lungs, and ingested through the mouth.

The inhalation of toxic vapors and gases, skin contact, and poor housekeeping pose some of the greatest hazards when working with chemicals. PPE and safety devices do not provide complete protection. Care in handling chemicals is essential.

Follow these safety practices.

1. Chemical Spills. Clean up chemical spills immediately, using approved procedures for disposal.
2. Removal of Stored Toxic Liquid Chemicals. Remove toxic liquid chemicals from large storage containers by a pump or siphon, or by a pipette equipped with a rubber suction bulb. Do not start siphons by mouth to remove liquid chemicals. ***Do not allow mouth pipetting.***
3. Food Safety. Do not eat or drink in any room or area where there is danger of contamination by toxic or radioactive substances. Do not store food and beverages in laboratory refrigerators. Do not use laboratory glassware for food or beverages.
4. Laboratory Glassware. Inspect glassware before and after use. If damaged, repair or discard. Do not pick up large glass containers by their necks or rims. Hands must be dry when handling chemical containers. Do not stress any glass part when setting up an apparatus. Rinse or purge flammable or toxic residue from glassware after use.
5. Mechanical Hazards. Operate equipment according to the manufacturer's recommendations. Secure appropriate guards and shields. Do not operate instruments or leave equipment unattended unless adequate safety measures are taken. All warning signs shall be clearly visible. Employees shall be familiar with all safety features.
6. Nonionizing Radiation. Mount appropriate eye protection or shields on instruments emitting nonionizing radiation. Post warnings. It is imperative that

equipment or materials emitting high energy radiation be handled according to established radiation and radioisotope policy (FSM 6741).

7. Pressure and Vacuum Systems. Store compressed gases and handle them in a safe manner. Use safety shields to protect personnel from equipment that may explode or implode. Regulatory and safety valves or controls must be maintained and regularly inspected as prescribed by the manufacturer.

8. Thermal Hazards. Wherever there are high or low temperature areas in the laboratory, install suitable insulation and warning signs. Employees working with high or low temperatures shall use adequate safety clothing. Never leave high temperature ovens or furnaces unattended unless they are equipped with temperature control and warning signs.

9. Electrical Hazards. Ensure that wiring meets National Electrical Code standards as required in classified areas where hazardous materials are stored and used.

All electrical equipment, wiring, switches, controls, and posted signs shall comply with NFPA 70 (ex. 01).

### **61.26 - Exhibit 01**

10. Infectious Hazards. Ensure that personnel using potentially hazardous microorganisms are trained in safety and health measures, and that they conduct their laboratory activities in accordance with the level of risk.

a. Keep laboratories clean. Disinfectants identified as effective against organisms being handled shall be available in each laboratory and used routinely on work surfaces. Disinfect equipment for handling hazardous biological materials before it is discarded or reused.

b. Do not eat or drink in laboratories where biohazardous materials are used or stored. Always wash hands after working with microorganisms.

c. Label all pathogens properly for ready identification (29 CFR 1910.1030).

d. Pipetting of hazardous microorganisms or toxic fluids shall be done only by bulb or other nonmouth devices. Do not blow infectious fluids out of pipettes.

e. Perform all work with hazardous microorganisms or toxic fluids on plastic-backed absorbent material.

11. Animal Hazards. Practice good personal hygiene and housekeeping techniques when caring for and working with animals. Use PPE to reduce the possibility of infection through a skin break, the respiratory tract, or through contact with excreta.

### 61.3 - Greenhouse Safety.

61.31 - Procedures. Develop a safety and health plan that includes:

1. Supervision responsibility.
2. Periodic inspection.
3. Use of hazardous materials.
4. Emergency evacuation procedures and communication plan.
5. Equipment use.
6. Accident investigation and reporting.

61.32 - Safety Practices. JHAs are required for all greenhouse work projects and activities.

#### 61.32a - Operations.

1. Do not use soil amendments containing pathogenic microorganisms (such as *Sporotrichum schenckii*, the cause of sporotrichosis) as a potting medium or for packing nursery stock. This prohibition applies especially to fresh, nondecomposed sphagnum moss that is often infested with *S. schenckii*. The prohibition does not apply to decomposed sphagnum peat moss sold commercially.

2. Wear a respirator when working with dry soil amendments like peat moss, vermiculite, and perlite (sec. 21.13).

3. Keep aisles and passageways clear. Do not obstruct exits with stored materials.

4. Consider fire characteristics when storing materials.

61.32b - Pesticides. Only licensed or certified persons are permitted to apply restricted-use pesticides. Refer to sections 22.11 and 61.7 for additional information.

1. Use only registered pest control chemicals. Apply all pesticides according to label instructions and use required PPE.

2. When using smoke fumigators, post warning signs on all greenhouse doors to indicate:

- a. What fumigants will be used.
- b. When fumigation will be done.
- c. Who will be allowed access.

**61.32c - Equipment.** Safety equipment, first aid kits, safety showers, and fire extinguishers must be readily available for emergencies. Employees shall be trained in the use of such equipment.

**61.32d - Electrical.** All electrical work shall be done in compliance with the NFPA 70 and State or local safety codes.

1. Because greenhouses are often damp, use double insulation and ground-fault circuit breakers to prevent shocks.

2. Schedule routine inspection of all electrical cords. Do not use worn or frayed extension cords.

**61.4 - Incompatible Chemicals.** Organize storage so there are separate areas for solvents, corrosive liquids, strongly oxidizing agents, and the remaining chemicals.

#### PARTIAL LIST OF INCOMPATIBLE CHEMICALS

Chemical	Incompatibles
Acetic acid	Chromic acid, ethylene glycol, hydroxyl-containing compounds, nitric acid, perchloric acid, permanganates, and peroxides
Acetone	Bromine, chlorine, nitric acid, and sulfuric acid
Acetylene	Bromine, chlorine, copper tubing, mercury, silver, fluorine, and iodine
Alkaline and alkaline earth metals, such as calcium, cesium, lithium, magnesium, potassium, and sodium	Carbon dioxide, chlorinated hydrocarbons, and water

Chemical	Incompatibles
Aluminum and its alloys (particularly powders)	Acid or alkaline solutions, ammonium persulphate and water, chlorates, chlorinated compounds, nitrates, and organic compounds in nitrate/nitrate salt baths
Ammonia (anhydrous)	Bromine, calcium hypochlorite, chlorine, hydrofluoric acid, iodine, mercury, and silver
Ammonium nitrate	Acids, chlorates, chlorides, lead, metallic nitrates, metal powders, finely divided organics or combustibles, sulfur, and zinc
Ammonium perchlorate permanganate, or persulfate	Combustible materials; oxidizing materials, such as acids, chlorates, and nitrates
Aniline	Hydrogen peroxide or nitric acid
Barium peroxide	Combustible organics, oxidizable materials, and water
Barium rhodanide	Sodium nitrate
Bismuth and its alloys	Perchloric acid
Bromine	Acetone, acetylene, ammonia, benzene, butadiene, butane and other petroleum gases, hydrogen, finely divided metals, sodium carbide, and turpentine
Calcium or sodium carbide	Moisture (in air) or water
Calcium hypochlorite	(Activated) ammonia or carbon
Chlorates or perchlorates	Acids, aluminum, ammonium salts, cyanides, phosphorous, metal powders, oxidizable organics or other combustibles, sugar, sulfides, and sulfur

Chemical	Incompatibles
Chlorine	Acetone, acetylene, ammonia, benzene, butadiene, butane and other petroleum gases, hydrogen, metal powders, sodium carbide, and turpentine
Chlorine dioxide	Ammonia, hydrogen sulfide, methane, and phosphine
Chromic acid	Acetic acid (glacial), acetic anhydride, alcohols, combustible materials, flammable liquids, glycerine, naphthalene, nitric acid, sulfur, and turpentine
Cumene hydroperoxide	Acids (mineral or organic)
Cyanides	Acids or alkalies
Fluorine	Most materials
Hydrocarbons, such as benzene, butane, gasoline, propane, turpentine	Bromine, chlorine, chromic acid, fluorine, hydrogen peroxide, and sodium peroxide
Hydrocyanic acid or hydrogen cyanide	Alkalies and nitric acid
Hydrofluoric acid or anhydrous	Ammonia (anhydrous or aqueous)
Hydrogen peroxide 3%	Chromium, copper, iron, most metals or their salts
Hydrogen peroxide 30% or 90%	Same as 3% hydrogen peroxide plus aniline, any flammable liquids, combustible materials, nitromethane, and all other organic matter
Hydrogen sulfide	Fuming nitric acid or oxidizing gases
Iodine	Acetylene, ammonia (anhydrous or aqueous), and hydrogen
Lithium	Acids, moisture in air, and water
Lithium, aluminum hydride	Air, chlorinated hydrocarbons, carbon dioxide, ethyl acetate, and water

Chemical	Incompatibles
Magnesium (particularly powder)	Carbonates, chlorates, heavy metal oxalates or oxides, nitrates, perchlorates, peroxides, phosphates, and sulfates
Mercuric oxide	Sulfur
Mercury	Acetylene, alkali metals, ammonia, hydrogen, nitric acid with ethanol, and oxalic acid
Nitrates	Combustible materials, esters, phosphorous, sodium acetate, stannous chloride, water, and zinc powder
Nitric acid (concentrated)	Acetic acid, aniline, carbon, chromic acid, flammable gases and liquids, hydrocyanic acid, hydrogen sulfide, and nitratable substances
Nitric acid	Alcohols and other oxidizable organic material, hydriodic acid (hydrogen iodide), magnesium or other metals, phosphorous, and thiophene
Nitrites	Potassium or sodium cyanide
Nitro paraffins	Inorganic alkalies
Oxalic acid	Mercury or silver
Oxygen (liquid or enriched air)	Flammable gases, liquids, or solids such as acetone, acetylene, grease, hydrogen, oils, and phosphorous
Perchloric acid	Acetic anhydride, alcohols, bismuth and its alloys, grease, oils or any organic materials, and reducing agents
Peroxides (organic)	Acids (mineral or organic)
Phosphorous	Chlorates and perchlorates, nitrates, and nitric acid
Phosphorous (red)	Oxidizing materials

Chemical	Incompatibles
Phosphorous (white)	Air (oxygen) or other oxidizing materials
Phosphorous pentoxide	Organic compounds or water
Picric Acid	Ammonia heated with oxides or salts of heavy metals and friction with oxidizing agents
Potassium	Air (moisture and/or oxygen) or water
Potassium chlorate or perchlorate	Acids or their vapors, combustible materials, especially organic solvents, phosphorous, and sulfur
Potassium permanganate	Benzaldehyde, ethylene glycol, glycerin, and sulfuric acid
Silver	Acetylene, ammonium compounds, nitric acid with ethanol, oxalic acid, and tartaric acid
Sodium amide	Air (moisture and oxygen) or water
Sodium chlorate	Acids, ammonium salts, oxidizable materials, and sulfur
Sodium hydrosulfite	Air (moisture) or combustible materials
Sodium nitrite	Ammonia compounds, ammonium nitrate, or other ammonium salts
Sodium peroxide	Acetic acid (glacial), acetic anhydride, alcohols, benzaldehyde, carbon disulfide, ethyl acetate, ethylene glycol, furfural, glycerine, methylacetate, and other oxidizable substances
Sulfur	Any oxidizing materials
Sulfuric acid	Chlorates, perchlorates, permanganates, and water

Chemical	Incompatibles
Water	Acetyl chlorides, alkaline and alkaline earth metals, their hydrides and oxides, barium peroxide, carbides, chromic acid, phosphorous oxychloride, phosphorous pentachloride, phosphorous pentoxide, sulfuric acid, and sulfur trioxide
Zinc (particularly powder)	Acids or water
Zinc chlorate	Acids or organic materials
Zirconium (particularly in powder form)	Carbon tetrachloride, other halo generated hydrocarbons, peroxides, sodium bicarbonate, and water

**61.41 - Area 1 - Solvents.** This area for solvents should be close to the floor with adequate ventilation to carry off any vapors. Store flammables only in the cabinets designed for flammable storage.

**61.42 - Area 2 - Corrosive Materials.** Corrosive materials react with other substances causing erosion and destruction of structural efficacy. Besides acids, such materials include acid anhydrides and alkalies. These materials often destroy their containers and therefore the *integrity of the container and its label must be checked often*. Acids are corrosive and produce hydrogen gas when they contact metals in the storage area. Alkalies in contact with aluminum liberate hydrogen.

Keep these materials close to, but not on, the floor. Do not store them in cabinets that contain gas pipes. Separate acids and strong bases by placing them at opposite ends of the cabinet or shelf. Also, organic acids react violently with strongly oxidizing mineral acids. Use spill trays under containers; use separate spill trays for incompatible chemicals. After using a chemical, return the container to its proper storage location.

Segregate acids away from substances that react with them or their mists to evolve heat, hydrogen, or explosive gases. Reactive materials in this category include those listed in exhibit 01.

**61.42 - Exhibit 01**

**61.43 - Area 3 - Strong Oxidizing Agents.** Oxidizing agents are solids, liquids, or gases that yield oxygen or other oxidizing gas during the course of a chemical reaction or that readily react to oxidize combustible materials. When containers of oxidizing materials are damaged and then allowed to mix with other chemicals, such as flammables, a fire or explosion may occur.

1. Common strong oxidizing agents include:

chlorates	peroxides (ethyl ether, ethylene, dichloride,
nitrates and nitrites	acetaldehyde, and many other chemicals)
nitric acid	halogens (fluorine, chlorine, bromine, iodine)
permanganates	
perchlorates	
bromates	

2. Separate the agents listed in paragraph 1 from:

combustible materials	metal powders
organic solvents	metal hydrides
(even high flashpoint)	phosphorus

Take special precautions if highly hazardous compounds are to be stored, such as fluorine, chlorine, and bromine. For example, secure small cylinders of halogen gases in a fume hood.

3. Store the following materials in a manner that prevents reaction with moisture, which creates hydrogen gas:

lithium	calcium
rubidium	cesium
sodium	alloys, amalgams and hydrides of the above
potassium	

4. Similarly, the following materials can react with moisture to produce flammable and sometimes spontaneously explosive hydrides:

nitrides	sulfides
carbides	borides
silicides	tellurides
selenides	arsenides
phosphides	

5. Certain materials react with moisture to evolve heat, including:

concentrated acids	acid anhydrides
concentrated alkalies	

6. Be careful in the storage of materials that ignite easily under normal conditions, such as:

finely divided metals	hydrides of boron
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phosphorus  
flammable gases

solvents with flash points below 20 °F (6-1/2 °C)  
sodium

Take special precautions in the storage of peroxidizable compounds. The degree of danger varies considerably with the structure of the peroxide. In some cases they may undergo an accelerating self-reaction that can be violent. Organic peroxides have combined oxidizing and combustible properties. Incompatible materials can initiate, catalyze, or accelerate the decomposition of organic peroxides. Refer to NFPA 43B for further information.

**61.44 - Area 4 - Remaining Chemicals.** Store chemicals on lipped shelves or in cabinets based on their compatibility (ex. 01, sec. 61.4). Store them within easy reach of the people using them.

**61.5 - Flammable/Combustible Liquids.** Flammable liquids are dangerous when they are in open containers, when they leak or spill, or when they are heated. The degree of danger is determined by the flash point, whether the vapor-air mixture is in an explosive range, and the possibility of a source of ignition.

Identifying the hazard class of flammable liquids is often difficult. Smell is not a reliable indication, but a strong odor is a signal that investigation is needed.

The distinction between a flammable liquid and a combustible liquid lies in the ease with which the liquid gives off flammable vapors (ex. 01). For example, gasoline, alcohol, and acetone are flammable. Lubricating, vegetable, or fish oils, and glycerin are combustible. Any combustible liquid, heated sufficiently or dispersed in a fine spray where small particles are mixed with air, becomes flammable (ex. 02).

### **61.5 - Exhibit 01**

The flammability hazard depends to a certain extent on the liquid exposed and the volume of the room or building. In a large, open room, a small quantity of flammable liquid may not produce sufficient vapors to make the atmosphere flammable except in the immediate vicinity. If the quantity is sufficient to make the entire atmosphere flammable, a further increase in quantity may not increase the hazard, but does provide more fuel for continuing fire.

Minimum flash points for fuel oils of various grades are: No. 1 and 2, 100 °F (38 °C); No. 4, 110 °F (43 °C); No. 5, 130 °F (54 °C); No. 6, 150 °F (65-1/2 °C) or higher (ex. 02). Actual flash points are commonly higher and are required to be higher by some State laws. No. 1 fuel oil is often sold as kerosene, range oil, or coal oil.

### **61.5 - Exhibit 02**

**61.51 - Special Concerns.**

**61.51a - Density.** With few exceptions (carbon disulfide is one), flammable liquids are lighter than water and can float on the water's surface. Some flammable liquids, such as acetone and alcohol, however, can dissolve in and completely mix with water.

**61.51b - Vapor Density.** Vapor density is the volume weight of pure gas compared to an equal volume weight of dry air. A figure greater than 1 indicates that a gas is heavier than air. This means that any escaped vapors settle downward onto floors and flow with air currents around corners and down stairs or shafts to pool in low spots.

If the source liquid is open and a continuous supply of vapor is flowing, a spark anywhere along the vapor trail (perhaps hundreds of feet or several floors away) can set off an explosion and a fire that may envelop an entire building almost instantly.

**61.51c - Toxicity.** Trichloroethylene, perchloroethylene, and similar nonflammable solvents are more toxic than gasoline or naphtha. Nontoxic, noncorrosive, nonflammable, nonacidic, noncaustic solvents that are biodegradable are recommended for substitution when possible (FSM 2160, 2162.2, and 2163.5).

**61.51d - Storage.** Specific standards for storing flammable/combustible liquids are in NFPA 30 and 395, 29 CFR 1910.106 and 1910.144, and ANSI Z5351-91. Refer to section 38.12 for further direction.

Do not allow sources of ignition where flammable liquids are stored or used, or where there is a possibility of leaks from piping or storage containers. One common precautionary measure is to ensure that there is no open-flame heating. Provide explosion-proof electrical wiring and equipment for hazardous (classified) locations (NFPA 70). Treat unmarked containers of liquid as flammable.

1. **Outside Above-ground Tanks.** Such tanks are used for large quantity storage. Approved tanks must be vented, protected from physical damage, and signed. Tank design, construction, and location shall be in compliance with regulations in 29 CFR 1910.106.

2. **Containers and Portable Tanks.** Generally, the quantity of flammable or combustible liquids to be stored in individual drums or other containers shall not exceed 60 gallons (227 L); individual portable tanks shall not exceed 660 gallons (2498 L). For specific requirements, refer to 29 CFR 1910.106(d).

3. **Inside Storage.** All doors must open outward from flammable/combustible liquid storage areas. Post appropriate signs inside and outside buildings and locations storing flammables. Prohibit open flames or sparks within 50 feet (15-1/2 m) of flammables. Provide positive ventilation to prevent accumulation of vapors.

Protect electric light bulbs to avoid accidental breakage. Fixtures and switches must be vapor- and spark-proof or explosion-proof where explosion hazards exist.

4. Incidental Storage or Use of Flammable/Combustible Liquids. Adequate precautions must be taken to prevent the ignition of flammable vapors. Sources of ignition include, but are not limited to, open flames; lightning; smoking; cutting and welding; electrical and mechanical sparks; spontaneous ignition, including heat producing chemical reactions; and radiant heat.

a. Store such liquids in an NFPA-approved storage cabinet and label it "Flammable - Keep Fire Away."

b. Do not store more than 60 gallons (227 L) of Class I or Class II liquids in a storage cabinet.

c. Use an NFPA-approved safety container for storing and dispensing small quantities of flammable liquids. The approved container for this purpose shall have not more than a 5-gallon capacity, shall have a spring-closing lid and a spout cover, and shall be designed so it safely relieves internal pressure when subjected to fire exposure (ex. 01, sec. 61.5).

d. Do not use a safety container that leaks when upright or leaks more than 4 drops per minute when inverted. **Do not weld or solder these containers.** Destroy defective safety containers.

e. Always place a portable fuel container on the ground prior to filling to dissipate static electricity. Bed liners create excellent insulation, preventing static electricity from bleeding off the gas can to the truck body, through the tires, and to the ground. Static is generated from the flow of gasoline through the hose, and when the nozzle is removed from the gas can, a spark can cause the vapors to ignite.

f. Do not store more than one day's supply of gasoline or other flammable liquid on equipment, unless the vehicle is a fuel supply truck that is properly placarded, labeled, and designed for that purpose.

g. Keep gasoline in warehouses with assembled fire-suppression units only if not more than one 5-gallon (19 L) can is assigned to each unit. Such storage must also conform with local laws and not exceed 25 gallons (94-1/2 L). When the fire season is over, remove gasoline cans from the units and store them in approved flammable storage buildings or cabinets.

h. Never store flammable/combustible liquids in office areas, except those required for maintenance and operation of building and equipment. Such storage must be in closed metal containers in a storage cabinet or in safety containers.

i. Store kerosene in dwellings in 2-gallon (7-1/2 L) closed safety containers. Storage shall be away from flames and sparks and in locations where the temperature is below 100 °F (38 °C).

***j. Do not store or transport flammables and radio equipment in the same truck compartment or storage building.***

Do not dispose of flammable/combustible liquids in sewer drains, storm drains, or floor drains.

k. Provide portable fire extinguisher(s), and control equipment in such quantities and types as are needed for the special hazards of operation and storage.

l. Ensure that all fire protection equipment and supplies are adequately maintained and periodically inspected and tested by a competent person to ensure they are in satisfactory operating condition and will serve their purpose in time of emergency.

m. Always maintain unobstructed aisles, stairways, passageways, and exits for movement of personnel.

n. Ensure that maintenance and operating practices are in accordance with established procedures that tend to control leakage and prevent accidental escape of flammable or combustible liquids.

#### 61.51e - Dispensing.

1. General Safety. Ensure that all handling and dispensing of flammable liquids is done in a well-ventilated area free of sources of ignition, and provide bonding between the dispensing equipment and the container being filled.

a. Use dispensing pumps approved by the Underwriters' Laboratories (UL) or Factory Mutual Liability Insurance Company of America. Pumps generally are the best means of withdrawing flammable liquids from tanks or drums because the flow can be controlled.

b. Where faucets are used on tanks or drums, provide the spring-closing type that flow only while manually held open. Blocking such faucets open is not permitted.

- c. Ground and bond gravity flow dispensing units to prevent a build up of static electricity (ex. 01).

**61.51e - Exhibit 01**

2. Cleanliness. Cleanliness is essential where combustible or flammable liquids are handled.

- a. Wipe up spilled gasoline, kerosene, or oil at once.
- b. Use sand, dry earth, or special oil-absorbent compound, not sawdust, to soak up spills. Wash off any part of the body that has been exposed to petroleum products immediately.
- c. Keep combustible waste material and residues to a minimum. Store them in covered metal receptacles, and dispose of them daily.
- d. Use nontoxic cleaners to remove oil from metal parts.
- e. Replace gas- and oil-soaked wood floors with a nonabsorbent surface, or remove old flooring from inside the building or platform.

3. Gasoline Dispensing Units and Associated Buildings.

- a. Do not dispense gasoline in enclosed buildings.
- b. Post flammable material signs on the outside of gasoline storage buildings. Prohibit all flammable material within 50 feet (15-1/2 m) of the dispensing station and buildings.
- c. When filling tanks, leave vapor above the liquid level to permit expansion with rising temperatures.
- d. Shut engines off and set the parking brake before filling fuel tanks on vehicles or equipment.
- e. Ground the delivery hose or gasoline container before contacting the hose nozzle or can spout against the container being filled.
- f. Do not fill portable containers while they are located inside the trunk, in the passenger compartment of a vehicle, or in a pickup truck with a bed liner.
- g. Do not use static-generating materials to wipe up spilled gasoline or flammables.

h. Provide gasoline dispensing units and buildings with explosion-proof wiring, switched, outlets, and lights. Ensure that electrical maintenance does not compromise explosion-proof wiring or fixtures.

i. Use dispensing hoses of the retractable type and protect them from physical damage.

#### 61.6 - Flammable Gases.

61.61 - General Safety. Flammable gases generally present hazards similar to flammable liquids. Gases that mix with air burn rapidly and explode if there is an ignition source. Refer to NFPA 58 for specific information on storage and handling (ex. 01).

##### **61.61 - Exhibit 01**

The density of a gas affects its behavior when it escapes and consequently affects its hazard. Heavier gases have a greater probability of coming in contact with sources of ignition (ex. 02).

##### **61.61 - Exhibit 02**

Some gases are odorized to assist in detecting their presence, but smell is only a rough estimator of the hazard.

#### 61.62 - Liquefied Petroleum Gas.

1. Store liquefied petroleum (LP) gas containers, including portable tanks, outside in a well-ventilated area that is protected from physical damage. Store all portable LP gas bottles upright and restrained. Never drop tanks. Install tanks in accordance with the placement shown in exhibit 01.

##### **61.62 - Exhibit 01**

2. Mount tanks on level, durable pads. Design pads with sufficient support for the weight of the tank. Each LP gas installation must be inspected and approved by a competent person.

3. Inspect tanks for corrosion and damage at the beginning of each work season. Containers showing serious dents, bulging, gouging, or excessive corrosion shall be removed from service and destroyed.

4. Use only DOT-approved tanks. Clearly label tanks and containers to identify contents and capacity. Approved tanks have specifications stamped into tank body. Use only a container furnished by a distributor for bottled gas.

5. Paint tanks only with the permission of the owner. Use heat-reflective paint.

6. Protect tanks and lines from environmental conditions, such as snow, to prevent broken connections. Install tanks on firm foundations, with nonmetallic straps for holding tanks upright and pipes in position. Where below-freezing temperatures occur, use only bottled gas that does not freeze. Protect distribution lines from freezing up.

7. Distribute gas with wrought iron or steel (black or galvanized), brass, copper, or polyethylene pipe. Pipe shall comply with applicable ASTM and ANSI standards. Piping should enter sides of buildings. Never place pipe in a crawl space or pit. Cavities formed by drifting snow have the potential of trapping gas vapors around tanks. Protect supply lines from damage. Keep weeds, brush, and other foliage away from tanks.

8. Prohibit open flames within 25 feet (7-1/2 m) of storage tanks.

9. Ensure that all gas containers are transported, stored, and secured with the safety valve protected by a ventilated cap or collar.

10. Inspect gas regulators periodically using recognized dealers and/or their maintenance personnel.

11. Tightly close the cylinder valve when the tank is not in use or when it is empty.

12. Never allow LP gas to contact skin or clothing.

**61.7 - Pesticides.** The field of pesticide use and management is extremely complex, constantly changing, and subject to many laws and regulations. Before using or disposing of any pesticide, check with the responsible Forest Service Pesticide Coordinator. The project planner, handler, user, and applicator are responsible for safety in use of pesticides.

Direction on the specific hazards encountered by exposure through handling, mixing, and application and preventive measures is in FSM 2167.12. Follow the direction in FSM 2150; chapter 40 of FSH 2109.14; and sections 22.1 and 61.32b of this Handbook to ensure proper storage, transportation, disposal, and handling of pesticides.

**61.71 - Safety Practices.** Do not use a pesticide without following the information on the label or MSDS.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, or wildlife. Avoid inhaling pesticide sprays or dusts. Do not apply

pesticides when there is danger of drift that may contaminate water or leave illegal residues. Wear PPE as identified by the MSDS, JHA, or manufacturer.

**61.71a - Storage.** Store pesticides that are flammable/combustible liquids in accordance with NFPA 30 and 395. Store pesticides that are oxidizing agents in accordance with NFPA 43A.

1. Do not store pesticide quantities exceeding 200 gallons (757 L) with other flammable materials.

2. Store all pesticides in the original labeled container. Never store unused pesticides in a food, feed, medicine, or beverage container.

3. Frequently check containers for leaks, tears, or loose lids. If containers are in poor condition, put contents in a suitable container and label properly. Protect the labels of pesticide containers so that they remain legible.

4. Always store pesticides in rooms away from food, feed, or water. Segregate and store each pesticide formulation under a sign containing the name of the formulation.

5. Never store combustible materials in direct sunlight. Excessive heat or extreme cold adversely affect some chemicals, so check the MSDS and the label for special storage requirements.

6. Store herbicides away from other pesticides or fertilizers.

**61.71b - Transportation of Pesticides.** Pesticides labeled with the signal words "Danger Poison" (skull and cross bones) or "Warning" are considered highly or moderately toxic, respectively. Transport these pesticides to and from the worksite, with any related equipment, outside the passenger-carrying portion of vehicles, such as in trailers and pickup beds.

Pesticides labeled "Caution" are considered slightly toxic and, when necessary, may be transported inside the passenger-carrying portion of vehicles.

In all transportation situations, the following apply:

1. All pesticide drums, cans, bottles, and jugs shall be securely capped and protected from breakage or spillage. Ripped or punctured bags or cardboard containers will be put into plastic bags, or otherwise contained, to prevent leakage.

2. Pesticide containers and application equipment, such as a hypo-hatchet or tree injectors, shall be stored in the vehicle in a locked, leakproof case or enclosure. Label the case or enclosure to identify the contents and potential hazard. Separate the case or enclosure from people, and securely anchor it to the vehicle to minimize

damage or spillage in the event of an accident. Pesticides shall not be transported in application equipment.

3. Original pesticide containers shall display the EPA approved label.

4. Service containers (any container used to hold, store, or transport a pesticide concentrate or diluted preparation, other than the original labeled container) shall be labeled as follows:

a. Pesticide Concentrate:

- (1) Product name.
- (2) EPA registration number.
- (3) Name and percentage of active ingredient.
- (4) Signal word(s) from registered label.

b. Diluted Preparation:

- (1) Product name preceded by the word "Diluted."
- (2) EPA registration number preceded by the words "Derived From."
- (3) Name and percent of active ingredient as diluted.
- (4) Signal word(s) from registered label.

61.71c - Disposal. When transporting or shipping pesticides or pesticide containers for the purpose of disposal (FSM 2167.12), the following apply:

1. The containers must be clearly marked "This product is for disposal only" in addition to the registered product label.

2. When the registered label is unreadable, an ingredient statement is required. When the ingredients are not known, a statement to that effect must appear on the containers.

3. Each container must bear the name, address, and telephone number of the person to be contacted in case of an accident or emergency.

4. If the container contains a highly toxic substance, a warning of the potential hazard (such as a skull and crossbones label) shall be prominently displayed in red.

Some States may have unique requirements regarding the transportation of pesticides for disposal. Contact lead State agencies before transporting the material.

**61.8 - Asbestos.** Asbestos is used in the manufacture of heat-resistant clothing, automotive brake and clutch linings, and a variety of building materials. Exposure occurs when the asbestos containing material is abraded or otherwise disturbed.

Forest Service employees may be exposed to asbestos when working with brake drums in motor vehicle repair shops (sec. 39.74a) or when working in buildings with asbestos insulation or pipe coverings. Activities involving friable asbestos-containing materials shall be performed by individuals accredited through the Environmental Protection Agency's (EPA) Asbestos Model Accreditation Plan (MAP) or an EPA-approved State accredited training program. The accreditation and training requirements are applicable to all Forest Service employees, volunteers, SCSEP personnel, and contractors. Forest Service employees shall not remove friable asbestos products (FSM 6743.2).

No employee shall be exposed to asbestos above the permissible exposure limits (PELs).

#### **61.81 - Procedures.**

1. Before beginning remodeling work on facilities, a competent person shall check for the presence of asbestos containing materials.
  - a. If asbestos exposure is suspected, take air samples to determine the extent of contamination, if any.
  - b. If air samples identify asbestos in the air, notify and provide protection for workers. Engineering controls that remove or enclose the asbestos are the best methods. Administrative controls, such as decreasing or eliminating employee exposure by moving employees or changing work schedules, are acceptable.
2. Refer to 29 CFR 1910.1001 and 29 CFR 1926.58 for specific requirements related to exposure monitoring; regulated areas; methods of compliance; respiratory protection; protective work clothing and equipment; hygiene facilities and practices; communications of hazards to employees (training); housekeeping; and medical surveillance, record keeping, and observation of monitoring.

**61.9 - Lead.** Employees occupationally exposed to lead during construction work projects and activities shall comply with the requirements in 29 CFR 1926.62. Refer to FSM 2167.17 and 29 CFR 1910.1025 for additional direction and requirements.

**62 - EXPLOSIVES AND BLASTING AGENTS.** All Forest Service employees who work with, monitor work, or inspect work involving explosives and blasting agents must be trained to recognize unsafe work practices and to ensure the safety of the public, Government employees, property, and natural resources.

All work with explosives and blasting agents shall be under the direct supervision of a qualified blaster, who by virtue of certification and experience, shall be designated the blaster-in-charge.

All work shall comply with Federal, State, and local laws in accordance with FSM 6745 and the "Guide for Using, Storing, and Transporting Explosives and Blasting Materials" (sec. 62.06).

Only those explosives and blasting agents approved by the Washington Office, Human Resources Management Staff, Branch Chief for Safety and Health shall be permitted for use on Forest Service land.

**62.01 - Authority.** The requirements and constraints for the use of explosives and avalanche ammunition are in:

1. Title 27, Code of Federal Regulations (27 CFR) Part 55, Storage.
2. 29 CFR 1910.109, Explosives and blasting agents; and Part 1926, Subpart U, Blasting and the use of explosives.
3. 30 CFR Parts 56 and 57, Subpart E, Explosives.
4. 33 CFR Parts 125 and 126, Identification credential for persons requiring access to waterfront facilities or vessels and handling of Class I (explosive) materials or other dangerous cargoes within or contiguous to waterfront facilities.
5. 49 CFR Parts 100-177 and 300-399, The authority for transportation of explosives and hazardous materials.
6. FSM 6745, Explosives and Blasting Agents.

**62.06 - Reference.** U.S. Department of Agriculture, Forest Service. Guide for Using, Storing, and Transporting Explosives and Blasting Materials. 9271-2815. Missoula, Montana: Missoula Technology and Development Center, Forest Service.

**62.1 - Personnel Qualifications.** Storing, transporting, and using explosives and blasting agents is complex and requires specialized training. Employees engaged in these activities should consult their local Blaster/Examiner for specific regulations and direction on qualifications.

**61.15a - Exhibit 01**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.15a - Exhibit 02**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.22 - Exhibit 01**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.22 - Exhibit 02**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.22 - Exhibit 03**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.25 - Exhibit 01**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.26 - Exhibit 01**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.42 - Exhibit 01**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.5 - Exhibit 01**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.5 - Exhibit 02**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.51e - Exhibit 01**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.61 - Exhibit 01**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.61 - Exhibit 02**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**

**61.62 - Exhibit 01**

**EXHIBITS ARE IN A SEPARATE DOCUMENT.**