

## Chapter III HM Storage

### A. INTRODUCTION.

1. DRMS will accept physical custody of hazardous materials (HM) from generating activities in accordance with DoD 4160.21-M, Chapter 10, DRMS-I 6050.1, Chapter II, Enclosure 5, and DLAI 4145.11. HM will be stored in facilities with adequate measures to ensure personnel safety, accident prevention, and detection of potential environmental damage. In addition, a storage facility for hazardous materials (chemicals) must be managed in compliance with 29 CFR and DLAI 4145.11.

2. Storage of HM on-site must be approved by the host installation.

### B. REPACKAGING/INSPECTIONS/VENTING.

1. The DRMO is responsible for any required repackaging or handling of hazardous material after acceptance of physical custody from the generating activity. This will normally be accomplished under the ISA with the host installation.

2. When inspections of HM storage facilities reveal severely dented, rusting, or bulging containers, their condition should be noted on the inspection log. The DRMO Chief or designee will contact the host spill team to overpack/repack/vent to prevent spillage or explosion (DRMS-H 6055.1, Chapter 1, Paragraph 10).

3. **DRMO PERSONNEL ARE NOT AUTHORIZED OR WILL NOT OPEN CONTAINERS UNDER ANY CONDITION**, e.g., inspection, venting, analysis, etc. DRMO personnel will not vent drums unless the DRMO

employee is participating as a trained member of the host spill team.

### C. CONTAINER MANAGEMENT.

1. Containers must be in good condition and closed during storage.

2. Containers will not be handled in a manner that could cause the container to rupture or leak, e.g., rough and careless handling by a forklift.

3. Storage areas must be inspected weekly to detect leaking or deteriorating containers. Contact the host spill team to overpack leaking or deteriorating containers.

4. Containers of HM should be stored on pallets as much as possible.

5. Containers must not obstruct an exit.

6. No container should be stored closer than 36 inches to the nearest beam, chord, girder or other roof member in a warehouse. All warehouses must be equipped with fire protection.

7. Tools must be non-sparking.

8. An emergency eyewash must be located within 10 seconds or 100 feet of travel of any stored hazardous materials. Fixed eyewashes **must** be flushed at least 3 minutes per week and logged to indicate flushing. Only a portable eyewash meeting the flow requirements of .4 gallon/minute for 15 minutes is approved.

9. Other management practices the DRMO must observe include:

a. Rigid containers must be stored in an upright position and off the ground or floor in an orderly way so as to permit ready access and inspection.

b. Inspect the storage area daily if loading/unloading is being performed.

c. Hazardous materials transferred by DRMS employees must be packaged to prevent tipping and spilling. Shrink-wrapped is recommended.

#### **D. COMPATIBLE STORAGE.**

1. The key to proper storage of HM and HW is knowing the exact chemical(s) received, the amount, and compatible storage location. This knowledge reduces risk of incompatible storage and allows the facility operator to remain within all regulatory requirements. DLAI 4145.11 requires that the storage of flammable, reactive or incompatible materials must be handled so that they do not threaten human health or the environment. Some of the dangers of mixing incompatible materials include:

- a. Generation of extreme heat.
- b. Fire.
- c. Explosion.
- d. Generation of toxic gases.

2. Manage incompatible HMs by keeping them separated by a dike, berm, wall, etc. Separation by distance is acceptable for receipt and staging.

3. HM will be separated into basic storage compatibility groups. Other references for determining compatibility of chemicals include:

- a. DLAI 4145.11.

b. Appendix V of 40 CFR Part 264, Examples of Potentially Incompatible Waste.

c. NIOSH Pocket Guide to Chemical Hazards.

d. NFPA Fire Protection Guide on Hazardous Materials.

e. 29 CFR 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

f. Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment, American Conference of Governmental Industrial Hygienists (ACGIH) (latest Edition).

g. National Toxicology Program (NTP), Annual Report on Carcinogens (latest Edition).

h. International Agency for Research on Cancer (IARC) Monographs (latest edition).

4. As HM is received, it may be stored with HW and should be screened against HM/HW that is presently being stored in the conforming storage area. Use the basic storage compatibility groups.

#### **E. STORAGE OF HM WITH HW.**

1. Similar compatible hazardous classes of HM and HW can be stored in the same storage facility and must be handled in compliance with OSHA, RCRA, and DRMS-H 6055.1, Safety and Occupational Health. For all hazardous chemicals listed on the HM inventory, a valid Material Safety Data Sheet (MSDS) must be readily available. The MSDS for each hazardous material must match the specific manufacturer on the label of the container as well as on the hazardous material inventory.

2. RCRA and state regulated hazardous waste will receive priority for storage space. If required

by regulators, RCRA permits should specify or be modified to show that simultaneous storage of HM is permitted. Where state law forbids the mixed storage of HM, separate facilities will be used.

## F. LABELING REQUIREMENTS.

1. **DOT Label.** Is required on the outside of any hazardous material transported over the highway or waterway, either to or from the DRMO. The requirements are in accordance with the 49 CFR, which should be consulted prior to transport.

2. **OSHA Chemical Warning Label.** Allows the end user to determine the handling hazards of all the chemicals within the vessel or container. It can not be used as a shipping label, satisfy the turn in requirements of DoD 4160.21-M, Chapter 10, or as the proper identification on the DD Form 1348-1/1A or automated format.

a. The following are minimum requirements of the OSHA Chemical Warning Label:

- The identity of the chemical. This could either be the chemical name or the common name of the chemical.
- The appropriate hazard warnings. The manufacturer determines these warnings. Examples are “**HARMFUL IF INHALED, MAY CAUSE CANCER**”, etc.
- Name of the manufacturer, importer, or responsible party.
- The target organs that are effected by being exposed to the chemical or compound. An example is “**May cause lung cancer**”.

b. This above information must be affixed to each can, jar, box, etc., stored inside the shipping vessel or container, even if the container has

like products. The can, jar, or box holding the hazardous material must have the OSHA Chemical Warning Label attached and not the outside packing vessel. Examples are as follows:

- A cardboard 5-gallon drum. This type of drums usually contains a liner and holds the material in bulk form. An OSHA Chemical Warning Label is required on the outside of this container. A DOT label is required if it is to be transported over the highway.
- A 55-gallon drum of rust solvent. The drum serves as the outer container for the liquid. An OSHA Chemical Warning Label is required on the outside of this drum. A DOT label is required if it is to be transported over the highway.
- A 5-gallon pail of engine degreaser. The drum serves as the outer container for the liquid. An OSHA chemical warning label is required on the outside of this drum. A DOT label is required if it is to be transported over the highway.

## G. WAREHOUSING.

The goal of material handling practices is to prevent accidents, spills to the environment, and damage to other material. Warehouse workers must be sensitive to the fact that damage to a pallet or outer container will often result in a spill, accident, or damage to the material at a later time. MHE operators should be trained to:

- Know what specific hazardous chemical (HM) they are going to be handling.
- Avoid handling incompatible materials at the same time.
- Select the proper piece of equipment to move specific items.
- Safely operate MHE.
- Report any spills.

- Use proper PPE.

1. **Storage location.** Stock location systems must pinpoint an exact storage location in a simple, easily understood manner. Suitable location markings must be clearly displayed. Procedures must be established to ensure positive control of all additions, deletions, and changes to the stock locator file. Stock locator systems will be periodically validated to ensure accuracy. (See DRMS-I 4160.14, Chapter IV). Storage locations will be marked with storage placards (see Enclosure 7 for a sample).

2. **Location Charts.** DRMOs will follow requirements for planographs and location charts as required by the host installation.

3. **Flammable Storage.** NFPA Standard 30 - Flammable and Combustible Code has standards for the storage of flammable and combustible liquids in containers not exceeding 60 gallons. The principal hazard of storing closed containers is the rupture of the containers resulting from increased internal pressure when exposed to a heat source.

a. Flammable storage areas should be detached from general-purpose storage, or must be modified to make them acceptable.

b. Outdoor storage of flammable liquids in metal drums is not recommended.

c. Flammable storage areas within general storage facilities must be in accordance with DLAI 4145.11.

d. Aerosols should be stored separately from flammables and a barrier must separate them to prevent the aerosols from becoming self-propelled or a heat source. This can be accomplished with wire mesh, metal, etc.

e. The storage limitations of containers of flammable/combustible liquids should comply with the specifications in Enclosure 1.

f. Empty or idle combustible pallet storage should be limited to a pile size of 2,500 square feet and to a maximum height of 6 feet. Idle pallet storage should be separated from liquids by at least 8 feet.

g. Inside storage rooms for flammable and combustible HM/HW must have either a gravity or continuous mechanical ventilation system capable of providing six-air changes per hour.

h. A DY, EX or EE rated forklift must be used for flammable materials and waste. The use of other types of forklifts must be approved in writing by the host installation and DRMS safety office.

4. **Cylinder Storage.** Cylinders may contain poisonous, flammable, corrosive, reactive, oxidizing, or other hazardous materials. They may contain hazardous and non-hazardous gases, under moderate or extremely high pressures. Cylinder storage/storage facilities, handling, and disposal are in accordance with DLAR 4145.25.

a. Storage facilities for compressed gases should be separated from other buildings by at least 50 feet (see DLAI 4145.11).

b. **Outside storage.**

(1) Cylinders must be stored in secured areas that will protect the cylinder from physical damage and tampering by unauthorized personnel.

(2) The area must be covered with a fixed non-combustible canopy to protect the cylinders from inclement weather and direct sunlight.

(3) Location should be within a crosswind or downwind of any residential or industrial buildings.

(4) Storage areas shall be kept free of all weeds, flammable and incompatible materials.

c. Compressed gas cylinders shall be palletized or stored standing in valve end upright position, grouped tightly together, in an approved storage area where they are unlikely to be knocked over.

d. Cylinders without valves, must be stored horizontally, crated, or palletized and strapped securely.

e. Acetylene and oxygen cylinders must always be used in a valve up position.

5. **Organic Peroxides.** (See DLAI 4145.11, for further guidance).

a. Storage areas within general storage facilities modified for organic peroxides should include the protective features for those described in DLAI 4145.11.

b. Storage areas should be conspicuously identified by the words **“ORGANIC PEROXIDE”**, and by class, if more than one class.

c. Packages requiring temperature control should be marked with the manufacturer’s recommended temperature range, and placed in a storage area capable of providing that recommended temperature range.

d. Proper aisle space must be maintained, 4-foot aisles, and 10-foot MHE aisles.

e. Open or unsealed packages of peroxides are not permitted.

f. 55-gallon drums must never be stored more than one high.

g. The quantity of organic peroxide formulations and pile height/width stored must never exceed the maximum allowable quantities as stated in NFPA 43B, Table 2-11.

6. **Reactive Materials.** The risk of fire, water reaction, and toxic gas emission are the principal hazards associated with the storage of water reactive hazardous materials.

a. Water reactive materials cannot be stored in the same area with flammable and combustible liquids.

b. A modified general-purpose warehouse storage area should be used for the storage of reactive hazardous materials.

c. Storage areas should be conspicuously posted with signs or notices indicating **“DANGEROUS IF NOT KEPT DRY - KEEP WATER AND FLAMES AWAY”**, or equivalent warning.

d. Reactive materials are to be palletized and stored off the ground on pallet racks, where ever possible.

e. Water reactive materials and pyrophorics should not be stored in a facility equipped with active overhead water sprinkler systems.

f. The storage area should be isolated by a waterproof or water-resistant barrier (e.g., plastic sheeting or tarpaulin) to protect the materials from water in the event the sprinkler system is activated elsewhere in the facility.

g. The area should be marked or posted to indicate the material being stored.

h. Access to the storage area must be restricted.

i. See 29 CFR 1910, and ANSI/NFPA Standard 101, Life Safety Codes.

7. **Poison Materials.** The release of hazardous materials may adversely affect the environment and/or cause personnel injury through inhalation, skin absorption, or ingestion. Materials stored in this area are likely to be assigned multiple hazards.

a. The area should be marked or posted to indicate the material being stored.

b. The manufacturer recommendations regarding the temperature range required to maintain the effectiveness of pesticides should be considered when determining the suitability of a poison storage area for pesticides. There should be a means to verify airflow such as a manometer or suspended airstrips.

c. Poisons should be stored in a secure area to prevent unauthorized entry.

d. Water sprinkler runoff must be contained to minimize the threat to personnel.

e. Pallet racks are to be used. Direct contact with the floor is prohibited.

f. Classes should be separated when placed in racks.

## H. OSHA CARCINOGEN REQUIREMENTS

### 1. Special Reporting Requirements for Carcinogens when Released or Spilled.

a. When storing any carcinogens listed in Enclosure 2, their MSDS must be reviewed to identify any that require additional OSHA compliance. Carcinogens will require storage in a designated, secure storage location and the appropriate employees must be trained on the hazards associated with the carcinogen.

b. For any spill or release involving carcinogens listed in Enclosure 2, 3 or 4, the exhaust air must not be discharged into any other area of

the storage facility. The ventilation system must be capable of being independently controlled to prevent the migration of vapors from the area. Carcinogens that require controlled ventilation can be determined by reviewing the MSDS, or by reviewing the OSHA standard.

### 2. Labeling of Carcinogenic, Toxic and Hazardous Chemicals.

a. Some containers containing toxic and hazardous substances listed in 29 CFR 1910.1001 to 1910.1050 must have a specific label. Most require a standard “**CANCER-SUSPECT AGENT**” labels and some require an additional label (see Enclosure 5).

**NOTE:** The Hazardous Chemical Warning Label (DD Form 2521 or 2522) will sometimes not contain this information.

b. Carcinogen Labels. Must be a minimum of two (2) inches in height, not be less than 1/2 the size of the largest lettering on the container and not less than 8 point type. There is no special color requirement. The label must appear immediately underneath or adjacent to the contents identification. This can be accomplished by stenciling, paint pen, or any other permanent marker. See Enclosure 5 for the type of label or marker needed.

c. Carcinogen Storage. Before storing any hazardous material the MSDS for that material must be checked to ensure it does not contain one of the listed toxic and hazardous substances. If it does contain one or more of the substances then the container must be properly labeled. The generating activity must ensure proper labeling, before taking accountability.

d. Carcinogen Storage Area. In some cases the facility used to store these substances must also have a specific sign. These signs are provided in Enclosure 6.