ARMY TM 38-410
NAVY NAVSUP PUB 573
AIR FORCE AFR 69-9
MARINE CORPS MCO 4450-12
DEFENSE LOGISTICS AGENCY DLAM 4145.11

DEPARTMENTS OF THE ARMY, THE NAVY, THE AIR FORCE, AND THE

DEFENSE SUPPLY AGENCY

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ARMY TECHNICAL MANUAL 38-410	**HEADQUARTERS**
NAVY PUBLICATION NAVSUP PUB 573	**DEPARTMENT OF THE ARMY,**
AIR FORCE REGULATION 69-9	**THE NAVY, THE AIR FORCE,**
MARINE CORPS ORDER 4450-12	**THE MARINE CORPS, AND THE**
DEFENSE LOGISTICS AGENCY MANUAL 4145.11	**DEFENSE LOGISTICS AGENCY**
	Washington, DC, 29 May 1992

STORAGE AND HANDLING OF HAZARDOUS MATERIALS

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures let us know Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blanks Forms) directly to Director, U.S.Army Materiel Command Packaging, Storage, and Containerization Center, ATTN: SDSTO-TT, Tobyhanna, PA 18466-5097. A reply

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CHAPTER

GENERAL

Section I. Purpose, Applicability, and Policy

1-1. Purpose and Applicability

a. The purpose of this manual is to establish uniform policies, procedures, and responsibilities for the receipt, storage, and handling of hazardous materials and wastes and, in turn, for the abatement and control of environmental pollution emanating from DOD operations. This manual incorporates current requirements of Executive Orders, Federal laws, and DOD regulations.

b. The provisions of this manual are applicable to all installations under the command and control of the Secretary of Defense.

c. This document may be supplemented at the installation level by written local directives. The most current revision of the publications found in appendix A, section I, must be available to the installation supply manager

and shall be used in conjunction with this manual.

d. Hazardous materials storage is provided in TM 38-410/DLAM 4145.11/ NAVSUP PUB 573/AFR 69-9/MCO P4450.12, Storage and Handling of Hazardous Materials. Storage space management policies and procedures are provided in TM 38-420/DLAM 4145.11/NAVSUP PUB 574/AFR 69-9/MCO P4450.12, Storage Space Management.

1-2. Policy

a. In taking an active and leading role in the protection and enhancement of the environment, DOD policy is to:

(1) Control environmental pollution from the operation of installations, equipment, vehicles, and other property.

(2) Demonstrate leadership in pollution abatement, and cooperate in abatement programs with local communities.

(3) Make the maximum effort to incorporate environmental pollution and spill prevention measures into military property, tests, exercises, and projects for rehabilitation or modification of existing structures and new construction.

(4) Promote and encourage industry adherence to the spirit and intent of national and DOD environmental objectives.

(5) Comply with the best management practices for the safe distribution, storage, use, handling, and transportation of hazardous materials and wastes.

b. With regard to the Emergency Planning and Community Right-to-Know Act of 1986, established under Title III of the Superfund Amendments and Reauthorization Act (PL 99-499 (SARA)), DOD policy is as follows:

(1) Defense installations will establish Emergency Planning Programs that, to the extent practicable, are comparable to community programs established under Title III. Tenants will cooperate with the host's Emergency Planning and Community Right-to-Know Program.

(2) Installations are not required to report and follow certain procedural requirements established under Title III of SARA. This means that inventories, lists of materials, and annual reports need not be submitted to states or local communities; however, voluntary cooperation with local authorities is suggested.

(3) Installations will appoint representatives to Local Emergency Planning Committees, where appropriate.

(4) Installations will immediately notify Local Emergency Planning Committees in the event of an installation release that might result in exposure of persons outside the installation boundary.

(5) Installations may enter into cooperative agreements with local fire departments and hazardous materials spill response agencies.

c. Installations will establish and maintain hazard communication programs to prevent occupational illness and injury by ensuring that all DOD employees are apprised of chemical hazards in the workplace and are adequately protected. The DOD Federal Hazard Communication Training Program will be used to train employees.

d. Storage and material handling policies, procedures, and methods will be uniform to the maximum practicable extent. Policies, procedures, and methods indicated herein by directive words such as "will," "shall," or "must" are mandatory; words such as "may" or "should" indicate that the procedures and methods described are recommended.

e. When necessary, DOD components may authorize temporary deviations to this manual when compliance with mandatory provisions is temporarily impracticable or the deviation is required as an emergency measure. Temporary deviations

including any extensions will not exceed 90 days. DOD components may authorize interim deviations from the mandatory provisions if the deviations will not violate environmental protection laws or regulations.

f. Local unions will be advised of the types of hazardous materials being handled at the installation. Upon request by the exclusive representative, appropriate negotiations will be conducted. Advice of any authorized deviation which may extend beyond 90 days will be forwarded to the Department of Army,

ATTN: DALO-SMP, Washington, DC 20310, within 15 days of the date of authorization, for a coordinated determination as to whether it should be (a) incorporated into the regulation, (b) continued as an authorized deviation, (c) withdraw, or (d) referred to the Assistant Secretary of Defense (Production and Logistics) (ASD (P&L)) for approval.

1-3. Organization and Use

a. Organization. This publication is organized by major subjects (chapters) and functions (sections). A table of contents reflects the scope of subject included.

b. Table of Contents. The organization of this manual makes it easy to determine the general location of desired information by referring to the table of contents.

c. Paragraph Numbering System.

(1) The chapter, section, and paragraph numbering system identifies the appropriate chapter followed by the applicable section and paragraph numbers within the chapter. Subparagraphs are identified by lowercase letters followed by numbers and lowercase letters in parentheses.

(2) Example.

Chapter: Chapter 1

Section: I.

Paragraph: 1-1

Subparagraphs: a(1)(c)

d. Illustrations. The purpose of the illustrations is to show, by means of photographs, charts, or filled-in forms, the principles and procedures explained in the text. The illustrations do not necessarily show current names, dates, and figures, but are included to clarify the principles outlined in the written instructions.

e. Processing Changes.

(1) Any organization or user of the manual can recommend changes by submitting directly to Director, AMC Packaging, Storage, and Containerization Center, ATTN: SDSTO-TT, Tobyhanna, PA 18466-5097.

(2) PSCC will place the proposed change on a meeting agenda. Meetings will be called periodically by PSCC to consider changes and other hazardous

material matters. Meetings will be chaired by a representative from PSCC. Members of the Hazardous Material Work Group will come from the material commands of the services and Defense Logistics Agency (DLA). Representatives of service headquarters and Office of the Assistant Secretary of Defense (Production and Logistics) (OASD (P&L)) may attend if they desire.

(3) Proposed changes to the manual, which are developed by the Work Group, will be coordinated with the appropriate service material headquarters and DLA. Objections to the case will be forwarded directly by PSCC to OASD for resolution. Copies of the correspondence will be provided to the headquarters of the services concerned and DLA.

Section II. Hazardous Materials Information System

1-4. Title 29, Code of Federal Regulations (CFR), part 1910.1200, Hazard Communication, requires that chemical manufacturers or importers assess the hazards of chemicals they produce or import and provide this information in the form of Material Safety Data Sheets (MSDSs), labeled products, and other forms of warning. The Federal Government has implemented this requirement through the use of contractual obligations to its suppliers. With respect to MSDSs, the method used by DOD to comply with this rule is defined in DODI 6050.5, DOD Hazard Communication Program.

1-5. The DOD Hazardous Materials Information System (HMIS) was implemented as an automated database of hazardous materials information, primarily on MSDSs. Information on hazard warning labels, transportation, and disposal has been added to supplement the database. The system provides a means of distributing MSDSs on demand without requiring the shipment of hard copies with the products. Also, it provides a means of delivering other hazardous materials information (e.g., hazard warning labels) to the workplace. Upon request, the DOD HMIS is distributed quarterly via microfiche publication, Compact Disc-Read Only Memory (CD-ROM), and magnetic tape to personnel who handle, store, ship, use, and dispose of hazardous materials as part of their job.

1-6. In addition, the DOD HMIS provides a mechanism for identifying hazardous materials through

the assignment and use of the Hazard Characteristic Code (HCC), (app B). The service/agency focal points can assign an HCC to each specific item (i.e., national stock number (NSN), Commercial and Government Entity (CAGE), and part number) when an MSDS is acquired with its purchase. However, an MSDS is not always required for items regulated by transportation, environmental protection, and other rules. An HCC can be assigned for any item the service/agency desires to manage as a hazardous item. When the assigned HCC is entered into the HMIS, it then becomes available for use in the workplace such as storage segregation (app C).

1-7. To ensure that MSDS information is properly acquired for input to the HMIS, specific procedures must be followed. For centrally-managed items, procurement inserts a contract clause which requires the contractor to submit

an MSDS to the contracting officer. The MSDS is then forwarded from the procuring office to the service/agency focal point for review. The focal point representative is responsible for reviewing the MSDSs for technical accuracy, consistency, and reasonableness, and for submission to DLA for entry into the system. In the case of locally-purchased items, MSDSs and warning labels must be contractually-required and obtained through the efforts of the purchasing or contracting offices of the activity doing the purchase. In turn, the MSDSs should be forwarded to the appropriate service/agency focal point. If an MSDS is not received with the shipment of a locally-purchased chemical, the contracting official should follow up with the supplier to obtain a satisfactory MSDS.

1-8. The DOD HMIS database is a useful system for maintaining technical information on hazardous materials; and to the extent possible, operational ADP systems should utilize this data to enhance their daily operational processing of hazardous materials.

CHAPTER 2

IDENTIFICATION OF HAZARDOUS MATERIALS

Section I. Purpose and Applicability

2-1. This chapter establishes uniform procedures for the identification of HM received, stored, and handled by installations, with the exception of bulk petroleum. Guidance applicable to bulk petroleum storage and handling is set forth in MIL-HDBK-201, Petroleum Operations.

2-2. The provisions of this chapter are applicable to all personnel whose duties involve the identification of HM.

Section II. Background

2-3. Many commodities received, stored, and issued by installations possess unique characteristics requiring specialized care and handling. Warehouse personnel have long been familiar with the specialized handling requirements associated with pilferable, sensitive, classified, perishable, or fragile commodities. No other single group of commodities, however, requires the degree of specialized handling mandated by public law and regulation as the group broadly described as HM. Failure to properly identify, store, and handle such material poses serious health risks for personnel. It can also result in death, injury, or long-term chronic physical disability of personnel, and property or environmental damage. It is imperative that the hazards associated with the storage and handling of these commodities be understood by all personnel required to physically handle them. No single functional area can be considered exempt from potential risks. For example, mixing the contents of a 6-ounce jar of calcium hypochlorite with the contents of a 1-pound bottle of methyl ethyl ketone peroxide on the packaging line will result in an explosion and serious fire.

2-4. A prerequisite to safe and effective storage and handling of HM is the accurate identification and proper classification of such materials. Federal, State, and local laws and ordinances exist compelling manufacturers and distributors to communicate the physical hazards of commodities. These communications are in the form of placards, labels, MSDS, product fact literature, warning statements, and other methods of identification. The procedures outlined in this manual are based upon the more simplified methods of identification and classification as published in various public laws and regulations. It must be emphasized, however, that use of simplified identification methods in no way relieve individual responsibility for displaying full awareness of known and potential hazards. At the same time, personnel will, unless otherwise specified, be responsible for full compliance with the mandatory procedures outlined in this manual.

Section III. Federal Regulatory Requirements

2-5. Few public laws have had as great an impact on routine DOD operations as those dealing with environmental protection. These laws have been assigned the highest national priority and have been adopted as policy. Implementation and compliance have necessitated major changes in nearly every functional area of operations. The following are briefly summarized for information and to indicate affected areas of operation:

a. Transportation, Title 49 CFR. The U.S. DOT, under HMTA, Public Law 93-633, 18 United States Code 1811, sets forth the primary requirements for marking, labeling, placarding, packaging, and documenting HM in the transportation system. Within Title 49, CFR is authority for the use of international regulatory systems based on the recommendations of the U.N. Committee of Experts on the TDG, the IMDG Code, and the ICAO TIs. These HM communication systems provide the first indication that material being received will require special storage and handling.

b. Protection of the Environment, Title 40 CFR. The most significant acts under Title 40 CFR relating to the identification of HM are--

(1) The RCRA of 1976 defines hazardous wastes and provides definitions for characteristic wastes that are ignitable, corrosive, reactive, and extraction-process toxic. Also contained in the act is the requirement for a Federal Uniform Hazardous Waste Manifest.

(2) The CERCLA of 1980, as amended by the SARA of 1986, defines and requires activities to be aware of hazardous substances and their corresponding RQs. It requires shippers to annotate shipping papers and mark packages containing a reportable quantity of a hazardous substance. Additionally, the law requires that defense installations promptly report to the National Response Center any spill of a hazardous substance equal to or greater than the reportable quantity.

(3) The TSCA of 1976 prescribes identification, storage, handling, and labeling requirements for PCBs.

(4) The FIFRA of 1972 is the only Federal law governing the identification, marking, packaging, labeling, and hazard statements of ready-to-use containers of pesticides stored by activities.

c. Occupational Safety and Health Act, Title 29 CFR. This regulation

prescribes definitions of HM and label requirements that may not be completely satisfied (even though activities are in compliance with DOT and EPA regulations). Part 1910.1200, Hazard Communication, and part 1910.120, CEPP requirements are contained in this regulation.

d. Public Health, Title 42 CFR. This regulation contains the requirements for identification and labeling of etiological agents/biomedical materials (infectious substances).

*e. Energy, Title 10 CFR. T*his regulation contains the NRC requirements for radioactive material use, possession, storage, marking, posting, transport, and disposal.

Section IV. Hazardous Materials Identification Indicators

2-6. This section outlines the key information affixed to packages or conveyances, accompanying shipments, or obtained from files and other sources indicating that HM is present. These HM identification indicators are: placards, shipping papers, shipping labels, markings, etc.

a. Placards. Placarding requirements and prohibitions are found in Title 49 CFR, part 172, subpart F. Placards may be either domestic (NA) or international (UN). The placard provides the first indication of the presence of HM in a transport vehicle. Placards are required to be affixed to vehicles, freight containers, portable or cargo tanks (tank trucks), and rail tank cars. Placards, when required, must be visible from the front, rear, and both sides of the vehicle or container, as shown in figure 2-1. Placards may contain descriptive terms or identification numbers.

PROGRAMMING DOCUMENTATION
STANDARDS AND SPECIFICATIONS

MARINE CORPS INTEGRATED MAINTENANCE MANAGEMENT SYSTEM
AUTOMATED INFORMATION SYSTEM
HEADQUARTERS MAINTENANCE SUBSYSTEM
(MIMMS AIS/HMSS)

USMC DOCUMENT NO.
4790 UM-02

USERS MANUAL
(HQMC)

UNITED STATES MARINE CORPS

(1) Placards with descriptive terms are usually found on transport vehicles or freight containers. Their purpose is to indicate the hazard class of HM (e.g., flammable), the actual name of the HM e.g., gasoline), or that several types of HM in different hazard classes are being transported (e.g., dangerous).

(2) Placard identification numbers communicate the four-digit UN or NA numbers assigned to identify either specific single items of HM or groups of HM. The identification number 1203, for example, covering only a single item of HM, indicates that item to be gasoline, a flammable for transportation

purposes. Identification number 1602, Dyes, n.o.s., includes both liquid and solid

forms, both of which are poisonous. When required by Title 49 CFR, placards with identification numbers or placards with words accompanied by orange panels with identification numbers will be displayed on portable or cargo tanks and tank cars. Figure 2-2 represents a typical display of the location of identification numbers and classes on placards and orange panels used on transport units.

HEADQUARTERS
UNITED STATES MARINE CORPS

PROGRAMMING DOCUMENTATION
STANDARDS AND SPECIFICATIONS

MARINE CORPS INTEGRATED MAINTENANCE MANAGEMENT SYSTEM
AUTOMATED INFORMATION SYSTEM
HEADQUARTERS MAINTENANCE SUBSYSTEM
(MIMMS AIS/HMSS)

USERS MANUAL
(HQMC)

[illegible] AUGUST 1977

USMC DOCUMENT NO.
4790
UM-02

PREPARED FOR
HEADQUARTERS MARINE CORPS

PREPARED BY
COMMANDANT OF THE MARINE CORPS (LPS-4)

(3) The absence of a placard does not necessarily mean that the vehicle does not contain HM. A placard is not required, for example, when a vehicle or container contains less than 1,000 pounds of HM (except Division 1.1 and 1.2 Explosives, Poison Gas, Dangerous When Wet Material, Poison Inhalation Hazard, or Radioactive Yellow III items, which always require a placard).

(4) Except for those items shown in parentheses in subparagraph 2-6a(3) above, a transport vehicle or freight container containing two or more classes of material requiring different placards and weighing more than 1,000 but less than 5,000 pounds may be placarded "Dangerous" in place of the separate placarding required by table 2 of Title 49 CFR.

b. Shipping Paper Indicators. When the transport vehicle or freight container is not placarded, the second indicator available to personnel is the DOT shipping paper.

(1) Title 49 CFR prescribes the requirement for preparing shipping papers for HM. Each person who offers HM for transportation is required to describe the material in a specific way on the shipping papers. When a description of HM is required to be included on shipping papers (referred to as the "shipping description"), that description must conform to the specific wording in Title 49 CFR. HM will be described on shipping papers by one of three methods:

(a) HM is entered in a color that clearly contrasts with any nonhazardous material entry on the shipping paper. However, when shipping papers are reproduced, the description may be highlighted rather than shown in a contrasting color.

(b) HM is entered first on the shipping papers.

(c) HM is identified by an "X" before the proper shipping name in a column captioned "HM." (The "X" may be replaced by "RQ" if appropriate.)

(2) Shipping papers for HM received will be in commercial format, international air or water format, or Government format.

(3) Commercial shipping papers for road and rail will accompany the largest number of HM shipments received. An example of a commercial HM shipping paper is illustrated in figure 2-3.

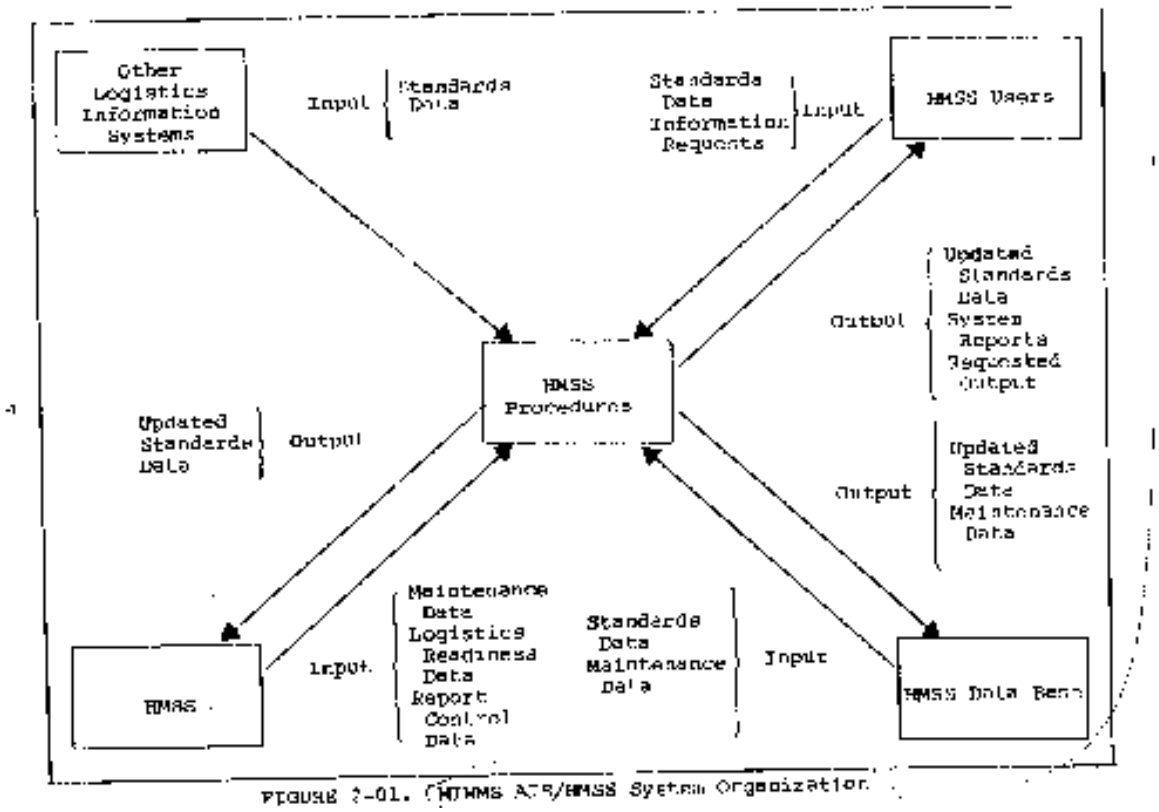


FIGURE 2-01. CHTHMS ACS/HMSS System Organization

(4) As prescribed by Title 49 CFR, the description of HM on the shipping papers must include several basic elements such as the following:

(a) Proper shipping description prescribed for the material, including the proper shipping name.

(b) Total quantity, by weight, volume, or as otherwise appropriate, of the HM covered by the description.

(c) If the proper shipping name for a hazardous substance (HM assigned RQs listed under section 101(14) of Public Law 96-510 (CERCLA), commonly referred to as Superfund) does not identify the technical or generic shipping name, the name shown in Title 49 CFR will be entered.

(d) When a package is required to be labeled "Dangerous When Wet," the words "Dangerous When Wet" must be entered on the shipping papers.

(5) The shipper's declaration of dangerous goods, illustrated in figure 2-4, is used when HM is shipped by commercial air (international or domestic) and by commercial water carrier (international). The dangerous goods transport document differs somewhat from the commercial (rail or road) shipping papers discussed above. A few key entries and differences are:

(a) Dangerous goods must be accurately described on the dangerous goods transport document by their proper shipping name (supplemented with the technical name(s) if appropriate). The transport document must include the class or division and UN number (if any) preceded by the symbol "UN" (see figure 2-4). These three elements of the basic dangerous goods description must always be provided in the same order (e.g., Allyl alcohol, 3, UN 1098).

(b) Since the shipping description is not included for n.o.s. entries, a technical name must be shown. For instance, the proper shipping name for "Drugs, n.o.s." would be described appropriately as one of the following:

1 Drugs, n.o.s., containing flammable aerosol, in small inner receptacles.

2 Drugs, n.o.s., containing nonflammable aerosol, in small inner receptacles.

3 Drugs, n.o.s., containing flammable liquid, in small inner receptacles.

4 Drugs, n.o.s., containing flammable aerosol and nonflammable

liquid, in small inner receptacles.

5 Drugs, n.o.s. containing flammable aerosol and flammable liquid, in small inner receptacles.

6 Drugs, n.o.s., containing nonflammable aerosol and flammable liquid, in small inner receptacles.

7 Drugs, n.o.s., containing flammable aerosol, nonflammable aerosol, and flammable liquid, in small inner receptacles.

(c) The document must include the net quantity in each package in mass or volume, or the gross mass, if applicable, for each HM item bearing a different proper shipping name, UN number, or packing group. However, this requirement does not apply to chemical kits, lifesaving appliances, radioactive material, or items that indicate "no limit."

(d) The number of packages must be included.

(e) Subsidiary risk(s), if any, corresponding to the label(s) applied must be included.

(6) Activities also will receive HM accompanied by Government shipping papers. The HM information on Government shipping papers must be the same information required by Title 49 CFR for commercial shipments (discussed in para a, this sec). HM must be listed first, in a contrasting color, or in a column captioned "HM." Government shipping papers may be in one of the following forms:

(a) SF 1103 (U.S. Government Bill of Lading) for shipments transported by commercial carriers.

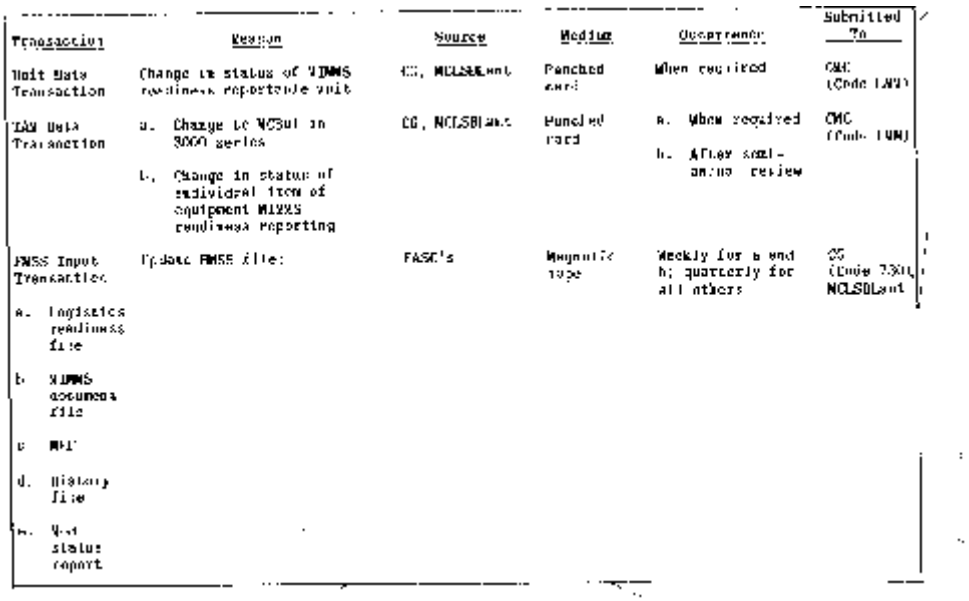
(b) DD Form 1384 (Transportation Control and Movement Document (TCMD)) for shipments moved within the Defense Transportation System.

2-7. Government and Other Document Indicators

Key information indicating the presence and type of HM may be attached to or accompanying incoming material receipts. These documents include DD Form 250 (Material Inspection and Receiving Report) OF 336 (Continuation Sheet) and DD Form 1348-1 (DOD Single Line Item Release/Receipt Document). A supplier may attach to or send with HM an MSDS or a Technical Data Sheet. An example of each is provided in figures 2-5 and 2-6, respectively.

Transaction	Reason	Source	Medium	Occurrence	Submitted To
PI Standards Data	a. New equipment	APO	Memorandum in Figure 2-02	a. When required	CNC (Code [illegible])
	b. Change in equipment standards			b. Upon semi-annual review	
	c. Equipment no longer in NSWC inventory				
	d. Designation as NIDAS readiness reportable				
	e. Decision to start or stop maintenance engineering analysis				
	f. Decision to track modification status				
MI Standards Data	a. Approval of new MI	APO	Memorandum in Figure 2-04	a. When required	CNC (Code [illegible])
	b. Change to modification			b. Upon semi-Annual review	
	c. Cancellation of MI				
Edit Standards Data	a. Change to job status codes	CG (Code 7361), NCLSDLant	Punched card	Upon program change	CG, NCLSDLant
	b. Change to defect codes				
	c. Change to JOD ID codes				

FIGURE 3-01. Input Requirements (Page 1 of 3)



Transaction	Reason	Source	Medium	Occurrence	Submitted To
Unit Data Transaction	Change in status of WIMMS readiness reportable unit	CC, NCLSBLant	Punched card	When required	CMC (Code LAM)
TAM Data Transaction	a. Change to WCSUI in 3000 series	CC, NCLSBLant	Punched card	a. When required	CMC (Code TAM)
	b. Change in status of individual item of equipment WIMMS readiness reporting			b. After semi-annual review	
WMSS Input Transaction	Update WMSS file:	FASC's	Magnetic tape	Weekly for a and b; quarterly for all others	CC (Code 7301, NCLSBLant
a. Logistics readiness file					
b. WIMMS documents file					
c. MAT					
d. History file					
e. Unit status report					

FIGURE 3-01 Staff Input Requirements (Page 2 of 3)

TECHNICAL DATA SODIUM HYDROSULFITE-F

Description

Sodium Hydrosulfite-F is a white, free-flowing, uniformly crystalline material, readily soluble in water. It is a powerful chemical reducing agent and will reduce polyvalent metal cations in solution either to the metal or to a lower valence. It reduces vat dyes and indigo to their soluble leuco

forms. Sodium Hydrosulfite-F can be used with confidence in the production of various fine chemicals, plastics and synthetic rubber because of the purity standards adhered to in its manufacture. The Sodium Hydrosulfite-F production process involves no heavy metal, i.e. zinc, employed in other processes. The product therefore is essentially free of heavy metals and is recommended in applications where absence of heavy metals and rapid solubility are desired. Although it reacts very rapidly, the stability characteristics of Sodium Hydrosulfite-F permit full and effective use of its strong reducing power in commercial use.

Chemical Formula
Na2S2O4

Properties

Solubility at	32 parts per 100 H[2]O
pH of a 1.0% by weight solution at 68øF	6.0
Bulk density (packed)	64lb./cu.ft.
Molecular weight	174.06

How Supplied

In sealed, single-trip drums, DOT specifications 37-A (metal) for both domestic and export shipping. Flammable solid label DOT specifications apply. The drum contains a 4 mil polyethylene liner and is closed with a bolted locking ring (5/16" bolt, 1/2" hex head).

Packaging Description

Domestic

	DOT 37-A
Gross wt.	268 lb. (121.6 Kg)
Net wt.	250 lb. (113.5 Kg)
OD.	19 3/4 in. (50.2cm)
OH.	29 1/8 in.(74 cm)
Volume.	30 gal. (113.6 liters)

Available for Export Only

	DOT 37-A
Gross wt.	107.3 kilos (236.5lbs.)
Net wt.	100 kilos (220.5 lbs.)
OD.	50.2 cm (19.75 in.)
OH.	65.4 cm (25.75 in.)
Volume.	.106 liters (28 gal.)

Domestic shipments made in carload, truckload, and less than truckload quantities. Export shipments in full twenty and forty foot containers or break bulk.

Shipping Information

DOT Shipping Name	Sodium Hydrosulfite
DOT Classification	Flammable Solid
DOT Identification Number	UN 1384

IMCO Code	4122
IMCO Class	4.2
IMCO Shipping Name	Sodium Hydrosulfite
IMCO Classification	Spontaneously Combustible

NOTE: Sodium Hydrosulfite-F is a very active chemical which can decompose when exposed to air and moisture with evolution of sufficient heat to cause a fire. Therefore it is imperative that it be protected against air, heat, and especially moisture, in storage and shipment. Dry sodium hydrosulfite is quite stable in sealed drums.

Important Uses

Dyeing with Indigo and Vat Dyes: Sodium Hydrosulfite-F is an excellent reducing agent in dyeing with indigo and vat dyes. The uniform strength of Sodium Hydrosulfite-F assures complete reduction and uniform shades when used in standard dyehouse formulas.

Decoloring Dyed Fabrics: Sodium Hydrosulfite-F is very effective as a chemical reducing agent for the removal of dyestuffs from fibers. In decolorizing or stripping applications, Sodium Hydrosulfite-F does not weaken fiber tensile strength. Sodium Hydrosulfite-F is also a highly effective clean-up medium around dyehouse equipment.

Fiber Bleaching: Recommended as a general bleaching agent for straw or other fibers which require strong reduction to produce a colorless compound.

Paper

Groundwood Bleaching: For both single-stage and 2-stage processes. Single-stage bleaching is employed in very inexpensive bleaching operations by mills making various grades of paper ranging all the way from newsprint to specialties and boxboard of different kinds. Brightness gains of up to 12 points can be achieved. Two-stage bleaching is employed to obtain economical brightness gains of 12-20 points by bleaching with peroxide followed by a sulfur dioxide neutralization and then a hydrosulfite bleach. No other method, even high-density peroxide, can match the economy and effectiveness of this type of bleaching at any brightness level.

VIRGINIA CHEMICALS INC.

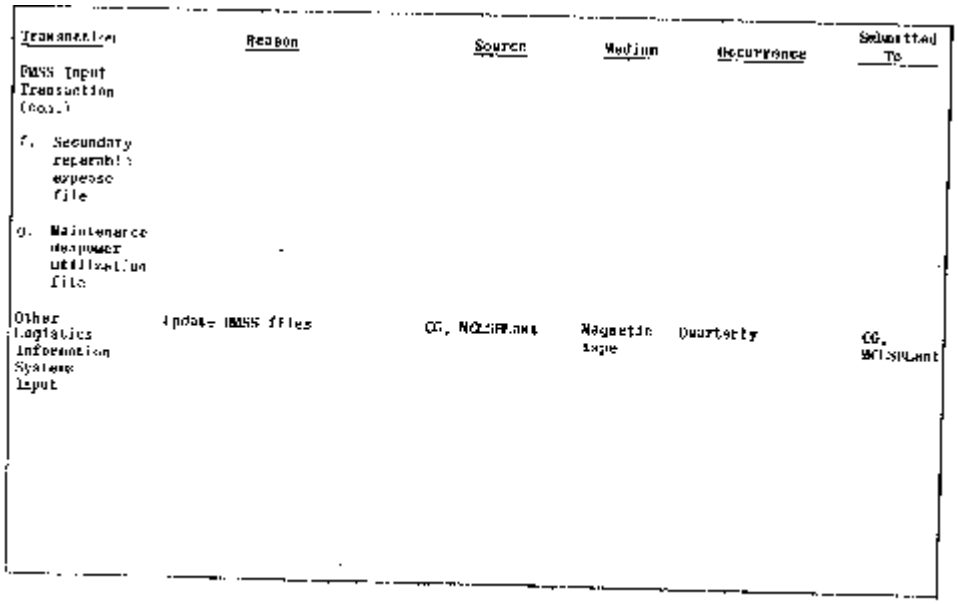
Figure 2-6. Technical Data Sheet for Sodium Hydrosulfite.

2-8. Shipping Label Indicators

All of the indicators previously mentioned may be used to identify HM before the doors of a transport vehicle or freight container are opened. Shipping labels are valuable indicators that are affixed to packages of HM being transported and are used to indicate the hazard class.

a. Domestic shipping labels, when required by U.S. Dot in Title 49 CFR, are affixed to packages shipped within CONUS. HM shipping labels are the most widely recognized and understood hazard communication method.

Table 2-1 is a list of domestic shipping labels.



Transaction	Reason	Source	Medium	Occurrence	Submitted To
DMSS Input Transaction (Cont.)					
f. Secondary repairable expense file					
g. Maintenance manpower utilization file					
Other Logistics Information Systems Input	Update DMSS files	CG, NOLSHF.mas	Magnetic tape	Quarterly	CG, WCISHLant

FIGURE 3-01. Staff Input Requirements (Page 1 of 2)

Output	Distribution	Frequency	Format	Medium
Edit Listing	To input source	When input submitted	Appendix B, page B-2	Hard copy printout
ID Standards File Report	Commodity managers, HQMC	Semiannually	TAMCN sequence	Microfiche
	PEO managers, MCLSBLant	Semiannually	TAMCN sequence	Microfiche
	Functional manager (FMC (Code LMM))	Semiannually	Appendix B, page B-3, TAMCN sequence	Hard copy printout
	PMF commanders	Semiannually	Appendix B, page B-3 TAMCN sequence	Hard copy printout
MI Standards File Report	Commodity managers, HQMC	Semiannually	Appendix B, page B-4	Microfiche
	PEO managers, MCLSBLant	Semiannually	Appendix B page B-4	Microfiche
	FMC (Code LMO)	Semiannually	Appendix B, page B-4	Microfiche
	FMC (Code LMM)	Semiannually	Appendix B, page B-4	Microfiche
	PMF commanders	Semiannually	Appendix B, page B-4	Microfiche
Edit Standards File Report	FMC (Code LMO)	Semiannually	Appendix B page B-5	Microfiche

FIGURE 3-02. Staff Output Requirements (Pg. 1 of 2)

Output	Distribution	Frequency	Format	Medium
Modification Status Report	Commodity managers, HCVT	Semiannually	Appendix B, page B-6	Microfiche
	PEE managers, MCLSRLnt	Semiannually	Appendix B, page B-6	Microfiche
	CMC (Code IMQ)	Semiannually	Appendix B, page B-6	Microfiche
	CMC (Code IKU)	Semiannually	Appendix B, page B-6	Microfiche
	FMF commanders	Semiannually	Appendix B, page B-6	Microfiche
Maintenance Manpower Utilization Report	Commodity Managers, IKMC	Quarterly	Appendix B, page B-7	Microfiche
	CMC (Code IMP)	Quarterly	Appendix B, page B-7	Microfiche
	CMC (Code IPN)	Quarterly	Appendix B, page B-7	Microfiche
	FMF commanders	Quarterly	Appendix B, page B-7	Microfiche
Secondary Reparable Expense Summary	LS, MCLSRLnt	Quarterly	Appendix B, page B-8	Microfiche
Equipment Status Exception Listing	MMSS user	As requested	Appendix B, page B-9	Hard copy printout
Equipment Status Report	MMSS user	As requested	Appendix B, page B-10	Hard copy printout
Halt File Report	MMSS user	As requested	Appendix B, page B-11	Hard copy printout

FIGURE 3-02. Staff Output Requirements (Page 2 of 5)

b. International shipping labels are required for materials being shipped by commercial air in accordance with the ICAO TIs or by commercial water carrier in accordance with the IMDG Code. Most U.S. DOT labels are the same as the international labels with the exception of Explosives and Infectious Substances. Two international labels, St. Andrew's Cross and Spontaneously Combustible, are currently used only for international shipments. The U.S. DOT is in the process of revising Title 49 CFR to: (1) Simplify HM regulations, (2) reduce the volume of the regulations, (3) promote flexibility and technological advances in packaging, (4) promote safety through better packaging, (5) reduce the need for exemptions, and (6) facilitate international commerce. DOT's intention is to use UN labels for both domestic and international transport hazard communication. Examples of international labels are provided in figure 2-7.

Output	Distribution	Frequency	Format	Medium
LAN Data File	HMSS user	As necessary	Appendix B, page B-12	Hard copy printout
FASC Standards Output	FASC's	Quarterly	Appendix B, page B-12	Magnetic tape

FIGURE 3-02. Staff Output Requirements (Page 3 of 3)

2-9. Markings and Other Indicators

All of the indicators previously mentioned are related to transportation. However, installations receive some material that is not regulated during transportation. Such material may, in sufficient quantity, present a storage hazard to personnel, facilities, or the environment. This section provides examples of other indicators and markings that may cause an item to be stored as HM.

a. Exterior container markings are required by MIL-STD-129 and are specified in the contract. Figure 2-8 illustrates types of markings that may indicate the presence of HM. The following HM indicators may be identified:

(1) The material is assigned a four-digit chemical FSC identification number.

(2) The supplier is a chemical company.

(3) The item nomenclature indicates the material may contain HM.

(4) The flashpoint, 152 degrees, indicates that the material does not require hazardous storage; however, it is 2 degrees greater than the UN Division 3.3 (150 degrees) flammable liquid. While a label or shipping paper indication of flammable and storage in a flammable liquids storage area is not required, it would be prudent to place the material in such storage if space is available.

b. ANSI 2129.1-1. standard for precautionary labeling of hazardous industrial chemicals, contains precautionary label statements indicating the hazardous nature of chemicals. Many of the statements indicate a material is sufficiently hazardous to require DOT labels or markings (e.g., the ANSI

statement "Danger, May be Fatal if Inhaled" is equivalent to DOT "Poison Gas" or "Poison-Inhalation Hazard"). However, the ANSI statement "Caution, Vapor Reduces Oxygen Available for Breathing" would probably not be associated with a material that would meet any DOT hazard criteria requiring a label. Some ANSI precautionary statements may appear on packaging that does not have a DOT label. These statements would be an indication that the material could be hazardous for storage.

c. Title 29 CFR, part 1910, subpart Z, contains marking and labeling requirements for toxic and hazardous substances that require special handling and storage. The statements required by this regulation are similar to those required by ANSI Z129.1. Also, included in Title 29 CFR, part 1910.1200, is the OSHA Hazardous Communication Standard, which requires that employees be informed of health hazards in the workplace.

d. the labeling system for pesticides is regulated in FIFRA, Title 40 CFR. All pesticides must have a human hazard signal word applied to the packaging. The pesticide label system is illustrated in figure 2-9. Pesticides falling into Toxicity Categories I and II will usually have a DOT label or marking applied; however, those falling into Categories III and IV may not. Therefore, the pesticide "Caution" signal word on a package could indicate the material should be considered for storage as HM. (Note. Insect repellents applied directly to the skin are considered pesticides. The Categories IV "Caution" statement would apply. These relatively nonhazardous or low hazard pesticides do not require HM storage unless they qualify for the international St. Andrew's Cross label; in this case, the only restriction would be to keep the items separate from foodstuffs.)

2-10. Sources of Placard and Label Information

Employees whose duties involve the identification of HM for receipt, storage, or packaging purposes shall be provided current reference materials at all times. Copies of the Code of Federal Regulations may be obtained from the U.S. GPO. DOT has available free label and placard charts, which also include regulatory references. A particular useful chart, DOT Hazardous Material Warning Labels/Placards, may be obtained from the Department of Transportation, R.S.P.A., Materials Transportation Bureau, Washington, DC 20590.

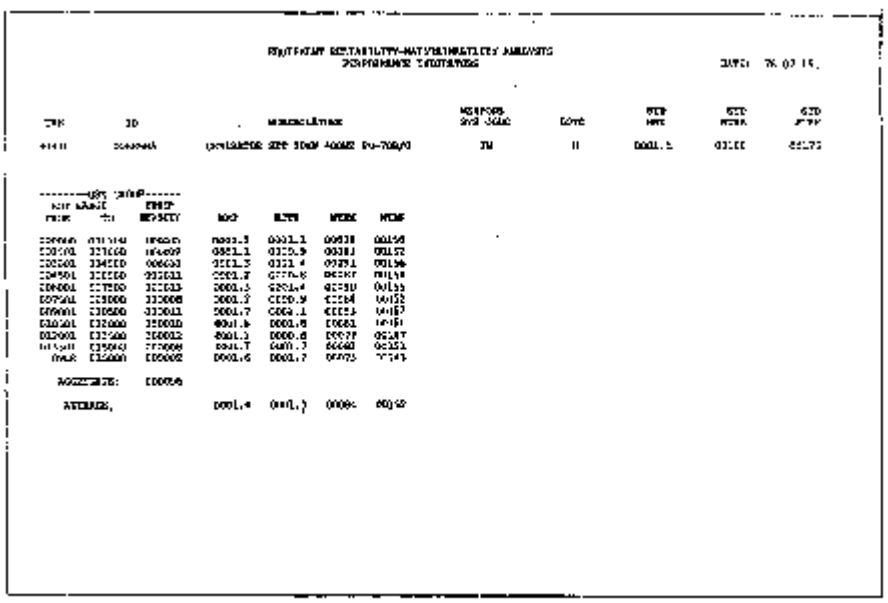


FIGURE 4-03. Sample Output Format for Equipment Reliability-Maintainability Analysis

EPA has published regulations for use of human hazard signal words on pesticide labels:

Signal words assigned by levels of toxicity

(A) Toxicity Category I

All pesticide products meeting the criteria of Toxicity Category I shall bear on the front panel the signal word "Danger." In addition, if the product was assigned to Toxicity Category I on the basis of its oral, inhalation, or dermal toxicity (as distinct from skin and eye local effects), the word "Poison" shall appear in red on a background of distinctly contrasting color and the skull and crossbones shall appear in immediate proximity to the word "Poison."

(B) Toxicity Category II.

All pesticide products meeting the criteria of Toxicity Category II shall bear on the front panel the signal word "Warning."

(C) Toxicity Category III

All pesticide products meeting the criteria of Toxicity Category III shall bear on the front panel the signal word "Caution."

(D) Toxicity Category IV

All pesticide products meeting the criteria of Toxicity Category IV shall bear on the front panel the signal word "Caution."

(E) Use of signal words

Use of signal word(s) associated with a higher Toxicity Category is not permitted except when the Agency determines that such labeling is necessary to prevent unreasonable adverse effects.

TOXICITY CATEGORIES

Hazard Indicators	I	II	III	IV
Oral LD(50)	up to and including 50mg/kg	from 50 thru 500 mg/kg	from 500 thru 5000 mg/kg	greater than 5000 mg/kg
Inhalation(50)	up to and including .2 mg/liter	from .2 thru 2 mg/liter	from 2.0 thru 20 mg/liter	greater than 20 mg/liter
Dermal LD(50)	up to and including 200 mg/kg	from 200 thru 2000	from 2000 thru 20,000	greater than 20,000
Eye Effects	Corrosive; corneal opacity not reversible within 7 days	Corneal opacity reversible within 7 days; irritation persisting for 7 days	No corneal opacity; irritation reversible within 7 days	No irritation
Skin Effects	Corrosive	Severe irritation at 72 hours	Moderate irritation at 72 hours	Mild or slight irritation at 72 hours

Figure 2-9. FIFRA Table of Toxicity Categories by Hazard Indicator.

CHAPTER 3

RECEIPT OF HAZARDOUS MATERIALS

Section I. Purpose and Applicability

3-1. The purpose of this chapter is to prescribe procedures that incorporate, where appropriate, regulatory requirements as they apply to the receipt, handling, and storage of HM. This chapter also contains procedures for processing damaged HM and discrepant packaging, and actions to be taken in the event of spills or leakages of HM detected during the receiving process. Compliance with the specific requirements identified in this chapter will substantially reduce the risks to personnel, installations, and the environment while ensuring compliance with both Federal laws and DOD policies.

3-2. The contents of this chapter are applicable to all personnel involved in the receipt of HM.

Section II. Planning and Coordinating the Receiving Operation

3-3. Planning for receiving operations requires complete coordination among organizational elements responsible for the different phases of the operation. Detailed planning assumes even greater importance in the case of HM. Proper evaluation of advance information and planning action taken prior to the actual arrival of HM will help ensure that appropriate steps are taken to receive such material as efficiently, economically, and safely as possible. Any correspondence concerning due-in HM should be considered in the planning process. PMRDs, contract schedules, reshipments, advance copies of bills of lading, or other shipping documents should be used to determine approximate arrival dates and the type and quantity of material due in. Pertinent information on significant due-in receipts of HM must be given to personnel concerned with warehousing, transportation, preservation, packing, and inspection.

3-4. Advance planning and coordination will promote effective storage space utilization, efficient assignment of labor and equipment resources, and timely identification of materials requiring specialized handling due to their hazard characteristics. While the reservation of specific storage space for due-ins is not recommended, advance planning will permit tentative storage determinations and, in turn, will facilitate receipt processing.

Section III. Impact of Federal Regulations, Other Than Transportation, on Receiving Operations

Personnel must be award of Federal regulations and their possible impact on receiving operations. These regulatory requirements are discussed in greater detail in chapters 8, 9, and 10. While processing receipts of HM, personnel must be particularly alert to the following:

3-5. Defense installations, designated as hazardous waste generators, are subject to the regulatory requirements of Title 40 CFR concerning the processing and reporting of releases of hazardous substances that may occur in connection with the unloading and movement of HM.

3-6. During the course of processing receipts from procurement, personnel may receive pesticides that are off specification, outdated, or in broken containers. Such material cannot be forwarded to storage, but must either be returned to the manufacturer for recycling or processed through DRMO as waste.

3-7. Thefts or losses during transportation of materials classified as explosives must be reported to the Bureau of Alcohol, Tobacco, and Firearms, Department of the Treasury, within 24 hours of discovery.

3-8. Radioactive material receipt and potential incidents involving release have reporting requirements contained in Titles 49 and 10.

Section IV. Hazardous Waste Minimization Responsibilities

3-9. The generation of hazardous waste at DOD activities is both a short- and long-term liability in terms of cost, environmental damage, and mission performance. The requirements of RCRA and SARA, adopted as policy for DOD, legally compel activities to take positive and specific actions in

day-to-day management of HM and hazardous waste.

3-10. Because of the volume of HM received and stored, many defense activities are considered major potential sources of hazardous waste generation. Consequently, defense activities must have in place a formal waste minimization program as directed by OASD. Waste minimization has been defined by OASD as "any action that reduces the need for disposal of hazardous waste." Accidental releases or spills occurring within activities are considered uncontrollable waste generation actions. There are, however, a number of waste minimization actions considered to be controllable. Installation waste minimization plans shall include, as a minimum, the following elements for the receiving function:

a. Training of warehousemen in the identification of HM on the basis of placards, labels, and shipping papers.

b. Procedures for identifying releases and spills and notifying spill response teams and authorities.

c. Compliance with the provisions of DOD 4140.27-M regarding the documentation of the initial packaging date and the remaining shelf-life of incoming HM.

d. Compliance with the requirements of this chapter in appendixes B and D regarding the assignment of HCCs.

e. Detailed plans for minimizing the need to handle HM within the receipt processing area. The likelihood of accidental damage can be significantly reduced by improvements in HM handling. Such plans should provide for the prepositioning of HM to facilitate pickup by MHE. MHE operators must not exceed the rated capacity of MHE when moving HM.

3-11. The above are not intended to serve as a comprehensive list of required actions, but rather as a guideline in developing waste minimization procedures tailored to fit the local operating environment. Employees should be encouraged to submit recommendations for achieving waste minimization goals. In addition to the requirement for legal compliance, Federal Law 5 USC 4503 (Beneficial Suggestion Program) allows payment of incentive bonuses to civilian personnel whose extra effort produces savings.

Section V. Hazard Characteristic Codes (HCCs)

3-12. It is absolutely essential that HM management be properly planned to prevent interaction of HM that pose risks to personnel, installations, and the environment during receipt and handling. To reduce the risk of hazards associated with incorrect classifications or categorizations by untrained personnel, a two-digit alphanumeric code has been developed for categorizing HM. This code has been developed to assist personnel in receiving, storing, and issuing material categorized by law or regulation as hazardous. HCCs are assigned by trained safety, health, and transportation personnel representing service HMIS focal points. Use of the HCC assures uniformity in the identification and management of HM. Properly assigned and used, HCCs will facilitate spill response and recoupment operations. Current HCCs, including hazardous characteristic groups and definitions are shown in appendix B.

3-13. Procedures governing the assignment of HCCs are contained in section VI.

Section VI. Arrival of HM at the Installation

3-14. Although current regulations require that defense installations receive advance notice of expected receipts of HM, shipments may arrive with little or no advance notice. Consequently, the HM identification process commences upon arrival of the carrier's vehicle or transport conveyance at the installation's main gate or other designated point of entry. Security personnel must, therefore, be sufficiently trained in HM identification on the basis of placards and shipping papers. Directing the vehicle to the desired unloading site, accomplishes the following:

a. Minimizes travel distances from the point of base access to the receiving or storage area.

b. Minimizes MHE operations.

c. Confines unloading operations to areas of the installation where experienced supervisory and other personnel are likely to be available to respond to leakages or spills of HM.

3-15. Security personnel will, upon arrival of transport vehicles, limit their inspection to a visual one of the conveyance for evidence of leaks or the presence of odors that might be indicative of damage. This inspection will include a review of shipping papers and an identification of placards that may have been affixed to the exterior of the conveyance. If a placard has been affixed, security personnel should determine from the vehicle

operator the exact location of HM on the conveyance. When it is determined that HM can be offloaded without double handling the cargo, the shipment may be spotted directly at the appropriate storage area designated for the hazard class or division involved. Cargo requiring double handling will be spotted at the central receiving dock.

3-16. If the visual inspection by security personnel discloses evidence of suspected leakage or spills, no effort will be made to open the conveyance for further investigation. Since Title 49 CFR, parts 174.48, 174.50, and 177.854, require that damaged containers be repaired or overpacked before further transportation is authorized, personnel will, under no circumstances,

insist that the carrier remove damaged HM from the confines of the installation. Security personnel will immediately notify the appropriate office in accordance with the installation spill plan. Spill Response Team deployment, package repair or overpack, or other disposition of the material must be completed before the conveyance is permitted to proceed to the storage area, central receiving, or returned to the supplier.

Section VII. Reports of HM Incidents

3-17. Title 49 CFR, parts 171.15 and 171.16, requires carriers who transport HM (including hazardous wastes) to give notice to DOT (and the Center for Disease Control, Atlanta, GA, for incidents involving etiological agents) after each incident that occurs during the course of transportation. For the purposes of this manual, transportation includes loading, unloading, and temporary storage. This notification is required if any of the following occur:

a. A person is killed.

b. A person receives injuries necessitating hospitalization.

c. Estimated carrier or other property damage exceeds $50,000.

d. Fire, breakage, spillage, or suspected radioactive contamination occurs involving a shipment of radioactive material.

e. Fire, breakage, spillage, or suspected contamination occurs involving a shipment of etiologic agents.

f. A situation exists of such a nature that, in the judgment of the carrier, it should be reported even though death, injury, or property damage has not occurred (e.g., a continuing danger to life exists at the scene of the accident).

3-18. Notification responsibility will be determined on the basis of circumstances. If a hazardous substance or etiologic agent is released during offloading operations performed by carrier representatives, notification of the DOT is a carrier responsibility. If, however, the release occurs during offloading by noncarrier/receiving personnel, or after release of the carrier's vehicle, notification is the responsibility of the commander in accordance with Title 49 CFR.

3-19. Notification by the installation commander is also required to report releases of hazardous substances equal to or greater than their reportable quantities. The employee having first knowledge of the incident will immediately inform his supervisor. The supervisor will report the incident in accordance with SPCC. Reports of releases of hazardous substances will be made in accordance with Title 40 CFR, part 302.6, and Title 49 CFR, part 171.15, to the NRC at (800) 424-8002 (toll free) or (202) 426-2675 (toll).

3-20. Although commanders are not required to make reports to the DOT for occurrences described in paragraph 3.17, such incidents will be reported in accordance with current directives.

Section VIII. Receiving Inspection of HM

3-21. Purpose of Inspection

The purpose of inspecting HM upon receipt is to verify that the material is properly identified, documented, packaged, and safe to handle. In preparing for inspection of HM, shipping papers will serve as the initial source of identification. Based on this information, the vehicle or rail container

will be positioned in an area or at a dock that will facilitate the inspection and offloading of the material. Once the hazard class has been determined, the offloading process may commence; however, a preliminary visual inspection will be performed before any cargo is offloaded. Historical data compiled by DOT and the chemical industry indicate that approximately 40 percent of reported spills and leakages are detected or occur during offloading operations.

3-22. Preliminary Inspection

a. Prior to commencing the offloading of cargo known to include HM, a preliminary inspection will be performed to detect damage that might

have been caused during transit by improper loading, blocking, or bracing. One of the first indications of such damage will be crushed or fallen containers or evidence that the load has shifted to such a degree that safe unloading is impeded. Particular care also must be taken to ensure that leakages or spills of liquids or solids are detected at this time. An indication of concealed damage is the presence of odors.

b. Should the preliminary inspection disclose actual or suspected damage, the conveyance will be closed and receipt processing actions will be terminated immediately. The circumstances will be reported to the immediate supervisor who will take actions to report and resolve the matter in accordance with locally published procedures.

c. Care must be exercised during offloading operations to ensure that incompatible HM are adequately segregated on the receiving dock. Incompatible materials will be separated as directed in Title 49 CFR. For a more precise determination of material segregation on a receiving or freight dock, refer to Title 49 CFR, part 174.81, 175.78, 176 (part D), or 177.848.

3-23. Inspection of Receipts From Procurement

a. The purpose of inspecting procurement receipts is to assure that the material actually received corresponds with that specified in the procurement documentation. Additional requirements have been imposed by domestic and international law. Since movements to storage will, at least in part, be made on the basis of labels and shipping papers, receiving personnel also must be alert to the quality of shipping papers and the appropriateness of labels. HM, like other commodities, generally become the property of the Government at the point of origin or manufacture, or at a commercial redistribution facility (FOB origin). The point of origin inspection, normally conducted by a QAR of CAS, is normally limited to an inspection of a representative or statistical sampling of the lot of material to be shipped. Consequently, deficiencies may exist in the uninspected portion of the shipment. For this reason, it is imperative that receiving personnel have the procurement documentation available to them. In addition, receiving personnel must be knowledgeable of the regulations and procedures governing the packaging, marking, labeling, and handling of HM.

b. Inbound HM will be inspected for piece count, evidence of external damage, and identification verification. In addition, material procured FOB destination normally has not been previously inspected by a QAR or other Government inspector for completeness, proper identification, packaging

requirements, and condition code, and will require inspection for compliance with the procurement documentation.

(1) During the offloading process, personnel will carefully inspect all incoming material to ensure that packaging is in full compliance with the quality assurance specifications and conditions of the contract. Only when it can be positively determined by inspection that packaging meets contractual requirements will such material be forwarded to the designated HM storage area.

(2) When it is determined that HM packaging does not meet contractual requirements, the deficiencies will be corrected immediately except in the case of pesticides (see para 3-26). The material to be repaired will be suspended under supply condition code E. Under no circumstances will such material be held pending the receipt of disposition instructions from the appropriate item manager. Containers found to be leaking or otherwise not in compliance with DOT regulations will be processed through the recoupment facility. Packages requiring marking or minor packaging repairs will be forwarded to the packaging facility for restoration and compliance with Title 49 CFR, parts 174.48, 174.50, and 177.854. Only when repairs and recoupment actions are completed will material be reintroduced into the normal receipt processing operation.

(3) Upon completion of corrective actions, the following additional actions will be taken:

(a) The office administering the contract will be contacted immediately by telephone and informed of the packaging problem.

(b) Violation of, or noncompliance with, DOT regulations will be reported to the nearest regional DOT office.

(c) Discrepancy reports will be prepared and submitted in accordance with paragraph 3.29.

3-24. Inspection of Radioactive Material

a. Radioactive material may be received as part of a larger shipment of other HM, or the Government may be required to pick it up at a carrier's terminal. Title 49 CFR, parts 173.389 through 173.390, require activity personnel to arrange for receipt or prompt pickup of a package containing radioactive materials in excess of type A quantities specified. This pickup will, when practicable, be completed within 3 hours notification by the carrier. Upon receipt of the material, receiving personnel will, unless exempted by Title 10 CFR, part 20.205, initiate monitoring of the material within 3 hours if the material is received during normal working hours. If the material is received

after normal working hours, the package will be monitored within 18 hours or receipt. The results of monitoring will, in all cases, be documented. It should be noted that while Title 10 CFR, part 20.205, exempts certain packages from immediate monitoring, all packages containing radioactive material will be monitored prior to opening.

b. During the preliminary inspection, each package containing radioactive material will be examined for evidence of possible leakage. The package or material suspected of containing radioactive contamination as a result of leakage will be segregated from personnel contact, and the RPO will be

contacted for advice. When the exterior of a radioactive material container shows signs of damage or leakage, the transport vehicle will be monitored for contamination. Prior to returning a previously contaminated vehicle to service, it will be decontaminated to the levels specified in Title 49 CFR, part 173.443.

(1) The NRC will be informed by telephone or telegraph when external radiation or radioactive contamination exceeds that specified by Title 10 CFR, part 20.205, or Title 49 CFR, part 173.397.

(2) The shipper and any carrier(s) will be informed of potential contamination of transport vehicles and the need for possible radiation surveys.

c. Leaking containers will, in all cases, be resealed in the presence of the RPO. When the cause of leakage has been determined (e.g., packaging deficiency or damage in transit), a discrepancy report will be submitted in accordance with paragraph 3.29.

d. Radioactive material will be inspected for identification, packaging requirements, quantity, and labeling as required by Title 49 CFR, part 172.

3-25. Astray/Misdirected Shipments

a. It is entirely possible that installations will, in the course of offloading and processing inbound shipments of HM, receive material consigned to other installations. Title 49 CFR, part 177.811, requires that a carrier or installation in possession of an astray shipment of HM, other than explosives, forward it promptly to its intended destination, if known. However, such material will not be forwarded until it has been confirmed by inspection that the package is in proper condition for transportation.

b. When an incident involving HM occurs during this transportation process, a report may be required in accordance with Title 49, parts 171.15 and 171.16.

3-26. Inspection of Pesticides

a. Receipt processing procedures for pesticides will vary somewhat from those prescribed for other HM. If inspection of incoming pesticides discloses that the manufacturer’s labels have been mutilated or obliterated and rendered unfit for further issue under FIFRA, the following actions will be taken:

(1) The pesticide will be processed as a receipt and immediately suspended in supply condition code L.

(2) The office administering the contract will immediately be alerted to the labeling problem. Within 24 hours, a discrepancy report will be prepared and forwarded in accordance with paragraph 3.29.

(3) Installation personnel will immediately contact the item manager and request that the pesticides be relabeled by or returned to the manufacturer. As the EPA registrant, the manufacturer is the only person allowed to affix a label to a package intended for distribution or sale.

(4) If the pesticide is determined to be sufficiently toxic to justify storage in a designated poison storage area (i.e., FIFRA categories I, II, or III), the pesticide will be temporarily stored in such area pending other disposition. Signs indicating the common name of the pesticide (e.g., malathion, etc.) and the appropriate signal word(s) (e.g., "Danger," "Poison," or "Caution") will be affixed to the exterior of the storage area.

b. When instructed by the manufacturer, the item manager, or the office administering the contract to return the pesticide, the package, container, and overpack will be clearly marked with the following information:

(1) "NSN-Repackaged," if applicable.

(2) Nomenclature and percentage of active ingredient.
(3) Total quantity (gallons for liquids and pounds for solids).
(4) Date of packaging (month/year).
(5) The phrase "For Return To Manufacturer's Location For Recycling."

c. In the event the manufacturer does not respond to the installation's request for relabeling or is no longer in business, the pesticide will be declared unserviceable and will be placed in supply condition code H pending receipt of disposition instructions from the item manager. The exterior of the package or container will be marked as shown in paragraph 3-26b except "For Disposal Only" will be substituted for the term "For Return To Manufacturer's Location For Recycling."

d. Pesticides identified for transfer to the DRMO will be processed in accordance with the procedures outlined in Title 40 CFR, part 165, Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticide Containers; DOD 4160.21-M, Defense Utilization and Disposal Manual; and DPDS-M 6050.1, Environmental Considerations in the DPDS Disposal Process.

e. If inspection discloses that a container or package of pesticides is leaking due to damage in transit, that package will automatically classify, under RCRA, as a waste pesticide. Such material will be processed in accordance with paragraph 3-26c.

3-27. Pilferable or Security Material

Highly pilferable or security material will be processed in accordance with component directives addressed to the subject.

3-28. Inspection of Compressed Gases in Cylinders

Inspection of compressed gases in cylinders will be performed in accordance with the procedures contained in section 4, DLAR 4145.25/AR-700-68/NAVSUPINST 4440.128/MCO 10330.2/AFR 67-12, Storage and Handling of Compressed Gases in Cylinders.

3-29. Discrepancies in Shipment

a. The purpose of reporting discrepancies in shipment is to provide claim offices with documented facts to support loss and damage claims against a carrier or contractor to ensure recovery of Government money. The two commonly used discrepancy reports are as follows:

(1) SF 361 (Transportation Discrepancy Report (TDR)). SF 361 is used for notifying or confirming notification of a problem with a shipment to carriers, and for notifying carriers (U.S. commercial or MAC) to pick up damaged material. SF 361 will be prepared in accordance with AR 55-38/ NAVSUPINST 4610.33C/AFR 75-18/MCO 4619.190/DLAR 4500.15.

(2) SF 364 (Report of Discrepancy (ROD)). SF 364 is used for reporting, adjusting, and accounting for supply (item) discrepancies; packaging and supply item identification marking; and lost or damaged parcel post shipments. SF 364 will be prepared in accordance with DLAR 4140.55/AR 735-11-2/OPNAVINST 4355.18/AFR 400-54/MCO 4430.30.

b. Discrepancy reports submitted in accordance with paragraph 3-22 will be marked "For Information Only-Hazardous Material."

Section IX. HM Receipt Processing Procedures

3-30. Current processing procedures, outlined in various manuals and regulations will apply when processing receipts of HM. In addition, all system requirements pertaining to report performance criteria, adjustment actions, etc., will apply to HM.

3-31. When HM in bulk quantity is received at the loading dock or central receiving area, a receipt inquiry data request will be initiated. Upon receiving the receipt control document, contract data sheet, and/or storage action document, the documents will be attached to the physical receipt in preparation for inspection and verification.

3-32. The receipt control card, reflecting NSN data extracted from the prepositioned material receipt file, will be screened to determine if the data bank indicates the item is hazardous. If the receipt control card indicates that an HCC has not been assigned, and there are no other indications that the item is hazardous, normal nonhazardous material receipt processing will be resumed.

3-33. In the event an HCC has not been assigned, and there are indications that the item may in fact be hazardous (e.g., special requirements codes, type cargo codes, transportation compatibility codes, labels, etc.), receipt processing will be discontinued until a valid HCC is entered into the installation data base.

3-34. The HCC will be obtained from the on-line data base or from the DOD HMIS. If an HCC is not available from either of these sources, a temporary HCC will be assigned in accordance with the following procedures:

a. For packages to which a DOT label has been affixed, refer to appendix D, table D-1.

b. For packages reflecting precautionary label text as recommended by ANSI Z129.1, refer to appendix D, table D-2.

c. For material listed in Title 29 CFR, part 1910, subpart 2, refer to appendix D, table D-3.

d. Pesticides that do not have a DOT label attached to the shipping package or container will be assigned a temporary HCC T5, refer to appendix B. If a DOT label is attached to a pesticide container, refer to appendix D, table D-1. If the pesticide is not packaged for shipment, a temporary HCC T4 will be assigned.

e. In the event a package or container does not contain a pesticide, bear a DOT shipping label or an ANSI precautionary signal word, or if doubt remains on the part of installation personnel as to the exact nature of the hazard, the EPO will be notified for resolution.

f. It should be noted that appendix D, except for table D-3, in addition to providing HCCs, reflects the recommended storage area, both primary and by subdivision.

Section X. Receiving Quality Control

3-35.6 The general purpose of quality control programs is to inform management of the effectiveness of installation operations by detection of defects in materials and errors in procedures. The basic aim is to provide reliable, timely, and comprehensive data to be used as a guide in directing corrective actions. Since installation operations in HM management are governed by Federal laws and regulations, installation quality control programs must be expanded to include specific procedures for ensuring that such laws and regulations are not violated. Noncompliance with Titles 29, 40, and 49 CFR may subject installation commanders and responsible managers to criminal and civil penalties. Because of the high political and legal visibility associated with HM management, consistent compliance with enforcement standards designed to protect human life and the environment is required.

3-36. Minimum quality control procedures governing the installation receiving function will incorporate additional periodic sampling procedures designed to ensure:

a. That leaking packages of HM, or packages requiring minor repair, are monitored during their movement to the recoupment or packaging facility, as appropriate, and during their return to the normal receiving process or disposal.

b. That HCCs and storage locations are properly assigned.

c. That all reports and/or notifications are made in connection with accidental releases of HM.

d. That quantities of hazardous wastes generated are accurately determined for the purposes of determining waste generator category and, in turn, the extent of compliance required.

CHAPTER 4

STORAGE OF HAZARDOUS MATERIALS

Section I. General

4-1. Purpose and Applicability

a. This chapter provides general requirements for allocating space for the storage of HM defines the various types of HM storage required to satisfy safety and regulatory requirements, outlines storage procedures, and prescribes a storage quality control program.

b. The provisions of this chapter are applicable to all personnel involved in the storage of HM.

4-2. Reporting of Storage Space

Storage Space Status Reports are current records of space utilization and occupancy. All warehouse space dedicated to the storage of hazardous materials will be accurately described in the narrative accompanying DD Form 805 (Storage Space Management Report). The following references are

applicable:

a. DODI 4145.5, Storage Space Management Report.

b. DOD 4145.19-R, Storage and Warehousing Facilities and Service.

4-3. Warehousing Division Hazardous Waste Minimization Responsibilities

a. As noted in paragraph 3-9, section IV, chapter 3, installations are legally compelled to take positive and specific actions in day-to-day management of HM and hazardous waste. Standards for hazardous waste generators are established in Title 40 CFR, part 262, EPA. Installations, as generators, are required to submit a report every two years to the Regional Administrator of the EPA. In addition to covering generator activities during the previous calendar year, the report must include a description of the efforts taken during the year to reduce the volume and toxicity of waste generated. Within the Warehousing Division, a significant source of hazardous waste will be associated with the movement of material into and out of storage locations and the deterioration of materials in storage.

b. Warehousing Division hazardous waste minimization plans should include, but not be limited to, the following elements:

(1) *Improved Material Handling Practices.* While material handling practices may vary, the basic principles remain constant. These principles are outlined in DOD 4145.19-M-1. These principles are particularly applicable to the movement of HM, since it is much easier to prevent an incident than to respond to one. The goal of material handling practices should be to prevent accidents, spills that damage the environment, and damage to the material being moved, either directly or indirectly. Warehouse workers must be sensitive to the fact that damage to a pallet or outer container will often result in a spill, an accident, or damage to the material at a later time. Warehouse workers and MHE operators must understand why the material is hazardous. They should be aware that certain items are sensitive to an increase in temperature or to vibration, and that other items may react adversely to water. MHE operators should be thoroughly trained to:

(a) Avoid handling incompatible materials at the same time.

(b) Select the proper piece of equipment to move specific items.

(c) Safely operate MHE.

(d) Report spills when they occur.

(e) Identify items as HM prior to moving them.

(f) Properly use PPE (refer to chap 10).

(2) *Storage Location Accuracy.* 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.

(3) *COSIS Program.* The use of quality control techniques will enable a COSIS Program to be accomplished at minimum cost with maximum efficiency. Quality control and deterioration data will be generated and used to improve storage serviceability standards. COSIS Program actions include performing schedule inspections of material in storage; property identifying items; determining the adequacy of the storage environment, preservation, packing, and marking; and arresting all forms of deterioration that will adversely affect the end use of the item. Periodic inspection of HM in storage is an important step in quality surveillance

of such material. While the material is in storage, until it is shipped to the user, it must be systematically inspected to detect degradation, deterioration, corrosion damage, and other deficiencies caused by improper storage methods, expiring shelf-life, or the material's inherent deterioration characteristics. The focus should be on detecting minor deficiencies before they become significant, thus providing time for corrective actions before the material becomes unserviceable or unusable and requires disposal as hazardous waste.

(4) *Shelf-Life Management.* Storage personnel are responsible for executing the control program directed by their component and installation. Effective shelf-life control at the warehouse level requires vigilance by all personnel, careful supervision, and understanding of the intent and purpose of the control procedures prescribed by DODD 4140.27-M, Identification, Control, and Utilization of Shelf-Life Items. Issues shall be directed against the oldest stocks (those with the least remaining shelf life). Under normal circumstances, this policy prescribes a strict application of FIFO issue control techniques unless exceptions are authorized in accordance with chapter IV, DODD 4140.27-M.

(5) *Hazardous Waste Storage Practices.* If an installation elects to store hazardous waste in containers (defined in Title 40 CFR, section 260.10, as any portable device in which material is stored, transported, treated, disposed of, or otherwise handled), the following requirements are prescribed by the EPA:

(a) Each container will comply with the requirements of Title 40 CFR, part 262, subpart C, and be clearly labeled with the words "Hazardous Waste" and with the date the installation began to collect waste in that container.

(b) Containers must be kept in good condition and handled carefully, and leaking ounces must be replaced immediately in accordance with Title 40 CFR, part 265, subpart I.

(c) Hazardous waste will not be stored in a container if it may cause rupture, leaks, corrosion, or other failure in accordance with Title 40 CFR, part 265, subpart I.

(d) Containers will be kept closed except when being filled or emptied in accordance with Title 40 CFR, part 265, subpart I.

(e) Containers will be inspected weekly for leaks or corrosion in accordance with Title 40 CFR, part 265, subpart I.

(f) To create a buffer zone when storing ignitable or reactive wastes, containers will be placed as far as practicable inside the installation property lines, but at least 50 feet away in accordance with Title 40 CFR, part 265, subpart I.

(g) Wastes that could react together to cause fire, leaks, or other releases must not be placed in the same container in accordance with Title 40 CFR, part 265, subpart I.

(h) Stored waste must be taken offsite or treated onsite within 180 days (or 270 days if the waste must be transported 200 miles or more) in accordance with Title 40 CFR, part 262, subpart C.

(i) Incompatible wastes should be isolated from one another to prevent the possibility of accidental mixing that could result in a reaction.

(j) The date upon which each period of accumulation begins must be clearly marked and visible for inspection on each container in accordance with Title 40 CFR, part 262, subpart C.

(k) Examples of potentially incompatible wastes are contained in Title 40 CFR, parts 264 and 265, appendix V.

Section II. HM Storage Requirements

4-4. General

It is not the intent of this chapter to provide definitive guidance for the design and construction of HM storage facilities. The considerations outlined are purposely broad to serve as a general guide for storing commodities possessing chemical and physical properties that involve serious risk to personnel, the facility, and the environment. Actual facility design criteria are derived from several sources within DOD, various Federal agencies, and industry. NFPA standards, for example, are consensus standards developed in committee by representatives of industry, Government standards agencies, and specialized consulting firms. Consequently, such standards reflect a mixture of both subjective and objective criteria that may or may not meet the specific requirements of the DOD. A facility designed to store HM in compliance with the requirements will address the following in the SSA: roof/ceiling, walls/columns, walking/working surfaces, climate control, ventilation, access/egress, electrical systems, lighting, alarms, monitors, communications, plumbing, fire suppression, heat/smoke and explosion venting, spill control and containment, emergency eyewash/shower and first aid, storage aids, and training and emergency spill procedures (AR 385-16).

4-5. Basic Facility Considerations

a. In developing storage layout plans, it should be noted that HM have characteristics that require the materials be specially stored or handled to prevent risks to personnel or to the facility in which they are stored. Identification of such materials on the basis of transportation placards and labels was discussed in chapter 2. While this method of identification helps to ensure that such materials are directed to a designated storage area, it should be recognized that transportation codes and regulations do not necessarily apply to the storage of materials. Transportation and storage are two different operations requiring different controls and the guidelines in this section are designed to ensure the provision of the maximum possible protection against commingling of incompatible items in storage.

b. In developing the current system of identification by transportation placards and labels, terminology such as compatibility and reactivity has been considered. However, these terms should be used with extreme caution since so many variables are involved. Generally, contact between incompatible materials will produce a reaction such as fire, explosion, polymerization, boiling or spattering, severe heat, or the release of poisons or hazardous gases. The matter is made even more complex by the fact that reactivity of chemicals with the same molecular formula may differ because they possess different structures. The unpredictability and complexity of the hazard must be understood when planning and allocating storage facilities. The following examples are presented for information:

(1) Certain chemicals may have the same molecular formula but be assigned different hazard classes when offered for transportation because

the CFR is open to interpretation in some cases.

(2) Varying interpretations of regulations, or sometimes conflicting regulations published by different agencies, may result in the same chemical being classified in different hazard classes for purposes of transportation further complicating the problem of assuring that incompatible HM are properly segregated in storage. For example, one one manufacturer has shipped 110-gallon containers of p-toluidine as NA 1993, combustible liquid, n.o.s., or as IMO Division 6.1, poison, for export via oceangoing vessels. On the other hand, another has shipped the same material as a nonregulated solid. Still another company, Olin Corporation, has simply described the material as a combustible liquid (OSHA-regulated class III).

(3) In other cases, ambiguities in regulations result in varying interpretations. A cylinder of chlorine may be labeled and shipped in either of two ways: It may be labeled with a green, nonflammable gas label and an accompanying white poison label, or it may be labeled with a single white chlorine label (a skull and crossbones with the word "CHLORINE"). DOT acknowledges that chlorine has toxic properties when inhaled, but has taken the position that it will not cause any significant contamination of food items. The same agency, however, will not permit chlorine to be transported with food items if the cylinder bears a "POISON" label.

4-6. Types of Storage Facilities

a. The definitions applicable to types of storage facilities are found in TM 38-400 and include:

-General purpose warehouse
-CH
-Refrigeration
-HM facility
-Dry tank
-Shed
-Transitory
-Above-ground magazine
-Earth-covered magazine
-Nontraditional warehouse
-Open storage space

b. Within facilities, two other defined areas are required:

(1) *Separate Inside Storage.* A room or building used for the storage of materials in containers or portable tanks, separated from other types of storage occupancies.

(2) *Segregated Storage.* Segregated storage is when materials are physically separated by sills, curbs, and distance. The distance used to separate materials may be occupied by nonhazardous, compatible material. If used, the distance between HM must be maintained even if nonhazardous.

4-7. Protective Features of HM Storage

In view of the inherent risks to personnel and facilities posed by the storage of HM, protective features must be considered in designing and allocating HM storage space. MIL-HDBK-1032/2, Covered Storage, outlines requirements for climate control; electrical lighting; plumbing; fire protection; automatic sprinklers; alarms; monitors; communications; heat/ smoke and explosion venting; ventilation; and shelving/rack systems.

a. Access/Egress. The layout of HM storage should provide for rapid and unobstructed exit

from any area of the warehouse. Both aisle and entry door areas should be kept clear of stored materials and other obstructions at all times. No dead ends should be associated with ways of egress, and no point in the facility should be greater than 75 feet (by foot travel) from an exit. There should be no access between areas storing incompatible HM.

(1) *Emergency Exits*. Emergency exits should be class A openings with a minimum NFPA fire-resistance rating of 3 hours for both interior and exterior doors. Doors should have a clear 36-inch wide opening in the line of egress and should be provided with exit/entry ways no less than 44 inches wide. Exits should be self-closing, equipped with panic release hardware, properly marked, sealed against liquid and vapor migration, and provided with a ramp not exceeding a slope of 12 percent. Exits should be provided with illumination for ways of egress.

(2) *Cargo Doors.* Horizontal sliding and overhead rolling cargo doors should be class A openings with a minimum NFPA fire-resistance rating of 3 hours and should provide a minimum opening 8 feet wide and 12 feet high. Doors must be provided with a seal against liquid and vapor migration, equipped with automatic closing devices inside and outside (e.g., fusible links), provided with governors to control opening and closing velocities, and capable of opening and closing manually.

b. Spill Control and Containment. Suitable means of spill control and containment shall be available between areas within the facility.

c. First Aid and Safety. Emergency eyewash and shower facilities shall be within a 10-second transit time and located no more than 100 feet (as measured by path of travel) from the hazard. The eyewash and shower units shall provide a comfortable water temperature range (60øF.-95øF.). First-aid boxes or lockers shall be available near each eyewash or shower station, administrative office, and areas designated for changing clothing. The contents of first-aid boxes or lockers shall be tailored, to the extent practicable, with modifications related to treatment of the specific HM in the area, and approved by the facility Safety and Health Monitor. Fire blankets shall be placed near the emergency exits of the flammable and combustible liquids storage areas.

d. Change/Clean Areas. A change/clean area should be in or adjacent to HM storage warehouses or facilities. This area should consist of a "clean" room and a "change" room. After handling HM and prior to entering "clean" rooms, personnel should first be required to pass through the change/clean area, remove PPE, and thoroughly wash. Cleanup should be completed prior to using toilet facilities or exiting the facility. Precautions should be taken to ensure that used work clothing is removed and placed in an appropriate container prior to the employee’s departure from the building. The shower should have a sill higher than the highest diking to prevent HM from entering the sewer system. A suitable area of the storage facility should be designated as "clean" to provide a point of assembly for personnel exiting the decontamination area. Restrooms, break rooms, lunch rooms, and administrative office spaces should also be designated clean areas. Formally published procedures should preclude the introduction of HM into such areas.

4-8. HM Storage Areas

It is not practical to provide a completely detailed, item-by-item listing of HM and their storage requirements. The 10 broad areas of HM storage are:

PRIMARY SEGREGATION CODES

A	Radioactive
C	Corrosive
D	Oxidizer
E	Explosive
F	Flammable
G	Gas, Compressed
L	Low Hazard
P	Peroxide, Organic
R	Reactive
T	Poison

They provide for separation of materials with a view towards reducing the risks of hazardous reactions. They also provide a means, when used in conjunction with appendix C, for directing HM to the storage area most appropriate for the item being stored. Within each of the 10 major storage areas, as shown in figure 4-1, further segregation is required based on the compatibility of the individual items whose general properties indicate they may be stored in the same storage area.

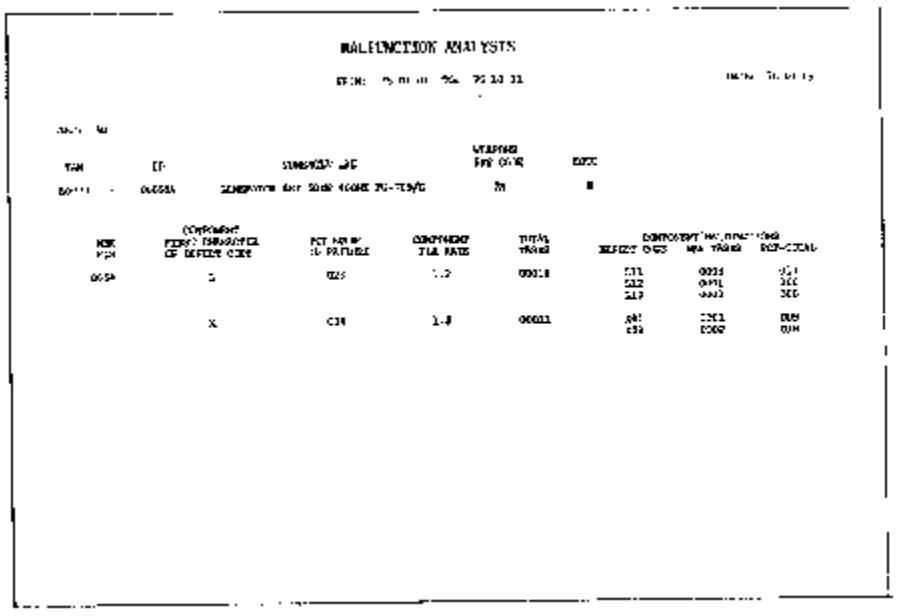


FIGURE 4-0[illegible]. Sample Output Format: For Malfunction Analysis

4-9 DOD Storage Type A: Radioactive Material Storage

a. Purpose. The radioactive storage area will be used to store items of Government property composed in whole or in part of radioactive materials, which can be identified by NSN or part number.

b. Hazard Considerations. Radioactive materials are substances that spontaneously decay and emit energetic rays or particles in the process. There are two types of radiation hazards, external exposure and internal exposure.

(1) An external radiation hazard is ionizing radiation contacting the body from an external source. Background radiation is naturally occurring external radiation; however, the hazard described here is additional to background radiation and is caused by radiation emanating from materials being handled. External radiation exposure may be reduced by limiting the time warehouse workers are exposed, increasing the distance between them and the source of radiation, and increasing the amount of source shielding.

(2) An internal radiation hazard is any radioactive material that is consumed, inhaled, or absorbed through the skin. Internal radiation exposure could occur while handing leaking sources, working in contaminated areas or in airtight storage areas containing leaking gaseous sources, and during accidents. Internal radiation hazards may be reduced in three ways:

(a) By prohibiting smoking, eating, and drinking in areas where radioactive materials may have been handled.

(b) By prohibiting the storage of foods, beverages, and eating and drinking utensils in the radioactive materials storage areas.

(c) By requiring personnel to wash their hands and faces upon leaving the radioactive materials storage areas.

(d) By following proper procedures in handing unsealed sources or ensuring availability of protective clothing to handle potential accidental release of radioactive material.

(3) The risk of radiation exposure is compounded by the fact that emissions from radioactive materials cannot be directly detected by any of the human senses. Significant levels of radiation exposure under emergency conditions could cause acute injury or death. Radioactive materials present no unusual fire hazards, because their fire characteristics are the same as the fire characteristics of the nonradioactive form of the same compound.

Radioactive materials may be expected to melt, vaporize, become airborne, or oxidize under fire conditions. The principal reason radioactive materials are sealed is to prevent the spread of contamination. A sealed source may burst if its contents are subject to fire. Under these conditions, it is conceivable that certain radioactive materials might be oxidized to a radioactive dust or smoke. In addition, such radioactive commodities may lose their integrity during storage and use, possibly releasing radioactive material and creating a potentially hazardous situation.

c. Applicable HCCs. The following HCCs should be stored in storage type A:

(1) A1, Licensed Radioactive Material (gamma emitters and unencapsulated alpha or beta emitters).

(2) A2, Licensable Radioactive Material (low risk) (nongamma and encapsulated alpha or beta emitters).

d. Storage Arrangement. Areas used for the storage of radioactive materials shall be kept to the minimum needed for adequate control. Radioactive materials shall not be stored in the same warehouse section with explosives, flammable materials, photosensitive items (e.g., photographic film), food products, or other incompatible commodities. Smoking, eating, and drinking shall be prohibited in areas where radioactive materials are stored and handled. Commodities that contain radioactive gases or radium should be stored in well-ventilated structures.

e. References. Additional information may be found in:

(1) MIL-STD-129, Marking for Shipping and Storing.

(2) DODI 6050.5, Hazardous Material Information System (HMIS).

(3) AR 700-64/DLAM 4145.8/NAVSUPINST 4000.34B/AFR 67-8/MCO P4400.105C, Radioactive Commodities in the DOD Supply Systems.

(4) MIL-HDBK-600, Guidelines for Identification, Marking, Labeling, Storage, and Transportation of Radioactive Commodities.

(5) NFPA Standard 801, Recommended Fire Protection Practice for Facilities Handling Radioactive Materials.

4-10. DOD Storage Type C: Corrosive Material Storage

a. Purpose. This area should be used to store liquid or solid materials classified by UN class 8 as corrosive materials. These materials may, in addition to being corrosive, be either acidic or alkaline.

b. Hazard Considerations. Materials packaged and labeled as corrosive have a destructive effect on tissue and a corrosive effect on both steel and aluminum. It should be noted that, on packages labeled as corrosive for transportation, no distinction is made between acidic or alkaline materials. If a corrosive material also meets the DOT criteria for classification as another hazard (e.g., oxidizer, flammable, poison, etc.), a second label describing the additional hazard will be affixed to the package. Many acids, when mixed with other acids, undergo hazardous reactions that may, in turn, result in an explosion. For this reason, each material must be individually evaluated to determine

specific storage and/or safety requirements. An additional problem arises in the case of material that is received in the warehouse, packaged and labeled for transportation as corrosive, but that later loses its transportation

label identity when the package is opened for issue. Since only the outer package or wrapping was labeled corrosive for transportation, the remaining units of the original package may not provide any indication that the material is corrosive. For example, wet electric storage batteries, transported as corrosive, are embossed with "EXPLOSIVE" and "POISON" warnings, but are not labeled as either for transportation. When the outer packaging, bearing the "corrosive" label, is removed and discarded, care must be taken to ensure that the material is treated as "corrosive" for storage purposes. Acetic acid, for example, must be protected against physical damage and separated from oxidizing materials. Storage near combustible materials must be avoided, and it must be kept above its freezing point (62ø F.) to avoid rupture of carboys and glass containers. Other corrosives must be protected from excessive heat. Organic acids should always be stored under automatic water sprinklers, whereas sprinkler protection is not required for mineral acids. Combustible and oxidizing acids must be appropriately segregated from each other and from other combustible or incompatible materials. It should also be noted that, although a building or area may be dedicated to corrosive storage, each material stored therein must be evaluated individually to determine its special storage and/or safety requirements. Peroxyacetic acid, for example, must never be stored on wooden pallets since a leak may cause a fire or explosion. Hydrochloric acid, on the other hand, should never be stored on a metal pallet since a leak may cause explosive hydrogen vapors to form.

c. Applicable HCCs. The following HCCs should be stored in storage type C:

(1) C1, corrosive, UN class 8, acid.

(2) C2, corrosive, UN class 8, alkali.

(3) D4, oxidizer and corrosive.

(4) J6, miscellaneous corrosives (alternatively may be stored in low hazard area (type L) if space is not available in corrosive area).

d. Storage Arrangement. Corrosives should be stored on pallets that are compatible with the material being stored. Pallet racks or box pallets may be used to store corrosive solids. The storage arrangement should permit constant surveillance and monitoring to detect leaking containers. When corrosive materials are stacked in pallet racks, incompatible materials should not be placed above or below each other. C1 acids and C2 alkalies are incompatible corrosives that should be separated by a wall or an aisle equal to or greater in width than the pile heights of the corrosives.

e. References. Additional information pertaining to the storage of corrosives may be found in:

(1) NFPA Standard 43A, Code for the Storage of Liquid and Solid Oxidizing Materials.

(2) National Safety Council Data Sheet 1-523-Rev 81, Chemical Burns.

(3) DLAM 6055.5-M, Occupational Safety Health Surveillance.

4-11. DOD Storage Type D: Oxidizer Material Storage

a. Purpose. This type of storage should be used for UN division 5.1 oxidizing materials.

b. Hazard Considerations. Several important groups of chemicals known as oxidizing agents readily yield oxygen or other oxidizing gases (e.g., chlorine, bromine, fluorine, etc.) for combustion. Although most oxidizing chemicals are not combustible, they may increase the ease of ignition of combustible materials and usually will increase the intensity of burning. A few oxidizing agents such as calcium hypochlorite, are unstable and susceptible to hazardous decomposition when in contact with moisture and

organic or other combustible materials. This situation provides all of the ingredients for a fire or explosion. Calcium hypochlorite should be stored in a cool, dry, and well-ventilated place, away from combustible materials.

c. Applicable HCCs. The following HCCs should be stored in storage type D:

(1) D1, oxidizer, U.S. DOT regulated.

(2) D2, oxidizer, low risk.

(3) J3, miscellaneous oxidizers (alternatively may be stored in low hazard area (type L) if space is not available in oxidizers area).

d. Storage Arrangement. Some general requirements are:

(1) The arrangement and quantity of oxidizers in storage depends upon their NFPA class (1, 2, 3, or 4), type of container, type of storage (segregated, cutoff, or detached), type of fire protection provided, and manufacturer's instructions.

(2) Approval of the storage arrangement should take into consideration the potential evolution of large quantities of toxic fumes that would present a severe hazard to surrounding areas.

(3) Oxidizers should be stored to avoid contact with incompatible materials such as combustibles, flammable liquids, greases, and those materials.

including other oxidizers, that could react with the oxidizer or catalyze its decomposition.

(4) Oxidizing chemicals should not be stored in the same storage area with combustible materials and flammable liquids. Combustible packaging and wood pallets may represent a severe hazard and should be eliminated from the ozidizers storage areas to the maximum practicable extent.

e. References. Additional information may be found in:

(1) NFPA 43A, Code for the Storage of Liquid and Solid Oxidizing Materials.

(2) Title 29 CFR, parts 1900-1910.

4-12. DOD Storage Type E: Explosive Material Storage

a. Purpose. The primary purpose of type E (magazine) storage is for DOD-managed ammunition and explosives assigned a DODAC. Low-risk explosives may also be stored in type E storage when space is available (1.43). Storage of military ammunition and explosives is addressed by specialized DOD and service directives and is beyond the scope of this manual.

b. Applicable HCCs. The following HCCs should be stored in storage type E:

(1) E1, explosive (military).

(2) E2, explosive in low-risk packaging arrangement (alternative to storage type L, if space available).

c. References. Additional information may be found in:

(1) DOD 6055.9-STD, Ammunition and Explosives Safety Standards.

(2) TM 38-400, Storage and Materials Handling.

4-13. DOD Storage Type F: Flammable Material Storage

a. Purpose. Flammable liquids, solids, and aerosols, UN division 3.1, 3.2, 3.3 and 4.1, and UN class 2 aerosols shall be stored in a flammable

storage area.

b. Hazard Considerations. Strictly speaking, flammable liquids do not "cause" fires; they are merely fuel. Flammable vapors, rather than liquids, in the presence of air and an ignition source cause fires. The principal hazard of storing closed containers is the rupture of the containers resulting from increased internal pressure when they are exposed to fire. This release and vaporization of liquid adds to the intensity of a fire and may cause the rupture of other containers, resulting in a rapidly spreading fire. Flammable solids include chemicals that are solids at 100ø F. or above. Flammable aerosols include flammable liquids in small pressurized spray cans such as hair sprays or paints that have a demonstrated ability to rupture violently from internal pressure when heated in a fire. Upon explosion, these items are fireballs; these rocketing projectiles may leave a trail of burning liquid. Aerosol products have been directly involved in and sometimes responsible for extensive, costly warehouse fires.

c. Basic Requirements. Flammable storage areas at facilities include detached flammable liquid warehouses and areas within general purpose warehouses that have been modified to make them acceptable.

(1) Outdoor storage of flammable liquid products in metal drums is not recommended. The risk associated with a pressure buildup in the drums due to thermal loading from the sun, and the likelihood of subsequent rupture, or drum failure due to corrosion or handling, creates a significant spill containment and environmental hazard. The cost of cleanup and negative public reaction to HM spills far exceeds the benefits of outdoor storage.

(2) Detached flammable liquids warehouses or areas within general purpose warehouses modified for the storage of flammables should include the protective features for HM storage identified in chapter 4, section II, paragraph 4-7 with additional consideration given to the following:

Aerosol Can Storage. Aerosol cans should be stored in a room separate from other flammables if space permits. A barrier should separate aerosol cans from other flammables, and it should be capable of containing aerosol cans that can become self-propelled projectiles and airborne sources of ignition. If aerosol cans must be stored in the same area with other flammables, then a wire mesh, expanded metal, or chain-link type of material should be used as a floor-to-ceiling or completely surrounding cage type barrier. Personnel access/egress must be addressed in accordance with NFPA 101, Life Safety Code. If access through the aerosol can barrier is required by MHE to service pallet racks, then a self-closing gate should be used to maintain the effectiveness of the barrier.

d. Applicable HCCs. The following HCCs should be stored in DOD storage type F:

(1) F1, flammable aerosol, IMDG 2.1.
(2) F2, flammable liquid, IMDG 3.1.
(3) F3, flammable liquid, IMDG 3.2.
(4) F4, flammable liquid, IMDG 3.3.
(5) F5, flammable liquid and poison.
(6) F6, flammable liquid and corrosive.

(7) F7, flammable solid, UN division 4.1.
(8) J1, miscellaneous flammable liquids (alternatively may be stored in

low hazard area (type L) if space is not available in flammables area).

(9) J2, miscellaneous flammable solids (alternatively may be stored in low hazard area (type L) if space is not available in flammables area).

e. Storage Arrangement. Liquids in containers should be stored on pallets or pallet racks subject to the quantities and height limits prescribed in Title 29 CFR. Storage racks, either single- or double-row, should be used.

f. References. Additional information may be found in:

(1) NFPA standard 231C, Rack Storage of Materials.

(2) NFPA standard 30, Flammable and Combustible Liquids Code.

(3) Title 29 CFR, section 1910.106.

4-14. DOD Storage Type G: Compressed Gas Cylinder Storage

a. Purpose. The following products should be stored in this area:

(1) Filled cylinders containing compressed gases classified by DOT as poison, flammable, or nonflammable for transportation.

(2) Filled cylinders containing compressed gases classified by DOT as poison, flammable, or nonflammable but having the additional hazard of being oxidizers, corrosives, or poisons.

(3) Filling cylinders assigned a DOT hazard classification of flammable liquid, poison (B), or other hazard.

(4) New, purged, and clean cylinders that have not been used and that contain a positive pressure of dry, oil-free air or nitrogen.

(5) Previously used but still clean and serviceable cylinders that have been cleaned of all HM, purged and charged with a positive pressure of an inert gas (e.g., nitrogen) or dry, oil-free air.

(6) DOT specification 4 and 4L cylinders classified as new for transportation and storage purposes. These cylinders contain a porous filler saturated with flammable acetone or a similar solvent but are not regulated for purposes of transportation and storage.

b. Hazard Considerations. Cylinders may contain poisonous, flammable, corrosive, reactive, oxidizing, or other HM. Many cylinders are filled with hazardous and nonhazardous gases under moderately or extremely high pressures. The prolonged storage of cylinders at temperatures in excess of 125ø F., may also cause leakage, distortion, failure of safety release devices, or explosion. Care must be exercised to ensure that unprotected valve outlets are not physically damaged during storage and handling.

c. Basic Requirements.

(1) All storage facilities for compressed gases should be separated from other buildings by at least 50 feet. Compressed gases should be stored in roofed, open-sided sheds on an above-grade concrete slab if climatic conditions are favorable and security precautions are adequate. Sheds should be constructed of light, noncombustible materials. Cylinders of flammable gases and gases that support combustion must be stored in separate sheds with a distance of at least 50 feet between sheds or by an approved firewall or fire barrier. The storage arrangement should protect the cylinders from direct exposure to sunlight.

(2) An enclosed storage facility, if used, should be a single-story detached, compressed gas warehouse or cutoff area within a general purpose warehouse modified for the storage of compressed gases. It should include the protective features for HM storage identified in chapter 4, section II, paragraph 4-7. In addition, consideration should be given to the recommendations identified for the specific hazards associated with each cylinder (e.g., chap 4, sec. II, flammables 4-13; poisons par 4-8; corrosives -par 4-10; and oxidizers par 4-11 outlined under each type of HM storage in this chapter.

d. Applicable HCCs. The following HCCs should be stored in storage type G:

(1) G1, gas, nonflammable, poison.
(2) G2, gas, flammable, nontoxic.
(3) G3, gas, nonflammable, nontoxic.
(4) G4, gas, nonflammable, oxidizer.
(5) G5, gas, nonflammable, corrosive.
(6) G6, gas, nonflammable, poison, corrosive.
(7) G7, gas, nonflammable, poison, oxidizer.
(8) G8, gas, flammable, poison.
(9) G2, gas, nonflammable, poison, corrosive, oxidizer.

e. Storage Arrangement. Storage aids for compressed gas cylinders should be noncombustible and should include steel edge protectors, frames and frame supports, separators, battens, and pallets. Cylinders of compressed gases should not be stored near readily ignitable substances or combustibles. Precautions should also be taken to ensure that cylinders are not stored near unprotected platform edges or in other locations where they are likely to be struck by heavy, moving

object or MHE. Storage temperatures should not exceed 125ø F. as measured at the surface of the cylinder. When stored inside, cylinders should not be stored near exists.

f. References. Additional information may be found in:

(1) Title 29 CFR, section 1910.101.
(2) DLAR 4145.25, Storage and Handling of Compressed Gases and Liquids in Cylinders.
(3) MIL-STD-147, Palletized Unit Loads.
(4) TM 38-400, Storage and Materials Handling.

4-15. DOD Storage Type L: Low Hazard Material Storage

a. Purpose. This area should be used to store products that are classified as low-risk HM.

b. Hazard Considerations.

(1) For purposes of this chapter, it would be impossible to provide a detailed listing of all the products involved and the rationale for their classification as low-risk HM. Low risk is generally assigned on the basis of physical and chemical properties of the material and packaging in limited quantities. Although not regulated by DOT for transportation purposes, these materials contain constituents that could be hazardous under circumstances other than routine storage and handling. Because of the hazardous constituents involved, HCCs have been assigned for purposes of storage and handling within DOD. Sodium bicarbonate, saline solution, calcium chloride, and distilled water, for example, are assigned NSNs in FSC 6800 (Chemicals), but are handled as low-risk HM under normal storage and handling conditions. Sealed, leakproof Ni-Cad batteries, corrosive and sometimes toxic, are exempted from DOT regulations, as are certain chemicals, and photographic packs are exempted because the packaging is virtually indestructible during normal handling. Similarly, lantern mantles, containing thorium or cerium nitrate, are assigned an HCC as a radioactive material but are exempted from DOT regulations.

(2) Low-risk explosive materials should be packaged and labeled in accordance with UN division 1.4 explosives or U.S. DOT or international regulations for class C explosives, respectively. UN division 1.4 includes substances and articles that present only a small hazard in the event of ignition during transportation. The effects are largely confined to the package, and no projection of fragments of appreciable size or range is expected. When exposed to external fire, virtually instantaneous explosion of most of the package's contents must not occur. To be classified as a class C explosive by the U.S. DOT, there must be a demonstrated ability to confine blast effects of a detonation to the package as prepared for transportation, and without propagation of detonation to similar packages that surround it. In a fire, all blast or projection effects are limited to the extent that they do not significantly hinder firefighting or other emergency response efforts in the immediate vicinity of the package.

(3) HM which has been grouped as "general" miscellaneous HM should be stored in similar primary hazard storage areas if space permits (e.g., J1 and J2 in type F, J3 in type D, J4 in type P, J5 in type T, and J6 in type C). The risk to be avoided to the extent practicable in these situations is the one encountered through the accumulation of "general" miscellaneous HM in sufficient quantities to create a high risk storage situation.

c. Basic Requirements. Since the materials are assigned a low-risk hazard classification, they may be stored in a modified general purpose warehouse as described in paragraph 4-7.

d. Applicable HCCs. The following HCCs should be stored in storage type L:

(1) A2, radioactive, licensable (low risk) (must be in security storage or alternatively stored in dedicated radioactive material storage type A).

(2) A3, radioactive, license exempt.

(3) C3, acid, (low risk).

(4) C4, alkali, (low risk).

(5) E2, explosive (low risk) (alternatively may be stored in an explosive area (type B) if space is available).

(6) F8, combustible liquid.

(7) J1, miscellaneous flammable liquids (should be stored in flammables area (type F) if space is available).

(8) J2, miscellaneous flammable solids (should be stored in flammables area (type F) if space is available).

(9) J3, miscellaneous oxidizers (should be stored in oxidizers area (type D) if space is available).

(10) J4, miscellaneous organic peroxides (should be stored in organic peroxides area (type P) if space is available).

(11) J5, miscellaneous poisons (should be stored in poisons area (type T) if space is available).

(12) J6, Miscellaneous corrosives (should be stored in corrosives area (type C) if space is available).

(13) J7, miscellaneous UN class 9.

(14) J8, miscellaneous ORM-E (other regulated material-E).

(15) M1, magnetized material.

(16) N1, nonhazardous material.

(17) P2, peroxide, organic, (low risk) (alternatively may be stored in organic peroxide area (type P) if space is available).

(18) T5, pesticide (low risk).

(19) T6, poison, food contaminant.

(20) T7, health hazard.

e. Storage Arrangement. Storage aids should offer the most practical and efficient use of space while simultaneously protecting the material from physical damage. Such aids may consist of pallet racks, pallet support sets, bins, cantilever racks drive-through racks, and gravity flow racks. Bulk storage space should be available to accommodate single height palletized loads of material that do not require storage aid support. Stacking heights of materials to be stored should be limited based on ceiling heights, material weight, floor load weight limitations, and minimum clearance required to accommodate fire suppression equipment.

f. References. Additional information may be found in:

(1) Title 29 CFR, part 1910.

(2) ASNI/NFPA standard 101, Life Safety Code.

4-16. DOD Storage Type P: Organic Peroxide Material Storage

a. Purpose. This storage area should be used to store those DOT-regulated organic peroxide formulations that are classified by NFPA standard 43B as class I, II, or III. Classes IV and V are considered low risk and may be stored in either type L or P storage.

(1) Class I describes formulations that are capable of deflagration but not detonation.

(2) Class II describes formulations that burn very rapidly and present a severe reactivity hazard.

(3) Class III described formulations that burn rapidly and present a moderate reactivity hazard.

(4) Class IV described formulations that burn in the same manner as ordinary combustibles and present a minimal reactivity hazard.

(5) Class V describes formulations that do not sustain combustion and present no reactivity hazard.

b. The organic peroxides that fall under NFPA classes I, II, and III are required to be labeled with a DOT "ORGANIC PEROXIDE" label for transportation purposes, which also facilitates directing them to type P storage. Classes IV and V may or may not be identified with the DOT "ORGANIC PEROXIDE" label.

c. Hazard Considerations.

(1) Class I organic peroxide formulations present a hazard through easily initiated, rapid, explosive ignition. Class I may include formulations that are relatively safe only under closely controlled temperatures. Excessively high or low temperatures may increase the potential for severe explosive decomposition.

(2) Class II organic peroxide formulations present a severe fire hazard similar to that presented by class I flammable liquids (F1 and F2); however, the decomposition is not as rapid, violent, or complete as that produced by class I formulations. As with class I formulations, this class may include formulations that are relatively safe under controlled temperatures or when diluted.

(3) Class III organic peroxide formulations present a fire hazard similar to a class II combustible liquid (F3). They are characterized by rapid burning and high heat liberation, due to decomposition.

(4) All organic peroxide formulations are incompatible with strong acids, strong alkalis, strong oxidizers, acetone, transition metal salts, promoters, and reducing agents.

d. Basic Requirements. Detached organic peroxide storage areas within general purpose warehouses modified for the storage of organic peroxides should include the protective features for HM storage identified in chapter 4, section II, paragraph 4-7 with additional consideration given to:

(1) All storage areas containing organic peroxide formulations should be conspicuously identified by the words "ORGANIC PEROXIDE" DOT placards are acceptable) and by class, and if more than one class is stored in the same area, then it should be marked for the most severe class present.

(2) Packages containing organic peroxides requiring temperature control should be marked with the recommended storage temperature range, and they should be stored in an environment within that range (i.e., refrigerated).

e. Applicable HCCs. The following HCCs should be stored in storage type P:

(1) J4, miscellaneous organic peroxides (alternatively may be stored in low hazard area (type L) if space is not available in organic peroxides area).

(2) P1, peroxide, organic, (regulated), NFPA classes I, II, and III.

(3) P2, peroxide, organic, (low risk), NFPA class IV (alternative to storage type L, if space available).

f. Storage Arrangement. Storage areas should be arranged in a manner that facilitates manual (4-foot aisles) and/or MHE (10-foot aisles) access and handling, maintains stability, allows inspections, and promotes good housekeeping. The quantity of organic peroxide formulations and pile height/ width limits stored in a single area should not exceed the maximum allowable quantities specified in table 2-11 of NFPA standard 43B. Unsealed or open packages of organic peroxides should not be permitted in the storage area at any time. Fifty-five gallon drums of organic peroxides should be stored only one-drum high. Incompatible materials should not be stored in the same storage area with organic peroxides. Bulk storage in the and piles should not be permitted.

g. Reference. Additional information can be found in NFPA standard 43B, Code for the Storage of Organic Peroxide Formulations.

4-17. DOD Storage Type R: Reactive Material Storage

a. Purpose. This storage area should be used to store materials that are air and/or water reactive (spontaneously combustible or pyrophoric) or water reactive (dangerous when wet), but not simultaneously in the same room.

b. Hazard Considerations. The risk of fire is the principal hazard associated with spontaneously combustible or water reactive (dangerous when wet) materials. Some of these materials may also emit toxic gases when burning. Nearly all HM handled by facilities and classified as spontaneously combustible or dangerous when wet are flammable. However, since such materials may ignite upon contact with air and/or water, they should not be stored with flammable liquids or solids because they provide the ignition source required for flammable materials to catch fire. Title 49 CFR requires that these materials be packaged in clean, dry, waterproof, airtight containers such as DOT specification 37A, single-trip drums, when offered for transportation. The same packaging requirement also applies to these materials when stored at freight terminals or warehouse facilities. These

materials do not present an unacceptable storage risk when (1) properly stored in an environment compatible with the material, (2) stored in original containers, (3) handled with care to avoid container damage, and (4) the manufacturer's recommended shelf-life items are not exceeded. The following additional hazard considerations for water and/or are reactive materials also apply:

(1) Significant fire hazards are associated with spontaneously combustible materials that may be water and/or are reactive. Significant quantities of heat are released during reactions, making combustible material capable of self-ignition. Therefore, incompatible materials should not be permitted in reactives storage areas. Materials such as aluminum hydride, aluminum alkyls, yellow phosphorous, and other similar chemicals must be stored in a manner that prevents contact with air. Yellow phosphorous, for example, must be stored underwater. On the other hand, materials such as aluminum alkyls that react with both air and water must be stored under a liquid or gas that is inert to the material.

(2) Dangerous when wet water reactive materials such as anhydrides, carbides, hydrides, sodium hydrosulfite, and similar chemicals, must be stored in dry areas and kept off the floor by use of pallets or rack storage. Dangerous when wet materials should never be stored directly beneath active water sprinklers.

c. Basic Requirements. A modified general-purpose warehouse storage area should be used for the storage of reactive materials. Particular emphasis should be placed on the type of floor construction and its maintenance. There should be no basement or depressions below the storage area into which water cold flow or fall. Specific requirements for reactives storage areas include:

(1) for R1, spontaneously combustible materials, specific storage requirements should be evaluated on a case-by-case basic. Source of storage information include the manufacturer of the material, technical information data sheets or pamphlets, MILSPECS, and other DOD sources.

(2) R2, dangerous when wet materials, should be stored in the original shipping container or in a compatible container of equal or greater strength. Storage areas should be conspicuously posted with signs or notices indicating "DANGEROUS IF NOT KEPT DRY KEEP WATER AND FLAMES AWAY" or equivalent wording.

d. Applicable HCCs. The HCCs of materials to be stored in this storage area include:

(1) R1, reactive chemicals, flammable, includes:

(a) Spontaneously combustible materials, UN division 4.2, as labeled for transportation under the ICAO Technical Instructions or the IMDG Code.

(b) Pyrophoric liquids that ignite in dry or moist air at or below a temperature of 130ø F as defined in Title 49 CFR, section 173.115.

(c) Spontaneously combustible pyophoric solids as listed in Title 49 CFR, section 173.150.

(2) R2, water reactive chemicals, includes:

(a) Dangerous when wet materials, UN division 4.3, as labeled for transportation under the ICAO Technical Instructions or the IMDG Code.

(b) Materials required by Title 40 CFR, section 172.101, to be labeled

both "FLAMMABLE SOLID" and "DANGEROUS WHEN WET."

e. Storage Arrangement. Reactive materials should be palletized in a manner that prevents direct contact between the material and the floor or ground. Pallet racks or single height stacks should be used to prevent excessive stress on the containers. MHE and load width will dictate the amount of aisle space required. All aisles should be kept clear of obstructions.

(1) Particular emphasis should be placed on the physical condition of the package or container in which the item is stored. Packages should show no evidence of damage or deterioration, and all warning statements or labels shall be completely legible. Care shall be exercised to ensure that warning statements and labels are not covered or obliterated when applying tape. Items should be arranged in a manner that will facilitate both periodic inspection and adherence to the FIFO principle of issue control. These materials should not be stored in Supply Condition Code A beyond the manufacturer's shelf-life expiration date.

(2) Water reactive materials and materials that are both water reactive and pyrophoric should not be stored in a facility equipped with active overhead water sprinkler systems. The specific area of a facility used for the storage of water reactive materials should be isolated by a water-proof or water resistant barrier (e.g., plastic sheeting or tarpaulin) to protect materials from water in the event the sprinkler system is activated elsewhere in the facility. Prior to storing reactive materials, all combustible rubbish, dry or oiled paper wrapping material, and other combustible materials shall be removed from the storage area. The area should be conspicuously marked or posted to indicate the material being stored. Access to the reactive materials storage area should be restricted. Personnel should not be permitted to enter the area unless accompanied by an individual familiar with the hazards of the material stored in the area.

f. References. Additional information may be found in:

(1) Title 29 CFR, part 1910.

(2) ANSI/NFPA standard 101, Life Safety Code.

4-18. DOD Storage Type T: Poison Material Storage

a. Purpose. This area should be used to store packaged materials classified by DOT and UN class/division 6.1 as poison.

b. Hazard Considerations. The release of materials stored in this area 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. Such materials may be flammable, combustible, oxidizing, or corrosive, in addition to being poisonous. Determining a suitable storage area for material assigned the single hazard poison, for example, may be relatively simple. When a poison is assigned a secondary hazard, the material must be further segregated in storage on the basis of the combined hazard. To avoid the risk of fire or explosion, for example, material assigned hazard classifications of both poison and oxidizer cannot be permitted to come into direct contact with flammables or combustibles. Determination of a suitable storage area for materials assigned multiple hazards, however, must be made on a case-by-case basis and must consider both the primary and secondary hazards. The storage layout plan should provide for positive horizontal and vertical isolation of incompatible materials. Isolation may be achieved by using separate inside storage or detached storage.

c. Basic Requirements. Poison storage sites should be selected with due regard to the amount, toxicity, and environmental hazards of the poisons

stored, and the number and size of containers to be handled. Storage areas containing poisons shall be conspicuously marked with signs or placards identifying them. The manufacturer's recommendations regarding the temperature range required to maintain the effectiveness of pesticides to be stored would be considered when determining the suitability of a particular poisons storage area for individual pesticides. The ventilation system should maintain the poisons storage areas at a lower pressure than the servicing staging areas and access aisles. There should be a means to verify airflow such as a manometer or suspended air strips.

(1) *Access/Egress.* Provisions should be made to prevent unauthorized entry with door locking mechanisms that do not impede emergency exits.

(2) *Spill Control and Containment.* Particular emphasis should be placed on control and containment of water sprinkler runoff because of the insidious threat to personnel and animals of the HM stored in the poisons storage areas.

d. Applicable HCCs. The following HCCs should be stored in storage type T:

(1) D3, oxidizer and poison.

(2) F5, flammable liquid and poison.

(3) J5, miscellaneous poisons (alternatively may be stored in low hazard area (type L) if space is not available in poisons area).

(4) K1, infectious substance.

(5) K2, cytotoxic drug.

(6) T1, DOT poison-inhalation hazard.

(7) T2, UN poison, packing group I.

(8) T3, UN poison, packing group II.

(9) T4, poison, food contaminant.

(10) X1, carcinogen.

e. Storage Arrangement. Pallet racks, box pallets, or shelving should be used when vertical storage is required. Poisonous materials should be stored in a manner that will prevent direct contact of the material with the floor. Only compatible materials of the same hazard class should be placed in any single vertical rack. Materials with multiple hazard classes should be placed in separate vertical racks. Poisons should not be stored, even temporarily, next to food, food items, or other items intended for consumption by humans or animals. Cyanides and cyanide mixtures must not be stored with acids or acidic materials to prevent their accidental combination and the subsequent release of hydrogen cyanide.

(1) Access to areas where cytotoxic drugs are stored should be limited to authorized personnel. Such areas should be posted with a large warning sign, a list of all drugs covered by cytotoxic drug policies, and a sign detailing spill response procedures. Detailed spill procedures are contained in chapter 8. If possible, facilities used for storing cytotoxic drugs, should not be used for other drugs and should be designed to prevent drugs from falling to the floor. Warning labels should be applied to all containers as well as to shelves and bins where these containers are permanently stored.

(2) To prevent diversion to unlawful use, cyanide in pallet or other easily pilferable forms shall be accorded high security, sensitive item

storage status.

f. References. Additional information is available in:

(1) Title 29 CFR, section 1910.106, Criteria for Flammable and Liquid Warehouses or Storage Buildings.

(2) Title 40 CFR, section 165.10, Recommended Procedures and Criteria for Storage of Pesticides and Pesticide Containers, and NFPA standard 43D, Procedures and Criteria for the Storage of Pesticides.

(3) Title 49 CFR, section 177.848(b), Segregation and Storage of Hazardous Materials.

(4) Title 29 CFR, part 1910, subpart Z, Toxic and Hazardous Substances.

(5) DODI 6055.1, Department of Defense Occupational Safety and Health Program.

Section III. Storage Quality Control

4-19. General

The general purpose of the storage quality control program is to assure compliance with established DOD storage management principles, and regulatory requirements of Titles 29, 40, and 49 CFR. In addition to the quality control procedures contained in local SOPs, installation quality control programs should provide for rigid compliance with the principles described in the following paragraph to assure achievement of hazardous waste minimization goals.

4-20. FIFO Method

a. The basic principle affecting the storage quality control plan is the FIFO method. Care must be taken to ensure that HM items with the least remaining shelf-life are arranged in the storage location in a manner that will allow access while minimizing the need to move or handle such material.

b. Action will be taken to ensure that all HM shelf-life items are assigned a shelf-life code. If a shelf-life code has not been assigned to an item that is in fact a shelf-life item, HM may deteriorate in storage and, in turn, introduce unnecessary safety or health risks.

4-21. Surveillance Programs

Necessary surveillance will be provided to ensure that HM items are always in a ready-for-issue condition in accordance with applicable DOD standards or other appropriate technical documentation. Storage personnel performing routine surveillance should be alert for expired shelf-life dates for which examination instructions have not been received, to ensure that the Quality Control Office is notified when expired stocks are discovered.

4-22. Disposal of Excess Stocks

Once it is determined that HM shelf-life items are excess and disposal action is required, they should be processed through the DRMO or recoupment facility, as appropriate, without delay. Prompt disposal action will reduce disposal cost and lessen other environmental problems. Some States, under their environmental laws, interpret the expiration of shelf-life for HM as the point at which the item becomes classifiable as hazardous waste. See

chapter 13 for procedures to process HM to DRMO.

4-23. Control of Storage Locations

a. Installations will ensure that procedures are established to provide for positive control of all HM removed from permanent storage locations to temporary storage areas, packaging, or the recoupment facility, for correction of deficiencies detected during routine surveillance inspection.

b. Necessary surveillance will be provided to ensure that all HM in storage has been assigned the proper HCC and that such material is in fact stored in the proper storage area.

4-24. Physical Inventory of HM

a. The policies, responsibilities, and procedures for conducting physical inventories of stored material are contained in DODI 4140.35. Unless otherwise announced by the manager, inventories of HM will be conducted at the same frequency as those for nonhazardous materials. Because of the risks associated with HM, variations between quantities and condition of material in stock and the item balance records must be identified and reconciled without delay.

b. Before being permitted to participate in physical inventories of HM, personnel shall be thoroughly indoctrinated in the hazards involved. Refer to chapter 11 of this manual for training requirements.

CHAPTER 5

ISSUE OF HAZARDOUS MATERIALS

Section I. General

5-1. Purpose and Applicability

a. The issue function is a critical function for the entire logistics operation. The basic objective is to satisfy the customers' demands on time and at the lowest cost possible to the Government. In the case of HM, however, cost considerations must include the additional effort required to ensure compliance with regulations designed to minimize the risk of environmental damage and cost associated with cleanup and disposal of hazardous wastes. At the time of stock selection, much of the material will not be packaged for transportation. Because of the additional costs associated with the movement of HM, it is essential that it be properly identified and segregated during movement from storage locations to the packaging branch. It is equally important that sound judgment be exercised when consolidating HM for shipment to ensure compliance with Federal regulations. This chapter provides procedures for segregation of MROs by compatibility group, for stock selection, for movement of material to packaging, and for consolidation of material into SUs and TUs to fill demands within established UMMIPS timeframes.

b. The provisions of this chapter apply to all personnel involved in processing MROs, selecting stock, staging, and moving HM to the packaging line.

5-2. Planning and Coordinating the Operation

The effectiveness of the shipping operation depends on how well storage branch operations have been performed during the stock selection process. In some cases, the only indication that the material is hazardous will be that it is located in a warehouse dedicated to the storage of HM. DOT shipping and warning labels may have been removed, since outer packaging is discarded when unit packs are broken to satisfy requirements for less than a unit pack. Although the material will again be properly packaged and labeled for transportation upon its arrival at the packaging line, provisions must be made for effective segregation from the time of selection from stock until movement to the line. Transportation load planning for HM must be in accordance with the load/compatibility requirements specified by the regulation or tariff governing the mode of transportation selected. Effective coordination is required, therefore, between the storage branch, the packaging branch, and the facility transportation officer. Outgoing shipments must be consolidated into SUs and, in turn, into TUs to minimize costs.

5-3. Impact of Federal Regulations on Issue Operations

HM arrive at the installation packed and labeled in accordance with the provisions of Title 49 CFR. During the storage period, the material is subject to the provisions of Title 29 CFR and to DOD regulations. When the material is removed from stock and prepared for reentry into domestic and international transportation systems, the provisions of Title 49 CFR again become applicable.

5-4. Hazardous Waste Minimization Responsibilities

Hazardous waste minimization responsibilities outlined in chapter 3 are generally applicable to material issue operations. However, the following measures are of particular importance during stock selection and movement of material to the packaging line:

a. Unless otherwise excepted by DOD Directive 4140.27-M, stock selectors will strictly adhere to the FIFO principle. Issues will be directed against the oldest stocks or those with the least remaining shelf-life unless those stocks are restricted from issue to specific units, activities, or geographical areas due to short shelf-life expectancy (e.g., Supply Condition Code B or C).

b. During the course of stock selection, employees must be alert to HM for which the shelf-life has expired and for packages that have been damaged during storage.

c. Precautions must be taken to prevent accidental damage to materials during removal from storage locations and subsequent movement to staging areas or the packaging line. Release of hazardous substances discovered during stock selection will be reported in accordance with the provisions of chapter 8 as otherwise specified herein.

Section II. Issue Processing

5-5. Processing (MROs)

a. MROs will be received via AUTODIN or other means. Each MRO will be mechanically subjected to a validation audit to assure that all essential data are as complete as possible. Unacceptable or invalid MROs will be returned to the originator.

b. Acceptable MROs will be subjected to additional computer processing prior to release for issue processing. With the exception of NSNs assigned HCC A1 (Radioactive, Regulated), MROs will be consolidated into SUs based on the equality of the NSN, CAGE, and CAGE Variation Code. SUs will, in turn, be consolidated into TUs based on load/storage compatibility requirements specified by DOT, ICAO, IMO, and DLAM 4145.3 as applicable. MROs will be further batched into location sequences based on HCCs to aid in maintaining segregation of incompatible materials during the stock selection process.

5-6. Stock Selection Procedures

a. Upon arrival at the storage area, the MROs will be distributed in the sequence of picking station, transportation priority by consignee, and straight or serpentine location sequence.

b. Material will be selected from stock based on the data contained in DD Form 1348-1 (DOD Single Line Item Release/Receipt Document) (e.g., location, condition, quantity, NSN, etc.). The exact quantity specified in the MRO will be selected whenever possible. An exception to this requirement may be made when a standard package is involved. When a contractor-supplied intermediate package of HM assigned an RQ in accordance with Title 49 CFR is broken, precautions must be taken to ensure that the item's RQ designation is not lost during issue processing. The 1987 SARA amendments to Title 49 CFR require that the individual containers be marked with the RQ at the packaging line. Marking procedures for this purpose are addressed in Title 49 CFR, chapter VI. To ensure that the RQ identity of the item is perpetuated from the time of issue at the storage location throughout staging and movement to the packaging line, a label or tag will be affixed to each individual container indicating the RQ for the item as it appeared on the intermediate package.

c. In addition to the RQ tag or label, Title 29 CFR, part 1910.1200, requires that each container of hazardous chemicals leaving the installation be labeled, tagged, or marked with (1) the identity of the hazardous chemical(s), (2) appropriate hazard warnings, and (3) the name and address of the chemical manufacturer, importer, or other responsible party. New labels need not be affixed if existing labels already convey the required information. Required labels or tags will be developed locally pending issuance of DOD guidance.

d. When the quantity in location is not sufficient to satisfy the MRO quantity, and a CAGE-variated coded item is available in that location, the MRO will be split into two shipments. To ensure the maintenance of shipment integrity, the original TCN will be maintained.

e. If the required quantity is not available in the location shown in the MRO, the MRO will be processed in accordance with criteria developed by each component.

f. Stock will be selected using the FIFO principle unless otherwise directed.

g. If the NSN selected is under inventory, the MRO will be annotated with the date and hour and forwarded to the inventory branch.

h. Upon completion of stock selection and completion of the SU or the scheduled packaging data, the material will be moved to the packaging line accompanied by the MRO and trailer.

5-7. Temporary Staging of HM

If circumstances dictate that material not be moved directly from storage to the packaging line, provisions must be made for staging the material in a manner that will preclude commingling of incompatible materials. The probability of accidental damage or release of hazardous substances is significantly increased during this phase of operations. In some cases, material originally received packaged and labeled for transportation will have lost its hazard identity when outer packagings and labels were discarded for some reason. It is imperative, therefore, that segregation requirements be rigidly maintained from the time material is removed from stock to the time it has again been packaged and labeled for onward transportation. If space considerations permit, the required segregation may be achieved by retaining the material in the immediate vicinity of the storage location or area from which it was selected. If an alternative central staging area is used, precautions must be taken to ensure that segregation is maintained throughout all movements until the material is received at the packaging line. Segregation requirements can be determined based on the hazard class of the material. As an alternative, storage personnel may refer to Title 49 CFR, part 174.81, 175.78, 176 (part D), or 177.848, for load/storage charts. Segregation requirements can also be

determined based on the information contained in figure 4-1, chapter 4.

5-8. Direct Shipments From Storage Areas

In some cases, it will be more practicable to issue and ship directly from the storage area than to move the HM to a staging area or freight consolidation area. This is particularly true in the case of drummed products or compressed gas cylinders stored in open, improved areas. Local procedures should be developed to provide complete control of issue and transportation documentation during such transactions. When issues are made directly from outdoor storage areas, the following requirements must be met before the material is removed from the installation.

a. The RQ, if applicable, must be clearly shown on the container(s) as required by the appendix to part 172.101, Title 49 CFR.

b. All materials must be properly labeled in accordance with the requirements outlined in Title 49 CFR, part 172.101 or 172.102, ICAO Technical Instructions, or in the IMDG Code.

c. All material intended for shipment by road or rail must be properly blocked and braced as required by Title 49 CFR, part 174.55 or 177.834. Specific blocking and bracing instructions are contained in chapter 7.

5-9. Material Found Damaged During Stock Selection

Packages found to be damaged or leaking during the stock selection process will be immediately reported to the supervisor. Operations in the immediate area will be suspended and will not be resumed until authorized by the supervisor. If the material can be repackaged, it will be processed through recoupment and returned to stock. If the material has been neutralized or overpacked by the spill response team, it will be processed as outlined in chapter 13 for DRMO.

5-10. Processing DROs

As DROs are received, they should be subjected to a validation audit in the same manner specified for MROs. In the case of HM, however, the material will not be removed from the stock location until the turn-in has been coordinated with the servicing DRMO. DRMO acceptance of physical custody of HM depends on a conforming storage determination by the DRMO and the availability of proper equipment and trained personnel to accept turn-in. Defense activities will forward turn-in documentation to the DRMO, which will, in turn, schedule a prereceiving visit to the facility. Physical custody of the material will be determined during this visit. Detailed procedures are contained in DOD 4160.21-M, Defense Utilization and Disposal Manual, and in local DRMO standard operating procedures.

5-11. Reports of HM Incidents

a. Notification of incidents involving personnel exposure to ionizing radiation, property damage, or releases of radioactive material will be made to the Nuclear Regulatory Commission and appropriate service/agency officials in accordance with DLAM 4145.8, and local directives.

b. In the event of an accidental release or spill of an item assigned an RQ, the report will be submitted in accordance with the provisions of chapter 8.

c. In the event of death, injuries necessitating hospitalization, or property damage occurring during temporary storage or loading of HM, notification will be made to DOT, if appropriate, and in accordance with the service/agency directives.

d. Title 29 CFR, part 1904.8, requires that an oral or written report be made to the nearest office of the Area Director of OSHA, U.S. Department of Labor, in the case of accidents involving a fatality or the hospitalization of five or more employees. This report will be made within 48 hours after the occurrence.

Section III. Issue Processing Quality Control

5-12. Minimum quality control procedures applicable to the issue or stock selection function shall incorporate additional periodic sampling procedures designed to ensure that:

a. The FIFO principle is adhered to in selecting stock for issue.

b. All reports and notifications are made in connection with accidental releases of hazardous substances or exposure to ionizing radiation occurring in connection with issue processing.

c. The identity of HM items assigned an RQ is perpetuated throughout the issue and packaging process.

d. Required segregation of HM is maintained from time and point of issue until material is moved to the packaging line.

CHAPTER 6

PACKAGING OF HAZARDOUS MATERIALS

Section I. General

6-1. Purpose and Applicability

a. This chapter outlines requirements for packing, marking, and labeling HM to ensure compliance with Federal and international regulations. Its provisions apply to all HM received, stored, and distributed by installations including commercially procured, low risk explosives not otherwise classified as military ammunition or explosives. DOD-managed explosive materials that have been assigned a DODAC are excluded from the provisions of this chapter.

b. The provisions of this chapter are applicable to all installation employees whose duties involve the care of supplies in storage or the packing, marking, and labeling of HM in preparation for shipment.

6-2. Installation Packaging Responsibilities

Installations supporting a packaging activity have the following responsibilities:

a. To repackage stored items as required by the results of periodic surveillance inspections. During this storage period, unknown and unsuspected deterioration and damage may occur if material is improperly preserved, packaged, or handled. The packaging materials may deteriorate during prolonged storage and thus fail to provide the required protection. This is particularly true in the case of HM.

b. To package repaired or modified items for storage or shipment. At the installation level, packages containing HM will occasionally require repackaging as a result of recoupment actions.

c. Packaging for outgoing shipments shall be in accordance with the specific requirements outlined in applicable transportation regulations or Title 49 CFR as a minimum.

6-3. DOD Packaging Program

a. All DOD elements are required to implement the provisions of DODI 4100.14, Packaging of Material. The purpose of this program is to protect and identify DOD-managed material for efficient storage, handling, and transportation, in consonance with OASD policy. This instruction requires that packaged material conform to the safety requirements of Title 49 CFR. Additionally, "the nature of the material shall determine the type and extent of protection required to meet the shipping, handling, and storage conditions expected during the material's life cycle." Therefore, if the material is a hazardous material and is expected to be shipped by a mode other than those covered under Title 49 CFR, then the material must be packaged according to the modal regulation anticipated.

b. The provisions of the following joint regulations are also applicable to installations:

(1) TM 38-236/NAVSUP PUB 504/AFR 71-8/DLAM 4145.7/MCC P4030.30, Preparation of Freight for Air Shipment. This manual contains information on fundamental principles and approved methods and techniques used when preparing military supplies and equipment for air shipment.

(2) DLAM 4145.2, Vol II/TM 38-230-2/NAVSUP PUB 503, Vol II/AFR 71-16/MCO P4030.21, Packaging of Material. This publication contains information on the fundamental principles and approved methods and techniques used in the protection of military supplies and equipment against deterioration and damage during shipment and storage.

c. Packages of HM, and hazardous wastes are also required to be marked and labeled in accordance with MIL-STD-129, Marking for Shipment and Storage.

6-4. Explanation of Terms

Definitions of the terms "package" and "packaging" may vary from one regulation or publication to another. The terms are defined in Title 49 CFR, section 171.8, as follows:

a. Package. Except for radioactive materials, "package" or "outside package" means a packaging plus its contents.

b. Packaging. Except for radioactive materials, "packaging" means the assembly of one or more containers and any other components necessary to assure compliance with the minimum packaging requirements of Title 49 CFR, and includes containers (other than freight containers or over-packs), portable tanks, cargo tanks, tank cars, and multiunit tank car tanks.

c. For radioactive materials, Title 49 CFR, section 173.403, defines "package" as the packaging,

together with its radioactive contents, as presented for transport. "Packaging" means the assembly of components necessary to ensure compliance with the packaging requirements of Title 49 CFR, section 173.403. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, and devices for cooling or absorbing mechanical shocks.

d. For purposes of this chapter, "packaging" encompasses the definition shown in subparagraph above and is expanded to include the additional elements of preservation, packing, and marking as traditionally used within DOD.

6-5. Hazardous Waste Minimization Responsibilities

The hazardous waste minimization responsibilities outlined in chapter 4, section I, paragraph 4-3 are applicable to packaging operations.

6-6. Impact of Federal and Other Regulations on Packaging Operations

a. Under authority of Public Law 93-633, Transportation Safety Act of 1974, the Secretary of Transportation issues policies, procedures, rules, and regulations governing all safety aspects of the transportation of HM. These rules and regulations are published in Title 49 CFR, parts 100 through 199, and apply to all HM offered for shipment. Hazardous wastes, however, are regulated by the EPA, which requires that hazardous wastes be packaged and transported in accordance with DOT regulations (Title 49 CFR).

b. In addition to complying with the provisions of Title 49 CFR, installations are conditionally authorized by DOT to package and transport HM in accordance with the requirements of the following international regulating bodies:

(1) The IMDG Code prescribes regulations designed to ensure compliance with the legal requirements of the International Convention for the Safety of Life at Sea for the transportation of HM by water. Shipments in accordance with the IMDG Code are specifically authorized by Title 49 CFR, sections 171.12 and 172.102.

(2) Title 49 CFR, section 171.11, authorizes shippers to package and transport HM by commercial passenger and cargo aircraft under regulations issued by the ICAO. These procedures, published in the form of ICAO TIs, establish requirements for the classification, labeling, marking, and

packaging of HM.

c. Other governing DOD and non-Government regulations will be addressed in section III.

6-7. Shipper's Certification

a. The Transportation Safety Act of 1974 states that no person will, by marking or otherwise, represent that a container or package for the transportation of HM is safe, certified, or in compliance with the law unless it meets all applicable regulations issued under authority granted by the act as stated in Title 49 CFR. The preparation, packaging, and marking of HM must, therefore, be accomplished by experienced personnel. Two certification requirements exist, and both are applicable to installations.

(1) The first requirement, imposed by Title 49 CFR, section 172.204, requires that the shipping papers for HM, offered for shipment by any mode, must bear a shipper's certification attesting that the shipment is properly classified, described, packaged, marked, and labeled, and that it is in proper condition for transportation by any mode.

(2) The second certification requirement, established by DOD, applies to shipments of HM by military air and DOD contract airlift. This certification requirement is prescribed in AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19/ DLAM 4145.3, Preparation of HM for Military Air Shipment. This joint directive requires that DD Form 1387-2, Special Handling Data/Certification, be completed by DOD personnel qualified in the preparation, packaging, and marking of HM. Specialized training is required every 2 years, and qualified DOD personnel must be authorized in writing by their unit commander to certify shipments. This training will satisfy the requirement for training stated in Title 49 CFR, section 173.1. Training requirements are addressed in chapter 11.

b. It should be noted that, while Title 49 CFR requires that HM being offered or transported be properly marked and labeled as such, it simultaneously expressly prohibits marking and labeling of material as hazardous when it is, in fact, not hazardous. Title 49 CFR, section 172.401, states that, with four exceptions, no person may offer transportation, and no carrier may transport, any package bearing a specified label unless that package contains a material that is hazardous and the label represents the hazard of the material in the package. Two exceptions pertain to air shipments made under authority of the ICAO TIs and water shipments made under authority of IMDG Code. Shipments of HM, both international and within the United States, are presently conditionally authorized to be shipped under the ICAO or IMDG systems as fully equivalent to Title 49 CFR, provided the trips involve both transportation by

aircraft or water and motor vehicle only. Transport of dangerous goods between the United States and Canada in accordance with the Canadian TDG Regulations is conditionally authorized by Title 49 CFR, section 171.12a. In addition, packages labeled in accordance with the UN recommendations "Transport of Dangerous Goods" (Orange Book) are authorized. While these systems may not agree precisely with Title 49 CFR, they nevertheless require that HM be classified as such.

Section II. Planning the Packaging Operation

6-8. General

Much of the difficulty associated with the storage, handling, and transportation of HM could be substantially reduced if the importance of proper packaging were recognized by all concerned. Packaging Branch personnel must, therefore, have a thorough understanding of the hazard class of the material to be packaged and the mode(s) of transportation that will be involved. In addition, they must ensure that the material being processed is safely packaged and, when offered for transportation, that it meets all packaging, marking, and labeling requirements contained in Title 49 CFR, military regulations, ICAO TIs, IMDG Code, TDG Regulations, or UN recommendations and MIL-STD-129.

6-9. Packaging Line Layout

General guidelines for planning a packaging line layout are contained in accordance with component directives. The actual layout, which will vary by installation, will be based on the total volume of material to be packaged, available space, and various other local operating conditions. In addition to basic layout factors, the requirements for the segregation of incompatible materials until they are packed, marked, and labeled for transportation must be considered. While a separate packaging line is not required for each hazard class or HCC, strict precautions must be taken to reduce the possibility of accidental commingling of incompatible materials during this phase of the operation.

6-10. Prepack Staging and Inspection

Immediately after the material is moved to the prepack staging area, it will be inspected for damage that may have occurred during stock selection or subsequent movement from the storage area to the packaging line. Installation employees performing this inspection must be aware that their failure to identify and correct deficiencies at this time may cause additional hazards during transportation. If inspection discloses that the damage or deficiency is minor (e.g., obliterated labels or markings, minor package abrasions or tears, etc.) and the material is not a pesticide, it may be moved directly to the packaging line where required repairs will be made. In the case of pesticides, corrective action will be taken in accordance with chapter 3, section VIII, paragraph 3-26. In the event of substantial package damage or evidence of leaks or suspected leaks, the supervisor will be notified and spill response procedures initiated in accordance with chapter 8.

6-11. Special Packaging Considerations

a. Title 49 CFR requires that packages containing HM or wastes be designed and constructed to remain intact under normal transportation and handling conditions. To prevent the release of HM, packages must be nonleaking and safe to handle, and their contents must be limited. Closures must be adequate to prevent leakage of contents under normal conditions. Gasketed closures must be fitted with gaskets of material not susceptible to deterioration by the contents of the container.

b. Nails, staples, and other metallic devices will not protrude into the interior of the outer packaging in a manner that will likely cause failures. All packages must be tightly and securely closed. When used, inside containers must be cushioned with suitable absorbent material to prevent breakage or leakage.

c. No container may be filled completely with liquid. A vacant space (e.g., outage, ullage, or headspace) will be provided to allow for expansion of the contents without rupturing or damaging the container. For containers of 110 gallons or less, sufficient outage must be provided so that the container will not be liquid full at 1300ø F. a means for computing ullage may be found in Title 49 CFR, section 173.116.

d. The following references may be consulted for more detailed packaging requirements:

(1) Title 49 CFR:

(a) Sections 171.11 and 173.6, General Standard Packaging Requirements for Shipments by Commercial Air.

(b) Section 173.21, General Standard Packaging Requirements for Forbidden Materials and Packages.

(c) Section 173.25, General Standard Packaging Requirements for Authorized Packaging Requirements for Authorized Packages and Overpacks.

(d) Sections 171.12 and 172.102, General Standard Requirements for International Shipments.

(e) Section 171.12a, Canadian Shipments and Packagings.

(2) AFR 71-4/TM-38-250/NAVSUP PUB 505/MCO P4030.19/DLAM 4145.3, Packaging Requirements by Military Air/DOD Contract Airlift.

Section III. Packing, Marking, and Labeling of Domestic Shipments

6-12. General

a. The first step in determining packing, marking, and labeling requirements is to select the mode of transportation to be used. This will be governed by the nature of the material, mode restrictions, transportation priority, required delivery date, weight and cube of shipment, cost of transportation, distance to be shipped, and mode(s) of transportation serving the installation and the consignee.

b. When the mode of shipment has been determined, specific packing, marking, and labeling requirements can be determined. Although a central data base may provide packaging personnel with information on packing, marking, and labeling requirements, they must have a working knowledge of the provisions of Title 49 CFR and other regulations governing the TDG.

6-13. Packaging Requirements

a. General packaging requirements for HM are outlined in Title 49 CFR, section 173.24. To ensure full compliance with the Hazardous Material Transportation Act, packaging must:

(1) Provide for strong and tight containment of the HM.

(2) Provide for compatibility of the packaging material with the contents of the package or container.

(3) Provide for no significant release of contents during transportation.

(4) Ensure that there is no mixture of materials that may reduce the effectiveness of the packaging through spontaneous increase of heat or pressure or through an explosion.

b. After the mode of shipment has been selected, the material has been inspected for packaging configuration and a proper shipping name has been

determined, packaging requirements, not otherwise available, may be obtained as follows:

(1) Using the proper shipping name assigned to the material, consult Title 49 CFR, section 172.101. The HM table shown in this section applies to shipments by air, rail, and road. Reading across the table from the proper shipping name to column (5), it will be observed that the "packaging" column is further subdivided into columns (a) and (b).

(2) Column (5)(a), titled "Exceptions," must first be reviewed to determine if "limited quantity" exceptions have been made for the material to be shipped. If an exception has been made, a specific section of Title 49 CFR will be cited. If the exception provisions of that particular section coincide with the material being shipped, the material may be exempted from DOT labeling and specification packaging requirements.

(3) Column (5)(b), titled "Specific Requirements," refers the packer to the section of Title 49 CFR which details specific packaging requirements when the material does not meet the criteria for limited quantity exception.

c. A guide to determining packaging requirements is shown in appendix E, of this manual.

6-14. Marking Requirement

a. General. HM offered by installations for shipment must be marked in accordance with the requirements outlined in Title 49 CFR, part 172, subpart D, and MIL-STD-129. Unless otherwise provided for in that section, HM having a rated capacity of 110 gallons or less must be marked with the proper shipping name and an identification number. The identification number will be preceded by U.N. (United Nations) or N.A. (North American), as appropriate. Identification numbers may be found in Title 49 CFR, section 172.101 or 172.102. The marking requirements of Title 49 CFR does not apply to the following:

(1) Packages determined by the installation to have been previously correctly marked as required for the materials they contain.

(2) The display of identification numbers on packages containing "limited quantities" of HM as outlined in Title 49 CFR, section 171.8.

(3) Materials classed as Other Regulated Material, Consumer Commodities, ORM-D, when packaged with no other HM.

(4) Packagings having a rated capacity of 110 gallons or less if packaged for shipment prior to 1 July 1983.

b. Title 49 CFR, section 172.312, requires that liquid HM have "This Side Up" or "This End Up"

orientation markings. In addition, packages should have orientation arrows when the package has inner containers filled with a liquid. This requirement does not apply to limited quantities or ORMD Consumer Commodities of flammable liquids under the conditions outlined in Title 49 CFR, section 172.312.

c. ORM material must be marked or labeled with the appropriate ORM designation within a rectangle or on an attached tag if the designation cannot be printed or affixed to the package.

d. Title 49 CFR, part 107, subpart B, prescribes procedures for obtaining administrative relief from the provisions of DOT requirements. These DOT

exemptions are granted on the basis of equivalent levels of safety or levels of safety consistent with public interest and the policy of the Hazardous Material Transportation Act. Since a number of exemptions are used by DOT, such packages must be identified with "DOT E" followed by the assigned four-digit number (e.g., DOT-E 7573, etc.).

e. Title 49 CFR, section 172.324, requires that packages of 110 gallons or less that contain hazardous substances have the name of the hazardous constituent marked on the package if it is not included in the proper shipping name. Procedures for determining if an "RQ" must be marked on the package are discussed in paragraph 6-15.

f. When the inhalation toxicity of any material in a package falls within the criteria of title 49 CFR, section 173.3a(b)(2), the package will be marked "Inhalation Hazard" in association with the required label(s)

g. A guide for determining marking requirements is shown in section II, appendix D, of this manual

6-15. Reportable Quantity Determinations (For Less Than Unit Pack)

a. Certain materials are listed or designated as hazardous substances under section 101(14) of the CERCLA (Public Law 96-510). These items have been determined to be capable of having an adverse environmental impact if released. Consequently, these items have been assigned an RQ for the purpose of reporting releases; the RQ must be marked on the package in association with the proper shipping name. Any release of a hazardous substance in a quantity equal to or greater than its RQ must be reported in accordance with the procedures outlined in chapter 8 of this manual.

b. Installation personnel assigned to the packaging branch must be knowledgeable of methods for determining RQs and appropriately marking packages to ensure compliance with both Public Law 96-510 and Title 49 CFR. Title 49 CFR, section 171.8, describes a hazardous substance for RQ purposes as a material, including its mixtures and solutions, that

(1) Is listed in the appendix to section 172,101 of Title 49 CFR.

(2) Is in a quantity, in one package, that equals or exceeds the RQ listed in the appendix to section 171.101.

(3) When in a mixture or solution, is in a concentration by weight that equals or exceeds the concentration corresponding to the RQ of the material.

c. To determine whether a package must be marked with a RQ, the packer must refer to Title 49 CFR.

(1) For example, an intermediate package of calcium hypochlorite, NSN 6810-00-255-0471, contains 48, 6-ounce bottles. By consulting the HM table in section 171.101 of Title 49 CFR, it will be seen that the item is an HM assigned to the hazard class "oxidizer." This information indicates that an oxidizer label must be affixed to the package when shipped by air or when in excess of the "limited quantity" exceptions. The HM table also indicates that the proper shipping name for the material is "calcium hypochlorite mixture dry (containing more than 39 pct available chlorine)."

(2) After determining the proper shipping name and labeling requirements, the appendix to section 171.101 will be consulted to determine if the item is designated as a hazardous substance with a corresponding RQ. In this case, the item is listed with an RQ of 10 pounds, confirming its designation as both an HM and a hazardous substance.

(3) The next step in the process is to determine the quantity to be shipped in one package. The RQ is 10 pounds or 160 ounces. Assuming that the quantity selected from stock and forwarded for packaging and shipping is 26, 6-ounce bottles, it can readily be determined that the package does not require an "RQ" marking since the total weight of the 26 bottles is 156

ounces or 9.75 pounds, less than the RQ of 10 pounds. If the quantity being packaged, however, was 27 or more 6-ounce bottles, the total weight would be in excess of the 10-pound RQ, and if packed in a single package, it would have to be marked "RQ calcium hypochlorite" or "calcium hypochlorite RQ." Since the proper shipping name identifies the hazardous substance in the basic description, the words "calcium hypochlorite" are not entered in parentheses.

(4) The method for determining the RQ differs; however, if the calcium hypochlorite is an ingredient in a mixture or solution. In this case, installation personnel must refer to the (dilution) table shown below (Title 49 CFR, section 171.8):

RQ Pounds (Kilograms)	Concentrate By Weight	
	Percent	PPM
5,000 (2270).....	10	100,000
1,000 (454).....	2	20,000
100 (45.4).....	0.2	2,000
10 (4.54).....	0.02	200
1 (0.454).....	0.002	20

(5) If the calcium hypochlorite is an ingredient in a bleach, for example, and the concentration by weight is greater than 0.002 percent or 20 ppm, then the package must be marked "RQ." The words "calcium hypochlorite" in parentheses must be entered before or after the shipping name.

6-16. Limited Quantities of HM

a. Section 18 of the IMDG Code provides exemptions for dangerous goods in very small receptacles that comply with the size limits specified in the introduction to U.N. classes 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 8, and 9. These items are regarded by the code as presenting a negligible risk in transport; therefore, they need not be carried under the provisions of the IMDG Code.

b. The IMDG Code further provides that a competent authority may allow exemptions from the provisions of the code for dangerous substances in packaging groups II and III of classes 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.1, 8, and 9, in quantities larger than those referred to above, when such substances are dissolved in or mixed with nonhazardous substances so that the risk is considerably reduced. The actual quantities of the dissolved or mixed dangerous constituent must not exceed the quantities specified in the relevant subsection on total exemption from the provisions of the code in the section on the limited quantities in the introduction to classes 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 8, and 9. These exemptions are contained in CAC, which are issued by DOT and do not have an expiration date. Applications should be directed to the Exemptions and Approvals Branch (DHM-30), Department of Transportation, Washington, DC 20590.

c. Advantages of the CAC are that (1) packages do not require any IMO hazard class labels and containers do not require placards unless there are other commodities that require such labeling/placarding, (2) dangerous goods covered by the CAC are exempt from segregation requirements that would otherwise apply, and (3) packages may be marked "Consumer Commodities" in place of their technical contents, and no other markings related to HM regulations are needed. This applies only to dangerous goods that are transported in a closed freight container that is not opened during transport.

Section IV. Packing, Marking, and Labeling International Shipments

6-17. General

a. Since January 1983, installations and other shippers have been conditionally permitted, under authority of Title 49 CFR, section 171.11, to use ICAO TIs for the domestic or international shipment of HM by commercial aircraft. Under the ICAO rules, travel by motor vehicle on a public highway to or from the air leg is also permitted.

b. ICAO TIs are based on U.N. Recommendations, which are not formally recognized regulations. In general, they do not prescribe packagings for individual HM. At the present time, shipments of HM are authorized under the ICAO System as fully equivalent to Title 49 CFR. The trip must, however, involve transportation by aircraft and motor vehicle only. DOT has published an Advance Notice of Proposed Rulemaking (HM-181), and it is anticipated that U.S. regulations will be revised to more closely agree with U.N. Recommendations.

c. United States adoption of the U.N. Recommendations will impose POP standards on U.S. shippers including defense installations. The purpose of POP standards, as stated by DOT, is to:

(1) Simplify HM regulations.

(2) Reduce the volume of regulations.

(3) Provide greater flexibility in the design and construction of packaging.

(4) Promote safety in transport.

(5) Reduce the need for exemption.

(6) Facilitate international commerce.

d. Several international systems of regulations have been published based on the U.N. Recommendations. The ICAO TI System and the IMDG Code are of particular interest. Both are international in scope and are conditionally recognized by Title 49 CFR. On a regional basis within Europe, requirements for shipping dangerous goods by road, rail, and inland waterway are established by

the Inland Committee of the Economic Commission for Europe. Those requirements are published in the following:

(1) The European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR).

(2) The European Provision Concerning the International Carriage of Dangerous Goods by Inland Waterway (ADN).

(3) The International Regulations For the Carriage of Dangerous Goods

by Rail (RID).

(4) The Regulations for the Carriage of Dangerous Goods on the Rhine (ADNR).

e. These regulating bodies have developed plans to terminate those provisions of their regulations that presently permit non-UN-packaged HM to be transported within Europe. Most of these provisions will expire and HM not packaged, marked,and labeled in accordance with U.N. standards will be unacceptable for transport. HM classed, described, and packaged according to Title 49 CFR requirements will only be able to move in domestic U.S. commerce. During this transitional period, installations are provisionally authorized to use either ICAO TIs or the IMDG Code for packing, marking, and labeling international shipments by air or water.

6-18. International Air Shipments

As discussed in the preceding paragraph, defense installations are provisionally authorized to use either ICAO TIs or the IMDG Code for packing, marking, and labeling HM to be shipped by international air. As an alternative to the ICAO TIs, most installations use the IATA Dangerous Goods Regulations. The IATA regulations should include all regulatory provisions of ICAO TIs and provide supplemental instructions not found in the ICAO TIs. It should be noted, however, that the IATA regulations are not formally recognized by the U.S. Government.

a. Packaging Requirements. To determine specific packaging requirements from the IATA regulations, the packer must refer to the Dangerous Goods List in section 4 of the publication. For example, if the item to be shipped is methyl ethyl ketone peroxide, NSN 6810-01-120-0408, the list indicates that the item may be transported by either passenger or cargo aircraft. If shipped by passenger aircraft, a maximum volume of 1 liter may be shipped in a single package. A maximum of 5 liters, however, may be shipped in a single package if shipment is made by cargo aircraft. In either case, the packer will be referred to section 5 of the regulations where specific inner and outer packaging instructions are outlined. Packaging requirements are stated by U.N./ICAO, IATA, and U.S./Canadian specifications.

b. Marking and Labeling Requirements. Marking and labeling requirements are outlined in section 7 of the IATA regulations.

Section V. Packing, Marking, and Labeling of Military Air Shipments

6-19. General

a. The provisions of this section apply specifically to military air shipment system in operation by or for DOD, to provide a flexible and readily available airlift service for priority cargo. These systems include MAC and DOD contract airlift, providing air transport on a global basis, and the Navy’s QUICKTRANS system and the Air Force LOGAIR system, providing airlift service within CONUS.

b. Standard requirements for acceptance of material for transportation by military or DOD contract aircraft are contained in AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19/DLAM 4145.3, Preparation of Hazardous Material for Military Air Shipment.

6-20. Packing Requirements

a. The following general requirements apply to packing of HM for transport by military aircraft:

(1) Items must be packed in containers that meet the prescribed DOT or military and Federal specifications. Except as otherwise specified in AFR

71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19/DLAM 4145.3, the container must be securely closed and constructed to prevent leakage caused by changes in temperature, humidity, or altitude during transportation and in-transit handling. Unit and exterior containers should provide:

(a) Protection from temperature variations ranging from -40øF. to 150øF. that could cause deformation, leakage, rupture.

(b) Protection from variations in atmospheric pressure ranging from sea level to 12,000 feet and explosive decompression from 12,000 feet to 50,000 feet that could cause deformation, leakage, or rupture.

(2) Containers of liquids must not be entirely filled. Sufficient interior space (ullage), as described in section II, paragraph 6-11, subparagraph c, must be left vacant to prevent leakage of

contents or distortion of containers from changes in temperature during transport.

(3) Containers, including closure, used in packaging liquids or semisolid HM must be capable of withstanding a minimum internal air gauge pressure of at least 15 psi without leakage.

b. Specific packaging requirements for HM to be transported by military aircraft are determined by consulting chapter IV, DLAM 4145.3/AFR 71-4/TM 38 -250/NAVSUP PUB 505/MCO P4030.19. This chapter contains an alphabetical listing of items by hazard group both allowed for and prohibited from air shipment. Having determined the proper shipping name of the item, specific packaging instructions may be obtained by reading across the list to the column titled "Packaging Paragraph." The paragraph referenced in this column will provide the packer with complete DOT packaging specifications, alternatives, exceptions, and special instructions.

6-21. Marking and Labeling Requirements

Packages containing HM must be marked with the proper shipping name and identification number for the item as shown in the alphabetical listing in chapter IV of DLAM 4145.3/AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19. Additional marking and labeling information is contained in chapter XIII, DLAM 4145.3/AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.29

6-22. DOT Exemptions

a. DOD is required to transport explosives and other HM that are forbidden from carriage by cargo-only aircraft or that are in quantities greater than those specified in Title 49 CFR for cargo-only aircraft. To permit the transportation by air of those items deemed essential to national defense, DOT has granted exemption DOT-E7573 to DOD. A requirement of this exemptions is HM be packaged according to, or in excess of, the requirements of Title 49 CFR and in compliance with DLAM 4145.3/AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19. A copy of this exemption must be maintained in the packing area and be attached to the shipping papers.

b. DOT has granted other exemptions that may or may not apply to installations. Certain commercial packaging supply companies also have been granted exemptions from DOT packaging specifications. The DOT exemption number must appear on the outside container. In all cases, transportation personnel must be informed that the material is being shipped under a DOT

exemption so that they will recognize that a copy of the exemption is attached to the shipping papers.

6-23. Waivers of MAC Packaging Requirements
When hazardous items or packagings are not authorized in DLAM 4145.3/AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19, installations must obtain waiver approval before releasing the item or packaging into the military air transportation system. Waivers will be requested in accordance with the provisions of paragraphs 1-1 and 2-3 of DLAM 4145.3/AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19.

6-24. RQ Marking Requirements for Military Air Shipments (MAS)
The requirements for RQ markings outlined in section III, paragraph 6-15 of this chapter are fully applicable to HM shipped by military air any portion of the journey performed within CONUS, Alaska, Hawaii, U.S. possessions, or territorial waters.

6-25. Shipper's Certification
A properly prepared DD Form 1387-2 (Special Handling Data/Certification) will be attached to all MAS as stated in section I, paragraph 6-7a(2).

Section VI. Packing, Marking, and Labeling of Hazardous Waste

6-26. General
a. Packing. Hazardous waste generated as a result of accidental spills, damage, expired shelf-life, etc., must be packaged in accordance with the applicable DOT regulations on packaging under Title 49 CFR, parts 173, 178, and 179.
b. Marking. Title 40 CFR, section 262.32, requires that, prior to offering hazardous waste for transportation off site, each hazardous waste generator must mark each package of such waste in accordance with DOT regulations under Title 49 CFR, part 172. Use of commercially procured labels meeting the requirement of Title 40 CFR may be substituted on marking requirements for containers of 110 gallons or less. Each container of 110 gallons or less must have the following words and information displayed in accordance with the requirements of Title 49 CFR, section 172.304:

HAZARDOUS WASTE Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency. Installation's name, address, and manifest document number.

c. Labeling. Hazardous waste also must be labeled in accordance with the applicable DOT regulations under Title 49 CFR, section 172.101 or 172.102, column 4.

6-27. Incident to Movement to a Recoupment Facility
Packages displaying evidence of actual or suspected leaking, or that have otherwise been damaged to the extent that they no longer meet the packaging specifications of Title 49 CFR, section 173.7, may be overpacked in accordance with the following requirements of Title 49 CFR, sections 173.3(c)

and 173.25:

a. The package must meet the requirements of Title 49 CFR, section 173.21 and 173.24.

b. The overpack must be marked with the proper shipping name and identification number, and labeled as required by Title 49 CFR, part 172, for each HM contained therein, unless markings and labels representative of each HM in the overpack are visible.

c. Each package subject to orientation marking requirements of Title 49 CFR, section 172.312 (liquid HM) is packed in the overpack with filling holes up; the overpack is marked "This End Up" or "This Side Up" (as appropriate) to indicate the upward position of closures.

d. The overpack is marked with a statement indicating that the inside (inner) packages comply with prescribed specifications when specification packagings are required, unless specification markings on the inside packages are clearly visible.

(1) Drums used for overpack are not required to comply with DOT specifications as long as they have equal or greater structural integrity than the package authorized for the material. The maximum capacity shall not exceed 110 gallons. Each drum must be marked with the proper shipping name of the material inside the defective packaging. In addition, the drum must be marked "Salvage Drum" in accordance with Title 49 CFR, section 173.3(c)(3). This marking requirement applies to drums bearing the trademarked name "Recovery Drum."

(2) HM packaged in accordance with the requirements of Title 49 CFR, section 173.7, do not require special packing or marking if there is no evidence of leakage and they are securely closed. Packages requiring segregation, taping, or unit palletization may be forwarded directly to either the packaging branch or the installation recoupment facility, as appropriate.

Section VII. Packaging Quality Control

6-28. General

Minimum quality control procedures applicable to installation functions shall incorporate additional sampling procedures designed to ensure that:

a. Incompatible HM are not commingled during the packaging process.

b. DOT-specification containers are authorized for the commodity being packaged.

c. Leaking containers are not packaged and prepared for shipment.

d. Containers are not marked as meeting DOT specifications when they do not.

e. Improperly packaged material is not offered for shipment.

f. Labels on outer containers represent mixed packages of HM when appropriate.

g. Labels on containers are consistent with the hazard class of the material.

h. Color and/or size of labels meet the standards of Title 49 CFR, section 172.407.

i. Commodity descriptions, or proper shipping names, are marked on containers.

j. Containers shipped under DOT exemptions reflect the DOT exemption number on the outer container.

k. Containers of liquid HM are marked on the outside with "This End Up" or "This Side Up."

l. Reconditioned drums are properly marked.

m. Marking requirements of MIL-STD-129, latest edition, are met.

CHAPTER 7

LOADING OF HAZARDOUS MATERIALS FOR SHIPMENT

Section I. General

7-1. Purpose and Applicability

a. The purpose of this chapter is to provide information on the fundamental principles and approved methods and techniques used when loading HM for shipment. The objective is to achieve waste minimization goals by reducing the loss and damage to shipments caused by improper loading. To this end, the chapter provides information on blocking, bracing, and anchoring of shipments. Included are the basic requirements to load HM for shipment via highway, rail, air, and water.

b. The provisions of this chapter do not apply to the shipment of explosives.

c. The contents of this chapter are applicable to all personnel whose duties involve the loading of HM for shipment.

7-2. Impact of Federal Regulations on Loading Hazardous Materials for Shipment.

a. Personnel must be knowledgeable of Federal regulations governing the loading of HM for shipment. Regulations governing the transport of HM in the United States are published in Title 49 CFR, parts 100-199. Additionally, shipments exported by water must meet the standards of the IMDG Code.

b. Violation of the DOT loading and securing regulations can carry the same penalties as violation of any other HM regulation. Civil penalties can be assessed in amounts up to $10,000 per violation. Criminal penalties for willful violation of the regulations can be as high as $25,000 and 5 years imprisonment.

c. Before reviewing specific loading and securing regulations for each mode of transportation, it is important to consider Title 49 CFR, section 173.1(b), the key regulation under which installations and other shippers in the United States must operate:

"A shipment that is not prepared in accordance with this subchapter may not be offered for transportation by air, highway, rail, or water. It is the duty of each person who offers hazardous materials for transportation to instruct each of his officers, agents, and employees having any responsibility for preparing hazardous materials for shipment as to applicable regulations in this subchapter."

7-3. Hazardous Waste Minimization Responsibilities

The general hazardous waste minimization responsibilities outlined in chapter 3 are applicable to the functions addressed in this chapter.

Section II. Planning the Loading Operation

7-4. General

After HM have been packaged, marked, and labeled for transportation, segregation of incompatible materials must still be maintained. Commanders will, if feasible, designate an appropriate area of a warehouse or freight terminal as a dedicated temporary storage area for HM awaiting shipment. Title CFR, section 174.55(e), further requires that HM be stored in a secure location while they are held for delivery or loading. Section 174.55(e) also requires that only persons involved in the loading effort be permitted access to such materials.

7-5. Understanding the Shipping Environment

a. In recent years, there has been a gradual shift from break-buld shipments to intermodal transportation of HM. It is commonplace today for intermodal containers to move, in a single trip, via three modes of transport: by highway, by rail (COFC), and by water. Trailers can move on rail-cars (TOFC) and on ships (RO/RO).

b. The first step in planning a load is to understand the forces to which the load will be subjected during shipment. Each mode of transport represents a different shipping environment that must be accommodated in the load plan. The range of force encountered in a single mode, or in the combination of modes, makes proper loading and securing of HM packages imperative. Loading and securing of freight in containers or trailers is as important as packaging in the process of shipment preparation. Improperly loaded and secured freight can result in underutilization of space, damaged packaging, loss of product, damage to

other freight or to the carrier's equipment, and even personnel injury and environmental damage. A container carried on a chassis via highway, for example, will be subject to different forces than a container carried on a rail flatcar, and therefore, a different system may be required to secure the load.

c. Since trailer loads are rarely subjected to impacts as high as 4 miles per hour, the highway mode is considered the least severe shipping environment. The forward movement of improperly braced loads will be caused by applying brakes on steep descents or by stopping suddenly to avoid hitting people or other vehicles. Rearward movement of loads will be caused by ascending steep hills, by load rebounds after the sudden application of brakes, or by sudden increases in speed. Sideward movement of loads is caused by rounding corners on sharp curves, traveling on high crowned or banked roads, or swerving to avoid accidents. Full loads also must be snug and adequately braced to reduce stress resulting from impact against loading docks, braking, acceleration, and sway.

d. Shipping by water is different. As illustrated in figure 7-1, a ship at sea may move in all of the following six directions: pitching about a vertical axis; yawing about a vertical axis; rolling about a longitudinal axis; surging in a fore and aft motion; swaying in a side-to-side motion; and heaving in an up and down motion. In addition, wave impact or water entry into faulty containers can affect loads and damage containers.

e. Rail transport includes railcars, TOFC, and COFC. Typical forces encountered in the rail transport environment include vertical, sidewards,

and lengthwise pressures.

(1) Vertical pressure or vibration, over and above the overhead weight of the load, are the most numerous forces but are small in magnitude and cumulative. Generally, the damaging action from vertical pressure or vibrations is absorbed by interior cushioning or bracing within the individual package or container.

(2) Sidewards pressure toward the sidewalls happens when a car rounds a curve, an action that tends to move the containers out of alignment with adjacent containers. Also, sidewards pressures tend to crush the containers on the off-side as the car rounds a curve. Although those pressures are of small magnitude, if the containers are out of alignment, subsequent lengthwise forces can cause damage because of uneven distribution of pressure.

(3) Lengthwise forces on the load result from cars accelerating or decelerating at a rate different from that of the whole train because of coupler slack. The impact of lengthwise force is normally negligible, since coupling impact is regulated by Title 49 CFR. HM in railcars are to be coupled with no more force than is necessary to complete the coupling. Additionally, Title 49 CFR, section 174.8, states that no railcar moving under its own momentum may strike a flatcar carrying a placarded trailer or freight container (humping). Other forces affecting rail transport include suspension system and track dynamic vibration, and sway, a side-to-side motion resulting from curves or uneven track.

f. While loading of aircraft may not be an installation responsibility, personnel should be aware of some of the complexities involved. Characteristics vary by aircraft type. Each cargo compartment floor is limited as to the weight it can carry per square inch or square foot. Furthermore, the dimensions of cargo must be known to determine the size limits of cargo that can be placed within each compartment. The potential for movement of hazardous cargo aboard passenger aircraft is some-what restrained because the cargo is stowed in compartments. In the case of both civilian and military cargo aircraft, however, movement pressure are of more concern. Sidewards movement of loads caused by aircraft banking or turning maneuvers must be considered while aircraft are loaded. A sudden, abrupt ascent or descent might cause some vertical movement of unsecured cargo; however, lengthwise movement is a primary consideration. On takeoff, improperly secured cargo is subject to rearward movement. On landing, however, cargo may be initially subject to forward movement during descent, rearward movement during the landing roll, and a sudden forward movement again as the brakes are applied. For these and other reasons, many military supplies are classified as restricted cargoes for air transport purposes, and Federal and DOD restrictions are imposed upon them. Strong magnetic materials, for example, are legally restricted because a sufficiently strong magnetic field strength could cause false readings on the compass sensing devices of the aircraft.

7-6. Installation Loading Responsibilities

a. In view of the transportation environments described in the preceding paragraphs, it should be obvious that HM must be loaded to withstand the normal hazards of transportation. Installations and all other shippers are required to load freight carried at carload rates, unless otherwise required

by tariff. They are also required to load heavy or bulky freight that is carried as LCL rates, but that cannot be handled at stations where the carrier's facilities are not sufficient for handling. In addition, installations must observe the rules of both the carrier and Title 49 CFR for safe loading of material and protection of equipment.

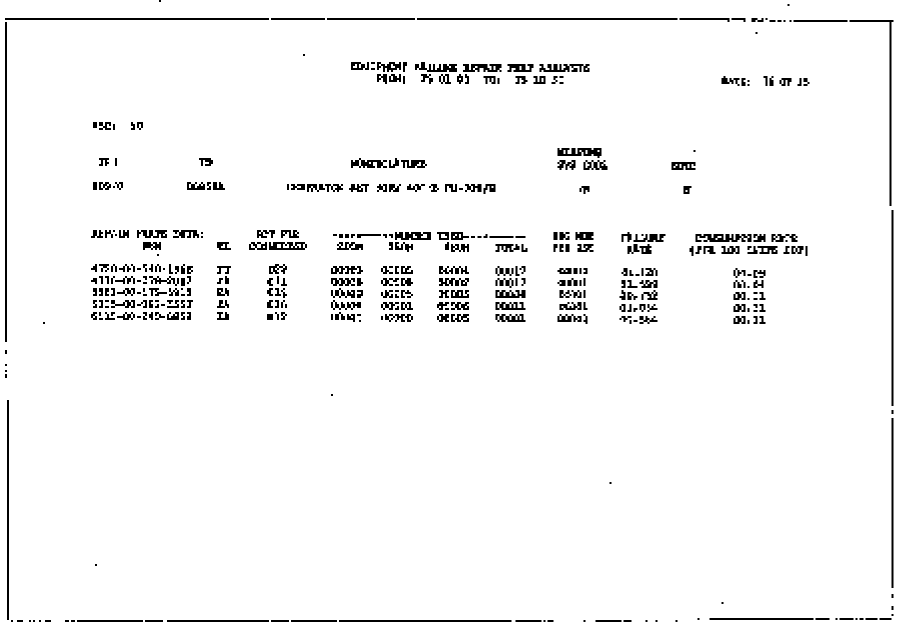


FIGURE 4-07. Sample Output Format for Equipment Failure Repair Parts Analysis

b. In addition to selecting the proper type of conveyance, the following precautions shall be taken to preclude the use of defective or unclean conveyances.

(1) The interior of the vehicle or conveyance should be examined for evidence of defective sides, roof, or floor that might cause snagging, tearing, scarring, or rupture of the container, or permit entry of rain, dirt, or other matter likely to damage the cargo.

(2) Protruding nails or other obstructions not part of the conveyance should be removed.

(3) Weather seals of doors should be inspected for damage or distortion.

(4) The doors should be checked for evidence of loose, worn, or damaged hinges, latches, levers, bolts, nuts, and pins.

(5) The general condition of mechanical bracing systems should be determined by inspection. All crossmembers should be present, and bolt rails should be inspected to ensure that they are firmly attached to sidewalls.

(6) The above are not intended to serve as a comprehensive checklist of inspection items, since items to be inspected will vary by conveyance type. The important point is that HM should not be loaded in vehicles or containers that are clearly not suitable for this purpose. Conveyances that cannot be suitably conditioned for the transportation of HM, without mechanical or extensive repairs, will be rejected by the installation.

c. AR 55-355/NAVSUPINST 4600.7/AFR 75-2/MC/O P4600.14/ DLAR 4500.3, Defense Traffic Management Regulation, requires that all motor vehicles used for the transportation of ammunition, explosives, poisons (class A or B), and the high-hazard items listed in table 1, section 172.504, Title 49 CFR, be inspected by the shipping activity. DD Form 626 (Motor Vehicle Inspection (Transporting Hazardous Material)) will be used for this purpose. Vehicles for which unsatisfactory conditions are noted on DD Form 626 shall not be accepted for loading. Vehicles will not be rejected, however, if deficiencies are corrected before loading. The distribution of the completed DD Form 626 shall be as follows:

(1) One copy will be kept by the installation performing the inspection (for commercial vehicles only) with a copy of the appropriate GBL attached.

(2) On truckload or LTL shipments, the original will be given to the driver at origin and will be surrendered by the driver to the consignee.

(3) When a commercial vehicle tendered for loading is rejected or the driver of the vehicle is found to be unsatisfactory, a copy of the completed form will be sent to each of the following:

(a) Nearest field office of the U.S. DOT.

(b) Home office of the carrier concerned.

(c) MTMC Regional Commander in whose territory the shipping installation is located.

(d) Commander, MTMC, ATTN: MTSS, Washington, DC 20315.

7-7. Loading Rules for Rail Carriers

Personnel engaged in or responsible for loading, blocking, and bracing HM should have available and be familiar with the general rules for proper

loading and securing of shipments. By complying with the applicable rules, procedures, and methods, the installation has accomplished the first step in assuring safe and economical carloading. Installations should have the following publications available:

a. Mandatory Requirements. Rule 27 of the Uniform and Consolidated Freight Classifications requires a shipper to observe carriers' rules regulating the safe loading of freight and the protection of equipment. Mandatory rules are contained in the AAR circular No. 42-E, General Rules concerning Loading of Carload Shipments of Commodities in Closed Cars, and all AAR pamphlets covering the loading and securing of shipments on open top cars.

b. Minimum Requirements. The various methods and specifications contained in all AAR carloading pamphlets will be observed as minimum requirements for the proper loading, blocking, and bracing of shipments for movement of rail freight on or in open top and closed cars.

c. Loading Methods Not Specified. When freight is to be loaded on or in open top or closed cars, and no loading or securing methods are provided, the cars will be blocked and braced according to the best procedure that can be devised from AAR pamphlets or other sources covering similar methods.

7-8. Loading Rules For MILVAN/SEAVAN Containers

MILVAN containers are reusable, military steel cargo containers 8 feet wide, 8 feet high, and 20 feet long with a capacity of 39,100 pounds. MILVANs are used for transporting HM in highway, rail, and water modes. Detailed instructions for loading, blocking, and bracing of MILVAN/SEAVAN containers are contained in MIL-STD-1386 (Navy). Loading of HM in MILVAN Containers.

Section III. Regulatory Requirements by Shipment Mode

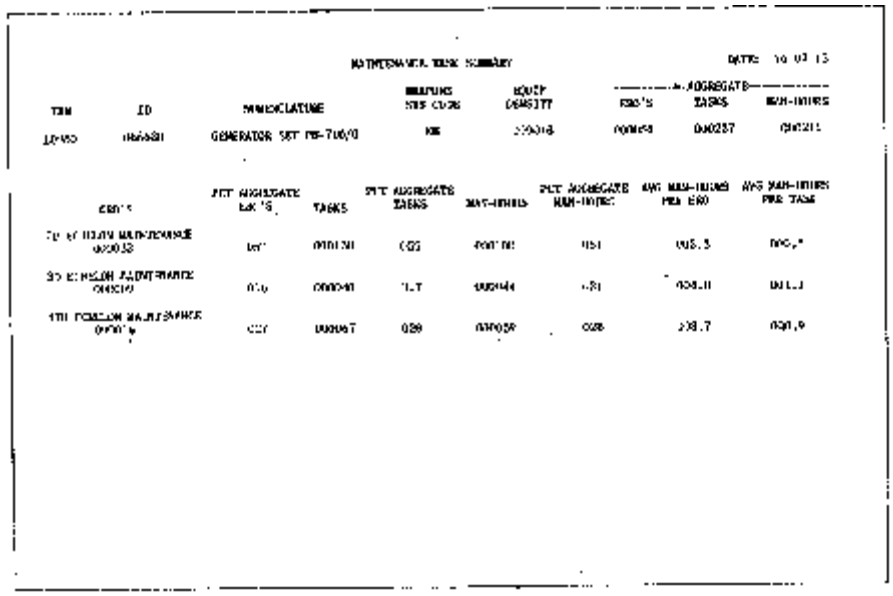
7-9. Rail Shipments

a. Each package of HM being transported by railcar must be loaded, blocked, and braced as prescribed by Title 49 CFR, section 174.55. The purpose of blocking and bracing is to prevent the packages from changing position, falling to the floor, or sliding into each other under shocks normally incident to transportation. BOE pamphlets Nos. 6 and 6c contain recommended methods of blocking and bracing in railcars.

b. Title 49 CFR, section 174.55, also provides that HM may be handled mechanically, but care must be taken to ensure that they are not dropped. A heavy package or container of HM may be trucked, rolled on pallet rollers, or moved by skid, forklift, or other handling devices. Planks for rolling trucks from platforms to cars must have beveled edges.

c. Each package of HM bearing markings "THIS SIDE UP" or "THIS END UP" must be handled, loaded, blocked, and braced in the car to remain in the position indicated by the markings during transportation.

d. HM may not be loaded or transported except as specified in Title 49 CFR, section 174.81, as shown in figure 7-2.



Segregation and Storage Chart of Hazardous Materials.

e. The loading of trucks, trailers, or freight containers holding HM is regulated by Title 49 CFR, section 174.61. These conveyances must be loaded so that the HM will not rupture under normal transportation.

7-10 Highway Shipments

a. General requirements for the transport of HM by highway are outlined in Title 49 CFR, section 177.834. Any tank, barrel, drum, cylinder, or other packaging not permanently attached to the vehicle, containing any flammable liquid, compressed gas, corrosive material, poisonous material, or radioactive material, must be secured against movement within the vehicle in which it is being transported. In addition, such materials must be braced to prevent movement relative to the vehicle while in motion.

(1) Forward movement can be prevented by positioning the load firmly against the front bulkhead of the vehicle. The front bulkhead serves to square the load and equalize forces across the frontal are of the vehicle.

(2) Movement of the cargo to the rear can be prevented by use of a rear bulkhead or gate. The rear bulkhead or gate must be braced to the doorpost of the vehicle with diagonal supports, or against the doorposts and the bulkhead or gate by secured risers. Backup blocks must be driven into

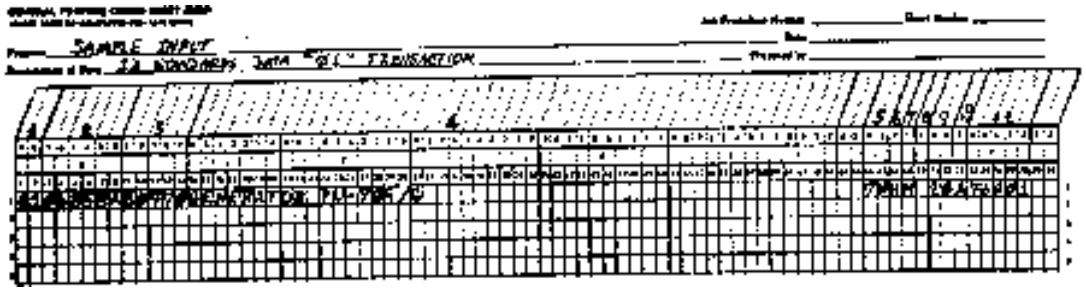
place and nailed to the risers and gate to eliminate slack.

(3) Sidewards movement can be eliminated by the use of lengthwise separators, steel strapping, and rigid block and bracing devices. DOT has approved some restraint systems specifically designed for highway transport. Those include steel strap and self-locking skid systems.

(4) Flammable solids, oxidizing materials, or corrosive liquids, when transported on a motor vehicle with other authorized lading, must be loaded in a manner that provides ready access for shifting or removal.

b. Appendix F illustrates various blocking and bracing techniques.

c. Segregation of HM will be maintained in accordance with the segregation and separation chart for HM shown in Title 49 CFR, section 177.848 and reprinted in figure 7-3



Segregation and Separation Chart of Hazardous Materials.

7-11. Water Shipments

a. The loading of HM to be transported by water are regulated by provisions of Title 49 CFR, section 176.76. Except as provided in paragraphs (b) through (f) of section 176.76, HM authorized to be transported by vessel may be carried on board a vessel in a highway or railroad vehicle subject to the following conditions:

(1) The material must be in proper condition for transportation according to the requirements of section 176.76.

(2) All packages in the transport vehicle or container must be secured to prevent movement in any direction. If the shapes of the packages and the stuffing pattern preclude shifting of the load, vertical restraint is not required.

(3) Bulkheads made of dunnage that extend to the level of the cargo must be provided unless the packages are stowed flush with the sides or ends.

(4) Dunnage must be secured to the floor when the cargo consists of dense materials or heavy packages.

(5) Each package marked "THIS SIDE UP" must be so stored.

(6) Any slack spaces between packages must be filled with dunnage.

(7) The weight of a container must be distributed as evenly as possible throughout, and the maximum permissible weight must not be exceeded.

(8) Adjacent levels of baggaged and baled cargo must be stored in alternate directions so that each tier binds the tier above and below it.

(9) Packages containing solids should be stowed above packages of

compatible materials containing liquids.

(10) The cargo or lading must be contained entirely within the freight container or vehicle body without overhang or projection; however, oversized machinery such as tractors or vehicles with batteries attached may overhang or project outside the intermodal container, provided all of the portion of lading consisting of HM is contained entirely within the freight container. No open bed container or vehicle is permitted to carry HM unless it is equipped with a means of properly securing the lading.

b. Segregation requirements for HM transported by vessel, in highway vehicles, railroad vehicles, or freight containers are the same as those prescribed for highway vehicles as shown in figure 7-3.

c. Segregation requirements aboard ship will be maintained as required by the IMDG Code, section 15.

7-12. Military Air Shipments

a. DOD personnel will be involved in the preparation of unitized and palletized loads to be transported by military air. The following general guidelines apply to such loads:

(1) Loads must be stable and secure, consistent with the type of aircraft, pallets, and handling equipment being used. Installations offering materials for air shipment must assure that loads are capable of being handled at aerial ports.

(2) Unitized loads will be configured to be as stable as single containers.

(3) Unitized loads will be configured to provide easy accessibility to individual packages in case if in-flight emergency. Use of fiberboard or plywood side boards is not permitted unless specifically required by the governing joint regulation, AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19/ DLAM 4145.3, Preparation of Hazardous Materials For Military Air Shipment.

(4) Containerized loads (CONEX, MILVAN, etc.) are not to be accepted for airlift because the contents are not accessible.

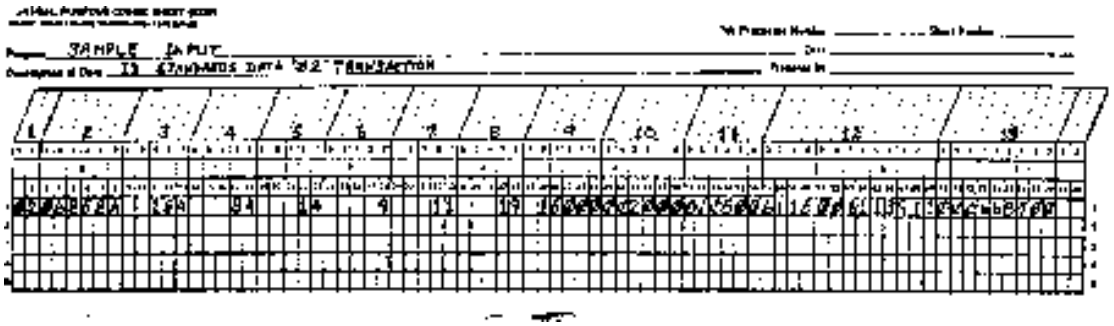
b. Loading and Storage Segregation requirements are shown in attachment 1 of DLAM 4145.3/AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19 and reprinted at figure 7-4.

Section IV. Documentation of HM Shipments for Rail or Road Transportation

7-13. DOT Requirements

a. Except as otherwise provided in Title 49 CFR, subpart C, each person who offers an HM for transportation shall describe the HM on the shipping paper in the manner required in Title 49 CFR, subpart C. For purposes of this section, the shipping paper is the GBL, SF 1103. The GBL will be prepared as follows:

(1) The description must be entered first on the GBL or in a color that clearly contrasts with any description of nonhazardous materials appearing on the GBL (refer to chap 2, fig 2-3).



Loading and Storage Chart for Transporting
Explosives and Other Hazardous Materials.

(2) The material must be identified as hazardous by entry of an "X" placed before the proper shipping name in the column of the GBL captioned "HM." The "X" may be replaced by "RQ" when appropriate.

(3) The proper shipping name for the HM will be that prescribed in Title 49 CFR, section 172.101 or 172.102 (when authorized).

(4) The hazard class prescribed for the material in Title 49 CFR, section 172.101 (or sec. 172.102, when authorized), will be inserted. Except for a proper shipping name that contains words describing more than one hazard class, inclusion of the hazard class is not required when the words of the proper shipping name contain the key words of the hazard class of the material such as FLAMMABLE LIQUID; POISON B, LIQUID; RADIOACTIVE DEVICES; or CORROSIVE LIQUID.

(5) The description will include the identification number (preceded by UN or NA as appropriate) prescribed for the material in Title 49 CFR, section 172.101 or 172.102 (when authorized).

(6) The description will also show the total quantity by net or gross weight as appropriate, and the unit of measure of the HM covered by the description (e.g. 800 lb, 55 gal). This requirement does not apply to empty packagings, cylinders of compressed gases, and packagings with capacity greater than 110 gallons.

(7) Material shipped under DOT exemptions must be identified by the notation "DOT-E" followed by the number.

b. As required by Title 49 CFR, section 172.204, the following shipper's certificate will be entered on the face of the GBL:

"This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the

Department of Transportation."

7-14. DOD Documentation Requirements

For shipment of HM by military airlift, DD Form 1387-2 (Special Handling Data Certification) is required to accompany the material. Complete instructions for completion and distribution of the DD Form 1387-2 are contained in section B, DOD 4500.32-R, volume 1, MISTAMP. Requirements for certification of DD Form 1387-2 are outlined in chapter 6 of this manual.

7-15. Commercial Air Documentation

The Shipper's Declaration for Dangerous Goods is the shipping paper used for commercial air transport. ICAO TIs are used to prepare shipping papers for air transport as authorized by Title 49 CFR, section 171.11; however, most commercial air carriers use IATA Dangerous Goods Regulations to prepare commercial air shipping papers. The U.S. Government, specifically DOT, does not recognize IATA as an official regulatory body. Shippers using IATA will verify that the latest edition of the IATA Dangerous Goods Regulations is used to prepare HM for commercial air shipment.

7-16. Commercial Shipping Papers, International Shipping papers for HM to be transported by water (or by road to Canada) are prepared as described in the IMDG Code as authorized by Title 49 CFR, sections 171.12, 171.12a, 172.102, and 176.24.

7-17. Placarding Requirements

a. Placards are required on motor vehicles or freight containers shipped domestically by road or rail when the load contains the following:

(1) Any quantity of HM listed in table 1 (high-hazard table) of section 172.504 of Title 49 CFR.

(2) One thousand pounds aggregate gross weight or more of HM listed in table 2 of section 172.504 of Title 49 CFR in the same vehicle or container.

b. A motor vehicle or freight container loaded at one installation, containing two or more classes of materials requiring different placards specified in table 2 of section 172.504 of Title 49 CFR, may be placarded "Dangerous" instead of the two specified classes when each class is less than 5,000 pounds aggregate gross weight.

c. Placards for international shipment by road, rail, and water are enlarged UN specification labels that correspond to the label for the class of dangerous goods in the transport unit as prescribed by the IMDG Code or the Canadian Transport of Dangerous Goods Regulations. Placards are required on all RO/RO trailers and freight containers containing any quantity of HM except in the following situations:

(1) When the material qualifies as and is shipped as "Dangerous Goods in Limited Quantities" (see chap 6, para 6-16a).

(2) The material being shipped is accompanied by a CAC (see chap 6, para 6-16b).

d. Installations will provide the motor carrier with the required placards for the material being

shipped prior to shipment or at the same time the material is offered for

transportation as required by section 172.506 of Title 49 CFR. Installations will obtain written acknowledgement from the motor carrier that placards were provided.

e. Federal placarding regulations are found in Title 49 CFR, part 172, subpart F.

f. Instructions for placarding areas where aircraft are parked are contained in paragraph 13-5 of AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19/DLAM 4145.3, Preparation of Hazardous Materials for Military Air Shipment.

Section V. Reports of HM Incidents

7-18. Notification of incidents occurring during preparation and loading of HM involving personnel exposure to ionizing radiation, property damage, death, or injury necessitating hospitalization will be reported in accordance with chapter 5.

7-19. If a package, drum, or other container marked with the letters "RQ" is ruptured during loading operations and a release of a hazardous substance occurs, the following action will be taken:

a. The employee first having knowledge of the release will notify his immediate supervisor of the incident.

b. Personnel not equipped with proper protective clothing and equipment will be excluded from the spill area.

c. The spill contingency plan outlined in chapter 8 will be activated.

d. Reports of the release will be made in accordance with locally established procedures.

CHAPTER 8
SPILL PREVENTION AND CONTINGENCY PLAN

Section I. General

8-1. Purpose and Applicability

a. The purpose of this chapter is to outline requirements for spill prevention management, contingency planning requirements and basic emergency response procedures.

b. The provisions of this chapter are applicable to all personnel involved in planning, development, coordination, and execution of plans to prevent accidental releases, minimize risk, and control damage resulting from HM incidents.

8-2. Federal Regulatory Requirements

a. A significant Federal law affecting oil and HM is CERCLA, as amended by SARA. Important elements of CERCLA and SARA are in Title 40 CFR, part 300.

(1) The definition of RQs for hazardous substances, SARA requires installations to report releases of RQs of CERCLA hazardous substances to the NRC.

(2) The establishment of the National Contingency Plan (NCP). The NCP

accomplishes the following:

(a) Assigns and divides responsibilities for oil and hazardous substances spill response actions among Federal, State, and local governments.

(b) Requires Federal regional and Federal local oil and hazardous substance spill contingency plans.

(c) Requires oil and hazardous substance spill contingency plans at installation which have the capacity for spilling a reportable quantity of a hazardous substance or for harming the environment.

(d) Establishes procedures for responding to oil and hazardous substance spills.

b. TSCA requires facilities storing transformers or other equipment containing PCBs to report to the EPA regional office releases of more than 10 pounds of oil or fluid containing over 50 ppm of PCBs. TSCA also requires the reporting of any release of materials containing 50 ppm PCBs that directly contaminates surface or drinking water, sewers, grazing land, or vegetable gardens. Local agencies may have more stringent requirements.

c. Title 29 CFR requires that the OSHA area director be informed, within 24 hours, when any employee is exposed to suspect carcinogens listed in part 1910, subpart Z, of the Title.

d. The RCRA defines hazardous wastes in Title 40 CFR, part 261. When a hazardous materials release occurs, the spilled material is then considered to be a hazardous waste, and the spilled material must be handled as a hazardous waste RCRA includes requirements for inspections, housekeeping, and personnel training for hazardous waste operations in Title 40 CFR, parts 260 through 265.

e. The CWA contains provisions for SPCC in Title 40 CFR, part 112. Facilities storing oil in quantities large enough to potentially harm the environment or spill in reportable quantities must be included in an installation's SPCC plan. In addition, these facilities must have spill prevention equipment and practice spill prevention measures so that the facility will prevent an oil spill from occurring. Note. The CWA also contains provisions for spill prevention measures at hazardous substance facilities, as Title 40 CFR, part 151 (proposed). However, Title 40 CFR, part 151 was never enacted, and hazardous substances SPCC plans are not required by law.

8-3. DOD Directive 5030.41

DOD-adopted Federal requirements for individual military installations in DOD Directive 5030.41, Implementation of the National Oil and Hazardous Substances Pollution Contingency Plan. Title 40 CFR, section 300.22, requires Federal agencies to coordinate their planning and response mechanisms with affected State and local governments and private entities. Federal agencies with facilities or other resources that may be useful in a Federal response situation are required to make those facilities or resources available within agency capabilities and authority. The DOD directive requires each facility or activity with oil or HM that could be accidentally spilled to have both an SPCC plan and an ISCP.

Section II. Spill Prevention Management

8-4. General

DOD installations with facilities that may discharge oil, HM hazardous wastes, or hazardous substances in RQs are required by statute to prepare an SPCC plan. The SPCC plan is oriented toward prevention of spills and releases of HM. The effects of a spill or release can range from superficial damage with few or no injuries to a mishap of catastrophic proportions involving loss of life, widespread damage, and major environmental damage. Regardless of the extent of the damage, productive time is nearly always lost as personnel and facilities are evacuated, damage is assessed, and the release is cleaned up. In more severe cases, the facility's ability to perform its assigned mission may be impaired either temporarily for a prolonged period if it becomes necessary to suspend operations. When the total cost of an HM mishap is considered, including lost productivity, cleanup and restoration, and replenishment of lost Government-owned stocks, the appropriateness of the expression "an ounce of prevention is worth a pound of cure" is obvious in the case of HM management.

8-5. SPCC Plan Requirements

a. Facility SPCC plans will, as a minimum, specifically address the following areas per Title 40 CFR, part 112:

(1) Maintenance of complete record of all spills or releases, federally reportable or not, occurring at the facility. The spills occurring during the past 12 months will be identified and listed together with corrective actions taken in each case. Specific plans implemented to prevent recurrences in each case will also be listed.

(2) Predictions of the direction of flow, rate, and maximum quantities of oil or hazardous substances that might be spilled or released for each storage location or handling site.

(3) Containment provisions and diversion structures or equipment in place of planned for use to prevent the discharge from reaching surface waters or other sensitive resources. Preventive systems may include dikes, berms, curbs, gutters or other drainage systems, booms, diversion or retention ponds, or absorbent materials.

(4) Conformance to EPA guidelines published in Title 40 CFR pertaining, where applicable, to drainage, bulk storage tanks, transfer operations, pumping, in-plant processes such as recoupment, or tank car or truck loading and unloading.

(5) Regular SPCC inspections must be conducted. Signed records of inspections must be retained as part of the SPCC plan for 3 years.

(6) Security procedures and precautions.

(7) Requirements for personnel training and spill prevention procedures briefings.

(8) Any of the following information that can be developed separately or included in the above listing:

(a) Identification of populations at risk. In addition to considering nearby civilian population centers, consideration will be given to onbase populations in administrative offices, family housing, etc.

(b) Identification or environmentally sensitive areas, probable need for waterfowl conservation efforts, and the presence of endangered species and other protected resources.

(c) Consideration of local geography, hydrology, and climate.

(d) Most probable locations for pollution incidents.

b. SPCC plans must be updated every 3 years and approved by a registered professional engineer. In addition, the SPCC plan must be amended and

recertified whenever there is a change to a facility that would effect the facility's potential for an oil or hazardous substance spill (e.g., a new tank is installed, berms are modified, etc.).

Section III. SPCC Management Practices

8-6. General

An effective spill prevention management program and SPCC for warehousing activities must anticipate possible interactions between the HM, the people, and the equipment involved in its handling from the time it is received until the time it is shipped. Once these interactions are identified, measures can be developed and implemented to eliminate or reduce the probability of spills or chemical releases.

8-7. The Human Factor

a. Supervisors are responsible for ensuring employee compliance with safety and health standards. The supervisors, with environmental personnel, are responsible for identifying hazards in the workplace and initiating action to eliminate such

hazards, and must be considered a principal participant in SPCC development.

b. Investigation reports frequently conclude that spills and releases of hazardous substances are the result of human error or negligence. Because of the complexity of human behavior and varying individual attitudes, the human factor is perhaps the most difficult to address. The role of human error as a contributing factor in spills can be reduced to some extent by appealing to the employee's instinct for survival. If they are aware that negligence in the workplace might cost them their lives, they are more likely to exercise caution when handling HM. It becomes the supervisor's responsibility to ensure employee awareness of the hazards associated with the chemicals they handle. Employees must be adequately indoctrinated before entering the work area where HM are handled and must receive periodic refresher briefings. They must also clearly understand how their present duties and responsibilities relate to the overall facility and national objectives of spill prevention programs.

c. Required internal controls must be in effect to reduce the probability of accidental spills and releases in the warehouse. Such controls include limiting the speed of MHE, restricting forklifts carrying HM to specific aisles, and using personal protective clothing and equipment. Individual work habits must also be continuously observed to ensure that they conform to accepted standards. Supervisors are encouraged to consider spill prevention goals when developing employee written performance standards. This should be done in consultation with the local CPO.

8-8. Physical Security

Physical security is defined as those measures designed to safeguard personnel; prevent unauthorized access to equipment, facilities, materials, and documents; and safeguard them against sabotage, espionage, damage, and theft. Facilities will ensure that command security plans specifically include HM. SPCC security provisions will provide for effective and efficient

utilization of personnel and equipment and will be flexible enough to permit timely changes to meet emergencies.

8-9. Equipment

a. MHE, both mechanized and nonmechanized, must be considered a key factor in developing SPCCs. Operators must be thoroughly trained in MHE operation. Movement of HM within the warehouse should be kept to a minimum. Movement paths should be continuously studied for the possibility of reducing "back-tracking" and length of moves. Equipment capabilities should never be exceeded. Overloading causes excessive equipment wear and creates greater accident potential. Proper loading and unloading of HM will prevent damage. In most cases, loose material is subjected to more damage than properly packed material. Adequate planning should precede any loading operation, including factors such as the carrier's center of gravity, the placement of heavy material on the bottom, the carrier's rated capacity, and the possibility of packaging, container, and product damage while the material is in transit.

b. Require daily inspections should be performed to identify deficiencies that, if not corrected, might result in a malfunction of failure and, in turn, a mishap resulting and in a spill or chemical release. Required periodic and regular servicing must be performed and documented to provide a maintenance history.

c. Manual handling of HM must also be carefully considered. Accidents and injuries frequently arise from employee attempts to manually handle material that should have been moved using mechanized equipment. Actions must be compatible with human strength, speed, accuracy, and reach limitations.

8-10. Housekeeping

The workplace will be inspected daily by the immediate supervision personnel to identify deficiencies. Housekeeping rules will be established and explained. Adequate lighting will be provided at all times. Machines, equipment, and working spaces will be kept clean and orderly. Scrap and waste will be cleaned up as soon as work is completed. Broken straps, exposed nails, or wire from containers or unit loads will be removed. Any spilled flammable liquids, greases, or other dangerous or slippery substances will be immediately cleaned up. Ample space will be provided in aisles and work areas to avoid congestion.

8-11. Condition of Stored Material

a. Preceding chapters have addressed the requirement that HM be subjected to a thorough inspection upon receipt and prior to being placed in storage. The potential for spills and chemical releases can be significantly reduced by early detection of unsatisfactory conditions or deficiencies caused by improper storage, extended periods of storage, or the inherent deterioration characteristics of the material. SPCC must, therefore, provide for an effective cyclic inspection program. Effective and efficient execution of inspections will ensure that stored material is inspected at intervals indicated by the assigned shelf-life code,

inspection frequency code, or type of storage afforded the material.

Inspections should also be oriented toward detection of improper segregation of HM.

b. The importance of an effective shelf-life program for HM cannot be overemphasized. Certain HM can become increasingly hazardous under prolonged and unfavorable storage conditions. Calcium hypochlorite, for example, is unstable and has a very limited shelf life, even under optimum storage conditions. If the decomposition process is allowed to continue unchecked, the material will, under the right circumstances, present a fire and/or explosion risk.

Section IV. Spill Contingency Planning

8-12. General

Under the National Contingency Plan, Title 40 CFR, part 300, Federal installations are to respond to their own oil and hazardous substance spills. Thorough preplanning of oil and hazardous substance spill response is necessary so that when a spill occurs, facility personnel can respond quickly and effectively, minimizing damage to human health and the environment. Contingency planning must take into consideration the following phases of spill response: discovery; notification; assessment; containment; cleanup; and disposal.

8-13. ISCP Development and Content

a. To perform an ISCP, the various tasks should be assigned to local fire and police teams who may already have considerable information about accidents within the facility and the nearby community. Planning shall routinely include the participation of the Environmental Office, Safety Office, Command Security Office, Public Affairs Office, Radioactive Control Office, On-Scene Commander designated in the Facility Contingency Plan, and other appropriate individuals who might have specific responsibility in the event of a spill. If the required information cannot be obtained and developed by personnel, local industry sources or consultants should be contacted.

b. In general, spill contingency plans contain certain types of advanced preparedness information, including amounts and locations of response equipment and materials, but are primarily oriented toward specifying procedures to be followed in the event of a spill or release of oil or hazardous chemicals. More specifically, ISCPs will contain:

(1) Names, addresses, and 24-hour phone numbers of the On-Scene Commander and alternates.

(2) Emergency equipment and response materials, location(s), and capabilities.

(3) An evacuation plan, including signals, evacuation routes, and alternate routes.

(4) A description of arrangements with local fire and police departments, hospitals, contractors, and State and local emergency response teams for response or coordination of services.

(5) A description of personnel action and responsibilities required in response to known or suspected personnel exposures, fires, explosions, or any unplanned sudden or gradual release of oil, HM, hazardous substances, or hazardous wastes to air, soil, or surface water at the facility or nearby community. This response is generally described in the following sequence:

(a) *Phase I*: discovery and notification (including both internal reporting and notification of participating outside organizations).

(b) *Phase II*: containment and countermeasures (such as public health

protection, source control, barrier placement, etc.)

(c) *Phase II*: cleanup, mitigation, and disposal.

(d) *Phase IV*: documentation (including external reporting and followup written reports.)

c. A good ISCP should, in addition, contain the following:

(1) Designation of duties and responsibilities for specific organizations and the on-Scene Commander.

(2) Facility response team composition and training, and operations center location and procedures.

(3) Facility response team alert and mobilization procedures, including use of communications systems for timely response.

(4) Surveillance procedures for early detection.

(5) Key installation personnel and community officials to be notified in the event of a release.

d. The ISCP must be reviewed and updated every 3 years. It must also be tested at least once a year and amended as needed. An actual spill may be used as a test situation.

. Suggested document for developing a spill contingency plan is FEMA-10 (Federal Emergency Management Agency Planning Guide and Checklist for Hazardous Materials Contingency Plans and Hazardous Materials Planning Guide).

8-14. Contingency Plan Implementation

a. HM defined. The first requirement in ISCP development is that the planners have a clear understanding of the materials to which the ISCP applies. For the purpose of emergency response planning, the term "hazardous materials" includes HM, dangerous goods, hazardous substances, and hazardous wastes. For purposes of this section, these terms will be collectively referred to as HAZMAT. It should be noted that these terms are defined for different purposes by different agencies. The regulatory sources of the definitions are as follows:

(1) HM defined by the DOT in Title 49 CFR, paragraph 171.8.

(2) Dangerous goods defined by the United Nations Recommendations of the Committee of Experts on the Transport of Dangerous Goods, and contained in the UN publication "Transport of Dangerous Goods." This publication is commonly referred to as the "Orange Book."

(3) Hazardous substances defined by EPA and listed in Title 40 CFR, part 302.

(4) Hazardous wastes defined by EPA and listed in Title 40 CFR, para 261.3 to 262.

b. Emergency Response Teams.

(1) Title 29 CFR, section 1910.120, outlines the legal requirements for ensuring that reasonably comprehensive protection is provided for all employees engaged in hazardous waste operations and emergency response. Title 29 CFR further states that HAZMAT teams will be employed to plus, path, or otherwise temporarily control or stop leaks from containers holding hazardous substances or health hazards. For purposes of this section, the term "HAZMAT team" will be used to describe the organizational unit designated to respond to spill emergencies; however, the terms "emergency response team" or "spill response team" are equally acceptable designations.

(2) The requirement that an HAZMAT team be available to respond to accidental spills or releases of HM may be satisfied either by designating and training employees or by arranging for the services of HAZMAT teams established and maintained by other agencies. If the team is composed of facility employees, the commander is responsible for ensuring that team members are physically examined, provided with personal protective equipment, and trained in accordance with the specific requirements of Title 29 CFR, section1910.120. Employees assigned to the HAZMAT team should be those who, through their experience and regularly assigned duties, are best qualified, equipped, and trained to respond to emergencies involving HM.

(3) If local circumstances preclude the use of employees as HAZMAT team members, team requirements may be satisfied by any of the following:

(a) Formal, written agreements with State and local governments to provide HAZMAT teams on an "as-required" basis.

(b) Interagency or Interservice Support Agreements with Federal agencies or military departments.

(c) Local contract arrangements to retain the services of qualified and licensed commercial HAZMAT teams.

(d) Emergency response personnel representing the manufacturer or supplier of the HM involved in the incident.

(e) Industry emergency response mutual-aid representatives that respond to emergencies involving specific materials (e.g., CHLOREP of the Chlorine Institute for emergencies involving chlorine).

c. Dissemination of the Facility Contingency Plan.

(1) The appropriateness of the initial response to an emergency will depend, in large part, on the work force's degree of awareness. Title 29 CFR requires the commander to ensure that employees are informed of hazards that may be present in the workplace. This requirement is addressed in detail in chapter 10. It is, therefore, equally essential that employees be aware of the actions to be taken in the event of an accidental spill or release of an HM.

(2) To instill and sustain employees awareness of emergency response requirements, commanders should, as a minimum, take the following actions:

(a) Ensure that employees, upon being assigned to duties involving HM, are formally briefed regarding purpose of the ISCP, response requirements, and individual responsibilities under the plan.

(b) Ensure that signs are prominently displayed at strategic locations throughout the workplace, clearly indicating the individual and telephone number to be notified in the event of a spill or release of an HM.

(c) Display appropriate posters in the workplace, rest and dining facilities, and locker rooms, emphasizing safety in the HM work environment.

(d) Ensure that refresher training is periodically provided to all employees assigned to HM storage and handling areas.

(e) Ensure that facility newspapers or periodicals regularly include articles designed to stimulate employee awareness of hazards and emergency response actions.

d. Deployment of the HAZMAT Team. A critical but often difficult consideration in ISCP development and execution is determining, in advance, the circumstances under which the HAZMAT team will be deployed. In the case

of a stack of acid carboys being toppled by a forklift operator cutting a corner too closely, or the ignition of vapors near cans of degreasers caused by a carelessly tossed lit cigarette, the "trigger" event is clear. In numerous other instances, the requirement for a response by the HAZMAT team will be less clear and on-scene judgments will have to be made. Since there are no definitive rules for determining the "trigger" event in advance, it becomes the responsibility of each facility to determine and publish criteria for HAZMAT team deployment based on a thorough evaluation of prevailing risk factors and resource availability. Circumstances at some facilities may favor deployment of the HAZMAT team for all spills and releases regardless of the degree of hazard involved. In other cases, ISCPs will necessarily have to be developed around flexible criteria for deployment. The objective should be to achieve a balance between achieving production goals and simultaneously ensuring that the response to any given emergency is the most appropriate one. Protection of personnel, facilities, and the environment will, in all cases, be the overriding consideration.

e. Emergency Response Operations.

(1) The number of discernible emergency response operations will vary according to the format and type of ISCP developed. FEMA, for example, breaks response operations into 11 phases. For purposes of this section, however, discussion will be limited to the discovery, notification, containment, collection, and recovery phases.

(2) In the discovery phase, the behavior of the individual discovering the emergency is an important factor in determining the most appropriate level of response. The employee first becoming aware of the actual or suspected emergency shares, in a large measure, the responsibility for the correctness of the initial response. The credibility of his assessment will be directly related to his experienced and the quality of training provided by the command. The ISCP should clearly delineate the responsibilities assigned to the individual that first discovers the emergency situation. That individual, if not injured, may simply be required to report the situation to his immediate supervisor or a designated emergency response center. The employee may, on the other hand, be responsible for making a tentative assessment of who and what is at risk prior to any notification. Whether the discovering employee notifies the HAZMAT team directly or notifies his supervisor must be determined by planners based on their evaluation of all pertinent factors. The important consideration is that the ISCP clearly outlines both circumstances and responsibilities for notification, scope of initial assessment, activation of alarms, rescue of injured personnel, etc. Specific requirements must be defined for both normal working hours and emergency incidents that may occur outside normal working hours.

(3) In the notification phase, one of the primary requirements is that the immediate supervisor be informed of the incident as soon as possible. If the emergency incident occurs during normal working hours, the supervisor’s assessment of the situation may determine the sequence and scope of response actions. If the ISCP does not specify immediate activation of an HAZMAT team, it should be the supervisor’s responsibility to determine the presence of poisonous, flammable, or corrosive materials; the structural integrity of containers; and the behavior of personnel. It is in this phase that the ISCP should clearly define requirements for notifying higher headquarters, Federal agencies, and LEPCs if the accident is determined to pose a risk to members of the local community outside facility boundaries.

(4) The containment phase should address controlling the immediate spread of the HM. For purposes of this manual, containment is defined as the

employment of fixed resources and deployment of temporary resources to stop and prevent, after accidental release from their primary storage locations or containers, the further discharge of HM into the external environment where contamination of ground, water, or atmosphere may occur. During this phase, the first priority must be to stop the further discharge of the solid, liquid, or gaseous material involved. The ISCP or locally developed SOPs should outline procedures for containment, including shutting off the source, predicting movement, contacting representatives of the manufacturer, etc. Types of equipment and materials to be used should also be clearly specified.

(5) During the collection or cleanup phase, HM are removed from the spill area using approved techniques. It should be noted that, for spills or releases occurring at a facility, the facility is, by law, responsible for cleaning up the spill. Whether the

facility elects to clean up the material using its resources or by calling in a commercial firm, the facility remains fully responsible. With regard to cleanup by personnel, caution must be exercised in determining the items that may be safely cleaned up by employees and those that must be cleaned up by the more specialized and better equipped HAZMAT team. If employees other than those assigned to the HAZMAT team are permitted to cleanup HM, the items permitted to be cleaned up and exact procedures of techniques should be clearly defined. Unless circumstances dictate otherwise, the supervisor should have maximum flexibility to use employees in cleaning up materials that, on the basis of guidelines and professional judgment, do not warrant deployment of the HAZMAT team. Examples of materials that may be safely cleaned up by employees include low risk materials such as lubricating oils, antifreeze, or household cleaning materials. Employees may also be trained and equipped to routinely cleanup certain corrosives, and to shut off leaks from certain compressed gas cylinders under the conditions outlined in DLAR 4145.25, Storage and Handling of Compressed Gases and Liquids in Cylinders. Criteria for cleanup by warehouse personnel may also be established on the basis of DOT transportation labels and HCCs discussed in chapter 3 of this manual.

(6) Released materials may be recovered (e.g., sodium hydroxide flakes), may become hazardous wastes (e.g., pesticides), or waste hazardous substances (e.g., 1-1-1-tri-chloroethane), or may be in significant (e.g., nitrogen released from a leaking cylinder). Materials to be recovered (repackaged) or to be disposed of must be properly labeled, packaged or overpacked, and stored while awaiting final disposition.

(7) Material that can be reclaimed or recycled will be forwarded to the recoupment facility for processing in accordance with the procedures outlined in chapter 9.

f. Packaging of Spilled Material. Packagings, packs, or salvage drums used by personnel in connection with cleanup operations will meet or exceed DOT specifications for the material being packaged as required by Title 49 CFR, parts 171 through 178. A packaging specialist will inspect all packagings to ensure that the package is:

(1) Compatible with the material being packaged.

(2) OF DOT-approved specification construction for the material being packaged.

(3) Marked, labeled, and properly prepared for transportation in accordance with Title 49 CFR, parts 171 through 178 and MIL-STD-129.

g. Suggested References. The following references are suggested for developing emergency responses to HM:

(1) Association of American Railroads, 1984, Emergency Action Guides.

(2) National Pest Control Association, 1976, Managing Pesticide Spills.

(3) Armed Forces Pest Management Board, 1980, Technical Information Memorandum Number 15: Pesticide Spill Prevention and Management.

(4) Environment Canada, 1986, Report EPS 9/SP/2: A Survey of Chemical Spill Countermeasures.

(5) U.S. EPA, 1979, EPA-600/9-79-045: National Pollutant Discharge Elimination System Best Management Practices Guidance Document.

(6) U.S. Department of Transportation, DOT P5800.3: Emergency Response Guidebook.

(7) U.S. Federal Emergency Management Agency, 1981, FEMA-10: Planning Guide and Checklist for Hazardous materials Contingency Guides.

(8) National Fire Protection Association, FPH1686: Fire Protection Handbook.

(9) Hazardous Materials Planning Guide (National Response Team).

Section V. Other Contingency Plan Requirements

8-15. General

In addition to the plans described above, facilities are required to have other contingency plans in effect to provide assistance to Federal, State, and local governments when necessary.

8-16. Emergency Planning and Community Right-to-Know Act of 1986

a. SARA's Title III of 1986, also known as the Emergency Planning and Community Right-to-Know Act is intended to encourage and support emergency planning efforts at the State and local government levels. Its purpose is to protect communities living near commercial industrial facilities from catastrophic releases of toxic substances such as the tragic releases in Bhopol, India, in 1984. Title III mandates the type of program advocated by the EPA's CEPP, a voluntary program designed to aid in planning for emergency response in the event of a hazardous release. The emergency

planning requirements of the act recognize the need to establish and maintain contingency plans for responding to chemical accidents that can inflict health and environmental damage as well as cause significant disruption within a community.

b. The following is a summary of the key statutory provisions of the act:

(1) Section 301 SARA required each State to establish an Emergency Response Commission by April 17, 1987. These commissions were responsible for establishing emergency planning districts and for appointing, supervising, and coordinating LEPCs.

(2) Under section 302, EPA is required to publish a list of extremely hazardous substances and TPQs for such substances. This list is published in Title 40 CFR, part 355, appendix A. Since this list will be subject to periodic change, it has not been included in this manual. The facility's

Environmental Officer will be consulted for assistance in determining items applicable to a particular facility. This list is intended to help communities focus on the substances and facilities of the most immediate concern for emergency planning and response. The act requires any facility that has an extremely hazardous substance in an amount exceeding TPQ to notify the State commission.

(3) Section 303 of the Act governs the development of comprehensive emergency response plans by LEPCs and provision of information to the committee. LEPC was responsible for completing an emergency plan meeting the requirements of section 303 by October 17, 1988. Under section 303(d), facilities subject to emergency planning must designate a representative who will participate in the local emergency planning effort as an emergency response coordinator. Facilities are required by statute to provide the committee with information relevant to development or implementation of the local response plan. This information includes inventories of extremely hazardous substances and MSDSs.

(4) Section 304 establishes requirements for the immediate reporting of certain releases of hazardous substances to the LEPC and the State Emergency Response Commission; the requirements are similar to the release reporting provisions of CERCLA. Followup reports are also required, including the effects of the release and the response action taken.

c. Applicable Guidance of SARA Title III to DOD.

(1) The above information has been included in this manual to provide an understanding of the conceptual objectives of the Act. OASD (P&L) has determined that Title III, by its wording, does not apply to Federal facilities. DOD, however, endorses the overall objective of the Act, which is to protect the public in the event of a release of toxic materials.

(2) Specifically, facilities are not required to submit to State Emergency Planning Commissions the MSDSs or annual inventory. It is policy, however, to ensure that emergency plans are comparable, wherever feasible, to State Title III programs. The objective of DOD is to establish programs with in facility boundaries that will provide the same hazard awareness and community protection as Title III programs established by jurisdictions outside facility boundaries. To this end, the following actions will be taken:

(a) Existing contingency plans will be expanded to cover releases during a catastrophic events such as a major warehouse fire.

(b) Representatives will be appointed to LEPCs where appropriate.

(c) LEPCs will be fully notified in the event of a release that might result in exposure to persons outside the facility boundary.

(d) Cooperative agreements with local fire and HM spill response agencies will be entered into.

(e) Include outside response facilities.

8-17. Planning for Accidents Involving Radioactive Materials

a. DOD components are required to provide radiological assistance to Federal, State, and local agencies, as available, in the event of a nuclear weapon significant incident of a radiological accident. Radiological accidents are defined as a loss of control over radiation or radioactive materials that presents a hazard to life, health, or property.

b. Installations will, when requested by FEMA, and within the constraints of national security, cooperate with FEMA in developing radiological emergency plans with State and local authorities. This requirement applies only to installations where the potential for an accident involving radioactive materials exists. Factors to be included in emergency response

planning and to be transmitted to State and local authorities include:

(1) Environment where the release is possible (atmosphere, geologic, or hydrologic).

(2) Type of material that may be released (isotopes and chemical and physical characteristics).

(3) General characteristics of accidents (e.g., fire, impact, loss of cooling, explosion, etc.).

(4) Pertinent timing (duration of release and delay before significant off-site exposures are expected).

(5) Radiologic levels for protective actions to be used.

(6) Specific response actions to be taken by the facility and possible response actions by State and local authorities.

(7) Specific response actions to be taken in the event of a release, including:

(a) Prompt notification of State and/or local authorities.

(b) Augmentation of resources and activation of emergency response organizations to the extent feasible.

c. Detailed guidance is contained in DOD Instruction 5100.52, Radiological Assistance in the Event of an Accident Involving Radioactive Materials.

8-18. Transportation Accident Contingency Planning

a. Military installations are frequently requested by local civilian authorities to render assistance in a variety of mishaps occurring outside installations boundaries. These mishaps may or may not involve DOD materials. When requested by local authorities, Federal agencies are required by Title 40 CFR, part 300, to render assistance following or in prevention of a discharge or release of a hazardous substance.

b. While no formal requirement exists for DOD installations to provide assistance outside the fence line, it is recommended they develop a basic contingency plan for the following purposes:

(1) To serve as the DOD component receiving first notification of a transportation accident involving DOD HM.

(2) To be prepared to dispatch a representative directly to the scene of an HM accident, if requested by local civilian authorities. That individual will serve as the DOD representative to the civilian On-Scene Emergency Coordinator until relieved by a competent authority.

(3) To be prepared to provide communications support as part of the DOD response to the accident.

(4) To be prepared to provide specific hazard and precautionary information for shipments that may have originated at the facility (e.g., public evacuation distance, toxicity, fire hazard, personal protective equipment requirements, etc.).

(5) To be prepared to temporarily receive and hold HM until proper reloading can be effected and onward transportation arranged.

(6) To report to the Staff Duty Officer, of a transportation accident and alerting response forces.

c. DOD Instruction 6055.13, Transportation Accident Prevention and Emergency Response Involving Conventional DOD Munitions and Explosives, requires any DOD activity which receives notice of a transportation mishap

involving DOD munitions or explosives to contract the Army Operations Center (AOC) located in the Pentagon ((202) 528-8230 or DSN 227-0218).

CHAPTER 9

RECOUPMENT OF HAZARDOUS MATERIALS

Section I. General

9-1. Purpose and Applicability

a. The purpose of this chapter is to prescribe procedures to safely receive, inspect, store, segregate, and recoup HM. Implementation of the requirements identified in this chapter should reduce the risks to personnel, installations, and the environment while assuring compliance with Federal and DOD regulations.

b. If recoupment facilities, equipment, or personnel are not available or are inadequate for the material involved, then prepare the HM for disposal as outlined in chapter 12.

c. The contents of this chapter are applicable to personnel involved in the physical recoupment of HM or in the decisionmaking process of recoupment operations.

9-2. Background

a. During the recoupment process, stock items in an NRFI state are reclaimed, brought back to an issuable state, and returned to stock. Most HM relegated to a recoupment facility deteriorated or were damaged during handling or storage; however, some materials may have been damaged during shipment. Damage or deterioration may be superficial and may only require replacement of labels, markings, or packing. However, damage or deterioration (e.g., dented, leaking packages) may require transfer of the material to a new package. Replacement of labels, markings, or packing is a packaging function; replacement of packages will be the responsibility of recoupment facilities. Materials with an expired shelf-life may be mistakenly relegated to a recoupment facility. Recoupment personnel must then assure that quality assurance directives are followed (see sec A).

b. Recoupment, an important part of an installation's HM operation, has three primary objectives: (1) minimizing hazardous waste; (2) minimizing loss of stock; and (3) maintaining product quality. Returning NRFI items to stock through recoupment, rather than relegating them to disposal for sale as excess personal property or as hazardous waste, is a positive and specific action directed toward decreasing stock loss and hazardous waste generated by installation operations. An effective recoupment operation must have fast turnaround of damaged stock with no loss of product quality.

c. A recoupment operation depends on a variety of factors: recoupment processes, the physical state of the material (e.g., solid, liquid, powder), the hazards associated with the material (e.g., flammability, reactivity, corrosivity, toxicity), and the type and size of the package. Actual recoupment operations that can safely be performed depend on the types of transfer, materials handling, and safety equipment available and on the

design of recoupment facilities. Relabeling or repacking the HM poses little threat to personnel health. However, operations that involve open packages of hazardous materials (e.g., transfer of hazardous materials to new packages, handling damaged/leaking packages of hazardous materials) pose a risk to personnel, the environment, and the facilities. The degree of risk is a function of the material and its associated hazards. The probability of a hazardous material mishap resulting in a serious incident (e.g., commingling of incompatible materials, fire, explosion, toxic fume generation, environmental/personnel exposure) is higher during recoupment operations than during normal operations because open packages of hazardous materials are involved. Strict procedural and engineering controls must be incorporated into recoupment operations to prevent any damage or injury to personnel, facilities, or the environment.

9-3. Impact of Federal Regulations

Recoupment personnel must be aware of pertinent Federal regulations and their impact on recoupment operations. In addition to the requirements identified in this manual, chapter 3, section I, recoupment personnel must be particularly alert to the following:

a. To comply with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and Title 40 CFR, concerning pesticides, manufacturers and formulators must submit pesticide labels to EPA for registration before distribution of the pesticide; use of any other label for distribution is unlawful. Recoupment of damaged or deteriorated pesticide labels, packs, or packaging cannot be performed. NRFI pesticides must be returned to the manufacturer for recycling or must be processed through the DRMO as waste.

b. Radioactive substances exceeding exempt concentrations require licensing by the NRC according to Title 10 CFR. Radioactive materials not licensed by the NRC may require licensing by the DOD component. If a licensed radioactive material is damaged, emergency procedures and reporting should be implemented. No sealed radioactive material source shall be opened. All maintenance operations with radioactive materials must be licensed or authorized by NRC or the appropriate service licensing official.

c. Management of hazardous waste generated during recoupment operations, including contaminated equipment and residues from damaged containers, must conform with regulations in Title 40 CFR concerning hazardous waste disposal. Hazardous wastes must either be turned in to the DRMO or disposed of by service contract with a licensed commercial firm or through interservice/ interagency support agreements.

d. To comply with the Clean Air Act, regulated by the EPA under Title 40 CFR, each State must develop and enforce an air quality control plan that will attain and maintain the levels of specified air pollutants at the national standard. Recoupment of hazardous materials may result in the emission of air pollutants regulated by air quality control plans (e.g., hydrocarbon vapors). Recoupment personnel at each facility should contact the Environmental Office to determine whether recoupment operations affect the installation's emissions.

9-4. Planning and Coordinating Recoupment Operations

a. To conduct safe and efficient recoupment operations, advance planning and coordination of activities are required. Recoupment personnel should receive advance notification of NRFI materials including identification of the material (e.g., national stock number (NSN), noun name), the unit of issue, the quantity, and the nature of the damage. Recoupment personnel (in conjunction with competent authorities) must assure that sufficient interim storage space is available, that proper equipment and sufficient personnel are available to perform recoupment operations, ensure items are safe to accept, and that recoupment procedures and emergency planning specific to a material can be prepared. Proper advance planning and coordination will promote a safe environment for the receipt, interim storage, and recoupment of NRFI HM and, in turn, will expedite the return of materials to stock.

b. After receiving notice of materials requiring recoupment, recoupment personnel should prepare for the arrival of NRFI items as follows:

(1) Determine, from the description of the item's condition, whether recoupment should be performed immediately upon receipt or whether the item can be placed in temporary storage until recoupment operations may be conveniently scheduled. Packages that show evidence of leaks, punctures, or deterioration should be recouped as soon as possible; these materials should be placed in overpacks or salvage drums before transport to recoupment facilities.

(2) If the item is to be placed in interim storage, assure that sufficient and acceptable space is available. Interim storage is discussed in more detail in section III of this chapter. If space is not available, reschedule the date of arrival for a time when space will be available, or coordinate with the Installation Environmental Office to find a suitable storage area.

(3) Based on the material identification and HCC, as described in chapter 3, recoupment personnel should determine the hazards associated with the specific material, plan the recoupment procedures, and determine the necessary emergency response procedures (if not already identified in the ISCP). Information concerning a material's hazards can be determined from material-specific references such as MSDS or HMIS. Recoupment procedures are discussed in more detail in section D, and emergency response procedures are discussed in chapter 8 and section V.

(4) Assure that appropriate labels, packaging materials, and packages are available that conform to DOT regulations and NSN specifications.

c. To assure that personnel can safely perform recoupment operations, competent authorities at each installation must assess the equipment and facilities available to determine which hazard classes can be processed. This assessment should take into consideration any Federal, State, local, or DOD regulations concerning storage and handling of hazardous materials (e.g., Titles 29, 40, 49, 16, and 10 CFR); applicable building codes (including NFPA codes, the National Electric Code, structural codes); and system safety analyses that have been performed on recoupment facilities or operations. Only the hazard classes certified by authorized personnel may be processed at a recoupment facility.

d. The following materials may not be recouped at any facility because of regulatory limitations or the high risk to personnel:

(1) Radioactive commodities (HCCs A1, A2) that are unsealed as a result of being damaged. Damaged packaging can be replaced if the source is undamaged and sealed, if the installation possesses a license for the item, and if the radiation protection officer has authorized the action.

(2) *Pesticides.* Pesticides will be returned to the manufacturer/ formulator for relabeling or repackaging, or processed for disposal in accordance with chapter 13.

(3) *F1 Aerosols.* Aerosols (F1) must be sent for disposal or crushing to a State- Federal-permitted facility that has the engineering controls and safety features comparable to those of an aerosol-filling facility. This action can be coordinated through the DRMO.

(4) *E1-E2 Explosives.* Explosives (E1 and E2) must be disposed of in accordance with DOD 6055.9-STD, Department of Defense Ammunition and Explosives Safety Standards. This action may be coordinated through the DRMO.

(5) *G1-G9 Compressed Gases in Cylinders and Flasks.* These must be processed in accordance with DLAR 4145.25, Storage and Handling of Compressed Gases and Liquids in Cylinders, and of Cylinders.

(6) *R1 Spontaneously Combustible Materials.* Spontaneously combustible materials must be sent for disposal to a State- or Federal-permitted facility that has engineering controls, and safety features on the same order as those of a manufacturing facility. This action may be coordinated through the DRMO.

(7) *K1 Infectious Substances.* For disposal of infectious substances (K1), contact the medical officer, veterinary officer, or Defense Personnel Support Center, or process in accordance with Title 42 CFR.

Section II. Receiving Hazardous Materials at a Recoupment Facility

9-5. General

a. Upon arrival of materials at a recoupment facility, an inspection should be preformed to assure that a release of hazardous materials has not occurred. Evidence for a potential release includes crushed/fallen/shifted loads, odors, stained packages, venting, or pooled liquids. If a hazardous material spill is detected, personnel should discontinue receiving operations and implement emergency procedures as outlined in chapter 8 of this manual.

b. A DD Form 1225 (Storage Quality Control Report) should accompany materials be turned-in to the recoupment facility. This report identifies the material and describes the corrective action required to return the material to an issuable status.

9-6. Receiving Inspection

a. The purpose of inspection is to assure that materials are properly identified and assigned the appropriate HCC, and that the facility is equipped to perform recoupment of the material.

b. Receiving inspection should be performed prior to offloading; however, if this is impractical, materials should be offloaded onto a staging area for inspection. Incompatible materials must be segregated as outlined in section III.

c. Receiving inspection should verify that the following information is available.

(1) Material identification, including NSN, noun name, common names of hazardous constituents, and HCC.

(2) Unit of issue and type of package, including number of packages per pack.

(3) Quantity of material.

(4) Shelf-life code (i.e., type I or II), expiration date or inspection/test date.

(5) Identification of operation turning in materials for recoupment.

(6) Details of the cause and nature of the defect, including whether personnel suspect the material has been contaminated.

d. Recoupment personnel should verify that the specific recoupment operation can be performed at the recoupment facility. If the material cannot be recouped, process the material for disposal as outlined in chapter 13.

e. Discrepancies discovered during the receiving inspection should be resolved per local procedures.

9-7. Accepting Receipt

a. If no discrepancies are discovered during the receiving inspection, recoupment personnel should accept receipt of the material. If an HCC has not been assigned, assign one.

b. At the time of receipt, materials should be included on the recoupment schedule. The recoupment schedule should be a prioritized list. The materials that must be recouped right away should appear first (e.g., leaking, punctured, or open packages that are overpacked; Condition Code E materials with pending back orders). These should be followed by the materials that should be recouped as soon as possible (e.g., packages that are likely to leak; rusting containers; materials with an extendable, expired shelf-life or with an extendable shelf

life expiration date within 3 months). Any remaining materials (e.g., slightly damaged containers) should have the lowest priority.

c. When it is determined that the material can be safely offloaded and that receipt can be accepted, the materials should be carefully removed from the transport vehicle or staging area and placed directly into the appropriate recoupment, processing, or holding area (see sec III). Incompatible materials must be segregated as outlined in section III at all times during storage and transport.

d. If test samples have not already been taken, at this time samples should be drawn of materials suspected to be contaminated and of materials with an extendable, expired shelf-life. These tests are required to assure that product quality is within specifications. Quality Assurance should be contacted concerning test sampling (see sec VI).

Section III. Process Holding of Hazardous Materials at a Recoupment Facility

9-8. General

The purpose of a holding area at recoupment facilities is to provide a means of segregating incompatible materials until they can be recouped. NRFI items turned in to recoupment facilities have a higher probability of leaking during handling or storage than during normal operations. Efficient segregation and procedural controls are required to prevent commingling of materials that may result in hazardous reactions (e.g., fire, explosion, toxic fume generation, etc.).

9-9. Holding Storage Area Requirements

a. The holding area must provide segregated storage for each storage group that is processed through a facility (as defined by HSAC and HCCs in chap 4). A list of HSACs follows, with corresponding HCCs to be handled at facilities. A segregated storage area should be provided for each HSAC. (HCCs that should not be processed within a facility are not included.)

(1) HSAC A: HCC A1, A2, A3.
(2) HSAC C: HCCs C1, C2, D4.
(3) HSAC D: HCCs D1, D2.
(4) HSAC R: HCCs R2.
(5) HSAC F: HCCs F2, F3, F4, F6, F7.
(6) HSAC L: HCCs C3, C4, F8, J1, M1, N1, P2, T6, T7, W1.
(7) HSAC T: HCCs D3, F5, K2, T1, T2, T3, T4, T8.
(8) HSAC P. HCC P1.

b. Incompatible storage areas must be segregated. Segregation within compatible storage areas is detailed in appendix C.

9-10. Holding Area Procedures

a. Materials brought to recoupment facilities should be segregated and placed, according to HCC, in a compatible holding area as outlined previously in this section.

b. Materials that are leaking or likely to leak must be placed in spill pans or overpack drums before being stored in the recoupment facility.

c. Personnel should simultaneously handle compatible materials only. Incompatible materials must be segregated during all phases of recoupment operations. Segregation within compatible holding areas defined by HSACs C, L, and T is required as follows:

(1) *HSAC C*: HCCs C1 and D4 a minimum of 6 feet from HCC C2.
(2) *HSAC L*: HCC P2 a minimum of 6 feet from flammable/combustible materials.
(3) *HSAC T*: HCC D3 a minimum of 6 feet from flammable/combustible materials.

d. A walkthrough inspection of the holding area by supervisory personnel should be frequently performed to detect actual or potential release of HM. If a release is discovered, recoupment personnel should implement emergency procedures as directed in chapter 8.

Section IV. Facility and Equipment Requirements for Hazardous Materials Recoupment

9-11. Requirements for HM Recoupment

a. An HM recoupment facility must provide a safe working environment that protects personnel against injury or illness, protects the facility against damage, prevents hazardous materials from contacting incompatible materials or conditions, and prevents release of hazardous materials into the environment. Ideally, structural, electrical, and mechanical components incorporated into the facility design (in conjunction with transfer, emergency, and safety equipment) should accomplish the tasks listed below. However, personnel and procedural controls (discussed in sec V)

may be required to fully achieve these goals. The facility design must accomplish the following:

(1) Minimize personnel exposure to HM and prevent personnel exposure to toxic materials (especially HCCs A1, A2, A3, D3, F5, K2, T1 through T4, and T8).

(2) Segregate incompatible materials to prevent dangerous reactions.

(3) Eliminate conditions that may decrease a material's stability or usefulness (e.g., ignition sources, water, warm temperatures, cool temperatures, contamination).

(4) Prevent escape of HM into the external environment.

b. This section will describe basic criteria that must be incorporated into the design of recoupment facilities; however, authorities at each installation must perform a final assessment to determine which hazard classes can be safely processed in the available facilities. To make this determination, personnel must comply with appropriate Federal, State, local, DOD, and component regulations concerning handling, transfer, and dispensing of HM; applicable building codes (e.g., NFPA codes, NEC), and system safety analyses. Requirements for flammable/combustible liquids have been included in this section, since a majority of materials handled by recoupment facilities belong to this hazard class.

c. A recoupment facility should be a completely enclosed building without crawl spaces or basements. In some cases, recoupment can be performed in a multipurpose facility as long as walls with a minimum 2-hour fire resistance rating isolate the recoupment area from the rest of the locations, per NFPA 30. Interior firewalls should extend from the floor to the ceiling and should parapet a minimum of 32 inches through the ceiling if the ceiling has less than a 1.5-hour fire resistance rating. Exterior walls should have a minimum fire resistance rating of 2 hours.

d. To provide sufficient segregation for safe recoupment of incompatible materials, the facility layout should have a minimum of six (and preferably seven) isolated recoupment workrooms. Each workroom should be assigned a group of compatible materials, based on the HCCs, as follows: (1) flammable/combustible materials (HCCs F2 through F8); (2) acidic materials (HCCs C1 and C3); (3) alkaline materials (HCCs C2 and C4) (these materials also may be recouped in workrooms assigned to toxic materials or to flammable/combustible materials); (4) oxidizing materials (HCCs D1 through D4); (5) organic peroxides (HCCs P1 and P2); (6) dangerous when wet materials (HCC R2); (7) toxic and low hazard materials (HCCs K2, J1, M1, N1, T1 through T8 (except pesticides), and W1); and radioactive materials (HCCs A1, A2, and A3). Recoupment in workrooms should be restricted to the assigned hazard categories only. However, if a sufficient number of workrooms is unavailable, recoupment of different hazard categories can be performed in the same workroom as long as the following procedures are followed: (1) the workroom is completely decontaminated between operations, including cleaning up spills and removing wastes that have been generated; (2) transfer equipment (e.g., funnels, tubing) is used for compatible materials only; and (3) flammable/combustible liquids and solids are not recouped in the same room as acids, oxidizers, organic peroxides, and water reactive materials.

e. A personnel change/decontamination area should be incorporated into recoupment facilities consisting of a "clean" room (used for donning work clothes and PPE) and a "contaminated" room (used for showering and for removing contaminated work clothes and PPE).

f. Spill control and containment features must be incorporated to prevent spread of spills, commingling of incompatible materials, and release of HM

into the environment. This includes diking around the perimeter of each room in the recoupment facility; continuous, nonporous surfaces; sealed construction joints; and sealed, impervious finish of floor surfaces. Dikes should be capable of containing accumulation from sprinkler system waterflow (in accordance with NFPA 15). Ramps should be incorporated to provide access for personnel and MHE with a maximum slope of 12 percent for personnel exits and a maximum slope of 8 percent for cargo exits.

g. A spill control/containment system is also required for the facility's load/unload pad. This system should include the features mentioned above and a containment trench with a release valve to allow drainage of rainwater accumulation.

h. Each room in the facility should have two emergency egress routes. However, recoupment workrooms may be too small to accommodate an additional emergency exit. In such cases, workstations within a workroom should be arranged so that personnel will have a clear, unobstructed egress route if an emergency occurs. Emergency exits must be equipped with panic hardware and illuminated exit signs and must open in the line of egress.

i. All rooms (including recoupment workrooms) should be separated by walls rising to and integral with the roof. Fire-rated observation windows

should be installed (in doors or walls) to allow personnel to view rooms prior to entry.

j. A ventilation system capable of functioning in both a general use mode and an emergency mode should be provided. The ventilation system should supply and exhaust air via mechanical or passive means or a combination of both, and should maintain negative pressures in recoupment workrooms relative to adjacent rooms (including interior corridors and staging areas). The ventilation system should not interfere with the airflow of local exhaust hoods (see transfer equipment requirements), but should provide a minimum of 6-room air changes per hour in the general use mode and 10 or more room air changes per hour in the emergency mode. Exhaust air ducts should be situated a maximum of 12 inches above the floor for recoupment of NFPA class I flammable liquids.

k. Electrical components should consist of inconduit wiring and conform to NEC class I, division 2 standards (per NFPA 70). In areas where NFPA class I flammable liquids will be recouped, all electrical components within 3 feet must conform to class I, division 1 standards.

(1) An automatic fire suppression system is required for recoupment of flammable or oxidizing materials. The system should use an appropriate extinguishing medium. Upon activation, the fire suppression system should deactivate ventilation systems and activate alarm systems.

(2) Equipment Requirements for HM Recoupment

(a) Recoupment facilities must be equipped with a variety of equipment to safely transfer HM to new packages. Transfer equipment is required to prevent release of a material or its vapors and to facilitate transfer with a minimal loss of the product. Safety and emergency equipment must be provided that will prevent or minimize personnel exposure/injury and damage if an HM mishap occurs. This section describes the equipment requirements for a HM recoupment facility.

(b) A variety of factors influence the specific transfer equipment

required for recoupment, including a material's physical characteristics (e.g., vapor pressure, physical state), a material's hazardous characteristics (e.g., flammability, corrosivity, toxicity), and the package. Transfer equipment, in conjunction with controls (e.g., spill control/ containment, ventilation, etc.), should prevent release of materials or dispersal of vapors or dust into the work environment during recoupment operations. Transfer equipment requirements include the following:

1. Transfer equipment, including pumps and funnels, must not react with or absorb the material being recouped. Particular care should be taken when equipment is chosen for solvents, corrosives, and reactives.

2. When recouping flammable, reactive, or shock-sensitive materials, transfer equipment should be nonsparking and designed to minimize friction and static charge buildup. Equipment must be bounded or grounded when flammable/combustible materials (including organic peroxides) are transferred between containers that are conductive (e.g., metal cans) or nonconductive and with capacity greater than 5 gallons (e.g., plastic-lined drums). Bonding or grounding should be achieved by one of the following methods: (1) by keeping transfer equipment (e.g., fill spout, nozzle, fill pipe, funnel, (strainer) in continuous contact with the edge of the fill opening; (2) by attaching a bond wire between metal parts of both containers; or (3) by attaching a ground wire between metal parts of each container and the ground.

3. Local exhaust hoods are required for recoupment of volatile, toxic, or powdered materials. Local exhaust hoods must be designed to maintain hazardous or toxic vapor/particulate concentrations below explosive limits established by OSHA in Title 29 CFR part 1910, and by ACGIH, and to maintain flammable vapor concentrations at a maximum of 25 percent of the LEL. If properly designed and used, local exhaust hoods will minimize personnel exposure to hazardous substances and prevent the buildup of an explosive atmosphere. The Industrial Hygiene Office should periodically monitor recoupment workrooms and exhaust systems to assure that local exhaust hoods are functioning properly.

4. Special MHE may be required for managing large containers, such as a hydrolift carrier.

5. Recoupment of highly toxic materials, infectious substances, and cytotoxic drugs should be performed in a glove box or biological safety cabinet.

(c) Safety and emergency equipment must protect personnel from exposure or injury and the facility from damage in the event of a mishap involving HM. Safety and emergency equipment requirements include the following:

1. The minimum PPE requirements consist of gloves, goggles, boots, and coveralls. Additional PPE such as respirators, face shields, and chemical-resistant coveralls, may be required depending on the material's hazardous characteristics. When selecting PPE, consideration must be given to the chemical and physical characteristics

and related hazards of the material and to the protection already given by facility and equipment controls (see para E2b(4) concerning PPE selection). The safety and health officer should be consulted concerning additional PPE requirements.

2. Eyewash/shower stations that conform to the "American National

Standard for Emergency Eyewash and Shower Equipment" (ANSIZ358.1) must be provided. Eyewash/shower stations should be situated within 25 feet from each recoupment workstation. Competent authorities should assure that tempered water (i.e., 60ø F. to 95ø F.) is provided to eyewash/shower stations and that valves are designed to provide a continuous flow of water without the need for constant activation. A shutoff valve should be provided to enable deactivation of the system when required.

3. First-aid kits and fire blankets should be strategically located within the facility.

4. Spill control and containment equipment including absorbents, neutralizers, and chemical mops should be available.

5. Fire extinguishers containing the appropriate fire extinguishing media should be provided in each recoupment workroom and interim storage area.

6. The facility should be equipped with a pull-box alarm at each exit, and heat/smoke detectors that activate alarms both locally and at the fire department should be installed.

Section V. Procedural Requirements for HM Recoupment

9-12. General

a. Recoupment of HM can be divided into two categories, "care and preservation" and "open container transfer." Care and preservation recoupment requires relabeling, remarking, cleaning, or repacking materials without opening the original package. Care and preservation recoupment will be performed by packaging personnel under the COSIS Program (see chap 4). Open container transfer recoupment involves the transfer of HM from damaged packages to new packages and thereby exposes personnel and facilities to the hazards associated with the material (e.g., flammability, toxicity, corrosivity, reactivity). To safely transfer HM, procedural controls must be implemented that will augment the safety provided by recoupment facility and equipment controls. This section will describe the procedures required to safely and efficiently return to an issuable state materials with severely damaged or deteriorated packages in need of replacement. General procedural requirements are detailed in this part. In this chapter, preparation for transfer and transfer procedures are detailed in section V, paragraph 9-13, decontamination and cleanup procedures in section V paragraph 9-14, and emergency procedures relevant to recoupment operations in section V paragraph 9-15.

b. During all phases of recoupment operations, incompatible materials must be segregated as outlined in section III for holding areas. Also, recoupment personnel should assure that incompatible conditions that may reduce the stability of a product are eliminated from the environment in which the HM is recouped. Incompatible conditions may include flame, heat, sparks, sunlight, water, humidity, air, or other manufacturer-identified conditions.

c. The quality of the product must be maintained. Before beginning recoupment, recoupment personnel should verify that the shelf-life has not expired, and during open container transfer operations, personnel should assure that the material is not contaminated. Quality control procedures detailed in section VI should be implemented.

d. Recoupment personnel should maintain the following records:

(1) An inventory of HM in the holding area and recoupment area should be maintained, and periodic updates should be sent to the fire department and spill response team. This should provide a means for emergency response personnel to quickly assess the hazards present in the facility in the event

of an HM mishap.

(2) A record of recoupment operations should be maintained, including the identity of personnel who performed the recoupment, the identity and quantity of material recouped (including NSN, hazardous constituents, and type of package), the type of recoupment performed, and any mishaps that occurred during recoupment (e.g., spill, personnel exposure). These records can be used to improve recoupment operations and may be vital in determining the health condition and required treatment of injured personnel.

(3) An inspection and maintenance log should be maintained for each piece of equipment. The log should identify as a minimum equipment inspected/tested, the nature of the defect discovered, corrective action taken, and the responsible party.

(4) An entry/exit log should be maintained identifying the personnel and visitors present in the facility.

e. Access to recoupment facilities and interim storage areas must be restricted at all times. Visitors should be escorted by authorized recoupment personnel.

f. Eating, drinking, smoking, and chewing should be prohibited in recoupment work areas and interim storage areas. An isolated area should be provided for personnel breaks.

g. Recoupment personnel should perform operator's maintenance or assure that operator's maintenance is performed on equipment and mechanical components. If equipment requires repair, personnel should schedule repair work with appropriate maintenance personnel as soon as possible. If repair work is performed on equipment that protects personnel or facilities (e.g., ventilation system, fire suppression system, emergency eyewash/shower), competent authorities should verify that the equipment functions properly.

h. The recoupment supervisor and personnel must have appropriate training, which should include the following:

(1) Safe procedures for handling, storage, and transfer of HM.

(2) Recognition and classification of hazards associated with materials brought to recoupment facilities.

(3) Proper selection and use of PPE, including respirators.

(4) Emergency response procedures, especially first aid.

i. Materials should be transferred from holding areas to recoupment areas at the time recoupment is to be performed. Recouped materials should be returned to stock as soon as possible.

j. When replacing a material's packing, packaging personnel should verify that the material's package has not deteriorated or become damaged. If the package has deteriorated or has been damaged, the material must be processed through a recoupment facility meeting criteria specified in section IV.

9-13. Preparation for Open Container Transfer

a. Open container transfer recoupment involves the transfer of HM from a damaged or deteriorated package to a new package. During open container transfer operations, recoupment personnel and facilities are at risk of exposure to materials and their related hazards. For safe transfer of HM to new packages, recoupment personnel must prepare for the specific operation and must implement procedural controls to assure that a mishap (e.g., spill,

personnel exposure, fire) does not occur.

b. To assure that transfer operations will run smoothly and safely, the following actions must be taken before recoupment operations begin:

(1) The recoupment supervisor shall request that local qualified safety and health personnel evaluate the workplace and assure that the facility is adequate for HM recoupment. Periodic testing of facility equipment (e.g., local exhaust hoods, ventilation systems) may be required.

(2) Recoupment personnel and supervisors should review and be aware of a material's hazards including its toxicity, incompatible materials and conditions that should be avoided, and necessary emergency procedures to follow if a mishap occurs.

(3) Specific recoupment procedures, including safety procedures, should be developed and reviewed before operations begin. These may be compiled into a safety/procedural manual, to be used by recoupment personnel, describing the procedures for recoupment of hazard classes that may be encountered.

(4) The recoupment supervisor shall request that local qualified safety and health personnel evaluate the workplace and select appropriate PPE for use by workplace personnel. Minimal PPE requirements are gloves, goggles, boots, and coveralls; however, additional PPE may be required. When selecting PPE, personnel should first evaluate the available equipment and determine the equipment's effectiveness in reducing the material's hazards. Next, the types of PPE (e.g., faceshields, respirators) must be selected that will provide complete protection to recoupment personnel. Selected PPE must resist degradation, penetration, and permeation by the materials being recouped; must not limit personnel mobility; must be resistant to tears and punctures; and must be disposal or easy to clean.

(5) The recoupment supervisor should assure that equipment is functioning properly and that appropriate hazard warning signs are posted.

c. Transfer of HM must be performed in a manner that will prevent personnel exposure to the material, that will prevent exposure of the material to incompatible materials and conditions, and that will prevent any release of the material. The following procedures should be incorporated into all transfer operations:

(1) A minimum of three recoupment personnel should be present during all transfer operations, so that, if personnel injury occurs, one person can

assist the injured person, and the remaining employee can call for help.

(2) Personnel and visitors present in recoupment areas should wear appropriate PPE.

(3) Transfer of HM must be in a work area segregated from incompatible materials. Equipment must be used for compatible materials only.

(4) Incompatible conditions (e.g., ignition sources, water) must be eliminated from recoupment work areas.

(5) During transfer operations, ventilation systems (including local exhaust hoods) should be activated, and to assure that a proper airflow is maintained, doors to the work area should be kept closed.

(6) When using local exhaust hoods, recoupment personnel should position package openings as close as possible to the hood's intake vent.

(7) Recoupment personnel should assure that they have a clear emergency

egress route during all phases of recoupment operations. Egress routes must not be blocked by equipment, debris, or materials being processed through the recoupment facility.

(8) Transfer operations of liquids should assure that splashing of the material does not occur.

(9) Transfer operations of volatile materials should assure that hazardous concentrations do not accumulate in the workroom.

(10) Transfer operations should assure that dispersion of powdered material does not occur.

(11) Transfer operations of flammable or shock-sensitive materials should assure that friction does not occur and that a static charge does not build up. All equipment and packages should be grounded or bonded during recoupment of these materials as directed in section D1K(2)(b) and in NFPA 77.

(12) If the specifications of a material have changed due to transfer operations (e.g., remnants of a 55-gallon drum were transferred to 5-gallon cans), recoupment personnel should assure that a new and appropriate NSN is assigned, and that action is taken to label new packages with the correct NSN and to make necessary adjustments to stock records.

(13) New packages and their labeling must conform to DOT regulations (Title 49 CFR, parts 171 thru 178) and to NSN specifications.

9-14. Decontamination and Cleanup

a. After recoupment is complete and at the end of each workday, appropriate cleanup and decontamination procedures should be followed to assure that waste generated during operations is disposed of properly and that recoupment personnel are not exposed to hazardous residues.

b. Solid or liquid waste, including disposal contaminated equipment and PPE, should be collected and placed in airtight sealing containers. Incompatible wastes must be placed in separate containers. Waste should be disposed of in accordance with chapter 13.

c. Old packages containing residues of materials listed in Title 40 CFR, part 261.33(e), must be triple rinsed with an appropriate solvent. The rinsed liquid must be disposed of as hazardous waste as outlined in chapter 13, and the triple-rinsed packages should be slashed and processed as scrap or sent to a landfill. If these packages are not triple rinsed, they must be processed as hazardous waste in accordance with chapter 13.

d. Equipment and PPE must be decontaminated, cleaned, and dried before it can be reused in another recoupment operation. Equipment and PPE should be reused with compatible materials only. If equipment or PPE cannot be cleaned, it must be disposed of as hazardous waste.

e. Floors and working surfaces (including workbenches) must be decontaminated, cleaned, and dried at the end of each workday. Residues should be completely cleaned up and processed according to its hazard.

f. Personnel handling HM must wash their faces and hands before taking personal or administrative breaks. Each person should take a complete shower at the end of each working day before leaving the recoupment facility.

9-15. Emergency Procedures for HM Recoupment

a. If an HM spill occurs or a fire starts during any part of recoupment operations, personnel should evacuate the area, immediately notify the spill response team and/or fire department, and follow procedures outlined in chapter 8.

b. If a worker is injured or exposed to HM during a mishap, recoupment staff will take immediate action necessary to save the injured person’s life

and to notify rescue personnel. (Follow the procedures in chap 8.)

Section VI. Quality Assurance Control

9-16. General

a. Procedures should be included in recoupment operations to assure the integrity of recouped materials. Materials cannot be issued when they do not conform to product specifications, when their quality has deteriorated, or when they have been contaminated. Recoupment operations must return materials to stock in a condition as good as that of the original unused product.

b. If facility or recoupment personnel suspect that material has deteriorated, Quality Assurance should be contacted to draw a sample. If sampling would result in a residual quantity unsuitable for a specification NSN (Para d), the recoupment will be discontinued (para c). Samples should be tested to assure that the material meets specifications. Situations that will require testing include the following:

(1) When facility or recoupment personnel know or suspect that the material has been contaminated (during transport, warehousing, or recoupment operations).

(2) If the shelf-life has expired (or if the shelf-life will expire within 3 months) and the installation is applying for an extension of the shelf-life; the shelf-life can be extended for materials with a Type II shelf-life code only.

c. If the test sample proves that the material has not deteriorated, recoupment procedures can continue. However, if the product has deteriorated or if the shelf-life cannot be extended, the material should be turned in to the DRMO or disposed of through contract with a licensed commercial firm or through interservice/interagency support agreements.

d. Another aspect of maintaining product quality is to assure that no loss of material has occurred. Personnel must assure that a recouped package contains the full amount of material as specified by the NSN. If a partially empty package is turned in for recoupment, the material will have to be transferred to smaller packages that will meet specifications.

CHAPTER 10

SAFETY AND HEALTH

Section I. General

10-1. Purpose and Applicability

a. The preceding chapter of this manual emphasized the dangers associated with the receipt, storage, and handling of HM. Personnel accidents

associated with any industrial-type warehousing operation can have an adverse effort on productive manhours and planned production schedules. In the case of HM the potential for injuries and lost production time is significantly increased. The purpose of this chapter is to outline safety and occupational health requirements and to provide general guidance for compliance with Federal and DOD programs.

b. The provisions of this chapter are applicable to all personnel involved in the planning and execution of activity safety and health programs.

10-2. Federal Regulatory Requirements

a. National occupational safety and health requirements are contained in Public Law 91-596, Occupational Safety and Health Act, published in Title 29 CFR, the Occupational Safety and Health Standards. Presidential Executive Order 12196, 26 February 1980, Occupational Safety and Health Programs for Federal Employees, made the provisions of this Act mandatory for Federal agencies. This Executive Order provides the heads of Federal agencies with the flexibility to implement their programs in a manner that is consistent not only with their respective missions, sizes, and organizations, but also with the standards published in OSHA.

b. Both Title 29 CFR and Executive Order 12196 specifically require each Federal agency to:

(1) Publish an agency Occupational Safety and Health Program to carry out the provisions of the Act.

(2) Develop a set of procedures to ensure effective implementation of the general policy and of the program.

(3) Establish goals and objectives to reduce and eliminate occupational accidents, injuries, and illnesses.

(4) Assure that the Safety and Health Office at each agency is designated at appropriate levels and given sufficient authority to represent the interest and support of the agency head responsible for the management and administration of the program.

c. A requirement was recently imposed for a written Hazard Communications Program (Title 29 CFR, section 1910.1200). The purpose of this plan is to ensure that all chemicals in the workplace are evaluated, and that information concerning their hazards is transmitted to employers and employees. This information is to be transmitted through comprehensive communications programs, container labeling or other forms of warning, MSDSs, and employee training.

10-3. Regulatory Requirements

a. DODI 6055.1, Department of Defense Occupational Safety and Health Program, established safety and health goals for DOD and incorporates the general requirements of Title 29 CFR and Executive Order 12196.

b. DODI 6055.8, Occupational Radiation Protection Program, supplements DODD 1000.3, Safety and Occupational Health Policy for the Department of Defense, and updates procedures for the Occupational Radiation Protection Program for DOD. It provides Radiation Protection Program requirements and DOD occupational exposure guides.

Section II. Safety and Health Responsibilities

10-4. Installation Commander

Title 29 CFR, section 1960.8, requires Commanders to provide employees with

a place of employment free from recognized hazards that cause, or are likely to cause, death or serious physical harm. Commanders are solely responsible for this function and cannot delegate it. They are required to display the same aggressive leadership in this that they display for other elements of command.

10-5. Supervisory Personnel

Title 29 CFR section 1060.9, requires supervisors to comply with the occupational safety and health standards applicable to DOD, including applicable OSHA standards. Mishap prevention is an operating

function that may not be transferred to a staff organization. To accomplish this responsibility, supervisors will ensure that personnel are trained to work safely, will enforce safety and health rules, and will correct unsafe or unhealthful acts and unsafe or unhealthful mechanical or physical conditions. Supervisors will also investigate mishaps and promptly report hazardous conditions to the Safety and Health Manager or other designated superior.

10-6. Employee Responsibilities and Rights

a. Title 29 CFR, section 1960.10, requires employees to comply with the DOD standards, rules, regulations, and orders applicable to their actions and conduct. The Act also requires employees to use safety equipment, PPE, and other devices and procedures provided or directed by the Act, DOD, or the commander as necessary for their protection.

b. Under title 29 CFR, section 1960.10, and Executive Order 12196, employees have the right to report unsafe and unhealthful working conditions to appropriate officials including the members of safety and health councils. The purpose of these councils is to foster mutual cooperation and open channels of communication, to make recommendations to the commander, and to perform such additional safety and health duties as the commander or council chairperson may direct. Employees also have the right to information relevant to their duties, including information on the nature and hazards of substances in workplaces. Executive Order 12196 also states that employees will not be subject to restraint, interference, coercion, discrimination, or reprisal for filing a report on an unsafe or unhealthy working condition, or for other participation in Occupational Safety and Health Program activities.

Section III. Written Hazard Communication Program

10-7. Program Requirements

a. Title 29 CFR, section 1910.1200, requires DOD components to establish and maintain a written Hazard Communication Program. The purpose of this program is to ensure that employees are apprised of and protected from workplace chemical hazards to help prevent occupational illnesses and

injuries. This program requires that the potential hazards of chemicals in the workplace be evaluated, that employees be informed of hazards and appropriate protective measures, and that hazard awareness training be provided and documented.

b. In view of the above, commanders will develop a written Hazard Communication Program that will include, as a minimum, procedures for accomplishing the following:

(1) Providing labeling or other forms or warning to employees regarding the hazards of chemicals in workplaces.
(2) Making MSDSs available at all times to employees in the workplace.
(3) Training employees about the hazards of chemicals present in the workplace.
(4) Providing employees with a list of chemicals known to be present in the workplace, using an identity that is referenced on the appropriate MSDS.
(5) Informing employees of the hazards of nonroutine tasks and of the hazards associated with chemicals contained in unlabeled pipes in their work areas.
(6) Informing other than regularly assigned employees of chemical hazards that may be present in the workplace (e.g., employees of a construction firm working onsite, employee performing routine maintenance and repair work or members of the inventory team). This includes providing these employees with copies of MSDSs, or making them available at central location, for each hazardous chemical the employees may be exposed to while working. In addition, commanders will ensure that the program informs these employees of the measures necessary to protect themselves under normal operating conditions and inforeseeable emergencies. The installation program will also provide methods for informing these employees of the labeling system.

c. Commanders will make the written Hazard Communication Program available, upon request, to employees, their designated representatives, the Secretary of Labor, or the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, in accordance with the requirements of Title 29 CFR, section 1910.1200.

10-8. Determination of Chemical Hazards

Title 29 CFR requires chemical manufacturers or importers to assess the hazards of chemicals that they produce or import. Since they are required to provide this information to DOD in the form of MSDSs, labels, and other forms of warning, the evaluation and determination of chemical hazards in the case of mission stocks is not an installation

responsibility. In the case of locally purchased nonstandard stock hazardous chemicals, MSDSs, will be contractually required and obtained by the Purchasing or Contracting Office. Those MSDSs will, in turn, be forwarded to the DOD HMIS focal point for the services or agency under which your installation operates for inclusion in the DOD HMIS data bank. If no MSDS is

received with a shipment of a locally purchased chemical, contracting officials shall followup with the supplier to obtain a satisfactory MSDS.

10-9. Labeling of Containers of Chemicals in the Workplace

a. Title 29 CFR, section 1910.1200, requires that all chemicals in the workplace be labeled, tagged, or marked with the identity of the hazardous chemical, the appropriate hazard warnings, and the name and address of the chemical manufacturer or other responsible party. The Act further provides, however, that in work operations where employees handle only chemicals sealed in containers that are not opened under normal conditions such as those found in a warehouse, employers need only ensure that labels on incoming containers are not removed or defaced. Consequently, mission stocks will not require additional labeling as long as the integrity of the original label is maintained and the label meets the requirements of the standard.

b. A warning label is required on containers of chemicals used in other workplaces such as industrial operations. This requirement also applies to chemicals in tanks and pipes. For this purpose, the installation is permitted to use signs, placards, process sheets, batch tickets, operating procedures, or other written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it applies and conveys the information shown in subparagraph a above. The written materials must be available to the employees in their work area throughout each work shift. The following additional requirements apply to the labeling of chemicals in the workplace:

(1) The commander is not required to label portable containers into which hazardous containers are transferred from labeled containers, and which are for the use of the employee who performs the transfer within that shift.

(2) Labels or other forms of warning will be written legibly and in English, and will be prominently displayed on the container or readily available in the work area throughout each shift. Facilities located in a region where another language is prominent shall present the information in the other language and in English.

c. For the DOD hazardous chemical warning label, DLA will develop a data bank of labeling information for all NSN hazardous chemicals used by DOD. DLA will disseminate this information via the DOD HMIS data bank established by DODI 6050.5, Hazardous Material Information System. When DLA develops the labeling information described above, labeling of existing stocks will be phased in as resources permit. Installations are advised not to undertake any new unilateral labeling action that will increase the expense and complexity of introducing the DOD standard warning label.

10-10. Material Safety Data Sheets

a. Title 29 CFR requires that chemical manufacturers or importers provide the installation with an appropriate MSDS or equivalent with each initial shipment of a hazardous chemical and again when a change of formulation has occurred. The installation is required to maintain copies of all required MSDSs for each hazardous chemical in the workplace. The MSDS must be

available and accessible to employees during each work shift when in the work area.

b. When employees must travel between workplaces during a work shift (e.g., work is carried out in different warehouses or geographical locations), MSDSs may be kept in a central location at the primary workplace.

c. MSDSs may be kept in any form, including operating procedures, and may be designed to cover groups of HM in a work area where it may be appropriate to address the hazards of a process rather than of individual hazardous chemicals. However, the commander will ensure that, in all cases, the required information is provided for each chemical and is readily accessible to employees during each work shift.

d. New MSDSs and hazard determinations are not required for hazardous chemicals that are redistilled or recycled by personnel as a result of the recoupment process described in chapter 9.

10-11. Employee Information and Training

a. Commanders are required by Title 29 CFR, section 1910.1200, to provide employees with information and training on hazardous chemicals in their work area at the time of their initial assignment and whenever a new hazard is introduced into their work area. Specifically, employees will be informed of:

(1) The requirements of the Hazard Communication Program as prescribed by Title 29 CFR, section 1910.1200.
(2) Any operations involving hazardous chemicals in their work area.
(3) The location and availability of the written Hazard Communication Program, including the list(s) of hazardous chemicals and the MSDSs required by Title 29 CFR, section 1910.1200.
(4) Specific training required by title 29 CFR, section 1910.1200, will be addressed in chapter 11 of this manual.

Section IV. Inspections and Operational Procedures

10-12. General

a. Mishap prevention surveys and inspections and sound operating procedures are among the principal elements of a total safety and health program. In addition to these inspections, installations are subject to both announced and unannounced inspections conducted by OSHA under authority of Title 29 CFR.

b. Inspections of workplaces in which HM are stored and handled are the responsibility of each employee assigned to work in these areas. Although the commander and supervisory personnel are ultimately responsible, each

employee, from the beginning to the end of the work shift, must be alert to conditions that, if not corrected, might later pose a more serious risk to all employees. These conditions include, but are not limited to, damaged to leaking containers, overturned drums, fallen stacks of materials, or employee smoking in prohibited areas. The purpose of this section is to provide general guidance concerning inspections, operating procedures, and physical examination requirements.

10-13. Inspections and Maintenance

a. Buildings designated for the storage of HM will generally have certain engineering features incorporated into their design for the specific purpose of controlling or minimizing the hazards of the stored materials. The unexpected sudden or gradual failure of these systems is, therefore, probably of greater concern than it would be in a nonhazardous storage facility. For this reason, periodic inspections and required servicing at prescribed intervals are key elements in ensuring that these systems serve their purpose reliably.

b. Since facilities vary by type, purpose, year of construction, and design features, establishment of specific inspection and maintenance intervals is beyond the scope of this manual. The Facility Engineer, in consultation with the EPO, will develop detailed requirements. Inspection and maintenance intervals will be based upon manufacturer's recommendations unless local maintenance history files suggest the need for more stringent requirements. The Installation Inspection and Maintenance Program will address, as a minimum, the following systems or components:

(1) Roofs, ceilings, walls, and floors of HM storage areas.

(2) Ventilation systems, including ventilation rates for each storage area.

(3) Heating and air-conditioning systems.

(4) Electrical, lighting, and plumbing systems.

(5) Emergency exits and cargo openings, including emergency lights and exit signs.

(6) Facility alarm systems.

(7) Fire suppression systems.

(8) Spill control and containment features.

10-14. Standard Operating Procedures

a. Although many hazards in the workplace will be eliminated or controlled through engineering controls, isolation of hazardous operations, and substitution of safer procedures, additional procedural controls may be required to achieve overall hazard abatement objectives. From a mishap prevention viewpoint, unsafe or unhealthy acts or conditions are the result of one or more basic causes. One frequent cause is the absence of command emphasis for sound operating procedures tailored to suit the local operating environment.

b. Defense installations will develop and publish local guidance for employees not otherwise provided in official manuals or authoritative publications. Such procedures may be available in the Operating and Support Hazard Analysis of the System Safety Analysis, if such an analysis has been performed on the specific warehouse or facility. Suggested areas to be covered include the following:

(1) Procedures for an inspection of the workplace prior to the entry of

employees at the beginning of the workday or shift for the purpose of detecting and correcting unsafe or unhealthy conditions that may have developed while the building was unmanned.

(2) Means of informing visitors and other personnel not regularly assigned to the workplace of the chemicals and hazards present, the precautions

to be taken, and the location of MSDSs, as required by Title 29 CFR, section 1910.1200.

(3) Controls or measures for logging employees and visitors in and out of HM storage or working areas (for emergency purposes).

(4) Procedures and responsibilities for periodic inspections of ventilation, lighting, alarm, fire suppression systems, and emergency eyewash and shower facilities.

(5) Assignment of responsibility for a periodic determination of the adequacy of first-aid supplies and equipment.

(6) Plans for daily employee orientation briefings concerning planned events such as processing receipts and issues, rewarehousing actions, inventory, presence of employees in the workplace who are not normally assigned, and anticipated requirements for personal protective clothing.

(7) Designation of no smoking areas.

(8) Designation of dining areas.

(9) Procedures for inspections to ensure the HM are stored away from heat and ignition sources.

(10) Local operating principles and safety instructions governing the operation of power and manually operated MHE including safe operating speeds for forklifts handling HM, truck loading and unloading operations, and intra-installation movement of HM.

Section V. Personnel Protective Equipment

10-15. General

Title 29 CFR, section 1910.132, requires that, whenever necessary, protective equipment, including PPE for eyes, face, head, and extremities, be provided, used, and maintained in a sanitary and reliable condition. PPE is required for process or environmental hazards, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing bodily injury or impairment through absorption, inhalation, or physical contact.

10-16. Eye and Face Protection

a. Eye and face protection is required by Title 29 CFR, section 1910.133, where there is reasonable probability of injury that can be prevented by such equipment. Commanders will make protection suitable for the work to be performed conveniently available, and employees will use such protection. No unprotected employee will knowingly be subjected to a hazardous environmental condition. Suitable eye protectors will be provided where machines or operations present the hazard of flying objects, glare, liquids, injuries, radiation, or a combination of these hazards. Protectors will meet the minimum requirements outlined in section 1910.133.

b. Employees whose vision requires the use of corrective lenses, and who are otherwise required by OSHA standards to wear eye protection, will wear one of the following types of goggles or spectacles:

(1) Spectacles whose protective lenses provide optical correction.

(2) Goggles that can be worn over corrective spectacles without disturbing the adjustment of the spectacles.

(3) Goggles that incorporate corrective lenses mounted behind the protective lenses.

c. Design, construction, testing, and use of devices for eye and face protection will be in accordance with American National Standard for Occupational and Educational Eye and Face Protection, Z87.1.

10-17. Respiratory Protection Program

a. Title 29 CFR, section 1910.134, states that, in controlling occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures such as enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials. When this is not feasible, respirators will be used.

b. The commander will provide respirators when necessary to protect the health of employees. Respirators will be suitable for the intended purpose. Employees will use the respiratory protection provided in accordance with instructions and training received.

c. Respirators will be selected according to the guidance of American National Standard Practices for Respiratory Protection, Z88.2.

d. Standard procedures for respirator use will be developed in accordance with the requirements outlined in Title 29 CFR, section 1910.134.

e. Title 29 CFR, part 1910, subpart I, requires the development of written SOPs governing the use and selection of respirators. These procedures will address, as a minimum, the following:

CHAPTER 11

HAZARDOUS MATERIALS TRAINING

Section I. General

11-1. Purpose and Applicability

a. The preceding chapters of this manual outlined procedural requirements unique to the identification, receipt, storage, and handling of HM. It should be readily apparent that the presence of HM in the workplace significantly increases the responsibilities of the activity Commander and his senior managers. The command responsibility to protect employees and the environment has been expanded and redefined, to some extent, by recent domestic legislation and rule changes by international regulatory agencies. Consequently, some operations previously governed largely by DOD policies and regulations are now being regulated by Federal statute and international regulations and rules. Some of these new procedural requirements may seem more complex and demanding, but in each case their common objective is the safe handling and transportation of goods and materials defined as dangerous or hazardous. The requirements' collective impact on operations is an increased requirement for sound and effective training programs to ensure full compliance with national and international regulations to protect personnel and the environment.

b. The purpose of this chapter is to summarize training requirements relating to the management of hazardous wastes and materials as published in various Federal and DOD regulations and, in addition, to provide general guidelines for developing local training programs. The design and conduct of personnel training programs can reduce serious injury and provide for environmental protection. Less obvious is the fact that such a program reflects a concern for the welfare of the individuals and their working environment. A visible and active training program, therefore, complements other morale-promoting activities.

c. The provisions of this chapter are applicable to all personnel involved in the development and conduct of training programs.

Section II. Federal and International Requirements for HM Training

11-2. General

Training requirements have been established by DOT, EPA, OSHA, and NRC. These requirements are contained in various parts of the CFR, and are summarized in the following paragraphs.

11-3. DOT Requirements

Title 49 CFR, section 173.1, requires installation Commanders, as offerors of HM for transportation, to instruct their officers, agents, and employees involved in preparing HM for shipment in the applicable regulations in Title 49 CFR, part 173. This includes requirements for identifying, packaging, marking, labeling, placarding, and preparing documentation to accompany such shipments.

11-4. EPA Requirements

a. Title 40 CFR, section 264.16, requires that employees assigned duties at a hazardous waste storage facility successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility's compliance with the requirements of Title 40 CFR, part 264. This program must be directed by a person trained in hazardous waste management procedures (including

contingency plan implementation) relevant to the positions in which they are employed. As a minimum, the training program must ensure that facility employees are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems, including, where applicable:

(1) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.

(2) Key parameters for automatic waste feed cutoff systems.

(3) Communications or alarm systems.

(4) Shutdown of operations.

b. Facility personnel must successfully complete the training program within 6 months after the date the their employment or assignment to the facility. Employees may not work in unsupervised positions until they have completed the training.

c. Facility personnel must participate in an annual review of the initial training.

d. Commanders must maintain the following documents and records at the facility:

(1) Records containing the job title of each position at the waste facility related to hazardous waste management, and the name of the employee filling the job.

(2) A written job description for each position listed above, which will include the requisite skills, education, or other qualifications, and the duties of employees assigned to each position.

(3) A written description of the type and amount of both introductory and continuing training that will be given to each person filling the above positions.

(4) Records documenting that the training or job experience requirements of the above paragraphs have been met by facility personnel.

e. Training records on current personnel must be kept until the hazardous waste facility is closed. Training records of former employees must be kept at least 3 years past the date the employee last worked at the facility.

11-5. OSHA Requirements

a. Occupational Safety and Health (General).

(1) *Training of Management Officials.* Title 29 CFR, section 1960.54, requires the training of top management officials. Each agency must provide top management officials with orientation and other learning experiences that will enable them to manage their agency's Occupational Safety and Health Programs.

(2) *Training of Supervisors.* Title 29 CFR, section 1960.55, requires the provision of occupational safety and health training that covers the supervisors' responsibility to provide and maintain safe and healthful working conditions for employees, the agency Safety and Health Program, Title 29 CFR, section 19, Executive Order 19126, and the occupational safety and health standards applicable to the assigned workplace. Training will include procedures for investigating and reporting hazards, investigating and reporting allegations of reprisal, and minimizing hazards; and will also

cover other appropriate rules and regulations. This training should include introductory and specialized courses and materials that will enable supervisors to recognize and eliminate or reduce occupational safety and health hazards in their working units. Training will also include the development of requisite skills for managing the agency's Safety and Health Program within the work unit, including training and motivating subordinates to ensure safe and healthful work practices.

(3) *Training of Safety and Health Personnel.* Training requirements for Safety and Health Specialists, Safety and Health Inspectors, and employees assigned collateral Safety and Health Committee responsibilities are covered in Title 29 CFR, sections 1960.56, 1960.57, and 1960.58, respectively.

(4) Training of Employees and Employee Representatives.

(a) Title 29 CFR, section 1960.59, requires that each agency provide appropriate safety and health training for employees, including specialized job safety and health training appropriate to the work performed by the employee. Training shall also inform employees of the agency Occupational Safety and Health Program and will emphasize employee rights and responsibilities.

(b) Occupational safety and health training for agency employees who are representatives of recognized employee groups (e.g., labor organizations) shall include both introductory and specialized courses and materials. This will enable the group to function appropriately in ensuring safe and healthful working conditions and practices in the workplace and enable them to assist in conducting workplace inspections.

b. Hazard Communication Standard. Title 29 CFR, section 1910.1200, requires that employers provide employees with information and training on hazardous chemicals in their work area at the time of their initial assignment and whenever a new hazard is introduced into their work areas. This employee training shall include at least:

(1) Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (e.g., monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released).

(2) The physical and health hazards of all chemicals in the work area.

(3) The measures employees can take to protect themselves from these hazards, including specific measures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and PPE to be used.

(4) The details of the Hazard Communication Program developed by the employer, including an explanation of the labeling system and the MSDS, and how the employees can obtain and use the appropriate hazard information.

c. Hazardous Waste and Emergency Response.

(1) Title 29 CFR, section 1910.120, requires that all employees (e.g., equipment operators,

general laborers) exposed to hazardous substances, health hazards, or safety hazards be thoroughly trained in the following:

(a) Names of personnel and alternates responsible for site safety and health.

(b) Safety, health, and other hazards present on the site.

(c) Use of PPE.

(d) Work practices by which the employee can minimize risks from hazards.

(e) Safe use of engineering controls and equipment on the site.

(f) Medical surveillance requirements, including recognition of symptoms and signs that might indicate exposure to hazards.

(g) Site control measures.

(h) Decontamination procedures.

(i) Site SOPs.

(j) Site contingency plan for safe and effective emergency response, including the necessary PPE and other equipment.

(k) Confined space entry procedures, including pre-entry briefings to be held prior to initiation of any site activity to ensure that employees are apprised of and following the site Safety and Health Plan.

(2) All employees shall, at the time of job assignment, receive a minimum of 40 hours of initial instruction off site, and a minimum of 3 days of actual field experience under the direct supervision of a trained, experienced supervisor.

(3) On-site managers and supervisors who are directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive training as provided in subparagraphs (1) and (2) above and at least eight additional hours of specialized training on operations management at the time of job assignment.

(4) Employees and supervisors that have received and successfully completed the training and field experience specified above shall be certified by their instructor as having completed the necessary training. Any person who has not been certified and who would be exposed to hazardous substances,health hazards, or safety hazards, shall be prohibited from engaging in hazardous waste operations.

(5) Employees who are responsible for responding to emergency situations that may expose them to hazardous substances shall be trained in emergency response. The amount of training depends upon the duties to be performed by the responder. Warehouse personnel, who are members of the spill response team, will be provided with the appropriate level of training. Consult the installation environmental office for further information.

(6) Employees exposed to hazardous substances, health hazards, or safety hazards, and onsite managers and supervisors shall receive 8 hours of refresher training annually on the items specified in subparagraphs (a) through (k) above and other relevant topics.

11-6 Nuclear Regulatory Requirements

a. Title 10 CFR, section 19.12, requires that all individuals working in or frequenting any portion of a restricted area shall be kept informed of the storage, transfer, or use of radioactive materials or of radiation in such portions of the restricted area. The extent of information provided will be commensurate with potential radiological health problems in the restricted area.

b. In addition, employees assigned to work in areas where radioactive materials are stored or used will be instructed in the following:

(1) Precautions to take or procedures to follow to minimize exposure.

(2) The purposes and functions of protective devices employed.

(3) Observing to the extent within the worker’s control, the applicable provisions of Commission regulations and licenses for the protection of personnel from exposures to radiation or radioactive materials occurring

in such areas.

(4) Their responsibility to report promptly to the licensee any condition that may lead to or cause a violation of Commission regulations and licenses or unnecessary exposure to radiation or radioactive material. At DOD installations, the licensee is the Installation Environmental Officer.

(5) The appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation or radioactive material.

(6) Radiation exposure reports that workers may request of employers in accordance with the provisions of Title 10 CFR, section 19.13.

11-7. International Requirements

a. ICAO TIs require that initial and recurrent Dangerous Goods Training Programs be established and maintained by regular shippers of dangerous goods.

b. To assist with the planning of training courses, the minimum required by subject matter relating to the transport of dangerous goods by air, for various categories of personnel, is indicated below:

(1) Personnel engaged in the ground handling, storage, and loading of dangerous goods must be trained in general philosophy, labeling and marking, handling and loading procedures, and compatibility.

(2) Packers must be trained in the classes of dangerous goods, list of dangerous goods, general packaging requirements, equivalents, specific packaging instructions, and labeling and marking.

(3) Shippers must be trained in the classification of dangerous goods, list of dangerous goods, prohibitions, packaging instructions, labeling and marking, shipper's responsibilities, and dangerous goods transport documents.

Section III. DOD Hazardous Material Training Requirements

11-8. Preparation of Hazardous Materials for Military Air Shipment

a. AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19/DLAM 4145.3, paragraph 1-20, requires that the preparation, packaging, and marking of HM be accomplished by the personnel most knowledgeable in properly preparing HM for shipment, except in mobility, tactical, or contingency operations. DD Form 1387-2 certification will be accomplished by DOD personnel qualified as a result of specialty training specified in subparagraphs 1-20c and 1-20d of the joint regulation. While any of th formal courses listed in paragraph 1-20 satisfies minimum training requirements, supervisors should consult DOD Catalog 5010.6, DMET, to select the course most appropriate for the individual concerned.

b. Refresher training is required every 24 months for personnel authorized by the activity Commander to certify DD Form 1387-2.

c. In addition to the specialized training required for certification of the DD Form 1387-2, paragraph 1-22 of AFR 71-4/TM 38-250/NAVSUP PUB 505/MCO P4030.19 DLAM 4145.3 requires that other personnel who perform handling or loading duties of military air shipments receive initial and annual refresher

training. This training will be designed for instruction by local units, and will be structured to include, as a minimum, familiarity with the following subjects:

(1) DOT hazard classification.
(2) Marking, labels, placards, and forms.
(3) Packaging and handling.
(4) Compatibility and other safety requirements.

Current records of individual training must be maintained.

Section IV. The Training Plan

11-9. General

Training's primary purpose and goal must be trained and competent personnel, adequate and properly maintained equipment, intelligent job planning, alert supervision, and satisfactory organization morale. Attainment of this goal in today's complex storage and materials operations, further complicated by numerous Federal laws and regulations, is very difficult. It is, however, a goal that installations must constantly strive to attain if they are to have efficient and safe storage and materials handling. Training is also the best preparation for emergencies. Training for emergencies must produce fast action and authoritative, decision-oriented operational responses across all levels. Training should also begin with the premise that, whatever the emergency might be, trained individuals can minimize the impact of emergencies on life, property, and the environment. Lastly, training courses must train managers, supervisors, and employees to actually manage emergencies, not just to talk about emergency management.

11-10. Responsibility for Training

Installation Commanders must assume direct responsibility for initiating, directing, supervising and conducting all training pertaining to storage and HM handling activity. Training is more effective when it is made a part of operations and is not considered to be disconnected from the job. Operations personnel must have a thorough knowledge of their work and must have the confidence of their associates and subordinates. Operating supervisors must consider training an integral part of the daily workload.

11-11. Support by Storage Managers

Since training is part of the daily workload, storage managers must strongly support and participate in the program. Such support and participation should ensure the necessary balance between operations and training, with the training program receiving proper emphasis. It is important that this be a continuous program and not an isolated, temporary interest.

11-12. Training Plan content

The first step in installing a training program is to institute an overall survey determining areas in which training is needed. Appendix G to this

manual has been developed as a suggested means of determining possible areas in which training may be needed and groups of personnel that might need the various types of training shown. Depot quality control and quality assurance personnel shall receive training relative to the operational areas designated in appendix G with which they interact. Since it is possible that training could be needed in many or all of the areas indicated in appendix G, priorities must be assigned so needs are met on the basis of urgency. An important point to remember is that attempting too much training at one time will interfere with operations and decrease training benefits. Thus, a well thought out and balanced plan, increasing or decreasing in intensity and scope as conditions require, is essential to the success of a training program.

11-13. Kinds and Methods of Training

a. All key personnel should receive general training in all HM procedures and standard practices; in addition, they must receive detailed instructions in those procedures with which they are specifically concerned. The amount of time devoted to training in each functional item as well as in operational procedures should be determined by the complexity of the job and the level of detail required.

b. A modified conference method of training with group participation and discussion, within the bounds of the training objective and under the control and guidance of the leader, should be used to present material related to principles of HM operations and detailed operating procedures.

c. The last phase of the training program should concentrate on actual job instruction for nonsupervisors. included in this phase (but not confined to it) will be on-the-job instruction and step-by-step demonstrations using working models of packaged HM, labels, shipping papers, films, charts, diagrams, etc. Activities such as equipment operation, receipt inspection and processing, segregation of incompatible materials, spill cleanup, and all other phases of HM storage and handling should be covered in this phase. Training in safety practices should be inherent in this type of training.

11-14. Coordination with Other Installation Activities

Coordination should be maintained between the storage and material handling or warehousing division and other affected elements of the installation (e.g., the Command Security Office, the Safety and Health Manager, the Industrial Hygiene Officer, and the Environmental Protection Office). In this manner, the installation's overall policies and objectives can be incorporated into the specific training programs of the separate activities or operations being trained.

11-15. Sources of Training Information

a. The following publications are recommended as source documents for the development of an installation HM Training Program and curriculum outline:

(1) Federal Regulations.
  (a) Title 10 CFR, Nuclear Regulatory Commission.
  (b) Title 29 CFR, Occupational Safety and Health.
  (c) Title 40 CFR, Environmental Protection.
  (d) Title 42 CFR, Public Health.
  (e) Title 49 CFR, Department of Transportation.

(2) Codes, Publications, and Standards.

(a) American Conference of Governmental Industrial Hygienists (ACGIH).
1. Guidelines for the Selection of Chemical Protective Clothing.
2. Industrial Ventilation.
3. TLV Handbook.
(b) ANSI standards pertaining to procedures, equipment and materials.
(c) AAR, BOE.
1. Emergency Action Guides.
2. Emergency Handling of HM in Surface Transportation.
(d) A Guide to the Safe Handling of Hazardous Material Accidents (ASTM STP 825).
(e) NEPA.
1. Fire Protection Guide on HM.
2. Fire Protection Handbook.
3. Manual of Hazardous Chemical Reactions.
4. NEC.
5. National Fire Codes.
(f) NIOSH.
1. Occupational Diseases, A Guide to Their Recognition.
2. Occupational Health Guidelines for Chemical Hazards.
3. Pocketbook of Chemical Hazards.
4. Registry of Toxic Chemical Substances.

5. The Industrial Environment, Its Evaluation and Control.
(g) National Safety Council, Accident Prevention Manual.
(3) DOD.
(a) DOD 6050.5, HMIS.
(b) DOD 6055.9, Ammunition and Explosives Standards.
(c) AR 700-64/DLAM 4145.8/NAVSUPINST 4000.34/AFR 67-8/ MCO P4400.105, Radioactive Commodities in the DOD Supply System.
(d) DLAR 4145.25/AR-700-68/NAVSUPINST 4440.128-/MCO 10330.2-/AFR 67-12. Storage and Handling of Compressed Gasses and Liquids in Cylinders, and of Cylinders.
(e) DOD 6050.5-G-1, Federal Hazard Communication Training Program--Trainers Guide.
(f) DOD 6050.5W, Federal Communication Training Program--Students Workbook.
(4) Miscellaneous Publications.
(a) A Method for Determining the Compatibility of Hazardous Wastes, EPA.
(b) RCRA Inspection Manual, EPA.
(c) Condensed Chemical Dictionary, Van Nostrand Reinhold Company.
(d) Emergency Response Guidebook, DOT P5800.3.
(e) Handbook of Compressed Gases, Compressed Gas Association, Inc.
(f) Fisher Scientific Company Handling, Storage, and Disposal Guide for Toxic and Hazardous Chemicals, Fisher Chemical Index 83C.
(g) The Merck Index, Merck and Co., Inc.

11-16. Hazardous Material Training Programs

Installation’s HM training programs may be supplemented by various programs

conducted by industry or Government agencies. Major chemical companies offer a wide variety of seminars and conferences designed to satisfy Federal training requirements as outlined in the CFR. These courses of seminars may be particularly useful in qualifying activity training specialists.

CHAPTER 12

AMMUNITION AND EXPLOSIVES

Section I. Purpose and Scope

The purpose of this section is to establish standard policies and principles governing the receipt, storage and issue, and care and preservation of ammunition and explosives at DOD establishments.

Section II. General

12-1. These policies and principles are general in nature. Contingencies not covered will require the exercise of discretion and judgment in complying with the requirements of this section. Detailed operational procedures are not included but will be found in the publications of the military services. The Department of Defense Explosives Safety Board also publishes information concerning ammunition and explosives. Military ammunition and explosives are products of war and as such are manufactured primarily to kill and destroy. Such products have inherent hazards that affect all handling operations from time of manufacture until expended in service. With a knowledge of the hazards involved, the first and foremost principle that should be considered in any discussion of ammunition storage is that ammunition and explosives must be handled, stored, and shipped in a manner that will afford optimum protection against deterioration, accidental ignition, and detonation.

12-2. A comprehensive safety training program should be established and administered at all military establishments where ammunition and explosives are stored. Safety organizations should be established for the purpose of supervising a single coordinated safety program including safety committee activities, accident prevention inspection, correction of day-to-day unsafe conditions and practices, employees training programs, publicity, accident cause investigation, and first aid training. Diligent and vigorous efforts should be made to prevent and eliminate hazards and unsafe practices. The planning of the handling of ammunition for any reason must be performed carefully and by competent experienced personnel to ensure that all hazards have been recognized and that adequate safeguards are provided.

Section III. Facilities

12-3. Magazine

Any building or structure, except an operating building, used for the storage of explosives, ammunition, or loaded ammunition components (see JSMTM

38-420/DLAM 4145.11/NAVSUP PUB 574/AFR 69-9/MCO P4450.12, Storage Space Management).

12-4. Igloo Magazine or Arch-type Magazine

An arch-type earth-covered magazine which may be constructed of concrete or metal.

12-5. Earth-Covered Magazines (barricaded)

Earth-covered magazines which are so located that the earth-covered sides or backs are toward each other, or the front of one magazine with a door barricade is toward an earth-covered side, back, or barricaded front of another magazine.

12-6. Earth-Covered Magazines (unbarricaded)

Earth-covered magazines which are so located that the front of one magazine without a door barricade is toward an earth-covered side or back of another magazine.

12-7. Standard Igloo Magazine

An earth-covered, reinforced concrete, arch-type magazine, with or without a separate door barricade, constructed according to approved standard service drawings.

12-8. Special-Type Magazines

Includes but are not limited to:

a. Magazines with steel (instead of concrete) arches and steel, wood, or concrete end walls.

b. Earth-covered, reinforced concrete magazines such as Corbetta, dome, or box type.

12-9. Aboveground Magazines

Any type of approved magazine which is not earth covered. They may be either barricaded or unbarricaded.

12-10. Open Storage

This type of storage is undesirable and should be only an emergency expedient when authorized by the controlling authority.

Section IV. Storage Plan

12-11. A storage plan will be prepared and maintained on a current basis by each establishment storing ammunition. The storage plan should include as a minimum the following:

a. The quantity and kinds of buildings in which ammunition and explosives are stored.

b. The quantity distance restrictions on each storage building and storage site, loading dock, holding yards and areas, installation rail classification yards, and ammunition work shops and operating sites.

Section V. Warehousing

12-12. General

Preparation for receipt of ammunition and explosives should commence as soon as it is known that ammunition will be received. Storage compatibility charts or tables, explosive weight content of the item, and other characteristics of the item being received should be checked prior to determining the storage location for the item. Within the restrictions mentioned above, a storage building should be selected to effect maximum utilization of space. When dunnage is required, a type of dunnage should be selected that will assure stack stability, proper ventilation, and ease in handling and subsequent rehandling of the item.

12-13. Quantity-Distance Tables

Quantity-distance tables established by the appropriate military service will govern quantities of ammunition or explosives that may be stored in a single location based on the distance the storage site is located from other storage sites, public highways and railroads, inhabited buildings, air fields, runways, and boundary lines, and utilities and utility lines.

12-14. Storage Compatibility Charts or Tables

The factors which determine grouping are: effects of explosion of the item, rate of deterioration, sensitivity to initiation, type of packing, effects of fire involving the item, and quantity of explosive per unit. Storage compatibility groupings should not be confused with hazard classifications established for quantity-distance requirements. The appropriate military service will issue detailed storage compatibility groupings.

12-15. Aisles

a. Inspection aisles should not be maintained except when specific instructions to the contrary are issued by the controlling authority.

b. Operating aisles widths in magazines should be adjusted to conform to widths required for specific types of available forklift equipment or other operational needs.

c. Aisles should be provided for use of handling equipment, inventory, surveillance, or as necessary to distribute the load within the floor capacity, ventilation, etc., as prescribed by the appropriate military service. However, aisles should not be maintained solely for inventory purposes of storage density will not be adversely affected. Storage is to be arranged to facilitate material inventory whenever possible.

12-16. Space Layout and Utilization

a. The military services are responsible for publishing instructions in the form of drawings, sketches, narratives, or combinations of these media

on the approved methods of storage of all type of ammunition.

b. Having given due consideration to safety and preferred magazine usage, the controlling authorities should establish controls which will assure storage in such a manner that most effective usage of existing storage space will result.

12-17. Preferred Storage for Certain Ammunition and Explosive Items

This list is not complete. More details may be obtained from publications of the appropriate military service.

a. General. Ammunition will be stored in accordance with published \ storage compatibility charts or tables.

b. Storage of small arms ammunition. Small arms ammunition may be stored in aboveground magazines, providing service security requirements are satisfied. Where there is more than one type available, the type which offers the most

protection against fire and pilferage should be selected.

c. Storage of bombs with HE components. Bombs should be stored in approved earth-covered magazines where possible.

d. Storage of separate-loading shells or projectiles. Separate-loading shells or projectiles should be stored in earth-covered magazines where possible.

e. Storage of pyrotechnic items. Pyrotechnic items will be given preferential storage in magazines which are well ventilated, dry, and in good repair.

12-18. Storage Aids

a. General. Ammunition should be stored and shipped palletized to effect a reduction in handling time. For proper grounding of ammunition and explosives while in storage, reference should be made to applicable publications of the appropriate military service. The following methods of palletization are permitted when authorized by the appropriate military service in the handling, storage, and shipping of ammunition:

(1) Unstrapped pallets. Conventional double-faced pallets.

(2) Short dunnage. Short dunnage of varying lengths used as horizontal dunnage in lieu of pallets and where authorized by the appropriate military service drawings.

(3) Palletized unit loads. Applies to an assemblage of a particular commodity, packaged or unpackaged, or strapped or tied together in a bundle. When a unit load is strapped or fastened to a pallet, it becomes a "palletized unit load." This method is commonly employed for the storage and shipment of separate-loading shells or projectiles and should be used to the maximum extent possible for storage and shipment of other items.

b. Box Pallets.

(1) Small quantities of ammunition may be retained in box pallet storage to meet current issue demands.

(2) Box pallets may be used for storage of irregular-shaped, hard to stack and crushable items such as container packed items, fiber containers,

bagged goods, loose small items, etc.

c. Dunnage.

(1) Dunnage should be placed beneath the first layer of ammunition or explosives to keep the ammunition or explosives from coming in contact with the floor or ground. The type dunnage is specified on agency storage drawings, sketches, and/or narratives.

(2) Steel racks which are grounded may be used for storage of separate-loading shells, bombs, and other cylindrical objects of ammunition.

12-19. Storage of Pilferable Ammunition

Appropriate security procedures as set forth in military department/agency regulations will be applied for all small arms ammunition, demolitions, and explosives such as blasting caps, igniters, detonators, fuses, and related items. The use of special locks and keys is required as directed by the controlling authority. Key and lock control procedures as set forth in appropriate military department/agency regulations will be applied.

12-20. Storage of Ammunition Bearing Security Classification of Confidential or Higher

The responsibility for taking the proper security measures involving the receipt, storage, and issue of classified material will rest with the commander of the installation involved. Structural standards, key and lock control, and applicable security procedures should conform to standards set forth in DOD 5200.1-R and appropriate military department/agency regulations.

12-21. Storing and Stacking of Dunnage

The storage of dunnage in a permanent open storage site should conform with the provisions of TM 38-400, chapter V, section A, Lumber and Wood Products, in so far as conditions permit. The location of dunnage yards will be governed by regulations published by the appropriate military service, JSMTM 38-400/DLAM 4145.11/NAVSUP PUP 572/AFR 69-9/MCO P4450.12, Storage and Handling of Hazardous Materials.

12-22. Fusible Links on Magazines

Fusible links will be listed on the current approved list published by Underwriters Laboratories, Inc. or other recognized testing laboratories. The melting point will be between 155 F. and 165 F. with a minimum rated braking strength of 20 pounds for the door ventilator link and 8 pounds for the rear-stack ventilator link. Fusible links will not be painted.

12-23. Rewarehousing

Rewarehousing of ammunition will be kept to the minimum consistent with safety and operational needs.

12-24. Termite Control

a. One method of controlling subterranean termites in ammunition magazines is to provide a layer of poison soil under the slabs or around footing

during construction. This principle may also be applied to structures already in place.

b. Earth-covered magazines will be treated only when vacant. If necessary, one section at a time may be treated.

12-25. Protection Against Moisture Damage

Every effort should be made to protect wood boxes from aggressive moisture, as moisture increases the possibility of attack by various types of fungi, particularly mildew. Wood boxes of ammunition exhibiting fungi should be stacked on a pallet in a manner that will provide for air circulation around the boxes. User of dunnage between layers is a method of allowing for air circulation.

Section VI. Receiving Railcars and Motor Vehicles

12-26. Railcars and motor vehicles containing ammunition and explosives received at military establishments will be inspected for sabotage, mechanical defects, and condition of the loading at an established inspection point. All shipments received in damaged or otherwise unsatisfactory condition because deficiencies such as improper preservation, packing, or marking will be reported on SF 364 (Report of Discrepancy) in accordance with AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73/AFR 400-54/MCO 4430.3 or SF 361 in accordance with AR 55-38 (RCS MTMC-54-R1)/NAVSUPINST 4610-33/AFR 75-18/ MCO P4610-19/DLAR 4500.15.

Section VII. Care of Ammunition in Storage

12-27. It is the responsibility of the commander of an installation to maintain stocks of ammunition in an issuable condition. When it becomes known that there is a need to perform a preservation operation, the commander should schedule the operation in accordance with the department policies and in such a manner that required preservation is accomplished with a minimum of delay.

12-28. Proper type storage for ammunition to afford adequate protection should be selected in accordance with policies and regulations of the appropriate military service.

12-29. Incoming ammunition should be inspected to determine condition and whether adequate preservation protection has been applied. Those packages of ammunition which have been opened and are being returned to the installation as excess should be cautiously checked to determine further serviceability and preservation requirements.

12-30. Inspections of ammunition in storage should be made to determine if the preservatives and protective measures are adequate. A definite inspection schedule should be established and pursued.

12-31. Proper preservation and cleaning methods and procedures will be

established and published by each military service.

Section VIII. Shipping

12-32. General

Ammunition shall be packaged in the containers prescribed by the drawings and specifications for the specific stock number involved. In addition, the individual departments published standard carloading and truckloading drawings, sketches, and narratives in compliance with DOT and U.S. Coast Guard regulations. Other requirements are specified by AR 55-355/DLAR 4500.3/NAVSUPINST 4600.70/AFM 75-2/MCO P4600.14.

12-33. Preparation for Delivery

a. Shipping activities will comply with DOT and departmental regulations, whichever are more restrictive.

b. All ammunition shall be loaded in accordance with the applicable outloading drawings and standards. Where such a drawing or standard does not exist, guidance contained in Bureau of Explosives Pamphlet Nos. 6, 6A, and 6C shall be followed. These pamphlets can be obtained from Bureau of Explosives, Association of American Railroads, 1920 L Street N.W., Washington, DC 20036.

c. All shipments will be documented and marked in accordance with DOD regulation 4500.32-R, Military Standard Transportation and Movement Procedures, and MIL-STD-129, Marking for Shipment and Storage.

d. Certification for shipment by military air will be made on DD Form 1387-2 as set forth in TM 38-250/DLAM 4145.3/NAVSUP PUB 505/AFR 71-4/MCO P4030.19. For shipment by commercial aircraft, restricted articles tariff No. 6 is applicable.

e. Authorized deviations from DOT regulations are issued in the form of special permits. These permits remain in effect for the period specified. Requests for new permits and renewal of existing permits are made through the cognizant inventory control point (ICP).

f. Ammunition lot integrity should be maintained in storage and shipment from the time of manufacture and assembly through the supply action to troops. Lots should not be mixed in storage and shipment.

g. Placards should be placed on the outside of both railcar doors, indicating on which side of the railcar the documents are to be found.

h. Components of DOD will give technical aid and assistance to rail and motor carriers in the event of an incident involving explosives and ammunition. All such incidents will be reported to the agency administering the installation rendering the aid in conformance with regulations of the appropriate military department.

i. Lumber and nails used for blocking and bracing of shipments will be of the size, variety, grade, and specifications approved by DOT, Bureau of Explosives, and the individual department drawings, sketches, or narratives.

j. Adequate safeguards will be taken to ensure that ammunition being shipped agrees with the item and condition specified on the shipping

directives.

k. Preparation for intransit security should conform to standards as set forth in appropriate military department/agency regulations for shipment of classified and/or sensitive material.

Section IX. Locator System

Locator records will be established at all military establishments where ammunition and explosives are stored. There should be two records established which can be crossreferenced; one should be a record of each lot of ammunition and the locations in which it is stored (the ammunition lot record cards may be used as this part of the locator system) and the second record should be a planograph for each storage building or a loose leaf book by magazine number on which is indicated its contents.

Section X. Inventory

Detailed inventory procedures are prescribed by the individual DOD Components.

Section XI. Safety

12-34. General

An integral part of all ammunition handling operations is consideration for the safety of personnel, property, ammunition, and explosives. It is the policy of DOD that its agencies establish adequate controls consistent with a safe and efficient operation. The controlling authority is responsible for ensuring that safe practices are being observed in all operations in which ammunition and explosives are handled. That line of responsibility remains unbroken until it reaches that person who handles the item.

12-35. Safety Rules

Each military service is responsible for the publication of safety rules, regulations, and procedures to be followed in the handling of ammunition.

12-36. Posting Instructions

General instructions governing the storage and care of explosives should be posted in each magazines and building where ammunition and explosives are stored. These general instructions will include as a minimum the following:

a. Always handle explosives and ammunition carefully.

b. Remove dirt, grit, and foreign materials from containers and ammunition before placing in storage.

c. Do not store explosives and ammunition in damaged containers.

d. Keep all containers in magazine effectively closed.

e. Store each lot separately. Make the piles stable. Provide for a free circulation of air to all

parts of the pile. Where dunnage is required to keep containers and ammunition off the floor, metal dunnage is preferred.

f. Do not open, repair, pack, or repack containers in or within 100 feet of magazine, except as specifically authorized.

g. Do not keep empty containers, tools, or other materials in magazine containing ammunition or explosives except as specifically authorized by controlling authority.

h. Cleanliness and order must be maintained.

i. Use only electric lights approved for use in magazines.

j. Do not smoke or bring matches or other flame or spark producing devices into magazine.

k. Do not allow unauthorized persons in or near magazine.

l. Keep magazine sparktight, with ventilators well screened and no openings around doors or foundations.

m. Keep doors locked when magazine is unattended. Close doors when vehicle is approaching platform unless vehicle is equipped with spark arrestor on exhaust.

n. Keep the 50-foot cleared space around above-ground magazines free from combustible materials and keep adequate cleared space around igloo magazine ventilators.

o. Two or more doors, when available, must be open when personnel are working in a magazine containing explosives or ammunition.

12-37. Standard Handling Methods

Standard handling methods, consistent with the safety rules and regulations of each military service, should be established for handling all serviceable ammunition packed in accordance with agency approved drawings and specifications. For all items not packed in accordance with agency drawings and specifications or an item considered to be extremely hazardous, an SOP should be developed and then approved by the commander of the installation prior to starting the operation. As a minimum, SOPs should be prepared for all preservation, renovation, and modification operations.

12-38. Educational Program

a. An educational program should be instituted in each installation to develop and maintain employees' interest in the safety program and to train employees in safe practices and safe procedures. Some of the mediums available for employee education are posters, bulletin boards, score boards, special exhibits, safety contests, articles in establishment publications, safety rules, hand out cards, pamphlets, warning signs for specific hazards, suggestion system, essay contests, or sound slide films of motion pictures for groups.

b. Appropriate "off-the-job" accident presentation features should be included in the program, and the safety organization should stimulate the interest of and cooperate with outside agencies concerned with this phase of the accident prevention program.

CHAPTER 13

HAZARDOUS PROPERTY DISPOSAL

Section I. Purpose

This chapter provides general information on disposing of HM and HW.

Section II. Background

13-1. Proper disposal of hazardous property is essential to the protection of human health and the environment. Generally,the same type of prudent care and handling procedures that apply to HM are necessary in the management of HW. Mismanagement or improper disposal of a HW may involve expensive cleanup costs, and the potential for imposition of heavy fines or penalties.

13-2. EPA promulgated regulations for the protection of human health and the environment under RCRA. These regulations hold generators liable for the proper disposal of their wastes under a "cradle to grave" concept. This concept involves the use of a uniform manifest which provides an audit trail for verifying compliance with disposal regulations.

13-3. EPA administers the national environmental protection program and enforces the regulations. However, operational and enforcement authority has been delegated to those individual states which set up HW programs that are equivalent to the Federal requirements. The states may also invoke regulations that are more stringent than the Federal regulations. Generators of HW must be aware of these variances.

Section III. Federal Regulatory Requirements

13-4. Regulatory requirements for the protection of the environment are identified in chapter 2 of this manual, paragraph 2-6.

Section IV. Department of Defense Implementation

13-5. DOD policy is to store and dispose of hazardous property in an environmentally acceptable manner in accordance with applicable environmental and other laws and regulations.

13-6. Various implementing regulations and guidance manuals have been published by the individual components of the Department as well as joint publications.

Section V. Hazardous Waste Disposal Responsibilities

13-7. DLA has the mission responsibility for centralized disposal management of certain categories of DOD generated hazardous property. DLA administers contracts with commercial HW disposal firms for the removal and ultimate disposal of HW. These contracts are also used for disposing of excess HM for which there is no reutilization, transfer, donation, or sales potential.

a. Guidance for turning in hazardous property to DRMO is contained in DOD 4160.21-M, Defense Reutilization and Marketing Manual, chapter IX. Contact your local DRMO to receive a handout that contains hours of operation, points of contact, and sample documentation. Prior to turning in property, it is recommended that customers coordinate with the DRMO. This will enable the DRMO to schedule the turn-in and will provide customers with an opportunity to obtain information regarding any recent changes to existing turn-in requirements.

b. Generators are responsible for the costs of disposing of HW. Funding for HW disposal costs is arranged through memorandums of understanding between the components and DLA.

c. Accurate identification of HW is essential for proper disposal. Misidentified or unknown HW present special problems; may result in unusually excessive lab analysis testing costs; and cause delays in disposal action. As a general rule, different types of wastes should not be combined, commingled, or mixed. Collecting different types of

wastes in the same container makes the identification process difficult. Combining different wastes may also result in a mixture that requires a more complex method of treatment or disposal, resulting in increased costs to the generator. Some wastes have a sales potential for recycling, use as a fuel, or for use in industrial process. However, if such wastes are contaminated with other products, the marketability may be destroyed and the generator will be required to pay for disposal on a commercial service contract.

13-8. DOD components are individually responsible for disposal of those categories of waste (e.g., municipal trash, radioactive waste, infectious medical items, etc.) which, for practical and economical reasons, were not assigned to DLA. Specific categories are provided in DOD 4160.21-M, chapter IX.

13-9. HW minimization responsibilities are covered in chapter 3, section IV, this manual.

13-10. HW storage practices are addressed in chapter 4, section I, paragraph 4-3b(5)(a) through (k), this manual.

13-11. Packing, marking, and labeling of HW is addressed in chapter 6, section VI, this manual.

13-12. HW and emergency response operations are addressed in chapter 10, section VI, paragraph 10-21, this manual.

13-13. Training requirements for employees handling HW are addressed in chapter 11, section II, this manual.

APPENDIX A

REFERENCES

Section I. Required Publications

AR 55-38/DLAR 4500.15/ NAVSUPINST 4610.33C/ AFR 75-2/MCO P4610.19 — (Reporting of Transportation Deficiencies in Shipments.) Cited in paragraph 12-26.

AR 55-355/DLAR 4500.3/ NAVSUPINST 4600.70/ AFR 75-18/MCO P4610.14 — (Military Traffic Management Regulation.) Cited in paragraph 12-32.

AR 700-64/DLAM 4145.8/ NAVSUPINST 4000.34B/ AFR 67-8/MCO P4400.105C — (Radioactive Commodities in the DOD Supply Systems.) Cited in paragraphs 4-9 and 11-15.

AR 700-68/DLAR 4145.25/ NAVSUPINST 4440.128/ AFR 67-12/MCO P10330.2 — (Storage and Handling of Compressed Gases and Liquids in Cylinders, and of Cylinders.) Cited in paragraphs 3-28, 4-14, 8-14, 9-4, and 11-15.

AR 735-11-2/DLAR 4140.55/NAVSUPINST 4355.18/AFR 400-54/ MCO 4430.3 — (Reporting of Item and Packaging Discrepancies.) Cited in paragraphs 3-29 and 12-26.

TM 38-230-2/DLAM 4145.2/NAVSUP PUB 503/AFR 71-16/MCO P4030.21 — (Packaging of Material, Vol. II, Packing.) Cited in paragraph 6-3.

TM 38-236/DLAM 4145.7/ NAVAIR 15-01-3/AFR 71-8/MCO P4030.30 — (Preparation of Freight for Air Shipment.) Cited in paragraph 6-3.

TM 38-250/DLAM 4145.3/ Military NAVSUP PUB 503/AFR 71-4/MCO P 4030.19 — (Preparation of Hazardous Materials for Air Shipment.) Cited in paragraphs 5-5, 6-7, 6-11, 6-19 through 6-23, 7-12, 7-17, 11-8, and 12-33.

DOD 4145.19-R — (Storage and Warehouse Facilities and Services.) Cited in paragraph 4-2.

DOD 4160.21-M — (Defense Reutilization and Marketing Manual.) Cited in paragraph 5-10, 13-7, and 13-8.

DOD 4500.32-R, Vol. I — (Military Standard Transportation and Movement Procedures (MISTAMP).) Cited in paragraph 12-33.

DOD Catalog 5010.6 — (Defense Management Education and Training (DMET).) Cited in paragraph 11-8.

DODD 1000.3 — (Safety and Occupational Health Policy for the Department of Defense.) Cited in paragraph 10-3.

DODD 4140.27-M — (Identification, Control, and Utilization of Shelf-Life Items.) Cited in paragraphs 3-10 and 4-3.

DODD 5030.41 — (Implementation of the National Oil and Hazardous

	Substances Pollution Contingency Plan.) Cited in paragraph 8-3.
DODD 6055.9	(Department of Defense Explosive Safety Board.) Cited in paragraph 9-4.
DODI 4145.3	(Storage Area Management Report.) Cited in paragraph 4-2.
DODI 6050.5	(Hazardous Material Information System.) Cited in paragraphs 3-10 and 4-3.
DODI 6055.1	(Department of Defense Occupational Safety and Health Program.) Cited in paragraphs 4-18, 10-3, and 10-20.

DODI 6055.8	(Occupational Radiation Protection Program.) Cited in paragraphs 10-3 and 10-23. Application for DOD publications should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.
DOT P 5800.3	(Emergency Response Guidebook.) Cited in paragraphs 8-14 and 11-15. Application for copies should be addressed to U.S. Department of Transportation, Research and Special Programs Administration, Washington, DC 20590.
ICAO	(International Civil Aviation Organization (ICAO) Technical Instructions.) Cited in paragraphs 2-5, 4-17, 5-5, 5-8, 6-7, 6-8, 6-17, 6-18, 7-2, 7-15, and 11-7.
IMO	(International Maritime Dangerous Goods (IMDG) Code.) Cited in paragraphs 2-5, 2-8, 4-13, 4-17, 5-5, 5-8, 6-7, 6-8, 6-16, 6-18, 7-11, 7-16, and 7-17. Application for copies of ICAD and IMO publications should be addressed to International Regulations Publishing and Distributing Organization, P.O. Box 60105, Chicago, IL 60660.
MIL-HDBK-201	(Petroleum Operations.) Cited in paragraph 2-1.
MIL-HDBK-600	(Guidelines for Identification Marking, Labeling, Storage, and Transportation of Radioactive Commodities.) Cited in paragraph 4-9.
MIL-STD-129	(Marking for Shipment and Storage.) Cited in paragraphs 4-9, 6-8, 6-14,6-28, 8-14, and 12-33.
MIL-STD-147	(Palletized Unit Loads.) Cited in paragraph 4-14.
MIL-STD-1386 (Navy)	(Loading of Hazardous Materials in MILVAN Containers.) Cited in paragraph 7-8. Application for copies of Military handbooks and standards should be addressed

	to Naval Publications and Forms Center, ATTN: NPFC 3064, 5801 Tabor Avenue, Philadelphia, PA 19120.
Title 10 CFR	(Energy, Nuclear Regulatory Commission.) Cited in paragraphs 2-5, 3-24, 9-3, 11-6, and 11-15.
Title 29 CFR	(Occupational Safety and Health, Department of Labor.) Cited in paragraphs 2-5, 2-9, 3-34, 4-11, 4-13, through 4-15, 4-17, 4-18, 5-3, 5-6, 5-11, 8-2, 8-14, 9-11, 10-2 through 10-12, 10-14 through 10-19, 10-21, 11-5, and 11-15.
Title 40 CFR	(Protection of Environment, Protection Agency.) Cited in paragraphs 2-5, 2-9, 3-5, 3-19, 4-3, 4-17, 4-18, 6-26, 8-2, 8-3, 8-5, 8-12, 8-14, 8-16, 8-18, 9-3, 9-14, 11-4, and 11-15.
Title 42 CFR	(Public Health.) Cited in paragraphs 2-5, 9-4, and 11-15.
Title 49 CFR	(Transportation, Department of Transportation.) Cited in paragraphs 1-4, 2-5, 2-6, 2-8, 3-16 through 3-19, 3-22 through 3-25, 4-17, 4-18, 5-3, 5-6 through 5-8, 6-2 through 6-4, 6-6 through 6-8, 6-11 through 6-15, 6-17, 6-22, 6-26 through 6-28.
	Application for copies should be addressed to Labelmaster, 5724 N. Pulaski Road, Chicago, II 60646-6797.

Section II. Related Publications

Association of American Railroads Circular 42-E	Emergency Action Guide. General Rules Concerning Loading of Carload Shipments of Commodities in Closed Cars. Application for copies should be addressed to Association of American Railroads, 59 East Van Buren Street, Chicago, IL 60605.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) OF 1980	Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20402.
DOT Hazardous Material Warning Labels/Placards Chart	Application for copies should be addressed to Labelmaster, 5724 N. Pulaski Road, Chicago, IL 60646-6797.

EO 12191	Application for copies should be addressed to the Superintendent of documents, U.S. Government Printing Office, Washington, DC, 20402.
Managing Pesticide Spills,	Application for copies should be addressed to

National Pest Control Association	Agency, the U.S. Army Environmental Hygiene Aberdeen PG, MD 21010-5422.
Pesticide Spill Prevention and Management Technical Information Memorandum Number 15	Application for copies should be addressed to the U.S. Army Environmental Hygiene Agency, Aberdeen PG, MD 21010-5422
Federal Insecticide, Fungicide, and Rodenticide Act (FIPRA) of 1972	Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20402.
Planning guide and Checklist for Hazardous Materials Contingency Guides (FEMA-10)	U.S. Federal Emergency Management Agency. Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.
Resource Conservation and Recovery Act (RCRA) of 1976	Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20402.
Superfund Amendments and reauthorization Act (SARA) of 1986	Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20402.
Toxic Substances Control Act (TSCA) of 1976	Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20402.
NFPH 1686	National Fire Protection Association (NFPA). Application for copies should be addressed to National Fire Protection Association (NFPA), 470 Atlantic Avenue, Boston, MA 02210.
NFPA Standard 43A	Code for the Storage of Liquid and Solid Oxidizing Materials.
NFPA Standard 43B	Storage of Organic Peroxide Formulations.
NFPA Standard 801	Recommended Fire Protection Practices for Facilities Handling Radioactive Material.

APPENDIX B

HAZARD CHARACTERISTIC CODES AND DEFINITIONS

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1. Number of Characters: Two.

2. Type of Code: Alpha/Numeric.

3. The Hazard Characteristics Code (HCC) is a two digit alpha-numeric code that is used to provide a means of categorizing hazardous material (HM). HCCs are assigned by trained scientific or engineering personnel, thereby, uniformly identifying HM that is managed by all Government activities. HCCs allow relatively untrained personnel to properly receive, handle, store, and process HM. In addition, HCCs can be used to simplify spill response and cleanup, processing of HM during recoupment operations, and assist in the identification of potential hazardous wastes. The HCC services as an identifier for automated processing of HM transactions and space utilization management.

Table B-1. Hazardous Characteristic Codes

Code	Hazard Group	Abbreviated Definition
A1	Radioactive, Licensable	RAM LICENSABLE
A2	Radioactive, Licensable, Low Risk	RAM LICENSABLE LOW RISK
A3	Radioactive, License Exempt	RADIOACTIVE EXEMPT
A4	Radioactive, License Exempt, Authorized	RADIOACTIVE EXEMPT AUTH
C1	Corrosive, DOT, Acid	CORROSIVE DOT ACID
C2	Corrosive, DOT, Alkali	CORROSIVE DOT ALKALI
C3	Acid, Low Risk	ACID LOW RISK
C4	Alkali, Low Risk	ALKALI LOW RISK
D1	Oxidizer	OXIDIZER
D2	Oxidizer, Low Risk	OXIDIZER LOW RISK
D3	Oxidizer and Poison	OXIDIZER POISON
D4	Oxidizer and Corrosive	OXIDIZER CORR
E1	Explosive, Military	EXPLOSIVE MILITARY
E2	Explosive, Low Risk	EXPLOSIVE LOW RISK
F1	Flammable, Aerosol	FLAM AEROSOL
F2	Flammable, IMDG 3.1	FLAM IMDG 3.1
F3	Flammable, IMDG 3.2	FLAM IMDG 3.2
F4	Flammable, IMDG 3.3	FLAM IMDG 3.3
F5	Flammable, and Poison	FLAM POISON
F6	Flammable and Corrosive	FLAM CORROS
F7	Flammable Solid	FLAM SOLID
F8	Combustible liquid	COMBUST LIQUID
G1	Gas, (Nonflammable) Poison	GAS, POISON
G2	Gas, Flammable, Non Toxic	GAS, FLAM, NON TOX
G3	Gas, Nonflammable, Non Toxic	GAS, NON FLAM,NON TOX
G4	Gas, Nonflammable, Oxidizer	GAS, NON FLAM, OXIDIZ
G5	Gas, Nonflammable, Corrosive	GAS, NON FLAM, CORROS
G6	Gas, (Nonflammable), Poison, Corrosive	GAS, NF, POISON, CORROS
G7	Gas, (Nonflammable), Poison, Oxidizer	GAS, NF, POISON, OXIDIZ
G8	Gas, Flammable, Poison	GAS, POISON, FLAM
G9	Gas, (Nonflammable), Poison, Corrosive, Oxidizer	GAS, NONFLAM, P, C, O
J1	Miscellaneous Flammable Liquids	MISC FLAM LIQUID
J2	Miscellaneous Flammable Solids	MISC FLAM SOLIDS
J3	Miscellaneous Oxidizers	MISC OXIDIZER
J4	Miscellaneous Organic Peroxides	MISC ORG PEROXIDE

J5	Miscellaneous Poisons	MISC POISON
J6	Miscellaneous Corrosive	MISC CORROSIVE
J7	Miscellaneous UN Class 9	UN CLASS 9
J8	Miscellaneous ORM-E	MISC ORM-E
K1	Infectious Substance	INFECTIOUS SUB
K2	Cytotoxic Drugs	CYTOTOXIC DRUG
M1	Magnetized Material	MAGNETIZED MATERIAL
N1	Nonhazardous	NON HAZARDOUS
P1	Peroxide, Organic, Regulated	PERIXODE ORG US DOT
P2	Peroxide, Organic, Low Risk	PEROXIDE ORG LOW RISK

Table B-1. Hazardous Characteristic Codes--Continued

Code	Hazard Group	Abbreviated Definition
R1	Reactive Chemical, Flammable	REACTIVE CHEM, FLAM
R2	Water Reactive Chemical	WATER REACTIVE CHEM
T1	DOT Poison-Inhalation Hazard	DOT POISON INHALE
T2	UN Poison, Packing Group I	UN POISON GROUP I
T3	UN Poison, Packing Group II	UN POISON GROUP II
T4	Poison, Food Contaminant	POISON FOOD CONTAM
T5	Pesticide, Low Risk	PESTICIDE LOW RISK
T6	Health Hazard	HEALTH HAZARD
T7	Carcinogen	CARCINOGEN
W1	Marine Pollutant	MARINE POLLUTE

Table B-2. Hazardous Characteristic Codes Definitions

Code	Hazard Group	Definition
A1	Radioactive Material Licensable	Any radioactive materials that require issuance of a license, according to Title 10 CFR, to persons who manufacture, produce, transfer, receive, acquire, own, possess, or use by product material; and are gamma emitters or unencapsulated alpha or beta emitters (e.g., uranyl acetate). Includes any radioactive material regulated, marked, and labeled Radioactive I, II or III for transportation purposes by the U.S. DOT according to Title 49 CFR.
A2	Radioactive Material,Licensable, Low Risk	Any radioactive materials that require issuance of a license, according to Title 10 CFR, to

		persons who manufacture, produce, transfer, receive, acquire, own, possess, or use by product materials; and are encapsulated such that they are unlikely to be released into the atmosphere and unlikely to be inhaled, ingested, or absorbed under normal conditions (e.g., Carbon-14 in night vision equipment or Promethium-147 in luminescent watch dials). Includes any radioactive material regulated and marked but not bearing a Radioactive label, for transportation purposes by the U.S. DOT according to Title 49 CFR.
A3	Radioactive Material, License Exempt	A radioactive material that is not required to be licensed by Title 10 CFR. Includes items packaged in accordance with Section 173.421 to Title 49 CFR, excepted radioactive materials, which through experience has been determined by the appropriate military service, or agency focal point that the material does not require special radioactive storage and handling. Includes items such as electron tubes with trace thorium in tungsten, smoke detectors, incandescent gas latern mantels, and tritium watches.
A4	Radioactive Material, Licensed Exempt, Authorized	Low hazard radioactive materials, exempt from the licensing requirements of Title 10 CFR, but for which the appropriate military service or agency focal point has determined that an authorization should be required for the purpose of producing, receiving, transferring, owning, possessing, or using. Included are electron tubes or smoke detectors containing more than 10 microcuries, or a material exceeding the NRC license-exempt quantities or 0.1 microcuries of radium or 1.0 microcuries of any other radionuclide.
C1	Corrosive, DOT, Acid	An acid, United Nations Class 8 material, liquid, or solid,

Table B-2. Hazardous Characteristic Codes Definitions--Continued

Code	Hazard Group	Definition
		required to be classed as "Corrosive" by the U.S. DOT or EPA that causes visible destruction or irreversible alterations in human skin tissue at the site of contact, or a liquid that has a severe corrosion rate on steel or aluminum, in accordance with any criteria: (a) A material is considered to be destructive or to cause irreversible alteration in human skin tissue if, when tested on the intact skin of an albino rabbit, the structure of the tissue at the site of contact is destroyed or changed irreversibly after an exposure period of 4 hours or less; or (b) A liquid is considered to have a severe corrosion rate corrosion rate exceeds 6.25 mm (0.246 inches) per year on steel (SAE 1020) or aluminum (nonclad 7075-T6) at a test temperature of 55ø C. (131ø F.). An acceptable test is described in NACE standard Tm-01-69; or (c) It is aqueous and has a pH in aqueous solution less than or equal to 2 as determined by the test method specified in Title 40 CFR, Section 261.22.
C2	Corrosive, DOT, Alkali	An alkali, United Nations Class 8 material, liquid, or solid, required to be classed as "Corrosive" by the U.S. DOT or EPA that causes visible destruction or irreversible alterations in human skin tissue at the site of contact, or a liquid that has a severe corrosion rate on steel or

		aluminum, in accordance with any one of the following criteria: (a) A material is considered to be destructive or to cause irreversible alteration in human skin tissue if, when tested on the intact skin of an albino rabbit, the structure of the tissue at the site of contact is destroyed or changed irreversibly after an exposure period of 4 hours or less; or (b) A liquid is considered to have a severe corrosion rate if its corrosion rate exceeds 6.25 mm (0.246 inches) per year on steel (SAE 1020) or aluminum (nonclad 7075-T6) at a test temperature of 55ø C. (131ø F.). An acceptable test is described in NACE Standard TM-01-69; or (c) It is aqueous and has a pH in acqueous solutions greater than or equal to 12.5 as determined by the test method specified in Title 40 CFR, Section 261.22.
C3	Acid, Low Risk	A liquid acid or solid acid that in solution has a pH greater than 2 but less than 7 that is unlikely to present a hazard to personnel.
C4	Alkali, Low Risk	A liquid or solid alkali that in solution has a pH greater than 7 but less than 12.5 that is unlikely to present a hazard to personnel.
D1	Oxidizer	An oxidizing material regulated by the U.S. DOT or in United Nations Division 5.1 that is also in NFPA 43A Class 2, 3, or 4, other than a compressed gas, that can undergo an explosive reaction when catalyzed or exposed to heat, shock, or friction; or will cause a severe increase in the burning rate of combustible material with which it comes in contact or which will undergo vigorous self-sustained decomposition when catalyzed or exposed to heat; or will moderately increase the burning rate or which may cause

		spontaneous ignition of combustible or flammable material with which it comes in contact.
D2	Oxidizer, Low Risk	An oxidizing material in NFPA 43A Class 1, whose primary hazard is that it may increase the burning rate of combustible material with which it comes in contact, or a potential oxidizing material for which an MSDS is not required based on the manufacturer's or supplier's certification that the material is not hazardous within the scope of the Federal Acquisition Regulations (FAR) Title 49 CFR, Section 252.217-7251. Includes the following oxidizers: Aluminum nitrate Ammonium persulfate Calcium chlorate Calcium peroxide Cupric nitrate

Table B-2. Hazardous Characteristic Codes Definitions--Continued

Code	Hazard Group	Definition
		Hydrogen peroxide solutions, over 8%, but not exceeding 27.5% Lithium hypochlorite Lithium peroxide Magnesium nitrate Magnesium perchlorate Magnesium peroxide Nickel nitrate Potassium dichromate Potassium nitrate Potassium persulfate Silver nitrate Sodium carbonate peroxide Sodium dichloroisocyanurate Sodium dichromate Sodium nitrate Sodium nitrite Sodium perborate Sodium perborate tetrahydrate Sodium perchloratre monohydrate

		Sodium persulfate Strontium chlorate Strontium nitrate Strontium peroxide Zinc chlorate Zinc peroxide
D3	Oxidizer and Poison	An oxidizing material (HCC D1), other than a compressed gas (HCC G4), that also meets the definition of a poison (HCCs T1, T2, T3, T4, T5, or T6
D4	Oxidizer and Corrosive	An oxidizing material (HCC D1), other than a compressed gas (HCC G4), that also meets the definition of a corrosive material (HCC C1 and C2).
E1	Explosives, Military	United Nations Class 1 Explosives (except for commercially procured UN Division 1.4S) and all Military Explosives identified by a Department of Defense Ammunition Code (DODAC). (See DOD Standard DOD 6055.9, for hazard classification and compatibility groups).
E2	Explosives, Low Risk	United Nations Class I Explosives in: Division 1.4 Substances and articles which present no significant hazard. This division comprises substances and articles which present only a small hazard in the event of ignition or initiation during transport. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. And in United Nations Compatibility Group: Group S--Division 1.4 Substances or articles so packed or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case, all blast or projection of fragments

		effects are limited to the extent that they do not significantly hinder or prohibit fire fighting or other emergency response efforts in the immediate vicinity of the package.
F1	Flammable Aerosol	An aerosol is regarded as flammable if a test of the filled dispenser produces any one of the following results:

Table B-2. Hazardous Characteristic Codes Definitions--Continued

Code	Hazard Group	Definition
		(a) With the valve fully open, the discharged material is capable of being ignited by a flame applied for a period of 5 seconds at 150 mm from the valve orifice and the resulting flame length in a horizontal plane exceeds 450 mm, or with any degree of valve opening the flame flashes back and burns at the valve; or (b) with the valve fully open, the discharged material when directed into an open--ended vessel containing an internal ignition source causes a significant propagation of flame; or (c) with the valve fully open, the discharged material when directed into a closed vessel containing an internal ignition source causes an explosion or rapid burning. Note: Recognized standard test methods utilizing procedures similar to the above and which produce similar results may also be used. Also, any aerosol that is required to be labeled "Flammable" under the U.S. Federal hazardous Substance Act. Included are International Civil

		Aviation Organization flammable non-refillable receptacles made of metal, glass or plastic and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a self-closing release device allowing the contents to be ejected as solid or liquefied particles in suspension in a gas, as a foam, paste or powder, or in a liquid or gaseous state. Excluded are refillable compressed gas cylinders or flasks which are assigned a "G" series code.
F2	Flammable Liquid IMDG 3.1	International Maritime Dangerous Goods Code Division 3.1 with a flashpoint (closed-cup) of 0øF. or lower.
F3	Flammable Liquid IMDG 3.2	International Maritime Dangerous Goods Code Division 3.2 Flammable Liquid with a flashpoint above 0øF. (closed-cup and lower than 73øF.
F4	Flammable Liquid IMDG 3.3	International Maritime Dangerous Goods Code Division 3.3 Flammable Liquid with a flashpoint (closed-cup) equal to or higher than 7øF. but lower than or equal to 141øF. (closed-cup) or 150øF. (open-cup).
F5	Flammable Liquid and Poison	United Nations Class 3 Flammable Liquids (HCCs F2, F3, F4) that also have the hazards of United Nations Division 6.1, Poisons, (HCCs T1, T2, T3, T4, or T6).
F6	Flammable Liquid and Corrosive	United Nations Class 3 Flammable Liquids (HCCs F2, F3, F4) that also have the hazards of United Nations Class 8 Corrosives (HCCs C1 and C2).
F7	Flammable Solid	Any United Nations Division 4.1 solid material, other than one classed as an explosive, spontaneously combustible (HCC R1), or Dangerous When Wet (HCC R2), required to be classed as a "flammable solid" by the U.S. DOT, which under conditions normally incident to transportation or storage is likely to cause fires through

		friction, retained heat from manufacturing or processing, or which can be readily ignited and when ignited burns so vigorously and persistently as to create a serious transportation hazard.
F8	Combustible Liquid	Any liquid that does not meet the definition of any other hazard class or HCC and has a flashpoint above 141øF. at or below 200øF.
G1	Gas, (Non-flammable), Poison	United Nations Class 2 and 6 nonflammable material, requiring a "Poison Gas" label, which is a gas at 20øC. (68øF.) or lower at one atmosphere of pressure (a material which has a boiling point of 20ø C. (68ø F.) or lower at 1 atmosphere) and which: (a) Is known to be so toxic to humans as to pose a hazard to health during transportation; or

Table B-2. Hazardous Characteristic Codes Definitions--Continued

Code	Hazard Group	Definition
		(b) In the absence of adequate data on human toxicity, is presumed to be toxic to humans, because when tested on laboratory animals, it has an LC50 less than 5,000 ppm. (c) Includes Poison Gases in United Nations Division 2.3, required to be marked "Inhalation Hazard" by the U.S. DOT in Title 49 CFR, section 173.3a. (d) Meets the definition of Nonflammable Gas (HCC G3).
G2	Gas, Flammable	United Nations Class 2 material, other than a flammable aerosol, which is a gas at 20ø C. (68ø F.) or lower at 1 atmosphere of pressure (a material which has a boiling point of 20ø C. (68ø F.) or lower at 1 atmosphere) and which--

		(a) Is ignitable at 1 atmosphere when in a mixture of 13 percent or less by volume with air; or (b) Has a flammable range at 1 atmosphere with air of at least 12 percent regardless of the lower limit. (c) The limits specified above shall be determined at 1 atmosphere of pressure and a temperature of 20ø C. (68ø F.) in accordance with ASTM E68-79, Standard Test Method for Limits of Flammability of Chemicals.
G3	Gas, Non-flammable	United Nations Class 2 Nonflammable gas (includes compressed gas, liquefied gas, pressurized cryogenic gas and compressed gas in solution). A "nonflammable compressed gas" means any material (or mixture) which-- (a) Exerts in the packaging a pressure of 40 psia (275.8 kPa) at 21.1ø C. (70ø F.) or regardless of the pressure at 21.1ø C. (70ø F.), exerts in the container a pressure of 104 psia (717.1 kPa) 54.4ø C. (130ø F.); and (b) Does not meet the definition of Flammable Gas. (HCC G2).
G4	Gas, Non-flammable Oxidizer	A Nonflammable Gas, Oxidizer is a material (or mixture) which-- (a) Meets the definition of HCC G3; and (b) Does not meet the definition of Poison Gas or Flammable Gas. (HCC G1 or G2); and (c) Requires oxidizer label for transport.
G5	Gas, (Non-flammable) Corrosive	A Nonflammable Gas, Corrosive, is a material (or mixture) which- - (a) Meets the definition of HCC G3; and (b) Does not meet the definition of Poison Gas or Flammable Gas. (HCC G1 OR G2); and (c) Also has the hazards of United Nations Class 8, Corrosive

		Material, (HCC C1 or C2).
G6	Gas, (Non-flammable) Poison, Corrosive	A Nonflammable Gas, Poison, Corrosive, is a material (or mixture) which-- (a) Meets the definition of HCC G3; and (b) Does not meet the definition of Flammable or Gas. (HCC G2). (c) Also has the hazards of Poison Gas, (HCC G1) or meets the U.S. DOT definition of Poison-Inhalation hazard (HCC T1). (d) Meets the definition of United Nations Class 8, Corrosive (HCC C1 or C2).
G7	Gas, (Non-flammable), Poison, Oxidizer	A Nonflammable Gas, Poison, Oxidizer, is a material (or mixture) which-- (a) Meets the definition of HCC G3; and (b) Does not meet the definition HCC G2; and (c) Meets the definition of HCC G1; and (d) Meets the definition of gas, oxidizer HCC G4.
G8	Gas, Poison, Flammable	United Nations Class 2 and 6, Poison Gas (HCC G1), that also has the hazards of Flammable Gas (HCC G2).
G9	Gas, Non-flammable, Poison, Corrosive Oxidizer	United Nations Class 2 and 6, Poison Gas (HCC G1), that meets the definition of United Nations Class 8, Corrosive Material (HCC C1 or C2) and gas, oxidizer (HCC G4).

Table B-2. Hazardous Characteristic Codes Definitions--Continued

Code	Hazard Group	Definition
J1	Miscellaneous Flammable Liquids	Materials in United Nations Class 3 (HCC F2, F3, or F4) that meet the quantity and packaging requirements stated below: United Nations Class 9, or U.S. DOT ORM-D, materials that

		present a minimal hazard during transport or storage, which are not included in any other Group and the material is referenced in Title 49 CFR, Section 172.101 for specific hazardous material exception. Includes items authorized to be marked "limited quantity" by Chapter 15 of the U.N. Recommendations of the Committee of Experts on the Transportation of Dangerous Goods, items packaged and marked in accordance with Section 18 of the International Maritime Dangerous Goods Code, "Carriage of Dangerous Goods in Limited Quantities". Also includes "Consumer Commodities" (ORM-D) packaged and distributed in a form intended or suitable for sale through retail sales agencies or instrumentalities for consumption by individuals for purposes of personal care, household use, or drugs and medicines, in accordance with Title 49 CFR, Section 171.8.
J2	Miscellaneous Flammable Solids	Materials in United Nations Division 4.1 (HCC F7) in Packing Groups II and III that meet the quantity and packaging requirements stated below: United Nations Class 9, or U.S. DOT ORM-D, materials that present a minimal hazard during transport or storage, which are not included in any other Group and the material is referenced in Title 49 CFR, Section 172.101 for specific hazardous material exception. Includes items authorized to be marked "limited quantity" by Chapter 15 of the U.N. Recommendations of the Committee of Experts on the Transportation of Dangerous Goods, items packaged and marked in accordance with Section 18 of the International Maritime Dangerous Goods Code, "Carriage of Dangerous Goods in Limited

		Quantities". Also includes "Consumer Commodities" (ORM-D) packaged and distributed in a form intended or suitable for sale through retail sales agencies or instrumentalities for consumption by individuals for purposes of personal care, household use, or drugs and medicines, in accordance with Title 49 CFR, Section 171.8.
J3	Miscellaneous Oxidizing Materials	Materials in United Nations Division 5.1 (HCC D1 or D2) in Packing Groups II and III that meet the quantity and packaging requirements stated below: United Nations Class 9, or U.S. DOT ORM-D, materials that present a minimal hazard during transport or storage, which are not included in any other Group and the material is referenced in Title 49 CFR, Section 172.101 for specific hazardous material exception. Includes Items authorized to be marked "limited quantity" by Chapter 15 of the U.N. Recommendations of the Committee of Experts on the Transportation of Dangerous Goods, items packaged and marked in accordance w with Section 18 of the International Maritime Dangerous Goods Code, "Carriage of Dangerous goods in Limited Quantities". Also includes "Consumer Commodities" (ORM-D) packaged and distributed in a form intended or suitable for sale through retail sales agencies or instrumentalities for consumption by individuals for purposes of personal care, household use, or drugs and medicines, in accordance with Title 49 CFR, Section 171.8.
J4	Miscellaneous Organic Peroxzides	Materials in United Nations Division 5.2 (HCC P1 or P2) in Packing Group II and III that meet the quantity and packaging requirements stated below:

Table B-2. Hazardous Characteristic Codes Definitions--Continued

Code	Hazard Group	Definition
		United Nations Class 9, or U.S. DOT ORM-D, materials that present a minimal hazard during transport or storage, which are not included in any other Group and the material is referenced in Title 49 CFR, Section 172.101 for specific hazardous material exception. Includes items authorized to be marked "limited quantity" by Chapter 15 of the U.N. Recommendations of the Committee of Experts on the Transportation of Dangerous Goods, items packaged and marked in accordance with Section 18 of the International Maritime Dangerous Goods Code, "Carriage of Dangerous Goods in Limited Quantities." Also includes "Consumer Commodities" (ORM-D) packaged and distributed in a form intended or suitable for sale through retail sales agencies or instrumentalities for consumption by individuals for purposes of personal care, household use, or drugs and medicines, in accordance with Title 49 CFR, Section 171.8.
J5	Miscellaneous Poisonous Materials	Materials in United Nations Division 6.1 (HCC T4) and in Packing Group III that meet the quantity and packaging requirements stated below: United Nations Class 9, or U.S. DOT ORM-D, materials that present a minimal hazard during transport or storage, which are not included in any other Group and the material is referenced in Title 49 CFR, Section 172.101

		for specific hazardous material exception. Includes items authorized to be marked "limited quantity" by Chapter 15 of the U.N. Recommendations of the Committee of Experts on the Transportation of Dangerous Goods, items packaged and marked in accordance with Section 18 of the International Maritime Dangerous Goods Code, "Carriage of Dangerous Goods in Limited Quantities". Also includes "Consumer Commodities" (ORM-D) packaged and distributed in a form intended or suitable for sale through retail sales agencies or instrumentalities for consumption by individuals for purposes of personal care, household use, or drugs and medicines, in accordance with Title 49 CFR, Section 171.8.
J6	Miscellaneous Corrosive Materials	Materials in United Nations Class 8 (HCC C1 or C2) and in Packing Group II and III that meet the quantity and packaging requirements stated below: United Nations Class 9, or U.S. DOT ORM-D, materials that present a minimal hazard during transport or storage, which are not included in any other Group and the material is referenced in Title 49 CFR, Section 172.101 for specific hazardous material exception. Includes items authorized to be marked "limited quantity" by Chapter 15 of the U.N. Recommendations of the Committee of Experts on the Transportation of Dangerous Goods, items packaged and marked in accordance with Section 18 of the International Maritime Dangerous Goods Code, "Carriage of Dangerous Goods in Limited Quantities." Also includes "Consumer Commodities" (ORM-D) packaged and

		distributed in a form intended or suitable for sale through retail sales agencies or instrumentalities for consumption by individuals for purposes of personal care, household use, or drugs and medicines, in accordance with Title 49 CFR, Section 171.8.

Table B-2. Hazardous Characteristic Codes Definitions--Continued

Code	Hazard Group	Definition
J7	Miscellaneous Class 9	Materials required to be labeled with the United Nations Class 9 label as listed in Title 49 CFR or the United Nations Recommendations on the Transport of Dangerous Goods. Also includes any material which has anesthetic, noxious, or other similar properties that could cause extreme annoyance or discomfort to a flight crew member so as to prevent the correct performance of assigned duties (formerly requiring an "Irritant Label").
J8	Miscellaneous ORM-E	Materials designated as hazardous substance with reportable quantities as listed in Title 49 CFR, Section 172.101 and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA) and listed in Title 40 CFR that cannot be classed to any other DOT Hazard Class.
K1	Infectious Substance	A viable micro-organism or its toxin, which causes or may cause animal or human disease as published in Title 42 CFR, Section 72.3. Includes Infectious Substances Affecting

		Animals only (UN 2900), Infectious Substances Affecting Humans (UN 2814), and Etiologic Agent, n.o.s. (NA 2814).
K2	Cytotoxic Drugs	Antineoplastic (Chemotherapy) drugs used in the treatment of cancer and determined and listed by the Directorate of Medical Material, Defense Personnel Support Center, Philadelphia, PA.
M1	Magnetized Material	Any material that requires a "Magnetized Material" label be affixed to the package in accordance with the ICAO Technical Instructions for transportation by aircraft.
N1	Nonhazardous	A material, such as a titanium dioxide, volatile oil of nepetalactone, or dicalcium phosphate, that by its chemical name may cause persons to perceive a nonhazardous material to have hazardous properties.
P1	Peroxide Organic	An Organic Peroxide regulated by the U.S. DOT and is defined in NFPA Code 43B as NFPA Classes I, II, or III based on information provided by the supplier or manufacturer. NFPA Class I formulations present a deflagration hazard through easily initiated, rapid explosive decomposition. NFPA Class I includes some formulations that are relatively safe only under closely controlled temperatures. Either excessively high or low temperatures may increase the potential for severe explosive decomposition. NFPA Class II formulations present a severe fire hazard similar to NFPA Class I flammable liquids. The decomposition is not as rapid, violent, or complete as that produced by Class I formulations. As with Class I formulations, this class includes some formulations that are relatively safe when under controlled temperatures or when diluted. NFPA Class III formulations present a fire hazard similar to

		NFPA Class II combustible liquids. They are characterized by rapid burning and high heat liberation, due to decomposition.
P2	Peroxide, Organic, Low Risk	An Organic Peroxide that is not regulated by the U.S. DOT and meets the definition of NFPA Code 43B, Class IV that burns as an ordinary combustible and presents minimal reactivity hazard. Class IV formulations present fire hazards that are easily controlled. Reactivity has little effect on fire intensity, or, an Organic Peroxide that is not regulated by the U.S. DOT and meets the definition of NFPA Code 43B, Class V. Class V formulations do not themselves burn and do not present a decomposition hazard. This definition includes Organic Peroxides regulated by the U.S. FDA that do not require an MSDS.

Table B-2. Hazardous Characteristic Codes Definitions--Continued

Code	Hazard Group	Definition
R1	Reactive Chemical, Flammable	Any United Nations Division 4.2 material required to be classed by the U.S. DOT as "Spontaneously Combustible," which is likely to heat spontaneously under conditions normal to transportation or storage, or to heat up in contact with air and being likely to catch fire. Included in this group are pyrophoric liquids that ignite spontaneously in dry or moist air at or below 130.1øF. (54.5ø C.).
R2	Water Reactive Chemical	Substances, in United Nations Division 4.3, required to be classed by the U.S. DOT as "Dangerous When Wet," which on

		interaction with water, are liable to become spontaneously ignitable or to give off flammable gases in dangerous quantities.
T1	DOT Poison-Inhalation Hazard	A material, other than a compressed gas (HCC G1), that is classed as a United Nations Division 6.1 Poisonous material that is required to be marked "Inhalation-Hazard" by the U.S. DOT in Title 49 CFR, Section 173.3a.
T2	UN Poison, Packing Group I	A material, other than a compressed gas (HCC G1) or Poison Inhalation-Hazard (HCC T1), that is classed as a United Nations Division 6.1 Poisonous material, that for packing purposes has been assigned to United Nations Packing Group I, Great Danger, in accordance with the recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods.
T3	US Poison, Packing Group II	A material, other than a compressed gas (HCC G1), or Poison-Inhalation Hazard (HCC T1), that is classed as a United Nations Division 6.1 Poisonous material, that for packing purposes has been assigned to United Nations Packing Group II, Medium Danger, in accordance with the recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods.
T4	Poison, Food Contaminant	A United Nations Division 6.1 Poisonous material, in Packing Group III, Minor Danger, that is a harmful substance or preparation, presenting a relatively low risk of poisoning that the manufacturer or supplier certifies is to be labeled with a United Nations St. Andrews Cross Label (Keep Away From Food) for transportation purposes.
T5	Pesticide, Low Risk Insecticide,	Pesticides regulated by the U.S. EPA under the Federal Fungicide, Rodenticide, Act (FIFRA) (Title 40 CFR), which are in FIFRA Category II, III, or IV

		and not regulated for transportation by the U.S. DOT (Title 49 CFR) or listed as a hazardous substance under the Comprehensive Environmental Compensation, Liability, and Recovery Act (CERCLA) (Title 40 CFR).
T6	Health Hazard	Any material defined as hazardous in Title 29 CFR, Part 1910.1200, which cannot be otherwise classed to any other Group which is supported by documentation, such as an MSDS or product Bulletin, or through experience is a known health hazard.
T7	Carcinogen, OSHA regulated	A material regulated by Title 29 CFR, Part 1910, Subpart Z as a cancer hazard or cancer suspect agent. In November 1987 the list was limited to the following materials (other materials may be added after November 1987): Agent 4-Nitrobiphenyl alpha-Naphthylamine Methy chloromethyl ether 3, 3-Dichlorobenzidine (and its salts) bis-chloromethyl ether beta-Naphthylamine Benzidine 4-Aminodiphenyl Ethyleneimine beta-Propiolactone

Table B-2. Hazardous Characteristic Codes Definitions--Continued

Code	Hazard Group	Definition
		2-Acetylaminofluorene 4-Dimethylaminoazobenzene N-Nitrosodimethylamine Vinyl chloride Inorganic arsenic Benzene 1, 2-Dibromo-3 chloropropane Acrylonitrile

		Ethylene oxide
W1	Marine Pollutant	A material that is required to be labeled "Marine Pollutant" that cannot be classed to any other hazard class.

APPENDIX C

STORAGE SEGREGATION MATRIX: HCCs TO STORAGE SEGREGATION

C-1. The storage segregation matrix in this appendix consists of four essential elements: (1) The Hazard Characteristic Code (HCC); (2) the HCC group name in the clear; (3) the primary segregation required by Hazard Storage Area Code (HSAC); and (4) the secondary storage required (if any) within the primary storage area.

C-2. The HSAC (10 codes) are associated with the HCC (54 codes) in the matrix. Once an item of HM has been assigned a permanent or temporary HCC, the primary storage site may be determined using the matrix.

C-3. The storing installation is further responsible for segregating HM within the primary area if secondary segregation is required. For instance, HCC F5, a multiple hazard material, which is both flammable and poison, will be assigned to HSAC T, Poison Storage Area. HCC D3, another multiple hazard material, which is both an oxidizer and poison, will also be assigned to HSAC T. These two HCCs are incompatible with each other and must be kept separate. The flammable can be located at the opposite end of the storage area from the oxidizer, or the flammable can be separated by a wall between bays within the Poison Storage Area.

PRIMARY SEGREGATION CODE

A	Radioactive	G	Gas, Compressed
C	Corrosive	L	Low Hazard
D	Oxidizer	P	Peroxide, Organic
E	Explosive	R	Reactive
F	Flammable	T	Poison

Table C–1. Storage Segregation Matrix

HCC	Hazardous Characteristics Group	Primary Segregation										Secondary Segregation [1]
		A	C	D	E	F	G	L	P	R	T	
A1	Radioactive, Licensable.	*										Security
A2	Radioactive, Licensable (Low Risk).							*				Security
A3	Radioactive, License Exempt.							*				Security
A4	Radioactive, Exempt Authorized.							*				None
C1	Corrosive, Acid (DOT).		*									Acid
C2	Corrosive, Alkali (DOT).		*									Alkaline
C3	Acid, (Low Risk)							*				None
C4	Alkali, (Low Risk)							*				None
D1	Oxidizer			*								None
D2	Oxidizer (Low Risk)			*								None
D3	Oxidizer and Poison										*	Away From (F5)
D4	Oxidizer and Corrosive.		*									Acid
E1	Explosive (Military)				*							Magazine
E2	Explosive (Low Risk)							-				Security
F1	Flammable Aerosol					-						Flammable Liquid

C–1

Table C-1. Storage Segregation Matrix—Continued

HCC	Hazardous Characteristics Group	Primary Segregation: A	C	D	E	F	G	L	P	R	T	Secondary Segregation
F2	Flammable Liquid IMDG 3.1.					•						Flammable Liquid
F3	Flammable Liquid IMDG 3.2.					•						Flammable Liquid
F4	Flammable Liquid IMDG 3.3.					•						Flammable Liquid
F5	Flammable and Poison.										•	Away from (DS)
F6	Flammable and Corrosive.					•						Flammable Liquid (Corrosive)
F7	Flammable Solid					•						Flammable Solid
F8	Combustible Liquid							•				None
G1	Nonflammable Gas (Poison).						•					Poison Gas
G2	Flammable Gas (Nontoxic).						•					Flammable Gas
G3	Nonflammable Gas (Nontoxic).						•					Nonflammable Gas
G4	Nonflammable Gas (Oxidizer).						•					Nonflammable Gas (Oxidizer)
G5	Nonflammable Gas (Corrosive).						•					Nonflammable Gas (Corrosive)
G6	Nonflammable Gas (Poison and Corrosive).						•					Poison Gas
G7	Nonflammable Gas (Poison and Oxidizer).						•					Poison Gas (Oxidizer)
G8	Flammable Gas (Poison).						•					Poison Gas (Flammable)
G9	Nonflammable Gas (Poison, Corrosive, and Oxidizer).						•					Poison Gas (Oxidizer Corrosive)
J1	Miscellaneous Flammable Liquids.					•						None
J2	Miscellaneous Flammable Solids.					•						None
J3	Miscellaneous Oxidizers.			•								None
J4	Miscellaneous Organic Peroxides.								•			None
J5	Miscellaneous Poisons.										•	None
J6	Miscellaneous Corrosives.	•										None
J7	Miscellaneous UN Class 9.						•					None
J8	Miscellaneous ORM-E.						•					None
K1	Infectious Substance										•	Biomedical
K2	Cytotoxic Drugs										•	Medical Security
M1	Magnetized Material							•				None
N1	Nonhazardous Material.							•				None

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Table C-1. Storage Segregation Matrix—Continued

HCC	Hazardous Characteristics Group	Primary Segregation: A	C	D	E	F	G	L	P	R	T	Secondary Segregation [1]
P1	Peroxide, Organic (Regulated).								•			None
P2	Peroxide, Organic							•				None
R1	Reactive Chemical, Flammable.									•		Spontaneously Combustible
R2	Water Reactive Chemical.									•		Dangerous when wet
T1	DOT Poison-Inhalation Hazard.										•	None
T2	UN Poison, Packing Group I.										•	None
T3	UN Poison, Packing Group II.										•	None
T4	Poison, Food Contaminant.							•				Away From Food
T5	Pesticide (Low Risk)							•				None
T6	Health Hazard							•				None
T7	Carcinogen										•	Classify To Primary Hazard for Segregation
W1	Marine Pollutant							•				None

[1] Secondary segregation applies to storage within assigned primary areas.
None: J Coded items are considered low hazard but should be stored as indicated above when space permits.

(1) Secondary segregation applies to storage within assigned primary areas.

None: J Code items are considered low hazard but should be stored as indicated above when space permits.

APPENDIX D

ASSIGNMENT OF TEMPORARY HAZARDOUS CHARACTERISTIC CODES (HCCs)

Table D-1. DOT Transportation Labels

DOT Label	Temporary HCC	Recommended Storage Area	
		Primary	Subdivision
Radioactive I	A1	Radioactive	Radioactive
Radioactive II	A1	Radioactive	Radioactive
Radioactive III	A1	Radioactive	Radioactive
Explosive A	E1	Explosive	Explosive
Explosive B	E1	Explosive	Explosive
Blasting Agent	E1	Explosive	Explosive
Explosive C	E1	Explosive	Explosive General
Explosive UN 1.4S	E2	Explosive	Hazard General Purpose*
Poison Gas	G1	Compressed Gas	Poison Gas Cylinder
Flammable Gas (Cylinder)	G2	Compressed Gas	Flammable Gas Cylinder
Flammable Gas (Aerosol, Nonrefillable Tank, or Canister).	F1	Flammable	Flammable Liquid
Nonflammable Gas	G3	Compressed Gas	Nonflammable Gas Cylinder
Oxygen	G4	Compressed Gas	Nonflammable Gas (Oxidizing)
Cylinder			
Chlorine	G6	Compressed Gas	Chlorine Nonflammable Gas Cylinder
Flammable Liquid	F2	Flammable	Flammable Liquid
Oxidizer	D1	Oxidizer	Oxidizer
Organic Peroxide	P1	Peroxide Organic	Peroxide Organic
Corrosive	C1(Acid)**	Corrosive	Acid or Alkali

	C2(Alkali)**		
Poison	T2	Poison	Poison Class B
Dangerous When Wet	R2	Reactive	Dangerous When Wet (No water sprinklers)
Spontaneously Combustible	R1	Reactive	Spontaneously Combustible
Flammable Solid	F7	Flammable	Flammable Solid
Biomedical/Infectious Substance	K1	Poison	Etiologic Agent
Magnetized Material	M1	General Hazard	General Hazard (General Purpose)
St. Andrew's Cross Miscellaneous	T4	Poison	Poison
Hazardous Materials	J1	General Hazard	General Hazard (General Purpose)

* Material bearing precautionary label text will not be assigned a general purpose location without notification of and approval by the installation Physical Science or Safety and Health Office.

** If it is not known if a corrosive is acid or alkali, assign Acid P01.

Table D-2. Precautionary label Text (ANSI Z129.1)

Signal Word	Statement of Hazard	Temporary HCC	Recommended Storage Area
DANGER!	MAY BE FATAL IF SWALLOWED	T2	Poison B
WARNING!	HARMFUL IF SWALLOWED	T2 or T4	Poison B or General Purpose*
DANGER!	MAY BE FATAL IF ABSORBED THROUGH SKIN	T2	Poison B
WARNING!	HARMFUL IF ABSORBED THROUGH SKIN	T6	Poison B or General Purpose*
DANGER!	CAUSES (SEVERE) ** EYE BURNS	C1	Corrosive
DANGER!	CAUSES (SEVERE) ** BURNS	C1	Corrosive
DANGER!	EXTREMELY FLAMMABLE	F1	Flammable (Flammable Liquid)
WARNING!	FLAMMABLE	F2 or F7	Flammable (Liquid or Solid)
CAUTION!	COMBUSTIBLE	F8	Flammable Liquid or General Purpose *
DANGER!	EXTREMELY FLAMMABLE, CATCHES FIRE IF EXPOSED TO AIR	R1	Spontaneously Combustible

Table D-2. Precautionary Label Text (ANSI Z129.1)-Continued

Signal Word	Statement of Hazard	Temporary HCC	Recommended Storage Area

DANGER!	STRONG OXIDIZER CONTACT WITH OTHER MATERIALS MAY CAUSE FIRE	D1	Oxidizer
DANGER!	MAY BE FATAL IF INHALED	T2	Poison
WARNING!	HARMFUL IF INHALED	T3	Poison B or General Purpose*
WARNING!	MAY CAUSE ALLERGIC RESPIRATORY REACTION	T6	Poison B or General Purpose*
CAUTION!	(VAPOR GAS)** REDUCES OXYGEN AVAILABLE FOR BREATHING	T6	General Purpose*
WARNING!	CAUSES EYE IRRITATION	T6	General Purpose*
WARNING!	CAUSES IRRITATION	T6	General Purpose*
WARNING!	MAY CAUSE ALLERGIC SKIN REACTION	T6	General Purpose*

* Material bearing precautionary label text will not be assigned a general purpose location without notification of and approval by the installation Physical Science or Safety and Health Office.

** Enter proper term as appropriate.

Table D-3. Toxic and Hazardous Substances Listed in Title 29 CFR, Part 1910, Subpart Z

Material	Temporary HCC	Recommended Storage Area
4-Nitrobiphenyl	T7	Poison
ALpha-naphthylamine	T7	Poison (St. Andrew's Cross Label)
Methyl chloromethyl ether (anhydrous)	F5	Flammable Liquid and Poison
3-3' -Dichlorobenzidine (and its salts)	T7	Poison
Bis-Chloromethyl ether (sym-Dichlorodimethyl ether UN2249)	F5	Flammable Liquid and Poison
Beta-napthylamine	T7	Poison
Benzene	F5	Flammable Liquid and Poison
Benzidine	T7	Poison
4-Aminodiphenyl (Biphenylamine)	T7	Poison
Ethyleneimine (Inhibited)	F5	Flammable Liquid and Poison
Beta-propiolactone	T7	Poison
2-Acetylaminofluorene	T7	Poison
4-Dimethylaminoazobenzene	T7	Poison
N-Nitrosodimethylamine	T7	Poison
Vinyl chloride	G8	Compressed Gases Cylinder Flammable and Poison
Inorganic arsenic	T7	Poison
1,2-Dibromo-3-chloropropane	T7	Poison (Pesticide)
Acrylonitrile	F5	Flammable Liquid and Poison
Ethylene oxide	F5	Compressed Gas Cylinder, Flammable and Poison

Note: Toxic and hazardous substances listed above must be referred to the Safety and Health Office for permanent storage criteria.

Table D-4. Class or Division Cross-Reference to Storage Areas

This table outlines a method recommended for determining to store HM not assigned an HCC based on the class or division numbers found in Title 49, CFR, part 172.102, or the ICAO Technical Instructions. The number is displayed at the bottom of the placard or label, or on a shipping paper after the shipping name. In certain cases, the case or division number may replace the written number of the hazard class in the shipping paper description.

UN Class and/or Division	Name	Primary Storage Area
1	Explosives/Blasting Agents	Explosive
1.1	Explosives (Mass Explosion)	
1.2	Explosives (Projection Hazard)	
1.3	Explosives (Predominantly Fire Hazard)	
1.4	Explosives (No Predominant Hazard)	

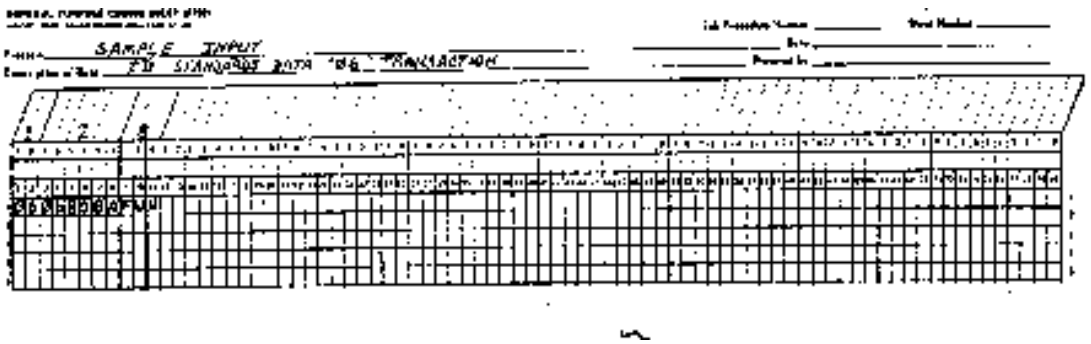
Table D-4. Class or Division Cross-Reference to Storage Areas--Continued

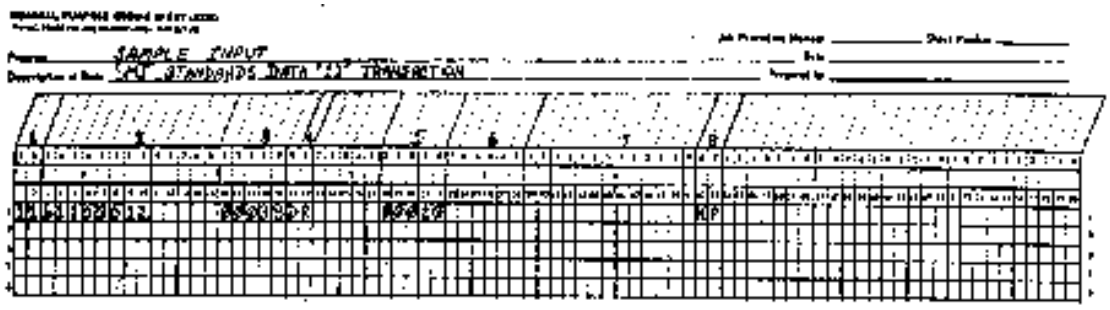
This table outlines a method recommended for determining where to store HM not assigned an HCC based on the class or division numbers found in Title 49, CFR, part 172.102, or the ICAO Technical Instructions. The number is displayed at the bottom of the placard or label, or on a shipping paper after the shipping name. In certain cases, the case or division number may replace the written number of the hazard class in the shipping paper description.

UN Class and/or Division	Name	Primary Storage Area
1.5	Explosives (Very Insensitive Explosives)	
2	Gases, Compressed General (Cylinders)	Cylinder/Compressed Gases
2.1	Flammable Gases	
2.2	Nonflammable Gases	
2.3	Poison Gases	
3	Flammable Liquids (General)	Flammable/Combustible Liquids
3.1	Flammable Liquids, Flashpoint Below 0øF	
3.2	Flammable Liquids Flashpoint	

	0øF to 73øF	
3.3	Flammable Liquids, Flashpoint 73øF to 141øF	
4	Flammable Solids (General)	Flammable Solids
4.1	Flammable Solids	
4.2	Spontaneously Combustible	Pyrophorics/Flammables
4.3	Dangerous When Wet	Water Reactives
5	Oxidizers (General)	Oxidizers
5.1	Oxidizers	
5.2	Organic Peroxides	Organic Peroxides
6	Poison/Infectious (General)	Poisons
6.1	Poisonous Materials	
6.2	Etiologic Agents (Infectious)	
7	Radioactives	Radioactives
8	Corrosives	Corrosives
9	Substances that, during transport, present a danger not covered by other classes	General Purpose*

*Material bearing precautionary label text will not be assigned a general purpose location without notification of and approval by the installation Physical Science or Safety and Health Office.

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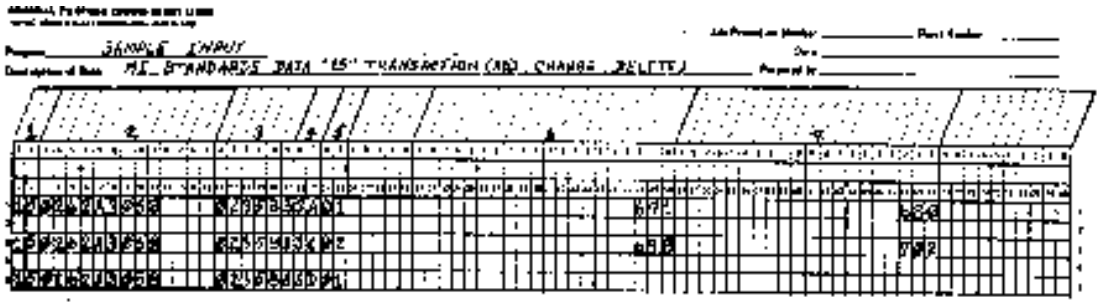

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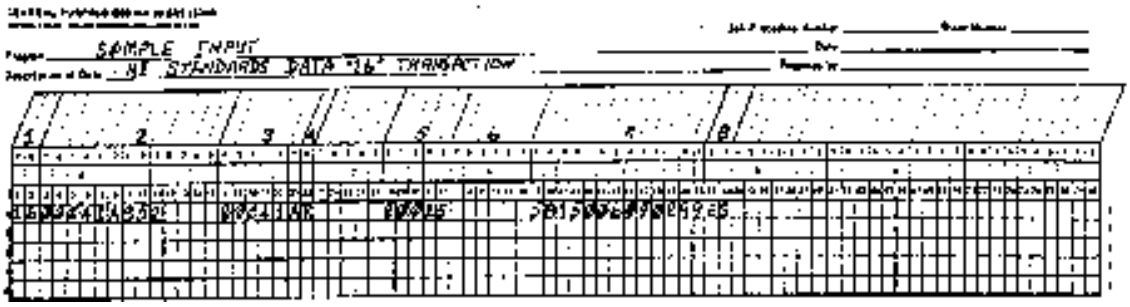

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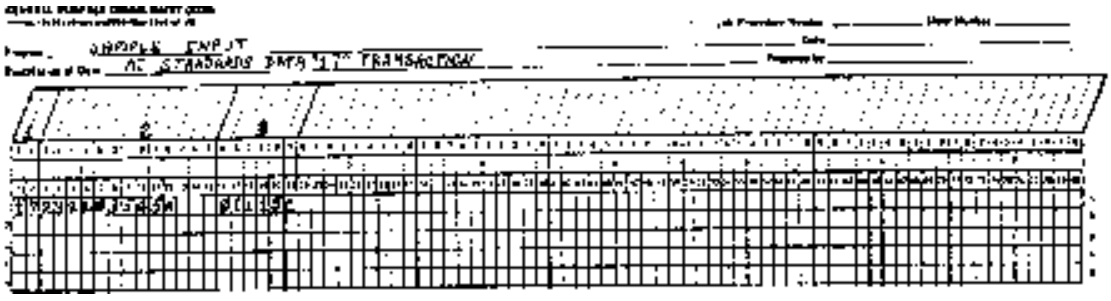

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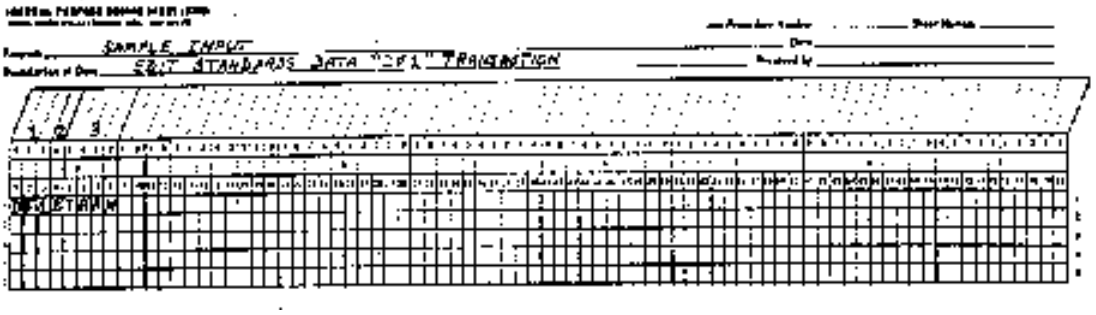

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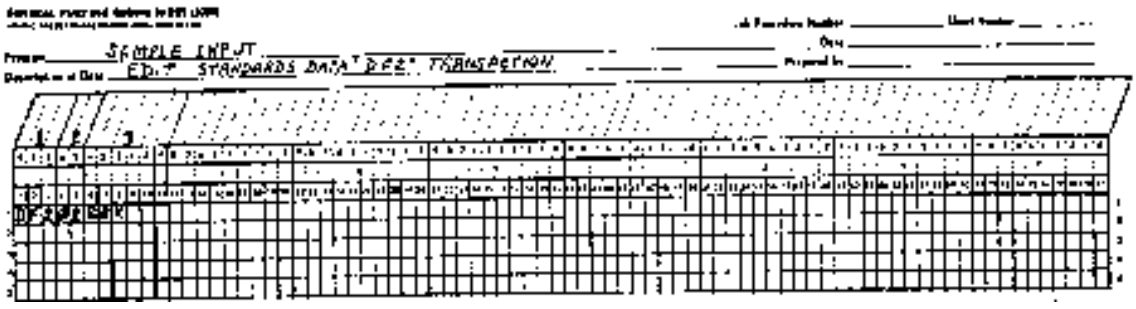
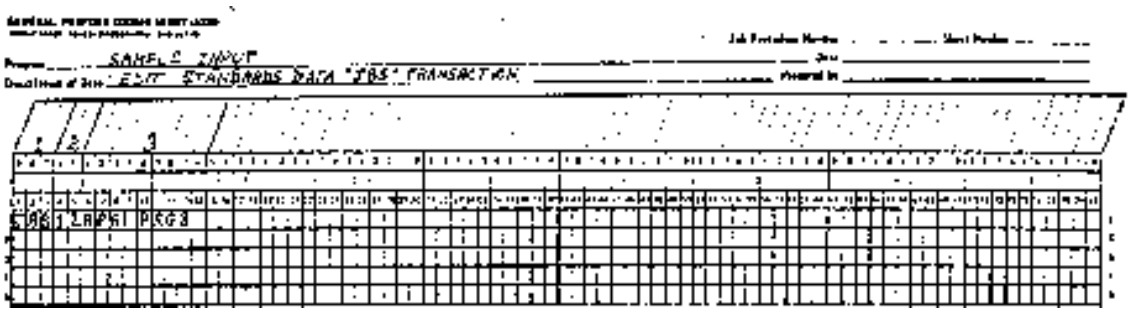


A Guide for Determining Packaging, Marking, and
Labeling Requirements for Hazardous Materials. (Continued)



A Guide for Determining Packaging, Marking, and
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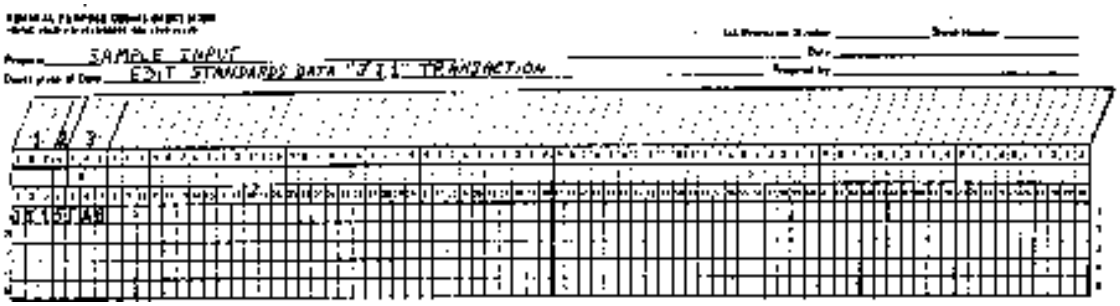

A Guide for Determining Packaging, Marking, and
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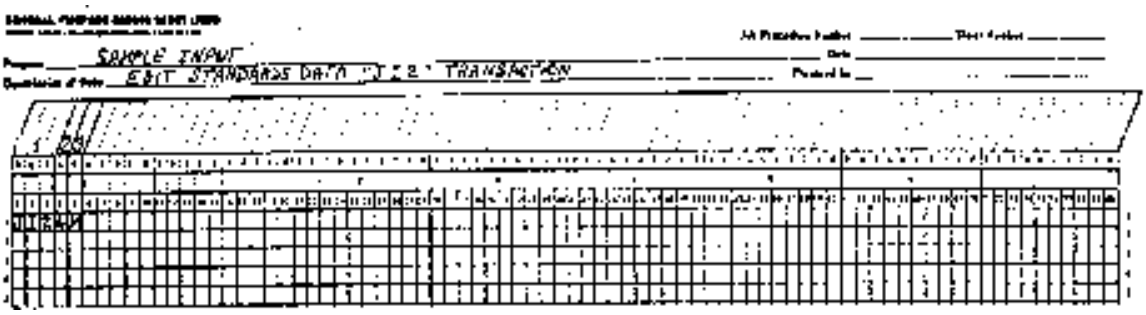
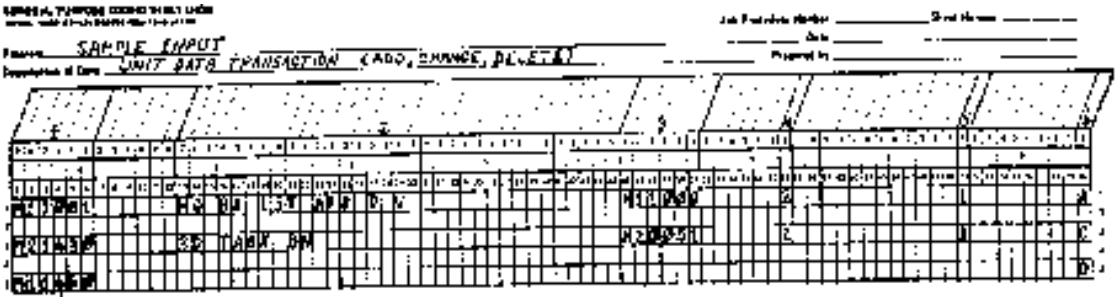


Typical Load of Hazardous Materials in 55-Gallon
Closed-Head Steel Drums in a 40-foot Trailer/Container.

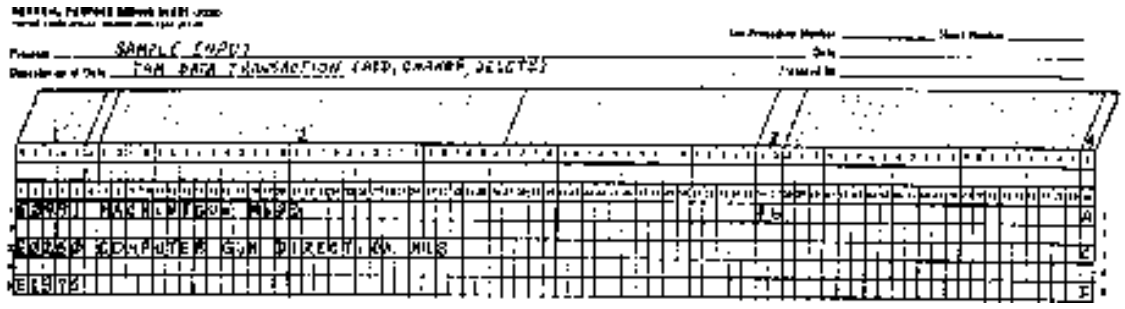
F-1

TM 38-410

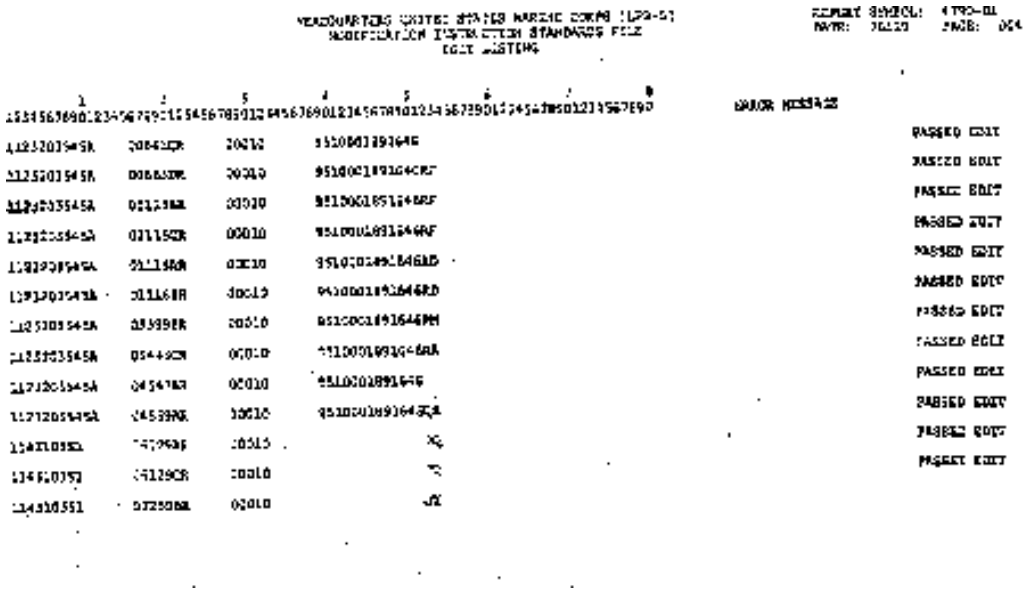


F-2

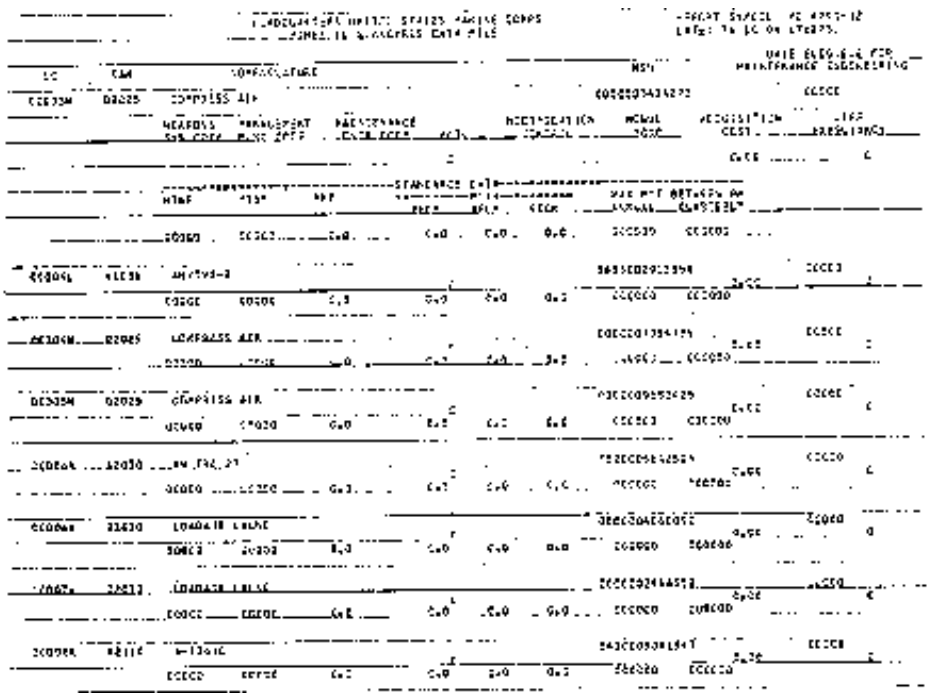
TM 38-410



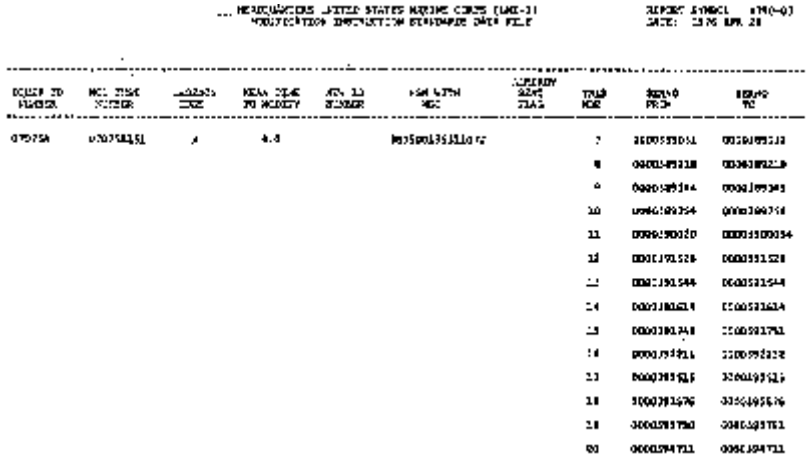
Typical Load of Hazardous Materials in 55-Gallon
Closed-Head Drums in a 20-foot Trailer/Container.



Typical Load of Hazardous Materials in 55-Gallon
Open-Head Steel Drums in a 40-foot Trailer/Container.

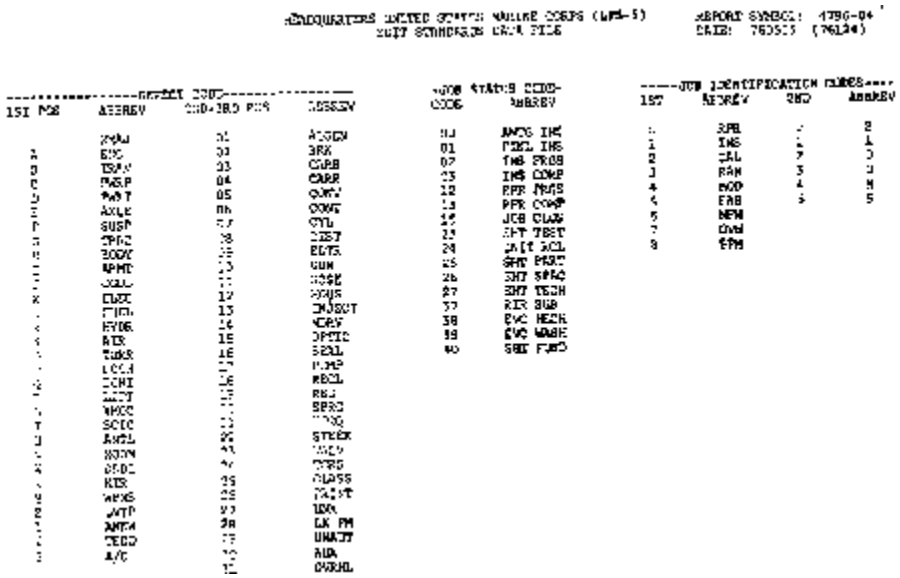


Typical Load of Hazardous Materials in 55-Gallon Closed-Head Steel Drums Braced with a Unitized Rear Bay in 40-foot Trailer/Container.



F-6

TM 38-410



REPORT SYMBOL: 4792-09

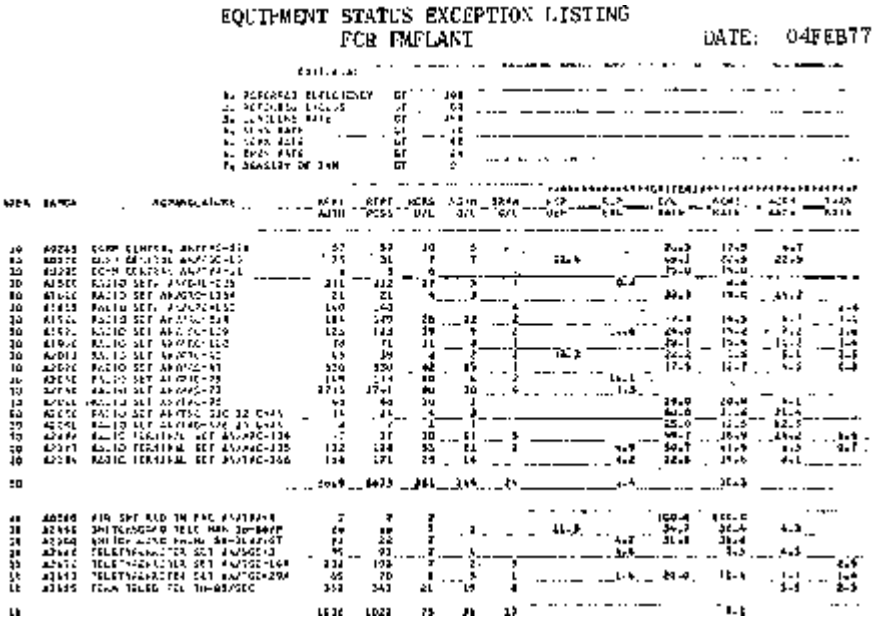
DATE: 02/26/76

[illegible] SECONDARY REPARABLE EXPENSE SUMMARY

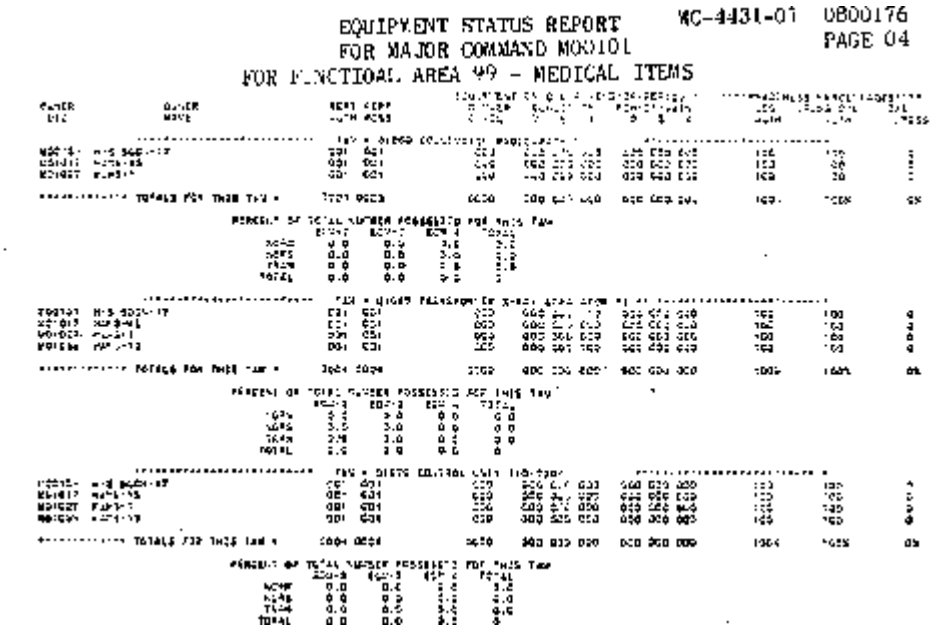
MAJOR CAC MFPGL

NSN	NUMBER INDUCTED	CAT-CODE	NUMBER WASHOUT	NOMENCLATURE	NUMBER REPAIRED	WASHOUT EXPENSE	REPAIRED EXPENSE	WOR	RR	RCT	SUP
5821006154138		D		AN-1599							
PAST QTR	1		0		1	$0.00	$10.18	.33	.33	30	$10.18
PAST YR	1		0		1	$0.00	$10.18	.06	.08	30	$10.18
5821006159655		D		AN-1526							
PAST QTR	0		0		0	$0.00	$0.00	.00	.00	0	$0.00
PAST YR	2		0		2	$0.00	$6.36	[illegible]	.17	[illegible]	$3.18
5821006159657		D		AN-1528							
PAST QTR	4		0		4	$0.00	$0.00	1.33	1.33	30	$0.00
PAST YR	4		0		4	$0.00	$0.00	.33	.33	30	$0.00

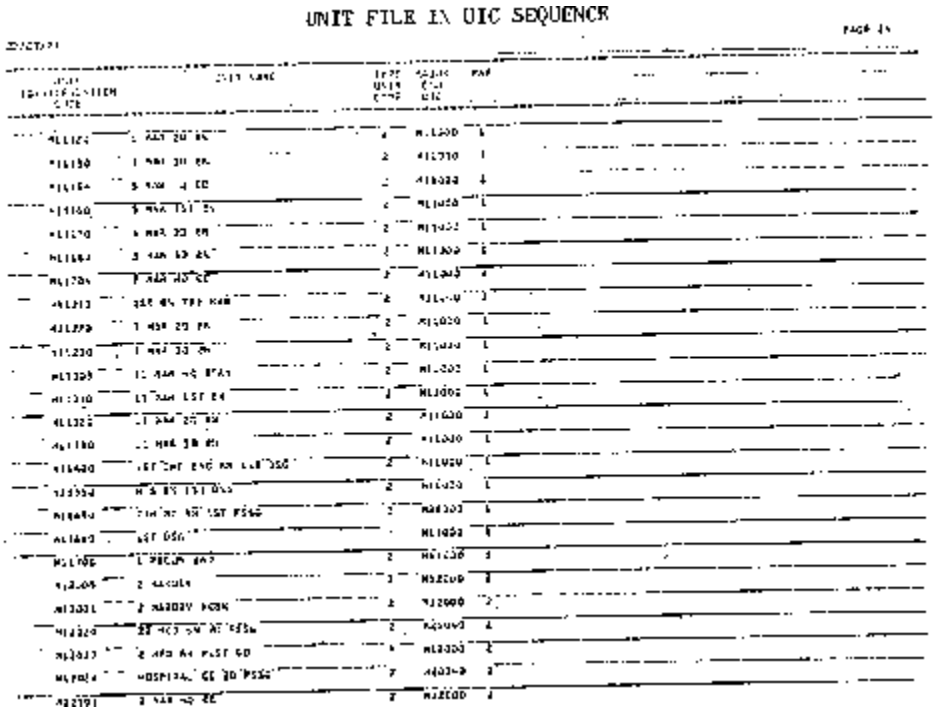
Typical Load of Hazardous Materials in DOT Specification Portable Tanks in 40-foot Trailer/Container.


EQUIPMENT STATUS EXCEPTION LISTING
FOR FMFLANT
DATE: 04FEB77

Assembly of Side Blocking Gate and Antisway Brace.

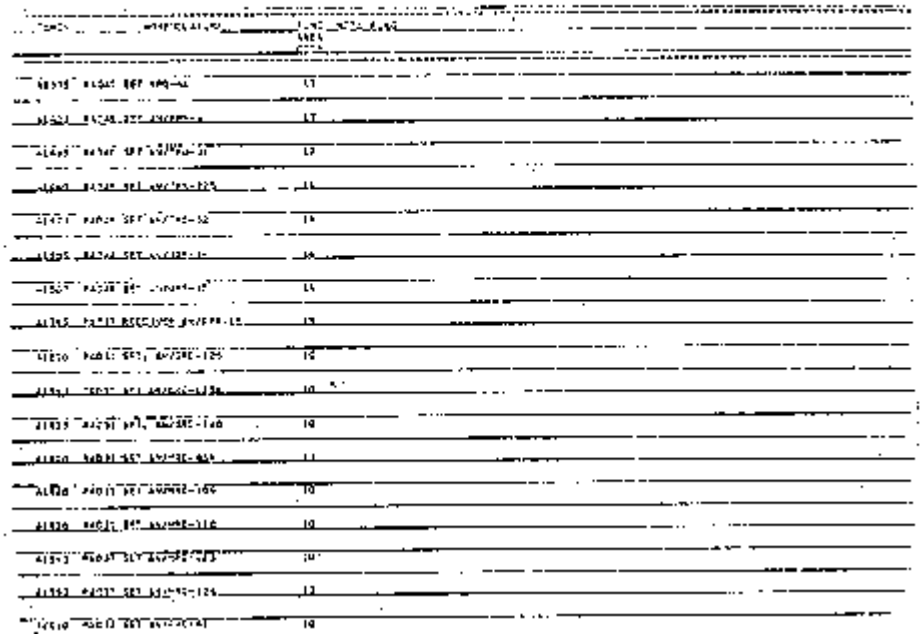

EQUIPMENT STATUS REPORT WC-4431-01 UB00176
FOR MAJOR COMMAND MX0101 PAGE 04
FOR FUNCTIONAL AREA 99 - MEDICAL ITEMS

Typical Load of Hazardous Materials in DOT
Specification Portable Tanks in 40-foot Trailer/Container.

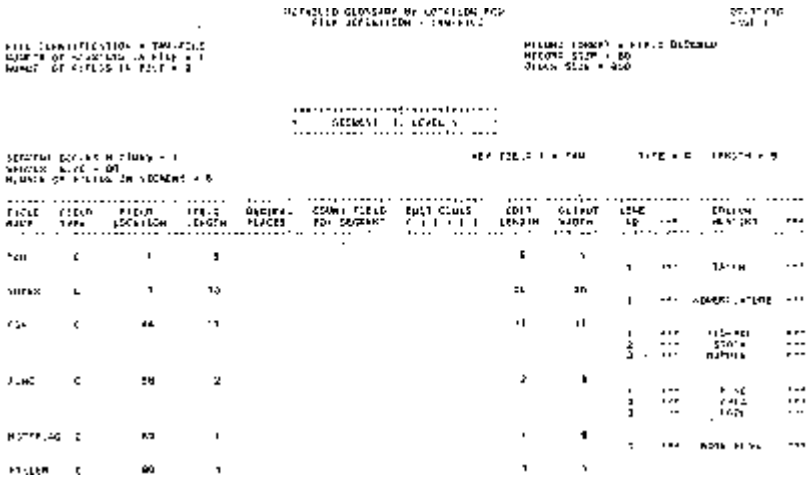


Typical Load of Hazardous Materials in
Compressed Gas Cylinders in a 40-foot Trailer/Container.

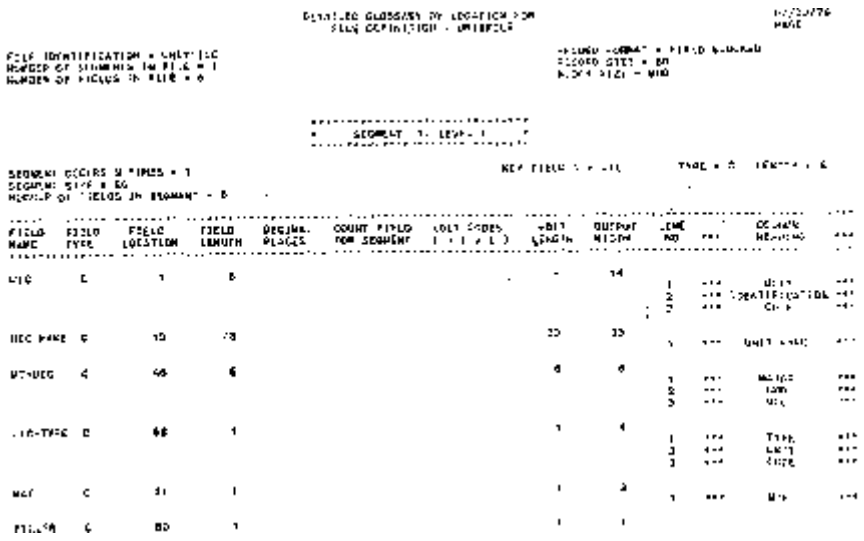
HEADQUARTERS UNITED STATES MARINE CORPS 12/30/70
MCBUL 3000 REPORTABLE TAMCN FILE
REPORT SYMBOL: MC 4790-XX



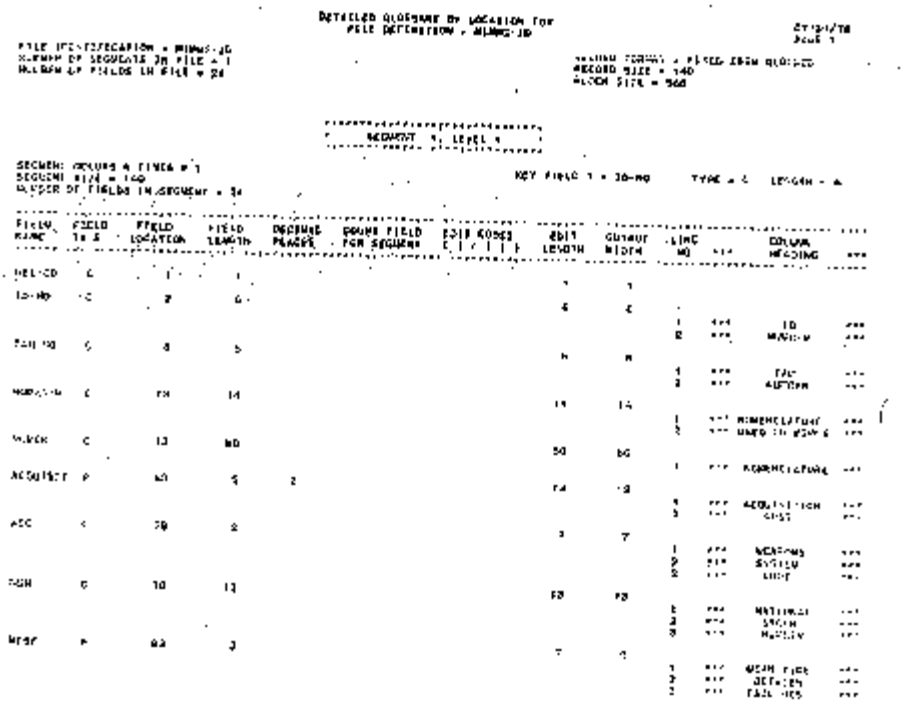
Typical Mixed Load of Hazardous Materials in
Various Containers in 40-foot Trailer/Container.



Typical Mixed Load of Hazardous Materials in
Various Containers in 40-foot Trailer/Container.



Steel Strap Method with Signode Chessie Floor Plates in 40-foot Trailer.



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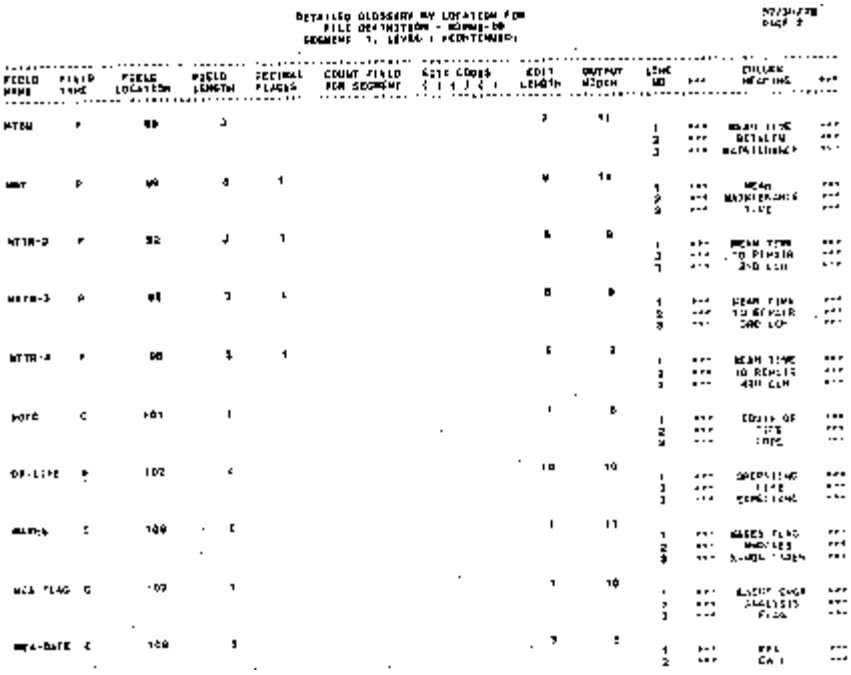
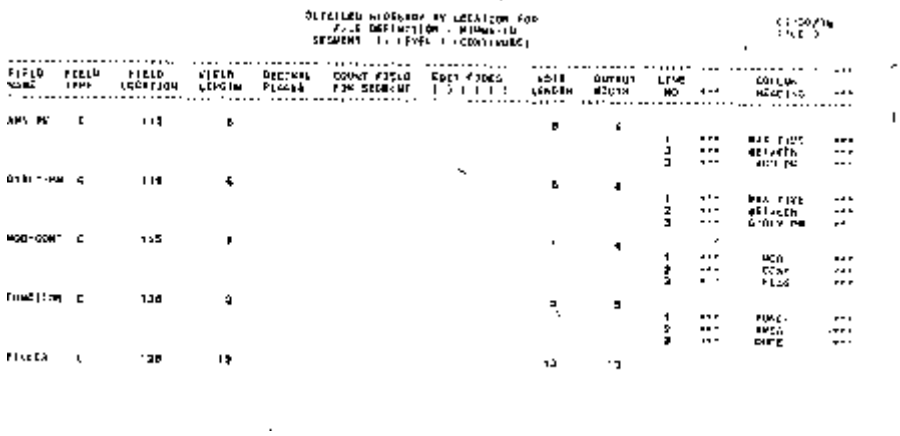
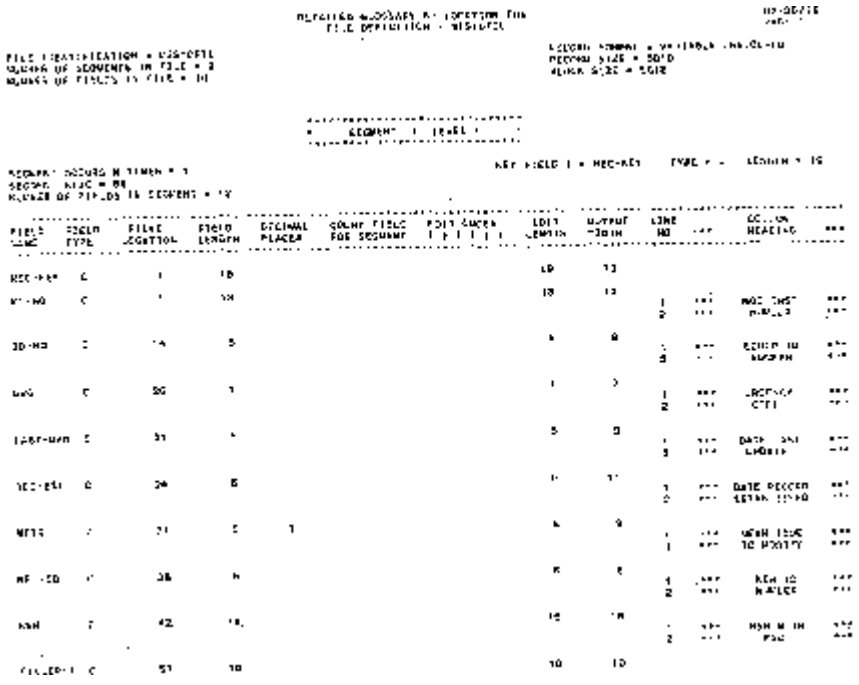


Steel Strap Method with Wall Anchors in 40-foot Trailer.



Self-locking Skid Method Using Drumtite Units
in 40-foot Trailer.



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DETAILED GLOSSARY BY LOCATION FOR
FILE DEFINITION - U.STOPIC
SEGMENT 1, LEVEL 1 (CONTINUED)

07/30/78
PAGE 2

FIELD NAME	FIELD TYPE	FIELD LOCATION	FIELD LENGTH	DECIMAL PLACES	COUNT FIELD FOR SEGMENT	EDIT CODES ( )	EDIT LENGTH	OUTPUT WIDTH	LINE NO	***	COLUMN HEADING	***
ANF	C	44	1				1	3				
									1	***	EMPLOY	***
									2	***	MENT	***
									3	***	FLAG	***
TALK CNT	2	45	2		5		3	4				
									1	***	TALK	***
									2	***	CNT	***

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DETAILED GLOSSARY BY LOCATION FOR
FILE DEFINITION - U.STOPIC

07/30/78
PAGE 3

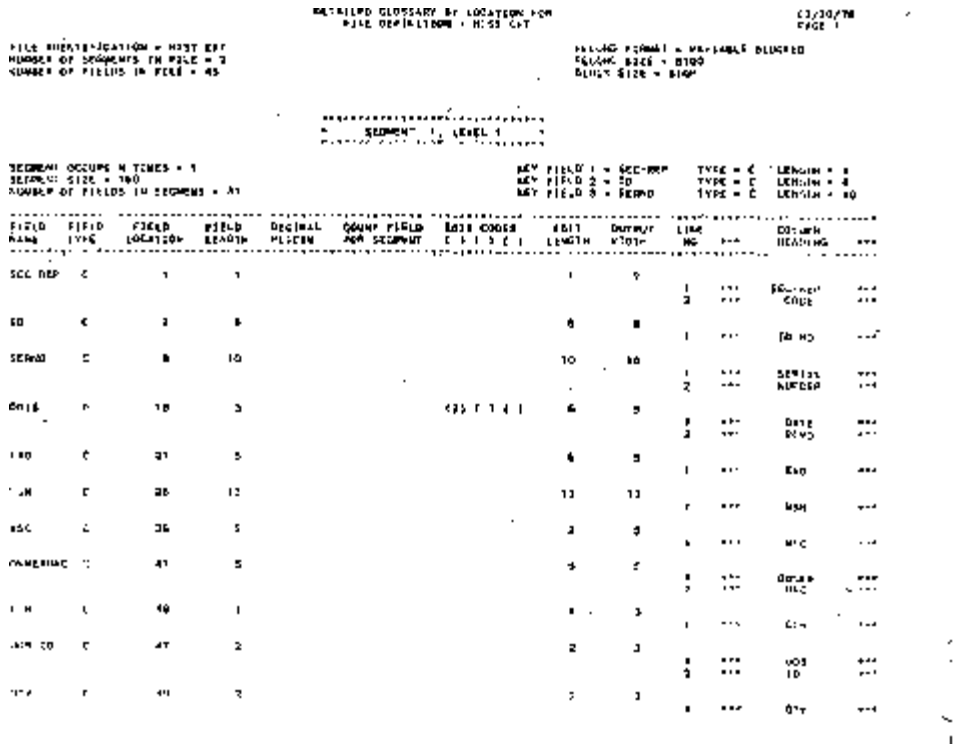
* SEGMENT 2, LEVEL 2 *

COUNT FIELD FOR SEGMENT = TALK CNT
SEGMENT SIZE = 68
NUMBER OF FIELDS IN SEGMENT = 4

KEY FIELD 1 = TALK-NBR TYPE = 2 LENGTH = 2

FIELD NAME	FIELD TYPE	FIELD LOCATION	FIELD LENGTH	DECIMAL PLACES	COUNT FIELD FOR SEGMENT	EDIT CODES ( )	EDIT LENGTH	OUTPUT WIDTH	LINE NO	***	COLUMN HEADING	***
TALK-NBR	2	1	2				3	4				
									1	***	TALK	***
									2	***	NBR	***
SERVO-[illegible]	C	3	20				20	20				
									1	***	SERVO	***
									2	***	[illegible]	***
SERVO-ID	C	23	20				20	20				
									1	***	SERVO	***
									2	***	ID	***
FILLER 2	C	43	26				26	26				

(1) Command includes all top level management at the installation.
(2) Supervisors includes all supervisors within the supply chain of command where Hazardous Materials are a prime responsibility (safety, health, environmental, Etc.)



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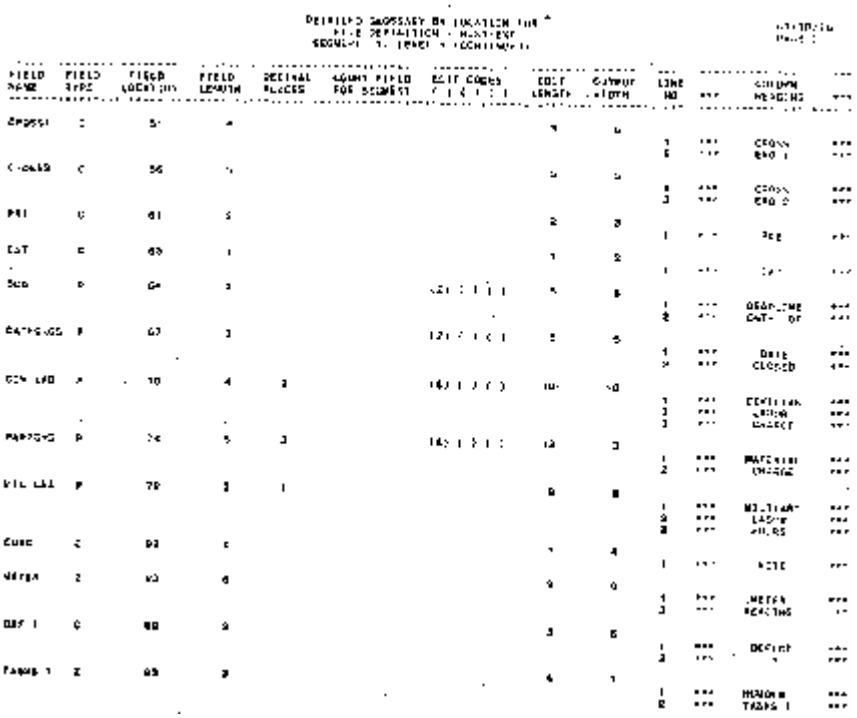

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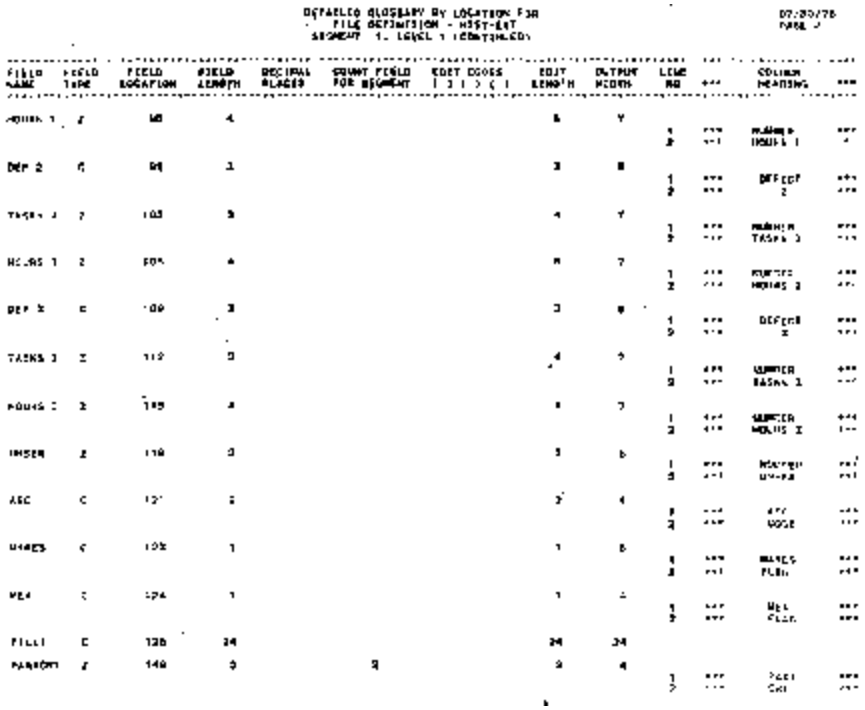

DOD Training Requirements for Hazardous
Material Management - Continued

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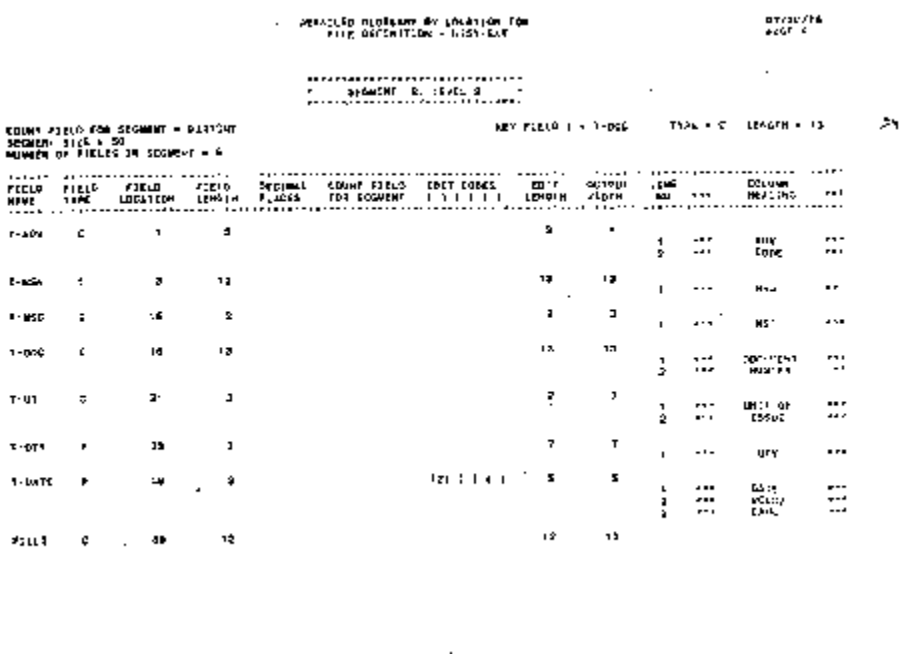

DOD Training Requirements for Hazardous
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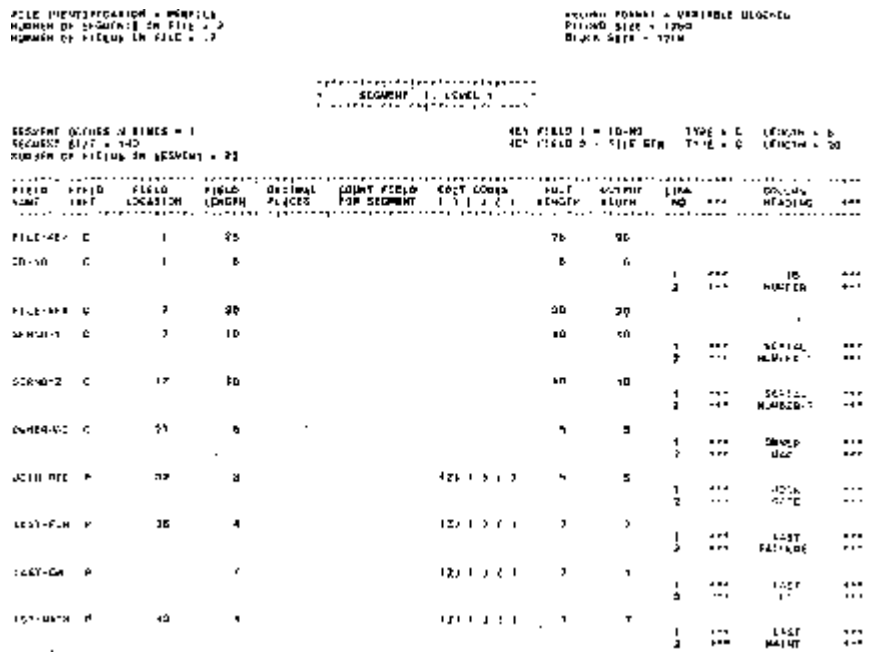

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Material Management - Continued

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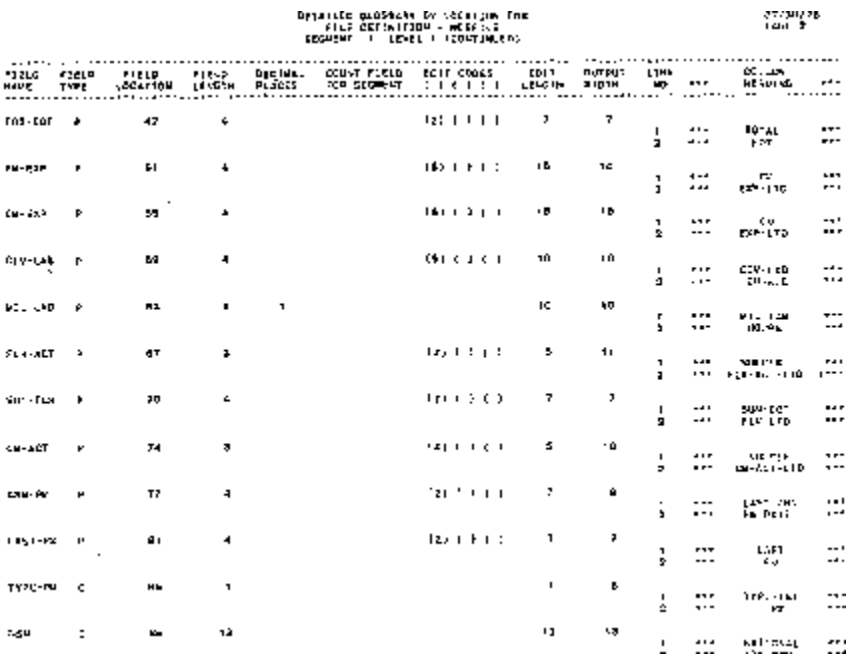

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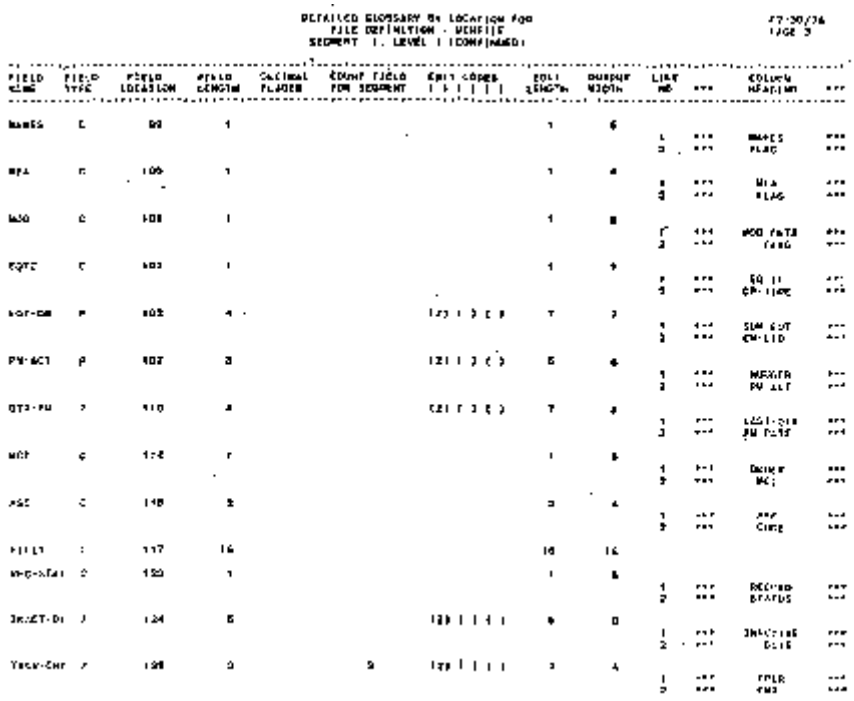

DOD Training Requirements for Hazardous
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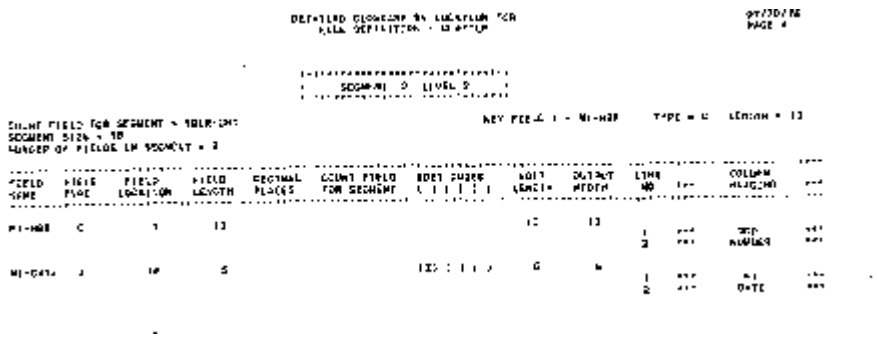

DOD Training Requirements for Hazardous
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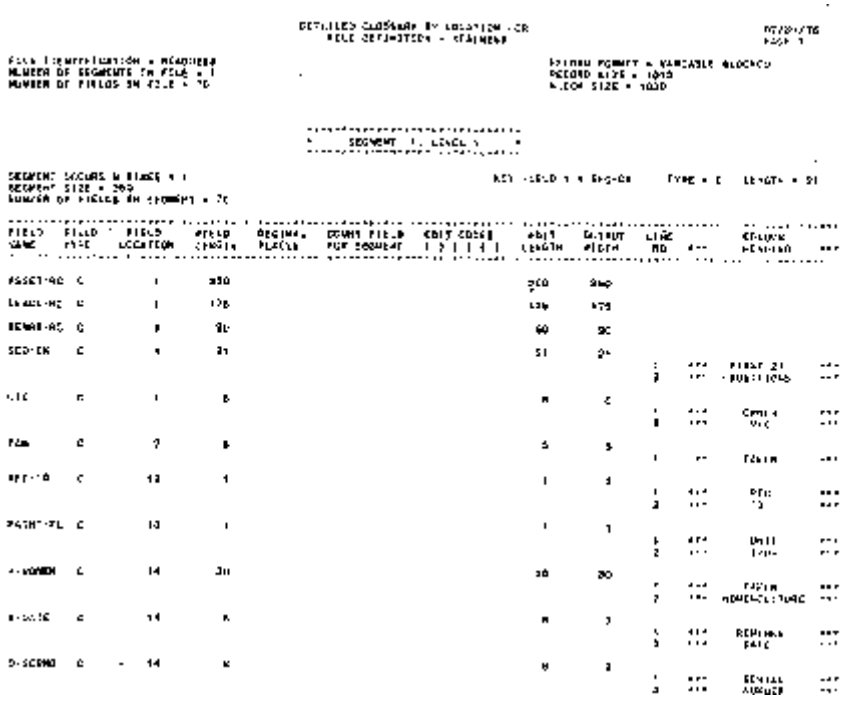

DOD Training Requirements for Hazardous
Material Management - Continued

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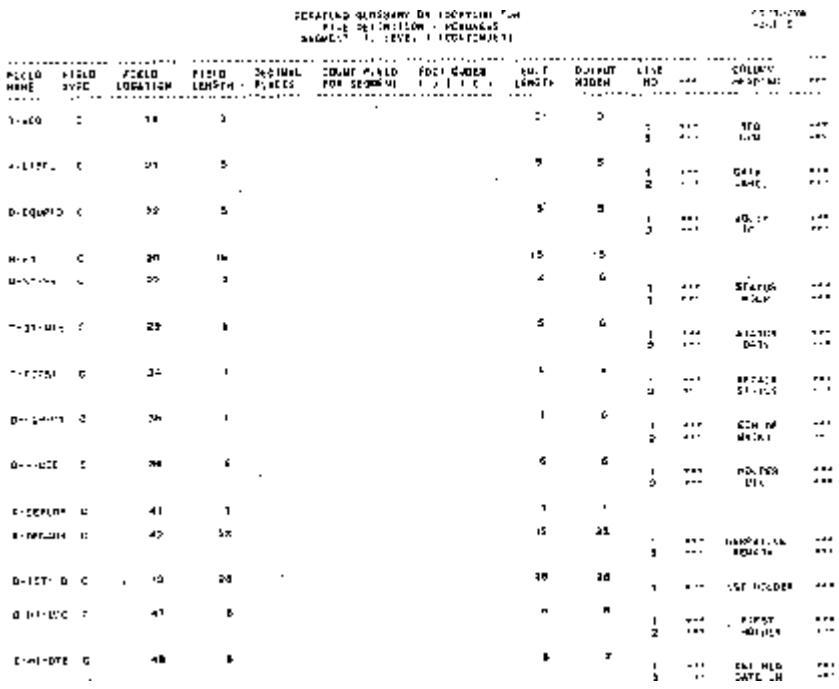

DOD Training Requirements for Hazardous
Material Management - Continued

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GLOSSARY

Section I. Abbreviations

AAPCO	Association of American Pest Control Office
AAR	Association of American Railroads
ACGIH	American Conference of Governmental Industrial Hygienist
ADN	The European Provision Concerning the International Carriage of Dangerous Goods by Inland Waterway
ADNR	The regulations for the Carriage of Dangerous Goods on the Rhine River
ADR	The European Agreement Concerning the International Carriage of Dangerous Goods by Road
AFFF	Aqueous Film Forming Foam
AFR	Air Force Regulation
ALARA	As low as reasonably achievable
ANSI	American National Standards Institute
AR	Army Regulation
ASTM	American Society of Testing and Materials
AUTODIN	Automatic Digital Network
CAA	Clean Air Act, implemented in Title 40 CFR
CAC	Competent Authority Certificate
CAGE	Commercial Activity Government Entity (see FSCM/FSCNM)
CAS	Contract Administration Service
CDC	Centers for Disease Control, 1600 Clifton Road NE., Atlanta, GA 30333. Telephone (404) 633-5313, 24 hours
CEPP	Community Emergency Preparedness Program
CERCLA	Comprehensive Environmental Response, Cleanup and Liability Act
CFR	Code of Federal Regulations
CGA	Compressed Gas Association

CGNRC	Coast Guard National Response Center. U.S. Coast Guard Headquarters, 2100 Second SW., Room 2611, Washington DC 20593. Telephone (800) 424-8802
CHEMTREC	A 24 hour emergency contact point that can be used to obtain guidance and advice relating to chemical spills that occur on public highways and railroads. Chemical Transportation Emergency Center, Chemical Manufacturers Association, 2501 M Street NW., Washington, DC 20037 Telephone (800) 424-9300 or (202) 483-7616, 24 hours
CHLOREP	Chlorine Emergency Plan. Operated 24 hours a day, 7 days a week by the Chlorine Institute for any emergency involving chlorine. In the event of a chlorine emergency call CHEMTREC
COFC	Container of flat car
CONEX	A military-controlled and--owned reusable serially numbered, steel shipping container in either of two sizes
CONUS	Continental United States
COSIS	Care of Supplies in Storage (Program)
CPO	Civilian Personnel Office
CSO	Command Security Officer
CWA	Clean Water Act, implemented in Title 40 CFR
DGSC	Defense General Supply Center, Richmond, VA.
DISREP	Transportation Discrepancy Report (TDR) (SF Form 361)
DLA	Defense Logistics Agency
DLAH	Defense Logistics Agency Handbook
DLAM	Defense Logistics Agency Manual
DLAR	Defense Logistics Agency Regulation

DMET	Defense Management Education Training
DLSC	Defense Logistics Service Center
DOD	Department of Defense

DODAC	Department of Defense Ammunition Code
DODI	Department of Defense Instruction
DOT	Department of Transportation
DPSC	Defense Personnel Support Center
DRMO	Defense Reutilization and Marketing Office
DRMS	Defense Reutilization and Marketing Service
DRO	Disposal Release Order
DSC	Defense Supply Center
DWASP	DLA Standard Warehousing and Shipping Automated System
EO	Executive Order
EPA	U.S. Environmental Protection Agency Regional Administrators: Region I J.F. Kennedy Federal Building Boston, MA 02203 (617) 223-7120 Region II 26 Federal Plaza New York, NY 10278 (212) 254-2525 Region III 6th and Walnut Streets Philadelphia, PA 19106 (215) 597-9800 Region IV 345 Courtland Street NE. Atlanta, GA 30365 (404) 881-4727 Region V 230 S. Dearborn Street Chicago, IL 60604 (312) 353-2000 Region VI 1201 Elm Street Dallas, TX 75270 (214) 767-2600 Region VII 716 Minnesota Avenue Kansas City, MO 66101 (913) 263-2800 Region VIII 1860 Lincoln Street Denver, CO 80295

(303) 837-3895
Region IX
215 Freemont Street
San Francisco, CA 94105
(415) 974-8153
Region X
1200 Sixth Avenue
Seattle, WA 98101
(206) 442-5810

EPO	Environmental Protection Officer
FCP	Facility Contingency Plan
FEMA	Federal Emergency Management Agency
FIFO	First-in/first-out. (Principle)
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act (see Title 40 CFR)
FSC	Federal Supply Class. The four-digit number preceding the NIIN that signifies the special group to which an item belongs (e.g., 6810, Chemicals; 8040, Adhesives)
FSCM/FSCNM	Federal Supply Code for Manufacturers/Federal Supply Code for Nonmanufacturers. The five-position code assigned to any contractor who does business with the Government for purposes of this manual; when FSCM is written, it can be assumed that FSCNM is also included. (Now retitled CAGE)
ft3	Cubic feet
GBL	Government Bill of Lading, Standard Form 1103
GPO	Government Printing Office
GSA	General Services Administration
HAZMAT	Hazardous materials
HCC	Hazardous Characteristic Code
HE	High Explosives
HM	Hazardous materials
HMIS	Hazardous Materials Information System (DOD 6050.5-M)
HMTA	Hazardous Materials Transportation Act (Title 49 CFR).
HMTC	Hazardous Materials Technical Center
HSAC	Hazardous Storage Area Code

HW	Hazardous Waste
IATA	International Air Transport Association. IATA is not recognized by the U.S. DOT as an official regulatory authority
ICAO	International Civil Aviation Organization
ICC	Interstate Commerce Commission
IMDG	International Maritime Dangerous Goods (Code)
IMDGC	International Maritime Dangerous Goods Codes
IMO	International Maritime Organization
IPG	Issue Priority Group
IPY	Inches per year (as corrosion rate reference in 49 CFR 173.240(a)(2) and 173.500(b)(2)(i)
ISCP	Installation Spill Contingency Plan
ISO	International Standards Organization
JSM	Joint Service Manual
MAC	Military Airlift Command
Magnetized Material.	See HCC M1 in appendix B
Maintenance	All action taken to retain material in a serviceable condition. Maintenance includes inspection, testing, servicing, classification as to serviceability, repair, rebuilding, and reclamation. The routine, recurring work required to keep a facility in such condition that it may be continuously utilized in its original or designed capacity and efficiency
Material Safety Data Sheet.	An MSDS must be in English and include information regarding the specific identity of hazardous chemicals. Also includes information on health effects, first aid, chemical and physical properties, and emergency phone numbers. (Latest revision of Federal standard No. 313)
MEKP	Methyl ethyl ketone peroxide

MHE	Materials handling equipment
MILSTAMP	Military Standard Transportation and Movement Procedures
MILVAN	Military-owned demountable container, conforming to U.S. and international standards and operated in a centrally controlled fleet for movement of military cargo
MMD	Material movement document
MOWASP	Mechanization of Warehousing and Shipment Processing
MRO	Material release order
MSDS	See Material Safety Data Sheet
MTB	Formerly Materials Transportation Bureau (of DOT); now the Research and Special Programs Administration (RSPA) of DOT
MTMC	Military Traffic Management Command
NA	North American. When NA preceeds a four-digit number, it indicates that this identification number is used in the United States and Canada to identify a commodity or group of commodities
NAVFACENGCOM.	Navy Facilities Engineering Command
NEC	National Electric Codes, National Fire Protection Association, NEPA Code 70
NFPA	National Fire Protection Association. An international voluntary membership organization to promote/improve fire protection and prevention and establish safeguards against loss of life and property by fire. Best known on the industrial scene for the National Fire Codes, 16 volumes of codes, standards, recommended practices, and manuals developed (and periodically updated) by NFPA technical committees. Among these is NFPA 704M, the codes for showing hazards of materials using the familiar diamond-shaped label or placard with appropriate

numbers or symbols designed for use by firefighters. The brief explanation below illustrates the NFPA principle of using scales of 0 to 4 (low to high)

to classify material hazards:

Fire Hazard (Red)

0--Will not burn
1--Will ignite if preheated
2--Will ignite if moderately heated
3--Will ignite at most ambient conditions
4--Burns readily at ambient conditions

Health Hazard (Blue)

0--Ordinary combustible hazards in a fire
1--Slightly hazardous
2--Hazardous
3--Extreme danger
4--Deadly

Specific Hazard

OXY--Oxidizer
Acid--Acid
Alkali--Alkali
COR--Corrosive
W--Use No Water
Radiation Hazard

Reactivity (Yellow)

0--Stable and not reactive with water
1--Unstable if heated
2--Violent chemical change
3--Shock and heat may detonate
4--May detonate

NIIN	National item identification number. The last nine digits in an NSN. For Government stock numbers other than NSNs, one or more alpha characters must be in the last nine positions
NIOSH	National Institute for Occupational Safety and Health of the Public Health Service, U.S. Department of Health and Human Services (DHHS). Federal agency that, among other activities, tests and certifies respiratory protective devices, recommends occupational exposure limits for various substances, and assists OSHA and MSHA in occupational safety and health investigations and research
NOS or n.o.s.	Not otherwise specified
NPTN	National Pesticide Telecommunications Network. A national pesticide poison control center restricted to use by health professionals. The network assists the health professional in diagnosing and

	managing pesticide poisoning. Services include product active ingredient identification, symptomatic review, toxicologic review, specific treatment recommendations, physician consultation, and referrals for laboratory analyses. These services are provided 24 hours a day. NPTN is funded through the Health Effects Branch, Hazard Evaluation Division, Office of Pesticide Programs, EPA, and is located at Texas Tech University; call toll free (800) 858-7378
NRC	National Response Center (800) 424-8802
NRC	Nuclear Regulatory Commission (Title 10 CFR)
NRFI	Not ready for issue
NRT	National Response Team
NSN	National stock number. The NSN for an item of supply consists of the applicable four-digit class code number from the Federal Supply Classification (FSC), plus the applicable nine digit NIIN. The NSN is assigned by the Federal Catalog System
OASD	Office of the Assistant Secretary of Defense
OHMR	Formerly Office of Hazardous Materials Regulation (within DOT's former Materials Transportation Bureau); now known as OHMT
OHMT	Office of Hazardous Materials Transportation of the Research and Special Programs Administration of DOT

ORM	Other regulated materials. A material that (1) May pose an unreasonable risk to health and safety or property when transported, and (2) does not meet any of the definitions of the other hazard classes specified in DOT (Title 49 CFR 173.500)
OSC	On-scene coordinator in emergency response actions
OSHA	Occupational Safety and Health Administration of the U.S. Department of Labor. Federal agency with safety and health regulatory and enforcement authorities for most U.S. industry and business (see Title 29 CFR and MSHA)
P&P	Preservation and Packing

PCB(s)	Polychlorinated biphenyls. A series of hazardous compounds used for a number of industrial purposes, which are now found throughout the natural environment. PCBs are toxic to some marine life at concentrations of a few parts per billion (ppb) and are known to cause skin diseases, digestive disturbances, and even death in humans at higher concentrations. PCBs are persistent in the environment and do not easily decompose, and biomagnify up the food chain
PCP	(1) Abbreviation for pentachlorophenol, a wood preservative used on military ammunition boxes and telephone poles (2) 1-(1-Phenylcylohexyl) piperidine or angel dust or HOG, an analgesic and anesthetic that may produce serious psychologic disturbances
pH	A numerical designation of relative acidity and alkalinity. A pH of 7.0 indicates precise neutrality; higher values indicate increasing alkalinity, and lower values indicate increasing acidity
PLFA	Primary Level Field Activity
PMRD	Prepositioned Materiel Receipt Document
POP	Performance oriented packaging
ppb	Parts per billion. A unit for measuring the concentration of a gas or vapor in air; parts (by volume) of the gas or vapor in a billion parts of air. Usually used to express measurements of extremely low concentrations of unusually toxic gases or vapors. Also used to indicate the concentration of a particular substance in a liquid or solid
PPE	Personal protective equipment
ppm	Parts per million. Refers to the concentration of a contaminant in air. Also used to indicate the concentration of a particular substance in a liquid or solid. This unit is frequently written as milligram/liter (mg/1) for liquids and milligram/ cubic meter (mg/m3) for gases
psf	Pounds per square foot
psi	Pounds per square inch
psia	Pounds per square inch absolute

psig	Pounds per square inch gauge
PSN	Proper shipping name
QAR	Quality Assurance representative
QDR	Quality Deficiency Report
QUICKTRANS	Navy-managed, long-term contract airlift service within the CONUS for the movement of cargo in support of the logistics systems of the military services and defense agencies. Included within QUICKTRANS are the supporting contract truck feeder systems which provide connecting service
RAM	Radioactive material
RCRA	Resource Conservation and Recovery Act (Public Law 99-499)
RID	European regulatory body that regulates rail shipments of dangerous goods in Europe

RO	Requisitioning objective
ROD	Report of Discrepancy (SF 364)
RO/RO or RORO.	Roll-on/roll-off service ocean shipping
RPO	Radiation Protection Officer
RQ	Reportable quantity. Materials and their corresponding RQs which are listed or designated as "hazardous substances" under section 101(14) of CERCLA as amended by SARA. RQs are listed in the appendix to section 172.101 of Title 49 CFR
RSPA	Research and Special Programs Administration (of DOT)
SARA	Superfund Amendments and Reauthorization Act. (Reauthorizes CERCLA)
SCBA	Self-contained breathing apparatus
SEAVAN	Commercial or Government-owned (or -leased) shipping container
SF	Standard Form
SHM	Safety Health Manager/Monitor

SOP	Standard operating procedure
SPCC	Spill Prevention Control and Countermeasure Plan
SPM	Spill Prevention Management
SRP	Spill Response Plan
SRT	Spill Response Team
SSA	System Safety Analysis
SSP	System Safety Program
STC	Single Trip Container (see Title 49 CFR 173.28 and 178.8)
SU(s)	Shipment unit(s)
TCMD	Transportation Control and Movement Document (DD Form 1384)
TCN	Transportation control number
TDG	Transport of Dangerous Goods. The regulations issued by Transport Canada for Transportation of Dangerous Goods in Canada
TIs	Technical instruction (used under ICAO)
TLV	Threshold limit value. Registered trademark of the ACGIH. ACGIH presents the most recent TLVs for commonly used industrial chemical compounds. The Threshold Limit Value-Time Weighted Average (TLA-TWA). The time weighted average concentration for a normal 8-hour workday and 40-hour workweek to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. Threshold Limit Value-Short Term Exposure Limit (TLV-STEL, 15 minutes). The concentration to which workers can be exposed continuously for a short period of time without suffering from (1) irritation; (2) chronic or irreversible tissue damage; or (3) narcosis or sufficient degree to the likelihood of accidental injury, impair self-rescue, or materially reduce work efficiency, provided that the daily TLV-TWA is not exceeded. This is not a separate independent exposure limit but, rather, supplements the time recognized acute effects from a substance whose toxic effects are primarily of a chronic nature. STELs are recommended only where toxic effects have been reported from high short-term exposures in either humans or animals

TM	Technical manual
TNT	Trinitrotoluene
TOFC	Trailer on flat car (Piggy Back)
TPQ	Threshold Planning Quantity
TSCA	Toxic substance Control Act (Public Law 99-519)
TSDF	EPA- or State-permitted hazardous waste treatment, storage, or disposal facility
TU(s)	Transportation unit(s)
UEL	Upper explosive limit. The highest concentration of the material in air that can be detonated
UFL	Upper flammable limit. The highest concentration of the material in air that will support combustion
UI	Unit of issue
UL	Underwriters Laboratories, Inc.

UMMIPS	Uniform Material Movement and Issue Priority System
UN	United Nations. When this precedes a four-digit number, it indicates this identification number is used internationally to identify a commodity or group of commodities
USACOE	United States Army Corps of Engineers
USAEHA	United States Army Environmental Hygiene Agency
USC	United States Code
USCG	United States Coast Guard
C	Degrees Centigrade
F	Degrees Fahrenheit

Section II. Terms

Alkali
Any substance that in water solution is bitter, more or less irritating, or caustic to the skin. Strong alkalies in solution are corrosive to the skin

and mucous membranes.

Appropriate
This term as used in ICAO Technical.

Authority
Instructions (ICAO) has the same meaning as "Competent Authority."

Combustibles
See definition of HCC F8 in appendix B.

Competent Authority
A national agency responsible under its national (Department of Transportation (DOT) and International Maritime Organization (IMO)) law for control or regulation of a particular aspect of the transportation of hazardous materials (dangerous goods). The Director, Office of Hazardous Materials Transportation (OHMT) of the Research and Special Programs Administration (RSPA) of DOT, is the United States Competent Authority for the purposes of Competent Authority under Title 49 CFR, Title 46 CFR, parts 64 and 146, and IMO regulations (see appropriate authority and CAC).

Compressed Gases
See definition of HCCs G1 through G9 in appendix B.

Container
Any portable device in which a material is stored, transported, disposed of, or otherwise handled (see Title 40 CFR260.10(a)(9)).

Container, Intermodal, ISO
An article of transport equipment that meets the standards of the International Organization for Standardization (ISO) designed to facilitate and optimize the carriage of goods by one or more modes of transportation without intermediate handling of the contents and equipped with features permitting ready handling and transfer from one mode to another. Containers may be fully enclosed with one or more doors, open top, tank, refrigerated, open rack, gondola, flatrack, and other designs. Included in this definition are modules or arrays that can be coupled to form an integral unit regardless of intention to move singly or in multiplex configuration.

Containerization
The use of transport containers (container express (CONEX), military-owned demountable containers (MILVAN), commercially or Government-owned (or -leased) shipping containers (SEAVAN), and roll on/roll off (RORO) trailers) to unitize cargo for transportation, supply, and storage. Containerization aids carriage of goods by one or more modes of transportation without the need for intermediate handling of the contents, and incorporates supply, security, packaging, storage, and transportation into the distribution system from source to user.

Corrosives
See definition of HCCs C1, C2, and J6 in appendix B.

Dangerous When Wet
A label required for certain materials being shipped under U.S. DOT, ICAO,

and IMO regulations (see Title 49 CFR 172.423 and HCC R2 in app B).

Disposal Drum/Recovery Drum
A nonprofessional reference to a drum used to overpack damaged or leaking containers of hazardous materials for shipment; the proper shipping name is Salvage Drum as cited in Title 49 CFR 173.3.

Empty Packagings
As related to Title 49 CFR:
a. The description on the shipping paper for a packaging containing the residue of a hazardous

material may include the words "RESIDUE: Last Contained * * * "in association with the basic description of the hazardous material last contained in the packaging.
b. For a tank car containing the residue (as defined in Title 49 CFR 171.8) of a hazardous material, the requirements of Title 49 CFR 172.203(e)(3) and 174.25(c) apply.
c. If a packaging, including a tank car, contains a residue that is a hazardous substance, the description on the shipping papers must be prefaced with the phrase "RESIDUE: Last Contained * * *" and the letters "RQ" must be entered on the shipping paper either before or after the description.

Etiological Agents
See definition of HCC K1 in appendix B.

Expiration Date
The date by which nonextendible items (type I) should be discarded as no longer suitable for issue or use.

Explosives
See definition of HCCs E1 and E2 in appendix B.

Flammable
See definition of HCCs F1 through F7, J1, J2, R1, and R2 in appendix B.

Flammable Aerosol
See HCC F1 in appendix B.

Flammable Gas
See definition of HCC G2 in appendix B.

Flammable Solid
See definition of HCC F7 in appendix B.

Fully Encapsulating Suits
Full chemical protective suits that are impervious to chemicals, offer full body protection from chemicals and their vapors/fumes, and are to be used with SCBA (EPA level protection).

Full Protective Clothing
Such units are typically recommended where high chemical gas, vapor, or fume concentrations in air may have a corrosive effect on exposed skin, and/or where the chemical in air may be readily absorbed through the skin to produce toxic effects. These suits are impervious to chemicals, offer full body protection, and include self-contained breathing apparatus (SCBA (EPA level B protection)).

Hazard Class
A category of hazard associated with an HM/HW that has been determined capable of posing an unreasonable risk to health, safety, and property when transported (see Title 49 CFR 171.8). The hazard class used by the U.S. DOT and published in Title 49 CFR 172.101. The hazard classes used in the U.S. include Explosive (Class A, B, or C); Flammable Liquid; Flammable Solid; Corrosive Material; Oxidizer; Poison A; Poison B; Radioactive Material; Nonflammable Gas; ORM-A, -B, -C, -D, and -E; Etiologic Agent; Irritating Material; Organic Peroxide; Combustible Liquid; Flammable Gas; and Blasting Agent.

Hazardous Chemicals
Hazardous materials used in the workplace that are regulated under OSHA "right-to-know" regulations in Title 29 CFR 1910.1200.

Hazardous Materials
As defined in Federal standard 313 C, a hazardous material is defined as a material having one or more of the following characteristics: (a) Has a flashpoint below 200ø F. (93øC.) closed cup, or is subject to spontaneous heating, or is subject to polymerization with release of large amounts of energy when handled, stored, and shipped without adequate control; (b) has a Threshold Limit ValueR equal to or below 1,000 ppm for gases and vapors, below 500 mg/m(3) for fumes, and equal to or less than 30 mppcf or 10 mg/m(3) for dusts (less than or equal to 2.0 fibers/cc, greater than 5 micrometers in length for fibrous materials); (c) a single oral dose that will cause 50 percent fatalities to test animals when administered in doses of less than 500 mg per kilogram of test animal weights; (d) is a flammable solid as defined in Title 49 CFR 173.150, or is an oxidizer as defined in Title 49 CFR 173.151, or is a strong oxidizing or reducing agent with a half cell potential in acid solution of greater than +1.0 volt as specified in Latimer's table on the oxidation-reduction potential; (e) causes first-degree burns to skin in short-time exposure, or is systemically toxic by skin contact; (f) in the course of normal operations, may produce dusts, gases, fumes, vapors, mists, or smokes with one or more of the above characteristics; (g) produces sensitizing or irritating effects; (h) is radioactive; (i) the item has special characteristics that in the opinion of the manufacturer could cause harm to personnel if used or stored improperly; (j) the item is hazardous in accordance with Title 29 CFR, part 1910; (k) the item is

hazardous in accordance with Title 49 CFR, parts 171-179, or the International Maritime Dangerous Goods Code of the Inter-Governmental Maritime Consultative Organization (IMCO) or the Dangerous Goods Regulations of the International

Civil Aviation Organization (ICAO); or (1) is regulated by the Environmental Protection Agency under Title 40 CFR.

Hazardous Substance
See RQ.

Hazardous Waste
Any material listed as such in Title 40 CFR 261, subpart D, that possesses any of the hazard characteristics of corrosivity, ignitability, reactivity, or toxicity as defined in Title 40 CFR 261, subpart C, or that is contaminated by or mixed with any of the previously mentioned materials (see Title 40 CFR 261.3).

IMDG Designation
A hazardous material identifier published by the International Maritime Organization in their Dangerous Goods Code.

Incompatible Waste
A waste unsuitable for commingling with another waste or material, where the commingling might result in the following:

a. Extreme heat or pressure generation.
b. Fire.
c. Explosion or violent reaction.
d. Formation of substances that are shock sensitive, friction sensitive, or otherwise have the potential to react violently.
e. Formation of toxic dusts, mists, fumes, gases, or other chemicals.
f. Volatilization of ignitable or toxic chemicals due to heat generation, in such a manner that the likelihood of contamination of groundwater or escape of the substances into the environment is increased.

Inspection/Test Date
The date by which extendible items (type II) should be subjected to inspection, test, or restoration.

Label
Any diamond, square, or rectangular-shaped attachment to a package that identifies the hazardous nature of a material (see Title 49 CFR Part 172, subpart E).

LCLo
Lethal Concentration Low. The lowest concentration of a substance which causes death in test organisms. The reported concentrations may be entered for periods of exposure that are less than 24 hours (acute) or greater than 24 hours (subacute and chronic).

LC50
Lethal Concentration of 50%. A quantity of a substance that is necessary to kill 50% of test organisms exposed to it within a specified time.

LDLo
Lethal Dose Low. The lowest dose of a substance introduced over any given period of time in one or more divided portions and reported to have caused death in test organisms.

LD50

Lethal Dose of 50%. A quantity of substance administered to kill 50% of exposed organisms in laboratory tests with a specified time. A substance having an LD50 of less than 50 mg/kg of body weight is rated as highly toxic.

LEL
Lower Explosive Limit. The lowest concentration of the material in air that can be detonated by spark, shock, fire, etc.

LEPC
Load Emergency Planning Committee.

LFL
Lower Flammable Limit. The lowest concentration of the material in air that will support combustion.

LOGAIR
Air Force-managed, long-term contract airlift service within CONUS for the movement of cargo in support of the logistics systems of the military services and defense agencies.

LSN
Local stock number (also known as activity control number). Any stock number other than the national stock number that is locally assigned by an individual activity. The LSN is not assigned by the Federal Catalog System.

Multiple Hazard Materials
HM defined as possessing or exhibiting multiple hazards. See definitions of HCCs in appendix B.

Nonflammable gas
See definition of HCC G3 in appendix B.

Nonhazardous material
See definition of HCC N1 in appendix B.

Organic Peroxides
See definition of HCCs P1, P2, and J4 in appendix B.

Overpack
Except when referenced to a packaging specified in part 178 of Title 49 CFR, means an enclosure used by a single consignor to provide protection or convenience in handling of a package or to consolidate two or more packages. "Overpack" does not include a freight container.

Oxidizers
See definition of HCCs D1 through D4 and J3 in appendix B.

Package or Outside Package
A packaging plus its contents (see Outside Package Title 49 CFR 171.8).

Packaging
The assembly of one or more containers and any other components necessary to assure compliance with minimum packaging requirements; includes containers (other than freight containers or overpacks), portable tanks, cargo tanks, tank cars, and multiunit tank car tanks (see Title 49 CFR 171.8).

Packing
See Packaging.

Pallets
A pallet is a low portable platform constructed of wood, metal, plastic, or fiberboard, built to specified dimensions, on which supplies are loaded, transported, or stored in units. Flat pallets are either single faced or double faced. Single-faced pallets have one platform with stringers underneath on which the weight of the load rests. Double-faced pallets have two platforms separated by stringers. Pallets may afford two- or four-way entry. The two-way entry pallet is so constructed that the forks of a forklift truck may be inserted from either the front or rear of the pallet. The four-way pallet is so constructed that the forks of a forklift truck may be inserted from any of the four sides. Flat pallets are constructed of either softwood or hardwood. Expendable pallets are four-way entry and are composed of either fiberboard, polystyrene, or a combination of these. A box pallet is constructed with a framework and crossmembers extending up from a pallet platform, the front side normally being left open for loading or unloading (see DOD 4145.19-M-1, Storage and Materials Handling). Aircraft 463L): Aluminum air cargo pallet, 88 inches by 108 inches or 54 inches by 88 inches, on which shipments are consolidated for movement by MAC.

Pesticide Low Risk
See definitions of HCC T5 in appendix B.

Poison
See definition of HCCs T1 through T4 in appendix B.

Poison Control Centers
A nationwide network of poison control centers has been set up with the aid of the U.S. Food and Drug Administration and Department of Health and Human Services. The centers, usually established in local hospitals, are now widely distributed and available by phone from most parts of the country. Staff members are specially trained in the treatment of poisoning cases.

Poison Gas
See definition of HCC CO1 in appendix B.

Poison Information Center (Pesticide)
See NPTN.

Proper Shipping Name
The name of the hazardous material shown in Roman print (not italics) in Title 49 CFR 172.101.

Protective Clothing Required
Characteristics and OSHA criteria for required protection against contact with the material.

Radioactive
See definition of HCC A1 through A3 in Materials appendix B.

Recoupment
The process of regaining or recovering materials that are still useful through repackaging, repacking, remarking, or repouring. (Pesticides regulated by Title 40 CFR under FIFRA will not be eligible for recoupment or relabeling.

Residue
As referenced in title 49 CFR 171.8, residue is the hazardous material remaining in a packaging after its contents have been emptied and before the packaging is refilled, or cleaned and purged of vapor to remove any potential hazard. Residue of a

hazardous material, as applied to the contents of a tank car (other than DOT specification 106 or 110 tank cars), is a quantity of material no greater than 3 percent of the car's marked volumetric capacity.

Rinse Liquid
The liquid(s) that remains after a container has been rinsed out.

Salvage Drum
A drum with a removable metal head that is compatible with the lading used to transport damaged or leaking hazardous materials for repackaging or disposal (see Title 49 CFR 173.3).

Storage Serviceability Standard
Mandatory instructions for the inspection, testing, and/or restoration of items in storage, encompassing storage criteria, preservation, packaging, packing, and marking requirements, and time-phasing for inspection during the storage cycle to determine the materiel serviceability and the degree of degradation that has occurred. Storage Serviceability Standards must be prepared by the managing wholesale ICP or other responsible organization for type II shelf-life items only. They are used at the Wholesale and retail level to determine if type II shelf-life items have retained sufficient quantities of their original characteristics and are of a quality level that warrants extension of their assigned time period, and the length of the time period extension.

Threshold Limit Value Ceiling
The concentration that should not be exceeded during any part of the working exposure.

Toxicity
Defined as the "quality, state, or degree of being ...poisonous."
a. Acute toxicity results from a severe case of poisoning due to a single dose of exposure to a chemical.
b. Chronic toxicity is caused by repeated small doses over a considerable period (greater than 6 months), resulting in accumulation of the chemical in

the body, or if its effects are additive, bringing on illness or sometimes death.

c. Dermal toxicity is a measure of the amount of a poison that can be absorbed through the skin of an animal or produce local toxicity. Measurements of toxicity are usually compared at the 50 percent level (see LD50).

d. Toxicity (Human). The AAPCO has adopted the following regulatory principles relating to the determination of highly toxic materials:

(1) Highly Toxic. An economic poison that falls within any of the following categories when tested on laboratory animals (mice, rats and rabbits) and is highly toxic to man within the meaning of these principles:

(a) "Oral Toxicity: Those materials which produce death in half or more than half the animals of any species at the dosage of 50 milligrams at a single dose, or less, per kilogram of body weight when administered orally to 10 or more such animals of each species."

(b) "Toxicity on inhalation: Those materials which produce death in half or more than half of the animals of any species at a dosage of 200 parts or less by volume of the gas or vapor per million parts by volume of air when administered by continuous inhalation for one hour or less to 10 or more animals of each species, provided such concentration is likely to be encountered by man when the economic poison is used in any reasonable foreseeable manner."

(c) "Toxicity by skin absorption: Those materials which produce death in half or more than half of the animals (rabbits only) tested a dosage of 200 milligrams or less per kilogram of body weight when administered by continuous contact with the bare skin for 24 hours or less to 10 or more animals. Provided, however, that an enforcement official may exempt any economic poison which meets the above standard but which is not in fact highly toxic to man, from these principles with respect to economic poisons highly toxic to man, and may after hearing designate as highly toxic to man any economic poison which experience has shown to be so in fact."

(2) Toxicity Categories. EPA has published regulations for use of human hazard signal words on pesticide labels. The following signal words are assigned by levels of toxicity:

(a) Toxicity Category I. All pesticide products meeting the criteria of Toxicity Category I shall bear on the front panel the signal word "Danger." In addition, if the product has been assigned to Toxicity Category I on the basis of its oral, inhalation, or dermal toxicity (as distinct from skin and eye local effects), the word "Poison" shall appear in red on a background of distinctly contrasting color, and the skull and crossbones shall appear in immediate proximity to the word "Poison."

(b) Toxicity Category II. All pesticide products meeting the criteria of Toxicity Category II

shall bear on the front panel signal word "Warning."

(c) Toxicity Category III. All pesticide products meeting the criteria of Toxicity Category III shall bear on the front panel the signal word "Caution."

(d) Toxicity Category IV. All pesticide products meeting the criteria of Toxicity Category IV shall bear on the front panel the signal word

"Caution."

(e) Use of signal wordsÄÄUse of signal words(s) associated with a higher toxicity category is not permitted except when the agency determines that such labeling is necessary to prohibit unacceptable adverse effects.

Glossary-12

By Order of the Secretaries of the Army, the Navy, and the Air Force:

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Chief of Staff

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Administrative Assistant to the
Secretary of the Army

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