Chapter XXXI
Transportation

A. GENERAL.

1. ***Major Provisions***. We have listed the major provisions in applying DOT requirements to HM/HW shipments. However, we have not listed every applicable rule. Therefore, DRMOs are advised to apply applicable DOT requirements to their shipments.

NOTE: Overseas -- Marking, labeling, placarding and manifesting shall be accomplished in accordance with the DoDI 4715.5-G, Overseas Environmental Baseline Guidance Document (OEBGD) or the Final Governing Standards (FGSs), where issued, host nation and international regulations. Storage and handling of hazardous materials will adhere to DoD Component policies, including Joint Service Publication on Storage and Handling of Hazardous Materials. DLAI 4145.11, TM 38-410, NAVSUP PUB 573, AFJMAN 23-209, and MCO 4450.12A (reference (i)) provide additional guidance on the storage and handling of hazardous materials. The International Maritime Dangerous Goods (IMDG) Code and appropriate DoD and component instructions provide requirements for international maritime transport of hazardous materials originating from DoD installations. International air shipments of hazardous materials originating from DoD installations are subject to International Civil Air Organization Rules or DoD Component guidance including AFJM 24-204, TM 38-250, NAVSUP 505, MCO P4030.19E, and DLAM 4145.3 (reference (j)).

2. ***Performance-Oriented Package (POP) Standards.***

a. The final rule published in the Federal Register (55 FR 52402), dated 21 December 1990, revised the Hazardous Materials Regulations (HMR). The effective date of the rule was 1 October 1991.

b. Major provisions of this new rule included:

- Requirement to manufacture and use performance-oriented packaging (POP) for the shipment of hazardous material (HM).

- Changes in hazard class definition and designation.

- Changes in hazard communication (shipping descriptions, marking, labeling, placarding).

- Revision of the Hazardous Materials Table (HMT).

c. The rule also provided specific transitional provisions for implementing certain requirements (49 CFR 171.14).

B. DOT BASIC DESCRIPTION.

(49 CFR 172.202)

1. The DOT basic description includes four (4) components, which must be entered on the manifest in the following order:

- Proper shipping name,

- Hazardous class/division,

- DOT identification number, and

- Packing group, (may be preceded by letters “PG”.)

2. Information for the DoT description may be obtained from several sources:

a. The manifest, for hazardous waste shipped from an off-site generating activity.

b. The Material Safety Data Sheet (MSDS) or Hazardous Waste Profile Sheet (HWPS).

c. The transportation section in the Hazardous Material Information System (HMIS).

d. The package markings and/or labels may provide specific information to assist in determining the basic description.

Whenever any of the above sources are used to determine the basic description, you should always attempt to verify its accuracy.

C. HAZARD MATERIALS TABLE.

(49 CFR 172.101)

1. If the basic description cannot be located on any existing materials, or you are not confident of the one you do find, you will need to use the Hazardous Materials Table (HMT) found in 49 CFR 172.101. Use the entry in the table that most appropriately describes the HM, using the following hierarchy:

- Technical (chemical) name (e.g., Acetone).
- Chemical Family (e.g., alcohol).
- Application (usage) name (e.g., Paint).
- N.O.S. name (e.g., Flammable Liquid, n.o.s.).

Once a proper shipping name has been selected, the rest of the basic description is obtained by reading horizontally across the HMT.

2. ***Hazardous Materials Descriptions and Proper Shipping Names*** *(49 CFR 172. 101(c)).*

a. The basic description must be legible and printed in English.

b. Whenever a hazard class and an ID number are used in association with the description of a material, that material must be a HM; i.e., you cannot use a DOT basic description for non-HM.

c. Shipping names may be used either in the singular or plural (e.g., "battery, wet, filled with acid" or "batteries, wet, filled with acid" and in either capital or lower case letters.

d. The abbreviations "**n.o.i.**" (not otherwise indexed) or "**n.o.i.b.n.**" (not otherwise indexed by name) may be used interchangeably with "**n.o.s.**" (not otherwise specified).

e. When a shipping name includes a concentration range as part of the shipping description, the actual concentration being shipped, if it is within the range stated, may be used in place of the concentration range. For example, a hydrogen peroxide solution containing 30 percent peroxide may be shipped as either "**Hydrogen peroxide, aqueous solution with not less than 20 percent but not more than 40 percent hydrogen peroxide**" **or "Hydrogen peroxide, aqueous solution with 30 percent hydrogen peroxide**."

f. The use of the prefix "**mono**" is optional, i.e., **Iodine Monochloride** may be used interchangeably with **Iodine Chloride**.

3. ***Hazardous Wastes*** *(49 CFR 172. 101(c)(9)).* If the word "**waste**" is not included in the HM description in the Table, the shipping name for a hazardous waste must include the word "**waste**" preceding the shipping name (e.g., "**Waste acetone**").

4. ***Mixtures or solutions*** *(49 CFR 172. 101(c)(10)).*

a. A mixture or solution not identified specifically by name, comprised of a hazardous material identified in the Table by technical name and non-hazardous material, shall be described using the proper shipping name of the HM and the qualifying word "**mixture**" or "**solution**", as appropriate, unless:

b. Except as provided in 172.101(i)(4), the package specified in column 8 is inappropriate to the physical state of the material;

c. The shipping description indicates that the proper shipping name applies only to the pure or technically pure HM;

d. The hazard class, packing group, or subsidiary hazard of, mixture or solution is different from that specified for the entry;

e. There is a significant change in the measures to be taken in emergencies;

f. The material is identified in column 7 of the 49 CFR 172.101 Table as a material that is poisonous by inhalation or the mixture, either no longer meets the definition of a poison by inhalation or it falls within a different hazard zone than specified by the special provision; or

g. The material can be appropriately described by a shipping name that describes its intended application, such as "coating solution" or "compound, cleaning liquid."

D. ADDITIONAL DESCRIPTION REQUIREMENTS.

1. ***Limited Quantities*** *(49 CFR 172.203(b))*. The description of a material offered for transportation as a limited quantity must include the words "**Limited Quantity**" or "**Ltd Qty**" following the basic description.

2. ***Hazardous Substances*** *(49 CFR 172.203(c))*.

a. If the proper shipping name for a material that is a hazardous substance does not identify the hazardous substance by name, the name of the hazardous substance must be entered in parentheses in association with the basic description.

b. If the material contains two or more hazardous substances, at least two hazardous substances, including the two with the lowest reportable quantities (RQ) must be identified.

c. For a hazardous waste, the waste code (e.g., D001) may be used to identify the hazardous substance.

d. The letters "**RQ**" shall be entered on the shipping paper either before or after, the basic description, e.g., "**RQ Allyl alcohol, 6.1, UN 1098, I**" or "**Environmentally hazard substance, solid, n.o.s., 9, UN 3077, III, RQ (Adipic acid)**".

3. ***Empty containers*** *(49 CFR 172.203(e))*. Unless a container has been cleaned and purged of all residue, it must be described in the same manner as when it held a greater quantity of HM (49 CFR 173.29). The proper shipping description required on a manifest will depend upon the identity of the residue. For empty containers with residue, the basic description may be preceded by the words "**RESIDUE: Last contained**" (49 CFR 172.203(e)). For example, a 55-gallon drum with acetone residue might be described as "**RESIDUE: Last contained Waste Acetone, 3, UN 1090, PG II**." Additionally, all marking and labeling requirements must also be complied with.

4. ***Technical names for "n.o.s." and other generic description*** *(49 CFR 172.203 (k))*.

a. If a HM is described by one of the "**n.o.s.**" proper shipping names listed at 49 CFR 172.203(k)(3), the technical name of the HM must be entered in parenthesis in association with the basic description. For example "**Corrosive liquid, n.o.s. (Carbonyl chloride), 8, UN 1760, PG II**."

b. If a HM is a mixture or solution of two or more hazardous materials, the technical names of at least two components, most predominantly contributing to the hazards of the mixture or solution must be entered on the shipping paper. For example, "**Flammable liquid, corrosive, n.o.s., 3, UN 2924, II (contains Methanol, Potassium hydroxide)**".

5. ***Marine pollutants*** *(49 CFR 172. 203(l))*.

a. If the proper shipping name for a material which is a marine pollutant does not

identify the component which makes the material a marine pollutant, then:

- The name of that component must appear in parentheses in association with the basic description.

- For a material consisting of two or more components which make the material a marine pollutant, the names of at least two of the components most predominately contributing to the marine pollutant must appear in parentheses in association with the basic description.

b. The words "**Marine Pollutant**" shall be entered in association with the basic description.

c. Except for transportation by vessel, marine pollutants subject to the provisions of 49 CFR 130.11 are excepted from the requirements of paragraph D5a above if a phrase indicating the material is an oil is placed in association with the basic description.

6. ***Poisonous materials*** *(49 CFR 172.203 (m)).*

a. If a liquid or a solid material meets the definition of a Division 6.1, Packing Group I or II, and is not disclosed by the shipping name or class entry, the word "**Poison**" will be entered in association with the shipping description, e.g., "**Decaborane, 4.1, UN1868, II, Poison**".

b. If the technical name of the compound or principle constituent that causes the material to meet the definition of a poison is not included in the proper shipping name, the technical name will be entered in parenthesis with the basic description, e.g., "**Motor fuel antiknock mixtures (Tetraethyl lead), 6.1, UN1649, I**", or "**Motor fuel antiknock mixtures, 6.1, UN1649, I (Tetraethyl lead)**".

c. Materials that are poisonous by inhalation, the words "**Poison-Inhalation Hazard**" and the words "**Zone A**", "**Zone B**", "**Zone C**", or "**Zone D**", for gases or "**Zone A**" or "**Zone B**" for liquids, will be entered in association with the shipping description, e.g., "**Thionyl chloride, 8, UN1836, I, Poison-Inhalation Hazard, Zone B**". The word poison does not to be repeated if it appears in the proper shipping description. Poison inhalation hazard items may be identified through the special provisions listed for the HM in column 7 of the HMT.

E. MARKING.

1. ***General marking requirements*** *(49 CFR 172.301).*

a. Markings must include proper shipping name and DOT identification number preceeded by "**UN**" or "**NA**".

b. Hazardous waste proper shipping name does not have to include the word "**waste**", if the EPA waste marking (see 40 CFR 262.32) is on the package.

c. Packages containing materials subject to the 49 CFR 172.203(k) shipping paper requirement must be marked with the technical name(s) in parentheses in association with the proper marked shipping name.

d. A non-bulk package shall be marked with the name and address of the consignor or consignee except when the package is:

- Transported by highway only and will not be transferred from one motor carrier to another; or

- Part of a carload lot, truckload lot or freight container load, and the entire contents of the rail car, truck or freight container are shipped from one consignor to one consignee.

2. ***Marking Requirements*** *(49 CFR 172. 304).* Markings must be durable, in English and printed on the surface of the package or on a label, tag, or sign securely affixed to the package. Markings must be displayed on a background of sharply contrasting color; must be unobscured; and must be located away from any other marking (e.g., advertisement) that could substantially reduce its effectiveness.

a. Hazardous materials that are classified as ORM-D must bear the ORM-D designation. The designation must be placed within a rectangle that is approximately ¼ inch larger on each side than the designator, and be placed either immediately following or below the marked PSN. (49 CFR 172.316)

b. Any package having inside containers of liquid HM must be legibly marked with the package orientation markings on two opposite vertical sides of the package with arrows pointing in the correct upright position. (49 CFR 172.312).

c. Packages that contain poison inhalation hazards must be marked "**Inhalation Hazard**" in association with the required label(s) or placards (49 CFR 172.313).

d. Prior to the hazardous property leaving the overseas DRMO, it must be properly marked in accordance with host country transportation regulations or international transportation regulations. If host country transportation regulations are not as stringent as international regulations, the DRMO will elevate the issue to the DRMSI legal office for review. Retrograde property will be marked, at a minimum, in accordance with U.S. DoT regulations.

F. LABELING.

1. ***General***. The information in this section covers only transport by motor vehicle.

2. ***Prohibited labeling*** *(49 CFR 172.401)*. Because labels may convey information to emergency response personnel, DoT has established prohibited labeling provisions. A package may not bear a label unless:

a. The package contains a material that is a HM; and

b. The label represents a hazard of the HM in the package.

In addition, packages may not bear any marking or labels (such as advertising) that by its color, design, or shape, could be confused with, or conflict with, the prescribed labels.

3. ***Subsidiary hazard labels*** *(49 CFR 172.402(a))*. Each package (see 49 CFR 172.400(a)) will be labeled with primary and subsidiary labels as specified in column 6 of the HMT. If more than one label is shown, the first label is the primary label and any others are subsidiary labels.

4. ***Placement of labels*** *(49 CFR 172.406)*.

a. Labels must be printed on or affixed to a surface (other than the bottom) of the package and be on the same surface as the proper shipping name marking.

b. Labels must be printed on or placed on a securely affixed tag, or may be affixed by other suitable means to:

- A cylinder.

- A package that has such an irregular surface that a label cannot be affixed.

c. When primary and subsidiary labels are required, they must be displayed next to each other (i.e., within 150 mm (6 inches)).

d. A label must be clearly visible and may not be obscured by markings or attachments.

5. ***Additional labeling requirements*** *(49 CFR 172.402)*. The specific size, shape, color, and design of labels must be as prescribed by 49 CFR Subpart E of Part 172.

a. Labels representing the primary hazard must have the appropriate class number (division number for 5.1 and 5.2 materials) in the lower corner. The class/division number may not be displayed on subsidiary labels. The text indicating the hazard (e.g., "flammable liquid" for class 3) is not required on primary and subsidiary labels for class 1, 2, 3, 4, 5, 6, or 8 materials.

b. Prior to the hazardous property leaving the overseas DRMO, it must be properly labeled

in accordance with host country transportation or international transportation regulations. If host country transportation regulations are not as stringent as international regulations, the DRMO will elevate the issue to DRMSI legal office for review. Retrograde property will be, at a minimum, labeled in accordance with U.S. DoT regulations.

G. PLACARDING.

1. ***Placarding Responsibilities***. As the shipper, you must provide to the carrier the placards required for the materials loaded at your site. The carrier is responsible for affixing the proper placards according to what you offer (plus what may already be on the vehicle). Your disposal contractor is required (as a condition of the contract) to have or get any placards that are needed for a pick-up. You need to be sure he does (49 CFR 173.506).

2. ***Placement of Placards***. Placards must be affixed to each side and each end of the transport vehicle. They must be readily visible from the direction they face; securely attached; and be located clear of appurtenances and devices such as ladders, pipes, doors, and tarpaulins. They must also be located away from any marking (such as advertising) that could substantially reduce their effectiveness (49 CFR 172.504(a) and 172.516(a) – (c)).

3. ***Prohibited Placards*** *(49 CFR 172.502).* You may not affix or display placards unless:

a. The material being offered or transported is a HM (49 CFR 172.502(a)(1)(I)); and,

b. The placard represents a hazard of the HM being offered or transported (49 CFR 172.502(a)(1)(ii)); and,

c. Placarding must conform to the requirements of 49 CFR Subpart F (49 CFR 172.502(a)(1)(iii)).

Additionally, you may not affix or display any sign or device that by its color, design, shape, or content could be confused with any prescribed placard (49 CFR 172.502(a)(2)).

4. ***Permissive Placarding*** *(49 CFR 172.502 (c)).* The permissive placarding provisions authorize you to display placards, even when they are not required, if the placarding conforms to 49 CFR Subpart F.

5. **Required Placarding** (49 CFR 172.504). Required placards are determined by consulting the two tables at 49 CFR 172.504. The two tables are accessed according to the primary hazard of your material. After determining the placards required by the tables, consult 49 CFR 172.505 to see if any placards must be added because of subsidiary hazards. The rules are:

a. If there are any quantity of material whose hazard class/division is listed in Table 1, use the placard specified herein.

b. For categories of materials in Table 2:

- If there are two or more categories of materials (from Table 2), the "**DANGEROUS**" placard may be used instead of separate placards (49 CFR 172.504(b)).

- However, if there are 2,205 lbs or more of any one category of material, loaded at one location, use the specified placard (49 CFR 172.504(b)).

- If there are 1,001 lbs or more (aggregate gross weight) of one category of material, use the placard specified in the table (49 CFR 172.504(a)).

c. Exception for less than 1,001 lbs (49 CFR 172.504(c)) Except for bulk packaging and hazardous material subject to 49 CFR 172.505, when hazardous materials covered by Table 2 of this section are transported by highway, placards are not required on:

- A transport vehicle or freight container that contains less than 1,001 lbs aggregate gross weight of hazardous materials covered by Table 2 of this section.

- Review the additional placarding exceptions at 172.504(f).

6. ***Subsidiary Hazard Placarding*** *(49 CFR 172.505).*

a. If a material meets the poison inhalation hazard criteria, add a "**POISON INHALATION HAZARD**" or "**POISON GAS**" placard in addition to the required placard.

b. If a material has a subsidiary hazard of "**DANGEROUS WHEN WET**", add a "**DANGEROUS WHEN WET**" placard in addition to any other required placard.

7. ***Placarding Exceptions*** *(49 CFR 172.500(b)).*

a. The following materials need not be considered when determining placarding requirements:

- Infectious substances (49 CFR 172.500(b)(1)).

- Hazard materials classed as ORM-D (49 CFR 172.500(b)(2)).

- Hazard material offered for transportation as Limited Quantities, when identified as such on the shipping paper (49 CFR 172.500(b)(3)).

- Hazard material prepared in accordance with 49 CFR 173.13 (49 CFR 172.500(b)(4)).

- Materials packaged as small quantities under the provisions of 49 CFR 173.4 (49 CFR 172.500(b)(5)).

- Combustible liquids in non-bulk packagings (49 CFR 172.500(b)(6)).

b. A non-bulk packaging containing only residue of HM need not be included in determining placarding requirements (49 CFR 172.504 (e)).

8. ***Placarding Specifications Overseas***. Prior to hazardous property leaving the overseas DRMO, the transport vehicle will be properly placarded in accordance with host-country transportation or international transportation regulations. If host country transportation regulations are not as stringent as international regulations, the DRMO will elevate the issue to DRMSI legal office for review. Retrograde property will be, as a minimum, packaged in accordance with U.S. DoT regulations.

H. PACKAGING.

1. ***Packaging Requirements***. DoT provides packaging instructions at 49 CFR 172, 173 and 178. Basically the requirements are that all packages must always meet the general packaging requirements, and that, depending on the commodity/quantity, there may be certain additional specific requirements.

2. ***General Packaging*** *(49 CFR 173.24).*

a. The general packaging requirements stipulate that each package must be designed, constructed, maintained, filled, its contents so limited, and closed, so that under conditions normally incident to transportation (49 CFR 173.24):

b. There will be no identifiable (without the use of instruments) release of the HMs to the environment (49 CFR 173.24(b)(1));

c. The effectiveness of the packaging will not be substantially reduced (49 CFR 173.24(b)(2)); and

d. There will be no mixing of gases or vapors in the package, which could, through any credible spontaneous increase of heat or pressure, significantly reduce the effective-ness of the packaging (49 CFR 173.24(b)(3)).

e. Additionally, packages must be compatible with their lading; have secure closure devices; and be filled in such a manner that they are not liquid full at 131 F nor have any HM

residue remaining on the outside (49 CFR 173.24(e), 173.24a(d), 173.24a(b)(5)).

f. Combination packages must have their inner packagings packed, secured, and cushioned to prevent their breakage or leakage and to control their movement within the outer packaging. Combination packages containing liquids must be packed so that closures on inner packagings are upright (49 CFR 173.24a(1)).

NOTE: At this point it might be helpful to review the definitions of "combination packaging," "composite packaging," and "single packaging" 49 CFR 171.8.

g. Shipper's Packaging Responsibility. As a shipper (user of the packaging), the DRMO is responsible for ensuring that:

- The packaging is authorized for the commodity (either a specification packaging is used, or an exception is allowed),

- Any special provisions that apply have been complied with, and,

- The general packaging requirements are satisfied (the packaging is in good condition, is not overfilled, and is closed properly).

I. OTHER.

1. ***Release of Property/Discrepancies.***

a. Do not release property to a transporter/contractor unless all documentation is correct. This includes reconciliation of all information contained on the DTIDs, delivery orders, manifests, and pick-up reports. The COR/COTR will check the manifest, the packaging, markings and labels for shipment. If everything is in compliance with the regulations, the COR will sign the manifest certification and date it. The COR/COTR will make other checks as required under the terms of the contract and, if everything is in compliance, the property will be released.

b. If any discrepancies are noted with respect to manifesting, packaging, labeling, or marking, attempt to resolve them with the COR/COTR. If any discrepancy cannot be resolved, coordinate the discrepancy with the DRMS Environmental Office for technical information and contact the contracting officer for guidance. If directed by the contracting officer to sign the manifest when you believe a discrepancy between the manifest, packaging, labeling, or markings, and stated regulations exists, make a record of conversation documenting your concerns and the directions you were given. After receiving such direction, sign the manifest, and retain a copy.

2. ***Manifest File***.

a. A copy of the manifest must be kept in a suspense file until the copy of the manifest, signed by the designated TSDF certifying receipt of the property, is received. Notify the Contracting Officer if the signed copy of the document is not received within 35 days of initial shipment. If it is not received by the end of the 45-day period, you must prepare and send an exception report, through the host, to the regulator.

b. The exception report consists of a legible copy of the appropriate manifest, plus a cover letter explaining what was done to locate the shipment after 35 days.

c. The signed copy, when received, must be retained for at least 3 years (or longer depending on individual state regulations) from the date of the initial shipment.

d. State regulations may differ. Contact the appropriate state agencies to determine what state regulations apply.