The original *Transporting Pesticides in Pennsylvania* fact sheet has been separated into two fact sheets. The beginning information on basic transportation safety is the premise of the shorter, hard-copy fact sheet since this information is useful for all applicators. This fact sheet, which will only be available online, will cover some of the basic requirements for transporting hazardous substances and materials.

Penn State **Extension**

Pesticide Safety Fact Sheet

Transporting Pesticides in Pennsylvania, Part 2

Safety Recommendations and Legal Requirements

Department of Transportation Regulations Affecting the Transport of Pesticides on Public Roadways

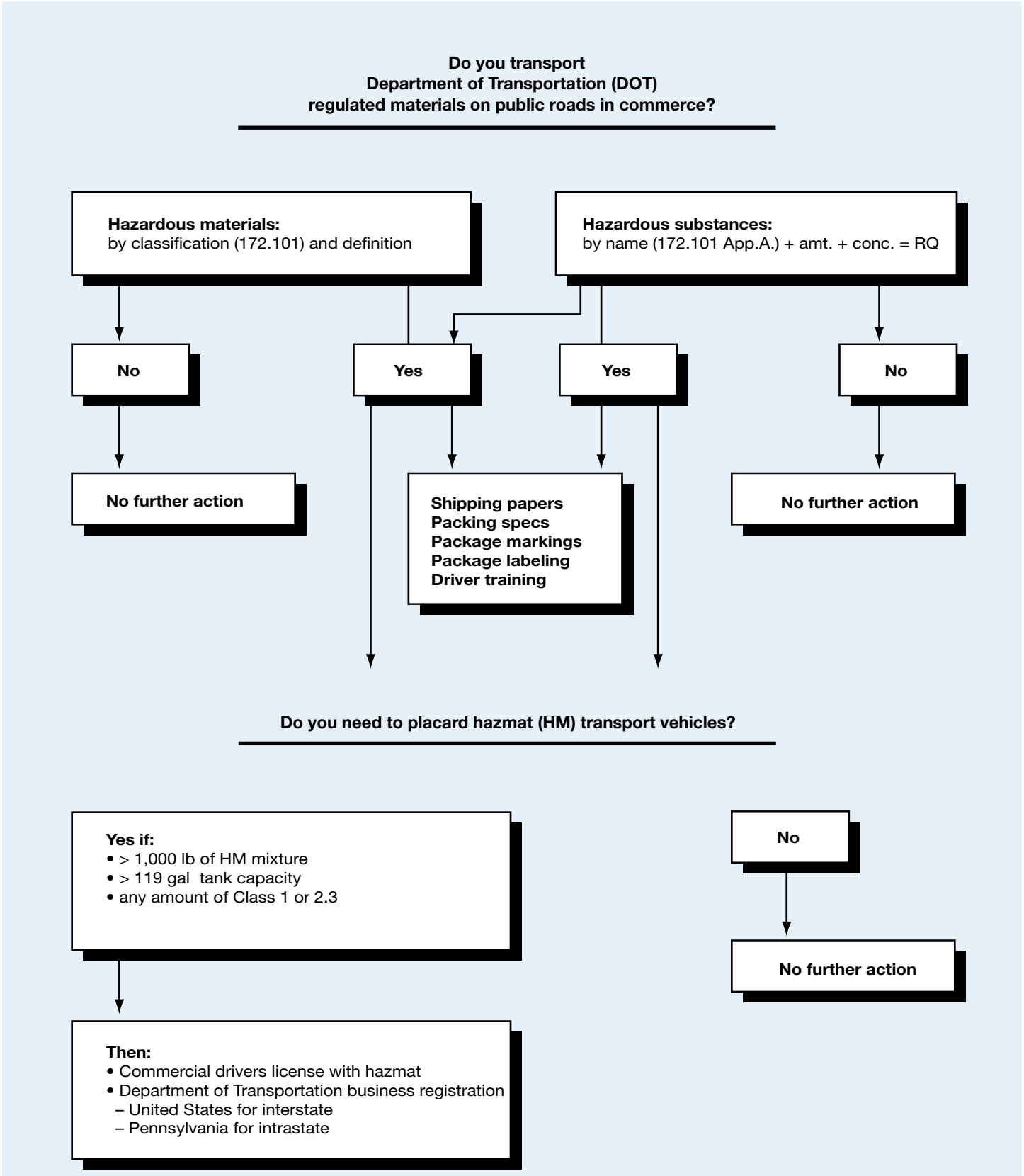
Most regulations affecting pesticides fall under the authority of the amended Federal Insecticide, Fungicide, and Rodenticide Act of 1947. However, some pesticides meet the definition of U.S. DOT hazardous materials (HM, hazmat) or SARA Title III hazardous substances and are subject to the special requirements of DOT hazardous materials regulations (49 CFR Parts 171–180) when being transported on public highways.

The DOT regulations are extensive and complex, addressing everything from live munitions to biological organisms to nuclear waste. The portions of the DOT regulations that most often apply to pesticide applicators and transporters are those that require training for vehicle operators. This training should prepare operators to avoid and react to chemical spills and, at the same time, educate them to communicate information to first-response emergency personnel to prevent their exposure or injury when responding to an incident. This fact sheet will outline the regulations and suggest a monitoring program to help meet these regulatory requirements. However, this publication is not intended to be a complete DOT hazmat reference or to eliminate the need to understand the regulation in its entirety. Figure 1 outlines the process for determining your own DOT hazmat compliance requirements.

Do you carry DOT-regulated materials?

The first and most important step is to determine if the product(s) being transported is a product or commodity being interchanged between parties and meets the requirements of a U.S. DOT-regulated material. Products used for personal use around the home or hobby farm (no income generated) are exempt from these requirements. Regulated materials are defined as either hazardous materials by DOT or hazardous substances by EPA in SARA Title III. Pesticides are just a few of the many materials that are DOT-regulated. Therefore, even if the pesticides being transported do not meet these definitions, other products in the load, such as solvents, fuels, or fertilizers, should be evaluated regarding possible DOT regulation.

Figure 1. Flow chart for determining Department of Transportation regulatory requirements (excludes hazardous waste).



Hazardous substances

Hazardous substances are those listed by EPA, but are regulated only if carried in both a quantity and concentration that exceeds EPA's specifications. Table 1 lists most of the pesticide active ingredients that EPA recognizes. The table also lists the minimum quantity and concentration for each that would qualify them as a hazardous substance. Check the product label for the list of active ingredients and percentage composition of each active ingredient. The following example illustrates how to use the information in Table 1 to determine if the pesticides being transported are considered a hazardous substance.

Example
2,4-D is a commonly used herbicide labeled for control of broadleaf weeds in turfgrass. Accordingb to the label, 2,4-D Amine 4 contains 3.8 pounds of active ingredient (lb ai) per gallon, a 39.3 percent solution. The 2,4-D Amine 4 label suggests spray solutions between 0.25 percent and 1.0 percent. The minimum regulated amount and concentration for 2,4-D listed in Table 1 are 100 pounds of active ingredient and a 0.2 percent (2000 ppm) concentration. Both of these criteria must be met for the load to be DOT-regulated.

If you are transporting undiluted 39.3 percent concentrate, which exceeds the 0.2 percent concentration standard, then any amount at or above 26.3 gallon (100 lb ai) is a DOT-regulated hazardous substance, because

$$\frac{\text{100 lb ai (from Table 1)}}{\text{3.8 lb/gal formulation}} = \text{26.3 gal}$$

If a mixed spray solution is being transported, then calculate the concentration and amount of active ingredient in the tank and compare to Table 1 to determine if the load is regulated. When mixed according to label directions, the concentration of the spray solution will be between 0.25 percent and 1.0 percent active ingredient, and this entire range is above 0.2 percent.

The amount of active ingredient in the tank can be calculated by simply multiplying the product formulation (3.8 lb/gal) by the amount of product added to the mix (2 quarts or 0.5 gal, in 100 gal) to get 1.9 pounds active ingredient.

3.8 lb/gal formulation × 0.5 gal product = 1.9 lb ai

In this example, 1.9 pounds of active ingredient is below the 100 pound threshold, so the load would not be regulated.

Hazardous materials

Hazardous materials are broadly classified by their toxicity, reactivity, flammability, and/or corrosivity characteristics. With few exceptions, pesticide products that are classified as hazardous materials carry that designation because of their flammability (particularly emulisifiable concentrates or ECs) or toxicity characteristics.

Table 2 lists some of the pesticides and a few fertilizers and fuels that pesticide applicators commonly carry that are often recognized by DOT as a hazardous material. Pesticides are often listed in the table of hazardous materials by chemical family rather than a specific active ingredient. Also, the category "pesticides, n.o.s. (not otherwise specified)" includes any product with an EPA registration number.

Hazardous materials are classified by the characteristics of the formulation of the material being transported—for instance, mixed spray solution, impregnated fertilizer, formulated concentrate—not the active ingredient. For example, undiluted EC formulations of insecticides are often classified as hazardous materials because of their flammability or toxicity characteristics. These same products, when diluted in water according to label directions, often no longer meet the definition of a hazardous material.

Table 3 includes the abbreviated descriptions of various hazardous material classifications that apply to pesticides. This table also includes the characteristics that require them to be classified as hazardous materials. Some hazardous material classes are further broken down into hazard zones and packing groups. This additional break-

down further defines the degree of danger associated with specific products and the precautions that should be observed when handling them.

Determining the regulatory status for the products being transported requires some research. Many MSDSs include DOT shipping requirements, usually in the last section of the MSDS. However, the manufacturer is not required to include this information on the MSDS. If the MSDS does not contain this information, contact the manufacturer or retailer directly. Since both transport the product, they should be able to supply the required transportation shipping information. If neither of these sources provide the needed information, check the chemical and physical data on the MSDS against the hazard class characteristics in Table 3 to determine the regulatory status of your product. If the product concentration changes because spray solutions or pesticides have been altered in any way, the regulatory status for this new concentration must also be determined.

All regulated hazardous substances are automatically defined as class 9 miscellaneous hazardous materials if they do not meet the definition of another specific hazard class. For example, Table 2 lists both organophosphorus and carbamate pesticides with the potential hazmat (HM) classification of 3, which is a flammable/combustible liquid, or HM classification 6.1 poisonous material. Triazine pesticides also carry similar classifications. In comparison, gasoline carries a hazmat classification of 3. The determination of hazardous substance, hazardous material, or both is important because this information must be entered on the shipping paper. The exact HM classification can be determined by the defining characteristics listed in Table 3. For example, a carbamate pesticide in liquid form that has an oral LD50 of less than 500 would have an HM classification of 6.1. If the oral LD50 of this liquid product was greater than 200 but less than 500, it would also require a packing group III designation.

By determining the legal status of transported chemicals, an important step in complying has been taken to meet the complex DOT regulations. If the product being transported is not regulated by DOT under the HM regulations, then no further action is necessary. However, this process must be repeated for each new product that requires transportation. If it is determined that the product being transported on public roads is a regulated substance, the next section describes the basic responsibilities of all hazmat transporters and briefly outlines additional requirements for transporters of especially large or dangerous loads.

Basic requirements for HM transporters

Pesticides that meet the definition of U.S. DOT hazardous materials or SARA Title III hazardous substances are regulated under 49 CFR Parts 171–180 when being transported on public highways. All transporters of hazardous materials (including hazardous substances) must comply with these basic requirements. The parts of these DOT regulations most important for transporters of hazardous substances and hazardous materials are commonly known as Part 172.700 (driver training) and Part 172.200 (shipping procedures). Part 172.700 describes which employees must be trained, the content of their training program, the timing and frequency of training, and record-keeping responsibilities. Shipping procedures regulated under Part 172.200 include proper shipping papers, access to 24-hour emergency assistance, and proper packaging, including marking and labeling, for the product in question.

Reminder: This section is not an official or complete summary of the DOT regulations. Official documentation can be obtained in several ways: (1) view and print at **ecfr.gpoaccess.gov** (select "Title 49—Transportation" and then under the *Browse Parts* heading select "100–185" to review Subchapter C—Hazardous Materials Regulations); (2) purchase a copy by calling 866-512-1800 to request 49 CFR Parts 171–180; or (3) purchase a copy online at **bookstore.gpo.gov** (click on the *Code of Federal Regulations* icon and then under the *Title* heading select "49, Parts 100–185").

Part 172.700: Driver training program outline

Part 172.700 requires that any employee who prepares, loads, transports, sells, tests, packages, or performs similar activities with a hazardous material receive hazardous materials transportation training. This regulatory requirement is designed to increase safety awareness and improve emergency preparedness for responding to transportation incidents and accidents. The hazmat training may be done in-house or by an outside source. Basic requirements for hazmat training include:

- General awareness training including hazmat regulations, recognition of hazardous materials, and understanding hazard communication requirements, label directions, MSDSs, and shipping forms. The DOT hazard communication requirement establishes uniform standards for vehicle placarding, package labeling and marking, and shipping papers. Note: these standards are not the same as the Occupational Safety and Health Administration (OSHA) requirement.
- Each employee must have specific training to comply with hazmat regulations for each task performed, such as a truck driver responding to a spill.
- Employee awareness of risks associated with hazardous materials that they may be exposed in the work place, including specific measures to protect themselves from exposure.
- Emergency response training, including emergency response procedures and first aid, for all employees who handle or transport packages containing hazardous materials (such as warehouse workers and drivers).
- Basic safety training for vehicle drivers will cover package handling, exposure precautions, and other nonemergency chemical safety procedures.

In addition, employers must maintain records of their employees' training for the previous three years. Records must include the employee's name, date of training, detailed description of training materials, the name and address of the trainer, and the certification that hazmat training and testing has been completed.

Numerous state and national associations as well as commercial sources provide additional training programs designed to teach compliance with these regulatory requirements. A list of these programs can be found at **hazmat.dot.gov/thirdpty.htm**.

Part 172.200: Shipping procedures

In addition to the training requirement, transporters of DOT-regulated materials must follow specific procedures for completing and carrying shipping papers, identifying 24-hour emergency contacts, and correctly choosing shipping materials, including their marking and labeling. Each vehicle operator must have available at all times a shipping paper, which has a log of the hazardous materials originally loaded on the vehicle. The shipping paper can also log unregulated materials. DOT does not require the driver to update the shipping paper throughout the day to reflect delivery or partial off-loading. The shipping paper must be within sight and hand's reach of the driving position with the seat belt fastened. Acceptable locations are on the seat or in the pocket of the driver's door, while in the glove compartment or under the seat are not acceptable locations for the shipping paper.

When a hazardous material is required to be included on a shipping paper, the following requirements must be met. When hazardous materials and nonregulated materials are on the same shipping paper, the hazardous materials must either be listed first, highlighted, or identified with an "X" (or an "RQ" when appropriate) placed before the proper shipping name in a column captioned "HM" to differentiate them from the nonregulated materials. A nonhazardous material may not be offered for transportation or transported when its description on a shipping paper includes a hazard class or identification number listed in the 171.101 Table. Exceptions include those materials in the United Nations (UN) recommendations, the International Civil Aviation Organization (ICAO) Technical Instructions, or the International Maritime Dangerous Goods (IMDG) Code (found in Part 171.7 of this regulation).

The shipping paper must be legible, printed in English, and, unless specifically authorized or required by the regulations, may not contain abbreviations or codes. While no specific form for the shipping paper is required by DOT, a generic sample shipping paper that can be adapted appears at the end of this publication

(Figure 2). The following information must be included and kept for 375 days after the material has been accepted by the initial carrier:

1. Proper shipping name of the material from the hazardous materials table (49 CFR Part 172.101)
2. The hazard class or division number
3. The four-digit identification number as found in 49 CFR Part 172.101
4. Packing group in Roman numerals
5. The total quantity of material on board by weight or volume including the unit of measurement
6. Company name, address, and contact person, the vehicle ID number, and the date
7. The type of packaging and destination marks may be entered in an appropriate manner before or after items 1 through 4, which provide the basic description
8. A 24-hour emergency number

In most cases, the information in items 1 through 4 must be shown in sequence with no additional information included. For example, "Gasoline, 3, UN1203, PG II" indicates that the proper shipping name is Gasoline, the hazard class is 3, the identification number is UN1203, and the packing group is II. The technical and chemical group name can be listed in parentheses between items number 1 and 2 or after item number 4. For example, "Flammable liquids, n.o.s. (contains Xylene and Benzene), 3, UN1993, II." The necessary information to complete the shipping paper requirements for the first four items can be found in the hazardous materials table of 49 CFR Part 172.101. This table is also located at **www.myregs.com/dotrspa**. Once you reach this site, select SubChapter C, then Part 172, and then select 172.101 Hazardous Material Table. This information may also be available from the MSDS sheet or the manufacturer.

The 24-hour emergency number must have a knowledgeable person standing by at all times. An answering machine or answering service is not adequate. As mentioned earlier, many pesticide manufacturers list a 24-hour emergency number on the label or MSDS, but these are almost exclusively for that company's products. For loads containing products from more than one manufacturer, emergency numbers must be available for each manufacturer of all products on the load. However, establishing communication with several manufacturers at the same time while at the scene of an incident would be difficult if not impossible. For this reason, many commercial transporters use CHEMTREC, a 24-hour emergency response service, as their 24-hour contact. If their number is used without authorization, the operator will be in violation of DOT regulations and considered not in compliance. CHEMTREC does provide emergency response information to emergency responders at no charge as a public service.

DOT also requires that basic emergency response information (for example information contained on the MSDS) be carried in the vehicle with the shipping paper(s). This information must include the basic description and technical name of the product (as it appears on the shipping paper), acute health hazards, basic first aid procedures, and emergency response procedures for incidents both with and without fire.

With the exception of most premixed pesticide solutions transported in small, manually operated sprayers, the packaging of hazardous products is also regulated by DOT. This includes specifications for container design and construction, and proper marking and labeling of packages. A container refers to any vessel holding a DOT-regulated product, whether it is a 1-liter plastic bottle or a stainless steel tank hauled by a tractor-trailer. Container specifications become more exact as the hazards associated with a particular product or use increase as indicated by the different packing groups referenced in Table 3. Once loaded in the proper container, packages must be appropriately marked and/or labeled so the hazards associated with their contents are easily determined just by looking at them. Package marking and labeling requirements vary, but generally include proper shipping names, identification numbers, hazard classes, package orientation (e.g., "This side up"), specific hazards (oxidizer, flammable, and so forth), and other important safety or hazard information all properly placed.

Due to the variation in marking and labeling requirements for the many pesticide products transported, this document cannot provide the details of those topics. Most shippers of regulated products have professionally trained staff to ensure that packages are properly marked and labeled as required by DOT. The use of original containers with original marking and labeling as provided by shippers and manufacturers is strongly encouraged. An example would be transporting bottles or jugs in their original cases rather than loose. When individual loose containers are transported, care-

fully reproduce all marking and labeling present on the original case or, in the case of agricultural operations, refer to 49 CFR Part 173.5 for the specific exemptions allowed.

Concentrated pesticide formulations should be transported in their original containers to ensure compliance with DOT container design and construction specifications. When purchasing large-volume tanks for mixed pesticide solutions, have the dealer provide evidence of DOT approval for the tank and its intended use. The DOT designation will be stamped somewhere on the tank. Do not purchase the tank if the seller cannot provide this evidence. If constructing a tank, refer to 49 CFR Part 173 for specifications applicable to its intended use.

Vehicle placarding and commercial driver licensing

The DOT regulations previously discussed apply to all transporters of hazardous products, regardless of quantity, hazard class, or any other technical consideration. Additional requirements, specifically vehicle placarding and related procedures, apply to transporters of large quantities of hazardous materials or of any quantities extremely dangerous substances. Placards are simply rectangular signs that identify the hazard class code and its associated hazard, such as 6.1 Poisonous. The regulations specify placard size, shape, color, symbol, location on the vehicle, and other important requirements. Vehicle placarding is required if transporting any of the following:

- Greater than 1,000 lb (454 kg) in a single container/package of any hazardous material or of any mixture containing a hazardous material
- Any quantity of hazardous material in a permanently fixed tank with a capacity of greater than 119 gal (450 l)
- Any quantity of a class 1 (explosive) or class 2.3 (poisonous gas) hazardous material. (While these classifications rarely apply to pesticides, fumigants containing methyl bromide are classified as 2.3 poisonous gases.)

If the load contents require placards on the vehicle, then the operator is automatically required to possess a commercial driver license (CDL) with hazmat endorsement. In addition, the business must register with either the state DOT or the U.S. DOT if the vehicle crosses state lines at any time. Other circumstances might require a CDL, such as gross vehicle weights in excess of 26,000 pounds or the operation of an articulating vehicle. Even if the operator already possess a CDL, the additional hazmat endorsement must still be obtained.

Because they rarely apply to most pesticide applicators, the details of placarding, CDLs, and DOT registration are not covered in this publication. Contact the state DOT for additional information when transportation activities require compliance with these regulations. In Pennsylvania, contact the Pennsylvania Department of Transportation, Hazardous Materials Section, Motor Carrier Safety Division at 717-787-7445.

Security Training

The Department of Transportation issued new regulations in 2003 requiring shippers and carriers of hazardous materials, including certain agrichemicals, to develop and implement security plans and also require security training for hazmat employees. Not included in these new regulations were requirements to list the name and address of the shipment consignor and consignee on shipping documents. A description of the materials being shipped is required on a shipping paper, but companies do not have to list who is shipping the material, where it is being shipped from, or who will be receiving the material.

Transporting pesticides and other hazardous materials is serious business with potentially serious consequences for those who do not know proper procedures or do not follow the law. Accepting responsibility as an operator and instilling those values in employees is the key to preventing dangerous mishaps on the road.

Table 1. Pesticides classified as U.S. DOT hazardous substances (from 49 CFR Part 172.101).

Pesticide active ingredients	Reportable quantities (RQ) lb (kg)	% by wt (ppm)
2,4,5-TP	100 (45.4)	0.2 (2000)
2,4-D	100 (45.4)	0.2 (2000)
Acrolein	1 (0.454)	0.002 (20)
Aldrin	1 (0.454)	0.002 (20)
Aluminum phosphide	100 (45.4)	0.2 (2000)
Captan	10 (4.54)	0.02 (200)
Carbaryl	100 (45.4)	0.2 (2000)
Carbofuran	10 (4.54)	0.02 (200)
Carbon disulfide	100 (45.4)	0.2 (2000)
Carbon tetrachloride	10 (4.54)	0.02 (200)
Chlordane	1 (0.454)	0.002 (20)
Chlorine	10 (4.54)	0.02 (200)
Chloroform	10 (4.54)	0.02 (200)
Chlorpyrifos	1 (0.454)	0.002 (20)
Coumaphos	10 (4.54)	0.02 (200)
Creosote	1 (0.454)	0.002 (20)
Diallate	100 (45.4)	0.2 (2000)
Diazinon	1 (0.454)	0.002 (20)
Dicamba	1000 (454)	2 (20,000)
Dichlobenil	100 (45.4)	0.2 (2000)
Dichlorpropane	1000 (454)	2 (20,000)
Dichlorvos	10 (4.54)	0.02 (200)
Dicofol	10 (4.54)	0.02 (200)
Dieldrin	1 (0.454)	0.002 (20)
Dimethoate	10 (4.54)	0.02 (200)
Diquat	1000 (454)	2 (20,000)
Disulfoton	1 (0.454)	0.002 (20)
Diuron	100 (45.4)	0.2 (2000)
Endosulfan	1 (0.454)	0.002 (20)
Endrin	1 (0.454)	0.002 (20)
Ethion	10 (4.54)	0.02 (200)
Famphur	1000 (454)	2 (20,000)
Formaldehyde	100 (45.4)	0.2 (2000)
Guthion	1 (0.454)	0.002 (20)
Heptachlor	1 (0.454)	0.002 (20)
Lindane	1 (0.454)	0.002 (20)
Malathion	100 (45.4)	0.2 (2000)
Maleic hydrazide	5000 (2270)	10 (100,000)
Methomyl	100 (45.4)	0.2 (2000)
Methoxychlor	1 (0.454)	0.002 (20)
Methyl bromide	1000 (454)	2 (20,000)
Methyl parathion	100 (45.4)	0.2 (2000)
Mevinphos	10 (4.54)	0.02 (200)
Naled	10 (4.54)	0.02 (200)
Napthalene	100 (45.4)	0.2 (2000)
Parathion (ethyl)	10 (4.54)	0.02 (200)
Phenyl mercuric acetate (PMA)	100 (45.4)	0.2 (2000)
Phorate	10 (4.54)	0.02 (200)
Pronamide	5000 (2270)	10 (100,000)
Pyrethrins	1 (0.454)	0.002 (20)
Thiram	10 (4.54)	0.02 (200)
Toxaphene	1 (0.454)	0.002 (20)
Trichlorfon	100 (45.4)	0.2 (2000)
Warfarin and salts	100 (45.4)	0.2 (2000)
Zinc phosphide	100 (45.4)	0.2 (2000)

Table 2. U.S. DOT hazardous material classifications for pesticides (from 49 CFR Part 172.101).

Compound	HM Classification	
Ammonium nitrate fertilizers	5.1	Oxidizer
Anhydrous ammonia	2.2 2.3	Nonflammable compressed gas Poisonous gas
Arsenical pesticides	3 6.1	Flammable/combustible liquid Poisonous material
Benzoic acid derivative pesticides	3 6.1	Flammable/combustible liquid Poisonous material
Bipyridilium pesticides	3 6.1	Flammable/combustible liquid Poisonous material
Cacodylic acid	6.1	Poisonous material
Cadmium compounds	6.1	Poisonous material
Calcium arsenate	6.1	Poisonous material
Calcium hypochlorite	5.1	Oxidizer
Carbamate pesticides	3 6.1	Flammable/combustible liquid Poisonous material
Carbon dioxide	2.2	Nonflammable compressed gas
Carbon disulfide	3	Flammable/combustible liquid
Carbon tetrachloride	6.1	Poisonous material
Chloropicrin	6.1	Poisonous material
Chloropicrin/methyl bromide mixtures	2.3	Poisonous gas
Chloropicrin mixtures, not otherwise specified (n.o.s.)	6.1	Poisonous material
Compounds, tree or weed killing	3 8 6.1	Flammable/combustible liquid Corrosive material Poisonous material
Consumer commodities	ORM-D	Other regulated material
Copper-based pesticides	3 6.1	Flammable/combustible liquid Poisonous material
Coumarin-derived pesticides	3 6.1	Flammable/combustible liquid Poisonous material
Diesel fuel	3	Flammable/combustible liquid
Dithiocarbamate pesticides	3 6.1	Flammable/combustible liquid Poisonous material
Environmentally hazardous substance	9	Miscellaneous
Ethylene dibromide (EDB)	6.1	Poisonous material
Ethylene dibromide (EDB)/Methyl bromide	6.1	Poisonous material
Ethylene dichloride	3	Flammable/combustible liquid

continued on next page

Table 2. continued

Compound	HM Classification	
Formaldehyde solutions	3	Flammable/combustible liquid
	8	Corrosive material
Gasoline	3	Flammable/combustible liquid
Insecticide gases	2.1	Flammable gas
	2.2	Nonflammable compressed gas
	2.3	Poisonous gas
Maneb (>60%)	4.2	Spontaneously combustible
	4.3	Dangerous when wet material
Mercury-based pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Methyl bromide	2.3	Poisonous gas
Nicotine compounds	6.1	Poisonous material
Organochlorine pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Organophosphorous pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Organotin pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Parathion and compressed gas mixtures	2.3	Poisonous gas
Pesticide, n.o.s.	3	Flammable/combustible liquid
	6.1	Poisonous material
Phenoxyacetic acid derivate	3	Flammable/combustible liquid
	6.1	Poisonous material
Phenyl urea pesticides	6.1	Poisonous material
Phosphine	2.3	Poisonous gas
Sodium hypochlorite	5.1	Oxidizer
Sodium pentachlorophenate	6.1	Poisonous material
Substituted nitrophenyl pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Sulfur	4.1	Flammable solid
	9	Miscellaneous
Triazine pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Zinc phosphide	4.3	Dangerous when wet material

Table 3. Defining characteristics of U.S. DOT hazardous materials that include pesticides.*

HM class codes	HM class name	Defining characteristics
2.1	**Flammable gas**	**Ignites in standard atmospheric conditions**
2.2	**Nonflammable, nonpoisonous compressed gas**	**> 41 PSI at room temperature**
2.3	**Poisonous gas by inhalation**	**LC_{50} < 5000 mL otherwise known toxins**
	Hazard zone A	$LC_{50} \leq$ 200 ppm
	Hazard zone B	200 < $LC_{50} \leq$ 1,000 ppm
	Hazard zone C	1000 < $LC_{50} \leq$ 3,000 ppm
	Hazard zone D	3000 < $LC_{50} \leq$ 5,000 ppm
3	**Flammable liquid**	**Flash point < 141°F**
	Combustible liquid	**141°F < flash point < 200°F**
	Packing group I	Initial boiling point ≤ 95°F
	Packing group II	Flash point < 73°F and initial boiling point > 95°F
	Packing group III	73°F ≤ flash point ≤ 141°F and initial boiling point > 95°F
4.1	**Flammable solid**	
	Packing group I	Ignites samples ≤ 10 minutes
	Packing group II	Ignites samples ≤ 5 minutes
	Packing group III	5 < Ignites samples < 10 minutes
4.2	**Spontaneously combustible material**	
	Packing group I	Pyrophoric liquids and solids
	Packing group II	Self-heating material
	Packing group III	According to standard chemical tests*
4.3	**Dangerous when wet material**	
	Packing group I	Spontaneously flammable when wet
	Packing group II	Flammable or toxic gases when wet
	Packing group III	Reacts slowly with water
5.1	**Oxidizer**	
	Packing groups I/II/III	According to standard chemical tests*
6.1	**Poisonous material**	**Liquid w/oral LD_{50} < 500 mg/kg**
		Solid w/oral LD_{50} < 200 mg/kg
		Dermal LD_{50} < 1,000 mg/kg
		Inhalation (dust/mist) LD_{50} < 10 mg/L
	Packing group I	Oral $LD_{50} \leq$ 5 mg/kg
		Dermal $LD_{50} \leq$ 40 mg/kg
		Inhalation $LD_{50} \leq$ 0.5 mg/L
	Packing group II	5 < oral $LD_{50} \leq$ 50 mg/kg
		40 < dermal $LD_{50} \leq$ 200 mg/kg
		0.5 < inhalation $LD_{50} \leq$ 2 mg/L
	Packing group III	Solids: 50 < oral $LD_{50} \leq$ 200 mg/kg
		Liquids: 50 < oral $LD_{50} \leq$ 500 mg/kg
		200 < dermal $LD_{50} \leq$ 1,000 mg/kg
		2 < inhalation $LD_{50} \leq$ mg/L

continued on next page

Table 3. continued

8	**Corrosive material metal**	**Irreversible skin damage (ISD) or severe corrosivity on**
	Packing group I	ISD with < 3 minutes of exposure
	Packing group II	ISD with 3 to up to 60 minutes of exposure
	Packing group III corrosivity tests	ISD with 1 to up to 4 hours of exposure or by std. metal
9	**Miscellaneous hazardous material**	**Indicate by column 5 of 172.101 Table**
ORM-D	**Other regulated material**	**Consumer commodities**
		Presents limited hazard due to its form, quantity, and packaging

* Additional information regarding classifications can be found at **ecfr.gpoaccess.gov** and select "Title 49—Transportation," click "100–185" under the *Browse Parts* heading and "173" under the *Part* heading, then scroll down to "Subpart D—Definitions Classification, Packing Group Assignments and Exceptions for Hazardous Materials Other Than Class 1 and Class 7."

Figure 2. A generic sample shipping paper that you can adapt to your own needs.

Sample Shipping Paper

Page 1 of #

Company Name

Company Address

Emergency response information: 24-hour telephone number

HM	Basic description	Amt	Comments
X	Proper shipping name (+ technical name for n.o.s. materials), hazard class/division, UN ID#, packing group in Roman numerals		
X or RQ	RQ, environmentally hazardous substance, liquid/solid n.o.s. (+ hazardous substance name), 9, UN ID#, III		
X or RQ	RQ, proper shipping name (+ hazardous substance name if applicable), hazard class/division, UN ID#, packing group in Roman numerals		
	Other unregulated materials		

Pesticide Safety Fact Sheets are produced by the Pesticide Education Program in Penn State's College of Agricultural Sciences. Topics covered in the series include

- pesticide laws and regulations
- handling chemical spills
- personal protective gear
- pesticides in the environment
- equipment care and cleaning
- pesticide toxicity and health effects

For a complete list of fact sheets and electronic copies or for more information about the Pesticide Education Program, visit **www.pested.psu.edu** on the web.

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