Shipping Hazardous Waste

Compliance Reference

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Expert Training—Anytime, Anywhere™

Shipping Hazardous Waste

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2016 AHMP Conference

LION TECHNOLOGY INC.
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PRE-SHIPMENT

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SELECTING THE TSDF

Generator's Responsibilities

Hazardous waste generators are the primary regulatory persons to decide *how* each hazardous waste must be managed. This is required under a number of regulatory provisions, but the three primary concerns of the generator in selecting treatment, storage, or disposal options and contractors are:

Identify Wastes and Restrictions

The generator must identify each hazardous waste generated at the point of generation, and then all applicable reliefs and/or restrictions in:

- 40 CFR Parts 264 and 265 (liquids in landfills, VOCs, etc.);
- 40 CFR Part 266 (recycling);
- 40 CFR Part 268 (land disposal restriction standards—waste-specific standards, UHCs, etc.); and
- 40 CFR 273 (universal wastes).

Treatment that must be performed prior to land disposal must be documented and sent with each manifested shipment.

Select Method of TSD

It is the responsibility of every hazardous waste generator to select "the practicable method of treatment, storage, or disposal currently available... which minimizes the present and future threat to human health and the environment." [40 CFR 262.27(a)]

Know Your TSDF!

Under CERCLA (Superfund), the generator is strictly liable for any environmental or public health damage caused by any facility to which that generator sent any quantity of hazardous waste or hazardous substances. As a matter of liability control, a generator must know every facility to which any of its waste is going and should specifically review and approve that facility on its technical merit and on the quality of its management.

In addition, when working with a TSDF or waste hauler, generators should be clear on exactly who bears regulatory responsibility for which aspects of regulatory compliance. The fact that a waste management services company is performing a particular task for the generator does not absolve the generator of responsibility to assure that the task is performed correctly and in accordance with applicable regulations. There have been quite a few instances where generators have been cited, and often heavily fined, for violations that were in fact committed by waste management contractors.

The bottom line: If the regulations require you to do something, you had better be sure that it is being done correctly!

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Selecting the TSDF, continued

Issues Related to TSDF Selection

The Generator Is Liable

Under CERCLA (Superfund) strict liability, if a waste that you generated ever causes damage to anyone or ever needs to be cleaned up, you are responsible for the damages/costs, even if the method of disposal was completely legal at the time, and even if it was not the generator's "fault." Any statute of limitations applies from the date the damage occurred, not from the date that you sent the waste for disposal. Essentially, your liability lasts forever.

Generator Must Select TSDF

When a generator signs Item 15 of the Hazardous Waste Manifest, he or she certifies that "I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment." This means that the generator has researched every type of waste management method that is available anywhere in the United States (whether as a product or service, or otherwise) that is appropriate for that type of waste and that the generator has selected the one method that is most protective of human health and the environment. While a brokering service may prove helpful in this search, it is ultimately the generator's responsibility to actually decide what will happen to the waste.

TSDF Waste Acceptance Not Based on Waste Codes

TSDFs must determine if they have the capability to handle any waste they will accept, before they attempt to handle it. This determination is based on physical and chemical properties of the waste itself. Waste codes do not provide any useful information at all in making this determination. Waste codes are not required to be in the TSDF permit.

Although it is not required by Federal law or regulations, many TSDF permits are written in terms of the waste codes that they are allowed to accept. As described above, waste codes do not provide the kind of information that the TSDF is required by Federal regulation to obtain.

TSDF "Waste Profiles" Serve Many Functions

When you complete a waste profile for a TSDF to accept your waste, keep in mind that *that* piece of paper is very important. It serves as:

A. A specification sheet—which you represent to the TSDF as accurately describing your waste. If a shipment of your waste falls outside of these specifications, the TSDF is likely to reject it.

B. An acceptance protocol—the TSDF will use the properties listed on these sheets to determine whether the waste received "matches the identity of the waste specified on the accompanying manifest."

C. A waste analysis document—the TSDF can use data developed by the generator to determine whether it is capable of handling a hazardous waste. The waste pro-

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Selecting the TSDF, continued

file limits and defines what data the TSDF needs from you. Misrepresentation of properties or hazards on this form can cause a TSDF to mismanage your waste.

D. Liability delineation—based on all of the representations made by the generator and TSDF, the waste profile serves to delineate "who's responsible for what."

E. Acceptance confirmation—permitted TSDFs are required to notify generators in writing that they can legally and effectively handle a waste. This acceptance is based, in part, on the data supplied by the generator on the waste profile. If a waste is within the limits established by the waste profile, the TSDF has pre-agreed to accept it.

TSDFs Are Not Required to Verify

Operators of some TSDFs believe that they must analyze the waste to assure that the generator has assigned the proper waste codes. This is simply not the case. There is no requirement to do so, nor is it generally possible for a TSDF to determine waste codes by analyzing the waste. It is the sole responsibility of the generator of the waste to properly determine the waste codes.

TSDFs Are Not Required to Analyze Every Shipment

TSDF operators must obtain detailed physical and chemical information about the waste to make this determination. They can rely on many sources to obtain this information, including analysis. Once the operator has determined that the TSDF has the capability to handle the waste, there is no requirement to perform detailed analysis of every shipment of that waste.

Generators Should Regularly Audit

As the generator is always held liable under CERCLA for future damages his/her waste might cause, it is extremely prudent to actually visit the facilities that will treat, store, or dispose of the waste to assure that their operations are conducted in an appropriate manner. If you don't like what you see, don't allow your waste to go there!

Separate Contractual Requirements from Regulatory Requirements

Many items required or requested from the generator by the TSDF are based on the TSDF's policies or procedures, rather than actual regulatory requirements. For example, many TSDFs have created their own land disposal restriction notification "forms," which include much information beyond that required by regulation, such as TCLP or other analytical data. Some may require signatures and also include language of a contractual nature. For most types of LDR notifications, Federal regulations require only six pieces of information. Signatures are not required unless it is an LDR certification. If you're not sure what you're actually signing, don't sign it until you consult appropriate corporate legal counsel.

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SELECTING "T S D" OPTIONS

General Considerations

- What are the reuse, recycling, and reclamation options?
- What are the treatment, storage, or disposal options?
- What are the advantages/disadvantages of on-site management versus off-site shipment?
- Is waste minimization or elimination an alternative?
- How well is the facility constructed and operated (liability minimization)?
- Is the facility reasonably in compliance with applicable Federal and state regulations?
- Does the facility maintain reasonably good community relations?
- Is facility management competent and well established? Have they proven reliability?
- What "comfort level" do you need? versus What amount and detail of assessment are you able/willing to perform?
- Does performance (liability control) justify cost of TSD option?
- Is the TSD option applicable/suitable to your waste(s)?
- In summary, is it:
    1. Legal: Federal and state;
    2. Available: now and in the future;
    3. Cost effective: best control for least cost; and
    4. Ethical: protective of human health and environment?

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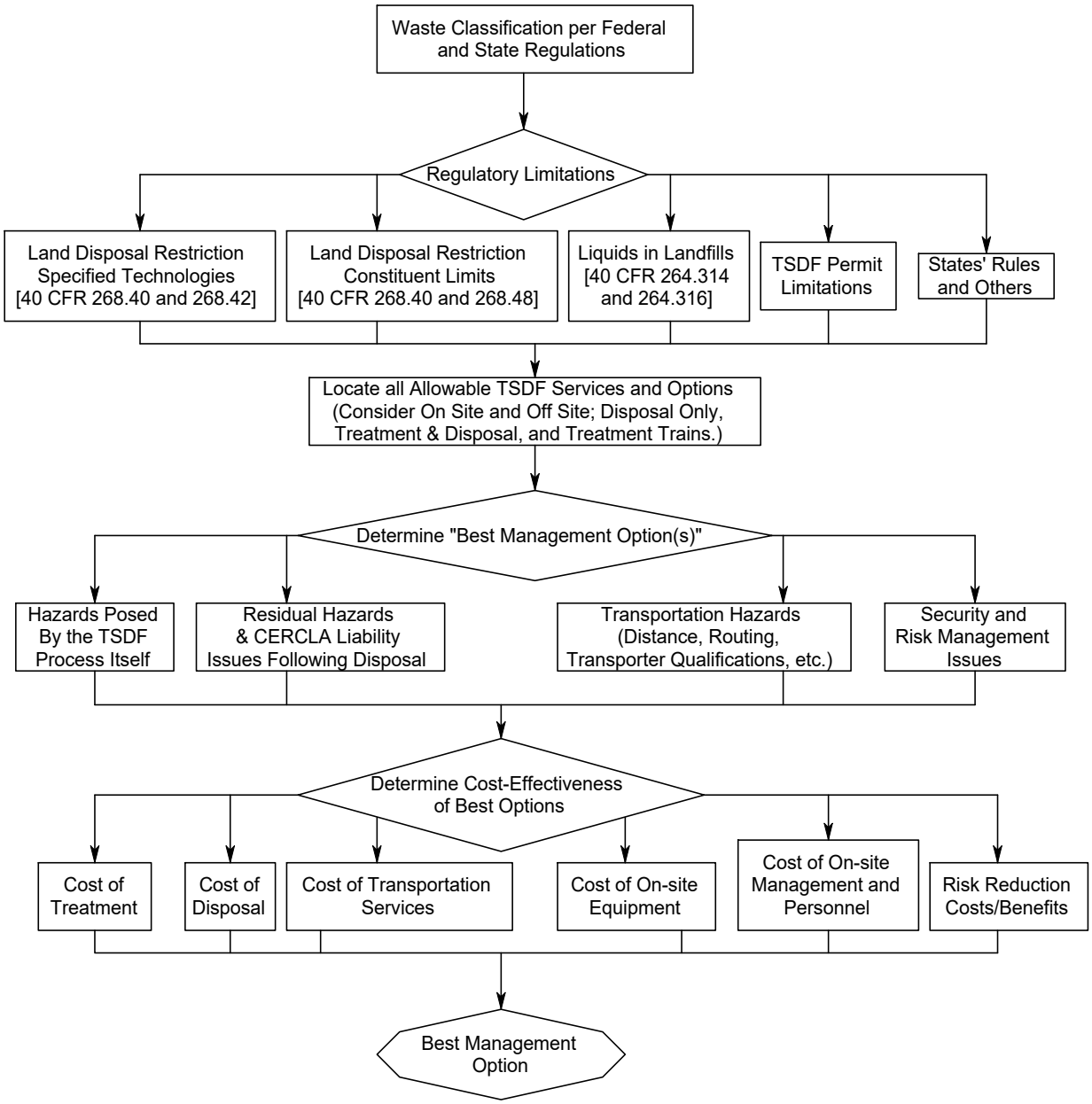
Selecting “T S D” Options, continued

Decision Flow Chart



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GENERATOR'S TSDF SELECTION CHECKLIST

Hazardous waste generators should, on a periodic basis, inspect and assess all TSDFs managing their waste. Ideally, TSDF assessments should be standardized, objective, and quantitative. Thus, various TSDFs may be compared and a decision can be made as to who offers the most environmentally sound waste management at the least cost.

Standardized

Standardization is particularly important if more than one individual is to be involved in doing assessments. But, even if only one person is assessing all TSDFs, that person should develop a firm idea of how each aspect of the assessment will be done and should assess each TSDF equally.

Objective

Wherever possible, objective measurements should be used. For example, a TSDF's insurance coverage may be judged in terms of total policy value or AM Best or Moody rating of the underwriter.

On the other hand, you should not assume "if it isn't measurable, it isn't important." Where an objective rating is not available for an important issue, you must still make some attempt at measuring and prioritizing the issue.

Quantitative

To be of most value, a TSDF assessment should be quantitative. You may achieve a quantitative assessment by:

- Assigning a "weighting" to each issue assessed, based on its importance to environmental protection and liability minimization (e.g., 1–5);
- Making a numerical assessment (score) of how well the TSDF is doing on each issue (e.g., 1–10);
- Multiplying each score times its weighting, and adding all weighted scores to get a numerical quantification of "how good the TSDF is."

Example Form

The following pages give an example of the type of form that you might use in assessing your TSDFs.

Notes:

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TSDF Name: _____ Date: _____
Assessor(s) _____

	Weighting	Score	Weighted Score
1. General Site Management			
• General Housekeeping	_____	_____	_____
• Contingency Plan; full, detailed, and distributed	_____	_____	_____
• Emergency Equipment sufficient, in good condition, and readily visible/available	_____	_____	_____
• Arrangements with outside emergency responses	_____	_____	_____
• Arrangements with local authorities (police, fire, first aid, hospital, etc.)	_____	_____	_____
• Employee Qualifications	_____	_____	_____
• Employee Training (effective, documented, and certificated)	_____	_____	_____
• Site Communications Systems	_____	_____	_____
• Spill Prevention	_____	_____	_____
• Fire Prevention	_____	_____	_____
• Fire extinguishing equipment	_____	_____	_____
• Controls for potentially contaminated firefighting water	_____	_____	_____
• Redundant process controls	_____	_____	_____
• Signs and warnings posted and intact	_____	_____	_____
• Empties management policy	_____	_____	_____
• Operating record up-to-date	_____	_____	_____
• Groundwater/Environmental Monitoring (copies of data and limits)	_____	_____	_____
• Decontamination procedures	_____	_____	_____
• Decontamination equipment and supplies	_____	_____	_____
• Security (Physical and Active)	_____	_____	_____
• Inspection, Procedures, logs, and records	_____	_____	_____
• Employee Safety and Health (general)	_____	_____	_____
• Written hazardous waste operations safety and health plan (29 CFR 1910.120)	_____	_____	_____
2. Waste Acceptance Control	_____	_____	_____
• Data required prior to acceptance	_____	_____	_____
• Limits on wastes accepted	_____	_____	_____
• Waste Analysis Plans (*and* is it followed)	_____	_____	_____
• Qualifications of waste "receivers"	_____	_____	_____
• Manifest handling system (speed and accuracy)	_____	_____	_____
• TSD Services Offered	_____	_____	_____

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	Weighting	Score	Weighted Score
• Are they permitted to accept your waste(s)?	_____	_____	_____
• Storage capacity & type	_____	_____	_____
• Materials of construction (durability and compatibility)	_____	_____	_____
• All drums within secondary containment (chemically impermeable and sufficient capacity)	_____	_____	_____
• All above ground tanks in secondary containment (chemically impermeable and sufficient capacity)	_____	_____	_____
• All below ground tanks vaulted, inspectable (vault chemically impermeable)	_____	_____	_____
• Piping, valves, and joints protected from traffic and other damage	_____	_____	_____
• Disposal meets minimum technology standards	_____	_____	_____
• Are there old, non-minimum-technology units on site?	_____	_____	_____
• Surface impoundments double lined	_____	_____	_____
• Waste piles covered, secondary containment	_____	_____	_____
• Treatment processes available	_____	_____	_____
• Documentation of treatment effectiveness	_____	_____	_____
• Treatment performance vs. land disposal restrictions	_____	_____	_____
• Are services provided on site or off site?	_____	_____	_____
• Are services provided by company or by another? (Note: review other sites and other companies also)	_____	_____	_____
3. Transportation Services Offered	_____	_____	_____
• Condition of vehicles and equipment	_____	_____	_____
• Driver qualifications and training	_____	_____	_____
• Insurance (Esp. MCS-90, ref. 49 CFR 387)	_____	_____	_____
• State hauler permits	_____	_____	_____
• Vehicles owned or rented	_____	_____	_____
• DOT compliance history	_____	_____	_____
• Route planning/hazards on route	_____	_____	_____
• Transportation Emergency Preparedness	_____	_____	_____
• Transportation Distance	_____	_____	_____
4. Discharges	_____	_____	_____
• Air Emissions and Control	_____	_____	_____
• Air Permit	_____	_____	_____
• Wastewater Discharges	_____	_____	_____

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	Weighting	Score	Weighted Score
• NPDES/SPDES Permits	_____	_____	_____
• Discharges to POTW	_____	_____	_____
• POTW approvals	_____	_____	_____
• Management of stormwater (including runon and runoff)	_____	_____	_____
• Off-site Waste Shipments (what, to whom)	_____	_____	_____
5. Surrounding	_____	_____	_____
• Surrounding community	_____	_____	_____
• Depth to groundwater	_____	_____	_____
• Nearest surface water	_____	_____	_____
• Soil permeability	_____	_____	_____
• Community relations (check local newspapers)	_____	_____	_____
• Buffer zones	_____	_____	_____
• Floodplain (100 year)	_____	_____	_____
• Earthquake-prone area?	_____	_____	_____
6. Financial Assurances	_____	_____	_____
• Insurance (type, amount, limitations)	_____	_____	_____
• Insurance carrier	_____	_____	_____
• Moody Rating	_____	_____	_____
• AM Best Rating	_____	_____	_____
• Closure and Post-Closure funding: type, amount, status (how fully funded)	_____	_____	_____
• Other financial assurance instruments (security, amount, status)	_____	_____	_____
• Financial status of owner (watch out for "creative corporate structures")	_____	_____	_____
• Other clients (who would be the PRPs?)	_____	_____	_____
• Contract Terms	_____	_____	_____
7. Compliance History	_____	_____	_____
• Permitted or interim status?	_____	_____	_____
• Permits (get copy of EPA 8700-13, review part B)	_____	_____	_____
• Agency inspections (frequency, get copy of recent inspection report)	_____	_____	_____
• History of Fines and Penalties	_____	_____	_____
• Outstanding enforcement matters	_____	_____	_____
• Accident/Incident history	_____	_____	_____
TOTAL SCORE			_____

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RCRA TRAINING
Generator's Requirements per Management Option

Satellite Accumulation [40 CFR 262.34(c)]

One advantage of using the "point of generation" accumulation option of 40 CFR 262.34(c) is that the EPA does *not* require written plans and formal documentation of training regarding activities at the point of generation. Generators need only assure that each person doing accumulation under this option knows his or her responsibilities sufficiently to avoid noncompliance.

In finalizing this rule in 1984, the EPA said:

"Several commenters stated that EPA should require...training plans for satellite areas. EPA believes, however, that since only one waste will normally be accumulated at each satellite area, and since only limited quantities are allowed to accumulate,...training plans are not necessary. As stated in the January 3, 1983 preamble, these requirements were intended for more centralized, higher volume accumulations of waste. When waste generated in a satellite area is transported to a storage area regulated under §262.34(a) or Parts 264 or 265, the training...plan requirements will apply." [49 FR 49570, December 20, 1984]

NOTE: If a person doing accumulation at the point of generation could also affect compliance in 90-day or 180-day accumulation, he or she will need training under those rules.

Universal Waste

Small Quantity Handler Training [40 CFR 273.16]

All employees must be informed about proper handling and emergency procedures appropriate to the type of waste they are handling.

Large Quantity Handler Training [40 CFR 273.36]

All employees must be thoroughly familiar with proper handling and emergency procedures appropriate to the type of waste they are handling.

180-day Accumulation Training [40 CFR 262.34(d)(5)(iii)]

Under the 180-day option, generators are allowed to follow training requirements that are less stringent than those in the 90-day option. For 180-day accumulation, the generator must:

"Ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures, relevant to their responsibilities during normal facility operations and emergencies." [40 CFR 262.34(d)(5)(iii)]

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RCRA Training, continued

Who/What?

While the EPA does not use the term "personnel," the intent is to require anyone who can cause noncompliance with the regulations to be instructed properly.

When?

Although there is no explicit requirement for scheduling this training, Lion recommends that anyone who can cause noncompliance be trained before they are placed in a position of managing hazardous waste. Training should be reviewed on an annual basis. Update or refresher training should be provided whenever an employee shows a need for it and whenever regulatory or operational changes make it necessary.

Documentation and Retention

There is no explicit requirement to keep any kind of training records under the 180-day rules. It would be a good management practice, however, to keep some type of record documenting that the required training has been done.

90-day Accumulation [40 CFR 262.34(a)]

While following the 90-day option, generators must comply with 40 CFR 265.16, the training standard for interim status TSDFs. [See 40 CFR 262.34(a)(4).]

Who/What [40 CFR 265.16(a)]

1. "Personnel" must be taught job-specific waste management procedures.

2. Training must be directed by a person trained in hazardous waste management procedures.

3. Training must cover, as applicable and relevant to each person's job responsibilities, the following:

   - Use, inspection, repair of emergency, and monitoring equipment;
   - Automatic waste feed cut-off systems;
   - Communications and alarm systems;
   - Response to fires or explosions;
   - Response to ground-water contamination incidents; and
   - Shutdown of operations.

When [40 CFR 265.16(b) and (c)]

- Within six months after becoming "personnel"

- Annual review of the initial training

NOTE: Employees may not work in unsupervised positions until they have completed the required training.

Documentation and Retention [40 CFR 265.16(d) and (e)]

Employers must maintain training records containing the following information:

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RCRA Training, continued

- The job title for each position at the facility related to hazardous waste management;
- The name of the employee filling each job;
- A written job description for each position listed above;
- A written description of the type and amount of introductory and continuing training; and
- Documentation that the required training or job experience has been given to and completed by facility personnel.

Training records must be kept until closure for all current personnel. Training records for former employees must be kept for at least three years from the date the employee last worked at the facility.

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"HAZMAT EMPLOYEE" TRAINING
49 CFR 172, Subpart H

Hazmat Employer's Duty—Ensure Your Employees' Training

The DOT explicitly requires "hazmat employers" to ensure that their "hazmat employees" are trained. 49 CFR 173.1(b) states, in part:

"It is the responsibility of each hazmat employer subject to the requirements of this subchapter to ensure that each hazmat employee is trained in accordance with the requirements prescribed in this subchapter."

Hazmat employer: means "a person who uses one or more of its employees in connection with: transporting hazardous materials in commerce; causing hazardous materials to be transported or shipped in commerce; or representing, marking, certifying, selling, offering, manufacturing, reconditioning, testing, repairing, or modifying containers, drums, or packagings as qualified for use in the transportation of hazardous materials." [49 CFR 171.8]

Note that hazmat employers are not required to *perform* hazmat employee training; however, the employer is required to "ensure" that all employees have the training required.

Who Must Be Trained?

Anyone who "*directly affects*" the safety of transportation of hazardous material.

Hazmat employee: "means a person who is employed by a hazmat employer and who in the course of employment directly affects hazardous materials transportation safety... This term includes an individual, including a self-employed individual, employed by a hazmat employer who, during the course of employment:

1. Loads, unloads, or handles hazardous materials;
2. Manufactures, tests, reconditions, repairs, modifies, marks, or otherwise represents containers, drums, or packagings as qualified for use in the transportation of hazardous materials;
3. Prepares hazardous materials for transportation;
4. Is responsible for safety of transporting hazardous materials; or
5. Operates a vehicle used to transport hazardous materials" [49 CFR 171.8].

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"Hazmat Employee" Training, continued

What Training Is Required? [49 CFR 172.704(a)]

All Hazmat Employees Must Be Trained In:

General Awareness

- Provide the "big picture" of the DOT hazardous material regulations in general, and where the employee "fits in"
- Provide familiarity with hazard classes—which things are hazardous materials, and what are their hazards
- Assure that employees are able to recognize and identify hazardous materials based on DOT-required communications (labels, package markings, etc.)

Function-Specific

- Teach each employee the specific hazardous material regulations applicable to their specific job functions
- Teach each employee the specific procedures they must follow to be in compliance with applicable hazardous materials regulations

Security Awareness

- Provide an awareness of security risks and of methods used to enhance security
- Assure that employees are able to recognize possible security threats and know how they are expected to respond

Some Hazmat Employees May Need Additional Training:

Safety

- Required for those hazmat employees who actually handle hazardous materials during transportation, or who may be exposed to hazardous materials in the event of a transportation-related incident
- Proper package handling to prevent spills
- What to do in the event of spills, both non-emergency and emergency procedures
- How to protect oneself from the hazards of the materials

Security Plan Specifics

- Required for hazmat employees of those facilities that require security plans
- Must include training on:
  - Your organization's security objectives
  - Specific security procedures
  - Individual employee's responsibilities
  - Actions to take in the event of a security breach
  - Your organization's security structure.

Substituting Other Training

Training given under other training requirements (e.g., OSHA "HazCom," "HAZWOPER," or EPA RCRA training) may be used toward satisfying some of the DOT's

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training requirement, but it must be documented in accordance with DOT rules. For example, a person who had OSHA training would not need safety training under DOT.

When Must Training Be Done?

Initial
[49 CFR 172.704(c)(1)]

- Prior to performing a job function
- Within 90 days, for new employees working under the direct supervision of someone who is properly trained and knowledgeable

NOTE: By "under the direct supervision," the DOT means that the supervisor is able to notice and correct any mistakes by the new employee. Merely reporting to a trained employee is not sufficient.

Recurrent
[49 CFR 172.704(c)(2)]

- All hazmat employees must be "retrained" no more than three years from the *anniversary date* of initial training
- "Recurrent training" includes all five types of training (general awareness, function-specific etc.), as applicable
- Employer must ensure testing and create an updated "record of training"

Update
[49 CFR 172.702(b)]

- If job duties change
- If the DOT changes regulations affecting the employee's job
- No new test or record is required, but it might be a "good management practice"

"If a new regulation is adopted, or an existing regulation is changed, that relates to a function performed by a hazmat employee, that hazmat employee must be instructed in those new or revised function specific requirements without regard to the timing of the three year training cycle" [Preamble, 61 FR 27169, May 30, 1996].

Testing and Recordkeeping

- Each hazmat employee must be tested "by appropriate means" on the training subjects covered [49 CFR 172.702(d)].
- The hazmat employer must create and retain a "record of training" for each hazmat employee. The record shall include:
  - The hazmat employee's name;
  - The most recent training completion date of the hazmat employee's training;
  - A description, copy, or the location of the training materials used to meet the requirements at 49 CFR 172.704(a);

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"Hazmat Employee" Training, continued

  - The name and address of the person providing the training; and
  - Certification by the hazmat employer that the hazmat employee has been trained and tested [49 CFR 172.704(d)].

- Training records must cover hazmat training given to an employee during the previous three years and must be kept for:

  - As long as the employee is employed as a hazmat employee, and
  - At least 90 days afterwards.

Offeror's Duty: Instruct Anyone Doing It for You

Finally, 49 CFR 173.1(b) states:

"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."

If you offer hazardous materials for transportation, you must assure that anyone performing any regulated function on your behalf is trained to perform that function correctly.

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STEP 1—CLASSIFICATION
Is It a Hazardous Material?

In This Step...

You must determine whether your material is a "hazardous material." Specifically, you must determine:

- The *type* of hazard (hazard class or division); and
- The *degree* of hazard ("packing group" for most materials, "hazard zone" for poison gases and vapors, "compatibility group" for explosives).

Key Regulatory References

49 CFR	What's There?
173	All hazard class/division definitions; criteria for assigning packing groups, hazard zones, and compatibility groups
173.2a	Rules for determining the primary hazard of a multiple-hazard material
172, Subpart H	Rules requiring detailed training for anyone "directly affecting" the safety of hazardous materials transportation

What's It All About?

The shipper of a material (the person "offering") must assure that the material is properly classified (see 49 CFR 173.22). All decisions and requirements regarding naming, packaging, describing, marking, labeling, placarding, and loading the material are based to a large extent on the hazard(s) the material actually has.

If you determine it's *not* a hazardous material, then the rest of the hazardous materials regulations (49 CFR 171–180) do not apply! In any case, be prepared to defend your decision.

What You Already Need to Know

To classify a hazardous material under DOT regulations, you need to know the physical and chemical properties of your material. Examples of the type of information you may need to know include:

- Physical state (i.e., whether it is a liquid, solid, or gas according to the DOT's definitions at 49 CFR 171.8);
- Flash point;
- Initial boiling point;
- Acute toxicological effects (i.e., how much it takes to kill people if exposed);

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Step 1—Classification, continued

- Corrosivity (i.e., what it will do to skin tissue or metals);
- Chemical/constituent makeup;
- Reactivity data (i.e., how it reacts if exposed to air or water); and/or
- Radioactivity.

Where Does This Information Come From?

A Safety Data Sheet (SDS) *may* provide some of this information; *however,* it is important that you do *not* rely solely on an SDS to make DOT hazard classifications!

Other sources of information include:

- Chemical text/reference books,
- Analytical data, and
- Manufacturer's technical data.

Although an SDS is a valuable source of information, the DOT does not require its use. It is required by OSHA.

Hazardous Wastes vs. Hazardous Materials

The US DOT includes in its definition of "hazardous material" anything that meets the DOT definition of a "hazardous waste." For the purposes of the hazardous materials regulations (HMR), the DOT defines the term "hazardous waste" as:

"[A]ny material that is subject to the Hazardous Waste Manifest Requirements of the US Environmental Protection Agency specified in 40 CFR Part 262." [49 CFR 171.8]

Simply put, if the US EPA identifies and regulates something as hazardous waste and requires it to be shipped using a Uniform Hazardous Waste Manifest, then the DOT considers the material to be a "hazardous waste."

On the other hand, if the US EPA does not require a particular type of hazardous waste to be shipped using a manifest, then it is NOT a DOT hazardous waste. Examples would include:

- CESQG hazardous wastes;
- Universal wastes; and
- State hazardous wastes.

NOTE: These wastes may still meet the definition of DOT hazardous materials based on whether they meet any of DOT's hazard class definitions. However, they will not be subject to additional DOT mandates for shipping "hazardous waste."

Classifying Hazardous Wastes

All DOT hazardous materials, including wastes, must be classified by:

- The *type* of DOT hazard (hazard class or division) the material poses; and

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Step 1—Classification, continued

- The *degree* of hazard ("packing group" for most materials, "hazard zone" for poison gases and vapors, and "compatibility group" for explosives).

Hazard Classes 1–8

Most materials are regulated because they present specific types of hazards defined in 49 CFR 173.

- Hazard definitions are based on chemical and physical properties (e.g., liquid/solid/gas, flash point, ability to corrode metals, acute toxicity).

- If a hazardous waste meets the definition of any DOT Hazard Class 1 through 8, then it is classified as a material posing that hazard. However, you still need to remember that it is a DOT hazardous waste because this will affect subsequent requirements and reliefs.

Hazard Class 9

If a DOT hazardous waste does not meet any of the definitions of Class 1 through 8, then it is classified as a Class 9 hazardous material.

NOTE: A material is Class 9 *only* if it poses no other DOT hazard.

Best Guesses

If a material is shipped for testing to determine its hazards, it is legal to make a tentative hazard class assignment based on your knowledge of the material. [49 CFR 172.101(c)(11)]

Hazard Class Definitions

Following are summaries of the US DOT hazard classes and divisions, listed in class order. For the full hazard class definition, refer to the US DOT regulations at 49 CFR Part 173.

Class and Division	Name and description of class or division	49 CFR reference for definitions	Packing Group
1.1	***Explosives (with a mass explosion hazard)*** Entire mass explodes simultaneously (e.g., plastic explosives).	173.50	N/A
1.2	***Explosives (with a projection hazard)*** The explosion causes the throwing of a projectile or projectiles (e.g., shrapnel).	173.50	N/A
1.3	***Explosives (with predominately a fire hazard)*** The explosion initiates combustion.	173.50	N/A
1.4	***Explosives (with no significant blast hazard)*** The explosion is not likely to throw any fragments of appreciable size and the explosion is largely confined to the package.	173.50	N/A
1.5	***Very insensitive explosives; blasting agents*** It will explode but requires a strong initiator to cause the explosion. Explosion would not likely occur in a transportation-related fire.	173.50	N/A
1.6	***Extremely insensitive detonating substances*** Generally articles containing class 1.5 materials.	173.50	N/A

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Step 1—Classification, continued

Class and Division	Name and description of class or division	49 CFR reference for definitions	Packing Group
2.1	***Flammable gas*** Is a gas at 20° C (~68° F) and burns readily in air.	173.115	N/A
2.2	***Non-flammable compressed gas*** Gas shipped at a pressure at or over 200 KPa (43.8 psia/29 psig) or as a cryogenic liquid that is neither flammable nor poisonous.	173.115	N/A
2.3	***Poisonous gas*** Is a gas at 20° C (~68° F) and has an $LC_{50} \leq 5{,}000$ ml/m^3 (i.e., one half of one percent concentration in air will kill half of the animals in a laboratory test).	173.115	Hazard Zone 173.116
3	***Flammable liquid*** Liquid with a flash point ≤60° C (~140° F), or 38° C (~100° F) for domestic transportation by rail or highway). Note: Flash point is the temperature at which a liquid gives off enough vapor to ignite and "flash" back to the liquid surface.	173.120	173.121
Combustibles	***Combustible liquid*** Liquid with a flash point < 93° C (~200° F).	173.120	PG III
4.1	***Flammable solid*** Wetted explosive; OR strongly exothermic decomposition; OR either ignites through friction (e.g., matches); OR burns very fast when ignited.	173.124(a)	173.125
4.2	***Spontaneously combustible material*** Spontaneously ignites within 5 minutes on exposure to air or can either heat to over 200° C (~392° F) or spontaneously ignite within 24 hours.	173.124(b)	173.125
4.3	***Dangerous when wet material*** Spontaneously ignites or emits flammable or toxic gases when contacted with water.	173.124(c)	173.125
5.1	***Oxidizer*** Causes or enhances combustion of other materials (e.g., sodium nitrite, oxygen gas, hydrogen peroxide).	173.127(a)	173.127(b)
5.2	***Organic peroxide*** A specific chemical group that is generally reactive.	173.128	PG II 173.129
6.1	***Poisonous materials*** Solids or liquids that are poisonous by ingestion, inhalation, or skin contact.	173.132	Hazard Zone and PG 173.133
6.2	***Infectious substance (etiologic agent)*** Disease-causing organisms, tissue, or body fluid samples for medical diagnosis, biological products, and medical wastes.	173.134	N/A
7	***Radioactive material*** Any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed specified values.	173.403	N/A
8	***Corrosive material*** Dissolves steel or aluminum or destroys skin tissue.	173.136	173.137

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Step 1—Classification, continued

Class and Division	Name and description of class or division	49 CFR reference for definitions	Packing Group
9	***Miscellaneous hazardous material*** (If no higher hazard) Anesthetic or noxious or similar hazard to crew of an airplane. Material that is shipped hot. US EPA-regulated hazardous waste or hazardous substance, MARPOL marine pollutants, plus other materials specifically listed by the US DOT.	173.140	173.141
ORM-D	***Other regulated materials: ORM-D*** (classification available until 12/31/2020) Small quantities of hazardous materials in secure packages classed down because of the limited hazard presented.	173.144	N/A
None	***Forbidden materials*** Electrical devices likely to create sparks or heat, heavily magnetic materials for air shipment, incompatible materials in the same package, materials that may undergo self-accelerated decomposition, ketone peroxides, etc.	173.21	N/A
None	***Forbidden explosives*** Individual listed chemicals, listed chemical groups, leaking explosives packages, loaded firearms, etc.	173.54	N/A

Packing Group

Many hazardous materials must be further classified based on the severity of the hazard. The most common method of doing this is to assign a "packing group" (PG) to the material. There are three possible packing groups:

- PG I indicates "great" danger.
- PG II indicates "medium" danger.
- PG III indicates "minor" danger.

NOTE: Hazard Classes 2, 6.2 (other than regulated medical wastes), 7, and ORM-D do not have packing groups.

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STEP 2—NAMING
What Is the Best Proper Shipping Name?

In This Step...

You must choose the Proper Shipping Name for the material. In doing this, you must find the entry on the DOT's hazardous materials table that is *the best* one for your material.

Key Regulatory References

49 CFR	What's There?
172.101	DOT's "Hazardous Materials Table" or "HM Table"
172.101(c)	Rules for selecting and using Proper Shipping Names
172, Subpart H	Rules requiring detailed training for anyone "directly affecting" the safety of hazardous materials transportation

What's It All About?

The shipper of a material (the person "offering") must assure that the material is properly identified and described (see 49 CFR 173.22). The shipping name entry on the 172.101 Hazardous Materials Table that you choose for the material determines:

- What type of packaging is authorized;
- The minimum hazard labeling;
- What actions responders will take in an emergency; and
- Any applicable special provisions.

If you select an incorrect or inappropriate Proper Shipping Name, it is possible (or even likely) that the material will not be packaged correctly and/or that the response actions indicated will be inappropriate for the material!

What You Already Need to Know

To ensure that you select the correct entry from the 172.101 Table, you must know:

- All the hazards the material has and the severity of each;
- Which hazard is "primary," if the material has multiple hazards;
- The physical state of the material (you must already know this for classification—it may also be important for naming);
- What the material *is* (i.e., is it a single chemical? What is the chemical? Is it a product formulation? What is it used for?); and

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Step 2—Naming, continued

If the material meets the definition of "hazardous waste" under 49 CFR 171.8.

Choosing a Proper Shipping Name ("Three Be's")

The DOT has three key requirements for choosing a Proper Shipping Name (PSN). The name assigned to a hazardous material must be:

- Selected from Column 2 of the 172.101 Hazardous Materials Table.
  - Use names in Roman type (not *italics*), and
  - Use as shown (no modifications except as explicitly allowed).
- Accurate (hazards of the name chosen must match the hazards of the material).
- Specific.

Critical Step

Choosing a PSN is a critical step. Among other things, the name you choose for your material determines:

- What type of packaging is authorized;
- Minimum hazard labeling;
- What actions responders will take in an emergency; and
- Applicable special provisions.

Naming Hazardous Wastes [49 CFR 172.101(c)(9)]

Hazardous wastes are named in the same manner as other hazardous materials, with one exception. If the material meets the DOT definition of hazardous waste as defined in 49 CFR 171.8, it must have the word "waste" added in front of the name (e.g., "waste acetone") unless the word "waste" is already a part of the name (e.g., "hazardous waste, liquid, n.o.s.").

NOTE: The word "waste" may not be added to a Proper Shipping Name unless the material is a <u>hazardous</u> waste by DOT definition. Because State hazardous wastes are not DOT hazardous wastes, it would be a violation of DOT rules to add the word "waste" to the Proper Shipping Name used for State hazardous wastes.

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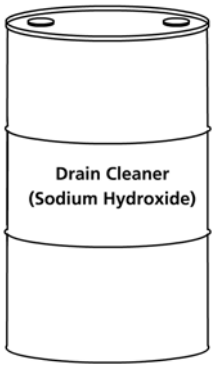
Step 2—Naming, continued

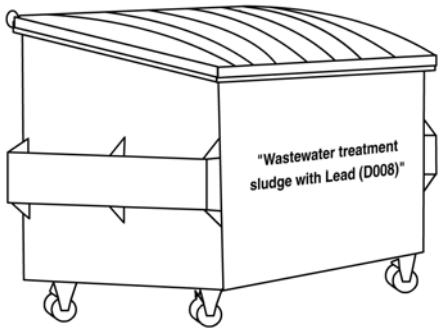
Examples of Proper Shipping Names

Waste acetone



Waste sodium hydroxide solution

Waste ammonium nitrate based fertilizer



Hazardous waste, solid, n.o.s.

NOTE:

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STEP 3—PACKAGING
What Can We Ship It In?

In This Step...

You must determine the packaging requirements that apply to your material. This includes determining:

- The type of packaging you can use;
- The standards or specifications the packaging has to meet;
- The rules for filling and closing the packaging;
- When different hazardous materials may be placed in the same package; and
- Any special rules that apply to the packaging.

Key Regulatory References

49 CFR	What's There?
172.101, Column 7	Special provision—codes
172.101, Column 8	DOT's "Hazardous Materials Table" packaging authorizations
172.101, Column 9	Quantity limitations
172.101(h)	Rules for Column 7
172.101(i)	Rules for Column 8
172.102	Special provisions—meanings and requirements of codes found in Column 7
173, Subpart B	General requirements for all packages and packagings
173, Subparts C through I	Packaging authorizations and exceptions for hazardous materials
178	Packaging specifications and standards for non-bulk and intermediate bulk packagings (IBCs), cylinders, portable tanks and cargo tanks
179	Specifications for tank cars (rail tankers)
180	Continuing qualifications and maintenance of IBCs, cargo tanks, tank cars, and portable tanks
172, Subpart H	Rules requiring detailed training for anyone "directly affecting" the safety of hazardous materials transportation

What's It All About?

The shipper of a material (the person "offering") must assure that the material is properly packaged (see 49 CFR 173.22).

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Step 3—Packaging, continued

The whole point of packaging is to make sure that the stuff stays *inside* the packaging under "conditions normally incident to transportation." These conditions include things like changes in temperature or elevation, handling, and vibration caused by rough roads or curves.

Three Requirements for Packaging

In selecting and preparing packaging, you need to be sure that the packaging:

1. Meets all the general requirements that apply to the package;
2. Is authorized; and
3. Meets any special provisions that may apply.

What You Already Need to Know

To ensure the selection of the correct packaging for your material and its proper use, you must know:

- The hazard(s) of your material (Step 1);
- The correct name from the 172.101 Table (Step 2);
- Compatibility issues for your material (e.g., will it corrode steel or aluminum; will it permeate, soften, or weaken certain types of plastic?);
- The physical properties of the material; and
- The kind of packaging you would like to use.

"Specification Packaging?"

Most types of "fully regulated" bulk and non-bulk packagings must meet specifications and standards identified at 49 CFR 178 or 179.

- In general, "exception" packaging (identified by Column 8A of the 172.101 Table) is not required to meet DOT specifications.
- In some cases, for low-hazard materials, the DOT authorizes "non-specification" non-bulk or bulk packaging.

Specification or Performance Standard?

Any packaging meeting a DOT standard identified at 49 CFR 178 or 179 is considered to be a "specification" packaging. However, there are different types of specifications.

"Manufacturing Specification" Packaging

Certain types of packagings must meet specific design and construction requirements for that package type. Packages that must meet manufacturing specifications include:

- Cylinders for compressed gases;
- Cargo tanks;
- Tank cars; and
- Portable tanks.

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Step 3—Packaging, continued

A manufacturing specification might include specific instructions for:

- Material of construction;
- Thickness of material of construction;
- Design and construction of seams (i.e., weld types and strengths);
- Size, design, and type of closures; or
- Maximum capacity.

"Performance-oriented" Packaging

Many types of packaging must meet minimum design and construction requirements, and then must be tested by the manufacturer to demonstrate that the package design type is capable of withstanding specific conditions.

The level of testing that a packaging must be capable of passing depends largely on the type and degree of hazards of the material that will be shipped in it.

Packagings that must meet performance-oriented standards include:

- Drums (including pails and cans);
- Barrels;
- Boxes;
- Jerricans;
- Bags; and
- Intermediate bulk containers (IBCs).

Typical tests that most performance-oriented packaging must pass include:

- Drop test;
- Stacking test;
- Hydrostatic pressure test;
- Leakproofness test; or
- Vibration standard.

Manufacturer's Obligations

Specification Markings

A manufacturer of specification packaging must mark each packaging with the appropriate certifying mark. The marking is the certification that all requirements of the applicable packaging specification (i.e., specification or performance-oriented standard) have been met.

Notification [49 CFR 178.2(c)]

Packaging manufacturers must provide *written notification* to purchasers of their packagings. This information must include:

- Identification of all the requirements ***not*** met at the time of transfer (i.e., what portions of the specification or standard the packaging does *not* meet as given to the purchaser); and
- Closure instructions to meet the manufacturer's performance certification (i.e., what the purchaser has to do to complete

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the package properly so that it will meet the applicable specification or standard when it is filled and shipped).

Shipper's Obligations

Follow Manufacturer's Instructions

Shippers must follow the manufacturer's written instructions to assemble, fill, and close packages.

Keep in Files [49 CFR 173.22(a)(4)]

If the manufacturer's packaging instructions are not printed or embossed on the packaging, the shipper must keep a copy of those instructions in their files and have them available for inspection.

Lab Packs [49 CFR 173.12(b), (d), and (f)]

A lab pack is a combination packaging used to ship commingled waste materials by rail, motor vehicle, or vessel. Lab packs are excepted from the usual packaging instructions, the rules for overpacks, and most segregation requirements.

Only hazardous materials in Class or Division 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 8, or 9 may be shipped in lab packs.

When two or more chemically compatible waste materials in the same hazard class are packaged in the same outer packaging, a generic shipping name may be used.

Inner packagings must be either:

- Glass with a capacity no larger than 4 L (1 gallon); or
- Metal or plastic with a capacity of no larger than 20 L (5.3 gallons).

When shipping liquids, there must be enough absorbent to absorb the total liquid contents.

Outer packagings must be PG III UN drums, PG II fiberboard boxes, or PG II fiberboard or composite IBCs. Certain high-hazard materials require stronger outer packagings.

The gross weight of each package may not exceed 205 kg (452 lbs.).

The following materials may NOT be shipped in lab packs:

- A material poisonous by inhalation
- A Division 6.1, PG I material
- Chloric acid
- Fuming sulfuric acid
- Class 1 explosives
- Class 2 gases
- Division 6.2 infectious material
- Division 7 radioactive material

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Step 3—Packaging, continued

When Is It Considered "Reuse?"

According to interpretive letters from the DOT:

"In order to consider a package to be reused, the package must be emptied and refilled (i.e., new material must be placed in the package)."

Packagings that have been used to ship hazardous materials and then emptied may be *reused* to ship other hazardous materials, under certain conditions.

Reuse in General

Any packaging used more than once must still be in good enough condition that it continues to meet all the requirements it had to meet when it was new.

If you choose to reuse a packaging, you must make sure the packaging is authorized for your material and meets applicable standards, specifications, general requirements, and special provisions, just as with new packaging.

Before reusing any packaging, you must inspect it and make sure that there is no:

- Incompatible residue;
- Rupture; and
- Other damage that reduces structural integrity.

Reusing Non-bulk Packagings

General Requirements

- If the packaging is a single or composite packaging intended to contain liquids, then it must be leakproofness tested and specially marked to indicate it successfully passed the test.
- Metal and plastic drums and jerricans must meet a minimum thickness requirment.
- If the packaging shows "evidence of a reduction in integrity," then it must be *reconditioned* in accordance with 49 CFR 173.28(c) before reuse.
- Additional special requirements for using cylinders are found at 49 CFR 173.34 and 173.40.

Reuse of Packagings for Waste Shipments [49 CFR 173.12(c)]

Under specific conditions, packagings that were previously used to ship hazardous materials can be reused for shipments of hazardous waste without meeting the leakproofness testing and other reconditioning and reuse provisions of 49 CFR 173.28 that would typically apply to reuse of packagings. To do this, the waste:

- Must be packaged in accordance with 49 CFR 173;
- Must be shipped by highway only, to designated facilities;

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Step 3—Packaging, continued

- May not be shipped for 24 hours after the package is filled and closed;
- Must be inspected immediately prior to offering it for transportation; and
- Must be loaded by the shipper and unloaded by the consignee (unless using a private or contract carrier).

If the packaging is reused more than once, then the detailed reuse requirements of 49 CFR 173.28 will apply.

RCRA-Empty vs. DOT-Empty

RCRA-Empty

In general, a container holding *non-acute* hazardous waste is RCRA-, or EPA-, empty when all wastes have been removed that can be removed, using methods commonly employed to empty that type of container, and:

- For all containers, no more than 1 inch of residue remains in the container; **OR**
- For non-bulk containers, no more than 3% by weight of the total capacity of the container remains in the container or inner liner; **OR**
- For bulk containers, n
- No more than 0.3% by weight of the total capacity of the container remains in the container or inner liner.

If a container holds one of the listed hazardous wastes that the EPA deems *acute hazardous* (e.g., the P numbers), it is RCRA-empty when the container is ***triple rinsed.*** In order to "triple rinse" a container, the container must be flushed three times, each time using a volume of diluent equal to at least *10% of the volume* of the container being rinsed. [43 FR 58955, December 18, 1978]

When a container meets the EPA definition of "empty," the material inside the container is no longer subject to 40 CFR 261–265, 267, 268, and 270.

DOT-Empty

In general, a package is DOT-empty if:

- The package has been *cleaned of residue* and *purged of vapor* such that it no longer poses a DOT hazard; **and**
- Hazardous materials communications have been removed, obliterated, or securely covered in transportation; **and**
- Any remaining residue is neither an EPA hazardous waste nor a marine pollutant; **and**
- No CERCLA hazardous substance remains in excess of its RQ in the package.

A package (container) is not subject to any of the hazardous materials regulations if it meets the DOT's definition of "empty."

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Step 3—Packaging, continued

Shipping Empty Containers

If a container meets the EPA definition of "empty," but NOT the DOT definition of "empty," it must, with limited exceptions, be shipped as a fully regulated DOT package (i.e., DOT labels, marking, shipping papers, etc.). However, since it is not regulated as a hazardous waste for EPA purposes, it does not need to be shipped using a hazardous waste manifest.

A container that meets the DOT definition of "empty" is no longer regulated as a *hazardous material* for shipping purposes.

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STEP 4—MARKING AND LABELING

In This Step...

You must determine:

- What marking requirements apply to each package;
- What marking requirements apply to the transport vehicle or freight container containing the packages;
- What standards the markings must meet;
- Which labels are required for each package; and
- How the labels must be displayed.

Key Regulatory References

CFR	What's There?
49 CFR 172.101, Table, Column 6	Codes for required labels per Proper Shipping Name
49 CFR 172, Subpart D	Rules for marking packages, transport vehicles, and freight containers
40 CFR 262.32	EPA's rules for additional marking of non-bulk hazardous waste packages
49 CFR 172, Subpart E	Rules for labeling packages and freight containers
49 CFR 172, Subpart H	Rules requiring detailed training for anyone "directly affecting" safety of hazardous materials transportation

What's It All About?

The shipper of a material (the person "offering") must assure that the material is properly "described" (see 49 CFR 173.22). This includes assuring that packages containing the material are properly marked and labeled.

Markings Identify:

- What the material is;
- What the correct emergency response actions are;
- The shipper or the consignee's name and address; and
- Special handling precautions.

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Step 4—Marking and Labeling, continued

Labels Identify:

- What hazard(s) the material has; and
- Special handling precautions.

What You Need to Know

To properly mark and label packages, you must know:

- Everything from Steps 1, 2, and 3 (classification, naming, and packaging);
- Whether the material meets the DOT's definition of:
  - Hazardous waste,
  - Hazardous substance,
  - Marine pollutant, or
  - Elevated-temperature material [49 CFR 171.8];
- Whether the material is being shipped under a special permit;
- Whether the material is being shipped under a "limited quantity" exception; and
- Whether the material is being shipped as a "consumer commodity," classed as ORM-D.

Marking: Two Main Questions

When determining marking requirements for hazardous materials, you must answer two main questions:

1. *What* must be marked?
2. *How* must it be marked?

General Standards for All Markings [49 CFR 172.304]

Regardless of what you're marking, *all hazardous* materials markings must be:

- Durable, in English, and printed on or affixed to the surface of a package or on a label, tag, or sign;
- Displayed on a background of sharply contrasting color;
- Unobstructed by labels or attachments; and
- Located away from any other markings (such as advertising) that could substantially reduce its effectiveness.

Marking ID Numbers

You must include the letters "NA" or "UN" as appropriate for the ID number. For example, non-bulk packages of "Paint Related Material" classed as Class 3 must show "UN 1263," not just "1263."

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Step 4—Marking and Labeling, continued

When marking the ID number on non-bulk packages, these markings must be at least 12 mm (0.5 in.) high, *except* packages with a maximum capacity of:

- 30 L (8 gal.) or less, 30 kg (66 lbs.) maximum gross weight or less, or cylinders with a water capacity of 60 L (16 gal.) or less must be marked with characters at least 6 mm (0.25 in.) high; and
- 5 L (1.3 gal.) or less or 5 kg (11 lbs.) or less must be marked in a size appropriate for the size of the package.

NOTE: PHMSA will not enforce font size standards until January 1, 2017.

Basic Hazardous Waste Markings [49 CFR 172.301, 40 CFR 262.32]

Almost all hazardous waste packages must be marked with certain basic information. Some of this information is required by the DOT, and some by the EPA. These markings include:

Non-bulk Packaging—Up to 119 Gallons

DOT	EPA
Proper Shipping Name	Generator's name and address
Identification Number (UN/NA number)	Generator's EPA identification number
Shipper or consignee's name and address	Manifest tracking number
	Hazardous waste statement

Bulk Packaging—Greater Than 119 Gallons

DOT	EPA
4-digit identification number without the UN/NA	N/A
Proper Shipping Name for most	
Owner's name on portable tanks	

Hazardous Waste Statement

The hazardous waste statement required on non-bulk packaging states the following:

> HAZARDOUS WASTE–Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the US Environmental Protection Agency.

It should be noted that some states have variations of this paragraph that may have to be utilized in lieu of the Federal statement.

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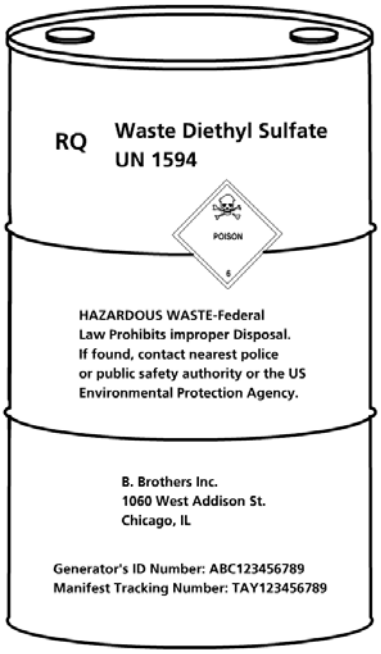
Step 4—Marking and Labeling, continued

Example of a Properly Marked Non-bulk Package



What Are Hazardous Material Labels?

Under the DOT's Hazardous Materials Regulations (HMR), there are two types of "labels":

1. Diamond-shaped *hazard* labels that identify the hazard class(es) of the material in the package (e.g., "Flammable," "Corrosive"); and

2. Square or rectangular *precaution* labels, used to communicate special handling or loading precautions (e.g., "Cargo Aircraft Only").

Label Specifications

The labeling regulations include detailed specifications and standards for size, shape, color, and durability of labels in 49 CFR 172.407–172.450. You could print your own labels, but if they do not meet these detailed standards, they are not legal DOT "labels."

What Gets Labeled?

Per 49 CFR 172.400, ***hazard class*** labels are required on:

- *Non-bulk* packages;
- Certain small *bulk packages* (these may alternatively be placarded); and
    - Certain overpacks, freight containers, and aircraft unit load devices (these may alternatively be placarded).

What Doesn't Get Labeled?

Hazard class labels are not required on:

- Most "limited quantity" packages (see the requirements of each specific packaging authorization);
- "Consumer commodity" packages;
- Most bulk packages; and
- Certain cylinders and other packages, per 49 CFR 172.400a.

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Step 4—Marking and Labeling, continued

Which Labels Are Required?

49 CFR 172.101, Column 6

The shipper must apply all labels identified in Column 6 of the 172.101 Table [49 CFR 172.101(g)].

The codes contained in Column 6 are defined according to the following table:

Label Substitution Table

Label Code	Label Name
1	Explosive
1.1[1]	Explosive 1.1[1]
1.2[1]	Explosive 1.2[1]
1.3[1]	Explosive 1.3[1]
1.4[1]	Explosive 1.4[1]
1.5[1]	Explosive 1.5[1]
1.6[1]	Explosive 1.6[1]
2.1	Flammable gas
2.2	Non-Flammable Gas
2.3	Poison Gas
3	Flammable Liquid
4.1	Flammable Solid
4.2	Spontaneously Combustible
4.3	Dangerous When Wet
5.1	Oxidizer
5.2	Organic Peroxide
6.1 (inhalation hazard, Zone A or B)	Poison Inhalation Hazard
6.1 (other than inhalation hazard, Zone A or B)[2]	Poison
6.2	Infectious substance
7	Radioactive
8	Corrosive
9	Class 9

[1] Refers to the appropriate compatibility group letter.

[2] The packing group for a material is indicated in Column 5 of the table.

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STEP 5—DOCUMENTING

In This Step...

The DOT requires use of a shipping paper when shipping hazardous materials. The shipping paper's purpose is to communicate the hazards to emergency responders and those handling the materials. In addition, for most hazardous wastes, The EPA requires the generator to prepare a Uniform Hazardous Waste Manifest. The purpose of the manifest is to track the shipment of hazardous wastes to assure proper delivery to the designated facilities.

Include Emergency Response Information

Specific emergency response information must also accompany the shipment and must be *on* or *with* the shipping papers, away from the package.

Key Regulatory References

CFR	What's There?
49 CFR 172, Subpart C	Rules for shipping papers
49 CFR 172, Subpart G	Rules for providing emergency response information
40 CFR Part 262 Appendix	EPA's rules for filling out the Uniform Hazardous Waste Manifest
49 CFR 172, Subpart H	Rules requiring detailed training for anyone "directly affecting" safety of hazardous materials transportation

What's It All About?

The shipper of a material (the "offeror") must assure that the material is properly described. [49 CFR 173.22] The shipping papers provide information about the material, including:

- What the material is;
- What its hazards are;
- How much of the material is present on the transport vehicle;
- What actions should be taken in the event of transportation emergencies; and
- Who to call for more information if needed.

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Step 5—Documenting, continued

What You Already Need to Know

To properly complete shipping papers, you must know:

- Everything from Steps 1, 2, and 3 (classification, naming, and packaging);
- Total quantity of material being shipped;
- Whether the material meets the DOT's definition of:
  - Hazardous waste
  - Hazardous substance
  - Marine pollutant
  - Elevated-temperature material

  [49 CFR 171.8];
- Whether the material is being shipped by air;
- Whether the material is being shipped under a special permit;
- Whether the material is being shipped under a "limited quantity" exception; and
- What the correct procedures and precautions to take in responding to various types of emergencies with the material are.

Creating a Shipping Paper

A shipper must create shipping papers that will accompany the hazardous material shipment. While the DOT does not mandate a specific form, the EPA does require the use of a Uniform Hazardous Waste Manifest for shipments of hazardous waste.

Regardless of what form of shipping paper you choose, it must contain all the information that the DOT requires on shipping papers. This includes:

- A basic description of the material and any necessary additional descriptions;
- The total quantity of the material being shipped;
- The number and type of package; and
- A shipper's certification.

NOTE: If you are shipping a hazardous waste off site, the US EPA will generally require that you use the Uniform Hazardous Waste Manifest. Since this form is designed to serve as a DOT shipping paper, it is typically used for DOT compliance. [40 CFR 262.20]

Entries on Shipping Papers [49 CFR 172.201]

Descriptions of hazardous materials entered on shipping papers must:

- Be printed legibly in English;
- Not contain any abbreviations, unless specifically authorized by the DOT;
- Be clearly distinguished from descriptions of non-hazardous materials by one of three specified means; and

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Step 5—Documenting, continued

- Include the page number and total pages for multi-page documents.

Any additional information about the material that the shipper wants to include about a hazardous material must be consistent with the required information and must be placed *after* the basic description of the material, unless otherwise permitted.

Hazardous Materials Entries Must Include:

The US DOT requires the following information be completed on all shipping papers:

- A basic description of the material being shipped; and
- Any required additional descriptions.

Basic Description [49 CFR 172.202]

The basic description of a hazardous material on a shipping paper *must* contain the following elements, *in order:*

1. The **UN/NA identification number;**
2. The **Proper Shipping Name;**
3. The **primary hazard class** followed by any **subsidiary hazard classes** (in parentheses); and
4. The **packing group** in Roman numerals (may be preceded by "PG").

Additional Descriptions [49 CFR 172.203]

Additional information may be required for certain kinds of hazardous material shipments. This includes hazardous substances, radioactives, certain poisons, and materials described with "generic" shipping names.

Hazardous Substance

Where a hazardous substance is present in a package in excess of its RQ:

- The name of the hazardous substance must be added in parentheses. The EPA F-, K-, or D-numbered hazardous waste code may be used, where appropriate; and
- The letters "RQ" must be added before or after the description. [49 CFR 172.203(c)]

Generic ("G") Shipping Names

If the Proper Shipping Name is identified by the letter "G" in Column (1) of Table 172.101, then the technical name(s) of the hazardous material(s) must be added in parentheses. Exceptions are allowed for:

- Lab packs [49 CFR 173.12(d)];
- Class 9 hazardous wastes; and
- "Best guesses" made under 49 CFR 172.101(c)(11). [49 CFR 172.203(k)]

Examples of Additional Descriptions

- RQ UN1090; Waste Acetone; 3; PGII
- UN1993; Flammable liquids, n.o.s.; 3; PG II (acetone and toluene)
- UN1993; Flammable liquids, n.o.s. (contains acetone and toluene); 3; PG II

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Additional Documents May Be Required

- Emergency response information per 49 CFR 172, Subpart G (§172.600 et seq.)
- Information required by tariffs or by commercial practice
- Land disposal restriction notification or certification for hazardous wastes

Use of a Manifest [40 CFR 262.20(a)(1)]

Generators who transport or offer for transport a hazardous waste for off-site treatment, storage, or disposal of a hazardous waste must utilize a Uniform Hazardous Waste Manifest. The DOT requires a shipping paper to accompany all hazardous material shipments.

When the EPA created the manifest, the Agency took into account the DOT shipping paper requirements for shipping DOT hazardous materials.

Since the DOT considers a manifest to be a type of shipping paper, the manifest is one document that covers the requirements for two agencies.

Uniform Hazardous Waste Manifest [40 CFR 262.21]

The hazardous waste manifest is uniform, meaning there is a specific form that must be utilized (EPA Form 8700-22). A manifest may only be obtained from printers that have been approved by the EPA, and each manifest has a unique tracking number. Generators cannot simply put the required information on paper and call it a manifest.

Purpose of a Manifest

The purpose of the manifest is to systematically track hazardous waste from the facility where it was generated to the facility where it will be treated, stored, or disposed of.

It also ensures accountability for the generation, transportation, and disposal process and allows the generator to verify that the waste has been properly handled and delivered.

Manifest Exceptions

Certain wastes are excepted from manifesting requirements. Examples of materials that do not need to be shipped on a manifest include:

- Universal waste [40 CFR 261.9]
- Used oil [40 CFR 261.6(a)(4)]
- CESQG waste [40 CFR 261.5(b)]
- SQG waste that is part of a reclamation agreement under specific conditions [40 CFR 262.20(e)]
- Materials that are excluded from the definition of solid waste or hazardous waste if all conditions are satisfied [40 CFR 261.4 and 261.6]

NOTE: Remember that the DOT has its own classification system. A generator's particular material may be excluded from RCRA or

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Step 5—Documenting, continued

manifesting requirements, but it may still be fully regulated by the DOT. So even though the material would be excluded from the use of a manifest, it would still require a shipping paper because of DOT rules.

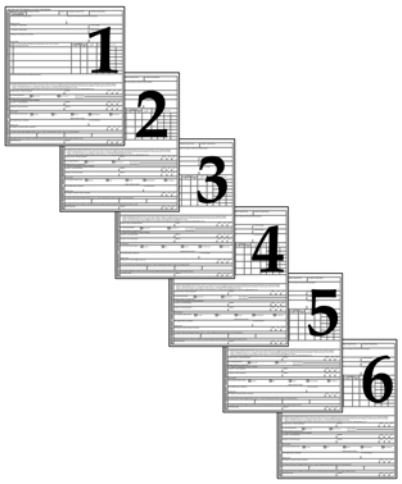
Copies of the Manifest [40 CFR 262.22]

The manifest consists of six copies. This allows everyone who handles the waste—from generator and transporter to the treatment, storage, and disposal facility—to receive a copy of the manifest. The six copies need to be completed and distributed according to the regulations.

Specifically, this will allow the generator, each transporter, and the designated TSDF to retain a copy of the manifest. One copy is sent from the designated facility to the original generator upon receipt of the waste.

Each copy of the manifest shows who it is intended for:

- Copy 6: Retained by the generator
- Copy 5: Retained by the transporter
- Copy 4: Retained by the Designated Facility
- Copy 3: Returned by the Designated Facility
- Copies 1 and 2: Utilized for states that require the generator, designated facility, or both to send copies of the manifest to their states



Generators Signing a Manifest [40 CFR 262.23]

Generators must sign the manifest by hand and obtain the handwritten signature of the initial transporter with the date of acceptance.

The generator retains a copy of the manifest and gives all other copies to the transporter.

Certification Statements [40 CFR 262.27 and 49 CFR 172.204]

Every time a generator initiates a shipment of hazardous waste, he or she certifies to specific regulatory statements by signing Item 15 of the manifest.

EPA's Waste Minimization Statement—Large Quantity Generator

"I am a large quantity generator. I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practica-

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Step 5—Documenting, continued

ble and I have selected the practicable method of treatment, storage or disposal currently available to me which minimizes the present and future threat to human health and the environment."

EPA's Waste Minimization Statement—Small Quantity Generator

"I am a small quantity generator. I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford."

NOTE: Although the Federal waste minimization certification does not require a written plan, many states add additional requirements that attach to these statements on the manifest.

DOT Offeror Certification

In addition to the waste minimization statement, by signing Item 15 on the manifest, the offeror also certifies that the package being shipped is correctly:

- Packaged;
- Named;
- Classified;
- Marked;
- Labeled; and
- Placarded.

It is in all respects in proper condition for transport according to applicable national and international regulations.

State Differences

States have specific rules for manifesting that may be different from the Federal rules. Some state differences include:

- State-specific wastes that must be shipped on a manifest; and
- State-specific universal waste that is not required to be manifested *while in the state where it was generated.*

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THE NEW E-MANIFEST RULE
79 FR 7517; February 7, 2014

On February 7, 2014, the EPA established new rules for the use of electronic manifests (e-manifests) for shipments of hazardous waste. The rule implements the mandates established in the "Hazardous Waste Electronic Manifest Establishment Act" [PL-112-195]. Once fully implemented, the e-manifest will be an alternative method to the traditional multi-page paper manifest. While the use of the e-manifest will be voluntary, the EPA is hoping that it will be the standard means for tracking hazardous waste shipments from generators to treatment, storage, and disposal facilities (TSDFs). All manifests, electronic *and* paper, will be entered into a new national database.

Dates

The e-manifest rule becomes effective on August 6, 2014; yet the use of an e-manifest will not be permissible until the Agency develops the infrastructure (IT system) for handling the e-manifest and promulgates the user fee structure. The EPA will notify the public in a separate rulemaking in the *Federal Register*.

Generators

Once the e-manifest infrastructure is in place, hazardous waste generators will be allowed to use electronic manifests for tracking hazardous waste shipments in lieu of EPA Forms 8700-22 and 8700-22A, provided:

- All waste handlers named on the manifest elect to participate in the electronic manifest system; and
- The generator provides a paper copy of the e-manifest to the initial transporter for highway shipments of hazardous waste subject to the US DOT hazardous materials regulations shipping paper requirements.
  [40 CFR 262.24(c) and (d)]

Generators may participate in the e-manifest system by accessing the system through their own computer system or a portable system brought to the generator's site by the transporter.

The electronic signature affixed to the e-manifest must be enforceable under EPA and fulfill other Federal requirements pertaining to electronic signatures. The specifics of electronic signatures will not be known until the EPA completes constructing the e-manifest infrastructure. However, the EPA stated in the preamble that the signature validation method will be governed by the definition of

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"valid signature" under the Agency's Cross-Media Electronic Reporting Regulation (CROMERR) at 40 CFR 3.

TSDF Requirements for Paper Manifests

While the EPA is hoping that the e-manifest system will become the standard for hazardous waste shipments, the rules do allow for the generator to opt out of the system and use the standard paper forms (i.e., EPA Form 8700-22). Since all manifests—electronic and paper—will be entered into a new national database, a TSDF that receives a hazardous waste shipment accompanied by a paper manifest then will be required to submit a copy of the top form (Page 1) to the EPA within 30 days. [40 CFR 264.71(a)(2)(v) and 265.71(a)(2)(v)]

State-only Hazardous Wastes

The new rule includes a definition of "user of the electronic manifest" at 40 CFR 260.10 that allows the use of an e-manifest for shipments of waste that may not be Federally regulated as hazardous waste per 40 CFR 261.3. The new e-manifest is permitted for state-only hazardous waste when:

- The generator or destination state requires the use of a hazardous waste manifest to track off-site shipments; and
- All the waste handlers named on the manifest have elected to use the e-manifest system.

Effect on Other Documents Related to Hazardous Waste Shipments

The e-manifest system will only impact the hazardous waste manifesting requirements. The new rules do not provide for electronic reporting for other documents related to hazardous waste shipments, including:

- Land disposal restriction notices and certifications [40 CFR 268.7];
- Manifest exception reports [40 CFR 262.42];
- EPA Acknowledgments of Consent to export [40 CFR 262.53(f) and 262.54(h)]; and
- Discrepancy reports [40 CFR 264.72(c)].

These reports and notices must still be prepared using paper documents as described in those specific requirements.

The new e-manifest by itself is not an acceptable shipping paper under the US DOT hazardous materials regulations (HMR). Generators (shippers) will still be required to prepare a written copy for the carrier and retain a copy per the HMR. [49 CFR 172, Subpart C]

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The New e-Manifest Rule, continued

User Fees

The new rule provides for the EPA to charge fees for persons using the e-manifest system, including generators, transporters, and TSDFs. [40 CFR 262.24(g), 263.20(a)(8), 264.71(j), and 265.71(j)] The actual fee structure has not yet been established by the EPA. This will be done in a future rulemaking.

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STEP 6—PLACARDING
49 CFR 172, Subpart F

In This Step...

You must determine:

- Whether placards are required for the package or shipment of packages;
- Which placards are required; and
- How the placards must be displayed.

Key Regulatory References

49 CFR	What's There?
172, Subpart F	Rules for placarding packages, transport vehicles, and freight containers
172, Subpart H	Rules requiring detailed training for anyone "directly affecting" safety of hazardous materials transportation

What's It All About?

The shipper of a material (the person "offering") must ensure that the material is properly "described" [see 49 CFR 173.22]. This includes ensuring that the proper placards are provided and/or affixed, as required.

What You Already Need to Know

To properly placard, you must know:

- Everything from Steps 1, 2, 3, 4, and 5 (classification, naming, packaging, shipping papers, and marking and labeling); and
- The primary hazard (and in some cases, the subsidiary hazards) of all materials on the transport vehicle, rail car, or freight container.

Placarding Bulk Packages and Vehicles Containing Bulk Packages

Unless specifically excepted, you must:

- Placard bulk packages containing ANY amount of hazardous materials.
- Placard transport vehicles and freight containers containing any bulk packages that are required to be placarded.

The specific hazard class placards for the materials must be used. In most cases, only the placard representing the primary hazard of the material must be used.

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Step 6—Placarding, continued

Placarding Vehicles Containing Non-bulk Packages: Table 1 Materials

When Are Placards Required?

Unless excepted, you must offer placards for vehicles and freight containers carrying non-bulk packages that contain ANY amount of Table 1 hazardous materials.

What Placards Must Be Offered?

The specific hazard class placards for the materials must be used. In most cases, only the placard representing the primary hazard of the material is required.

Table 1
[Any Quantity Requires Placards]

Category of material (hazard class or division number and additional description, as appropriate)	Placard name	Placard design section reference (§)
1.1	EXPLOSIVES 1.1	172.522
1.2	EXPLOSIVES 1.2	172.522
1.3	EXPLOSIVES 1.3	172.522
2.3	POISON GAS	172.540
4.3	DANGEROUS WHEN WET	172.548
5.2 (Organic peroxide, Type B, liquid *or* solid, temperature controlled).	ORGANIC PEROXIDE	172.552
6.1 (material poisonous by inhalation (see §171.8 of this subchapter))	POISON INHALATION HAZARD	172.555
7 (Radioactive Yellow III label only)	RADIOACTIVE[a]	172.556

a.RADIOACTIVE placard also required for exclusive use shipments of low specific activity material and surface contaminated objects transported in accordance with §173.427(b)(4) and (5) or (c) of this subchapter.

Placarding Vehicles Containing Non-bulk Packages: Table 2 Materials

When Are Placards Required?

Unless specifically excepted, you must offer placards for vehicles and freight containers carrying non-bulk packages that contain a *gross aggregate weight* of 454 kg (1,001 lbs.) or more of the hazardous materials identified in Table 2.

What Placards Must Be Offered?

If only one Table 2 material is present in the vehicle, then the specific placard for that material must be used (i.e., Class 3 Flammable, Class 8 Corrosive, etc.).

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Step 6—Placarding, continued

If two or more Table 2 materials are present in the vehicle, then either the specific placards for the materials present or the "DANGEROUS" placard may be used,

UNLESS

1,000 kg (2,205 lbs.) or more gross aggregate weight of a **single hazard class** are loaded at a **single facility.** Then, the specific placard for that material must be used. In other words, you cannot use the DANGEROUS placard to cover that particular material; however, it can still be used to cover the other hazardous materials in the vehicle.

How Are Quantities Counted?

Unless specifically excepted, the gross weight of ALL Table 2 materials in non-bulk packages (including miscellaneous Class 9 materials) must be considered to determine if the gross aggregate weight trigger of 1,001 lbs. (454 kg) has been met.

The weight of Table 1 materials and the weight of hazardous materials in bulk packages are *not* included in this calculation, since the placarding requirements for these types of materials are separate from the requirements for non-bulk packages of Table 2 materials.

Table 2
[The 454 kg and the 1,000 kg Rules]

Category of material (hazard class or division number and additional description, as appropriate)	Placard name	Placard design section reference (§)
1.4	EXPLOSIVES 1.4	172.523
1.5	EXPLOSIVES 1.5	172.524
1.6	EXPLOSIVES 1.6	172.525

Table 2
[The 454 kg and the 1,000 kg Rules]

Category of material (hazard class or division number and additional description, as appropriate)	Placard name	Placard design section reference (§)
2.1	FLAMMABLE GAS	172.532
2.2	NON-FLAMMABLE GAS	172.528
3	FLAMMABLE	172.542
Combustible liquid	COMBUSTIBLE	172.544
4.1	FLAMMABLE SOLID	172.546
4.2	SPONTANEOUSLY COMBUSTIBLE	172.547
5.1	OXIDIZER	172.550
5.2 (Other than organic peroxide, Type B, liquid or solid, temperature controlled).	ORGANIC PEROXIDE	172.552
6.1 (other than material poisonous by inhalation)	POISON	172.554
6.2	(None)	
8	CORROSIVE	172.558
9	CLASS 9 (see §172.504(f)(9))	172.560
ORM-D[a]	(None)	

a.The ORM-D classification is available through December 31, 2020.

Which Materials Require Placarding?

Once the 454 kg trigger has been met, the hazards of all of the Table 2 materials in non-bulk packages must be identified through the use of placards, regardless of how much of the *individual* material is present. For example:

- A shipment consists of 800 lbs. of Class 3 and 800 lbs. of Class 8. The shipment would require either:
  - Class 3 and Class 8 placards, or
  - The DANGEROUS placard.

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Step 6—Placarding, continued

- A shipment consists of 200 lbs. of Class 3, 3,800 lbs. of Class 8, and 200 lbs. of Division 2.2. The shipment would require either:
  - Class 3 and Class 8 and Division 2.2 placards, or
  - Class 8 placards and the DANGEROUS placard.

The DANGEROUS Placard

The DANGEROUS placard is intended to be used on vehicles with mixed loads of Table 2 materials in non-bulk packages. The DANGEROUS placard may NOT be used:

- For Table 1 materials;
- For bulk packages;
- When there is only a single hazard class of a Table 2 material present in the vehicle; or
- When 2,205 lbs. or more of a single hazard class are loaded at one pickup point.

Providing Placards [49 CFR 172.506(a)]

In general, the shipper must *provide* the placards required *for the material being offered*, unless the transport vehicle is already placarded as required for the material.

Affixing Placards on Transport Vehicles

- Shippers must affix the applicable placards for rail shipments. [49 CFR 172.508]
- Motor carriers must affix the applicable placards based on the *contents of the vehicle* for non-bulk shipments by motor vehicle. [49 CFR 172.506(a)]
- For cargo tanks (tank trucks), who the person responsible for affixing placards is will depend on whether or not the loading of the bulk package is done in the presence of the carrier. [49 CFR 172.514] For example:
  - A shipper fills up his own cargo tank and then has a carrier come pick up the tank. In this case, the shipper must affix placards to the cargo tank.
  - A carrier brings an empty truck to a shipper. The shipper attaches a hose to the truck and fills it with hazardous material and then the carrier drives his truck away. In this case, the shipper must provide placards and the carrier must affix the placards to the bulk package.

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Step 6—Placarding, continued

Displaying Placards [49 CFR 172.504(a) and 172.516]

Among the specific requirements for the display of placards are the following:

- Displayed on all four sides of the vehicle or bulk package;
- Visible from each side except from the direction of another transport vehicle or rail car to which it is coupled;
- Kept clear of ladders, pipes, doors, and tarpaulins; and
- Words and lettering displayed horizontally.

Displaying Placards When Not Required

Placards may be displayed for a hazardous material, including for subsidiary hazards, even when not required, as long as the placard represents the actual hazard of a material being transported and the placarding conforms to the regulations.

Prohibited Placards [49 CFR 172.502]

Placards are forbidden on packages and transport vehicles unless they are being used to transport a hazardous material and the placard represents the hazard of the material. Extraneous information (such as "Drive Safely") is forbidden in placard holders.

Placarding Exceptions [49 CFR 172.504(f)]

The following exceptions apply to the rules for placarding packages, vehicles, and freight containers:

- When more than one division placard is required for Class 1 materials on a transport vehicle, rail car, freight container, or unit load device, only the placard representing the lowest division number must be displayed.
- A FLAMMABLE placard may be used in place of a COMBUSTIBLE placard on:
  - A cargo tank or portable tank.
  - A compartmented tank car that contains both flammable and combustible liquids.
- A NON-FLAMMABLE GAS placard is not required on a transport vehicle that contains non-flammable gas if the transport vehicle also contains flammable gas or oxygen and it is placarded with FLAMMABLE GAS or OXYGEN placards.
- OXIDIZER placards are not required for Division 5.1 materials on freight containers, unit load devices, transport vehicles, or rail cars that also contain Division 1.1 or 1.2 materials and that are placarded with EXPLOSIVES 1.1 or 1.2 placards.
- For transportation by motor vehicle or rail car only, an OXIDIZER placard is not required for Division 5.1 materials on a transport vehicle, rail car, or freight con-

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tainer that also contains Division 1.5 explosives and is placarded with EXPLOSIVES 1.5 placards.

- An EXPLOSIVES 1.4 placard is not required for those Division 1.4 Compatibility Group S (1.4S) materials that are not required to be labeled 1.4S.

- For domestic transportation of oxygen, compressed or oxygen, refrigerated liquid, the OXYGEN placard described at 49 CFR 172.530 may be used in place of a NONFLAMMABLE GAS placard.

- For domestic transportation, a POISON INHALATION HAZARD placard is not required on a transport vehicle or freight container that is already placarded with the POISON GAS placard.

- For Division 6.1, PG III materials, a POISON placard may be modified to display the text "PG III" below the mid line of the placard.

- For domestic transportation, a POISON placard is not required on a transport vehicle or freight container required to display a POISON INHALATION HAZARD or POISON GAS placard

- A non-bulk packaging that contains only the residue of a Table 2 material.

- A CLASS 9 placard is not required for domestic transportation.

NOTE: A bulk packaging and a vehicle containing bulk packages must still be marked with the appropriate identification number as required in 49 CFR 172, Subpart D.

Placards for Subsidiary Hazards [49 CFR 172.505]

Generally, placards are required based only on the *primary* hazard of the material being shipped, and subsidiary hazards do not require placarding. However, placards must be displayed for these *subsidiary* hazards:

- A Division 6.1 poisonous by inhalation (PIH);

- A Class 7 radioactive uranium hexafluoride with a Class 8 corrosive subsidiary; and

- A Division 4.3 dangerous when wet.

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STEP 7—TRANSPORTING

In This Step...

Anyone who performs the task of *loading* or *unloading* hazardous materials into or from a transport vehicle, rail car, airplane, vessel, etc., must comply with the applicable *carrier* regulations (see 49 CFR 173.30). The specific provisions that apply are determined by the function you perform and the *mode* of transportation (rail, air, vessel, or highway by motor vehicle).

You must determine:

- General handling and loading requirements and any special handling or loading precautions that apply to the material;
- Which materials may not be transported on the same vehicle, rail car, or freight container;
- Which materials must be separated within a vehicle, rail car, or freight container;
- Requirements for securing packages against movement and damage; and
- Requirements for safe operation and transportation, per mode of transportation.

Key Regulatory References

49 CFR	What's There?
174	Rules for loading, moving, and unloading trains
175	Rules for loading, moving, and unloading airplanes
176	Rules for loading, moving, and unloading vessels (boats and ships)
177	Rules for loading, moving, and unloading motor vehicles
172, Subpart H	Rules requiring detailed training for anyone "directly affecting" safety of hazardous materials transportation

What's It All About?

No matter who does the actual loading, packages containing hazardous material must be properly:

- Handled to prevent damage during loading and unloading;
- Segregated and separated to prevent incompatible material from mingling during transportation; and
- Secured and braced to prevent movement and damage during transportation.

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Additionally, the person transporting the material must know what to do with packages that are found damaged or leaking and what to do in an emergency.

What You Already Need to Know

To properly load and transport hazardous materials, you must know:

- Everything from Steps 1, 2, 3, 4, and 5 (classification, naming, packaging, shipping papers, and marking and labeling);
- The primary hazard of all materials on the transport vehicle, rail car, or freight container;
- The labels displayed on all non-bulk packages being loaded; and
- Any other regulations that may apply to the transportation of the hazardous material you are shipping.

Other Hazmat Regulations

In most cases, there are at least two sets of regulations applicable to each mode of transportation. The first, as part of the Hazardous Materials Regulations, tells how one must manage hazardous materials in that mode of transportation. The second, the "modal" regulations, tells you how to be safe in that mode of transportation, whether carrying hazardous materials or not. In addition, there are two situations where regulations other than the hazardous materials regulations apply to the transportation of hazardous materials.

Modal Rules

In addition to the hazardous materials regulations published by the Pipeline and Hazardous Materials Safety Administration (PHMSA) of the DOT, there are separate rules for each of the four modes of hazardous materials transportation. These modal rules include:

Modal Regulations	
14 CFR 1–199	Federal Aviation Administration—Aviation Safety
49 CFR 200–299	Federal Railroad Administration Regulations—Railroad Safety
49 CFR 350–399	Federal Motor Carrier Safety Regulations—Motor Carrier Safety
49 CFR 400–499 and Title 46 (all)	US Coast Guard and Federal Maritime Commission

Regulated by Rules Other Than the Hazardous Materials Regulations

There are two special situations where the transportation of hazardous materials in commerce is NOT regulated by the DOT's hazardous materials regulations [49 CFR 171–180]. These two situations are:

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Step 7—Transporting, continued

- Pipelines. The rules for using pipelines to transport hazardous materials are found at 49 CFR 190–199.

- Bulk by vessel. The rules for using a bulk vessel to transport hazardous materials (e.g., an oil tanker or barge) are found at Title 33 of the *Code of Federal Regulations,* Chapter 1, particularly Subchapters O and P.

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LOADING AND UNLOADING MOTOR VEHICLES
General Requirements

The rules for loading motor vehicles include both general and hazard class–specific requirements. All rules applicable to any material shipped must be complied with. Some of the specific requirements and issues for loading and unloading motor vehicles are summarized below.

Securing of Packages [49 CFR 177.834(a)]

Packages containing hazardous materials must be secured against movement during transportation. Packages with valves or other fittings must be loaded in a manner to minimize the possibility of damage during transport.

Orientation of Packages [49 CFR 177.834(b)]

Packages of hazardous materials that are required to be marked with the orientation markings ("up" arrows) at 49 CFR 172.312 must be loaded into the transport vehicle with the arrows pointed upwards and must remain so positioned during transport.

Prohibition Against Smoking and Fires [49 CFR 177.834(c) and (d)]

Employees must not smoke on or around any vehicle while loading the following types of hazardous materials:

- Class 1 (explosive)
- Class 3 (flammable liquids)
- Class 4 (flammable solids)
- Class 5 (oxidizing)
- Division 2.1 (flammable gas)

In addition, care must be taken to keep fire away from the vehicles during the loading and unloading process, including fires from lighted cigars, pipes, or cigarettes.

Setting the Handbrake vs. Chocking Wheels [49 CFR 177.834(e)]

The US DOT explicitly requires that a vehicle's handbrake must be set during loading and unloading ***and*** all other "reasonable precautions" must be taken to prevent move-

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ment of the vehicle. In addition, OSHA rules often require that wheels be chocked (e.g., 29 CFR 1910.178(k)).

Use of Tools [49 CFR 177.834(f)]

Do not use tools in a manner that could damage the closure of the package or compromise the package's integrity in any way.

Loading and Unloading Cargo Tanks [49 CFR 177.834(i)]

The DOT has detailed requirements for the attendance of cargo tanks (i.e., tank trucks) during loading and unloading. In general, such tanks must be attended by a "qualified" individual.

A person is considered to be attending the loading or unloading process if, during the entire process, he or she:

- Is alert,
- Is within 25 feet of the cargo tank, and
- Has an unobstructed view of the tank to the maximum extent practicable.

A qualified individual is one who:

- Has been made aware of the nature of the materials being loaded or unloaded,
- Has been instructed in emergency procedures, and
- Is authorized to move the cargo tank in case of emergency and has the means to do so.

Carriers With Valid Safety Permits [49 CFR 173.22(b)]

When carrying certain high-hazard materials (explosives, radioactives, etc.), shippers can only use carriers who have a "valid safety permit" from the Federal Motor Carrier Safety Administration (FMCSA).

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SEGREGATION AND SEPARATION
Using the Chart in 49 CFR 177, Subpart C

Applicability [49 CFR 177.848(a)]

Because certain types of hazardous materials could pose the potential for dangerous interactions with one another, the DOT has created rules regarding the storage, loading, and transportation of different classes with one another. These segregation and separation rules generally must be followed for the following hazardous materials transported in:

1. Packages requiring labels or placards (therefore, these rules do NOT include most limited quantity and consumer commodity packages);
2. Multi-compartmented cargo tanks; and
3. Portable tanks loaded in a transport vehicle or freight container.

Using the Segregation Table [49 CFR 177.848(d) and (e)]

To determine whether or not two different hazard classes can be stored or transported together under the DOT's hazardous materials regulations, it is necessary to use the Segregation Table for Hazardous Materials that appears at 49 CFR 177, Subpart C.

To use the table, simply find each of the hazard classes in question, one along the top and the other along the side, and look to see what appears in the box where the two intersect. There are four possibilities for any pair of hazardous materials:

- An "X"
- An "O"
- A blank space
- An "*"

The Letter "X"

When an "X" is in the intersecting box for two hazard classes, these materials may not be loaded, stored, or transported together on the same vehicle.

The Letter "O"

When an "O" is in the intersecting box for two hazard classes, the materials may be loaded, stored, or transported together on the same vehicle, provided that steps are taken to ensure that comingling of the materials would not occur in the event of leakage during the course of normal transportation.

In addition, Class 8 corrosive liquids generally may not be loaded above or adjacent to:

- Class 4 (flammable); or
- Class 5 (oxidizing).

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Segregation and Separation, continued

A Blank Space

If there is no symbol in the intersecting box for the two hazard classes, then no restrictions apply to storing, loading, or transporting the two materials together.

The Symbol "*"

When an "*" appears in the intersecting box for two hazard classes, it indicates that the segregation among these different Class 1 explosives is governed by the Compatibility Table at 49 CFR 177.848(f).

The Absence of a Hazard Class

The absence of a hazard class on the table means there are no restrictions for that class.

Additional Restrictions

Cyanides and Cyanide Mixtures [49 CFR 177.848(c)]

Generally, cyanides and cyanide mixtures or solutions may not be stored, loaded, or transported with acids.

However, waste cyanides and cyanide mixtures can be transported with ALL acids under certain conditions. See 49 CFR 173.12(e) for specifics.

Division 4.2 and Class 8 Liquids [49 CFR 177.848(c)]

Generally, Class 8 liquids may not be stored, loaded, or transported with Division 4.2 spontaneously combustible materials.

Poison Inhalation Hazards [49 CFR 177.848(c)]

Division 6.1, Packing Group I, Hazard Zone A materials may not be stored, loaded, or transported with Class 3 or Class 8 liquids or Class 4 or Class 5 materials.

The "A" in the "Notes" Column [49 CFR 177.848(e)(5)]

The "A" in the notes column (Column 2) indicates that ammonium nitrate (UN 1942) and ammonium nitrate fertilizer may be loaded or stored with Division 1.1 or Division 1.5 explosive materials despite the fact that there is an "X" is in the intersecting box for these materials.

Subsidiary Hazards [49 CFR 177.848(e)(6)]

If Column 6 of the 172.101 Table requires a material to have a subsidiary hazard label, then the separation and segregation rules must be applied using the subsidiary hazard *if it is more restrictive* than the results of comparing primary hazards. However, hazardous materials within the same class may be stored or transported together without regard to their subsidiary hazards, provided they are not capable of:

- Reacting dangerously;
- Causing combustible or dangerous heat;
- Causing the evolution of flammable, poisonous, or asphyxiant gases; or
- The formation of corrosive or unstable materials.

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Segregation and Separation, continued

Segregation Table for Hazardous Materials

Class or division	Notes	1.1 1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3 gas Zone A	2.3 gas Zone B	3	4.1	4.2	4.3	5.1	5.2	6.1 liquids PG 1 Zone A	7	8 liquids only
Explosives, 1.1 and 1.2	A	*	*	*	*	*	X	X	X	X	X	X	X	X	X	X	X	X	X
Explosives, 1.3		*	*	*	*	*	X		X	X	X		X	X	X	X	X		X
Explosives, 1.4		*	*	*	*	*	O		O	O	O		O				O		O
Very insensitive explosives, 1.5	A	*	*	*	*	*	X	X	X	X	X	X	X	X	X	X	X	X	X
Extremely insensitive explosives, 1.6		*	*	*	*	*													
Flammable gases, 2.1		X	X	O	X				X	O							O	O	
Non-toxic, non-flammable gases, 2.2		X			X														
Poisonous gas Zone A, 2.3		X	X	O	X		X				X	X	X	X	X	X			X
Poisonous gas Zone B, 2.3		X	X	O	X		O				O	O	O	O	O	O			O
Flammable liquids, 3		X	X	O	X				X	O					O		X		
Flammable solids, 4.1		X			X				X	O							X		O
Spontaneously combustible materials, 4.2		X	X	O	X				X	O							X		X
Dangerous when wet materials, 4.3		X	X		X				X	O							X		O
Oxidizers, 5.1	A	X	X		X				X	O	O						X		O
Organic peroxides, 5.2		X	X		X				X	O							X		O
Poisonous liquids PG I Zone A, 6.1		X	X	O	X		O				X	X	X	X	X	X			X
Radioactive materials, 7		X			X		O												
Corrosive liquids, 8		X	X	O	X				X	O		O	X	O	O	O	X		

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MANIFEST DISCREPANCIES

Types of Manifest Discrepancies [40 CFR 264.72(a) and 265.72(a)]

Manifest discrepancies are:

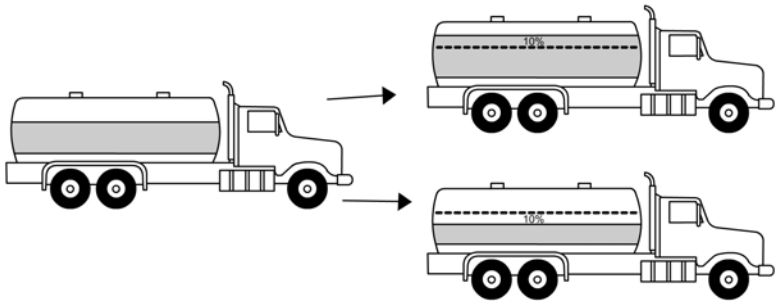
- Significant differences between the quantity or type of hazardous waste designated on the manifest or shipping paper and the quantity and type of hazardous waste a facility actually receives;
- Rejected wastes, whether the facility rejects the entire shipment or only a portion of it; or
- Container residues that exceed the quantity limits for "empty" containers.

Significant Discrepancies in Quantity [40 CFR 264.72(b) and 265.72(b)]

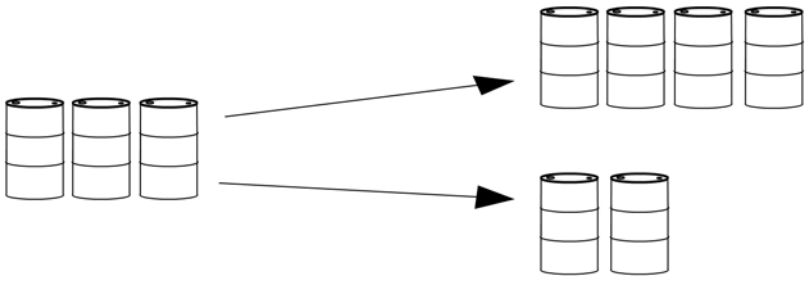
A significant discrepancy in quantity would be:

- For bulk wastes, variations greater than 10% in weight; and
- For batch waste, any variation in piece count.

Bulk Shipment:



Batch Shipment:



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Manifest Discrepancies, continued

Significant Discrepancies in Type [40 CFR 264.72(b) and 265.72(b)]

A significant discrepancy in type would be an obvious difference in the waste that can be discovered by inspection, such as waste solvent substituted for waste acid or toxic constituents that have not been reported on the manifest. They are NOT manifest mistakes.

Required Actions for Significant Discrepancies [40 CFR 264.72(c) and 265.72(c)]

If a TSDF discovers a manifest discrepancy, the facility must:

1. Attempt to reconcile the discrepancy with the generator; and

2. Note the discrepancy in Item 18 on the manifest.

If, after 15 days, the TSDF and the generator are unable to reconcile the discrepancy, then the TSDF must notify the state or the US EPA in writing.

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REJECTED SHIPMENTS

TSDFs Rejecting Shipments [40 CFR 264.72(e) and (f)]

If a facility rejects (in part or in total) a shipment of hazardous waste, then the facility may forward the waste to another TSDF or return it to the generator (per the generator's instructions). To do either of these, it must:

- Prepare a new manifest in accordance with the regulations at 40 CFR 262.20(a);
- Write the generator's US EPA ID number in Item 1 and the generator's name and address in Item 5 of the new manifest;
- Copy the manifest tracking number of the old manifest to the Special Handling and Additional Information Block of the new manifest and indicate the shipment is a residue or rejected waste from a previous shipment;
- Copy the manifest tracking number of the new manifest to Item 18(a) of the old manifest;
- Sign the Generator's/Offeror's Certification as the offeror of the shipment; and
- Send the waste to the alternative facility or the generator within 60 days of the rejection.

NOTE: If the waste is being returned to the generator, then the TSDF's EPA ID number should be written in Item 1, and the generator's name and ID number should be written in the designated facility block (Item 8).

If the TSDF rejects the entire shipment while the transporter is still present at the facility, then the rejected shipment may be forwarded to an alternate facility or returned to the generator by completing Item 18b of the original manifest.

Generators Receiving Returned Hazardous Wastes [40 CFR 262.34(m)]

The new manifest rules amended the definition of a "designated facility" to include a generator site that has been designated on a manifest to receive its waste as a return shipment from a TSDF that has rejected that hazardous waste. [40 CFR 260.10]

If a generator receives hazardous waste back from a designated facility as a rejected load or residue, then the generator may accumulate the returned waste on site in accordance with the 90-day or 180-day rules (depending on generator status). In such cases, the 90-day or 180-day clock is "reset," and generators have an additional 90 or 180 days to accumulate the waste on site.

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EXCEPTION REPORTING AND FOLLOW-UP

Origination vs. Confirmation [40 CFR 264.71 and 265.71]

Origination Copy

Generators sending hazardous waste off site must keep a copy of the manifest (the "origination" or generator copy) for three years *or* until receipt of a signed copy from the TSDF.

Confirmation Copy

TSDF must sign (by hand) and date the manifest to confirm that the shipment was received, identify whether there were any "significant discrepancies," and return a copy bearing a handwritten signature to the generator (the "confirmation" or facility copy) within 30 days of receipt of the shipment.

Make Sure You Get It Back!

Large Quantity Generators [40 CFR 262.42(a)(1) and (2)]

1. Check in 35 Days

   A large quantity generator must determine the status of the hazardous waste shipment if no confirmation copy is received from the TSDF within 35 days of the date of shipment.

   - Contact the TSDF operator to determine whether it received the shipment and whether it sent the confirmation copy.
   - If the TSDF has not received the shipment, contact the transporter to determine the status of the shipment.

2. Exception Report in 45 Days

   A large quantity generator who does not receive a confirmation copy bearing the handwritten signature of the TSDF operator within 45 days of shipment must submit an exception report to the EPA Regional Administrator for the region in which the generator is located or to the State agency, if the state has RCRA authorization.

   The exception report must include:

   i. A legible copy of the manifest; and
   ii. A cover letter, signed by the generator, explaining efforts taken to locate the hazardous waste and the results of those efforts.

Small Quantity Generators [40 CFR 262.42(b)]

- Exception Report in 60 Days

A small quantity generator who does not receive a confirmation copy from the TSDF within 60 days of the date of shipment must submit a copy of the manifest with an indication that it has not received confirmation of delivery. This can be indicated by a handwritten or typed note directly on the manifest copy or on an attached note. This should be sent to the EPA Regional Administrator for the region in which the generator is located or to the RCRA-authorized State agency.

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MANIFEST TRACKING SYSTEM

Following is a simple procedure to provide a system for tracking Uniform Hazardous Waste Manifests. It is the generator's responsibility to assure that manifest copies are returned from TSDFs within the regulatory required period of time, and that appropriate actions are taken if manifest copies are not returned from TSDFs.

1. Establish a file to be used specifically for tracking current manifested shipments of hazardous waste for which TSDF copies have not been returned (the manifest "tracking file"). Also create a separate chronological file for maintaining copies of all manifests for which delivery has been confirmed by the TSDF (the "chronological file").

2. When a manifested shipment is sent off site, after all other manifest copies are distributed appropriately [i.e., given to transporters, sent to states as required], keep the generator's copy and place it in *back* of the manifest tracking file. This will keep the newest manifests at the back of the file, and the oldest outstanding manifests at the front.

3. When a TSDF confirmation copy is received for a particular manifest, remove that manifest from the tracking file. Compare the generator's copy to the TSDF confirmation copy.

   - Did the TSDF hand sign and date the manifest?
   - Do the printed and signed names agree?
   - Are any "discrepancies" [Ref. 40 CFR 265.72(a)] indicated in Item 18a?
   - If any discrepancies are indicated, were you notified by the TSDF as required by 40 CFR 265.72, and were the discrepancies resolved?

   NOTE: The TSDF *may not* make any changes or alterations to the manifest except to indicate "discrepancies" in Item 18a.

4. If all items are completed properly, no discrepancies have been indicated, and no changes have been made by the TSDF, staple together the generator's copy (from the tracking file) and the TSDF confirmation copy. Place these in the *front* of the chronological manifest file. This assures that the *newest* additions to the file are in *front*.

5. *At least once each working day*, open the manifest tracking file and check the date of the *front* manifest. This will be the oldest manifest in the file, as the new ones are added from the back.

6. If 35 days have elapsed since the date shown in Item 15, and no copy has been received from the TSDF, *immediately* determine the status of the waste shipment by contacting the transporter and the TSDF. (***Note:*** In some states, this time

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Manifest Tracking System, continued

period may be shorter; check State regulatory requirements.) **Keep written records of your telephone conversations with all parties involved, including name of individual contacted, company name, time and date of call, and conclusions reached as a result of the call.** This is *extremely* important documentation and may be used if it becomes necessary to submit an Exception Report.

7. If 45 days have elapsed since the date shown in Item 15, and no copy has been received from the TSDF, you must immediately submit an exception report as required by 40 CFR 262.42 or State equivalent regulations.

8. Keep copies of returned manifests for at least three years from the date of shipment.

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