Land Disposal Restrictions

Compliance Reference

www.Lion.com

LION TECHNOLOGY INC.®

Expert Training—Anytime, Anywhere™

Land Disposal Restrictions

Compliance Reference

LION TECHNOLOGY INC.®
Expert Training. Anytime, Anywhere.™

LION CORPORATE POLICIES

Confidentiality

Any non-public information supplied by the client is kept as top confidential until and unless a formal release is obtained.

The nature and scope of our services for any client are considered to be confidential.

Information to be supplied to outside agencies (e.g. reports, requests for exemptions, permits, or registrations) will be, when requested, prepared by LION TECHNOLOGY INC. and then vetted, approved, and submitted by the client and not LION TECHNOLOGY INC. The client assumes full responsibility for the accuracy, completeness, and scope of information supplied in all cases, whether researched, prepared, and/or drafted by LION TECHNOLOGY INC. or not.

In instances where LION TECHNOLOGY INC. may represent a client, either openly or on a nondisclosed (blind) basis, only information approved by the client will be presented, and the client assumes responsibility therefore in all instances and aspects.

In the event of termination of our services per any agreements in effect, such materials or information as particularly relate to the client will be promptly returned and/or destroyed.

Ethics

Our responsibility is to our clients. Our goal is to assist them in complying with and, where possible, benefiting from the hazardous materials/wastes regulations affecting their business area. We do endeavor to guide implementation of the most practical and inexpensive programs possible to achieve safety and compliance.

Concurrently, we have assumed the professional and social responsibility to meet the objectives of protecting human and environmental health, safety, and integrity. Therefore, we do not assist in finding "loopholes" or developing avoidance procedures not in the spirit of said laws and responsibilities.

We deal only with subcontractors, suppliers, and professionals as have been found to maintain similar high standards of integrity, capabilities, and ethics. This protects both our clients and our own interests, and we are adamant in this regard.

Copyrights

The GMP (Good Management Practices) System and all related materials, modules, literature, and other elements thereof are the copyrighted property of LION TECHNOLOGY INC. No copies, photographs or recordings, or duplications in any form may be made without specific written authorization from LION TECHNOLOGY INC.

Disclaimer

This workshop has been designed to provide guidelines for compliance with the applicable Acts, Rules, and Regulations thereunder as in effect at the date of publication hereof. Notwithstanding that the workshops are intended to serve such purposes, LION TECHNOLOGY INC. and/or any and all agents or affiliates, cannot and shall not be or become liable or responsible in any way, with or without the use of these workshops, in connection with or for any loss, injury, damage, penalty, or violation to, by or in respect of any person or property, however caused. Neither LION TECHNOLOGY INC. nor any of their agents or affiliates, act or purport to act as legal counsel, guarantor, warrantor, or insurer with respect to the workshops and/or the contents thereof.

Errors and Omissions

As stated in the promotional materials, we here again state our policy on errors and omissions. All conclusions, information, worksheets, or other actions resulting from these meetings should be reviewed with your legal counsel before proceeding. Neither LION TECHNOLOGY INC., its Divisions, representatives, or personnel assume any responsibility for errors and/or omissions regardless of cause and by whom.

Your attendance, participation, and/or any actions are to be with this explicit understanding.

© Lion Technology Inc.
18-0828

CONTENTS

Slide Presentation....1
Acronyms and Key Terms....31
Land Disposal Restrictions (LDRS)....32
Introduction....32
Generator's LDR Responsibilities....33
Step 1: Determining Significant Waste Codes....35
Step 2: Determining the Treatment Standards....39
Step 3: Determining Underlying Hazardous Constituents (UHCs)....42
Alternative Treatment Standards....44
- Lab Packs—40 CFR 268.42(c)....44
- Hazardous Debris—40 CFR 268.45....46
- Contaminated Media—40 CFR 268.49....48

LDR Documentation Requirements....52

© Lion Technology Inc.

LION TECHNOLOGY INC.

Land Disposal Restrictions

1 © Lion Technology Inc. 18-0828

Land Disposal Restrictions (LDRs)
What's It All About?

In general, no hazardous waste can be placed in a land disposal unit (e.g., a landfill) until it has been treated to meet applicable treatment standards

2 © Lion Technology Inc. 18-0828

Generator's LDR Responsibilities

LDRs are treatment standards intended to:

- Minimize the long-term threat to human health and the environment
- Treat hazardous wastes using the "best demonstrated available technology"

3 © Lion Technology Inc. 18-0828

Generator's LDR Responsibilities
Initial Generator Is Responsible

- LDRs apply at the moment a hazardous waste is generated
- Generator has the ultimate responsibility to determine LDRs and communicate information to TSDF

4 © Lion Technology Inc. 18-0828

Basic Steps for Generators

1. Determine significant LDR waste code(s)
2. Determine all applicable treatment standards for each waste code
3. Identify any "underlying hazardous constituents" (UHCs) in the waste

5 © Lion Technology Inc. 18-0828

Step 1: Determining Significant Waste Codes

Generator is required to identify all significant waste codes

- "Significant" codes are the codes that must be treated for before the waste can be land disposed

Not all waste codes are significant

[40 CFR 268.9(b)]

6 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Determining "Significant" Waste Codes

[40 CFR 268.9]

7 © Lion Technology Inc. 18-0828

Determining "Significant" Waste Codes

Only Listed Codes

[40 CFR 268.9]

8 © Lion Technology Inc. 18-0828

Determining "Significant" Waste Codes

Only Listed Codes → All Significant

[40 CFR 268.9]

9 © Lion Technology Inc. 18-0828

Determining "Significant" Waste Codes

Only Listed Codes → All Significant

Only Characteristic Codes

[40 CFR 268.9]

10 © Lion Technology Inc. 18-0828

Determining "Significant" Waste Codes

Only Listed Codes → All Significant

Only Characteristic Codes → All Significant

[40 CFR 268.9]

11 © Lion Technology Inc. 18-0828

Determining "Significant" Waste Codes

Only Listed Codes → All Significant

Only Characteristic Codes → All Significant

Both { Listed Codes / Characteristic Codes }

[40 CFR 268.9]

12 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Determining "Significant" Waste Codes

Only Listed Codes → All Significant

Only Characteristic Codes → All Significant

Both
- Listed Codes → All Significant
- Characteristic Codes

[40 CFR 268.9]

13 © Lion Technology Inc. 18-0828

Determining "Significant" Waste Codes

Only Listed Codes → All Significant

Only Characteristic Codes → All Significant

Both
- Listed Codes → All Significant
- Characteristic Codes → May or may not be significant

[40 CFR 268.9]

14 © Lion Technology Inc. 18-0828

Determining Significant Waste Codes: Example

Which waste code MUST be significant?

15 © Lion Technology Inc. 18-0828

Determining Significant Waste Codes: Example

Which waste code MUST be significant?

Significant

Listed codes are ALWAYS significant

16 © Lion Technology Inc. 18-0828

Determining Significant Waste Codes: Example

Which waste code MUST be significant?

Significant

Listed codes are ALWAYS significant

- **The D005 is caused by barium**

17 © Lion Technology Inc. 18-0828

Determining Significant Waste Codes: Example

Which waste code MUST be significant?

Significant

Listed codes are ALWAYS significant

- **The D005 is caused by barium**
- **The D006 is caused by cadmium**

18 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Determining Significant Waste Codes: Example

Which waste code MUST be significant?

Significant

- **The D005 is caused by barium**
- **The D006 is caused by cadmium**

Listed codes are ALWAYS significant

The F007 treats for:
- **Cadmium**
- **Chromium**
- **Cyanides**
- **Lead**
- **Nickel**
- **Silver**

19 © Lion Technology Inc. 18-0828

Determining Significant Waste Codes: Example

Which waste code MUST be significant?

Significant

- **The D005 is caused by barium**
- **The D006 is caused by cadmium**

The F007 treats for:
- **Cadmium**
- **Chromium**
- **Cyanides**
- **Lead**
- **Nickel**
- **Silver**

Is the D005 code significant?

20 © Lion Technology Inc. 18-0828

Determining Significant Waste Codes: Example

Which waste code MUST be significant?

Significant
Significant

- **The D005 is caused by barium**
- **The D006 is caused by cadmium**

The F007 treats for:
- **Cadmium**
- **Chromium**
- **Cyanides**
- **Lead**
- **Nickel**
- **Silver**

Is the D005 code significant?

21 © Lion Technology Inc. 18-0828

Determining Significant Waste Codes: Example

Which waste code MUST be significant?

Significant	F007
Significant	D005
	D006

- The D005 is caused by barium
- The D006 is caused by cadmium

The F007 treats for:
- **Cadmium**
- **Chromium**
- **Cyanides**
- **Lead**
- **Nickel**
- **Silver**

Is the D006 code significant?

22 © Lion Technology Inc. 18-0828

Determining Significant Waste Codes: Example

Which waste code MUST be significant?

Significant	F007
Significant	D005
Not Significant	D006

- The D005 is caused by barium
- The D006 is caused by cadmium

The F007 treats for:
- **Cadmium**
- **Chromium**
- **Cyanides**
- **Lead**
- **Nickel**
- **Silver**

Is the D006 code significant?

23 © Lion Technology Inc. 18-0828

Step 2: Determining the Treatment Standards

- Treatment standards are found at 40 CFR 268.40
- Each waste code is listed with its appropriate treatment(s)

Waste Code	Waste description and treatment/ regulatory subcategory[1]	Regulated hazardous constituent		Wastewaters	Non-wastewaters
		Common Name	CAS[2] Number	Concentration[3] in mg/L; or Technology Code[4]	Concentration[5] in mg/kg unless noted as "mg/L TCLP"; or Technology Code[4]
D008[7]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for lead based on the toxicity characteristic leaching procedure (TCLP) in SW846	Lead	7439-92-1	0.69 and meet §268.48 standards[8]	0.75 mg/L TCLP and meet §268.48 standards[8]
	Lead Acid Batteries Subcategory. (Note: This subcategory consists of nonwastewaters only.)	Lead	7439-92-1	NA	RLEAD
	Radioactive Lead Solids Subcategory. (Note: This subcategory consists of nonwastewaters only.)	Lead	7439-92-1	NA	MACRO

24 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Step 2: Determining the Treatment Standards

To determine the appropriate treatment standard for each waste code, must know a few things about the waste:

- What are the significant waste codes?
- What is the waste subcategory? (*as applicable)*
- What is the treatability group?

Waste Code	Waste description and treatment/ regulatory subcategory[1]	Regulated hazardous constituent		Wastewaters	Non-wastewaters
		Common Name	CAS[2] Number	Concentration[3] in mg/l; or Technology Code[4]	Concentration[5] in mg/kg unless noted as "mg/L TCLP"; or Technology Code[4]
D008[9]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for lead based on the toxicity characteristic leaching procedure (TCLP) in SW846	Lead	7439-92-1	0.69 and meet §268.48 standards[8]	0.75 mg/L TCLP and meet §268.48 standards[8]
	Lead Acid Batteries Subcategory. (Note: This subcategory consists of nonwastewaters only.)	Lead	7439-92-1	NA	RLEAD

25 © Lion Technology Inc. 18-0828

LDR Treatment Standards Table – Excerpt
40 CFR 268.40

- Column 1 – waste codes
- Column 2 – waste description and subcategory
- Columns 3 and 4 – regulated constituent name and CAS number
- Columns 5 and 6 – treatment standards

Waste Code	Waste description and treatment/ regulatory subcategory[1]	Regulated hazardous constituent		Wastewaters	Non-wastewaters
		Common Name	CAS[2] Number	Concentration[3] in mg/l; or Technology Code[4]	Concentration[5] in mg/kg unless noted as "mg/L TCLP"; or Technology Code[4]
D008[9]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for lead based on the toxicity characteristic leaching procedure (TCLP) in SW846	Lead	7439-92-1	0.69 and meet §268.48 standards[8]	0.75 mg/L TCLP and meet §268.48 standards[8]

26 © Lion Technology Inc. 18-0828

Waste Code Subcategory

If a waste is divided into subcategories, must identify which one it best matches because the treatment can vary for different subcategories

Waste Code	Waste description and treatment/ regulatory subcategory[1]
D008[9]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for lead based on the toxicity characteristic leaching procedure (TCLP) in SW846
	Lead Acid Batteries Subcategory. (Note: This subcategory consists of nonwastewaters only.)
	Radioactive Lead Solids Subcategory. (Note: This subcategory consists of nonwastewaters only.)

27 © Lion Technology Inc. 18-0828

Treatability Group

- Wastewater:
  - Contains < 1% by weight total organic carbon (TOC); AND
  - Contains < 1% by weight total suspended solids (TSS)
- Nonwastewater:
  - Doesn't meet the criteria for wastewater

[40 CFR 268.2]

28 © Lion Technology Inc. 18-0828

Determining Treatment Standards: Example 1

- Treatment differs for different D008 lead wastes

Waste code	Waste description and treatment/ regulatory subcategory[1]	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS[2] Number	Concentration[3] in mg/L or Technology Code[4]	Concentration[3] in mg/kg unless noted as "mg/l TCLP"; or Technology Code[4]
D008[5]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for lead based on the toxicity characteristic leaching procedure (TCLP) in SW846.	Lead	7439-92-1	0.69 and meet §268.48 standards[6]	0.75 mg/l TCLP and meet §268.48 standards[6]
	Lead Acid Batteries Subcategory (Note: This standard only applies to lead acid batteries that are identified as RCRA hazardous wastes and that are not excluded elsewhere from regulation under the land disposal restrictions of 40 CFR 268 or exempted under other EPA regulations (see 40 CFR 266.80). This subcategory consists of nonwastewaters only.)	Lead	7439-92-1	NA	RLEAD

29 © Lion Technology Inc. 18-0828

Step 3: Determining Underlying Hazardous Constituents (UHCs)

An underlying hazardous constituent is "any constituent listed in §268.48… which can reasonably be expected to be present at the point of generation of the hazardous waste at a concentration above the constituent-specific UTS treatment standards."

[40 CFR 268.2(i)]

30 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Requirements for Treating UHCs

Three questions determine if generators must identify UHCs:

1. Are there any significant D codes?
2. Does the treatment standard for any significant D code state “and meet §268.48 standards?”

Waste code	Waste description and treatment/Regulatory subcategory[1]	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS[2] number	Concentration[3] in mg/L; or Technology Code[4]	Concentration[3] in mg/kg unless noted as “mg/L TCLP”; or Technology Code[4]
D010[5]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for selenium based on the toxicity characteristic leaching procedure (TCLP) in SW846.	Selenium	7782-49-2	0.82 and meet §268.48 standards[5]	5.7 mg/L TCLP and meet §268.48 standards[5]

31 © Lion Technology Inc. 18-0828

Requirements for Treating UHCs

Three questions determine if generators must identify UHCs:

3. Is there a reasonable expectation that there is something in the waste that has not yet been treated for by a significant waste code?

Waste code	Waste description and treatment/Regulatory subcategory[1]	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS[2] number	Concentration[3] in mg/L; or Technology Code[4]	Concentration[3] in mg/kg unless noted as “mg/L TCLP”; or Technology Code[4]
D010[5]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for selenium based on the toxicity characteristic leaching procedure (TCLP) in SW846.	Selenium	7782-49-2	0.82 and meet §268.48 standards[5]	5.7 mg/L TCLP and meet §268.48 standards[5]

32 © Lion Technology Inc. 18-0828

Determining UHCs: Example

- An F007, D005, and D006 hazardous waste is produced
- The waste contains antimony at 2 mg/L TCLP and thallium at 0.05 mg/L TCLP

33 © Lion Technology Inc. 18-0828

Determining UHCs: Example

- Significant codes are F007 and D005
- Nonwastewater
- Treatment standard for the D005 code requires the waste to be treated to 40 CFR 268.48 standards

Waste code	Waste description and treatment/Regulatory subcategory[1]	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS[2] number	Concentration[3] in mg/L; or Technology Code[4]	Concentration[5] in mg/kg unless noted as "mg/L TCLP"; or Technology Code[4]
D005[6]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for barium based on the toxicity characteristic leaching procedure (TCLP) in SW846.	Barium	7440-39-3	1.2 and meet §268.48 standards[8]	21 mg/L TCLP and meet §268.48 standards[8]

34 © Lion Technology Inc. 18-0828

Determining UHCs: Example

- Antimony and thallium are not treated by either the F007 or D005 codes, so need to check 40 CFR 268.48 to see if they are listed as UHCs

35 © Lion Technology Inc. 18-0828

Determining UHCs: Example

- Antimony is in the 40 CFR 268.48 table
- The regulatory limit for antimony in a nonwastewater is _____

Regulated constituent common name	CAS[1] number	Wastewater standard	Nonwastewater standard
		Concentration[2] in mg/l	Concentration[3] in mg/kg unless noted as "mg/l TCLP"
Antimony	7440-36-0	1.9	1.15 mg/l TCLP
Arsenic	7440-38-2	1.4	5.0 mg/l TCLP
Barium	7440-39-3	1.2	21 mg/l TCLP
Beryllium	7440-41-7	0.82	1.22 mg/l TCLP
Cadmium	7440-43-9	0.69	0.11 mg/l TCLP

36 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Determining UHCs: Example

- Antimony is in the 40 CFR 268.48 table
- The regulatory limit for antimony in a nonwastewater is **1.15 mg/L TCLP**

Regulated constituent common name	CAS[1] number	Wastewater standard Concentration[2] in mg/l	Nonwastewater standard Concentration[3] in mg/kg unless noted as "mg/l TCLP"
Antimony	7440-36-0	1.9	1.15 mg/l TCLP
Arsenic	7440-38-2	1.4	5.0 mg/l TCLP
Barium	7440-39-3	1.2	21 mg/l TCLP
Beryllium	7440-41-7	0.82	1.22 mg/l TCLP
Cadmium	7440-43-9	0.69	0.11 mg/l TCLP

37 © Lion Technology Inc. 18-0828

Determining UHCs: Example

Antimony is present in the waste at a concentration of 2 mg/L TCLP

- Above the threshold listed at 40 CFR 268.48
- **Antimony is a UHC**

Regulated constituent common name	CAS[1] number	Wastewater standard Concentration[2] in mg/l	Nonwastewater standard Concentration[3] in mg/kg unless noted as "mg/l TCLP"
Antimony	7440-36-0	1.9	1.15 mg/l TCLP
Arsenic	7440-38-2	1.4	5.0 mg/l TCLP
Barium	7440-39-3	1.2	21 mg/l TCLP
Beryllium	7440-41-7	0.82	1.22 mg/l TCLP
Cadmium	7440-43-9	0.69	0.11 mg/l TCLP

38 © Lion Technology Inc. 18-0828

Determining UHCs: Example

- Thallium is in the 40 CFR 268.48 table
- The regulatory limit for thallium in a nonwastewater is _____

Regulated constituent common name	CAS[1] number	Wastewater standard Concentration[2] in mg/l	Nonwastewater standard Concentration[3] in mg/kg unless noted as "mg/l TCLP"
Thallium	7440-28-0	1.4	0.20 mg/l TCLP
Vanadium[5]	7440-62-2	4.3	1.6 mg/l TCLP
Zinc[5]	7440-66-6	2.61	4.3 mg/l TCLP

39 © Lion Technology Inc. 18-0828

Determining UHCs: Example

- Thallium is in the 40 CFR 268.48 table
- The regulatory limit for thallium in a nonwastewater is **0.20 mg/L TCLP**

Regulated constituent common name	CAS[1] number	Wastewater standard Concentration[2] in mg/l	Nonwastewater standard Concentration[3] in mg/kg unless noted as "mg/l TCLP"
Thallium	7440-28-0	1.4	0.20 mg/l TCLP
Vanadium[5]	7440-62-2	4.3	1.6 mg/l TCLP
Zinc[5]	7440-66-6	2.61	4.3 mg/l TCLP

40 © Lion Technology Inc. 18-0828

Determining UHCs: Example

Thallium is present in the waste at a concentration of 0.05 mg/L TCLP

- Below the threshold listed at 40 CFR 268.48
- **Thallium is not identified as a UHC**

Regulated constituent common name	CAS[1] number	Wastewater standard Concentration[2] in mg/l	Nonwastewater standard Concentration[3] in mg/kg unless noted as "mg/l TCLP"
Thallium	7440-28-0	1.4	0.20 mg/l TCLP
Vanadium[5]	7440-62-2	4.3	1.6 mg/l TCLP
Zinc[5]	7440-66-6	2.61	4.3 mg/l TCLP

41 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Waste Profile
Waste codes: F002 (trichloroethylene), F005 (isobutyl alcohol and pyridine), D001 (isobutyl alcohol, pyridine, and isopropanol), D006 (cadmium), D011 (silver), and D040 (trichloroethylene) TOC: > 90%, TSS: > 1% TCLP: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Significant Waste Codes
Wastewater or Nonwastewater

42 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Material 1 – Spent Solvent Blend Containing Metals

Waste Profile
Waste codes: F002 (trichloroethylene), F005 (isobutyl alcohol and pyridine), D001 (isobutyl alcohol, pyridine, and isopropanol), D006 (cadmium), D011 (silver), and D040 (trichloroethylene) TOC: > 90%, TSS: > 1% TCLP: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Significant Waste Codes
F002
Wastewater or Nonwastewater

43 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Waste Profile
Waste codes: F002 (trichloroethylene), F005 (isobutyl alcohol and pyridine), D001 (isobutyl alcohol, pyridine, and isopropanol), D006 (cadmium), D011 (silver), and D040 (trichloroethylene) TOC: > 90%, TSS: > 1% TCLP: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Significant Waste Codes
F002, F005
Wastewater or Nonwastewater

44 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Waste Profile
Waste codes: F002 (trichloroethylene), F005 (isobutyl alcohol and pyridine), D001 (isobutyl alcohol, pyridine, and isopropanol), D006 (cadmium), D011 (silver), and D040 (trichloroethylene) TOC: > 90%, TSS: > 1% TCLP: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Significant Waste Codes
F002, F005, D001
Wastewater or Nonwastewater

45 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Waste Profile
Waste codes: F002 (trichloroethylene), F005 (isobutyl alcohol and pyridine), D001 (isobutyl alcohol, pyridine, and isopropanol), D006 (cadmium), D011 (silver), and D040 (trichloroethylene) TOC: > 90%, TSS: > 1% TCLP: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Significant Waste Codes
F002, F005, D001, D006
Wastewater or Nonwastewater

46 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Waste Profile
Waste codes: F002 (trichloroethylene), F005 (isobutyl alcohol and pyridine), D001 (isobutyl alcohol, pyridine, and isopropanol), D006 (cadmium), D011 (silver), and D040 (trichloroethylene) TOC: > 90%, TSS: > 1% TCLP: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Significant Waste Codes
F002, F005, D001, D006, and D011
Wastewater or Nonwastewater

47 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Waste Profile
Waste codes: F002 (trichloroethylene), F005 (isobutyl alcohol and pyridine), D001 (isobutyl alcohol, pyridine, and isopropanol), D006 (cadmium), D011 (silver), and D040 (trichloroethylene) TOC: > 90%, TSS: > 1% TCLP: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Significant Waste Codes
F002, F005, D001, D006, and D011
Wastewater or Nonwastewater
Nonwastewater

48 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
F002	
F005	
D001	
D006	
D011	

49 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
F002 First description – F002 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	
F005	
D001	

50 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
F002 First description – F002 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	Treat trichloroethylene down to at least 6 mg/kg total concentration
F005	
D001	

51 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
F002 First description – F002 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	Treat trichloroethylene down to at least 6 mg/kg total concentration
F005 First description – F005 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	
D001	

52 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
F002 First description – F002 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	Treat trichloroethylene down to at least 6 mg/kg total concentration
F005 First description – F005 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	Treat isobutyl alcohol down to at least 170 mg/kg total concentration. Treat pyridine down to at least 16 mg/kg total concentration.
D001	

53 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
F002 First description – F002 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	Treat trichloroethylene down to at least 6 mg/kg total concentration
F005 First description – F005 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	Treat isobutyl alcohol down to at least 170 mg/kg total concentration. Treat pyridine down to at least 16 mg/kg total concentration.
D001 Second description – High TOC ignitable characteristic *(≥ 10% TOC = High TOC subcategory*	

54 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
F002 First description – F002 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	Treat trichloroethylene down to at least 6 mg/kg total concentration
F005 First description – F005 solvent containing trichloroethylene, isobutyl alcohol, and pyridine	Treat isobutyl alcohol down to at least 170 mg/kg total concentration. Treat pyridine down to at least 16 mg/kg total concentration.
D001 Second description – High TOC ignitable characteristic *(≥ 10% TOC = High TOC subcategory*	RORGS; CMBST; or POLYM

55 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
D006	
D011	

56 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
D006 First description – Toxicity characteristic for cadmium	
D011	

57 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
D006 First description – Toxicity characteristic for cadmium	Treat cadmium down to at least 0.11 mg/L TCLP and meet §268.48 standards
D011	

58 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
D006 First description – Toxicity characteristic for cadmium	Treat cadmium down to at least 0.11 mg/L TCLP and meet §268.48 standards
D011 First description – Toxicity characteristic for silver	

59 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

Subcategories	Treatment Standards
D006 First description – Toxicity characteristic for cadmium	Treat cadmium down to at least 0.11 mg/L TCLP and meet §268.48 standards
D011 First description – Toxicity characteristic for silver	Treat silver down to at least 0.14 mg/L TCLP and meet §268.48 standards

60 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Material 1 – Spent Solvent Blend Containing Metals

UHCs
TCLP results: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Chromium – ***Nickel –*** ***Lead –*** ***Copper –***

61 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

UHCs
TCLP results: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Chromium – treat as a UHC; above regulatory limit; treat down to 0.60 mg/L TCLP ***Nickel –*** ***Lead –*** ***Copper –***

62 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

UHCs
TCLP results: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Chromium – treat as a UHC; above regulatory limit; treat down to 0.60 mg/L TCLP ***Nickel –*** treat as a UHC; above regulatory limit; treat down to 11 mg/L TCLP ***Lead –*** ***Copper –***

63 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

UHCs
TCLP results: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Chromium – treat as a UHC; above regulatory limit; treat down to 0.60 mg/L TCLP ***Nickel –*** treat as a UHC; above regulatory limit; treat down to 11 mg/L TCLP ***Lead –*** not a UHC; below regulatory limit of 0.75 mg/L TCLP ***Copper –***

64 © Lion Technology Inc. 18-0828

Material 1 – Spent Solvent Blend Containing Metals

UHCs
TCLP results: cadmium = 6 mg/L; copper = 30 mg/L; chromium = 3 mg/L; lead = 0.5 mg/L; nickel = 20 mg/L; silver = 9 mg/L
Chromium – treat as a UHC; above regulatory limit; treat down to 0.60 mg/L TCLP ***Nickel –*** treat as a UHC; above regulatory limit; treat down to 11 mg/L TCLP ***Lead –*** not a UHC; below regulatory limit of 0.75 mg/L TCLP ***Copper –*** not a UHC because it's not listed as a regulated constituent

65 © Lion Technology Inc. 18-0828

Alternative Treatment Standards

Lab packs

Hazardous debris

Contaminated media

66 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Problems Posed by Lab Packs

- Lab packs contain small amounts of various hazardous wastes packed together
- Lab packs may be treated to meet either:
  - Each LDR standard that applies to all of the waste codes in the lab pack; or
  - The alternative lab pack standards

[40 CFR 268.42(c)]

67 © Lion Technology Inc. 18-0828

Alternative Standards Allowed

- Lab packs must be incinerated
- Residues may require further treatment
- Special certification is required
- All waste codes must be identified; however, *not* required to determine UHCs

Not all waste codes can be "lab packed"—specific LDR treatment standards apply!

68 © Lion Technology Inc. 18-0828

LDR Documentation Requirements

LDR documentation must be created for any waste that had LDRs attached to it at the point of generation

- Many different types of LDR documents exist
- Records must be kept for three years after last time waste was sent off site

[40 CFR 268.7(a)]

69 © Lion Technology Inc. 18-0828

Notifications and Certifications

Notifications ("land ban forms") are used when either:

- The waste hasn't met its treatment standards; OR
- The generator decides not to make the determination as to whether the waste needs to be treated

[40 CFR 268.7(a)(2)]

70 © Lion Technology Inc. 18-0828

Notifications and Certifications

Certifications are used to indicate that a waste has met all its LDR treatment standards and can be legally land disposed

- Must include a specific, signed certification statement from generator

[40 CFR 268.7(a)(3)]

71 © Lion Technology Inc. 18-0828

Format of Notifications and Certifications

Notifications and certifications typically must include:

- Manifest document number of first shipment
- EPA hazardous waste codes
- Treatability group
- Waste subcategory (where applicable)
- Available waste analysis data

LAND DISPOSAL NOTIFICATION AND CERTIFICATION

D'Argo Waste Disposal
345 Duncan Avenue
Springfield, KA 67882
Phone: 785-555-5555

1. GENERAL INFORMATION

Generator:_____ US EPA ID No._____

Manifest No.:_____ Manifest Line No. 11a☐ 11b☐ 11c☐ 11d☐

EPA Waste Code No(s):_____

Waste Category: ☐ Non-wastewater ☐ Wastewater

Waste Subcategory, if applicable: _____

72 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Requirements for Sending Notifications and Certifications

Notifications and certifications must be sent to the TSDF:

- With the *initial* shipment of the waste; AND
- If the waste changes

[40 CFR 268.7(a)(2) and (a)(3)]

73 © Lion Technology Inc. 18-0828

Documentation for Constituents of Concern in F001–F005 and F039 Wastes

If sending F001–F005 or F039 waste to a TSDF, must identify constituents of concern present in waste

- Otherwise, TSDF must treat and monitor for ALL potentially regulated constituents (i.e., all solvents listed under F001–F005 or every constituent listed at F039)

2. TREATMENT STANDARDS:
A. F001 - F005 Solvent Waste (check each constituent present in the waste)

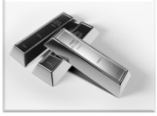
Regulated Constituent	Waste water mg/L	Non-waste water mg/kg	Regulated Constituent	Waste water mg/L	Non-waste water mg/kg	Regulated Constituent	Waste water mg/L	Non-waste water mg/kg
___ Acetone	0.28	160	___ o-Cresol	0.11	5.6	___ Nitrobenzene	0.068	14
___ Benzene	0.14	10	___ Cyclohexanone	0.36	NA	___ Pyridine	0.014	16
___ n-Butyl alcohol	5.6	2.6	___ o-Dichlorobenzene	0.088	6.0	___ Tetrachloroethylene	0.056	6.0
___ Carbon tetrachloride	0.057	6.0	___ Ethyl acetate	0.34	33	___ Toluene	0.080	10
___ Carbon disulfide	3.8	NA	___ Ethyl benzene	0.057	10	___ 1,1,1-Trichloroethane	0.054	6.0
___ Chlorobenzene	0.057	6.0	___ Ethyl ether	0.12	160	___ 1,1,2-Trichloroethane	0.054	6.0
___ Cresol-mixed isomers (Cresylic acid) (sum of o-,m-, p-cresol concentrations)	0.88	11.2	___ Isobutyl alcohol	5.6	170	___ 1,1,2-Trichloro-1,2,2 trifluoroethane	0.057	30
___ Cresol (m- and p-isomers)	0.77	5.6	___ Methanol	5.6	NA	___ Trichloroethylene	0.054	6.0
			___ Methylene chloride	0.089	30	___ Trichloromonofluoromethane	0.020	30
			___ Methyl ethyl ketone	0.28	36	___ Xylenes (total)	0.32	30
			___ Methyl isobutyl ketone	0.14	33			

74 © Lion Technology Inc. 18-0828

Documentation for UHCs in Characteristic Wastes

If sending characteristic wastes (D codes) subject to 40 CFR 268.48 standards to a TSDF, must identify UHCs that are reasonably expected to be present in waste

- Otherwise, TSDF must treat and monitor for ALL potentially regulated constituents (i.e., everything on the Universal Treatment Standards Table)



75 © Lion Technology Inc. 18-0828

The "One-time Notice to File"

Required for wastes that were subject to LDRs at the point of generation but later excluded from the hazardous waste regulations, for example:

- Wastes treated in an on-site wastewater treatment system and then discharged under a Clean Water Act permit
- Neutralized corrosive wastes sent via sanitary sewer to a POTW

[40 CFR 268.7(a)(7)]

76 © Lion Technology Inc. 18-0828

The "One-time Notice to File"

- The notice must describe the generation, exclusion, and ultimate disposition of the waste
- The notice must be kept on file at the generator's facility

[40 CFR 268.7(a)(7)]

77 © Lion Technology Inc. 18-0828

Waste Analysis Plan

- A plan is required if the generator is treating hazardous wastes on site to meet LDR standards
- The plan must:
  - Be based on a detailed analysis of wastes
  - Describe procedures used to comply with treatment standards (including testing frequency)

[40 CFR 268.7(a)(5)]

78 © Lion Technology Inc. 18-0828

© Lion Technology Inc.
18-0828

Thank You for Attending

We hope that enjoyed the AHMP conference!

You may reach us at:

info@lion.com

973-383-0800

www.Lion.com

79 © Lion Technology Inc. 18-0828

NOTES

© Lion Technology Inc.
18-0828

Land Disposal Restrictions

© Lion Technology Inc.
18-0828

© Lion Technology Inc.

ACRONYMS AND KEY TERMS

CST: Constituent subject to treatment

Debris: "solid material exceeding a 60 mm particle size that is intended for disposal and that is: A manufactured object; or plant or animal matter; or natural geologic material." [40 CFR 268.2]

HSWA: Hazardous and Solid Waste Amendments of 1984

Land Ban Form: Common name for forms used to meet the land disposal restriction notification requirements

LDR: Land disposal restrictions

Nonwastewater: "wastes that do not meet the criteria for wastewaters...." [40 CFR 268.2]

RCRA: Resource Conservation and Recovery Act

TOC: Total organic carbon: an analytical method that measures the total amount of carbon present in organic compounds in a mixture.

Treatability group: Wastewater or nonwastewater categories are commonly referred to as treatability groups.

TSDF:Treatment, storage, or disposal facility

TSS: Total suspended solids: an analytical method that measures the total amount of non-dissolved solids present in a liquid.

UHC: Underlying hazardous constituent

Underlying hazardous constituent: "any constituent listed in §268.48, Table UTS—Universal Treatment Standards, except fluoride, selenium, sulfides, vanadium, and zinc, which can reasonably be expected to be present at the point of generation of the hazardous waste at a concentration above the constituent-specific UTS treatment standards." [40 CFR 268.2]

UTS: Universal treatment standards

Wastewater: "wastes that contain less than 1% by weight total organic carbon (TOC) and less than 1% by weight total suspended solids (TSS)." [40 CFR 268.2]

Notes:

© Lion Technology Inc.

LAND DISPOSAL RESTRICTIONS (LDRS)
Introduction

Key Regulatory References

40 CFR	Topic
268.7	Testing and recordkeeping
268.9	Rules for determining "significant" waste codes
268.40	Treatment standards
268.48	List of potential underlying hazardous constituents (UHCs)
268.42(c), 268.45, and 268.49	Alternative treatment standards

What's It All About?

In general, no hazardous waste can be placed in a land disposal unit (e.g., a landfill or surface impoundment) until it has been treated to meet its applicable treatment standards at 40 CFR 268. The EPA established treatment standards for each hazardous waste based on the effectiveness of existing treatment technologies in minimizing the present and long-term threat to human health and the environment from land disposal of the waste.

The specific treatment standards that apply are based on what the hazardous waste was at its *initial* point of generation.

For each hazardous waste produced, the generator must be able to identify the specific land disposal restriction (LDR) treatment standards that apply, based on what the hazardous waste is at its initial point of generation. Then, the generator must record these treatment standards and communicate the information to the treatment, storage, or disposal facility (TSDF), so that the facility knows what treatment standards apply to each hazardous waste it receives.

What Do You Need to Know?

To determine the applicable LDR treatment standards, the generator needs to gather everything learned from hazardous waste identification. This includes knowing:

- What applicable waste codes (listed and/or characteristic) apply at the initial point of generation.
- What specific constituents are present in the waste at the initial point of generation (through knowledge and/or analysis).
- What the amount of total suspended solids in the hazardous waste at the initial point of generation is.
- What the amount of total organic carbon present at the initial point of generation is.
- Whether it is one of the following special hazardous wastes:
  - Lab pack
  - Hazardous debris
  - Contaminated environmental media

Notes:

© Lion Technology Inc.
18-0828

GENERATOR'S LDR RESPONSIBILITIES
40 CFR 268

Land Disposal Restrictions

The land disposal restriction (LDR) regulations require treatment of hazardous wastes prior to disposal. These standards are designed to *minimize the long-term threat* posed to human health and the environment by requiring that hazardous wastes be treated using the "best demonstrated available technology."

It is illegal to dispose of restricted waste until it meets the applicable standards given in 40 CFR 268.

Applicability of Standards

Anything that is or was a hazardous waste must meet LDR standards before it is land disposed. The LDR standards and requirements apply to hazardous waste the moment it is generated and remain applicable through disposal, unless there is a specific exclusion.

In addition, no residue from treatment of any hazardous waste may be land disposed if it exhibits a hazardous waste characteristic.

The LDR regulations also provide alternative standards and special documentation requirements for contaminated debris, lab packs, and contaminated soil.

Initial Generator Is Responsible

LDR treatment standards apply to a hazardous waste at the initial point of generation. The *generator* of a hazardous waste bears the primary responsibility for determining whether the waste meets the applicable LDR standards and for communicating this information in writing to treatment, storage, or disposal facilities.

Generators and TSDFs each have specific documentation and recordkeeping requirements.

Basic Steps for Generators

1. Determine the significant LDR waste code(s) that apply to the waste at the *initial* point of generation of the waste.

2. Determine all treatment standards applicable to the waste based on the significant waste code(s).

Notes:

© Lion Technology Inc.
18-0828

Generator's LDR Responsibilities, continued

3. Identify any "underlying hazardous constituents" for any wastes with significant characteristic waste codes (D codes).

LDR Paperwork Requirements [40 CFR 268.7(a)(8)]

Generators must prepare, provide, and keep copies of all notifications, certifications, and supporting documentation used to make any of the above determinations. These records must be kept for at least three years.

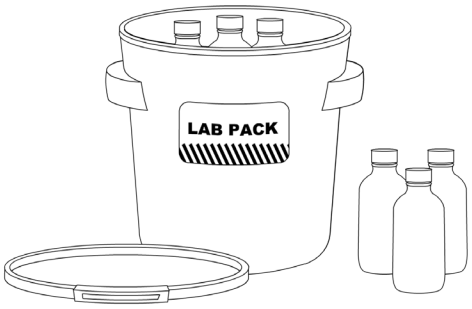
Variances [40 CFR 268.7(a)(4)]

If necessary, a person may petition the EPA for a no-migration variance, capacity variance, or treatability variance. These variances allow the person either to land dispose of the waste without treating it to meet the specific standards or to treat it to different standards. Variances must go through rulemaking procedures, and petitioners must make specific demonstrations to the EPA.

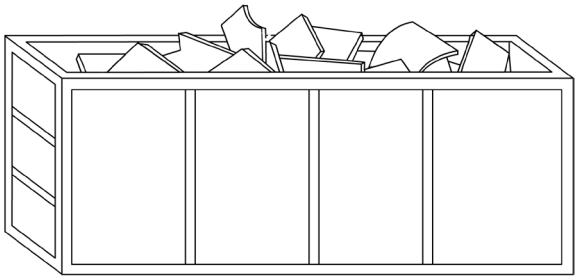
Alternate Treatment Standards [40 CFR 268.42(c), 268.45, and 268.49]

There are certain situations where the current treatment standards found at 40 CFR 268.40 cannot be met or would be financially burdensome. The EPA has identified three alternative treatment standards for the following three situations:

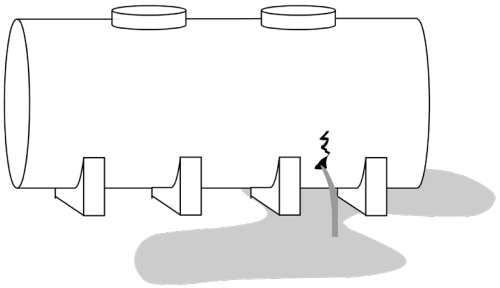
1. Labpacks



2. Hazardous debris



3. Contaminated media



Notes:

© Lion Technology Inc.
18-0828

STEP 1: DETERMINING SIGNIFICANT WASTE CODES 40 CFR 268.9(b)

Standards Set for Each Waste Code

The EPA has identified treatment standards for all hazardous wastes in a table at 40 CFR 268.40. The table organizes the treatment standards by waste code (i.e., D001, F003, etc.). To locate the specific treatment standard for a hazardous waste, the generator must know which waste codes to look up in the table.

"Applicable" Waste Codes vs. "Significant" Waste Codes

According to the instructions for hazardous waste identification at 40 CFR 262.11, the generator must identify all applicable waste codes for a hazardous waste. As a result of this process, a hazardous waste will fall into one of three categories:

1. It is hazardous *only* due to listings (i.e., it only carries F, K, P, or U waste codes).
2. It is hazardous *only* due to characteristics (i.e., it only carries D waste codes).
3. It is *both* listed and characteristic.

"Significant" codes are the waste codes that must be identified to the TSDF and treated for before the waste can be land disposed. In some cases, "applicable" waste codes will not be considered "significant," meaning that, for some wastes, even though certain waste codes might techically apply to the waste, the waste would not actually need to meet that waste code's treatment standard prior to land disposal of the waste.

Determining "Significant" Waste Codes [40 CFR 268.9]

Hazardous Wastes That Carry Only Listed Waste Codes

If the hazardous waste carries only listed waste codes (F, K, P, or U codes), all of the waste codes will be considered significant, and the waste will need to be treated to meet the standards at 40 CFR 268.40 for all applicable listed waste codes.

Hazardous Wastes That Carry Only Characteristic Waste Codes

If the hazardous waste carries only characteristic waste codes (D codes), all of the waste codes will be considered significant and the waste will need to be treated to meet the standards at 40 CFR 268.40 for all applicable characteristic waste codes.

Hazardous Wastes That Carry Both Listed and Characteristic Waste Codes [40 CFR 268.9(b)]

If the hazardous waste carries BOTH listed and characteristic waste codes:

Notes:

© Lion Technology Inc.
18-0828

Step 1: Determining Significant Waste Codes, continued

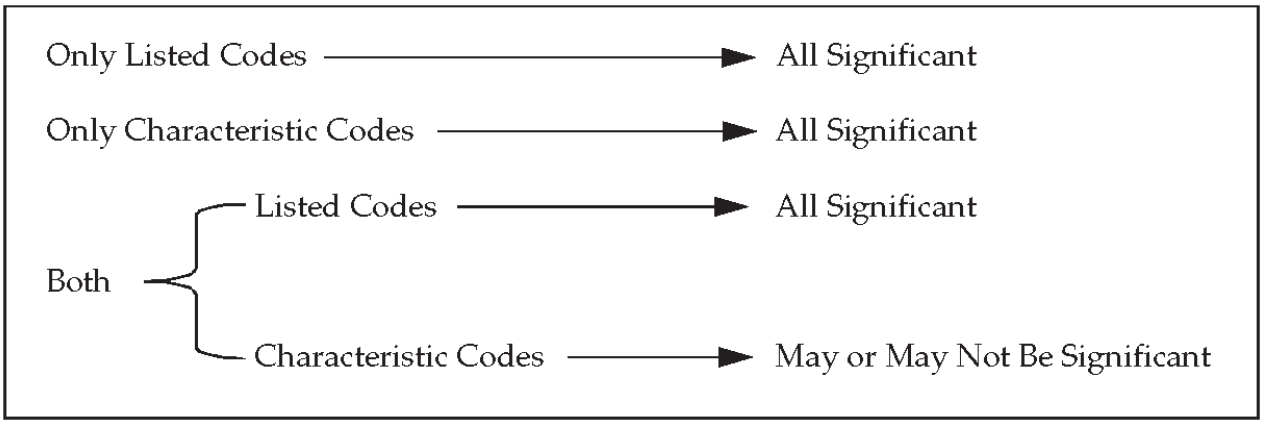
- ALL of the listed waste codes (F, K, P, or U codes) are significant.
- The characteristic waste codes (D codes) MAY or MAY NOT be significant.

The rules at 40 CFR 268.9(b) explain how to determine which characteristic codes are significant, and which codes are not, when a hazardous waste carries both listed and characteristic codes. To determine whether a characteristic waste code is significant, the generator must:

1. Determine the constituents that cause each of the characteristics in the hazardous waste.
2. Look up the treatment standard for the listed waste codes (F, K, P, or U) at 40 CFR 268.40.

- If the constituent causing the characteristic is identified in the treatment standard for the listed waste code, the characteristic waste code is *not* significant.
- If the constituent that causes the characteristic is not included in the treatment standard for the listed waste code, the characteristic waste code *is* significant.

Essentially, the rules state that if the treatment for the listed waste code will treat for the specific constituent(s) that cause the characteristic waste code, there is no need to identify the characteristic waste code to the TSDF for treatment, because it will be "covered" by the treatment for the listed waste code.



Notes:

© Lion Technology Inc.
18-0828

Step 1: Determining Significant Waste Codes, continued

Determining Significant Waste Codes: Example

A generator creates a spent cyanide plating bath solution from electroplating operations (F007) that contains barium (D005) and cadmium (D006) above regulatory levels.

The treatment standard for F007 is automatically significant because listed codes (F, K, P, and U) are always significant.

Barium causes the D005 characteristic. Since the treatment standard at 40 CFR 268.40 for F007 does NOT specify a treatment for barium, the D005 waste code is significant. Cadmium causes the D006 characteristic. Since the treatment standard at 40 CFR 268.40 for F007 specifies treatment for cadmium, the D006 waste code is *not* significant.

Answer: The F007 and D005 codes are significant.

Waste Code	Waste Description and Treatment/ Regulatory Subcategory	Regulated Hazardous Constituent		Wastewaters	Non-Wastewaters
		Common Name	CAS Number	Concentration in mg/L or Technology Code	Concentration in mg/kg unless noted as "mg/L TCLP"; or Technology Code
F007	Spent cyanide plating bath solutions from electroplating operations.	Cadmium	7440-43-9	NA	0.11 mg/L TCLP
		Chromium	7440-47-3	2.77	0.60 mg/L TCL
		Cyanides (Total)	57-12-5	1.2	590
		Cyanides (Amenable)	57-12-5	0.86	30
		Lead	7439-92-1	0.69	0.75 mg/L TCLP
		Nickel	7440-02-0	3.98	11 mg/L TCLP
		Silver	7440-22-4	NA	0.14 mg/L TCLP

1. The F007 is automatically significant because it is a listed waste code.

2. Barium causes the D005. Cadmium causes the D006.

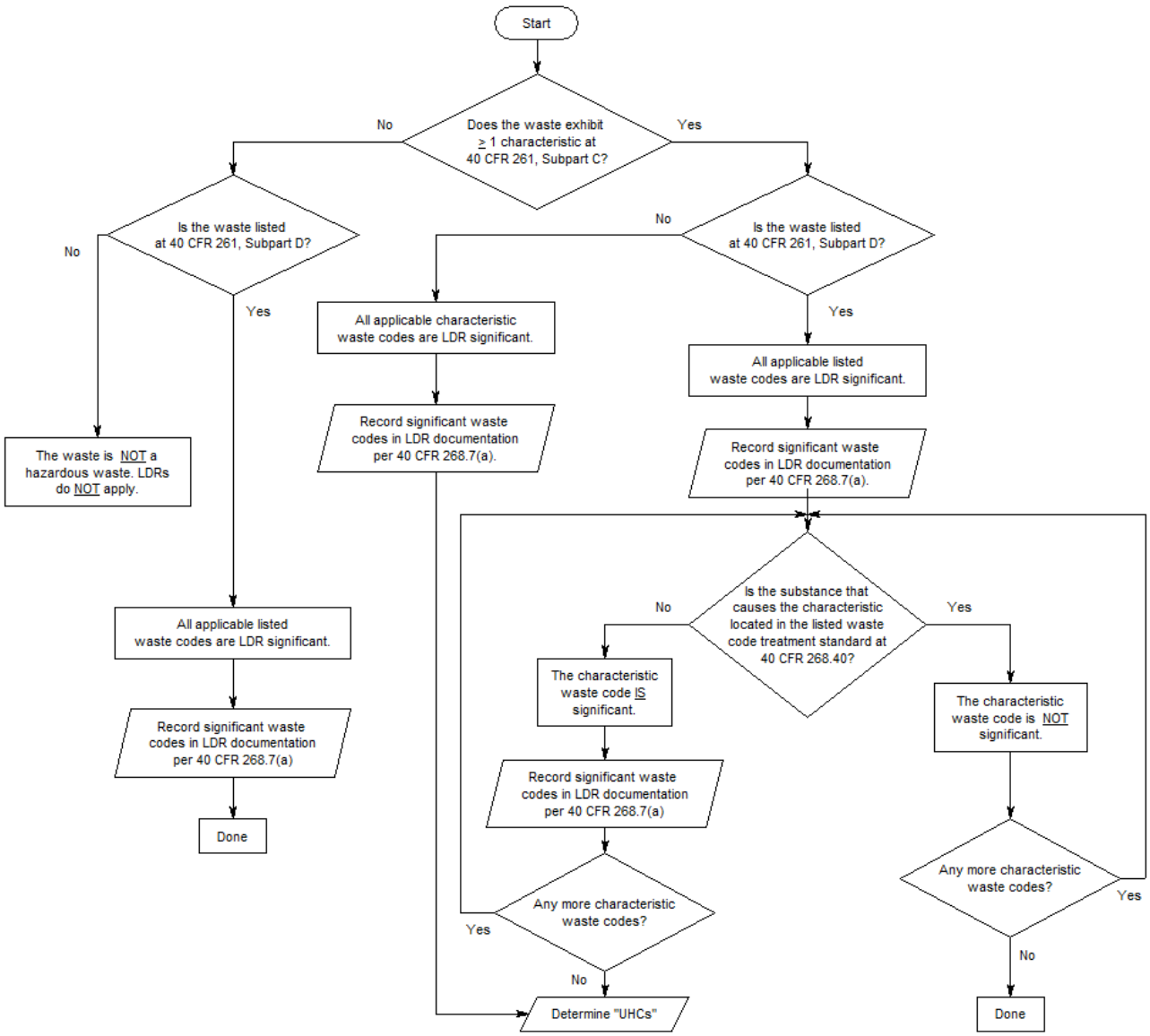
3. The TSDF will treat for the constituents that are in this column when treating the significant waste code.

4. The F007 contains a treatment standard for cadmium, so there is no need to treat the cadmium again as a D006. The F007 does not contain a treatment for barium, so the D005 must be treated.

5. Therefore, the F007 and D005 are significant; the D006 is not significant since it will be treated for by the F007 treatment standard.

© Lion Technology Inc.
18-0828

Step 1: Determining Significant Waste Codes, continued



© Lion Technology Inc.
18-0828

STEP 2: DETERMINING THE TREATMENT STANDARDS 40 CFR 268.40

Treatment standards for hazardous wastes subject to LDRs are found in the table at 40 CFR 268.40, "Treatment Standards for Hazardous Wastes." To determine which standard or standards apply to your waste, you must know the following about your waste:

- The significant waste codes
- The subcategory for each waste code (when applicable)
- The regulated constituents
- The waste's treatability group
- The "constituents of concern" in the waste (when applicable).

Waste Code	Waste description and treatment/regulatory subcategory[1]	Regulated hazardous constituent		Wastewaters	Non-wastewaters
		Common Name	CAS[2] Number	Concentration[3] in mg/L; or Technology Code[4]	Concentration[5] in mg/kg unless noted as "mg/L TCLP"; or Technology Code[4]
D008[9]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for lead based on the toxicity characteristic leaching procedure (TCLP) in SW846	Lead	7439-92-1	0.69 and meet §268.48 standards[8]	0.75 mg/L TCLP and meet §268.48 standards[8]
	Lead Acid Batteries Subcategory. (Note: This subcategory consists of nonwastewaters only.)	Lead	7439-92-1	NA	RLEAD
	Radioactive Lead Solids Subcategory. (Note: This subcategory consists of nonwastewaters only.)	Lead	7439-92-1	NA	MACRO
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile.	Acetonitrile	75-05-8	5.6	38
		Acrylonitrile	107-13-1	0.24	84
		Acrylamide	79-06-1	19	23
		Benzene	71-43-2	0.14	10
		Cyanide (Total)	57-12-5	1.2	590

The subcategory is a brief description of the waste.

The treatability groups contain the actual treatment standard for a specific constituent.

The treatment standard for a particular constituent can be found where the subcategory and the treatability group intersect.

© Lion Technology Inc.
18-0828

Step 2: Determining the Treatment Standards, continued

Waste Code Subcategory

The EPA has identified different treatment standards for some waste codes using subcategories.

The subcategories in Column 2 of the treatment standard table are descriptive. Generators must determine which one best describes their waste. Often, the subcategories are straightforward and obvious. For instance, one subcategory could be "batteries," while the other subcategory consists of wastes that are clearly not batteries. It is also common for there to be only one subcategory, eliminating the need to make a choice at all.

Regulated Hazardous Constituent

The regulated hazardous constituents are the chemicals/compounds that will be treated for when a specific waste code is sent for treatment. Often, there is more than one chemical being treated for through a waste code.

Treatability Group [40 CFR 268.2]

The last two columns of the treatment standard table identify the actual treatment standards for each waste code and subcategory. These columns are divided into "wastewaters" and "nonwastewaters."

- *Wastewater:* If the waste contains less than 1% by weight total organic carbon (TOC) AND less than 1% by weight total suspended solids (TSS), it is a "wastewater."
- *Nonwastewater:* If the waste contains 1% or more by weight TOC, OR 1% or more by weight TSS, it is a "nonwastewater."

Types of Treatment Standards

There are three types of treatment standards found in the table at 40 CFR 268.40:

1. Total Concentration—The hazardous waste must be treated such that the total concentration of the constituent in Column 3 of the treatment standard table is at or below the concentration identified.

2. TCLP Concentration—The hazardous waste must be treated such that the leachable concentration of the constituents in Column 3 of the treatment standard table is at or below the level specified as mg/L TCLP.

3. Technology Standards—The hazardous waste must be treated by the technology indicated by the specified code(s)

Constituents of Concern

If the waste being treated is assigned waste codes F001 through F005 (the spent solvents) or F039 (leachate from landfills), the generator must identify the constituents of concern. Since wastes with these waste codes do not typically contain all of the regulated constituents identified at 40 CFR 268.40, the generator can identify only the regulated constituents that are present. In other words, the constituents of concern are the regulated constituents that are actually present in the waste and therefore have to be treated for. If the generator does not identify which specific constituents are in the waste, then the TSDF is required to treat for

Notes:

© Lion Technology Inc.
18-0828

Step 2: Determining the Treatment Standards, continued

ALL of the possible constituents identified for the waste by these waste codes.

Determining Treatment Standards: Example 1

A generator has a baghouse dust that fails the TCLP for lead and is assigned the D008 waste code. The waste contains > 1% TOC and > 1% TSS. What would be the treatment for the lead in the waste?

Step 1: Determine the Subcategory

There are three subcategories of D008 wastes to choose from, so the generator must choose the one that best represents the waste.

This particular waste is considered a sludge. It is not a battery and not a radioactive lead solid, so it would fall into the first subcategory: wastes that exhibit the characteristic of toxicity for lead based on the TCLP.

Step 2: Determine the Treatability Group

The treatability group for this waste would be a nonwastewater, since it has more than 1% TOC and more than 1% TSS.

Step 3: Determine the Treatment Standard

The treatment standard is found where the subcategory and treatability group intersect for the particular constituent that needs treatment, in this case, lead.

Answer: The treatment standard for lead in a nonwastewater D008 waste in the first waste subcategory is to treat the waste so that an extract of the waste will produce a maximum leachable concentration of 0.75 mg/L TCLP, and then meet §268.48 standards.

Determining Treatment Standards: Example 2

A generator has bottom stream waste from the wastewater stripper in the production of acrylonitrile that was assigned the K011 waste code. The waste contains > 1% TOC and > 1% TSS. What would be the treatment for the benzene in the waste?

Step 1: Determine the Subcategory

There is only one subcategory for K011 wastes.

Step 2: Determine the Treatability Group

The treatability group for this waste would be a nonwastewater, since it has more than 1% TOC and more than 1% TSS.

Step 3: Determine the Treatment Standard

The treatment standard is found where the subcategory and treatability group intersect for the particular regulated constituent that needs treatment, in this case, benzene.

Answer: The treatment standard for the benzene in a nonwastewater K011 waste is to treat the waste so that the total concentration of benzene in the waste after treatment is at or below 10 mg/kg.

Notes:

© Lion Technology Inc.
18-0828

STEP 3: DETERMINING UNDERLYING HAZARDOUS CONSTITUENTS (UHCS)

Definition of a UHC [40 CFR 268.2(i)]

Underlying hazardous constituents: "any constituent listed in §268.48, Table UTS—Universal Treatment Standards, except fluoride, selenium, sulfides, vanadium, and zinc, which can reasonably be expected to be present at the point of generation of the hazardous waste at a concentration above the constituent-specific UTS treatment standards."

Requirements for Treating UHCs

UHCs are essentially chemicals that are "in the background" of a characteristic hazardous waste that would not otherwise be treated for by any of the waste codes that apply to the waste, but that the EPA has decided still need to be treated for before the waste can be land disposed. Constituents that are identified and treated for under an LDR treatment standard, therefore, are not UHCs

UHCs are only required to be treated under specific circumstances related to the hazardous waste. Generators can ask themselves three questions to determine if they need to identify the UHCs in their hazardous waste:

1. After determining the significant waste codes for a particular waste, are there any significant D codes?

2. Does the treatment standard for the significant D code contain the phrase "and meet §268.48 standards"?

3. Is there a reasonable expectation that there is a constituent in the waste that has not already been treated for by a significant hazardous waste code?

Generators are only required to identify UHCs if the answer to ALL three questions is "yes." If the waste is required to meet 40 CFR 268.48 standards for UHCs, then each UHC identified by the generator must be treated down to the levels identified for the constituent in the Universal Treatment Standards Table at 40 CFR 268.48 prior to land disposal.

Waste code	Waste description and treatment/regulatory subcategory[1]	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS[2] Number	Concentration in mg/l[3]; or Technology Code[4]	Concentration in mg/kg[5] unless noted as "mg/l TCLP"; or Technology Code[4]
D005[9]	Wastes that exhibit, or are expected to exhibit, the characteristic of toxicity for barium based on the toxicity characteristic leaching procedure (TCLP) in SW846.	Barium	7440-39-3	1.2 and meet §268.48 standards[8]	21 mg/L TCLP and meet §268.48 standards[8]

Notes:

© Lion Technology Inc.
18-0828

Step 3: Determining Underlying HazardousConstituents (UHCs) , continued

Determining UHCs: Example

An F007, D005, and D006 hazardous waste is produced. The waste contains antimony at 2 mg/L TCLP and thallium at 0.05 mg/L TCLP.

The significant codes are F007 and D005 (the D006 for cadmium is not significant since the F007 code treats for cadmium).

There is only one subcategory for the F007 and one subcategory for the D005 waste codes, and the waste is a non-wastewater.

Steps 1 and 2: Are There Significant D Codes That Must "Meet 268.48 Standards?"

The treatment standard for the D005 includes the phrase "and meet §268.48 standards," therefore, we need to determine if the waste poses any UHCs.

Step 3: Are Constituents Present That Aren't Treated for by Waste Codes?

The cadmium and barium aren't UHCs since they will be treated by the F007 and D005 codes respectively. Antimony and thallium are not treated by either the F007 or D005 codes, so we must go to 40 CFR 268.48 and determine whether they are UHCs.

Antimony is listed at 40 CFR 268.48, and the amount in the waste is above the regulatory level of 1.15 mg/L TCLP for nonwastewaters. Therefore, antimony is a UHC in this waste and must be treated.

Thallium is listed at 40 CFR 268.48, but the amount in the waste is below the regulatory level of 0.2 mg/L TCLP for nonwastewaters. Therefore, thallium is not a UHC in this waste.

Answer: Antimony is a UHC for this waste.

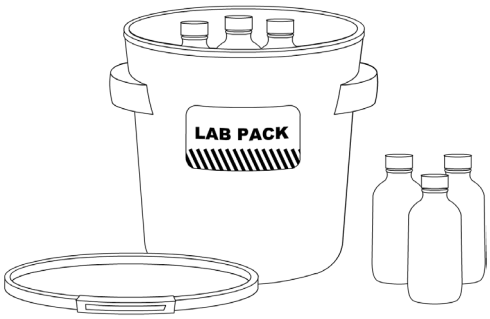
Universal Treatment Standards			
REGULATED CONSTITUENT common name	CAS Number	Wastewater Standard	Nonwastewater Standard
		Concentration in mg/L	Concentration in mg/kg unless noted as "mg/L TCLP"
Antimony	7440-36-0	1.9	1.15 mg/L TCLP
Barium	7440-39-3	1.2	21 mg/L TCLP
Cadmium	7440-43-9	0.69	0.11 mg/L TCLP
Thallium	7440-28-0	1.4	0.20 mg/L TCLP

Notes:

© Lion Technology Inc.

ALTERNATIVE TREATMENT STANDARDS
Lab Packs—40 CFR 268.42(c)

A lab pack is an outer, DOT-authorized packaging that contains two or more relatively smaller containers of different, but compatible, hazardous wastes. The standard LDR rules would require that each hazardous waste be treated to meet its specific treatment standards prior to land disposal.



Problem Posed by Lab Packs

It may be impractical to meet the treatment standards for each individual waste code placed in a lab pack. Therefore, the EPA has provided "alternative" treatment standards for lab packs, found at 40 CFR 268.42(c).

Lab packs may be treated to meet the standards that apply to all of the waste codes contained in the lab pack, or the alternative standards may be used instead.

Alternative Standards Allowed

Lab packs that do not contain *any* of the waste codes listed below may be treated using the alternative standards at 40 CFR 268.42(c).

These standards require the lab pack to be incinerated in full compliance with applicable TSDF rules.

Residues from incinerating lab packs that contained toxicity characteristic metals (D004–D011, *except* D009) must meet the treatment standards for those metals as specified at 40 CFR 268.40.

Certification

Each waste code in the lab pack must be identified; however, in this situation, generators do *not* have to determine underlying hazardous constituents (UHCs).

Generators who use the alternative standards are required to include in the notification document a statement certifying that the lab pack does not include any of the Appendix IV waste codes. [40 CFR 268.7(a)(9)]

Prohibited from Using the Alternative Standard for Lab Packs

The following waste codes listed in 40 CFR 268, Appendix IV are *not* allowed to be included in a lab pack for treatment using the alternative standards:

Notes:

© Lion Technology Inc.
18-0828

Alternative Treatment Standards, continued

- D009
- F019
- K003, K004, K005, K006, K062, K071, K100, K106
- P010, P011, P012, P076, P078
- U134, U151

These wastes must be treated to meet their individual standards found at 40 CFR 268.40.

DOT Rules Also Apply [49 CFR 173.12(b) and (d)]

The US DOT hazardous materials transportation regulations (HMR) contain special requirements for shipping lab packs. All materials placed in a lab pack must be compatible with one another. This compatibility determination cannot be made based on EPA waste codes or DOT hazard classes. Knowledge of chemistry is required to prepare lab packs safely for transportation and disposal.

DOT Packaging Requirements

The following packaging requirements apply to shipments of lab packs:

- Shippers must use an authorized UN drum, box, or IBC as the outer packaging.
- Outer packagings may contain only one hazard class of material.
- Inner packagings must be made of glass not exceeding 4 liters (~1 gallon) or metal or plastic not exceeding 20 liters (~5.3 gallons).
- When shipping liquids, enough absorbent materials to absorb the total liquid contents are required.
- Packages must be transported for disposal or recovery by highway, rail, or cargo vessels only.
- The gross weight of the completed package cannot exceed 205 kg (~452 lbs.).

Under specific conditions, the DOT allows the use of a generic shipping name in place of specific chemical names. In these cases, technical names are not required to be included on shipping papers or package markings.

DOT Prohibitions on Lab Packs

Per DOT rules, the following materials may not be packaged under the provisions for lab packs:

- Materials that are poisonous by inhalation
- Division 6.1, Packing Group I materials
- Division 4.2, Packing Group I materials
- Chloric acid
- Oleum (fuming sulfuric acid)

Notes:

© Lion Technology Inc.

ALTERNATIVE TREATMENT STANDARDS
Hazardous Debris—40 CFR 268.45

Background

Requiring contaminated debris to be treated in the same manner as the waste that contaminates the debris is not practicable in many cases. Therefore, the EPA developed alternative treatment standards for debris, which were published in the *Federal Register* on August 18, 1992. Treatment standards for hazardous debris are found at 40 CFR 268.45.

Definition of "Debris"

Debris is defined at 40 CFR 268.2(g) as a *solid* material that:

1. Has a particle size exceeding 60 mm.
2. Is intended for disposal and is:
   - A manufactured object (e.g., scrap metal, concrete, bricks, glass, plastic, lumber); or
   - Plant or animal matter (e.g., tree stumps, animal carcasses); or
   - Natural geologic material (e.g., boulders, rocks, cobbles).

Examples of Debris

Examples of materials that are considered debris and that may be treated using the alternate standards at 40 CFR 268.45 are:

- Glass
- Masonry and refractory bricks
- Tanks
- Appliances, industrial equipment
- Animal carcasses
- Rock (cobbles and boulders)
- Concrete
- Non-intact containers (e.g., crushed drums)
- Pipes, valves
- Scrap metal
- Tree stumps
- Paper, plastic, and rubber

The Following Are Specifically Not Debris:

- Any material for which a specific treatment standard has been established (e.g., lead-acid batteries).
- Process wastes, such as smelter slags.
- Residues from treatment of wastes, wastewater, sludges, or air emission residues.
- Intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. Unless "empty" under 40 CFR 261.7, these are managed as containers of hazardous waste (not debris), and any prohibited waste inside is subject to specific treatment standards.
- Soil and/or groundwater.

Notes:

© Lion Technology Inc.
18-0828

Treatment Standards for Hazardous Debris

Currently, there are three options for treatment of hazardous debris. The debris may be:

1. Treated to **meet the specific LDR standards** that apply to the waste with which the debris is contaminated. In this situation, debris contaminated with listed waste would continue to be regulated as hazardous waste after treatment and be subject to RCRA Subtitle C management standards.

2. Treated **using the alternative treatment technologies found at 40 CFR 268.45**. See discussion below.

3. Managed **in accordance with EPA's "contained-in" policy.** Under this policy, the debris is regulated as hazardous waste because it contains hazardous waste. Once the debris is treated so that it no longer contains hazardous waste, it is regulated as Subtitle D waste. It must be demonstrated to the EPA's satisfaction that the debris has been treated adequately and no longer contains hazardous waste.

Alternative Technologies for Debris [40 CFR 268.45]

The treatment technologies for debris are divided into three categories:

1. Extraction

2. Destruction

3. Immobilization

There are several treatment methods within each technology category, which are listed at 40 CFR 268.45.

There are some limitations placed on which type of technology may be used for certain debris/contaminant combinations. For example, chemical oxidation is not an acceptable method of treatment for debris contaminated with metal constituents.

Treated Debris

If the debris is treated using one of the extraction or destruction technologies listed, it will no longer be regulated as hazardous waste after treatment and may be certified "clean" and disposed of as RCRA Subtitle D "solid" waste.

If the debris is treated using an immobilization technology, the debris remains subject to hazardous waste regulation.

Residue from Treated Debris

Residuals from treating contaminated debris (e.g., water and chemical washes, material removed by grinding or spalling) must be separated from the treated debris using "simple mechanical means" and continue to be subject to the specific LDR standards that apply to the waste that contaminated the debris.

Notes:

© Lion Technology Inc.

ALTERNATIVE TREATMENT STANDARDS
Contaminated Media—40 CFR 268.49

Background

Historically, soil contaminated with a listed hazardous waste or exhibiting a characteristic had been subject to the same treatment standards as the listed waste or characteristic waste itself. In some cases, these may be unachievable or inappropriate for contaminated soil.

On May 26, 1998, the US EPA finalized specifically tailored alternative treatment standards for contaminated soils, which are more technically and environmentally appropriate. [See 63 FR 28556.]

Applicability

Land disposal restriction (LDR) treatment standards for soils apply to soils contaminated with hazardous waste. A contaminated soil is regulated as a hazardous waste if:

- The soil is mixed with one or more listed wastes.
- The contaminated soil exhibits one or more hazardous waste characteristics. [See 40 CFR 261.3.]

Contained-in Policy

The principle that a soil would be regulated as a hazardous waste by one of the above-mentioned criteria is the EPA's ***"contained-in"*** policy. The EPA may use this policy on a site-specific basis to determine that the concentration of hazardous constituents is low enough so that the medium (e.g., soil) does not contain a hazardous waste and may not be subject to the LDRs.

To determine whether LDRs apply to soils contaminated with only a listed waste, refer to the following table from 40 CFR 268.49:

If LDRs	And if LDRs	And if	Then you
Applied to the listed waste when it contaminated the soil*	Apply to the listed waste now		Must comply with LDRs
Didn't apply to the listed waste when it contaminated the soil*	Apply to the listed waste now	The soil is determined to contain the listed waste when the soil is first generated	Must comply with LDRs
Didn't apply to the listed waste when it contaminated the soil*	Apply to the listed waste now	The soil is determined not to contain the listed waste when the soil is first generated	Needn't comply with LDRs
Didn't apply to the listed waste when it contaminated the soil*	Don't apply to the listed waste now		Needn't comply with LDRs

* For dates of LDR applicability, see 40 CFR Part 268 Appendix VII. To determine the date any given listed hazardous waste contaminated any given volume of soil, use the last date any given listed hazardous waste was placed into any given land disposal unit or, in the case of an accidental spill, the date of the spill.

Notes:

© Lion Technology Inc.
18-0828

Three Treatment Options [40 CFR 268.49(b)]

There are three treatment options for contaminated soil subject to land disposal restrictions:

1. Comply with the treatment standards for hazardous waste in 40 CFR 268.40.

2. Treat according to the alternative soil treatment standards in 40 CFR 268.49.

3. Receive a site-specific variance in 40 CFR 268.44.

Alternative Soil Treatment Standards

At 40 CFR 268.48, the EPA lists approximately 300 chemical constituents and assigns a Universal LDR Treatment Standard (UTS) for each.

Identify Constituents Subject to Treatment (CSTs) [40 CFR 268.49(d)]

Under the alternative treatment standards for soil, *all* contaminated soil (listed or characteristic) must be treated for CSTs. For soils, these are defined as:

- Any constituent listed in 40 CFR 268.48 (except fluoride, selenium, sulfides, vanadium, and zinc) that are

- *Reasonably expected* to be present in the soil

- In concentrations greater than ten times the universal treatment standard (UTS) for that constituent.

In addition to the constituents mentioned above, PCBs are not required to be identified as CSTs in contaminated soils, until further notice is published in the *Federal Register.* [See 65 FR 81373, December 26, 2000.]

"90% Capped by 10 × UTS Levels" [40 CFR 268.49(c)(1)]

Under the alternative standard, soil must be treated to achieve a 90% reduction in concentration for each constituent subject to treatment.

However, if treatment of a given constituent to meet the 90% reduction standards would reduce concentrations to less than 10 × UTS, then the soil need only be treated to a concentration of 10 × UTS, not lower.

Characteristics [40 CFR 268.49(c)(2)]

Contaminated soils that exhibit a toxicity characteristic (TC) must be treated for the TC constituent. Those that exhibit the characteristic of ignitability, corrosivity, or reactivity must be treated for the characteristic property.

Examples

Facilities A and B both have releases of a spent xylene solvent (F003). The contaminated soil is removed for treatment. The only constituent subject to treatment is xylene and the soil does not exhibit any characteristic. The UTS for nonwastewater xylene is 30 mg/kg.

Notes:

© Lion Technology Inc.
18-0828

Alternative Treatment Standards, continued

Facility A

A representative sample of the recovered soil indicates that the concentration of xylene is 3,500 mg/kg.

1. 90% reduction: 3,500(0.9) = 3,150
   (3,500) – (3,150) = 350 mg/kg
2. 10 × UTS = 300 mg/kg
3. Treatment standard: Since the 90% reduction results in a higher concentration than 10 × UTS, the contaminated soil must be treated to 350 mg/kg.

Facility B

A representative sample of the recovered soil indicates that the concentration of xylene is 2,000 mg/kg.

1. 90% reduction: 2,000(0.9) = 1,800
   (2,000) – (1,800) = 200 mg/kg
2. 10 × UTS: 300 mg/kg
3. Treatment standard: The 90% reduction would result in a concentration *lower* than the 10 × UTS limit. Therefore, the contaminated soil need only be treated to 300 mg/kg.

Dilution Is Illegal [40 CFR 268.3(a)]

Any dilution of a contaminated soil as a substitute for adequate treatment to achieve compliance with LDR treatment standards is illegal. It is also illegal to mix a prohibited hazardous waste with soil in order to change its treatment classification (i.e., from waste to contaminated soil).

Site-specific Variances [40 CFR 268.44(h)(3)–(4)]

Site-specific variances from the technology treatment standards may be granted by the EPA or an authorized state if it is determined that the contaminated soil at higher concentrations will not pose a short- or long-term threat to human health and the environment. These site-specific variances are similar to the EPA's guidance for making contained-in determinations. [See 61 FR 18795, April 29, 1996.]

Recordkeeping

Standard Records [40 CFR 268.7(a)(2)–(3)]

Contaminated soils are subject to the same recordkeeping requirements as other restricted wastes. The EPA requires the following certification statement to be included with the initial notification:

> "I certify under penalty of law that I personally have examined this contaminated soil and it [does/does not] contain listed hazardous waste and [does/does not] exhibit a characteristic of hazardous waste and requires treatment to meet the soil treatment standards as provided by 268.49(c)." [40 CFR 268.7(a)(2)(i)]

Notes:

© Lion Technology Inc.
18-0828

Alternative Treatment Standards, continued

Exclusion Records [40 CFR 268.7(e)]

A one-time Notice to File must be prepared for either of the following conditions:

- The EPA or authorized state determines that the soil no longer contains a listed hazardous waste.
- The restricted soil no longer exhibits a characteristic.

State LDR Rules

Since this is a Federal EPA rule providing a "less stringent" alternative to LDR regulations, you must check your State regulations to assure that the state allows this option.

Notes:

© Lion Technology Inc.

LDR DOCUMENTATION REQUIREMENTS 40 CFR 268.7(a)

Generator LDR Documentation Requirements

Generators must create and maintain LDR documentation for any waste that had LDRs attached to it at its original point of generation. There are many different types of LDR documents required under the hazardous waste regulations, including documents identifying wastes that become excluded from the hazardous waste regulations after generation, and special documentation any time a generator makes use of an alternative treatment standard for their waste.

Record Retention [40 CFR 268.7(a)(8)]

Generators must keep a copy (on site) of all notices, certifications, waste analysis data, and any other LDR documentation for at least three years from the last date the waste subject to documentation was sent off site.

Notifications and Certifications—General [40 CFR 268.7(a)(2)–(3)]

The two most common LDR documents are "notifications" and "certifications."

The notification is commonly referred to as the "land ban form," although there is actually no standard form. A notification is used for hazardous wastes that have not met their treatment standards, or when a generator chooses not to make the determination as to whether or not the waste needs to be treated.

A certification is used to indicate to a TSDF that the hazardous waste has already met all applicable LDR treatment standards and can be legally land disposed. The certification contains a specific statement that must be signed by an "authorized representative" taking responsibility for the statement that LDR standards have been met. The statement reads as follows:

> "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D. I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

Format of Notifications and Certifications

As stated previously, there is no standard EPA notification or certification form. However, unless specifically excepted, notifications and certifications must include all of the following information:

- The manifest document number of the first shipment of the waste to the TSDF

Notes:

© Lion Technology Inc.
18-0828

LDR Documentation Requirements, continued

- The EPA hazardous waste codes (i.e., LDR "significant" waste codes for the wastes)
- The treatability group for each waste (wastewater or non-wastewater)
- The waste subcategory for each waste code (where applicable)
- Any available waste analysis data (not required for lab packs)

NOTE: In most cases, the TSDF that receives the waste will have its own form for generators to use for the shipment that will provide space for all of the required information.

Requirements for Sending Notifications and Certifications

Notifications and certifications are required to be sent to the TSDF with the *initial shipment* of hazardous waste. After that, generators are only required to send another copy with the waste they are shipping to the TSDF if:

- The waste changes.
- The generator sends the waste to a different facility.
- The regulations change, affecting what information the generator must provide.

NOTE: It is not uncommon for TSDFs to require generators to send a copy of the notification or certification with every shipment.

Special Notification and Certification Requirements

Wastes for Which the TSDF Will Make LDR Determinations [40 CFR 268.7(a)(2)]

If generators choose not to make the LDR determination of whether the waste must be treated and instead have the TSDF do it on their behalf, then in addition to the standard information required on a notification, the notification must *also* include the following:

- The manifest document number of the first shipment of the waste to the TSDF
- The EPA hazardous waste codes for the wastes
- The statement:

  "This hazardous waste may or may not be subject to the LDR treatment standards. The treatment facility must make the determination."

Documentation for Constituents of Concern in F001–F005 and F039 Wastes [40 CFR 268.7, Generator Paperwork Table]

If the generator is sending F001 through F005 or F039 listed waste to a TSDF, then in addition to the standard information required on a notification or certification, the generator must identify the constituents of concern that are reasonably expected to be present in the waste.

If the generator does not identify the constituents of concern, then the TSDF will be required to treat and monitor for ALL

Notes:

© Lion Technology Inc.

LDR Documentation Requirements, continued

potentially regulated constituents in the F001 through F005 and F039 treatment standards the generator sends to them (i.e., every solvent listed under F001 through F005 or every constituent listed under the F039 listing).

Documentation for Underlying Hazardous Constituents (UHCs) in Characteristic Wastes [40 CFR 268.7, Generator Paperwork Table]

If the generator is sending "characteristic" wastes that were subject to 40 CFR 268.48 standards to a TSDF, then in addition to the standard information required on a notification or certification, the generator must also identify the UHCs that are reasonably expected to be present in the waste. If the generator does not identify the UHCs, then the TSDF will be required to treat and monitor for ALL potentially regulated constituents in the waste (i.e., for the approximately 250 constituents listed on the Universal Treatment Standards Table at 40 CFR 268.48).

Documentation for Characteristic Wastes Treated to Remove the Characteristic but That Require Further Treatment for UHCs [40 CFR 268.9(d)(2)(i)]

If the generator sends a decharacterized hazardous waste to a TSDF for further treatment for the UHCs, then in addition to the standard information required on a notification and certification, the document must include a specific certification signed by an "authorized representative" indicating that the waste has been treated to remove the hazardous waste characteristic, but still requires additional treatment for UHCs:

> "I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.40 or 268.49 to remove the hazardous characteristic. This decharacterized waste contains underlying hazardous constituents that require further treatment to meet treatment standards. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

Documentation for Characteristic Wastes That Meet All LDR Standards and Are Being Sent to a Subtitle D Facility [40 CFR 268.9(d)]

Special LDR documentation is required for characteristic hazardous wastes that have met their LDR treatment standards and will be sent to a Subtitle D landfill for disposal. Unlike most other notifications and certifications, though, this LDR documentation is not sent to the receiving facility, but instead should just be kept by the generator.

The one-time Notice to File the generator must keep has to include all of the following information:

- The name and address of the facility receiving the waste shipment
- A description of the waste as originally generated, including applicable waste codes
- The treatability group of the waste
- Any UHCs that were originally present in the waste
- A special certification statement signed by an "authorized representative:"

  "I certify under penalty of law that I have personally examined and am familiar

Notes:

© Lion Technology Inc.
18-0828

with the treatment technology and operation of the treatment process used to support this certification. Based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the treatment standards specified in 40 CFR 268.40 without impermissible dilution of the prohibited waste. I am aware there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

Documentation for Wastes Excluded from Regulations Subsequent to the Point of Generation ("One-time Notice to File") [40 CFR 268.7(a)(7)]

In some cases, a hazardous waste that is subject to LDRs at the point of generation can later become excluded from the hazardous waste regulations through some particular relief. Examples could include wastes that are sent to an on-site wastewater treatment system and subsequently discharged under a Clean Water Act permit or neutralized corrosive wastes that are sent through a sanitary sewer to a publicly owned treatment works, or POTW.

In these cases, instead of the usual notification or certification, a one-time notice to file that describes the generation, exclusion from the hazardous waste regulations, and ultimate disposition of the waste must be created and kept with the generator's files.

NOTE: The purpose of the one-time NTF is to document the fact that a hazardous waste existed and was land disposal restricted, but was then excluded from regulation. The NTF must be kept on file at the generating facility. By doing this, the generator demonstrates that his or her land disposal restricted waste is not being illegally land disposed.

Documentation for Lab Packs Managed Under the Alternative Standards [40 CFR 268.7(a)(9) and 268.42(c)]

Generators wishing to have their hazardous waste lab packs treated under the alternative treatment standards at 40 CFR 268.42(c) must provide a notification/certification including the following information:

- The manifest document number of the first shipment of the waste to the TSDF
- The EPA hazardous waste codes for the wastes
- The following certification statement signed by an "authorized representative," stating that the lab pack does not contain wastes prohibited under the alternative standard:

  "I certify under penalty of law that I personally have examined and am familiar with the waste and that the lab pack contains only wastes that have not been excluded under appendix IV to 40 CFR part 268 and that this lab pack will be sent to a combustion facility in compliance with the alternative treatment standards for lab packs at 40 CFR 268.42(c). I am aware that there are significant penalties for submitting a false certification, including the possibility of fine or imprisonment."

Notes:

© Lion Technology Inc.

LDR Documentation Requirements, continued

Documentation for "Hazardous Debris" Managed Under the Alternative Standards [40 CFR 268.7, Generator Paperwork Table]

Generators wishing to have their hazardous debris treated with the alternative treatment technologies provided at 40 CFR 268.45 must include the following information with the standard notification documentation:

- The names of the contaminants subject to treatment, determined pursuant to 40 CFR 268.45(b)
- An indication that the contaminants are being treated to comply with 40 CFR 268.45

NOTE: Special documentation/certification requirements apply to generators who treat their own hazardous debris to meet the requirements at 40 CFR 268.45. These requirements are found at 40 CFR 268.7(d).

Documentation for Contaminated Soils Managed Under the Alternative Treatment Standards [40 CFR 268.7, Generator Paperwork Table]

If the generator sends contaminated soil to a TSDF for treatment of the hazardous constituents, then in addition to the standard information required on a notification or certification, the document must include:

- The contaminants subject to treatment, determined pursuant to 40 CFR 268.49(d)
- The following statement:

  "This contaminated soil [does/does not] contain listed hazardous waste and [does/does not] exhibit a characteristic of hazardous waste and [is subject to/complies with] the soil treatment standards as provided by §268.49(c) or the universal treatment standards."

Documentation for Wastes That Have Been Granted a Variance or an Exemption from LDR Standards [40 CFR 268.7(a)(4)]

If a variance or exemption from being treated to meet LDR requirements prior to land disposal has been granted for a particular waste by the EPA or State authority, the following information must be kept on site by the generator to document this:

- The manifest document number of the first shipment of the waste to the TSDF
- The EPA hazardous waste codes for the wastes
- Any available waste analysis data
- A statement that the waste is not prohibited from land disposal
- The date the waste will become subject to LDR standards

Additional LDR Documents

Waste Analysis Plan [40 CFR 268.7(a)(5)]

If a generator is managing and treating wastes on site to meet LDR standards, then the site must develop and follow a written waste analysis plan. This plan must be based on a detailed chemical and physical analysis

Notes:

© Lion Technology Inc.
18-0828

LDR Documentation Requirements, continued

of a representative sample of the wastes and must describe the procedures that will be used to treat the wastes in accordance with the LDR standards, including the selected testing frequency.

LDR Determination Records [40 CFR 268.7(a)(6)]

Generators must keep records demonstrating that all applicable land disposal restriction treatment standards that applied at the point of generation for a waste have been identified. If a generator determines the LDR standards based solely on his or her knowledge of the waste, all supporting data used to make this determination must be retained on site in the generator's files. If the LDR determination was based on testing the waste or extract, then all waste analysis data must be retained on site in the generator's files.

Notes:

© Lion Technology Inc.

EPA TRAINING

CORE EPA COMPLIANCE PROGRAMS

COMPLETE ENVIRONMENTAL REGULATIONS

Identify your responsibilities under a full range of EPA air, water, and chemical programs that impact your site. Learn the critical requirements for each program, and what you must do to comply.

EPA Regulations Training Highlights:

- Latest EPA Clean Air Act requirements
- CERCLA and EPCRA release reporting
- Big changes to TSCA chemical law
- Clean Water Act and SDWA compliance
- NPDES permits and stormwater rules
- Emergency preparedness and reporting
- Basics of RCRA hazardous waste

Catch the workshop in cities nationwide or train online when you want, where you want.
Online (ENV 300) Workshop (ENV P30)

SPECIALIZED EPA COMPLIANCE TRAINING

CLEAN WATER ACT AND SAFE DRINKING WATER ACT REGULATIONS

This course prepares you to identify and comply with the Clean Water Act and SDWA requirements that impact your site.
Online (ENV 306)

SUPERFUND AND RIGHT-TO-KNOW ACT REGULATIONS (EPCRA/CERCLA)

This training guides you through the EPCRA and CERCLA emergency preparedness and reporting requirements all managers must know.
Online (ENV 303)

TSCA REGULATIONS

Learn the detailed management and reporting rules for handling, storing, processing, and producing chemical substances.
Online (ENV 304)

INTRO TO ENVIRONMENTAL REGULATIONS

This course will help you identify the laws and EPA regulations that apply to your operations.
Online (ENV 301)

CLEAN AIR ACT REGULATIONS

This training walks you through the details and requirements of each Clean Air Act program, preparing you to oversee and maintain site compliance.
Online (ENV 302)

TSCA: CHEMICAL REPORTING & RECORDKEEPING

This training details what you must collect, report, and keep on file to remain in compliance with the latest US EPA TSCA chemical regulations.
Webinar (ENV C34)

REGULATORY LITERACY

This course provides an introduction to Federal regulations in the areas of environmental protection, safety, health, and transportation.
Online (EHS 101)

DEVELOPING AN SPCC PLAN

Learn what you must know to create and certify a fully compliant Spill Prevention, Control, and Countermeasure (SPCC) Plan to prepare for and mitigate oil spills.
Online (ENV 420)

Lion.com/EPA
Visit Lion.com/Group for group training options

Lion.com/EPA
888-LION-511

570 Lafayette Road
Sparta, NJ 07871

LION TECHNOLOGY INC.®
Expert Training. Anytime, Anywhere.™

RCRA TRAINING

CORE RCRA PROGRAMS

RCRA HAZARDOUS WASTE MANAGEMENT
Satisfy EPA's initial or refresher RCRA training mandate at the expert-led workshops trusted nationwide since 1977.
Online (RCRA 300) Workshop (RCRA P30)

RCRA HAZARDOUS WASTE MANAGEMENT REFRESHER
This RCRA refresher training provides a review of critical RCRA management standards to meet EPA's annual training mandate.
Online (RCRA 310) Workshop (RCRA P31) Webinar (RCRA C31)

RCRA HAZARDOUS WASTE REFRESHER & RECURRENT HAZMAT GROUND SHIPPER (DOT) CERTIFICATION WORKSHOPS
2 days, 2 certificates. Meet RCRA hazardous waste and DOT hazmat ground shipper training requirements. Only in Sparta, NJ!
Workshop (RCRA P31A) Only available at NJ Training Center in Sparta, NJ

ADVANCED RCRA HAZARDOUS WASTE MANAGEMENT
Advanced RCRA training brings together experienced professionals to discover new opportunities to control costs and minimize waste.
Workshop (RCRA P40)
Workshop (RCRA P40A) Attend both RCRA & Advanced workshops

STATE HAZARDOUS WASTE PROGRAMS

NEW YORK HAZARDOUS WASTE MANAGEMENT
Learn NYSDEC's unique rules for managing hazardous waste, universal waste, and PCBs in the Empire State.
Online (RCRA 340) Workshop (RCRA P34)

TEXAS HAZARDOUS & INDUSTRIAL WASTE MANAGEMENT
Master TCEQ's hazardous and industrial waste standards, including STEERS reporting requirements, industrial waste ID, and more.
Online (RCRA 370) Workshop (RCRA P37)
Workshop (RCRA P37A) Attend both RCRA & Texas workshops
Workshop (RCRA P37B) Attend both Advanced & Texas workshops
Workshop (RCRA P40B) Attend RCRA, Advanced, & Texas workshops

CALIFORNIA HAZARDOUS WASTE MANAGEMENT
Learn the unique, stringent rules for managing hazardous waste in California and meet DTSC's annual training mandate. Online refresher training also available.
Online (RCRA 320) Workshop (RCRA P32) Refresher (RCRA 321)

WASHINGTON DANGEROUS WASTE MANAGEMENT
Washington DOE sets specific requirements you must know to manage hazardous/dangerous waste in the state.
Online (RCRA 380)

Lion.com/RCRA
Visit Lion.com/Group for group training options

SPECIALIZED OSHA TRAINING

LAND DISPOSAL RESTRICTIONS
Build expertise working with the complex RCRA Land Disposal Restrictions (LDRs) to ensure proper, safe disposal of your hazardous waste.
Online (RCRA 408)

STORING HAZARDOUS WASTE - OPS (RCRA)
Meet EPA's initial or annual RCRA training mandate for employees who accumulate, store, or handle hazardous waste, universal waste, or used oil at large or small quantity generator sites.
Online (RCRA 230)

STORING AND SHIPPING HAZARDOUS WASTE - OPS (RCRA & DOT)
This course covers everything that is in RCRA 230 and it provides critical training on DOT hazmat shipping requirements (49 CFR).
Online (RCRA 231)

EPA'S NEW ELECTRONIC MANIFEST SYSTEM
Covers what EPA expects from generators, transporters, and TSDFs, and how to select the best option for your facility.
Webinar (MEM 18-001)

HAZARDOUS WASTE RECYCLING RELIEFS
Master the latest RCRA recycling reliefs to minimize waste, reduce disposal fees, and streamline your hazardous waste management efforts.
Online (RCRA 460)

MANAGING USED OIL
Build your understanding of the RCRA used oil rules at 40 CFR Part 279. Make sure you know what's required—and what's not required—to stay in compliance.
Online (RCRA 290)

UNDERGROUND STORAGE TANKS
The course guides compliance professionals through the design, operation, administrative, financial, and closure requirements for USTs.
Online (RCRA 280)

RCRA FOR VERY SMALL QUANTITY GENERATORS
This course covers hazardous waste requirements for managers and employees at sites that generate ≤ 100 kg of waste per month.
Online (RCRA 305)

Lion.com/RCRA
888-LION-511

570 Lafayette Road
Sparta, NJ 07871

LION TECHNOLOGY INC.®
Expert Training. Anytime, Anywhere.™

HAZMAT TRAINING

CORE HAZMAT PROGRAMS

HAZMAT GROUND SHIPPER CERTIFICATION (DOT)
Build the in-depth expertise to certify hazardous materials for transport by highway in the US.
Online (HMT 300) Workshop (HMT P30)

RECURRENT HAZMAT GROUND SHIPPER CERTIFICATION (DOT)
Meet DOT's three-year re-training mandate and get up to speed on new and changing 49 CFR hazmat standards.
Online (HMT 340) Workshop (HMT P34) Webinar (HMT C34)

HAZMAT AIR SHIPPER CERTIFICATION (IATA)
Learn the latest IATA *Dangerous Goods Regulations (DGR)* requirements you must know to ship hazmat by airplane.
Online (HMT 350) Workshop (HMT P35) Webinar (HMT C35)

HAZMAT VESSEL SHIPPER CERTIFICATION (IMDG)
Shippers who offer hazardous materials for transport by vessel are subject to different regulations than those who ship only by ground or air.
Online (HMT 360) Workshop (HMT P36) Webinar (HMT C36)

MULTIMODAL HAZMAT SHIPPER CERTIFICATION WORKSHOPS (DOT, IATA, IMDG)
Learn the latest in DOT, IATA, and IMDG shipping regulations for hazmat by ground, air, and vessel.
Workshop (HMT P36A)

SPECIALIZED HAZMAT TRAINING

SHIPPING HAZMAT BY GROUND (DOT) – OPS
DOT hazmat training for operations employees like pickers, packers, and warehouse or administrative staff. Meet DOT requirements at 49 CFR 172.704.
Online (HMT 218)

SHIPPING HAZMAT BY AIR (IATA) – OPS
Covers additional IATA *DGR* rules that operations employees must know to prepare hazmat air shipments.
Online (HMT 219)

SHIPPING HAZMAT BY VESSEL (IMDG) – OPS
Covers additional *IMDG Code* rules that operations employees must know to prepare hazmat vessel shipments.
Online (HMT 220)

SHIPPING LIMITED QUANTITIES AND CONSUMER COMMODITIES
Learn to identify limited quantity hazmat shipments and capitalize on available reliefs.
Online (HMT 235)

HAZMAT GROUND SHIPPER - ADDITIONAL RAIL REQUIREMENTS
Provides function-specific training on the unique rules for offering hazmat shipments for rail transport.
Online (HMT 370)

SHIPPING LITHIUM BATTERIES
Get full hazmat/DG training to ship lithium batteries—big or small, with equipment or standalone—by ground, air, or vessel.
Online (HMT 254) Workshop (HMT P54) Webinar (C54A)

SHIPPING LITHIUM BATTERIES (FUNCTION-SPECIFIC)
Already up-to-date on general hazmat training? Dive right into the specific, unique rules you must know to ship lithium batteries by ground, air, and vessel.
Webinar (HMT C54)

SHIPPING REGULATED MEDICAL WASTE
Hazmat training for hospital staff and healthcare workers who work with shipments of regulated medical waste.
Online (HMT 222)

SHIPPING INFECTIOUS SUBSTANCES WITH DRY ICE
Training for managers or employees at healthcare and research facilities who ship Division 6.2 infectious substances, including the rules for shipping dry ice.
Online (HMT 221)

SHIPPING AUTOMOTIVE AIRBAGS AND OTHER SAFETY DEVICES
This course focuses on the unique hazmat shipping rules for airbags and other automotive safety devices.
Online (HMT 256)

Lion.com/Hazmat
Visit Lion.com/Group for group training options

Lion.com/Hazmat
888-LION-511

570 Lafayette Road
Sparta, NJ 07871

LION TECHNOLOGY INC.®
Expert Training. Anytime, Anywhere.™

OSHA TRAINING

CORE OSHA PROGRAMS

10 HOUR OSHA GENERAL INDUSTRY
This course provides OSHA safety training for general industry workers on topics like fall protection, HazCom, PPE, electrical safety, and bloodborne pathogens.
Online (OSH 300)

LITHIUM BATTERY SAFETY
Improper handling of lithium batteries can result in dangerous thermal runaway fires, which can cause serious injury, physical damage, and evacuations.
Online (OSH 254)

MANAGING HAZARD COMMUNICATION
This course covers the elements of OSHA's HazCom Standard at 29 CFR 1910.1200 for managers, including how to develop and oversee a workplace HazCom program.
Online (OSH 336)

FORKLIFT SAFETY
This course covers OSHA's rules for the safe operation and maintenance of powered industrial trucks.
Online (OSH 235)

HAZARD COMMUNICATION
This course guides employees on how to recognize and use workplace hazard labels, read Safety Data Sheets, and other OSHA hazard communications.
Online (OSH 200)

HAZWOPER TRAINING

8 HOUR HAZWOPER REFRESHER—EMERGENCY RESPONSE TECHNICIAN LEVEL III
This course provides 8 hours of HAZWOPER refresher training for Emergency Response Technicians who respond aggressively to a hazardous substance release.
Online (OSH 311)

2 HOUR HAZWOPER EMERGENCY RESPONSE FIRST RESPONDERS AWARENESS LEVEL I
This course provides an awareness-level training for employees who may witness or discover a hazardous substance release.
Online (OSH 308)

8 HOUR HAZWOPER REFRESHER—CONTAMINATED SITE CLEANUP
This course provides 8 hours of HAZWOPER refresher training for covered employees who perform monitoring or cleanup work at "uncontrolled hazardous waste sites," like Superfund sites.
Online (OSH 305)

SPECIALIZED OSHA TRAINING

LOCKOUT/TAGOUT
Informs workers of the hazards associated with unexpected start-up or release of stored energy during equipment maintenance or servicing. Covers critical requirements and procedures detailed in OSHA's Control of Hazardous Energy (Lockout/Tagout) Program.
Online (OSH 270)

PERSONAL PROTECTIVE EQUIPMENT
This one-hour course satisfies OSHA's PPE training requirement for employees by leading them through wearing, care, and maintenance of their equipment.
Online (OSH 219)

MATERIAL HANDLING AND STORAGE
Employees who handle materials must follow safe work practices to avoid injury and overexertion. This course covers safe material handling, storage, and stacking procedures.
Online (OSH 130)

BLOODBORNE PATHOGENS
Students who complete this course will have an understanding of the dangers of bloodborne pathogens, means of transmission, and using personal protective equipment.
Online (OSH 265)

HAZCOM & HAZMAT SAFETY TRAINING

HAZCOM: FLAMMABLES AND COMBUSTIBLES
Provides required OSHA Hazard Communication training and hazmat safety training for employees who work with or around flammable or combustible materials.
Online (OSH 202)

HAZCOM: COMPRESSED GASES
Provides required OSHA Hazard Communication training and hazmat safety training for employees who work with or around compressed gases.
Online (OSH 203)

HAZCOM: CORROSIVES
Provides required OSHA Hazard Communication training and hazmat safety training for employees who work with or around corrosive materials.
Online (OSH 204)

HAZCOM: POISONS/TOXIC SUBSTANCES
Provides required OSHA Hazard Communication training and hazmat safety training for employees who work with or around poisons or toxic substances.
Online (OSH 205)

Lion.com/OSHA
Visit Lion.com/Group for group training options

Lion.com/OSHA
888-LION-511

570 Lafayette Road
Sparta, NJ 07871

LION TECHNOLOGY INC.®
Expert Training. Anytime, Anywhere.™