Waste Classification

Session 1

Industrial and Hazardous Waste Permits (I&HW) Section

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IH&W

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Presentation Agenda
Session 1

1:00 pm – 2:00 pm
Classification of Industrial & Hazardous Waste

Introduction: Handouts

Topic I. Industrial & Hazardous Waste Notification, Exemptions and Generator Status

Topic II. Solid Waste Categories

Topic III. Hazardous Wastes

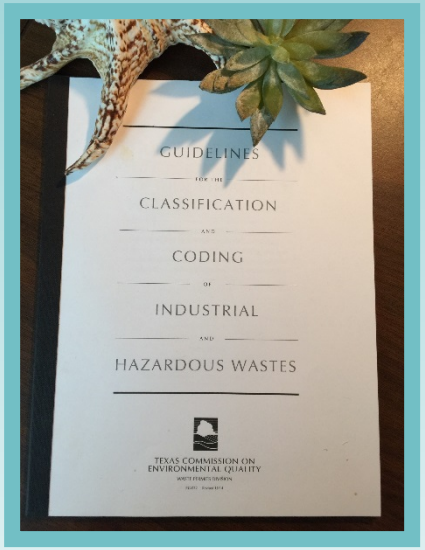
Topic IV. Industrial Wastes

Topic V. Process Knowledge, Testing and Documentation

Presentation Handouts

- **RG-022:** Guidelines for the Classification and Coding of Industrial and Hazardous Waste;
- **Laminate 1:** The Hazardous Waste Identification Process; Listed Hazardous Waste & Characteristically Hazardous Waste;
- **Laminate 2:** Industrial Waste Classification/Industrial; and Waste vs. Nonindustrial Waste (Municipal Solid Waste)
- **Laminate 3:** Texas Waste Form Codes

Presentation Based Upon TCEQ Regulatory Guidance RG-022



Guidelines For The Classification And Coding of Industrial and Hazardous Wastes

Rules are found in 30 Texas Administrative Code (TAC) Sections (§§) 335.501-.521 (Subchapter R).

Who Needs to Comply with 30 TAC 335 Subchapter R?

Generators of industrial and hazardous wastes

- generated in Texas for treatment, storage and/or disposal; and
- generated outside of Texas and sent to Texas for treatment, storage and/or disposal.

How to Comply with 30 TAC 335 Subchapter R?

Texas Waste Codes

Assign each hazardous and industrial waste stream a Texas waste code

- Contains 8 characters
- Gives information about the waste stream's origin, general nature and hazardous status
- Helps ensure proper and safe disposal.

This will be covered in more detail in Session II examples.

Who Doesn't Need to Comply with 30 TAC 335 Subchapter R?

Generators of nonindustrial (municipal) non-hazardous wastes, are excluded from requirements in 30 TAC Subchapter R.

Topic 1: Waste Notification, Exemption and Generator Status

Notification Requirements and Forms

- Must notify TCEQ no later than 90 days after generation and before handling, shipment, or disposal
- Use TCEQ form 00002 or STEERS – the State of Texas Environmental Electronic Reporting System.
- This information is used to create your Notice of Registration (NOR).

Notification Requirements & Forms

Generators that are Exempt from notification

Conditionally Exempt Small Quantify Generators (CESQG) that *also*:

- Generate less than 220 lbs./month of Class 1 industrial waste;
- Never accumulate more than 11,000 lbs. of universal waste on-site at a time; and
- Do not generate a “new chemical substance” whose classification has not been approved by the TCEQ; ***Or***

Notification Requirements & Forms

Generators that are Exempt from notification

Conditionally Exempt Small Quantify Generators (CESQG) that are regulated by the Railroad Commission of Texas.

Notification Requirements and Forms

Notifications About Class 2 and Class 3 Out-of-State Waste

Non-hazardous wastes shipped into Texas are automatically Class 1 waste unless:

- You request the TCEQ to review your waste classification supporting lower classification such as Class 2 or 3; and
- TCEQ concurs with lower classification.

Notification Requirements and Forms

How Do You Get Forms and/or Access STEERS?

- Visit a TCEQ Regional Office near you
- Go to WWW.tceq.texas.gov then select “Forms”
- Contact TCEQ publications by fax (512) 239-4488, or voice (512) 239-0028
- Go to STEERS at WWW.tceq.texas.gov then follow STEERS reporting or registration links

Notification Requirements and Forms

Need More Help?

CONTACT

Permitting and Registration Support Division

Registration and Reporting Division

- Phone: 512-239-6413 (Queue)
- E-Mail: wasteval@tceq.texas.gov
- Ed Minter: (512) 239-5262

Hazardous

Class 1

Topic 2: Solid Waste Categories

Class 2

Class 3

Topic 2: Solid Waste Definitions

Let's introduce some terms:

Solid Waste

Hazardous Waste

Industrial Waste

What is a Solid Waste?

30 TAC Section 335.1(146)(A)

- Any garbage, refuse, sludge…..that is discarded or intended to be discarded, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, municipal, commercial, mining, and agricultural operations….that is not excluded from being a solid waste
- A solid waste can be hazardous or nonhazardous and come from industrial or municipal (nonindustrial) sources

What is a Hazardous Waste?

- Must be a Solid Waste, before it can be a Hazardous Waste
- Defined in Title 40 Code of Federal Regulations (CFR), Part 261

With the possible exception of radioactive wastes, they are the most stringently regulated wastes because they pose the greatest threat to human health and the environment.

What is an Industrial Solid Waste?

30 TAC Section 335.1(83)

Solid waste resulting from or incidental to any process of industry or manufacturing, mining, or agricultural operations

Solid Waste Classes

Hazardous

Listed

F, K, P & U

Characteristic

Ignitability
Reactivity
Corrosivity
Toxicity

Nonhazardous

Industrial

Class1
Class 2
Class 3

Topic 3: Hazardous Wastes

Topic 3 : Hazardous Wastes

All waste generators should work through Part 1 of the RG-022 checklist to determine if the waste is hazardous as defined by the EPA.

This process is called “making a hazardous waste determination.”

Making a Hazardous Waste Determination

Step #1 – Make an inventory of all wastes generated.

1. Determine the overall flow of wastes from your operations or processes.
2. Identify the individual waste streams.

Making a Hazardous Waste Determination

RG-022 Table 2-1, gives examples of situations in which waste flow from an operation or process can produce more that one waste stream.

Table 2-1. An Operation's Overall Waste Flow Can Produce Multiple "Waste Streams"

IF you have WASTES that are ...	AND they come from PROCESSES that are ...	THEN the wastes are considered ...
different	similar	**different** "waste streams"—for example, a sludge removed from an electroplating vat is not the same waste stream as a liquid removed from an electroplating vat.
similar	different	**different** "waste streams"—for example, methylene chloride used in a paint- stripping operation is not the same waste stream as methylene chloride used in laboratory analysis.
similar	similar	**the same** "waste stream"—for example, a site may have several paint booths that perform the same activities with the same materials, and each produces drop cloth waste. These drop cloth wastes, from the various locations at this site, could be considered one waste stream as long as they were all classified the same (for more on classification, see Chapter 3).
altered physically or chemically by treatment	N/A	**different** "waste streams"—for example, if a sludge is dewatered, it may produce two new waste streams, one a solid and the other a liquid.

Making a Hazardous Waste Determination

Step #2 – For each waste stream generated, recycled or reclaimed, determine if any are exempt wastes.

Some examples of exempt wastes can be found in 40 CFR §261.4 and include:

- Industrial wastewaters subject to the Clean Water Act
- Mining overburden
- Household Wastes

Making a Hazardous Waste Determination

Step #3 – Determine if your waste is (1) a listed hazardous waste and/or (2) a characteristic hazardous waste.

Making a Hazardous Waste Determination

Listed Hazardous Wastes

- Always hazardous when generated
- Fall under four categories (F,K,P and U)
- Must meet the listing description found in 40 CFR Part 261 Subpart D, Section 261.31-33

EPA Lists Over 400 Wastes as Hazardous

Listed Hazardous Wastes

- A listed waste is hazardous, not because of the concentration of the constituents, but because it meets a listing description on one of the four lists in the regulations.
- The primary criterion for applying the listed code to a waste is to know the process that generates the waste.
- Appendix VII of Part 40 CFR Part 261 identifies the hazardous constituents contained within each group.

Listed Hazardous Wastes

To indicate its reason for listing a waste, EPA assigns a hazard code to each waste listed in the F and K lists with the following explanations:

(T) – Toxic Waste;

(H) - Acute Hazardous Waste;

(I) – Ignitable Waste;

(C) – Corrosive Waste;

(R) – Reactive Waste; and

(E) – Toxicity Characteristic Waste

Listed Hazardous Wastes

EPA Hazardous Waste Code

- EPA assigned a four-character hazardous waste code to each waste on these lists.
- The code is used for reporting and manifesting, and critical under the Land Disposal Restriction (LDR) regulations.
- This hazardous waste code is not part of the Texas Waste Code.

Listed Hazardous Wastes

ICR-only listed wastes

29-listed wastes are listed solely because they exhibit the characteristic of ignitability, corrosivity, and or reactivity (what are referred to as ICR-only listed wastes).

These 29 F,K,P & U wastes are not hazardous wastes if, at the point of generation, they do not exhibit any characteristic of a hazardous waste.

Listed Hazardous Wastes

F Listed Wastes from Non-Specific Sources

(40 CFR 261.31)

Listed Hazardous Wastes

F-Listings

- There are 28 “F” coded wastes
- Generated by a wide variety of mostly industrial processes.
- Examples include:
  - Solvents commonly used in degreasing
  - Metal treatment baths and sludges
  - Wastewaters from metal plating operations
  - Dioxin containing chemicals

Listed Hazardous Wastes

F001-F005 Spent Solvents

- Initial RCRA regulations included listings for five spent solvents.
- Spent solvents were involved with more environmental damage than any other waste type.
- Spent mixtures of the listed solvents were not regulated until January 1986.
- The five spent solvent listings each include specific pure and technical grade solvents.

Listed Hazardous Wastes

F001-F005 Spent Solvents

- **F001** - Halogenated solvents used in large-scale industrial degreasing operations.
- **F002** - Halogenated solvents used other than large-scale industrial degreasing.
- **F003** - 9 Non-halogenated solvents listed only because they are ignitable.

Listed Hazardous Wastes

F001-F005 Spent Solvents

- **F004** - Cresols, cresylic acid, or nitrobenzene listed due to their toxicity.
- **F005** – Non-halogenated solvents listed for both toxicity and ignitability.

The five spent solvent listings each include specific solvents.

Listed Hazardous Wastes

F001-F005 Spent Solvents

IMPORTANT:

The F001-F005 spent solvent codes only apply if ALL of the following criteria are met:

1. The solvent was used for its solvent properties;
2. The solvent is spent (i.e., no longer fit for use without being regenerated, reclaimed, or reprocessed); and
3. Must be 10% or more by volume.

Process wastes and products do not fall under the F001 – F005 listings because these are non-solvent uses (i.e. reactants or ingredients)

Listed Hazardous Wastes

K Listed Wastes From Industry-Specific Sources

(40 CFR §261.32)

Listed Hazardous Wastes

K Listings

- Made up of manufacturing process waste from **specific industry sources**
- List subdivided into groups of wastes based on industrial categories
- 181 K-listed wastes, generated by 13 industries

Listed Hazardous Wastes

K Listings

If uncertain whether a particular K-waste listing applies, read EPA's listing background document that the agency prepared for every F- and K-waste.

Copies can be found online from http://www.regulations.gov by entering RCRA-2004-0016 for F-listed listed wastes or RCRA-2004-0017 for K-listed wastes in the search field.

Listed Hazardous Wastes

P & U Listed Wastes

(40 CFR §261.33)

Listed Hazardous Wastes

P (205) & U (411) Listings

- More mistakes are made by generators in identifying P- and U-wastes than any other type of listed hazardous waste.
- P-list wastes and U-list wastes contain pure and commercial grade formulas of discarded chemical products, off-spec chemicals, container residues, and residues from chemical spills.
- P-list and U-list wastes differ in their degree of risk.
- **P-listed** wastes are “acutely toxic” meaning they possess extremely hazardous properties that make them lethal in very small quantities.

Listed Hazardous Wastes

For a waste to be considered a P- or U-listed waste it must meet the following conditions:

- A potentially U or P listed chemical must be present in the waste;
- The chemical must be in the form of a **commercial chemical product** (CCP); and
- The waste must be **unused**.

Listed Hazardous Wastes

For a waste to be considered a P- or U-listed waste it must meet the following:

- A CCP is a chemical that is either:
  - 100% pure, technical (e.g., commercial) grade, or
  - The sole active ingredient in a chemical formulation

Listed Hazardous Wastes

For a waste to be considered a P- or U-listed waste it must meet the following:

- If commercial grade, the generic chemical names from the P- or U-list will be on the label of the bottle.
- A sole active ingredient is defined as one that performs the primary function of the product. If a product has more than one active ingredient, it's not P- or U-listed when discarded.

Characteristically Hazardous Wastes

Does the waste meet one of the four characteristics?

1. Ignitable Wastes (D001) 
2. Corrosive Wastes (D002) 

3. Reactive Wastes (D003) 
4. Toxic Wastes (D004 – D043) 

Characteristically Hazardous Wastes

Ignitability (D001)

A solid waste exhibits the characteristic of ignitability if a representative sample meets any of the following [261.21.21(a)] :

1. A liquid with a flash point <140°F (excluded are aqueous solutions containing <24% alcohol by volume);
2. A nonliquid that: (1) can ignite under STP (68°F and 1atm) through friction, moisture absorption, or spontaneous chemical changes, and (2) burn vigorously and persistently after ignition;

Characteristically Hazardous Wastes

Ignitability (D001)

A solid waste exhibits the characteristic of ignitability if a representative sample meets any of the following [261.21.21(a)] it is:

3. An ignitable compressed gas: (1) that is flammable when in a mixture of 13% or less of air, or (2) has a flammable range with air of more than 12%; or
4. An oxidizer (i.e., a chemical that yields oxygen readily and stimulate combustion of organic matter) (e.g., peroxides, chlorates, nitrates, etc.).

Characteristically Hazardous Wastes

Ignitability (D001)

Noteworthy Information

- Liquids with a flash point <140°F make up most ignitable wastes.
- Flash point testing is only appropriate for liquid samples.
- To separate dual phase samples, preferred method is the Pressure Filtration Technique Specified in Method 1311 (TCLP).

Characteristically Hazardous Wastes

Ignitability (D001)

Noteworthy Information Continued

- TSD facilities and waste haulers may still require flash point data on certain waste solids that do not contain free liquids as a condition for transporting or accepting wastes. ***However,*** the D001 code would not have to be applied to such solid wastes unless it meets the criteria for a non-liquid [§261.21.21(a)(2)] or is an oxidizer described in [§261.21.21(a)(2)].

Characteristically Hazardous Wastes

Corrosivity (D002)

A solid waste exhibits the corrosivity characteristic if a representative sample meets one of the following [§261.22(a)(1) and §261.22(a)(2)]:

- It is **aqueous** with a pH ≤2 or ≥12.5, as measured in SW-846 Method 9040C; and
- It is a **liquid** that corrodes SAE 1020 carbon steel at a rate >0.25 in/yr, as measured by SW-846 Method 1110A.

Characteristically Hazardous Wastes

Corrosivity (D002)

Noteworthy Information

- Most corrosive solid wastes are aqueous with a pH ≤2 or ≥12.5.
- Since pH is a measurement of the dissociated hydrogen ion, a liquid solid waste should be at least 20% aqueous of the total volume of waste. This is according to SW-846 Method 9040C.

Characteristically Hazardous Wastes

Corrosivity (D002)

Noteworthy Information

- **There are no corrosive solids at the federal level. For a waste to be D002, it must be a liquid.**
- Non-liquid waste can be “corrosive” and classified as Class 1 Industrial waste at the state level.

Characteristically Hazardous Wastes

Reactivity (D003)

A solid waste exhibits the reactivity characteristic if a representative sample of the waste meets one of the following [§261.23(a)]:

1. Normally unstable and readily undergoes violent change without detonating
2. Reacts violently with water
3. Forms potentially explosive mixtures with water

Characteristically Hazardous Wastes

Reactivity (D003)

4. Produces toxic gas, vapors or fumes when mixed with water sufficient to present dangerous conditions for health and environment
5. Cyanide and sulfide-bearing waste producing toxic gas, vapors or fumes when exposed to pH conditions ***between 2 and 12.5*** in quantities present dangerous conditions for health and the environment

Characteristically Hazardous Wastes

Reactivity (D003)

6. Detonation or explosive reaction if subjected to heat or initiating source
7. Can detonate or have explosive reaction or decomposition at standard temperature and pressure
8. Explosive, as defined in 49 CFR 173.54, or Division 1.1, 1.2, or 1.3 Explosive as defined in 49 CFR 173.50 and 173.53

Characteristically Hazardous Wastes

Reactivity (D003)
Noteworthy Information

- No test methods specified by EPA for identifying D003 wastes
- Thresholds set (>250 mg of hydrogen cyanide (HCN) per kg or >500 mg of hydrogen sulfide (H_2S) per kg
- Reactive cyanides and explosives most common
- Waste ammunition up to 0.50 caliber not considered reactive

Characteristically Hazardous Wastes

Toxicity (D004 – D043)

A solid waste exhibits the toxicity characteristic if the method leachate from a representative sample (SW-846 1311 TCLP) contains any of the constituents equal to or greater than the concentration in 40 CFR §261.24 Table 1 (RG-22 page 6, Table 3-1).

Characteristically Hazardous Wastes

Toxicity (D004 – D043)

- Forty Toxicity Characteristic (TC) constituents are listed in §261.24 Table 1, or Table 3-1 in RG-022
- These include seven pesticides, eight heavy metals, and twenty-six solvents and other organic compounds.
- Many of these compounds are commonly found in industrial wastes (e.g., lead, mercury, benzene, methyl ethyl ketone, silver and vinyl chloride).

Characteristically Hazardous Wastes

Toxicity (D004 – D043)

TCLP Testing Rule of 20

- Rule of 20 is a screening tool for **solid** matrix wastes.
- If a totals concentration from a solid matrix waste divided by 20 is less than the hazardous limit, this shows the material is non-hazardous.
- If the totals concentration divided by 20 is greater than the hazardous limit, the generator either needs to run TCLP or assume the waste is hazardous.

Characteristically Hazardous Wastes

Toxicity (D004 – D043)
TCLP Testing Rule of 20

- For example– the TCLP limit for lead is 5.0 ppm. If a total analysis is conducted on a non-aqueous sample and the test result is less than 100 ppm, then the sample cannot be hazardous for TCLP lead.
- If the sample result is greater than or equal to 100 ppm, the TCLP test must be run, or the waste must be assumed to be a hazardous waste.

Characteristically Hazardous Wastes

Toxicity (D004 – D043)

Noteworthy Information

- A generator cannot always rely on chemical composition data on safety data sheets (SDSs) ***alone*** for determining whether a waste exhibits the toxicity characteristic.
- OSHA regulations generally require manufacturers to identify constituents present in the material at concentrations ≥1% (10,000 ppm) for noncarcinogens or ≥ 0.1% (1,000 ppm) for carcinogenic constituents.
- The material may contain TC constituents above RCRA regulatory levels even though they are not identified on the SDSs.

Class 1

Topic 4: Industrial Wastes

Class 2

Class 3

Topic 4: Industrial Wastes

Industrial Waste Categories

See Laminated Handout

Texas has created categories of industrial wastes (Class 1, 2, and 3), with Class 1 considered to be potentially threatening to human heath and the environment but not as stringently regulated as HW.

Remember: Municipal (non-industrial) generators do not classify their non-hazardous waste streams.

Industrial Wastes

Class 1

- Wastes that leach toxic constituents at or above the levels listed in Table 1, Appendix 1 of 30 TAC Chapter 335 Subchapter R when subjected to TCLP (see Appendix C of RG-022).
- Liquids with a flash point ≥ 140 °F and less than 150°F.
- Contains polychlorobyphenyls (PCBs) >50 ppm;

Industrial Wastes

Class 1 Continued

- Contain total petroleum hydrocarbons (TPH) > 1,500 ppm;
- Regulated asbestos containing materials (RACM);
- Solids or semi-solids that when mixed with an equivalent amount of ASTM water, produce a solution with a pH ≤ 2.0 or ≥ 12.5.

Industrial Wastes

Class 2

Any industrial waste that is neither hazardous, Class 1, or Class 3 industrial waste. Examples are:

- Empty containers ≤ 5 gallons, or > 5 gallons, all residues removed (RCRA empty) and rendered unusable;
- Waste contaminated with < 50 ppm PCBs
- Waste contaminated with < 1,500 ppm TPH
- Liquid waste with a flash point > 150°F.

Industrial Wastes

Class 3

Not a hazardous or Class 1 waste

- Chemically inert
- Cannot be a liquid
- Does not decompose
- Essentially insoluble
  [See 30 TAC §335.507(4)]
- 7-Day Distilled Water Leaching test

Topic 5: Process Knowledge, Testing, and Documentation

Process Knowledge, Testing, and Documentation

Now That You Know How to Classify Your Waste, What's Next?

Compile the supporting documentation.

- Documentation requirements found in 30 TAC Sections §§335.9 – 335.11, 335.13 and 335.70.
- You must keep the documentation for at least three years after the waste is no longer generated, stored or recycled...

Process Knowledge, Testing, and Documentation

Compiling Supporting Documentation

Process Knowledge

Title 30 TAC §335.511 provides for the use of process knowledge to classify a generator's waste.

Process Knowledge, Testing, and Documentation

Compiling Supporting Documentation

Process Knowledge

- A full description of the generator's manufacturing process, and comprehensive list of chemicals involved in the process.
- Safety Data Sheets (SDSs).
- Manufacturer's literature about the chemicals used in industry processes.
- Identification of potential contaminants.

Process Knowledge, Testing and Documentation

Compiling Supporting Documentation

Analytical Testing Criteria:

- TCEQ Accredited laboratory (TNI) Standards;
- Detection limits and/or quantitation limits; and
- Known and acceptable quality of data to support classification.

Process Knowledge, Testing, and Documentation

Compiling Supporting Documentation

Analytical Testing Criteria Continued

- Sampling Plan - number, type and location for a representative sample
- Description of site and/or unit from which samples was taken
- Chain-of-Custody – quantity, preservation, dates of sample collection etc.

Process Knowledge, Testing, and Documentation

TCEQ Quarterly Audits Common Deficiencies

- Not analyzing for or otherwise addressing 3 Class 1 metals (antimony, beryllium and nickel)
- No chain-of-custody
- Missing quality assurance/quality control data
- Material in contact with TPH, but no TPH analysis.

Process Knowledge, Testing, and Documentation

Accreditation Questions?

Laboratories are assessed against the provisions of The NELAC INSTITUTE (TNI) Standards

- Rules found in 30 TAC Chapter 25 (Environmental Laboratory Accreditation and Certification
- Monitoring Division – Laboratory and Quality Assurance Section: Laboratory Accreditation, (512) 239-3754

Have you signed up for the latest I&HW waste news from TCEQ?

- Keep up-to-date on changes that are occurring with I&HW in Texas
- Sign up today at https://www.tceq.texas.gov/goto/ihwgovdev.

More Information, Questions on Industrial & Hazardous Waste Management?

Texas Commission on Environmental Quality

Industrial & Hazardous Waste Permits Section

MC-130 * P. O. Box 13087 * Austin, TX 78711-3087

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The End!

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