Hazardous Waste Management and Universal Waste Management Training

University of Arkansas
AR Dept. of Environmental Quality (ADEQ) conducted compliance evaluation inspection of UAF campus in August 2004

As result of inspection, ADEQ alleged that UAF had not complied with all requirements of APC&EC Reg. 23 § 265.16

Reg. 23 is state regulation that is the same as or more stringent than EPA’s regulations under Resource Conservation & Recovery Act (RCRA)
What is RCRA?

- RCRA is the abbreviation for the Resource Conservation and Recovery Act (42 USC 6901 et seq.)
- It is the primary federal law governing the regulation of solid and hazardous waste.
Laws & Regulations

- Congress enacted RCRA in 1976, then updated it in 1984
- EPA promulgated its regulations to implement RCRA
- RCRA tells EPA what it can and cannot regulate
- EPA’s regulations specify the details
Regulatory Structure

RCRA authorizes the US Environmental Protection Agency (EPA) to:

- regulate the generation, management, treatment, storage, transportation and disposal of hazardous wastes, solid wastes and underground storage tanks; and
- to ensure compliance by enforcing regulatory violations discovered during inspections.
Federal and State Relationship

- Federal laws can be delegated to state if state has constitutional and legislative authority to carry out federal program
- Arkansas legislature enacted Hazardous Waste Management Act (HWMA) that is like RCRA
- APC&EC promulgated regulations so state can carry out its own program
Objectives of RCRA/HWNA

- Promote the protection of human health and the environment from potential adverse effects resulting from the improper management of solid and hazardous waste.
- Conserve material and energy through waste recycling and recovery.
- Reduce or eliminate the generation of hazardous waste as expeditiously as possible.
State Program

- Arkansas Pollution Control and Ecology Commission ("APC&EC") Regulation No. 23 has provisions for:
  - Identification of hazardous wastes. (APC&EC Reg. 23 § 261)
  - Management requirements for generators; (APC&EC Reg. 23 §§ 262 and 265)
  - Management requirements for transporters and for treatment, storage and disposal facilities. (APC&EC Reg. 23 §§ 263 and 265)
  - Land disposal restrictions. (APC&EC Reg. 23 § 268)
- With some exceptions, Arkansas’s rules mirror the federal rules.
Identification of Hazardous Waste
Definition of Hazardous Waste?

- A solid, liquid, gas, or aqueous waste which displays a “hazardous characteristic” or is specifically “listed” as hazardous waste. 40 CFR § 261.3; APC&EC Reg. 23 § 261.3)

- **Waste** is any “discarded material” that is not excluded from the definition of hazardous waste.

- **Discarded Material** is material that is “abandoned,” “recycled” or inherently “waste-like.”

EPA and ADEQ view old chemicals that have not been used in years and which are unlikely to be used in the foreseeable future as waste.
Waste Determinations

- All hazardous waste generators must determine if the wastes they generate are hazardous by:
  - Sampling and analyzing the waste using specified EPA test methods (or equivalent methods); or
  - Applying knowledge of the composition of the waste and the process used to generate it.

40 CFR § 262.11; APC&EC Reg. 23 § 262.11
Two Types of Hazardous Waste

1. “Characteristic” Hazardous Wastes

2. “Listed” Hazardous Wastes

All hazardous waste is assigned at least one “waste code.” Applicable waste codes must appear on the hazardous waste manifest when the material is transported off site. Throughout this training presentation you will see examples of waste codes for the different types of hazardous wastes (e.g., D001, F002, U154, etc.)
“Characteristic” Hazardous Wastes display one of four characteristics:

- Ignitable
- Corrosive
- Reactive
- Toxic

(40 CFR § 261.20(a); APC&EC Reg. 23 § 261.20(a))
Characteristic Waste Determination

- Characteristic hazardous waste that is not listed and no longer exhibits any characteristic is not hazardous waste.
“Listed” Hazardous Wastes

- Listed hazardous wastes are those materials that have been specifically identified and listed in the regulations.
  
  (40 CFR § 261 Subpart D and APC&EC Reg. 23 § 261 Subpart D)

- Similar to characteristic hazardous wastes, there are four types of listed hazardous wastes.
  
  (40 CFR §§ 261.31, 261.32; APC&EC Reg. 23 §§ 261.31, 261.32)
“Listed” Hazardous Wastes (cont.)

- **F-Wastes** – Wastes from non-specific sources.
  (40 CFR § 261.31; APC&EC Reg. 23 § 261.31)

- **K-Wastes** – Wastes from specific sources.
  (40 CFR § 261.32; APC&EC Reg. 23 § 261.32)

- **P-Wastes** – Acutely hazardous wastes which are unused commercial chemical products.
  (40 CFR § 261.33; APC&EC Reg. 23 § 261.33)

- **U-Wastes** - Wastes which are unused commercial chemical products.
  (40 CFR § 261.33; APC&EC Reg. 23 § 261.33)
Waste Oil

- Waste oil needs to be managed appropriately.
  - Used oil with acceptable specifications may be burned for energy recovery

- Waste oil may have to be managed as a hazardous waste:
  - If it displays the toxicity characteristic, or;
  - If it is mixed with a listed hazardous waste; or
  - If it contains certain constituents above acceptable levels; or
  - If it is not recycled by burning for energy recovery.

(40 C.F.R. § 279; APC&EC Reg. 23 § 279)
The Mixture Rule

- Any mixture of a listed waste with a non-hazardous waste becomes a listed hazardous waste (may also display a hazardous characteristic). (40 CFR § 261.3(a)(2)(iv); APC&EC Reg. 23 § 261.3(a)(2)(iv))

Example:

If a small amount of used solvent such as methyl ethyl ketone, brake or carburetor cleaner, or acetone (each of which is a hazardous waste) is mixed into a 55-gallon drum of anti-freeze or a large used oil tank (each of which is non-hazardous waste), then the entire drum of anti-freeze or tank becomes hazardous waste and must be managed as a F-listed waste.
Why is it important to properly identify hazardous wastes?

RCRA requires all generators to characterize every waste stream generated on-site. Properly identifying hazardous wastes at the point of generation ensures compliance with the characterization requirement and that the wastes will be managed on-site and disposed of off-site in compliance with the law. To help comply with RCRA’s “cradle-to-grave” rules, the University relies, in part, on the professional judgment of trained personnel such as faculty and staff to identify the wastes they generate and provide necessary information to appropriate campus authorities. The information provided allows those campus authorities to complete hazardous waste manifests and select the appropriate treatment or disposal facility.
Common Hazardous Waste Exclusions and Exemptions

The following are not solid wastes and therefore are not hazardous waste:

- Domestic sewage and mixtures of domestic sewage and other wastes.
- Wastewater that discharges into a surface water subject to Clean Water Act (CWA) regulation.
Common Hazardous Waste Exclusions and Exemptions

- Secondary materials that are reclaimed and returned to the original process.
- Wastewater resulting from laboratory operations containing toxic wastes and solvents listed in subpart D provided the requirements of 40 C.F.R. § 261.3(a)(2)(IV)(E) are met.
- Ash from combustion of coal or other fossil fuel.
Common Hazardous Waste Exclusions and Exemptions

- The following materials are **not** hazardous waste:
  - **Household wastes** (this does **NOT** mean you can take UA waste home). (40 CFR § 261.4(b)(1) and APC&EC Reg. 23 § 261.4(b)(1))
  - **Scrap metal that is sent off-site for recycling**. (40 CFR §§ 261.2(c), 261.6 and APC&EC Reg. 23 §§ 261.2(c), 261.6))
  - **Residues of hazardous waste in “empty” containers and the empty containers** (unless the container held P-listed wastes). (40 CFR § 261.7(a) and APC&EC Reg. 23 § 261.7(a))
A container that has held any material that would be either a “Characteristic” or “Listed” hazardous waste (except P-listed waste) is considered empty when:

- All of the material that can be removed has been removed using common practices such as pouring, pumping, and scraping.
- No more than 1 inch of residue remains in the bottom of the container.

(40 CFR § 261.7 and APC&EC Reg. 23 § 261.7)
If the container held a P-listed constituent, it is not considered “empty” unless the container has been triple rinsed with an appropriate solvent (the resulting rinsate is hazardous [P-listed] waste).

It is better to simply dispose of P-listed waste containers rather than triple rinsing.

Again, if you are disposing of P-listed wastes please consult EH&S.
Management of Hazardous Waste
Arkansas hazardous waste generators are subject to a range of different rules depending on their generator status.

Generator status is based on hazardous waste generation rates and/or maximum volume of hazardous waste stored on-site at any one time.

There are three categories of generator status:

- **Large Quantity Generator (LQG)**
- **Small Quantity Generator (SQG)**
- **Conditionally Exempt Small Quantity Generator (CESQG)**

(40 CFR § 262.10; APC&EC Reg. 23 § 262.10)
Generator Categories - Large Quantity Generator (LQG)

A facility is a large quantity generator (LQG) if:

- **in any one calendar month** it generates:
  - more than 1,000 kgs./2,200 lbs. of hazardous waste; or
  - more than 1,000 kgs./2,200 lbs. of spill cleanup debris; or
  - more than 1 kg./2.2 lbs. of acutely hazardous waste.

- **at any time** it stores:
  - more than 6,000 kgs/13,200 lbs of hazardous waste; or
  - more than 1 kg./2.2 lbs. of acutely hazardous waste.

- UA Fayetteville operates as an LQG

(40 CFR §§ 262.34; APC&EC Reg. 23. §§ 262.34)
Generator Categories - Small Quantity Generator (SQG)

A facility is a **small quantity generator (SQG)** if:

- **in any one calendar month** it generates:
  - between 100 kgs./220 lbs. (roughly 27 gallons) and 1,000 kgs./2,200 lbs. of hazardous waste; or
  - between 100 kgs./220 lbs. and 1,000 kgs./2,200 lbs. of spill cleanup debris; or
  - no more than 1 kg/2.2 lbs. of acutely hazardous waste.

- **at any time** it stores:
  - no more than 6,000 kgs/13,200 lbs of hazardous waste
  - no more than 1 kg./2.2 lbs. of acutely hazardous waste

The University Farm is a Small Quantity Generator.

(40 CFR § 262.34(d); APC&EC Reg. 23 § 262.34(d))
Generator Categories - Conditionally Exempt Small Quantity Generator (CESQG)

- A facility is a **conditionally exempt small quantity generator (CESQG)** if:
  - **In any one calendar month** it generates:
    - no more than 100 kgs./220 lbs. (roughly 27 gallons) of hazardous waste; and
    - no more than 100 kgs./220 lbs. of spill cleanup debris from the spill of any acutely hazardous waste; and
    - no more than 1 kg/2.2 lbs. of acutely hazardous waste.
  - **At any time** it stores:
    - no more than 1,000 kgs/2,200 lbs of hazardous waste at any time (If a campus exceeds this limit, then the requirements for an SQG apply)
    - no more than 1 kg./2.2 lbs. of acutely hazardous waste at any time (If a campus exceeds this limit, then the requirements for an LQG apply) The University ERC is a CESQG.

(40 CFR § 261.5; APC&EC Reg. 23§ 261.5)
Why Should The Generator Status Matter to Campus Personnel?

If a campus crosses to a higher generator status because it generates or stores above the set amounts of hazardous waste or acutely hazardous (P-listed) waste, the campus faces considerably more regulatory requirements. Because the generator status is based solely on weight and is cumulative for the whole campus, it is very important that anyone generating waste on a campus consult the appropriate campus authority. Especially if you are generating any P-listed wastes (i.e., Potassium Cyanide, Nickel Carbonyl, or Osmium Tetroxide)
## Differences between LQGs, SQGs, and CESQGs

<table>
<thead>
<tr>
<th></th>
<th>LQG</th>
<th>SQG</th>
<th>CESQG</th>
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<tbody>
<tr>
<td><strong>EPA Identification Number</strong></td>
<td><strong>Required §262.12</strong></td>
<td><strong>Required §262.12</strong></td>
<td><strong>Not required §261.5</strong></td>
</tr>
<tr>
<td><strong>Quantity Handled by Category</strong></td>
<td><strong>generate ≥ 1,000 kg per month</strong></td>
<td><strong>generate &lt; 1,000 kg (2,200 lb) per month</strong></td>
<td><strong>generate ≤ 100 kg (220 lb) per month</strong></td>
</tr>
<tr>
<td></td>
<td><strong>&gt; 1 kg acute HW per month</strong> Part 262 and §261.5 (e)**</td>
<td><em><em>&lt; 1 kg acute</em> per month §260.10</em>*</td>
<td><em><em>≤ 1 kg acute</em> per month §261.5 (a) and (e)</em>*</td>
</tr>
<tr>
<td><strong>On-Site Accumulation Limit</strong></td>
<td><strong>No quantity limit</strong></td>
<td><strong>&lt; 6,000 kg §262.34(d)(1)</strong></td>
<td><em><em>≤ 1,000 kg ≤ 1 kg acute</em> ≤ 100 kg spill residue from acute §261.5(f)(2) &amp; (g)(2)</em>*</td>
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Differences between LQGs, SQGs, and CESQGs (cont.)

<table>
<thead>
<tr>
<th></th>
<th>LQG</th>
<th>SQG</th>
<th>CESQG</th>
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<tbody>
<tr>
<td><strong>Storage Time Limit</strong>&lt;br&gt;(without a storage permit)</td>
<td>≤ 90 days&lt;br&gt;[§262.34(a)]</td>
<td>≤ 180 days or&lt;br&gt;≤ 270 days&lt;br&gt;[§262.34(d) &amp; (e)]</td>
<td>None&lt;br&gt;[§261.5]</td>
</tr>
<tr>
<td><strong>Manifest Shipment</strong></td>
<td>Required&lt;br&gt;[§262.20]</td>
<td>Required&lt;br&gt;[§262.20]</td>
<td>Not required&lt;br&gt;[§261.5]</td>
</tr>
<tr>
<td><strong>Personnel Training</strong></td>
<td>Full Training&lt;br&gt;[§262.34(a)]</td>
<td>Basic Training&lt;br&gt;[§262.34(d)]</td>
<td>Basic Training geared toward personnel responsibilities&lt;br&gt;[§261.5]</td>
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Generator Responsibilities

Of the generator responsibilities, the two that involve faculty, students, and staff who work in laboratories and handle chemicals are:

— Evaluate every waste generated to determine if it is hazardous waste;

— Properly label, store, and manage wastes on-campus (CESQGs are exempted from this requirement);

We have covered the types of hazardous wastes. Now we will review how to properly label, store, and manage wastes in laboratories and other facilities until it is transferred to the central accumulation area.
Provided certain requirements are met, LQGs and SQGs can accumulate the following amounts in “Satellite Accumulation Areas”:

- up to 55-gallons of hazardous waste
- up to one quart of P-listed hazardous waste

(40 CFR § 262.34(c); APC&EC Reg. 23 § 262.34(c))
The waste must be stored in containers that are:

- “At or near the point of generation” of the process generating the waste;
- “Under the control of the operator” of the process generating the waste;
- In good condition (not leaking, bulging or dented);
- Compatible with the waste; and
- “Closed,” except when waste is being added or removed.

(40 CFR §§ 262.34(c), 265.171, 265.172, 265.173; APC&EC Reg. 23 §§ 262.34(c), 265.171, 265.172, 265.173)
SAA Waste Management Requirements (cont.)

- Labeling of Containers
  - Labeled with the words “HAZARDOUS WASTE”
  - Labeled with the description or identity of the contents (no abbreviations or chemical formulas are allowed)

(40 CFR § 262.34(c)(1)(ii); APC&EC Reg. 23 § 262.34(c)(1)(ii))
SAA Hazardous Waste Label

LABELING INSTRUCTIONS:
1. **Affix** completely filled out label (except date) when waste is first placed in container.
2. **CONTENTS:** List the primary substances which render the waste hazardous, in words (no abbreviations, symbols or formulas). Mark approximate % of each substance for the total solution.
3. **HAZARDS:** Check all applicable hazard boxes. For wastes that are contaminated media (e.g. silica gel or mixtures) check off hazard box(es) for the associated hazardous substance.
   - **Ignitable/Flammable:** Flashpoint less than 141°F (e.g. acetone, ethanol)
   - **Corrosive:** PH ≤ 2 or PH ≥ 12.5 (e.g. nitric acid, sodium hydroxide)
   - **Oxidizer:** Yields oxygen: (e.g. silver nitrate, potassium permanganate)
   - **Poison:** Toxic material (e.g. methylene chloride, chloroform, phenol, silver and lead)
   - **Other:** Use to describe chemicals, chemical mixtures or substances that are not listed or characteristic hazardous wastes (e.g. Ethidium Bromide) **OR** Use to provide descriptive information/precautions for waste handling (e.g. Water Reactive, Shock Sensitive)

EMERGENCY CONTACT

COMPLIANCE REMINDERS
- Containers must be **CLOSED** at all times, unless waste is being added or removed. Open-top funnels must not be left in container opening.
- Containers storing incompatible wastes must be physically segregated. Use appropriate bins, trays, etc.
- Containers must be in good condition (i.e. no severe rusting, dents, etc.)
- Each container must be individually labeled and, to avoid confusion, the other labels should be removed, or covered by this label.
Why is it important to properly label hazardous wastes?

First, it is required.

Further, EH&S relies upon the information provided on the individual container label to complete the hazardous waste manifest. Every hazardous waste manifest includes a Generator Certification that a responsible UA employee must sign under penalty of law that the materials are accurately classified, packed, marked, and labeled.
SAA Hazardous Waste Storage Requirements (cont.)

- Within three days of reaching the 55 gallon limit of non-acute hazardous waste or one quart limit of acutely hazardous waste, containers of hazardous waste must be moved from a SAA to the central accumulation storage area.

(40 CFR § 262.34(c)(2); APC&EC Reg. 23 § 262.34(c)(2))
SAA Hazardous Waste Storage Requirements (cont.)

- When the container is full or ready to be picked up:
  - Make sure that the waste is properly labeled.
  - Fill out and submit the request form found on the EH&S website.
  - The container must be dated when the accumulation limit was reached or a container is moved to central storage (which ever occurs first).
  - EH&S will come to the SAA, collect the waste, and transport it to the central accumulation area.
  - The work of laboratory personnel is done.

(40 CFR § 262.34(c)(2); APC&EC Reg. 23 § 262.34(c)(2))
Emergency Response Procedures
Emergency Procedures

- All chemical spills, leaks, fires or other uncontrolled releases must be immediately reported.
- Report directly to EH&S at 5-5448 during working hours and to University Police at 5-222 “after hours”.
- If there is a fire, immediately pull the fire alarm, call 911, and begin evacuation.
Chemical Spill Clean-Up

- Faculty, students and administrative staff may clean-up small spills (less than 1 gallon) if and only if:
  - You have the supplies to absorb and bag the spilled material;
  - You are familiar with the properties of the spilled materials;
  - You have the proper personal protective equipment; and
  - The spill is in a well ventilated area.
Mercury Spills

- If there is a spill of mercury:
  
  - Immediately evacuate the area
  
  - Immediately notify EHS Office at 5-5448 during working hours or University Police at 5-222 “after hours”.
  
  - EHS notifies the National Response Center if greater than one pound of mercury was spilled.
OSHA AND RCRA

- OSHA regulations requiring contingency plans relate to protection of worker
- OSHA’s contingency regulations are known as Hazardous Waste Operations (HAZWOPER) regulations
- RCRA contingency plan is not same as OSHA contingency plan
Universal Waste Rule

- The Universal Waste Rule was added to the federal RCRA program in 1995 to:
  - Ease regulatory burdens on businesses
  - Promote proper recycling, treatment, or disposal
  - Provide for collection opportunities
A waste must be a hazardous waste before it can be considered a universal waste. A waste must also meet certain criteria to qualify as a universal waste. For instance, it must be:

- widespread;
- commonly found in medium to large volumes; and
- exhibit only low-level hazards or be easily managed.
Federal Universal Waste

- The federal universal waste regulations streamline management requirements for certain hazardous wastes in the following categories:
  - Batteries containing heavy metals;
  - Pesticides;
  - Mercury-Containing Lamps;
  - Mercury-Containing Thermostats;
  (There is a proposed regulatory amendment to Consumer Electronic Equipment as an additional category)
  
(40 CFR § 273; APC&EC Reg. 23 § 273)
Universal Waste by State

- States do not have to include all of the Federal universal waste when they adopt the program and states can make them more stringent and add their own universal wastes.
- Arkansas has adopted the same universal waste categories as the federal regulations.

(40 CFR § 273; APC&EC Reg. 23 § 273)
Universal Waste vs. Hazardous Waste

If a campus *does not* manage these wastes as universal wastes

AND

If they have at least one hazardous characteristic, then they are hazardous waste

**WHICH MEANS THAT**

*They must be managed as hazardous waste!*
Categories of Universal Waste Handlers

- Just as with hazardous waste, facilities are regulated differently depending on the amount of universal waste they accumulate.

- There are two categories of universal waste handlers:
  - Large Quantity Universal Waste Handlers
  - Small Quantity Universal Waste Handlers
## Differences between LQHUW and SQHUW

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<thead>
<tr>
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<th>SQHUW</th>
<th>LQHUW</th>
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<tbody>
<tr>
<td><strong>EPA Identification Number</strong></td>
<td>Not Required (§273.12)</td>
<td>Required (§273.32)</td>
</tr>
<tr>
<td><strong>On-Site Accumulation Limit</strong></td>
<td>Less than 5,000 Kg (§273.9)</td>
<td>No limit</td>
</tr>
<tr>
<td><strong>Manifest</strong></td>
<td>Not Required (§273.19)</td>
<td>Not required, but must keep basic shipping records (§273.39)</td>
</tr>
<tr>
<td><strong>Employee Training</strong></td>
<td>Proper handling and emergency procedures (§273.16)</td>
<td>Proper handling and emergency procedures geared towards employee responsibilities (§273.36)</td>
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</tbody>
</table>
Universal Waste must be managed to prevent releases to the environment.
Universal Waste Handling
General Requirements

- **Accumulation Time**
  - Universal Waste cannot be accumulated for more than one year, unless the handler can demonstrate longer accumulation is necessary.
  - The handler must accurately demonstrate accumulation time by dating the items, dating the container holding the item, maintaining an inventory or by other means.

(40 CFR § 273; APC&EC Reg. 23 § 273)
Universal Waste Labeling and Storage Requirements

- **Storage**
  
  The regulations specify certain storage requirements for each type of universal waste.

- **Labeling**
  
  The regulations specify certain required phrases be used to identify each type of universal waste.

The next several slides describe the storage and labeling requirements for each type of universal waste.

(40 CFR § 273; APC&EC Reg. 23 § 273)
Universal Waste Training
Large Quantity Handlers

- LQHUW must ensure that all employees are thoroughly familiar with the proper waste handling and emergency procedures that relate to their responsibilities during normal facility operations and emergencies.

(40 CFR § 273; APC&EC Reg. 23 § 273)
Releases

- Handlers must immediately contain releases of universal waste and associated residue.

- Handlers must make hazardous waste determination on material resulting from release.

(40 CFR § 273; APC&EC Reg. 23 § 273)
Disposal Requirements
Large Quantity Handler

- A LQHUW must maintain a record of shipment. This can be a:
  - manifest
  - bill of lading
  - invoice
  - shipment log

- The shipment record must be maintained for at least 3 years.

- LQHUW Must use a licensed transporter.

- Waste must go only to another universal waste handler or a recycling facility.

(40 CFR § 273; APC&EC Reg. 23 § 273)
THANK GOODNESS IT’S OVER!