

ELI Summer School

# Hazardous Sites and Waste

[RCRA]

June 30, 2010

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# Major U.S. Environmental Laws

- 1947 – Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- 1965 - Solid Waste Disposal Act (SDWA)
- 1970 - Clean Air Act (CAA)
- 1970 - Environmental Protection Agency (EPA)
- 1970 - National Environmental Policy Act (NEPA)
- 1972 - Clean Water Act (CWA), FIFRA Amendments
- 1974 – Safe Drinking Water Act (SDWA)
- 1976 - Resource Conservation and Recovery Act (RCRA)
- 1976 - Toxic Substances Control Act (TSCA)
- 1980 - Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund)
- 1986 – Emergency Planning and Community Right-to-Know Act (EPCRA)

# Impetus for RCRA

- Expansion of industrial manufacturing and metropolitan centers post WWII leads to more waste generated in the US
- Correlation between deaths/diseases and pollution or waste
- Lax disposal practices require expensive cleanup
- End-point regulation already existed through CAA and CWA, but loop of hazardous substances/waste remained open
  - *“The federal government is spending billions of dollars to remove pollutants from the air and water, only to dispose of such pollutants on the land in an environmentally unsound manner.”*

# Legislative History

[RCRA]

- Solid Waste Disposal Act (SWDA)
  - 1976 – Amended by Resource Conservation and Recovery Act (RCRA)
  - 1984 – Amended by the Hazardous and Solid Waste Amendments (HSWA)
  - 1992 – Amended by the Federal Facilities Compliance Act
  - 1996 – Amended by the Land Disposal Program Flexibility Act
- RCRA – 42 U.S.C. § 6901 et seq.

# Goals

[RCRA]

- Protect human health and the environment from the potential hazards of waste disposal
- Strengthen federal regulation of hazardous waste, but retain state control of nonhazardous solid waste
- Manage hazardous byproducts from industrial activities
- Manage land disposal of waste in an environmentally sound manner, and prevent contamination of groundwater
- Reduce generated waste by encouraging manufacturing processes that minimize waste
- Reduce landfill waste and conserve resources by encouraging recycling and treatment of waste instead of disposal

# Major Components

[RCRA]

- **Subtitle C – Hazardous Waste**
  - Cradle-to-grave tracking system
  - Standards for generators and transporters of hazardous waste, and for operators and facilities that treat/store/dispose of hazardous waste
- **Subtitle D – Nonhazardous Waste**
  - State-run permitting program for owners/operators of municipal landfills
- **Subtitle I – Underground Storage Tanks**

# Hazardous Waste

[RCRA]

- **Subtitle C**
- Purpose: Regulate hazardous waste from cradle to grave
- **Places responsibility on:**
  - Generators of hazardous waste
  - Transporters of hazardous waste
  - Facilities that treat, store, and dispose of hazardous waste (TSD facilities)
- **Hazardous Waste Manifest System**
  - System of forms, reports, and procedures designed to track hazardous waste from the time it leaves the generator facility until it reaches the waste management facility that will store, treat, or dispose of the hazardous waste
  - Each entity signs manifest
  - Ensure that waste is properly delivered to treatment facility, and that no waste is lost

# Hazardous Waste

[RCRA]

- **Generator must:**

- Obtain govt-issued ID
- Determine if wastes are hazardous
- Store and handle hazardous waste properly
- Notify transporters that waste is hazardous
- **Prepare manifest about its hazardous waste, and track shipment of waste**
- Keep records of test results, waste analyses, other waste determinations
- For ex: dry cleaners, auto repair shops, hospitals, photo processors, chemical manufacturers, petroleum refineries



# Hazardous Waste

[RCRA]

- **Conditionally Exempt Small Quantity Generators**
  - < 200 lbs/month - no time limit
  - Exempt from most requirements for generators, subject to limited generator waste management standards
- **Small Quantity Generators**
  - 200-2,200 lbs/month -store for 180 days
- **Large Quantity Generators**
  - > 2,200 lbs/month -store for 90 days

# Hazardous Waste

## [RCRA]

Please print or type Form designed for use on site (7-1/2 pitch typewritten)

Form Approved OMB No. 2050-0039 Expires 9-30-97

UNIFORM HAZARDOUS WASTE MANIFEST		1 Generator's US EPA ID No.	Manifest Document No.	2 Page 1 of	Information in the shaded areas is not required by Federal law
3. Generator's Name and Mailing Address			A. State Manifest Document Number		
4. Generator's Phone ( )			B. State Generator's ID		
5. Transporter 1 Company Name		6. US EPA ID Number	C. State Transporter's ID		
7. Transporter 2 Company Name		8. US EPA ID Number	D. Transporter's Phone		
9. Designated Facility Name and Site Address		10. US EPA ID Number	E. State Transporter's ID		
			F. Transporter's Phone		
			G. State Facility's ID		
			H. Facility's Phone		
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
C E M E R A T O R	a.				
	b.				
	c.				
	d.				
J. Additional Descriptions for Materials Listed Above				K. Handling Codes for Wastes Listed Above	
15. Special Handling Instructions and Additional Information					
<p>16. <b>GENERATOR'S CERTIFICATION:</b> I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.</p> <p>If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.</p>					
Printed/Typed Name			Signature		Month Day Year
T R A N S P O R T E R	17. Transporter 1 Acknowledgement of Receipt of Materials				
	Printed/Typed Name			Signature	
18. Transporter 2 Acknowledgement of Receipt of Materials					
Printed/Typed Name			Signature		Month Day Year
F A C I L I T Y	19. Discrepancy Indication Space				
	20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.				
Printed/Typed Name			Signature		Month Day Year

EPA Form 8700 - 22 (Rev. 9 - 88) Previous editions are obsolete.

# Hazardous Waste [RCRA]

- **Transporter must:**
  - Obtain govt-issued ID
  - Label shipments as hazardous waste
  - Handle hazardous waste properly
  - Transport waste to licensed TSD facility
  - **Deliver manifest to TSD facility**
  - In case of discharge of hazardous waste, transporter must take immediate action to protect human health and environment

# Hazardous Waste

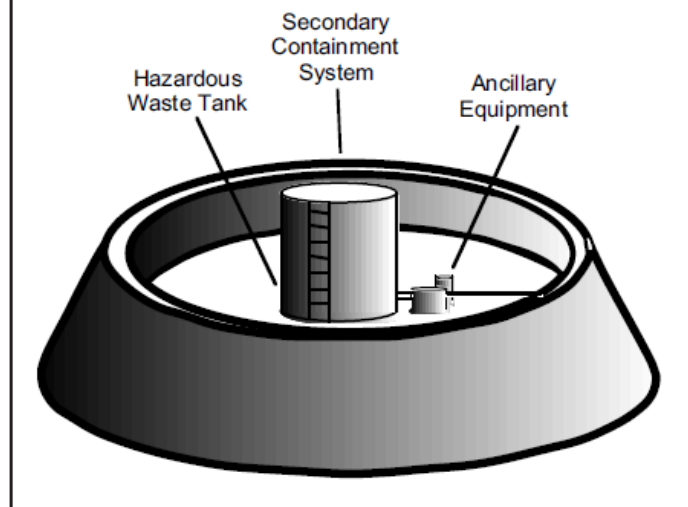
[RCRA]

- **Treatment, storage, and disposal (TSD) facility must:**
  - Obtain govt-issued permit
  - Store, treat, and dispose of waste in units that meet design criteria – containers, containment buildings, landfills, surface impoundments, tanks
  - **Return manifest to generator, to confirm that the waste has been received by the designated facility**
  - Demonstrate financial capacity to take correction action in case of spill/leak
  - Take corrective action for all releases of hazardous waste from the facility
  - Conduct groundwater monitoring to ensure waste does not leak
  - Clean up prior contamination at facility

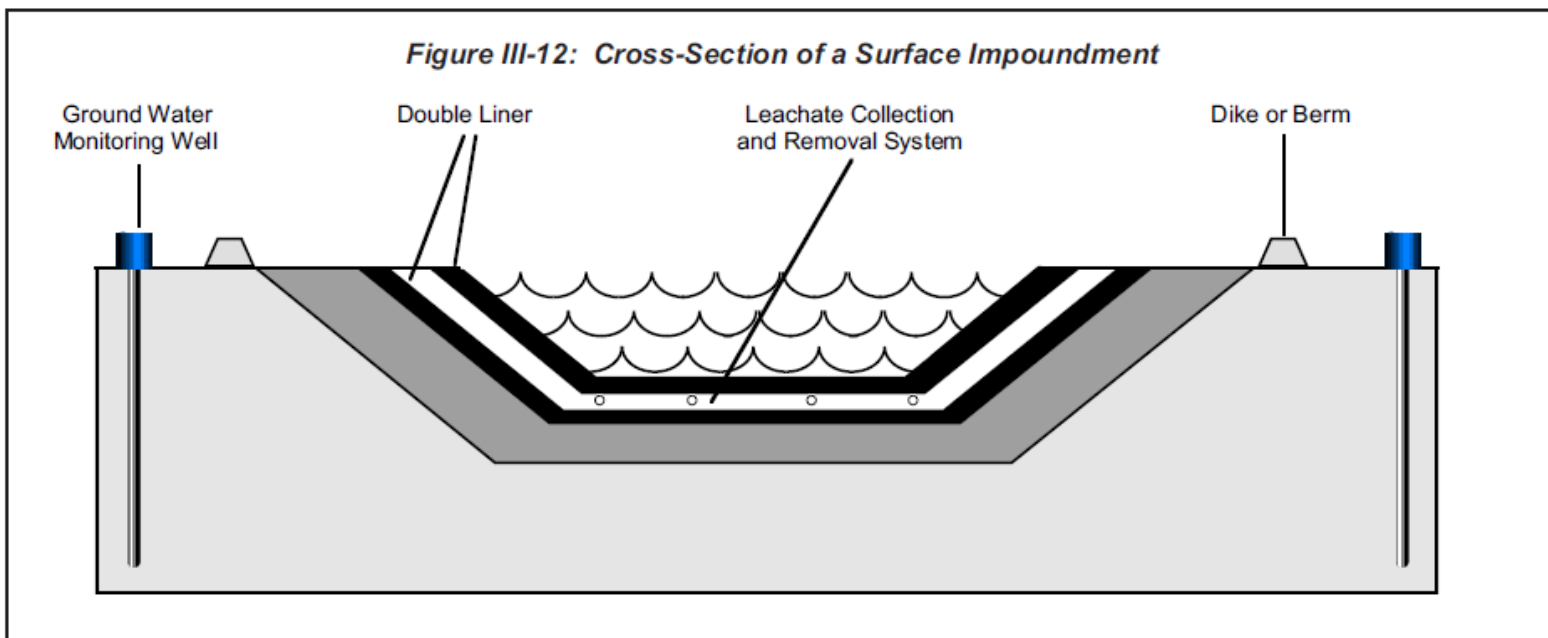
# Hazardous Waste

[RCRA]

*Figure III-13: Secondary Containment for Tanks*



*Figure III-12: Cross-Section of a Surface Impoundment*



# What is hazardous waste? [RCRA]

- A hazardous waste must be a **solid waste**
  - Garbage, refuse, sludge, or other discarded material
  - Can be solid, semi-solid, liquid, and contained gaseous material

# What is hazardous waste? [RCRA]

- Listed wastes
  - Specific wastes that EPA has determined are hazardous
  - For ex: wastes from common manufacturing and industrial processes, such as wood preserving
- Characteristic wastes
  - Wastes that are not “listed” but are ignitable, corrosive, reactive or toxic
- Contaminated media
  - For ex: hazardous waste leaks into soil, so soil is considered hazardous waste
- Special management provisions for used oil and universal wastes (batteries, pesticides, mercury-containing equipment, lamps)

# Nonhazardous Waste

[RCRA]

- **Subtitle D**
- **Nonhazardous solid waste**
  - Municipal solid waste – trash/garbage, non-recycled household appliances, refuse such as metal scrap, wall board and empty containers
  - Nonhazardous industrial waste
  - Sludge from industrial and municipal waste water and water treatment plants and from pollution control facilities
  - Hazardous wastes from households
  - Hazardous wastes from conditionally exempt small quantity generators



# Nonhazardous Waste

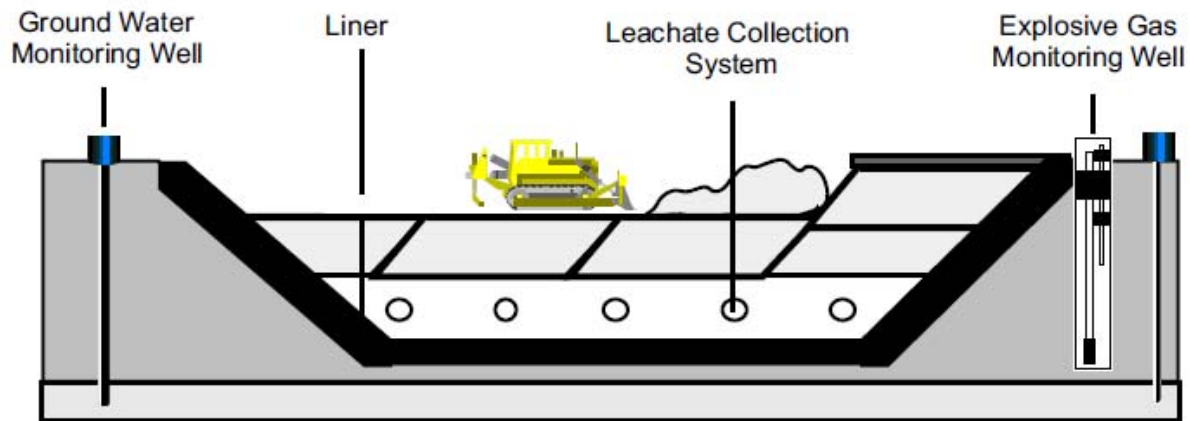
[RCRA]

- Purpose of Subtitle D: Encourage states to better manage nonhazardous wastes
- Encourage reduction of disposed waste through recycling, composting, combustion
- Facilities must implement public health and safety precautions to prevent spread of disease and control migration of waste
- Owners and operators of municipal solid waste landfills must meet minimum federal requirements, but states have primary responsibility
  - Design
  - Groundwater monitoring
  - Corrective action and closure
  - Demonstrate financial resources for closure

# Nonhazardous Waste

[RCRA]

*Figure II-5: Cross-Section of a Municipal Solid Waste Landfill*



# Regulation of Coal Ash [RCRA]

- Coal ash released from power plants burning coal, often mixed with water to contain ash
- TVA Kingston Fossil Plant in Tennessee stored ash/water slurry in an 84-acre unlined pond that was above ground
- December 2008, containment wall of pond ruptured
- 1.1 billion gallons of sludge released
  - 1,660 Olympic-size swimming pools
  - Volume released was about 101 times larger than the Exxon Valdez oil spill
  - Covered 300 acres, destroyed homes, gas/rail/power lines, killed fish
- Cleanup will cost ~\$1 billion

Aerial Image Of Kingston Ash Slide 12/23/08



William M. Latta  
1988-2008  
Geographic Information and Engineering



(AP Photo/Wade Payne)



(Photo: TVA)



(Photo: TVA)

# Regulation of Coal Ash [RCRA]

- EPA proposed rule – 75 Fed. Reg. 35,128 (June 21, 2010)
- Should coal ash be regulated as:
  - hazardous waste under Subtitle C?
  - nonhazardous waste under Subtitle D?

	<b>Subtitle C (HAZ)</b>	<b>Subtitle D (NON HAZ)</b>
<b>Enforcement</b>	State and Federal enforcement	Enforcement through citizen suits or by states
<b>Corrective Action</b>	Monitored by States and EPA	Self-implementing
<b>Permit Issuance</b>	Yes	No
<b>Requirements for Storage</b>	Yes	No
<b>Landfills Built After Rule is Finalized</b>	Liner requirements and groundwater monitoring	Liner requirements and groundwater monitoring
<b>Requirements for Closure and Post-Closure Care</b>	Monitored by States and EPA	Self-implementing



# Other Responsibilities [RCRA]

- TSD facilities (haz waste) and municipal solid waste landfills (nonhaz waste) are required to perform corrective action if their waste causes contamination
- Owner/operator must also arrange and pay for closure when facility is no longer useful
  - If all waste removed, clean closure
  - If not clean closure, and waste remains, owner/operator must perform post-closure monitoring or activities to ensure integrity of waste containment system, and groundwater monitoring

# Enforcement

# [RCRA]

- EPA can issue an order requiring entity to come into compliance with RCRA
  - Penalty of up to \$37,500/day
- EPA can issue order requiring monitoring, analysis, testing
- In cases of imminent and substantial endangerment potential to human health or environment, EPA can order entity to take corrective action
- Criminal acts: Fine of up to \$50,000/day and up to 5 years in prison
  - Transporting waste without a manifest or to a nonpermitted facility
  - Treating, storing, or disposing waste without permit
  - Generating waste without complying with recordkeeping and reporting requirements

# Underground Storage Tanks [RCRA]

- **Subtitle I**
- **Purpose:** Protect underground drinking water from underground storage tanks (USTs) holding petroleum or hazardous substances (risk of leaks, spills, corrosion)
- Technical requirements to prevent, detect, and clean up releases from USTs.
- Financial requirements – in case of a release, there are funds for clean up and to compensate 3<sup>rd</sup> parties

# Underground Storage Tanks [RCRA]

- USTs regulated under RCRA Subtitle I
  - Any tank that is at least 10% underground – may include above ground tanks with extensive underground piping
  - USTs holding **petroleum or hazardous chemicals**
- USTs NOT regulated under RCRA Subtitle I
  - USTs holding **hazardous wastes** – already regulated under Subtitle C
  - Small residential USTs

# Underground Storage Tanks [RCRA]

- Requirements:
  - Design and installation of USTs
  - Report new USTs that are installed
  - Upgrade older USTs
  - Owners and operators of USTs must demonstrate sufficient financial resources for a cleanup if a release occurs

# Import/Export of Hazardous Waste [RCRA]

- International shipment of hazardous waste
- Toxic colonialism
- EPA amends RCRA regulations to align with decisions made by Organization for Economic Cooperation and Development (OECD)
  - Before spent lead-acid batteries can be exported, generator must notify and receive permission from receiving country
  - Ensure that batteries are being sent to countries and facilities where they will be managed in an environmentally sound manner
  - When treatment/storage/disposal facilities in the US receive hazardous waste that is imported from another country, submit manifest to EPA

# Import/Export of Hazardous Waste

- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
  - International treaty designed to reduce the movements of hazardous waste between nations
  - Prevent transfer of hazardous waste from developed to less developed countries
  - Notification and consent requirements
- EPA is not a party to the Basel Convention, so must have bilateral agreement in place in order to trade covered wastes with parties to the Convention

# Results of RCRA

- In 1960, almost 94% of solid waste was discarded into landfill or other disposal area.
  - In 2007, only 54% of solid waste was disposed in landfills. Remainder was recycled, composted, or recovered.
  - In 2006, 32.5% (82 million tons) of municipal solid waste generated in the US was recycled
- In 2005:
  - 15,000 large quantity generators
  - 18,000 transporters
  - 500 TSDs



# Thank You!

Hazardous Sites and Waste  
[RCRA]

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