



# Chancellor's Day

Chemical Waste Management and  
Disposal

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- Brooklyn (born and raised)
  - Product of NYC Public School System
  - Brooklyn Tech 2002
- SUNY College of Environmental Science & Forestry
- Field Chemist
- Technical Services
- Account Management
- Sales Manager

# Regulating Bodies

- **US – EPA**
  - **Resource Conservation and Recovery Act (RCRA)**
- **US - DOT**
- **NYS – DEC**
- **NYC – DEP**
- **OSHA**
- **FDNY**

# Resource Conservation and Recovery Act

## RCRA's goals:

1. 1976 – Gave EPA authority to regulate hazardous waste from ‘Cradle to Grave’
2. Protect the public from harm caused by waste disposal
3. Conserve energy and natural resources by recycling and recovery
4. 1984 - Federal Hazardous and Solid Waste Amendments: Reduce or eliminate waste
5. Clean up waste which may have been spilled, leaked, or improperly disposed

# Training for Generators

- Training is required for all employees involved in the generation or management of hazardous waste.
- Initial training must be completed within 6 months of hire.
- Retraining is required

## Who is a Generator?

- Any person, by site, whose act or process produces hazardous waste or whose act first causes a hazardous waste to become subject to regulation.

# Cradle to Grave System

The Resource Conservation Recovery Act creates a cradle-to-grave management system for hazardous waste to ensure proper treatment, storage, and disposal in a manner protective of human health and the environment. This includes a record-keeping and labeling system that requires the manifesting of hazardous waste shipments from generation to disposal.

# Waste Manifest

- Waste Manifest is created and signed by generator
- Generator sends copy to DEC
- Waste disposal facility sends copy to DEC

Please print or type. (Form designed for use on 8 1/2 x 11 inch paper.)

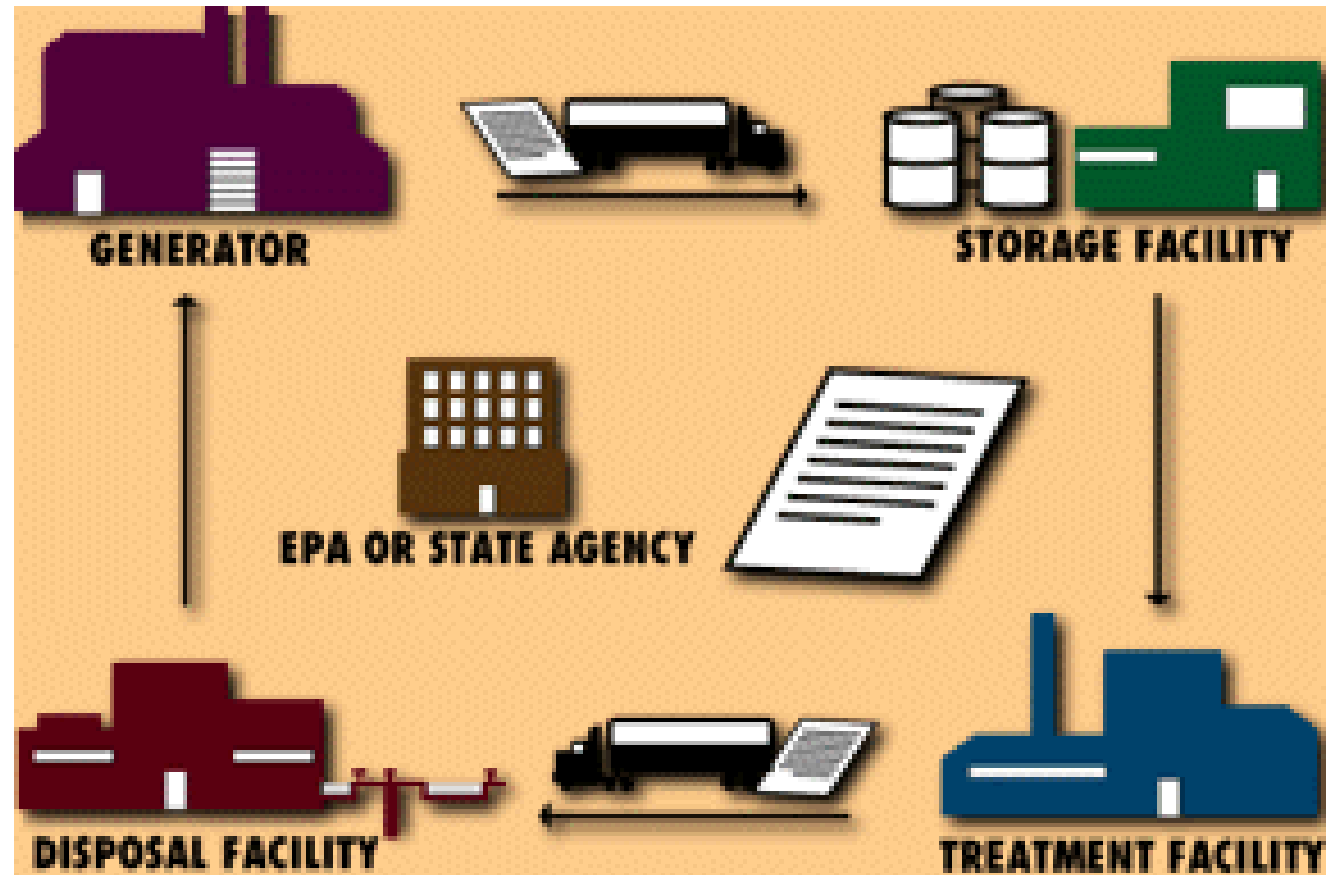
Form Approved OMB No. 2080-0035, Expires 6/30/01

## UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.		Manifest Document No.		2. Page 1 of 1 Information in the shaded areas is not required by Federal law.	
3. Generator's Name and Mailing Address					
4. Generator's Phone ( )					
5. Transporter 1: Company Name		6. US DOT ID Number		7. State: Manifest Document Number	
8. Transporter 1: Phone		9. State: Transporter's ID		10. State: Generator's ID	
11. Transporter 2: Company Name		12. US DOT ID Number		13. State: Transporter's ID	
14. Transporter 2: Phone		15. State: Transporter's ID		16. State: Facility's ID	
17. Designated Facility Name and Site Address		18. US DOT ID Number		19. Facility's Phone	
20. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)		21. Containers No. Type		22. Total Quantity 13. Total Quantity 14. Unit (lb/ton) 15. Waste No.	
a.					
b.					
c.					
d.					
23. Additional Descriptions for Manifests Listed Above				24. Handling Codes for Manifests Listed Above	
25. Special Handling Instructions and Additional Information					
<p>26. GENERATOR'S CERTIFICATION: 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 the waste generated 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	
27. Transporter 1: Acknowledgment of Receipt of Materials					
Printed/Typed Name		Signature		Month Day Year	
28. Transporter 2: Acknowledgment of Receipt of Materials					
Printed/Typed Name		Signature		Month Day Year	
29. Discrepancy Indication Space					
30. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 13.					
Printed/Typed Name		Signature		Month Day Year	

EPA Form 3700-22 (Rev. 9-88) Previous editions are obsolete.

# Waste Manifest





# 3 Generator Classes

- Large Quantity Generator (LQG)
  - Generates more than 2200 lbs per month of hazardous waste **OR** more than 2.2 lbs of acutely hazardous waste.
- Small Quantity Generator (SQG)
  - Generates between 220 and 2200 lbs per month of hazardous waste **AND** less than 2.2 lbs of acutely hazardous waste.
- Conditionally Exempt Small Quantity Generator
  - Generates less than 220 lbs per month of hazardous waste.

# EPA Identification Number

NYF0008675309

- All LQGs and SQGs must apply for an EPA identification number **prior** to shipping hazardous waste off site.
- A person can request in writing to **deactivate** the number when operations have ceased.

# 2 Categories of Hazardous Waste

## Characteristic Wastes:

- These wastes exhibit a characteristic that makes them a hazardous waste
- If a material stops exhibiting the characteristic, the waste is no longer a hazardous waste
- (Ignitable, Corrosive, Reactive, Toxic)

## Listed Wastes:

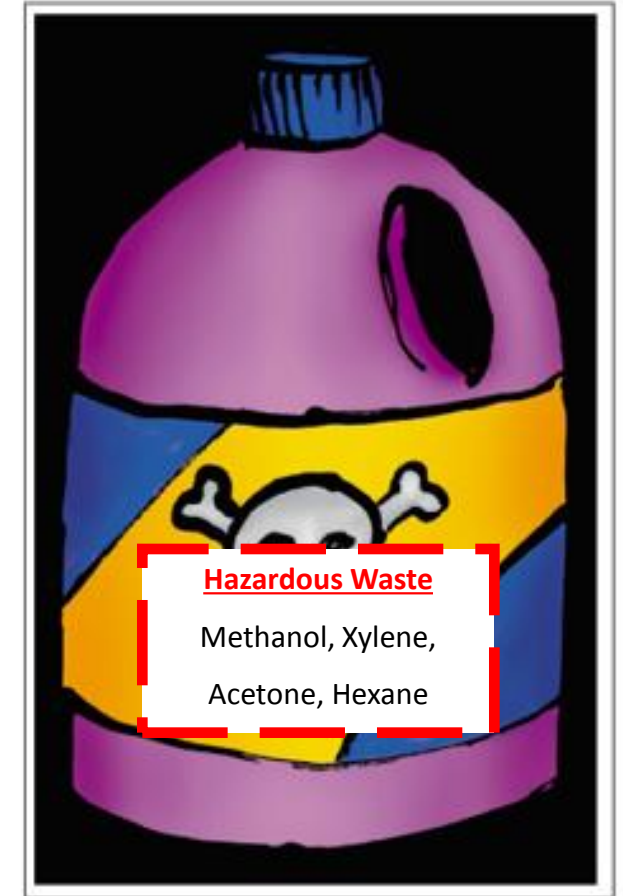
4 lists – U, P, F, K

- U List – Chronic Toxicity
- P List – Acute Toxicity
  - Pharmaceutical Waste
- F List – Non-Specific Sources
- K List – Specific Industrial Sources

\* Not all hazardous substances meet the RCRA definition of Hazardous Waste

# How do I properly label a Hazardous Waste container?

- Every hazardous waste bottle must contain:
  - The words “Hazardous Waste”
  - Chemical constituents (no formulas or abbreviations)
- Label must be legible



# How do I properly store a Hazardous Waste container?

- Container must be in good condition.
- Container must be compatible with chemicals inside (no acid in metal containers).
- Container must be closed except when adding or removing waste (do not leave funnel in).
- Inspect waste bottles at least weekly to make sure the labeling is correct and none are leaking.

# Satellite Accumulation Area Requirements

- Store waste at or near the point of generation.
  - Must be within same room.
- Incompatible materials must be segregated.
  - Use two different secondary containment trays.
- Store waste in a safe area away from heat and drains.
- Cannot accumulate more than 55 gallons of hazardous waste or 1 quart of acutely hazardous waste in a SAA.
- Waste exceeding the above limits must be dated and moved to the MAA within 3 days. \*What's an MAA?\*

# Improper Disposal

- Do NOT use sinks or garbage cans for hazardous waste disposal.
- Confirm with EHS Officer on what can be managed as a non-hazardous waste.
- Improper waste disposal is a crime.



# Waste Minimization

- When possible, do the following to reduce the quantity and toxicity of waste generated:
  - Perform microscale experiments
  - Substitute toxic chemicals with a less hazardous or non-hazardous one
    - This reduces risk, disposal costs, and resource consumption
- LQGs are **REQUIRED** to have a waste minimization plan.



# Why? (according to Alicia)

- WORKER SAFETY!!!! (proper closures, proper placement, proper labeling)
- Safety for emergency personnel (firefighters)
- Environmental Protection
  - Some pharmaceutical wastes are hazardous waste

# Potentially Explosive Compounds (PECs)

- Most chemicals used in laboratories are not explosive at the time of purchase.
- Over time, chemicals can oxidize, dry out, or otherwise destabilize to become PEC.
- WHEN THE CHEMICAL CHANGES SO DOES THE HAZARD

# PECs

- Known explosives are designed to be stable under normal conditions.
- PEC's are dangerous because they may explode if subjected to
  - Electrostatic discharge, Friction, Impact, Heat, Shock
- See (without moving the compound) if crystals appear
- Look to see if the container is deformed or in a irregular shape

**\*Never open or move a potential high hazard compound until it has been deemed safe to do so**

# These Chemicals

- Can become explosive when dry...
  - Picric Acid - used in labs as a reagent (picrates)
  - Dinitrophenol - used in labs as a reagent/stain
  - Peroxide Formers - ethyl ether
  - Dinitrophenylhydrazine - used in labs as a reagent for aldehydes and ketones
  - Methyl-nitro-nitrosoguanidine - used in cancer research

# These Chemicals

- Can become explosive when Wet...
  - Sodium Amide - used in labs as a reagent (forms peroxides)
  - Tollen's Reagent - used in protein analysis (ammonical silver nitrate)
  - Sodium Azide solutions - used in labs as a reagent or preservative (mixed with mercury)

# High Haz Job Types

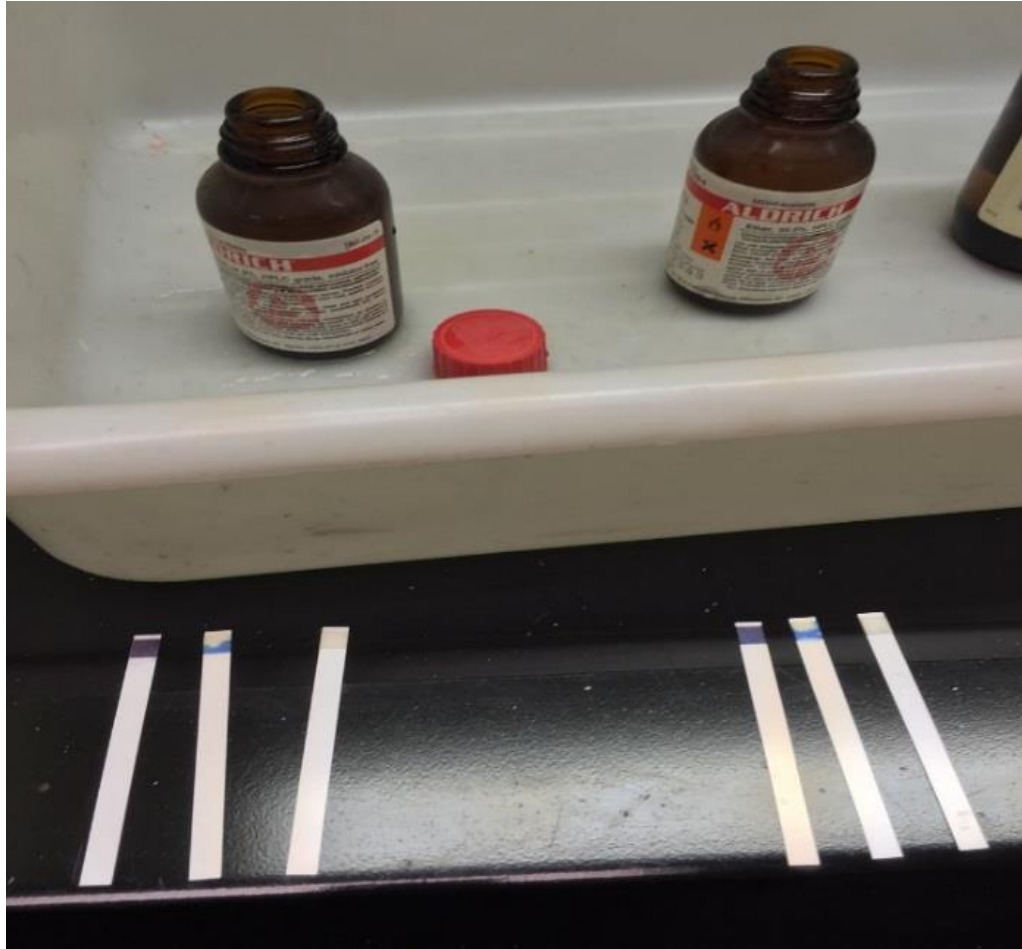
- Job types broken out into four categories
  - low risk
  - deflagration risk
  - detonation risk
  - other

# Low Risk

- Primarily peroxide formers that are determined to be low risk for crystal formation.
  - Items can be tested or wetted in a hood using standard or flash PPE.
  - Lowest cost of three job categories
  - Can include low level peroxide deactivation
  - Can include low risk stabilization



# Low Risk





# Deflagration Risk

- Peroxide formers that are determined to be high risk for crystal formation.
  - Fireball risk items require remote opener and flash PPE.
  - Higher costs – utilize corporate resources.
  - Usually includes peroxide deactivation.



# Deflagration Risk



# Deflagration Risk



# Detonation Risk

- Detonation risk
  - Explosion risk items (picric acid, azide compounds, etc.) require remote opening, explosion risk PPE and flash PPE
  - Highest cost – utilize multiple corporate recourses
  - Require the most planning
  - Includes item stabilization.





# Other

- Certain cylinders (HF, HBr, Acetylene)
- Decon of spaces high haz materials were used.



# Other





# Other



# Damage Zones

- “Rule of Thumb” effects of Overpressure
  - 1 psi- personnel knocked down
  - 5 psi- possible eardrum rupture
  - 15 psi- 50% chance of eardrum rupture
  - 30 psi- possible lung injury
  - 75 psi- 50% chance of lung injury
  - 100 psi- lethality threshold
  - 130-180 psi- 50% chance of lethality
  - 200-250 psi- nearly 100% chance of lethality



# Blast Damage of Picric Acid

- 2.5 lbs of Picric Acid

- |       |      |     |     |    |    |    |    |    |    |
|-------|------|-----|-----|----|----|----|----|----|----|
| • Ft  | 1    | 2   | 3   | 4  | 5  | 6  | 7  | 8  | 40 |
| • psi | 1013 | 284 | 118 | 62 | 37 | 24 | 18 | 13 | 1  |















# THANK YOU!

## CONTACT ME!

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