Managing Hazardous Waste in 2015

PRESENTED BY:

ROLAND J. FORNOFF
SUSTAINABILITY MANAGER

Business Environmental Program
College of Business
University of Nevada, Reno

Hazardous waste you say?

However…

Businesses Generating Haz. Waste

- Hotels
- Casinos
- Automotive shops
- Golf courses
- Manufacturers
- Printers
- Dry cleaners
- Painters & construction contractors
- Retail centers
- Laboratories
- Hospitals
- Furniture repair
- Cabinet makers

Recognize These?

RCRA Hazardous Waste

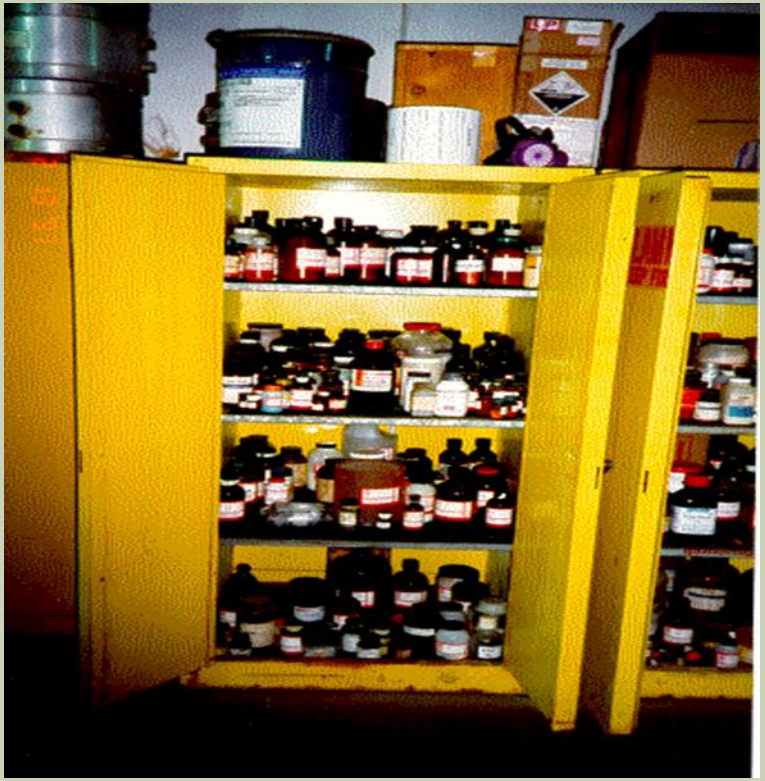
WHAT IS RCRA?

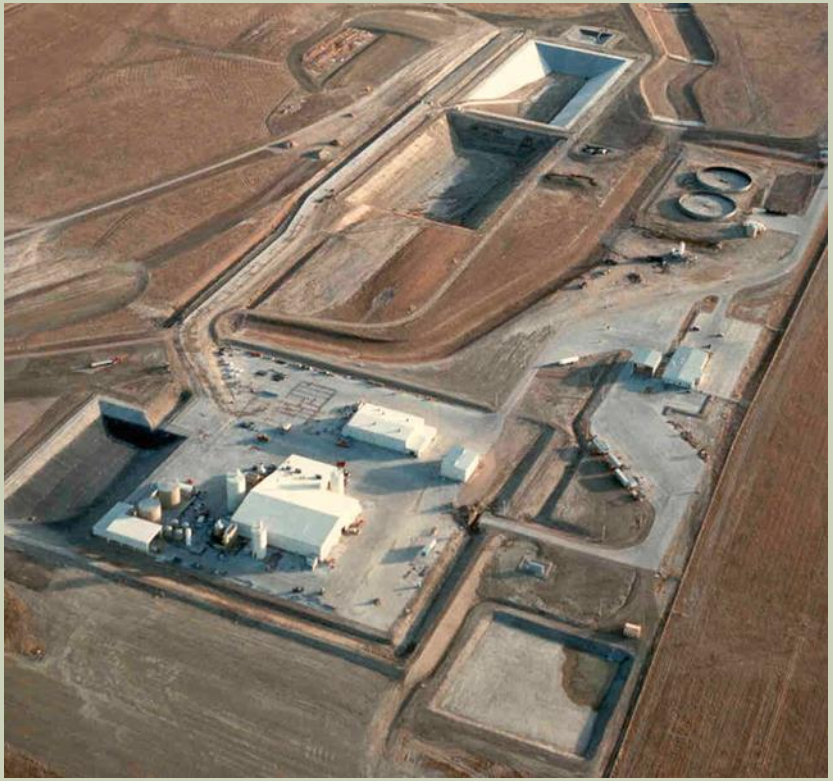
- **R**esource **C**onservation and **R**ecovery **A**ct
- Passed by Congress in 1976.
- Federal regulation that establishes “Cradle to Grave” management requirements for hazardous waste.
- RCRA waste = federally identified hazardous waste

Pre-regulation (<1976) Haz. Waste Disposal

Pre-regulation (<1976) Haz. Waste Disposal

With “Cradle to Grave” Management





Elements of Haz. Waste Management

- Generator Status
- Waste Determination
- On-Site Management
- Spill Response
- Record Keeping

Generator Status

- Conditionally Exempt Small Quantity Generators (**CESQG**): less than 100 kg (**220 lbs.**) per month
- Small Quantity Generators (**SQG**): 100 kg or (**220 lbs.**) but less than 1,000 kg (**2,200 lbs.**) per month.
- Large Quantity Generators (**LQG**): more 1,000 kg (**2,200 lbs.**) per month.

Generator Status

- Cumulative of all hazardous wastes generated per calendar month and accumulated on site at any one time.
- Cannot “Average” generation over the year
- Waste that is stored prior to recycling is counted toward generator status.
- Change in status, facility must be managed as such.

Disposal Matrix

Category	Generation Limit	Storage Time	Storage Quantity	Requirements if Limit(s) are Exceeded
Conditionally -Exempt Small Quantity Generator (CESQG)	< 100 kg/mo (less than 220 lbs) of hazardous waste	None	1,000 kg (2,200 lbs) of hazardous waste	If generator exceeds generation limit, waste is subject to LQG or SQG requirements depending upon amount exceeded If generator exceeds storage quantity limit, waste is subject to SQG requirements.
	<1kg/mo (2.2 lbs) of acutely hazardous waste	none	1 kg (2.2 lbs) of acutely hazardous waste	If generator exceeds generation limit, waste is subject to LQG requirements.
Small Quantity Generator (SQG)	100 to 1,000 kg/mo (220-2,200 lbs) of hazardous waste	180 days (or 270 days if waste must be shipped over 200 miles)	6,000 kg (13,200 lbs) of hazardous waste	If generator exceeds generation limit, waste is subject to LQG requirements If generator exceeds storage time or quantity limits. Facility is subject to storage facility (TSD) requirements
Large Quantity Generator (LQG)	>1,000 kg/mo (2,200 lbs) of hazardous waste >1kg/mo of acutely hazardous waste	90 days	None	If generator exceeds time limit. Facility is subject to storage facility (TSD) requirements.

100kg = 220 lbs. or approximately 26 gallons

Federal EPA ID Numbers

- NVR123456789:
  - All SQG and LQG are required to have an EPA ID Number.
  - CESQG Not required, typically.
  - CESQG Disposing of hazardous waste in other states may be required to obtain an EPA ID number.

Federal EPA ID Numbers

To apply for the EPA ID #:

- Complete form 8700-12 “Notification of Regulated Waste Activity” and mail to the appropriate office for your state;
- Form available at http://www.epa.gov/osw/inforesources/data/form8700/8700-12.pdf

Haz. Material or Haz. Waste?

What is Hazardous Waste?

- A **hazardous waste** is a material destined for **treatment, disposal or recycling** with properties that make it dangerous or potentially harmful to human health or the environment.

- Hazardous wastes can be **liquids, solids, compressed gases, or sludges**. They can be the by-products of manufacturing processes, off-spec commercial products, or other discarded articles or wastes.

MAKING A WASTE DETERMINATION

- CFR 40, Sections 261.20 - 261.24
  - Characteristics Of Hazardous Waste
- CFR 40, Sections 261.30 - 261.33
  - Listed Hazardous Waste
- At The Point of Generation
- You are LEGALLY RESPONSIBLE for ALL hazardous wastes generated!!!

Tools for Making a Waste Determination

- Material Safety Data Sheets (MSDS)
- Product Manufacturer
- Process Knowledge
- Environmental Laboratories
- Your state or local environmental business assistance program

Is It A Hazardous Waste?

- Four Questions to ask:
  - Is it a solid waste?
  - Is it exempt or excluded?
  - Is it listed?
  - Is it characteristic?

- Asking these questions should keep mistakes in identifying hazardous waste to a minimum.

  (40 CFR §262.11).

Identify if the Waste is a Solid Waste

- A Solid **Waste** may be a Solid, Liquid, or Gas.
- A material is a solid waste if it is “Discarded”:
  - Abandoned;
  - Disposed of;
  - Recycled;
  - Burned or incinerated.
- A material must be a Solid **Waste** before it can be a Hazardous Waste.

If you answer NO to question #1

Stop!! You do not have a hazardous waste!

Exclusions/Exempt

- Domestic sewage
- Industrial wastewaters covered under the clean water act
- Irrigation return flows
- Household hazardous waste
- See 40 CFR 261.4 for complete list

Waste Determination

- Now determine if the waste is:
  - Listed?
  - Characteristic?
  - Both Listed & Characteristic?
- Keep All Determinations on File
  - Even if the waste is non-hazardous

Is it Listed?

- **F LIST** - wastes from non-specific sources such as solvents, still bottoms, and plating wastes
- **K LIST** – specific wastes from the chemical manufacturing industry
- **P, U LISTS** – discarded and/or, off-spec chemical products, container residues and spill residues
  - P - ACUTE HAZARDOUS WASTE
  - U - TOXIC HAZARDOUS WASTE

4 Hazardous Characteristics

A hazardous waste can be defined by one or more of the following:

Ignitability = D001

Corrosivity = D002

Reactivity = D003

Toxicity = D004 –D043

Ignitability - D001

The flashpoint is < 140° F (60° C).

- Common wastes include:
  - Paint thinner
  - Gasoline
  - Alcohol
  - Solvents
  - Flammable compressed gas

Corrosivity - D002

- It is an aqueous solution with a pH of
  ≤ 2 or ≥12.5.
  Hydrochloric acid, Sodium hydroxide

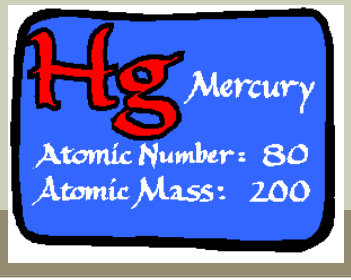
- It corrodes steel at 6.35 mm/year at 55° C.
- Common examples include:
  - Waste from rust remover
  - Alkaline cleaning fluid
  - Battery acid

Reactivity - D003

- Normally unstable, explosive, reacts violently with water or forms toxic gasses
- Cyanide or sulfide bearing waste when exposed to pH conditions between 2 and 12.5 can generate toxic gasses
- Capable of explosion or detonation
- Examples include: waste from cyanide plating, bleach

To  icity - D004-D043

- Regulatory levels are based on ability to leach to groundwater.
- Laboratory Analysis assesses concentration in sample (TCLP Test)



TCLP Testing

- Measures the potential to seep or "leach" into groundwater if a waste is landfill disposed
- 40 parameters, specific regulatory limit for each
- Must be done by a certified lab

Examples from the **40 CFR §261.24 Table 1**

EPA HW Code	Contaminant	Regulatory Level
D018	Benzene	0.5 mg/L
D008	Lead	5.0 mg/L
D009	Mercury	0.2 mg/L
D035	Methyl Ethyl Ketone (MEK)	200 mg/L
D039	Tetrachloroethylene	0.5 mg/L
D043	Vinyl Chloride	0.2 mg/L

Wastes Typically Needing TCLP

- Paint Booth Exhaust Filters
- Sand/Oil Separator Sludge
- Solvents
- Paints
- High-Flash Or Aqueous Cleaning & Degreasing Solutions

Common Hazardous Wastes

Description of Waste	EPA Waste Code(s)
Spent cleaning or degreasing solvents (e.g., xylene, acetone, MEK, toluene, benzene, methanol) Still bottoms, solvent wipers	F003, F004, F005, D001, D018, D035
Spent halogenated cleaning or degreasing solvents (e.g., methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, trichloroethylene). Still bottoms, solvent wipers	F001, F002, D019, D039, D040
Old paint, paint booth filters	D001, D035, D006, D007, D008
Mineral spirits or stoddard solvent, solvent wipers	D001
Spent acids or caustics	D002
Dry cleaning waste and filters	F001, F002, D019
Printing wastes	D001, D002, D011
Lab chemicals	D, F, P, U codes possible
Metal plating wastes	F007, F008, F009, F010, F011, F012, F019, D007, D008

Common Violation

Failure to make a waste determination

- Business doesn't determine if waste is hazardous or non-hazardous
- No supporting documentation

Special Waste Streams

- E-Waste
- Universal Waste
- Wipers and Rags
- Used Anti-Freeze
- Used Oil

E-Waste

Electronic Waste

- **AKA E-waste:**
  - Electronic equipment and products that are broken, obsolete, discarded or have reached the end of their useful life.
- Computer and Video Monitor glass typically contains enough lead to be classified as hazardous waste.
- Printed wiring boards contain plastic and copper, plus chromium, lead solder, nickel, and zinc.

E- Waste Management

- Most electronics- computers, keyboards, stereos, etc. are exempt if recycled for scrap metal.

- Intact CRT monitors may be shipped to a recycling facility
  - If the monitor is broken (i.e. vacuum released), it MUST be managed as hazardous waste.

Universal Waste

- Streamlines collection and management standards for certain hazardous waste streams:
  - Used fluorescent, neon, mercury vapor, sodium, and HID lamps.
  - Batteries;
  - Recalled/suspended pesticides;
  - Mercury-containing equipment.

Universal Waste

- Intent is to encourage recycling.
- Does not count toward generator status.
- Shows attempt to reduce the volume and toxicity of hazardous waste.

Universal Waste Requirements

Small Quantity Handlers of Universal Waste:

- Accumulates less than 5,000 kg (**11,000 lbs**.) at any time;
- No EPA ID Number Required;
- Compatible closed container;
- Proper labeling: start date and "**UNIVERSAL WASTE-BATTERIES, - LAMPS," etc.;**
- 1 year storage limit from start date;
- No manifesting or paperwork retention requirements;
- Employee training.

Improper Universal Waste Storage

Improper Universal Waste Storage

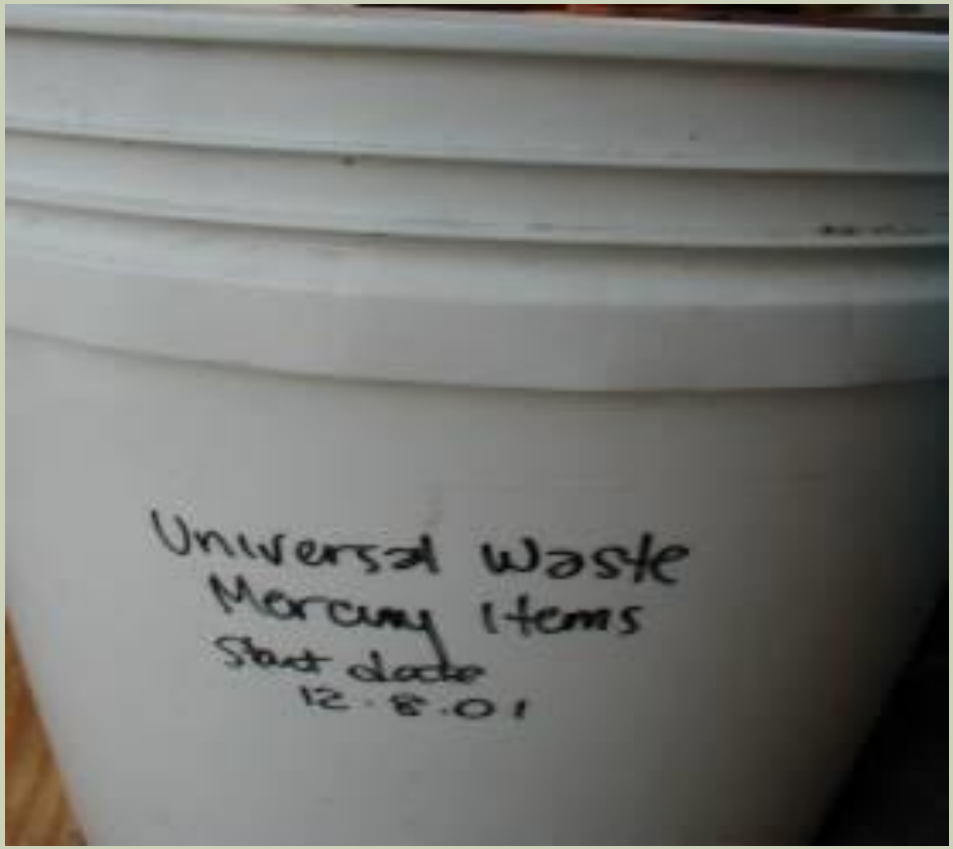
Improper Universal Waste Storage

- **BROKEN** fluorescent bulbs, batteries, mercury-devices need to be managed as **Hazardous Waste** - NOT Universal Waste

Proper Universal Waste Storage

Mercury Containing Equipment

Storing Mercury Containing Equipment



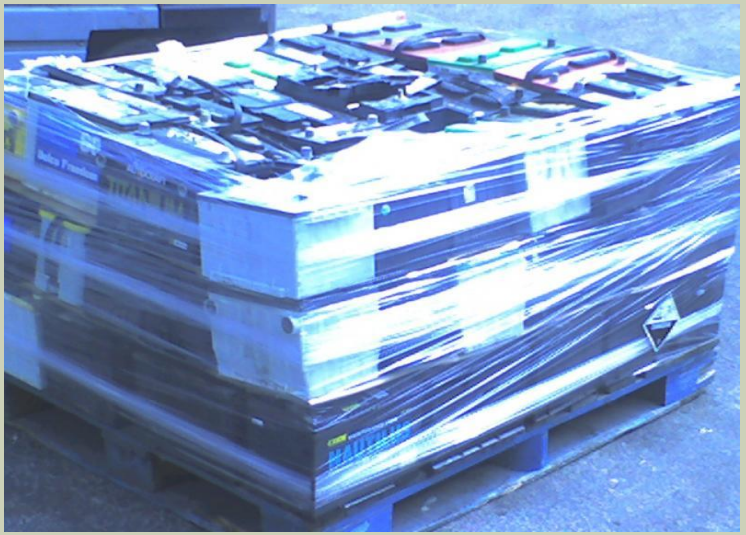
Batteries

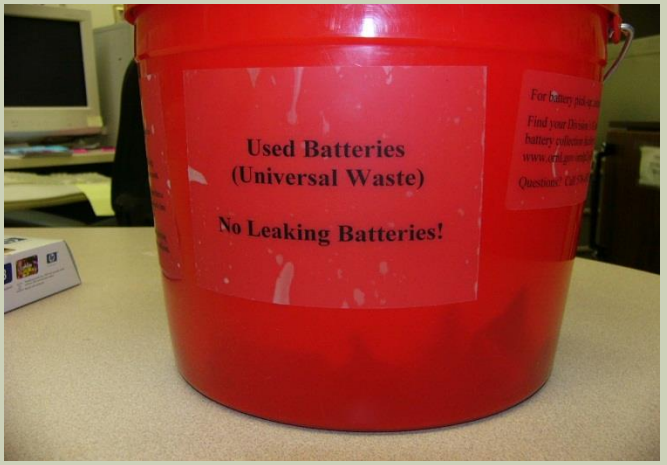
Batteries

- If picked up for recycling, not considered hazardous waste.
- Keep receipts on file to document recycling.
- If cracked, prepare a waste determination prior to disposal (**D002, D008**).
- Tape terminals if possible to prevent contact
- Remember to store in a cool, dry, and safe place!

Improper Battery Storage

Proper Battery Storage



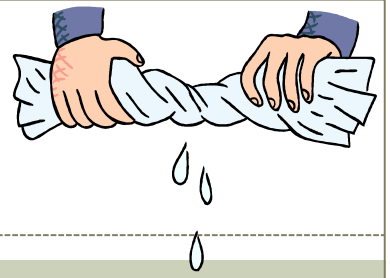


Other/Exempt Wastes Streams

Specific types of waste are not regulated as hazardous waste provided that they are managed properly. Examples include:

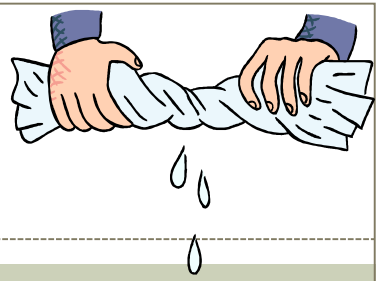
- Wipers and Rags.
- Used Antifreeze;
- Used Oil;
- Oil Filters;

Wipers and Rags



- If disposed, you must determine if they are hazardous waste:
  - Listed solvents;
  - Toxic characteristics.

Wipers and Rags



- Wipers and Rags professionally laundered for reuse at a permitted facility are considered non-hazardous if:
  - No Free Liquids;
  - Managed in Closed Containers;
  - Labeled.

Used Antifreeze

- If recycled, no waste determination needed.
- Does not count toward generator status.
- Keep receipts for at least 3 years.
- High volume users- consider recycling yourself.

Used Oil

- Label as **“Used Oil”**.
- Do not mix with hazardous waste.
- If recycled, it does not count toward generator status.

Used Oil Filters

- Exempt from hazardous waste regulation if the filters have been gravity hot-drained by any of the following methods:
  - Puncturing the filter anti-drain back valve or filter dome and hot-draining;
  - Hot-draining and crushing;
  - Dismantling and hot-draining; or
  - Any other equivalent hot-draining method.

Don’t Forget these Waste Streams

- May be hazardous and require waste determination:
  - Aerosol Cans;
  - Filters;
  - Machine Oils.

Storage Requirements

- Proper Containers.
- Satellite Accumulation.
- Labeling.
- Central Accumulation Area.
- Inspections.

Hazardous Waste Containers Must Be:

- In good condition
- Compatible with the waste
- Always kept closed
- Labeled properly

Good Condition ?

Common Violation

- Open Containers
  - Securely Closed unless waste is being added or removed
  - Only open when adding or emptying.
- **Funnels in drums does not mean they are closed!**

Empty?

Empty Containers

- Empty Containers:
  - Good faith effort (all the material that can be removed has been removed);
  - Less than 1 inch of residue or 3% or less by weight of total capacity;
  - If **“P’** listed must be triple rinsed. A sewer permit is required for discharge to the sewer.

Containers Must be Labeled Clearly!

- Label must include:
  - The words “Hazardous Waste”;
  - Description of contents;
  - EPA Waste Codes;
  - Beginning Date of Accumulation.

Satellite Accumulation

- CESQGs & SQGs may co-locate Satellite Containers with Central Storage
- LQGs must justify “At or Near the point of generation”, AND “Under the control of the process operator”
- Up to 55 gallons of hazardous waste or 1 quart acutely hazardous waste.

Satellite Accumulation Area

- Mark or label the container with the words **“Hazardous Waste”**, and/or other words that identify the content of the containers.
- Within 3 days of the container becoming full:
  - ✓ Date
  - ✓ EPA Waste Code
  - ✓ Transfer to central storage

Common Violations

- **90 or 180 day storage area vs. satellite area**
- **Labeling Violations**
  - Wording
  - Accumulation start date

Container Staging

Central Accumulation Area

- Containers handled so they will not rupture or leak.
- Access control.
- Containment.
- Waste segregated if incompatible.
- Protect containers from elements.

Accumulation Time Limits

- CESQG - cannot store more than 1,000 kg (2,200 lbs) at any time or more than 1kg (2.2 lbs) of acutely hazardous waste
- SQG - 180 days or 270 days if waste is shipped greater than 200 miles away
- LQG - 90 days

Container Inspections

- SQG and LQG required to inspect the hazardous waste storage area ***weekly***.
- Inspections must note:
  - Date and Time of Inspection;
  - Name of Inspector (Signature);
  - Observations made;
  - Date and Time of any corrective actions.
- Maintain written records of inspections for at least 3 years.

Nothin' Fancy…

Hazardous Waste Storage Facility
Weekly Inspection Log

Date	Time	Inspector	No. of Drums	Status		Comments
				OK	Needs Att'n	
4/12/93	8AM	C More	20	ℓ		
4/19/93	8AM	C. More	20	ℓ		
4/26/93	8AM	C. More	20	ℓ		
5/3/93	8:00	L. Jones	21		X	Acid waste drum leaking
						Pumped into new drum on 5/7
5/10/93	8:00 AM	J. Smith	21	✓		
5/24/93	8:00 AM	J. Smith	29		✓	Missing bung on drum of spray paint gun cleaner
						Bung replaced on 5/28
6/4	8:00	L. Jones	29	X		
6/11	8:00	D. Jones	29	✓		
6/18	8:00	DJ	29	✓		
6/25	8:00	Jones	29	✓		
7/2	8:00	J.S.	11	✓		
7/9	8:15	Smith	11	✓		
7/16	8:00	CM	6	ℓ		

Business Environmental Program
College of Business
University of Nevada, Reno

2015
Hazardous Waste Compliance Calendar

ASSISTING NEVADA BUSINESSES WITH
ENVIRONMENTAL MANAGEMENT AND
ENERGY EFFICIENCY ISSUES

(800) 882-3233

www.unrbep.org

This calendar was developed by the Business Environmental Program.

January 2015

Facility Name: _____ EPA ID Number: _____

Weekly Container Inspection Record

Inspectors Name	Inspection Date /Time	Container Area Inspected	Leaks Yes No	Corrosion Yes No	If yes: Description of problem/ date and actions taken to correct the problem

Emergency Coordinator Information

Name: _____

Title: _____

Phone : _____

Alt. Phone : _____

Police **911** or: _____

Fire **911** or: _____

Hospital: _____

Previous Month Generator Status

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

Spill Reporting

NDEP Spill Reporting Hotline
1-888-331-NDEP (6337)
Outside of Nevada : 1-775-687-9485
National Response Center
800-424-8802

HAZARDOUS WASTE

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL
IF FOUND CONTACT THE NEAREST POLICE OR PUBLIC SAFETY AUTHORITY OR THE U.S.ENVIRONMENTAL PROTECTION AGENCY

NAME _____

ADDRESS _____ PHONE _____

CITY _____ STATE ____ ZIP _____

EPA ID NO

MANIFEST _____

ACCUMULATION

START DATE _____ EPA WASTE NO. _____

_____

_____

_____

DOT PROPER SHIPPING NAME AND UN OR NA NO. WITH PREFIX

HANDLE WITH CARE!

Common Violation

- Weekly Inspections (SQGs & LQGs)
  - Must inspect weekly
  - Must maintain log
    - Date & time
    - Inspector name
    - Observations
    - Remedial action taken

Preparedness and Prevention

- Emergency Coordinator.
- Spill Response.
- Preparedness and Prevention Plan (P3)
- Training.

Emergency Coordinator

- One or more employees designated to coordinate emergency response measures
- Must post next to telephone:
  - Name and phone numbers of coordinators;
  - Location of fire extinguishers, spill control equipment;
  - Location of alarm system (if present);
  - Phone number of Fire Department.

Spill Response

- HAVE A SPILL KIT STOCKED AND READY!
- Employees familiar with waste handling and emergency procedures.
- Make sure employees are able to respond in the event of an emergency.

Preparedness and Prevention Plan (P3)

Required for SQG and LQG:

- Maintenance and operation of facility;
- Required equipment;
- Testing and maintenance of equipment;
- Access to communications and alarm systems;
- Required aisle space;
- Arrangements with local authorities.

Required Equipment

- All facilities are required to have:
  - Internal communications or alarm system (voice or signal); (i.e. a telephone or two way radio),
  - Portable fire extinguishers;
  - Spill control equipment;
  - Decontamination equipment (if required); and
  - Water in adequate volume and pressure.

Testing and Maintenance

- All facility communications, fire protection equipment, spill response equipment (if required) must be tested and maintained as necessary to assure proper operation.

Communications/Alarm System

- Whenever hazardous waste is being handled, persons involved must have immediate access to:
  - An internal alarm; or
  - Emergency communication device.

- If there is just one employee on the premises while the facility is operating he/she must have a cellular phone or two-way radio to summon help.

Required Aisle Space

- Adequate aisle space is required to allow unobstructed movement of personnel, fire protection equipment or decontamination equipment (if required) to any area of the facility in the event of an emergency.

  40 CFR §265.35

Arrangements with Authorities

- Familiarize police, fire department, and emergency response teams with:
  - The layout of the facility;
  - Properties of the hazardous waste and associated hazards;
  - Places where employees work;
  - Possible evacuation routed;
  - Have proof of notification to local authorities.

Arrangements with Authorities

- Familiarize local hospitals with:
  - Waste types handled at the facility;
  - Types of injuries and illness that could result from handling or exposure to the waste either through handling or fire or explosion;
  - If either State or Local authorities decline to enter into such arrangements the refusal must be documented into the facility operating record.

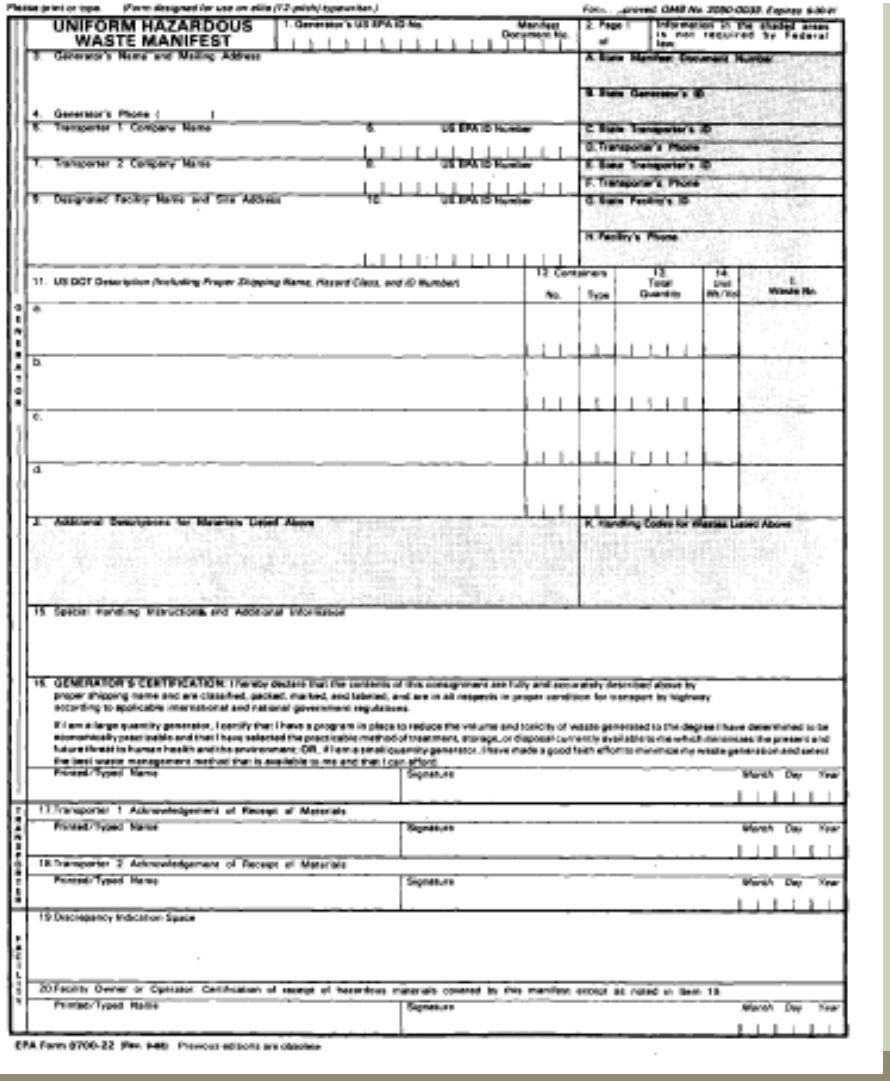
Employee Training

- SQG facilities must ensure all employees are familiar with:
  - Proper waste handling procedures; and
  - Emergency procedures.
    - Spill response
    - Evacuation plan
    - Fire extinguisher location
    - Decontamination procedures (if necessary)

Common Violation

- **Training**
  - Inadequate employee training
  - Not documenting employee training

Manifests



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 | B. State Generator's ID

4. Generator's Phone ( )

5. Transporter 1 Company Name | 6. US EPA ID Number | C. State Transporter's ID | D. Transporter's Phone

7. Transporter 2 Company Name | 8. US EPA ID Number | E. State Transporter's ID | F. Transporter's Phone

9. Designated Facility Name and Site Address | 10. US EPA ID Number | 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.	12. Containers Type	13. Total Quantity	14. Unit Wt./Vol.	I. Waste No.
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

16. 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.

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.

Printed/Typed Name | Signature | Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

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.

Manifests

- Must be used by all SQG and LQGs that ship hazardous waste off-site for treatment, storage, disposal, or recycling.
- Provides tracking from your facility to TSDF
  - Generator initiates the manifest
  - TSDF sends signed copy back to generator
  - Staple signed copy to the original; not required, but helps to keep them organized.
- Keep on file for 3 years.
- Used to complete the Biennial Hazardous Waste Report

Biennial Generator Reports (BGR)

- **Due March 1, 2016**
- **Federally required by all LQGs and TSDFs; some states require reports from SQGs and CESQGs.**

Recordkeeping

- **Operational Records:**
  - Waste Determination;
  - Training Records;
  - Weekly Inspection Records.

- **Waste Disposal Records:**
  - Manifests;
  - Land Disposal Restrictions;
  - Tolling Agreements.

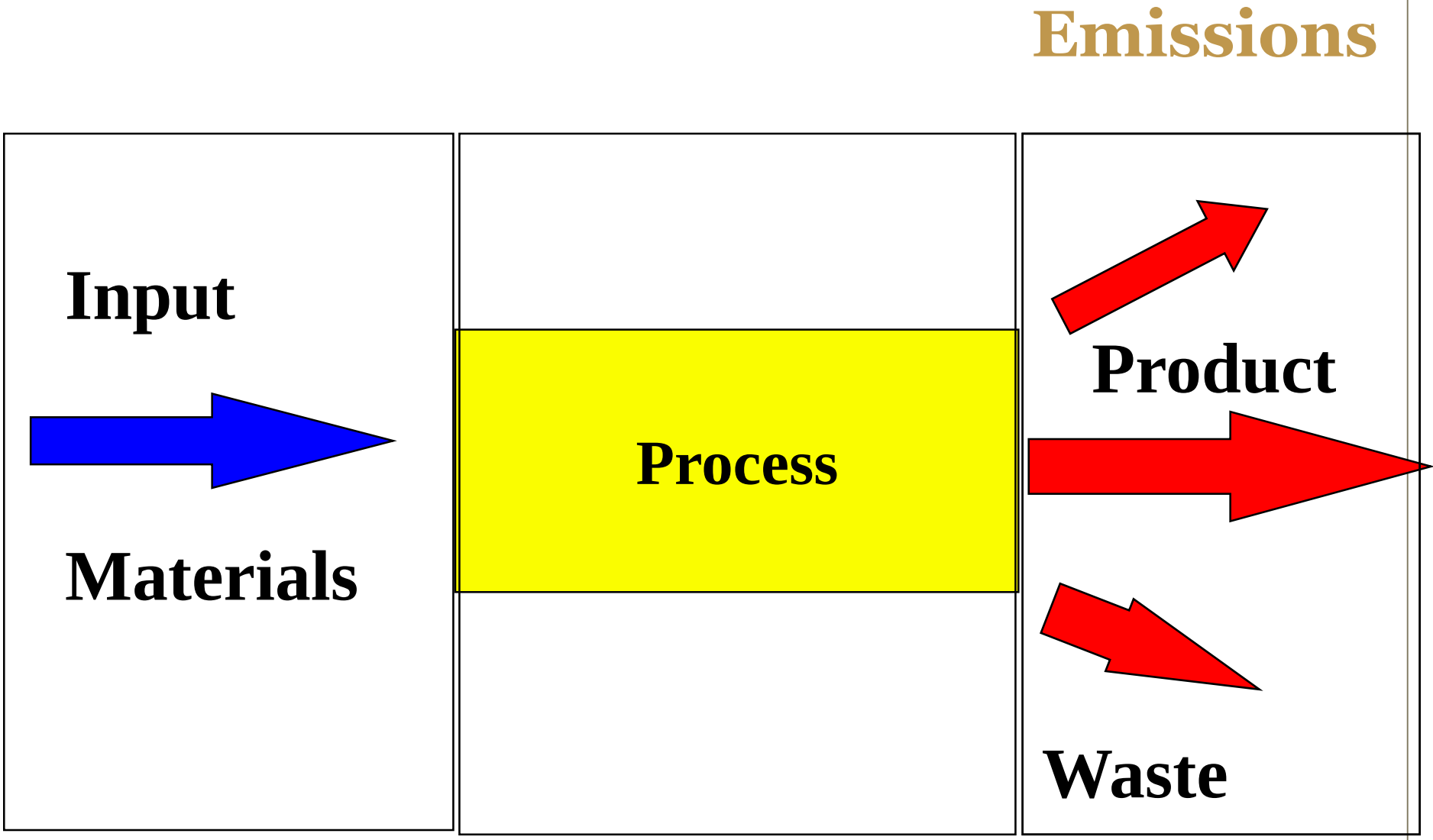
- **Preparedness and Prevention Records:**
  - Preparedness and Prevention Plan;
  - Contingency Plan;
  - Required Postings.

What are My Basic Responsibilities as a Hazardous Waste Generator?

- Follow procedures for labeling, storing and disposing of hazardous waste.
- Maintain proper records and paperwork.
- Prepare ahead of time for spills or other mishaps.
- Minimize the amount of waste generated.

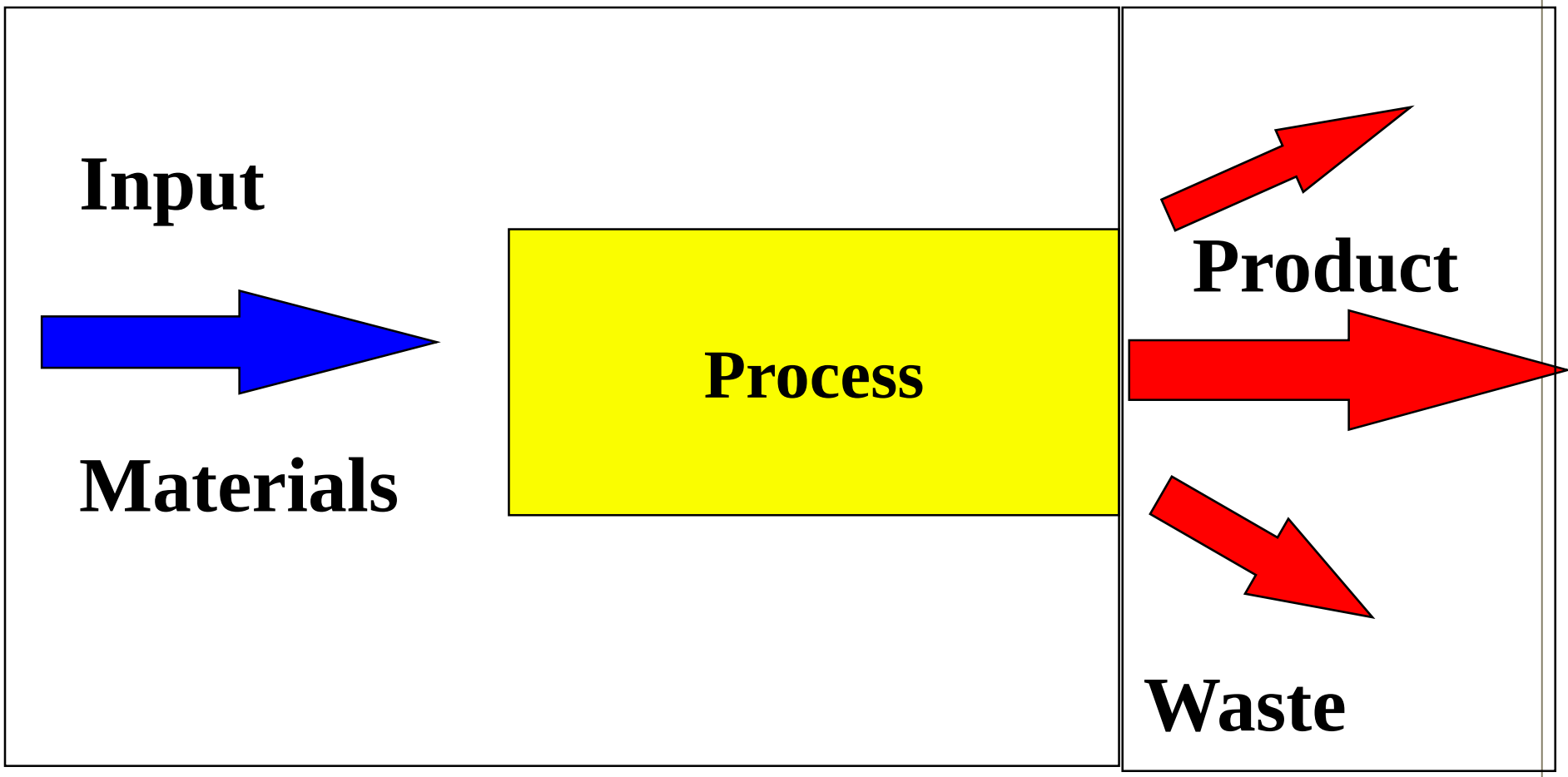
Pollution Prevention (P2) and Waste Minimization

Primo Levi
1919-1987


Emissions
Input
Materials
Process
Product
Waste

Pollution Prevention

Pollution Control



BENEFITS OF P2

Improved worker health and safety

- Minimize exposure to hazardous products
- Improved training leads to safer work practices

BENEFITS OF P2

Environmental Protection

- Cleaner air and water
- Conserve natural resources
- Reduce pollutants entering the environment

BENEFITS OF P2

Cost Savings

- Savings in material, supply, and tracking costs
- Reduced liability and regulatory burden
- Elimination of expensive clean-up costs

SEVEN P2 TECHNIQUES

- Policy/Procedural Change
- Equipment Modification
- Material Reuse
- Material Substitution
- Process Efficiency Improvements
- Improved Housekeeping
- Inventory Controls

POLICY or PROCEDURAL CHANGE

Technique 1

Put policy in place requiring the purchase of less hazardous products or the use of less wasteful practices.

-Require metal free auto paint
-Low VOC latex paint
-Double-sided printing

Equipment Modification

Technique 2

Replacing solvent degreasers with aqueous parts washers.

Equipment Modification

Technique 2

Digital Photography/ X-Ray

Equipment Mod./ Material Reuse

Technique 2 and 3

Using a distillation/recovery unit allows you to reuse the product and reduce your waste quantities, saving costs on purchasing and disposal.

Case Study

- Aggregate Industries - Las Vegas, NV
- Purchased ≈ 125 gallons of solvent each month; generated ≈ 125 gallons of hazardous waste solvent per month.
- Product purchase and waste disposal cost: $40,000 per year
- Purchased a solvent recovery unit for $4,500.
- Reduced hazardous waste generation by ≈ 9,500 lbs per year
- Annual savings ≈ $34,000

MATERIAL SUBSTITUTION

Technique 4

Purchase Environmentally Preferable Products

MATERIAL SUBSTITUTION

Technique 4

Replace aerosol solvents with compressed air sprayers and citrus-based cleaners for cleaning and degreasing.

PROCESS EFFICIENCY IMPROVEMENTS

Technique 5

Laser guide for spray gun

IMPROVED HOUSEKEEPING

Technique 6

- Preventative maintenance
  - Proper labels
  - Organization
  - Keep lids closed
- Reduced opportunities for accidents

INVENTORY CONTROLS

Technique 7

The hazardous material barcode color changes every year.

Barcode#	Year Barcoded
1A010000	2001
2A010000	2002
3A010000	2003

WASTE MINIMIZATION/P2 WRAP-UP

- Purchase less hazardous material.
- Use it more efficiently.
- Reduce waste management cost.
- Reduce insurance costs.
- Reduce labor, recordkeeping, reporting and regulatory requirements.
- Feel good and make more money.

www.unrbep.org

Roland J. Fornoff
Sustainability Manager
702.866.5927
fornoff@unr.edu