

WELCOME!

**Welcome to Today's Workshop
on Universal Wastes**

WHY ARE YOU HERE?

- **Required by law and NH Solid Waste Rules.**
- **Build your resume**

WHY UNIVERSAL WASTE?

- **One of top 10 most dangerous jobs**
 - **33 deaths per 100,000**
 - **Due to accidents and exposure to hazardous materials and heavy equipment**

TODAY'S AGENDA

- **Solid Waste Operator Rule Changes**
- **UW – Pesticides, CRTs, Auto Antifreeze**
- **Real Life UW – Part I**
- **Break**
- **UW – Batteries, Hg Devices, Fl Lamps**
- **Real Life UW – Part II**
- **Mercury**
- **Spill Clean Up**

SOLID WASTE FACILITY OPERATOR WORKSHOP

Solid Waste Operator Training Rule Changes

Effective July 1, 2014

OPERATOR TYPES

Establishes two types of operators:

1. Principal operator

- **Attend basic training and pass the exam.**
- **May be in supervisory/management position.**

OPERATOR TYPES

2. Assistant operator

- **Attend basic training, but do not take/pass the exam.**
- **Must work under supervision of principal operator.**

OPERATOR QUALIFICATIONS

- **No more minimum education/experience requirements.**
- **Employers determine who is competent, not DES.**

TRANSITION FROM LEVEL TO STEP

- *Attendant in Training → Assistant Operator*
- *Level 1 → Principal Operator, Step 1*
- *Level 2 → Principal Operator, Step 2*
- *Level 3 → Principal Operator, Step 3*
- *Level 4 → Principal Operator, Step 4*

SENIOR PRINCIPAL OPERATOR

Operators who had 20+ years of certification as of 7/1/2014 were designated Senior Principal Operators.



STEPS

- **Recognition for continuing professional development.**
- **Awarded automatically with renewal.**
- **Step increases with hours of accrued training starting July 1, 2014.**

STEPS

Step	Hours of Accumulated Continuing Professional Development
1	2.5 total
2	12.5 total
3	25 total
4	37.5 total
Senior *	50 total

* Only for Principal Operators

PROFESSIONAL DEVELOPMENT

“Continuing Professional Development” - professional or technical instruction that imparts information and instruction relevant to waste management and solid waste facility operations to individuals who have already attended basic training.

PROFESSIONAL DEVELOPMENT

- 2.5 hour minimum for annual renewal for **ALL** designations.
- Must be completed in the 12 months in-between expiration dates before you are considered late.

PROFESSIONAL DEVELOPMENT

- **Repeated courses do not qualify for certification renewal or step increases.**
- **In-house and third party training count, provided the topic is waste-related.**
- **If you aren't sure if the training you want to take will count, call and ask us before you go.**

GRACE PERIOD

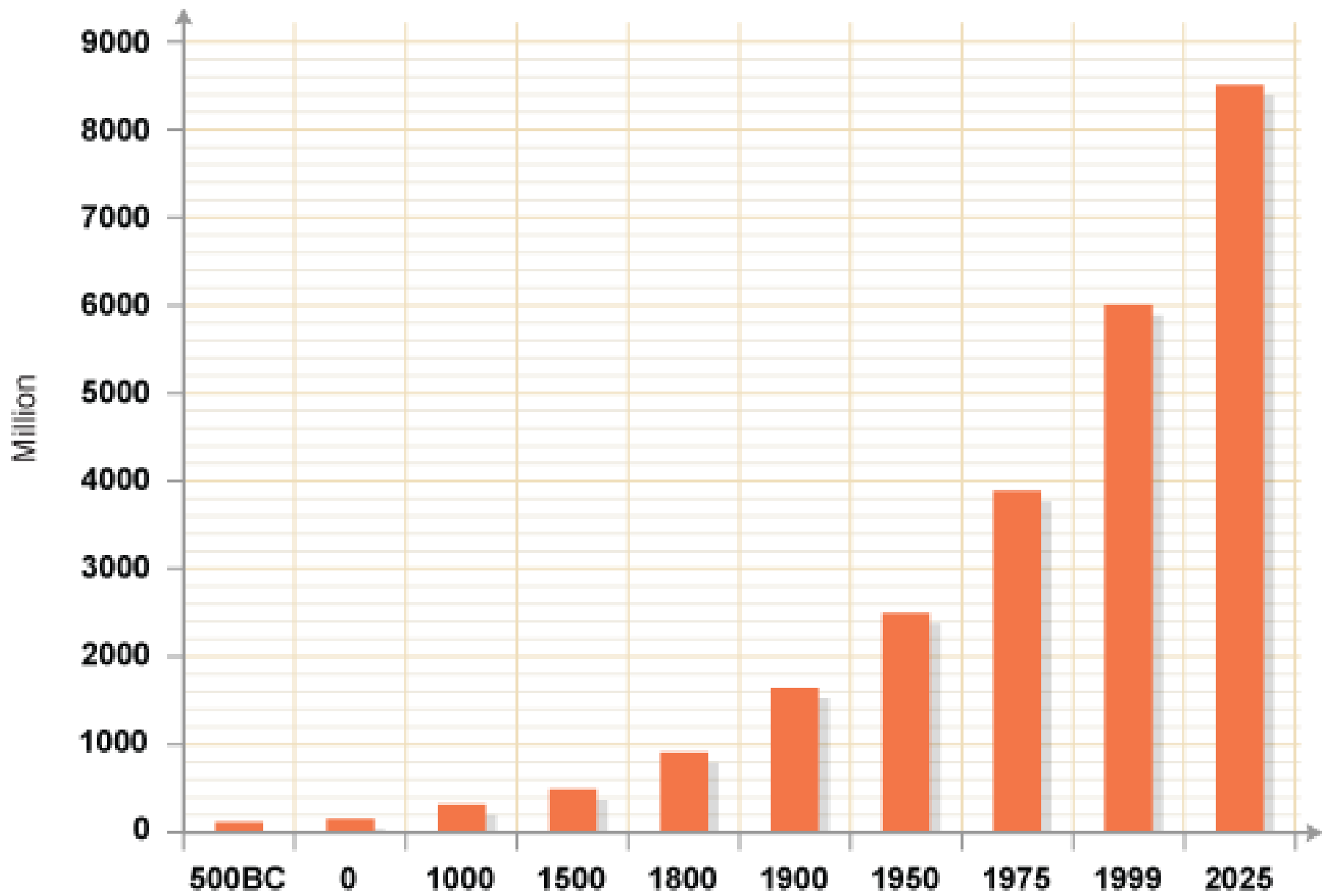
- **There is a 90-day grace period for renewal applications**
- **A \$25 late fee will be assessed if your complete renewal application is received within 90 days after your certification expiration date**

BEYOND THE GRACE PERIOD

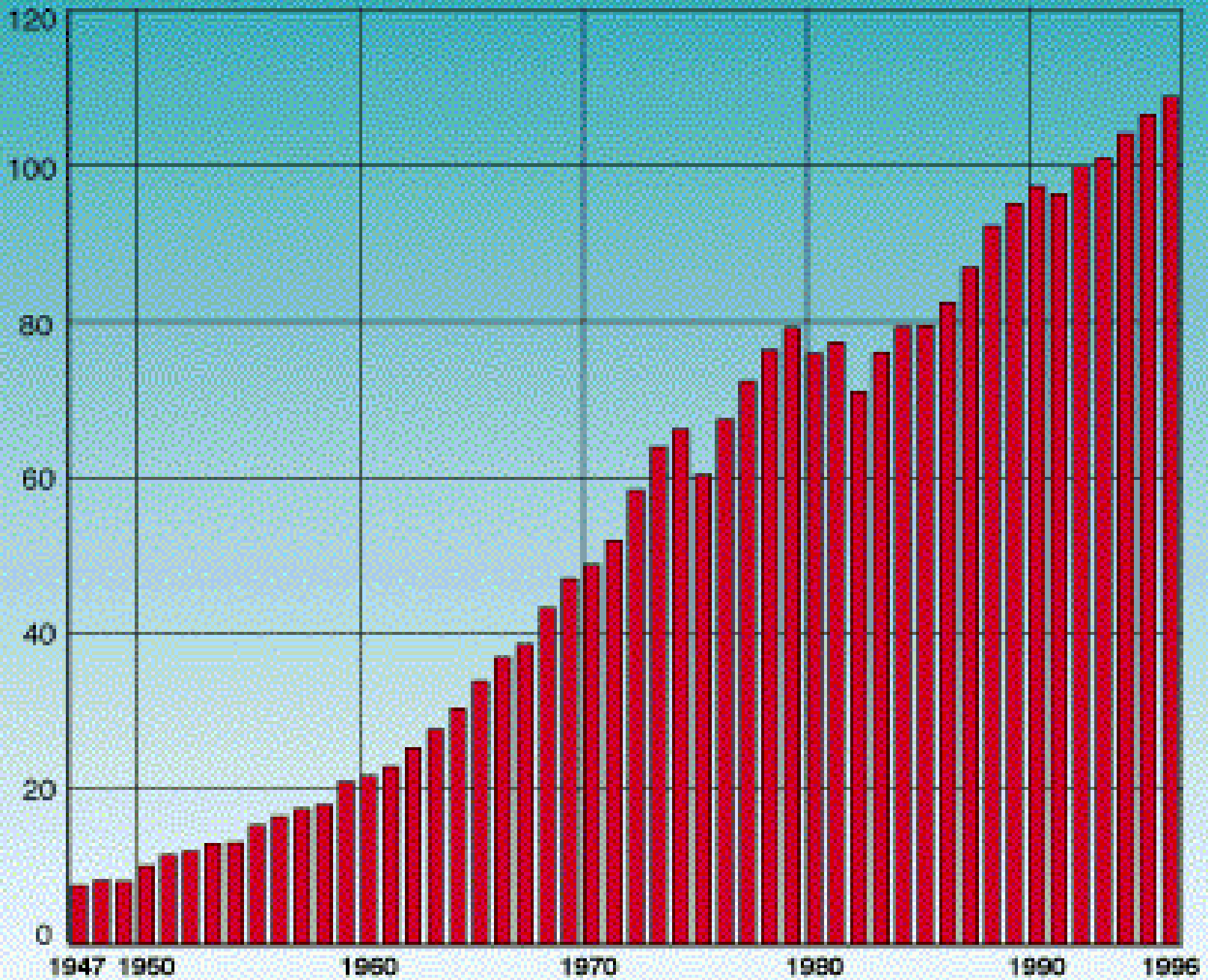
- **If you miss the grace period, you must start over.**
 - **Come back to Basic Training; and**
 - **Take the test again**

SIGNATURE

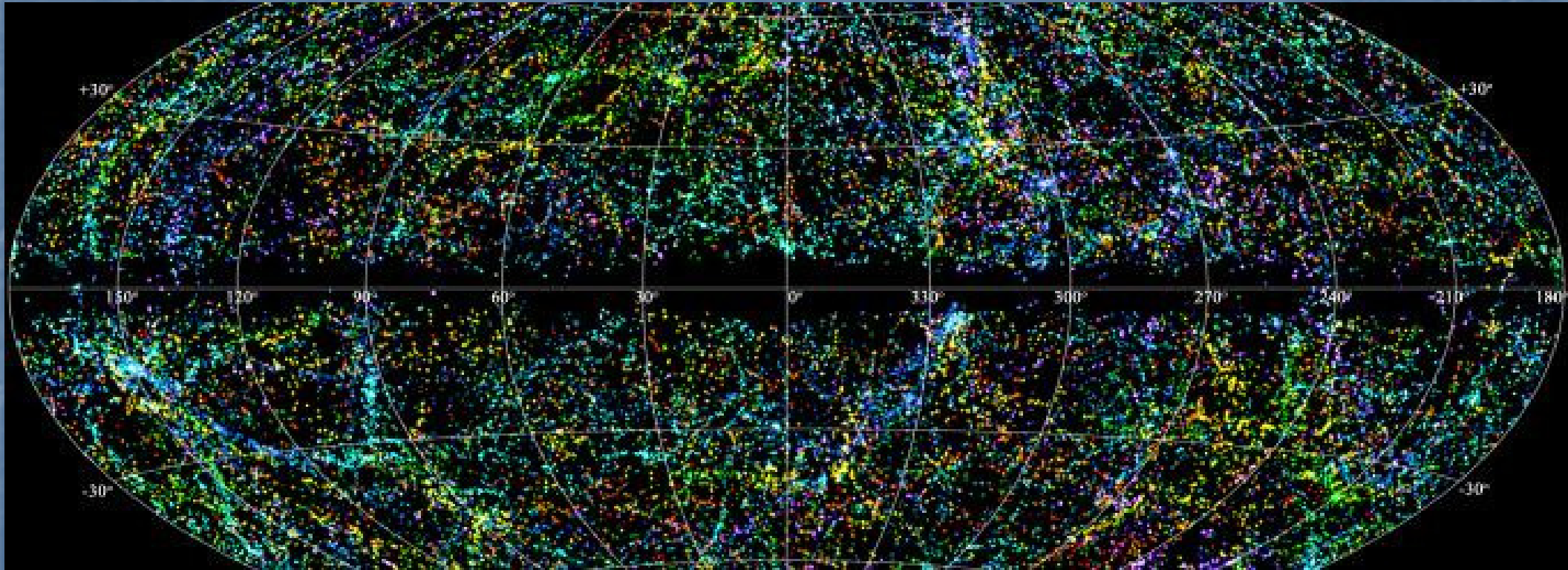
- **The operator's signature shall certify:**
 - **the information is true, complete and not misleading;**
 - **the operator understands s/he is subject to penalties of law for false swearing; and**
 - **the operator understands s/he is required to comply with RSA 149-M and SW Rules.**



Production index, 1992 = 100



Universal Wastes...





Some Pesticides



Cathode Ray Tubes

Automotive Antifreeze



Some Batteries



Mercury-Containing Devices





Some Lamps

What Does “Universal Waste” Mean For You?

- This stuff might be hazardous, or it might not...but it probably is
- Options:
 - Take the time to prove it isn't hazardous, or
 - Just assume it's a hazardous waste and call it a universal waste
 - Easier regulations
 - Must be recycled

OVERVIEW

HAZARDOUS WASTES

“Typical” Hazardous Wastes

Managed under
Env-Hw 500

Expensive & Hard

A TOLL ROAD
Typical
Haz-Waste
↓ ↓

Universal
Waste
↗ ↘

Universal Waste

Hazardous, but
usually managed
under Env-Hw 1100

Cheaper & Easier



Household Universal Waste

- Made by...households!
 - Not regulated by hazardous waste folks
- When a non-household accepts it, they become regulated
- Your solid waste facility becomes a “universal waste **handler**”



Business Universal Waste

- Unlike other hazardous wastes, you can legally accept universal waste from a business
 - Is it a good idea?
 - What is the recycling market?
 - Will taxpayers support it?
 - Will management support it?
- They are also a “Handler”



What/who is a “Handler”?

- Someone who receives universal waste at their facility
- Someone who makes universal waste
- Someone who stores universal waste
- Someone who sends universal waste to another party
- Households are not handlers

Things Handlers Can't Do

- Dispose of it
- Treat it – such as crushing lamps on purpose
- Give it to someone who isn't going to handle it legally



Things Handlers Must Do

Rules



Rules for ALL Universal Wastes

1. Any containers that hold universal waste must be:



In good condition



Closed



Compatible with the waste

When is a container needed?

1. If batteries are leaking or damaged
2. All Pesticides
3. If mercury devices are leaking or damaged
4. Mercury ampoules removed from devices
5. Intact or broken lamps
6. Damaged or intentionally broken CRTs
7. Automotive antifreeze

Storage time requirement

- Must store for 1 year or less
 - Date container, or
 - Date the item, or
 - Maintain an inventory

April 23, 2015

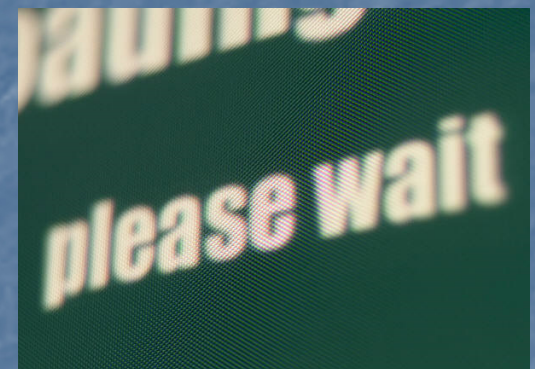


Storage Time Requirement

- Store more than one year only if it is necessary to allow proper recovery, treatment, disposal
 - Contract to prove it
 - Date on materials



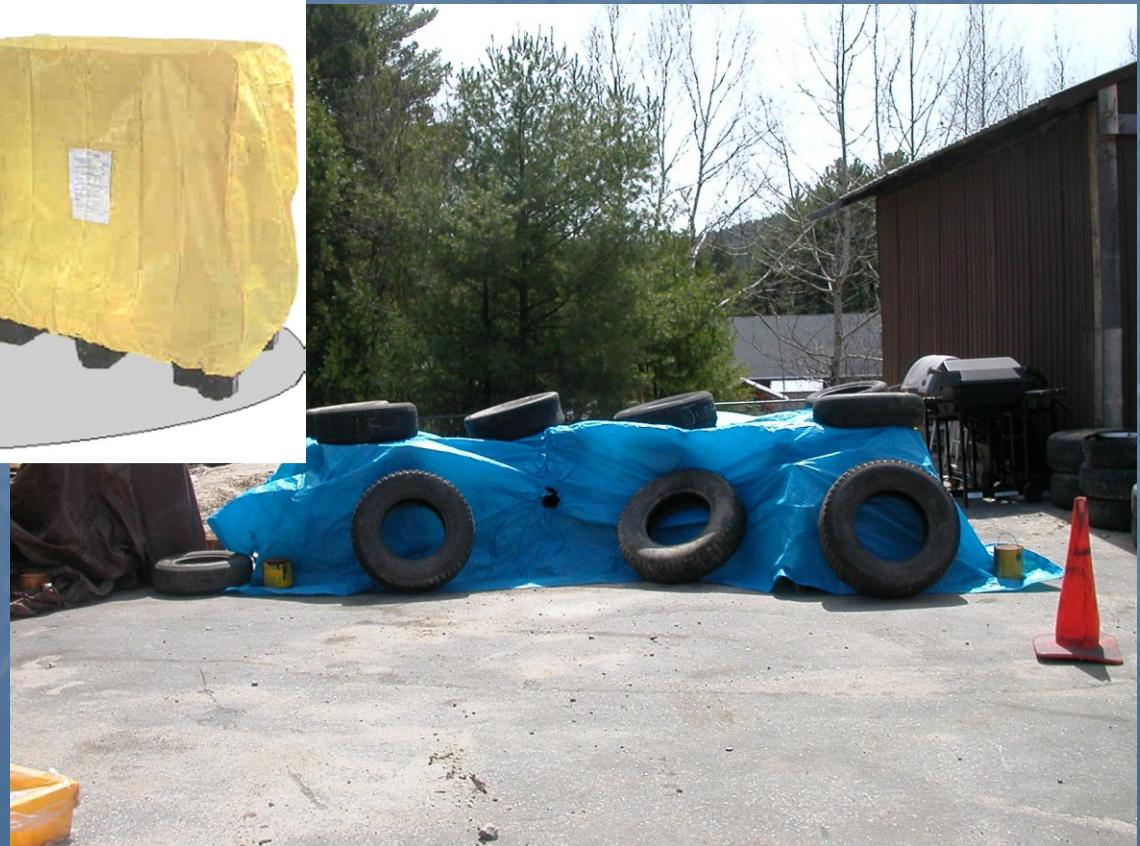
John Hancock



please wait

For All Universal Wastes

3. Outside storage must be covered



Leaks and Releases

4. Respond to leaks and other releases

- Immediately contain
- Clean up in 24 hours
- If human health or the environment is threatened, notify local fire company and DES (271-3899)



All Universal Wastes

5. Ship in compliance with DOT

- Use a bill of lading
- Not required to use a registered hazardous waste transporter



6. Handlers must be trained to recognize risks of waste, be familiar with waste handling and emergency procedures



For All Universal Wastes

7. If you have $\geq 11,000$ pounds of universal waste on-site
- Tell (Notify) DES
 - 271-2921
 - Don't include the weight of batteries
 - Keep shipping records for 3 years



Rules for Individual Universal Wastes – Part 1.

Pesticides, CRTs, Antifreeze

Pesticides

Pesticides have the Toughest Universal Waste Rules

- Designed to intentionally kill
- In a form that can easily get:
 - Moved
 - Inhaled
 - Ingested
 - Soaked into your skin
 - Dissolved



Pesticides have the Toughest Universal Waste Rules

- More likely to be destroyed than recycled
- Rules are designed more for large-scale collections
 - Major recalls



Rules for Certain Pesticides

Which Pesticides?



Rules for Certain Pesticides

Which ones?



Those that are suspended or recalled under
“Federal Insecticide Fungicide
Rodenticide Act” (EPA’s FIFRA)

Contact NH Dept of Agriculture for most up-
to-date list

- 271-3550

List those pesticides

- EPA Documents
 - “The Rainbow Report” - 1998
 - <http://www.epa.gov/oppsrrd1/Rainbow/98rainbo.pdf>
 - “Suspension of Registrations Under FIFRA”
 - <http://www2.epa.gov/pesticide-reevaluation/suspension-registrations-under-fifra>
- NH Dept. of Agriculture Rules – Pes 701.04
 - http://www.gencourt.state.nh.us/rules/state_agencies/pes700.html

Rules for Certain Pesticides



Do better than this!

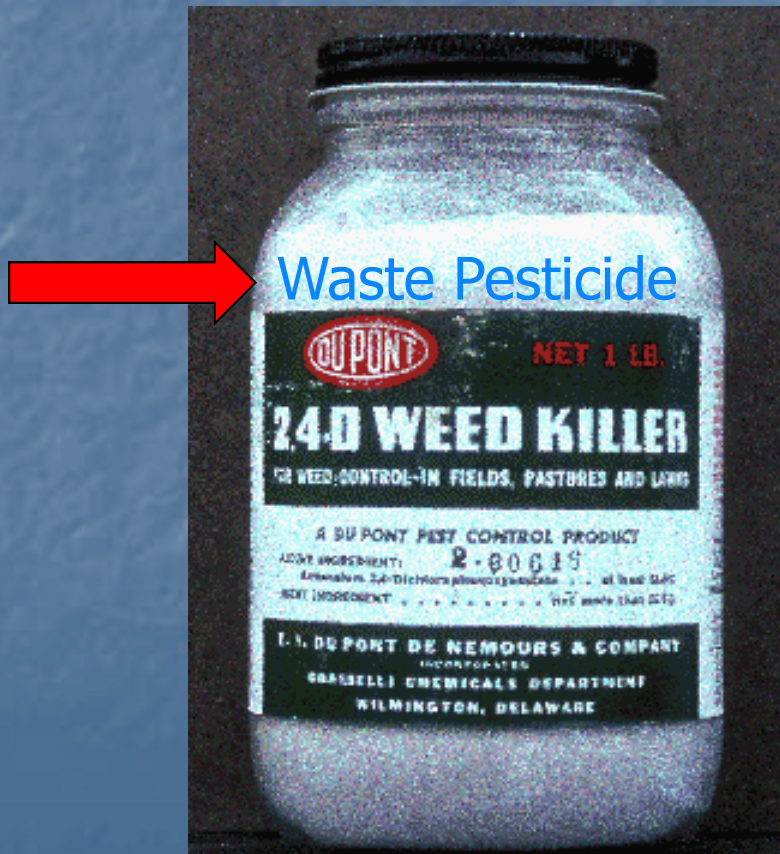


1. Must be in a container (closed!)

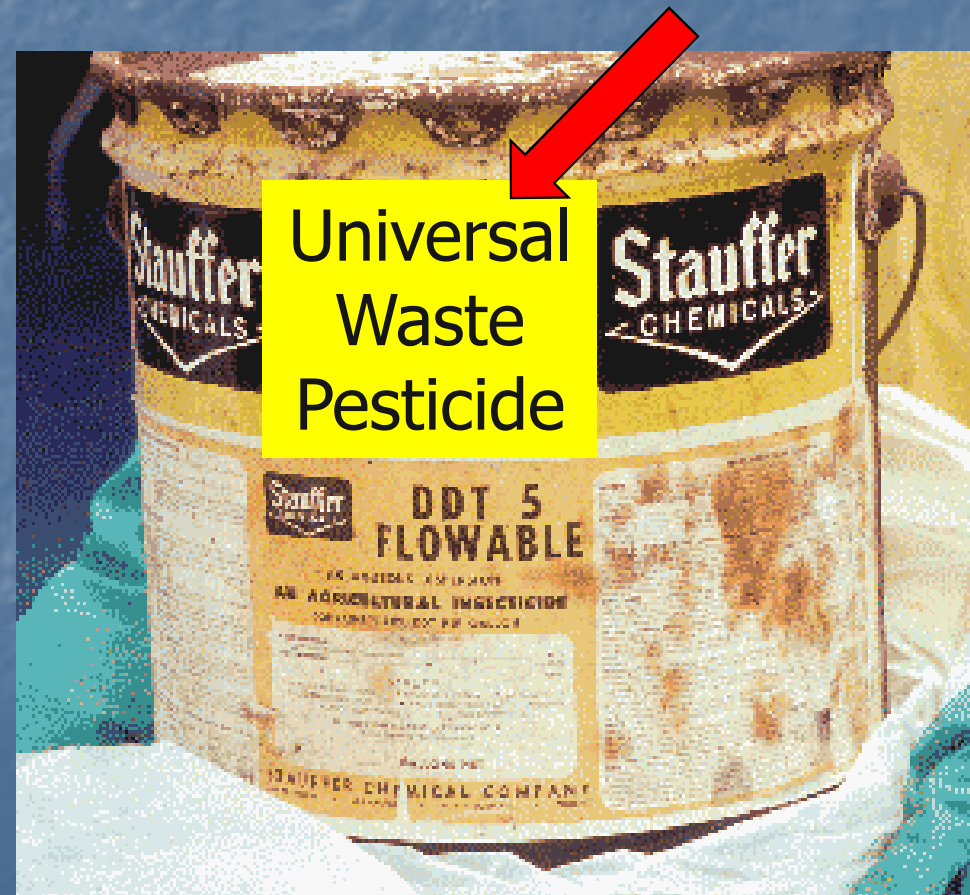
Rules for Certain Pesticides

2. Label with:

- The label originally on the package **AND**



OR



Pesticide Storage

3. Stored on an impervious surface
 - Secondary containment if near floor drains, sinks or manholes



Rules for Certain Pesticides

4. Equipment required near pesticides

Fire Control Equipment



Spill Control



Decontamination Equipment

Rules for Certain Pesticides

5. Adequate aisle space

- to respond to emergency
- To find problems!



Rules for Certain Pesticides

6. Telephone posting

- Local fire dept., 911, or both
- Local police, 911, or both
- DES (271-3899)
- DOS (223-4381)
- Local response team #
- **Steps to take in an emergency**



Rules for Certain Pesticides

7. Outdoor Storage Requirements

- A barrier (fence, wall) surrounding waste
- Controlled (gated) entry
- Posting that says:

“Danger – Unauthorized Personnel Keep Out”



Rules for Certain Pesticides

8. Personnel Training!!!

- A formal –written training plan that tells who, what and when
- Trained in hazardous waste management within 6 months
- Can't handle pesticides until trained
- Receive training again **every 6 months**
- Strict documentation of training records



Rules for Cathode Ray Tubes

1. Broken/damaged cathode ray tubes that could release glass particles must be in a container that is closed, impermeable, and prevents releases
2. DO NOT BREAK OR CRUSH on purpose

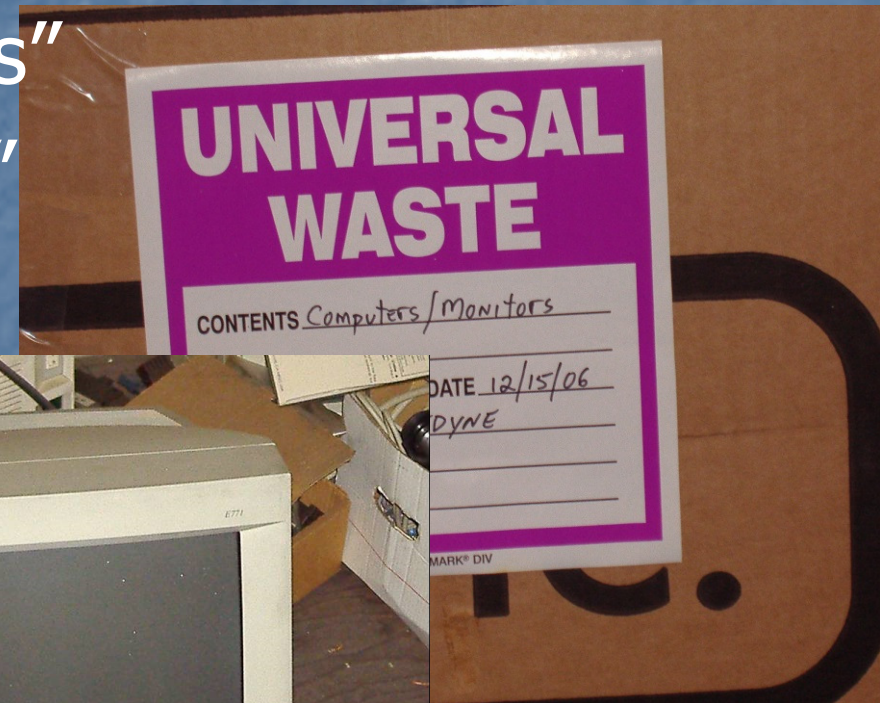


Cathode Ray Tubes (CRTs) contain lead.

Cathode Ray Tubes

3. Label:

- “Universal Waste – Cathode Ray Tubes”
- “Waste Cathode Ray Tubes”
- “Used Cathode Ray Tubes”



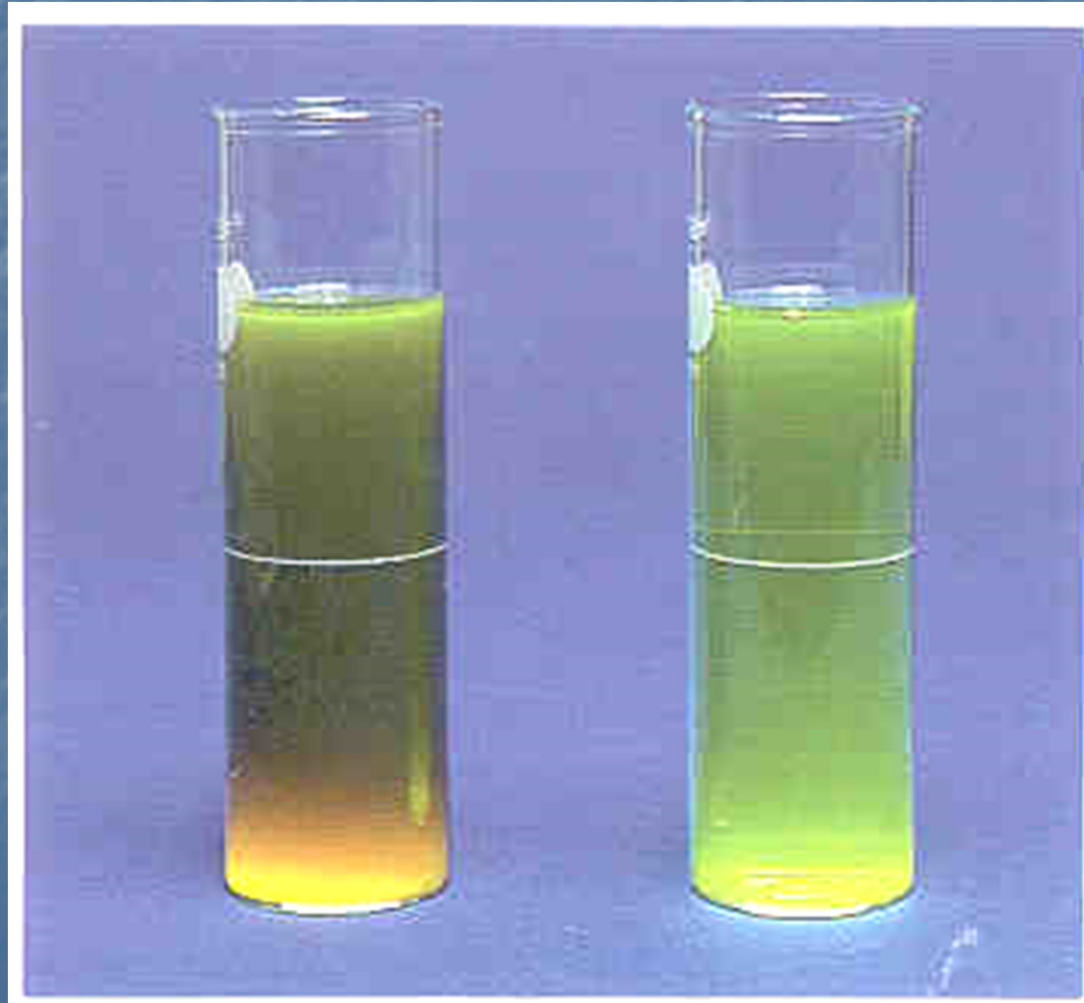
Rules for Auto Antifreeze

1. Store in a container or tank (closed!)
2. Label the container or tank:
 - “Universal Waste Antifreeze”
 - “Waste Antifreeze”
 - “Used Antifreeze”

May contain heavy metals and cancer-causing benzene

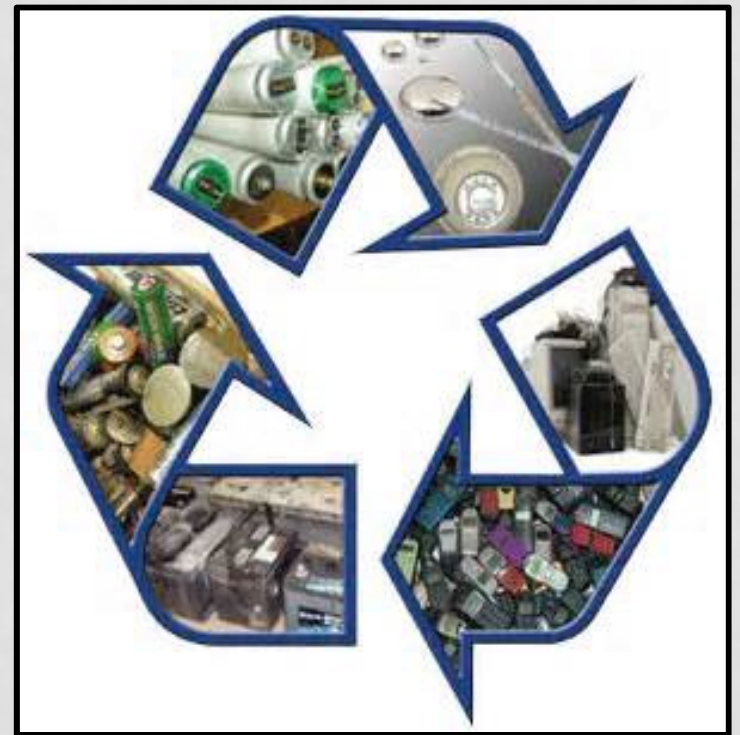


Through use antifreeze becomes contaminated.



CRTS, ANTIFREEZE AND PESTICIDES

- How do you collect them?
- How do you store them?
- How do you manage them?
- Are they shipped properly?
- Are they recycled or properly disposed of?



CATHODE RAY TUBES

How do you collect them at your facility?



CATHODE RAY TUBES

How do you store them at your facility?



CATHODE RAY TUBES

How do you store them?
What can happen here?



HOW DO YOU SHIP CRTS?

Are they in the proper shipping container?



Electronics storage shed. Contain CRTs – still UW.

WHERE DO YOU SHIP THEM TO?

Are they in someone's backyard?



...OR ARE THEY BEING PROPERLY RECYCLED?



Where are your shipping papers or BOL?

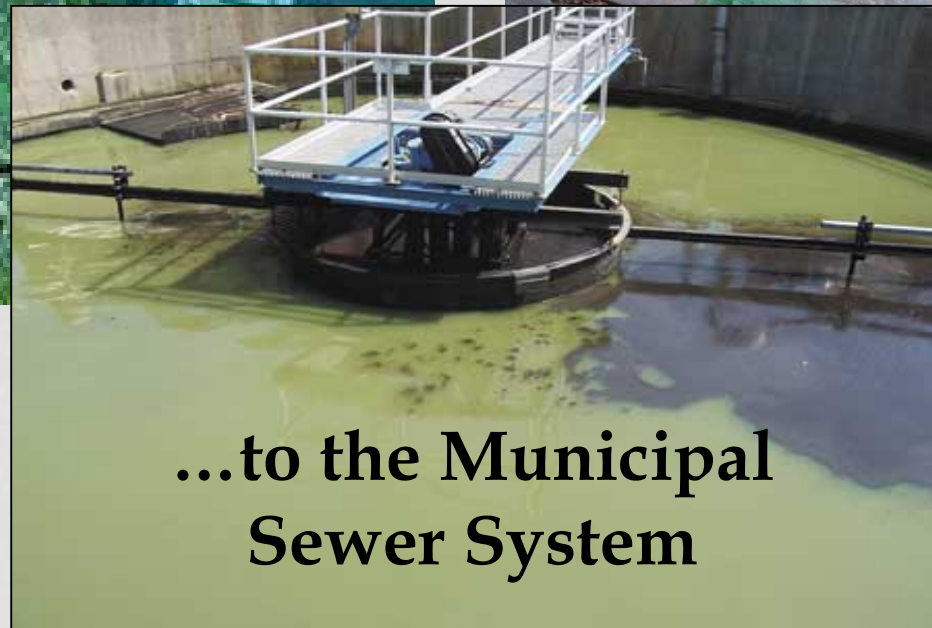
IMPROPER DISPOSAL OF ANTIFREEZE



From here



..or the local stream



...to the Municipal
Sewer System

ANTIFREEZE

How do you collect it?



ANTIFREEZE

How do you store it?



ANTIFREEZE SHIPMENTS

How do you ship it?

- You can self transport
- No limit on amount
- Follow NHDOT Requirements
- Use bill-of-lading



IS IT BEING RECYCLED?

Can you document where your antifreeze is going?



Have you investigated the hauler or destination facility?

PESTICIDES

Which ones are UW?
Which ones are hazardous waste?



- Store them properly (containers/labels)
- Residents can toss their pesticides in the trash – not a BMP

Recommend: Have residents take them to a HHW day.

PESTICIDES

Options?

- **Contact the NH Dept. of Agriculture [DOA] for assistance 271-3550**
- **Before calling the DOA, look for special coding on the container**
- **Inform your residents that they can bring any used pesticides to a HHW event**
- **Contact the Lakes Region HHW facility in Wolfeboro at 569-5826**
- **Contact the City of Nashua at 589-3410**
- **Keene HHW Facility at 352-6550**

UNIVERSAL WASTES

Facts:

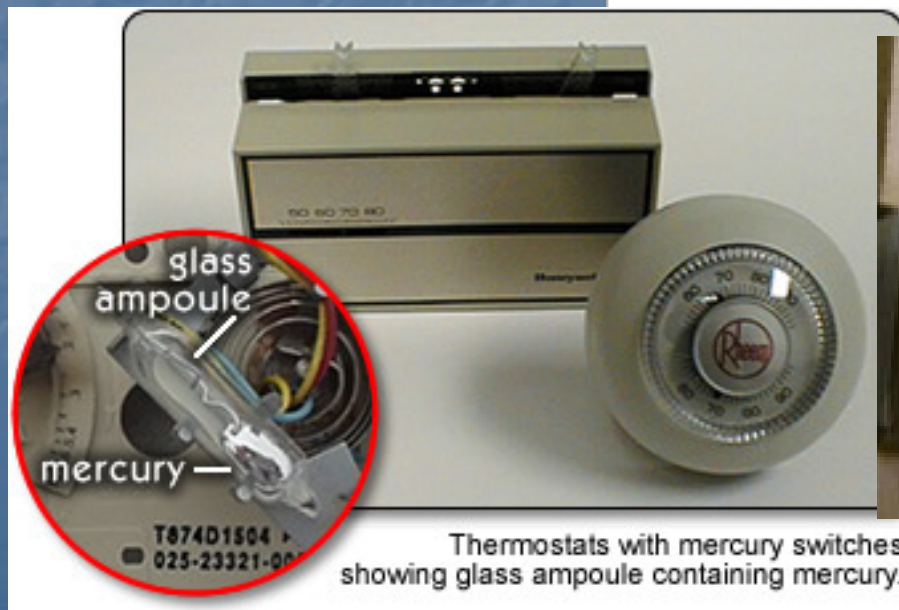
- They are hazardous.
- They can cause damage to the environment and/or human health if not properly managed.
- They can save money if recycled.
- You must be compliant with rules and regulations if accepting them.



BREAK TIME

Rules for Certain Universal Wastes – Part 2.

- Batteries
- Mercury Devices
- Lamps



Thermostats with mercury switches showing glass ampoule containing mercury.



Rules for Certain Batteries

Which ones?



BATTERIES

Nickel-Cadmium (Ni-Cd)



Lithium



Button cell



Lead-acid



Dangerous for Heavy Metals, fire hazard, and sometimes acids

Alkaline and Carbon Zinc

Non-hazardous



In 1996, Federal law is adopted (Mercury Containing and Rechargeable Battery Act) that prohibits addition of mercury to batteries (except for button cells).

Recycling Alkaline Batteries

- Vendors will take them for you – for a price
- Ask for documentation that they are truly recycled and not disposed of



Rules for Universal Waste Batteries

1. Any battery leaking, or at risk of leaking, goes into a container (closed! And compatible with the stuff that's leaking!)
2. Label containers holding batteries:
 - "Universal Waste Batteries"
 - "Waste Batteries"
 - "Used Batteries"



LEAD ACID BATTERIES

Another option!

May be managed under Env-Hw 809 or the
Universal Waste Rule (Env-Hw 1100)



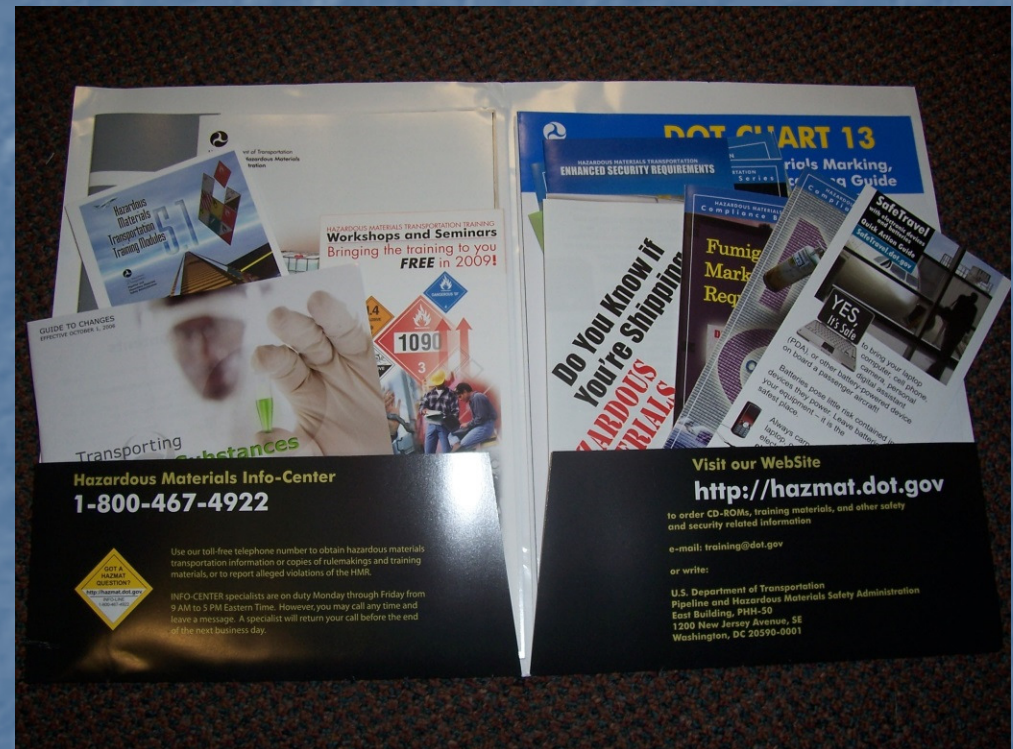
Env-Hw 809

- Collectors (handlers)
 - “Store in a manner designed to ensure that the battery housings do not break or leak acid onto the soil or into any ground-waters or surface water”



Env-Hw 809

- Transporters
 - Load and brace to prevent damage or short circuits
 - Comply with State and Federal shipping regulations



Lead-acid Batteries

Additional Best Management Practices

- Stack on leak-proof surface
 - Also on a pallet is advised
- No more than 5 layers high



Lead-acid Batteries

- Additional Best Management Practices
 - Inside or under cover



Lead-acid Batteries

- Additional Best Management Practices
 - Keep any container lids loose to prevent build-up of dangerous gases or fumes
 - Store away from sparks or flames



Lead-acid Battery Cleanup

- Put on acid-proof gloves and eye protection at a minimum



Lead-acid Battery Cleanup

- Put leaking battery in a 5-gallon bucket
 - Put baking soda or lime in bucket to neutralize acid that leaks out
 - Do **NOT** put baking soda or lime directly on battery
 - May spatter (“AAA”)
 - Recycler will probably still accept it with advanced notice



Lead-acid battery cleanup

- Neutralize acid on ground with baking soda
- Save contaminated soil and debris for HHW event

Mercury-containing Devices

- What are they?



Mercury-containing Devices



Mercury-containing Devices

1. Put any leaking devices into a closed & compatible container
2. Do not remove ampoules except in compliance with Env-Hw 1111.03(b)
3. Label:
 - “Universal Waste” – Mercury-containing Devices”
 - “Waste Mercury-containing Devices”
 - “Used Mercury-containing Devices”

Lamps

Which Ones?



Metal halide



fluorescent



High Pressure Sodium



Mercury vapor



Neon – not red

THEY ALL CONTAIN MERCURY!

Metal halide automotive lamps "Xenon"

- Blue tinted light
- Three older models had mercury

- "D1"
- "D2"
- "9500"



Lamps

1. Intact and broken lamps stored in CLOSED containers
2. DO NOT CRUSH THE LAMPS
Permit required



Lamps

- Label:
 - “Universal Waste – Lamps”
 - “Waste Lamps”
 - “Used Lamps”
- Do not tape lamps together



GE Lighting
Fluorescent Lamps

GE Lighting
Fluoresce

Lamps-For Recycling
Lamps Only
WASTE

Apply return
shipping label
here

**UNIVERSAL
WASTE**
CONTENTS: Lamps
ACCUMULATION START DATE: 1/1/08
SHIPPER:
ADDRESS:
CITY, STATE, ZIP:

**UNIVERSAL
WASTE**
CONTENTS: Lamps
ACCUMULATION START DATE: 1/1/08
SHIPPER:
ADDRESS:
CITY, STATE, ZIP:

**UNIVERSAL
WASTE**
CONTENTS: Lamps
ACCUMULATION START DATE: 1/1/08
SHIPPER:
ADDRESS:
CITY, STATE, ZIP:

Surgical Consent
Consent for anesthesia

LED Lamps

- Not considered universal wastes
- Some versions have regulated lead and arsenic in them
 - Majority don't
 - Don't know if they would fail the test for hazardous waste



Why is this important?

Hazards –

What have we talked about?

- Cadmium = Cd
 - Silver = Ag
 - Lead = Pb
 - Lithium = Li
 - Mercury = Hg
 - Sulfuric Acid = H_2SO_4
- “Heavy” Metals
-

Health Concerns

- **Cadmium** – Ni-Cd batteries
 - Suspected of causing cancer
 - Poison by inhalation or ingestion
- **Silver** – button batteries
 - Discoloration of the skin
 - Toxic by inhalation
 - Toxic to marine life

Health Concerns

- **Lead** – lead-acid batteries, antifreeze, CRTs
 - Nervous system, blood, kidneys
 - Anemia, tremors, paralysis, hallucinations, swelling of brain, nerve damage
 - Inhalation more dangerous than ingestion (adults)

Health Concerns

- **Lithium** – batteries, button cells
 - Dangerous fire hazard
 - Use of typical fire extinguishers may cause explosion
 - Reacts violently with water
 - Fire releases toxic gas
 - Fire releases hydrogen gas (Hindenburg)

Health Concerns

- **Sulfuric Acid** – lead-acid batteries
 - Burns to skin on contact
 - Burns to lungs on inhalation (concentrated)
 - Higher concentrations will spatter if water is added



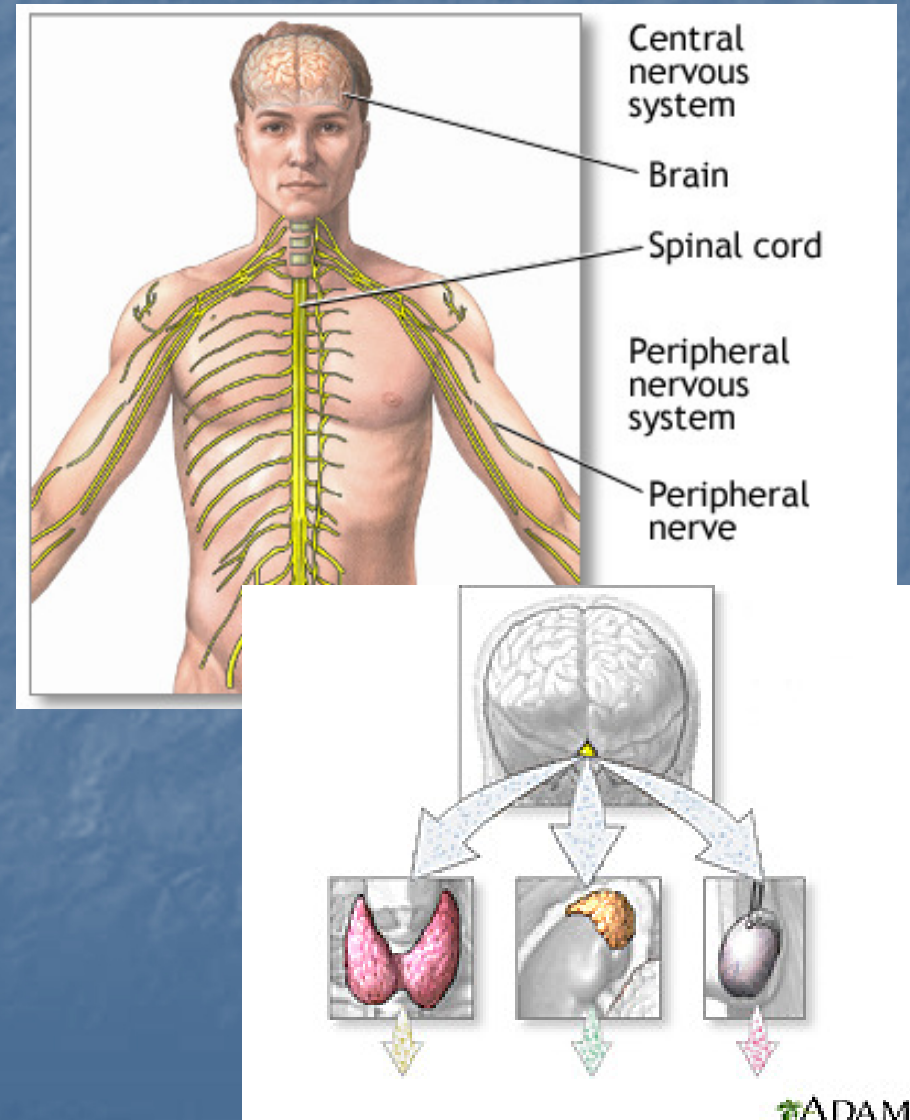
Health Risks

- Pesticides

- Central Nervous System

- Hormones

- Chemicals that tell your body what to do when



MANAGING UNIVERSAL WASTES AT YOUR FACILITY

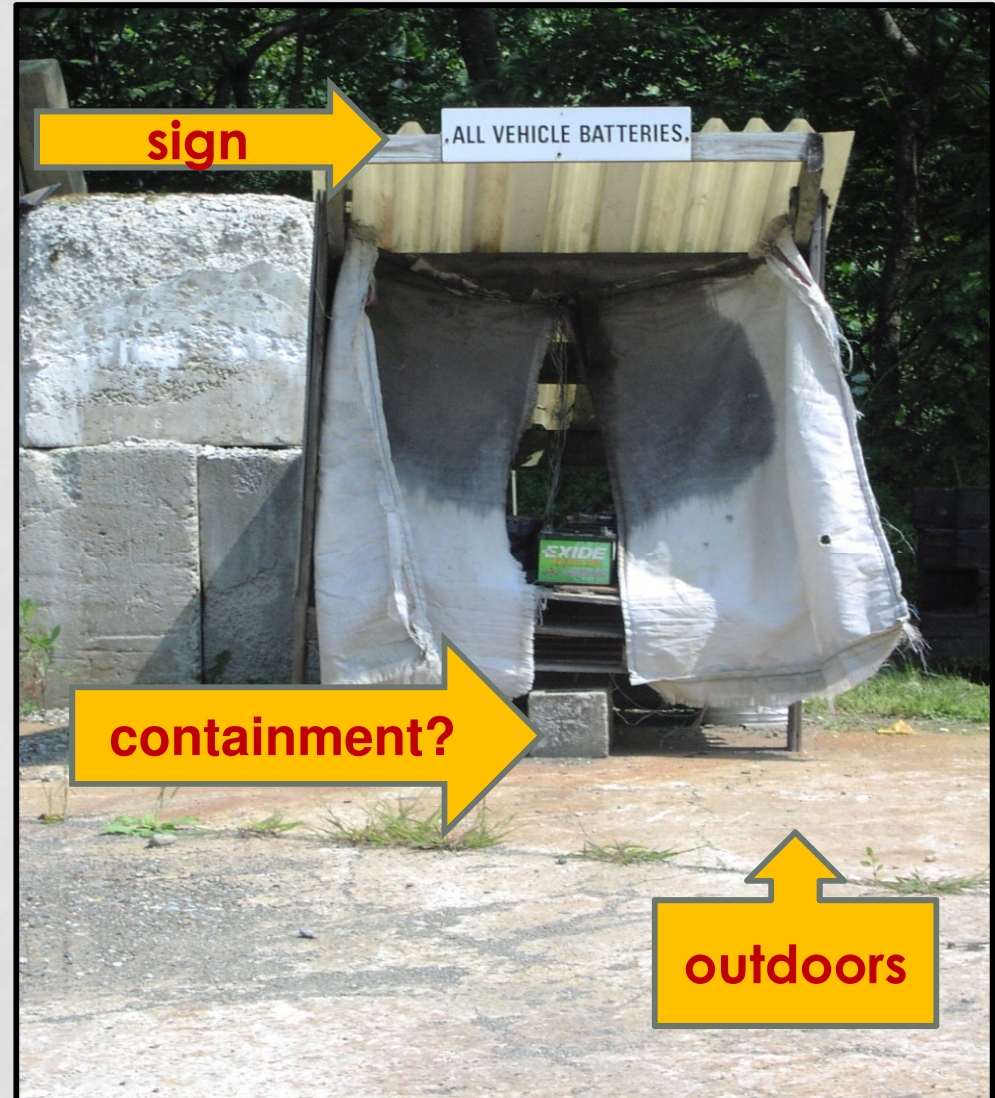
Batteries, Mercury Devices, Fluorescents

- How do you accept them?
- How do you store them?
- It's 5:00 pm, do you know where your universal wastes are?



AUTOMOTIVE BATTERIES

How do you accept them?



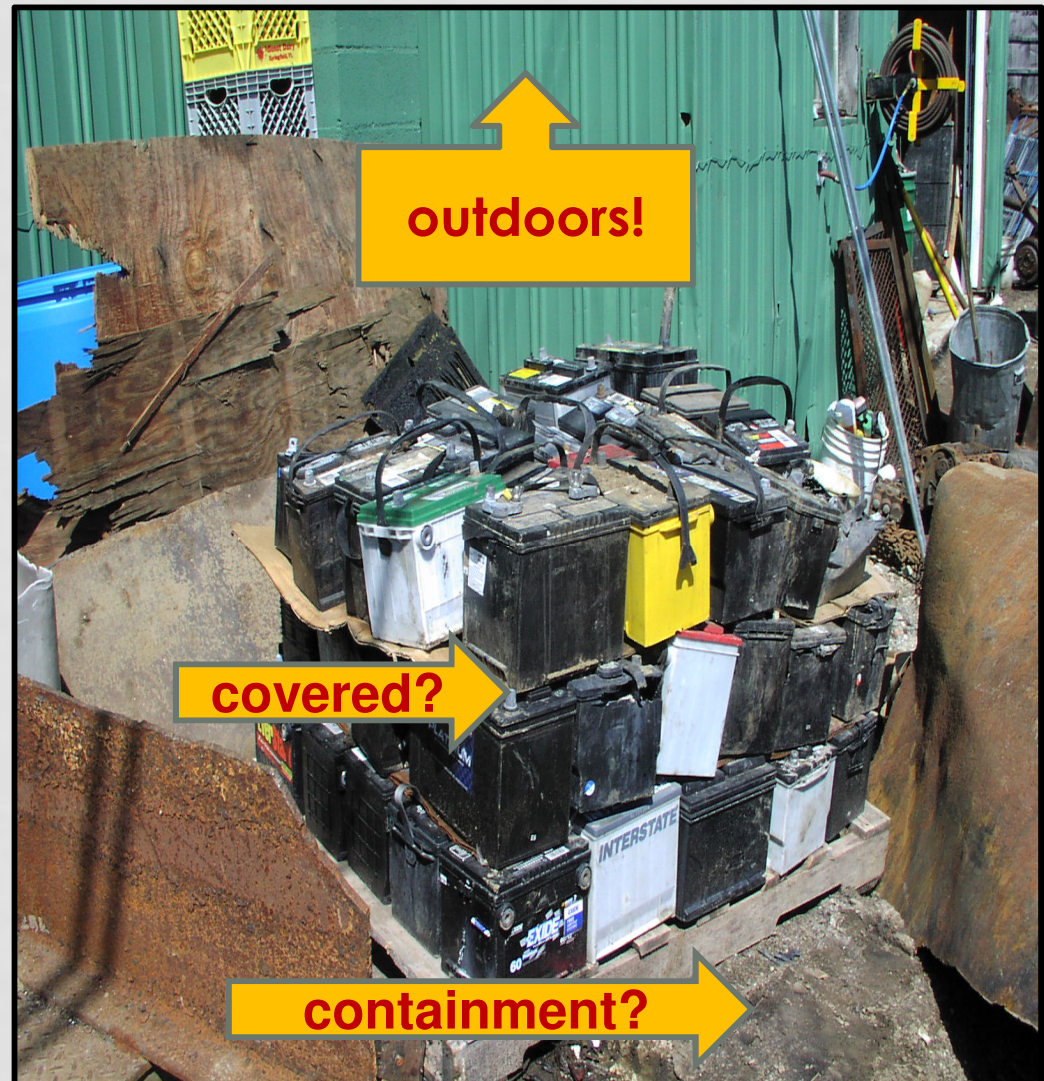
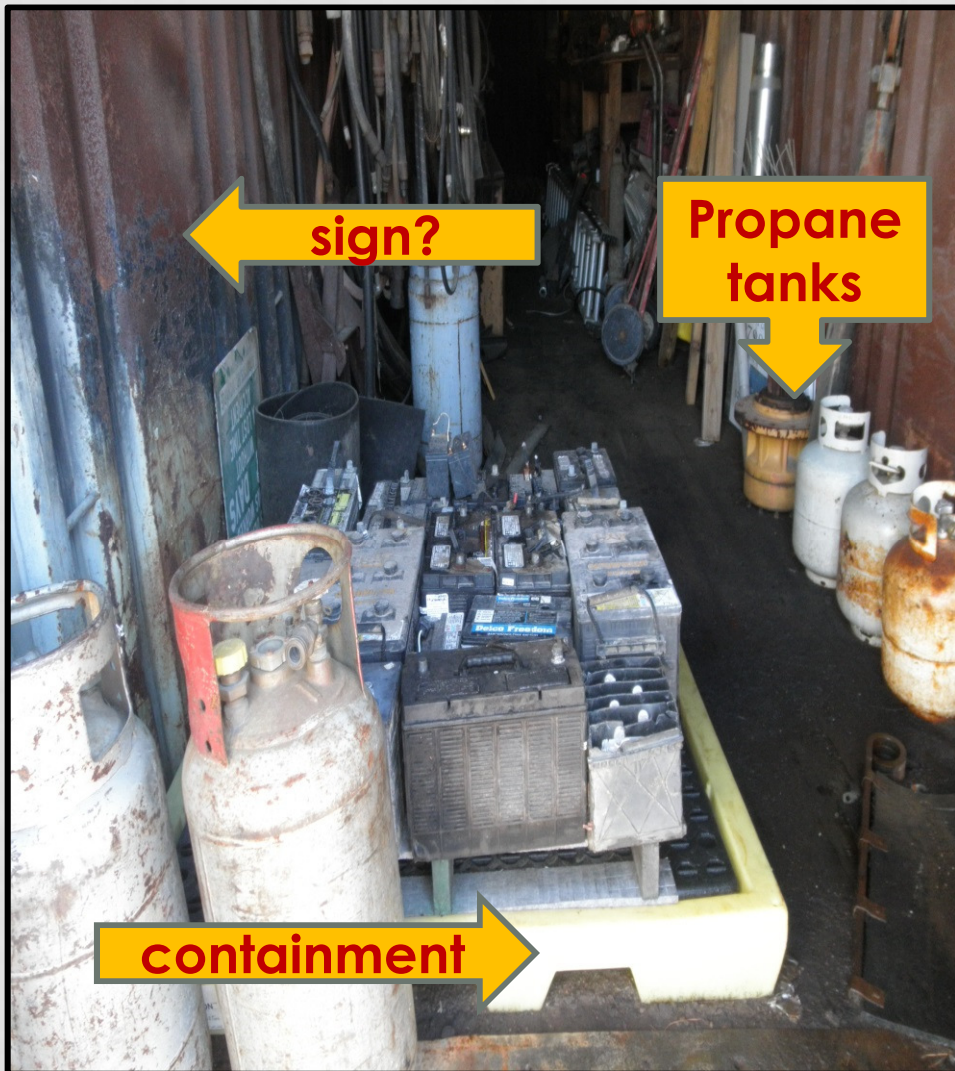
AUTOMOTIVE BATTERIES

How do you accept them?



AUTOMOTIVE BATTERIES

How do you store them?



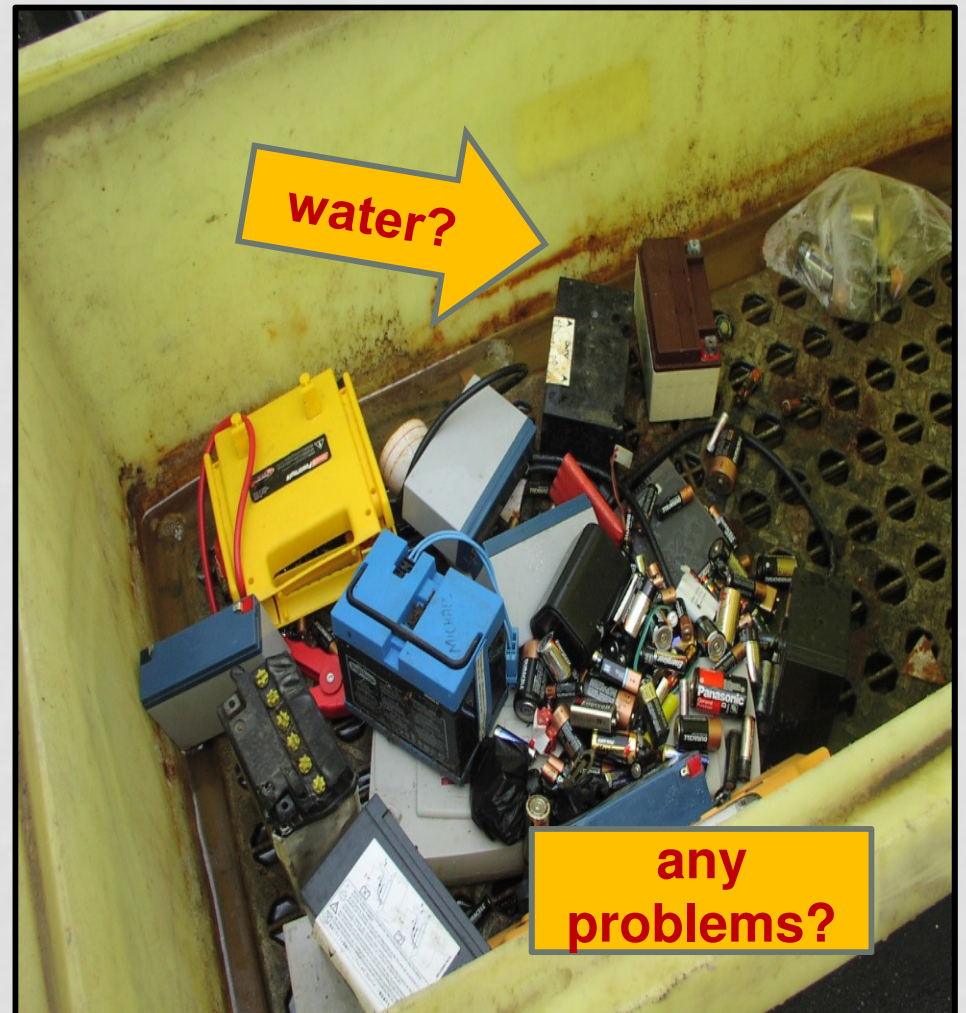
AUTOMOTIVE BATTERIES

How do you transfer them?



HOUSEHOLD BATTERIES

How do you accept them?



HOUSEHOLD BATTERIES

How do you accept them?



MERCURY DEVICES

How do you accept them?

MERCURY CONTAINING DEVICES

THERMOMETERS, THERMOSTATS,
ELECTRICAL SWITCHES,
MERCURY BUTTON CELL BATTERIES,
AND FLUORESCENT LIGHT BULBS,
INCLUDING COMPACT FLUORESCENT BULBS

EFFECTIVE JANUARY 1, 2008

NH STATE LAW RSA 149-M:58 PROHIBITS
DISPOSING OF MERCURY-ADDED PRODUCTS
IN SOLID WASTE LANDFILLS & INCINERATORS

NEW HAMPSHIRE *The Beautiful*

mercury
ban sign

DON'T THROW MERCURY-
CONTAINING PRODUCTS
IN THE GARBAGE...

...IT'S AGAINST
THE LAW!

As of January 1, 2008,
New Hampshire law bans the
disposal of mercury-added
products at this facility.

These include:

- Fluorescent lamps
- Compact Fluorescent Lamps
- Thermometers
- Thermostats
- Tilt switches
- Manometers
- Button batteries



**RECYCLE
THEM HERE
INSTEAD!**

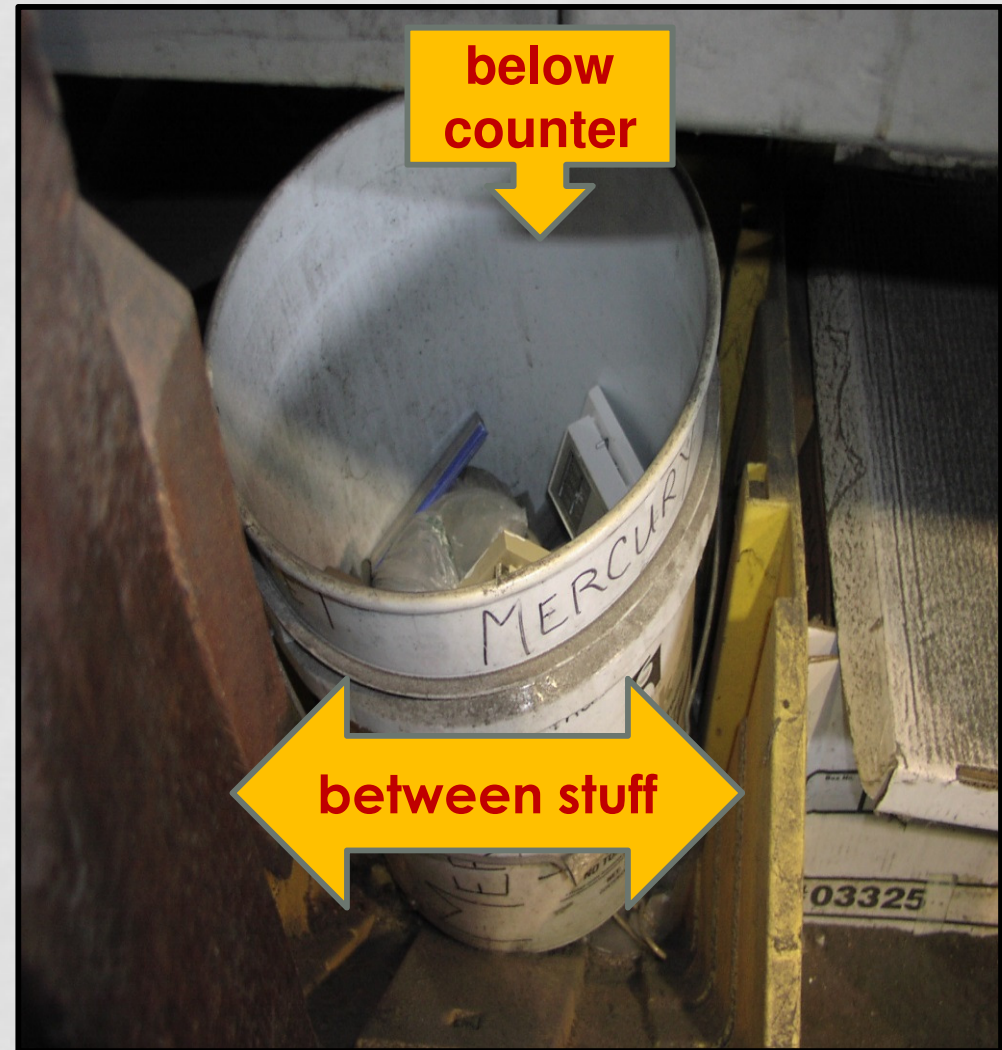
Mercury containing products can harm the environment if improperly disposed of. For information, call the NH Dept. of Environmental Services at 271-2956 or visit www.des.nh.gov/ehp/Mercury.

mercury
ban
sign

container

MERCURY DEVICES

How do you store them?



FLUORESCENT LAMPS

How do you accept them?



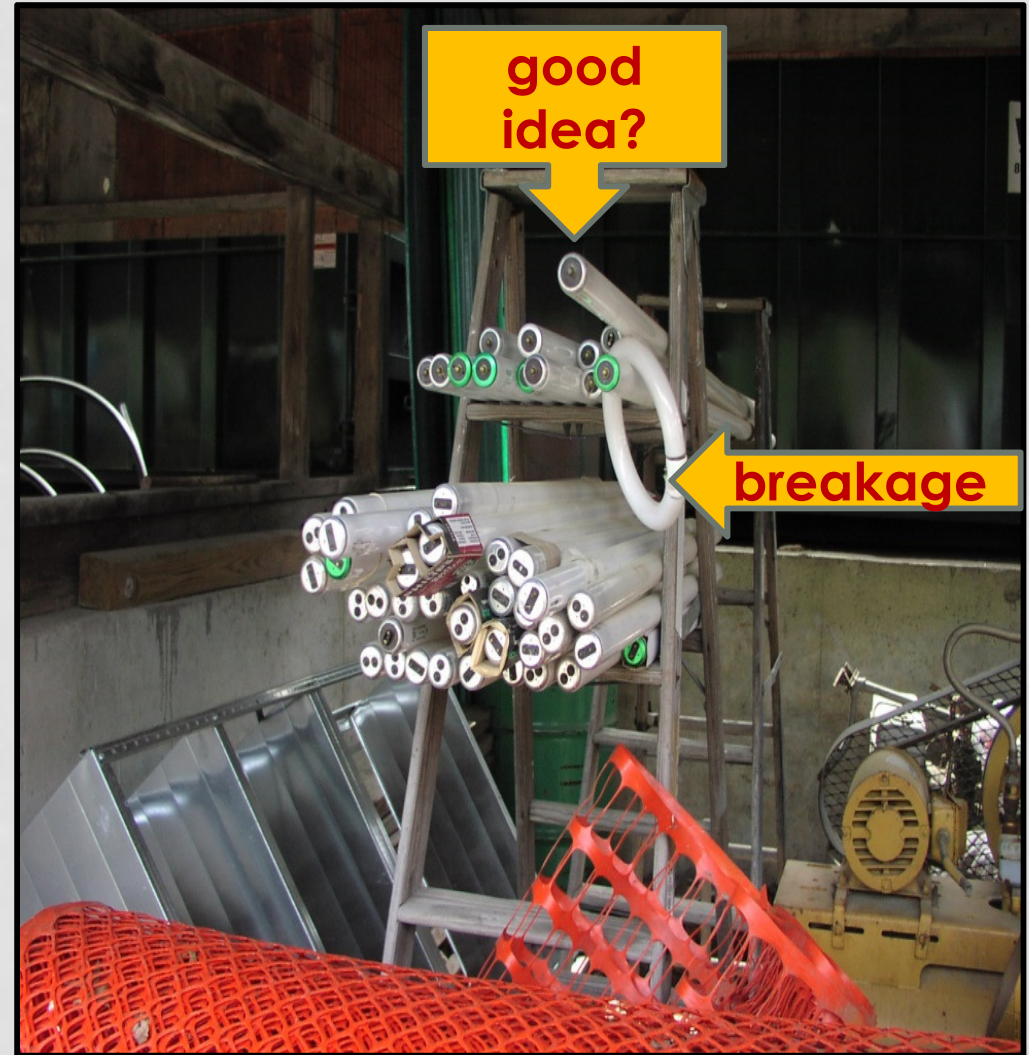
FLUORESCENT LAMPS

How do you accept them?



FLUORESCENT LAMPS

How do you store them?



FLUORESCENT LAMPS

How do you store them?



BATTERIES, MERCURY DEVICES & LAMPS

How do you store them?



WASTE TRANSFER

- Should leave your facility with a bill-of-lading
- Identify either the number of items or the tonnage of each shipment
- Loads must be stable



IT'S 5:00 PM?

Do you know your hauler & where the waste is going?



Everything you Always
Wanted to Know About
Mercury But Were Afraid
to Ask

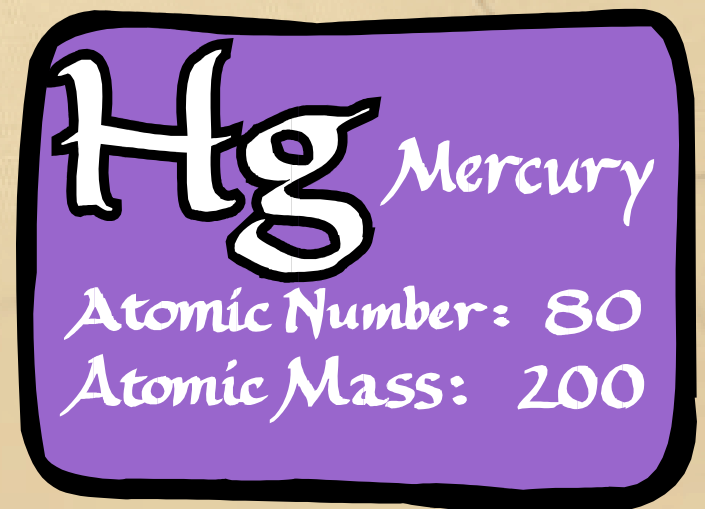


Stephanie D'Agostino 271-6398
stephanie.dagostino@des.nh.gov

Mercury, what's the big deal?

Mercury is:

- Persistent;
- Bioaccumulative;
- Toxic;
- and everywhere!



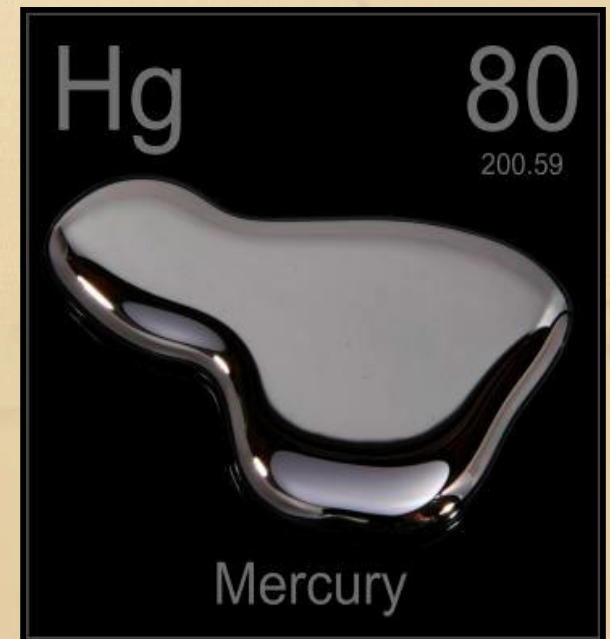
Periodic Table of the Elements

Period	1 IA 1A	2 IIA 2A											13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	18 VIIIA 8A
1	1 <u>H</u> 1.008																	2 <u>He</u> 4.003
2	3 <u>Li</u> 6.941	4 <u>Be</u> 9.012											5 <u>B</u> 10.81	6 <u>C</u> 12.01	7 <u>N</u> 14.01	8 <u>O</u> 16.00	9 <u>F</u> 19.00	10 <u>Ne</u> 20.18
3	11 <u>Na</u> 22.99	12 <u>Mg</u> 24.31	3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIB 7B	8 ----- VIII ----- 8	9 ----- VIII ----- 8	10 ----- VIII ----- 8	11 IB 1B	12 IIB 2B	13 <u>Al</u> 26.98	14 <u>Si</u> 28.09	15 <u>P</u> 30.97	16 <u>S</u> 32.07	17 <u>Cl</u> 35.45	18 <u>Ar</u> 39.95
4	19 <u>K</u> 39.10	20 <u>Ca</u> 40.08	21 <u>Sc</u> 44.96	22 <u>Ti</u> 47.88	23 <u>V</u> 50.94	24 <u>Cr</u> 52.00	25 <u>Mn</u> 54.94	26 <u>Fe</u> 55.85	27 <u>Co</u> 58.47	28 <u>Ni</u> 58.69	29 <u>Cu</u> 63.55	30 <u>Zn</u> 65.39	31 <u>Ga</u> 69.72	32 <u>Ge</u> 72.59	33 <u>As</u> 74.92	34 <u>Se</u> 78.96	35 <u>Br</u> 79.90	36 <u>Kr</u> 83.80
5	37 <u>Rb</u> 85.47	38 <u>Sr</u> 87.62	39 <u>Y</u> 88.91	40 <u>Zr</u> 91.22	41 <u>Nb</u> 92.91	42 <u>Mo</u> 95.94	43 <u>Tc</u> (98)	44 <u>Ru</u> 101.1	45 <u>Rh</u> 102.9	46 <u>Pd</u> 106.4	47 <u>Ag</u> 107.9	48 <u>Cd</u> 112.4	49 <u>In</u> 114.8	50 <u>Sn</u> 118.7	51 <u>Sb</u> 121.8	52 <u>Te</u> 127.6	53 <u>I</u> 126.9	54 <u>Xe</u> 131.3
6	55 <u>Cs</u> 132.9	56 <u>Ba</u> 137.3	57 <u>La</u> * 138.9	72 <u>Hf</u> 178.5	73 <u>Ta</u> 180.9	74 <u>W</u> 183.9	75 <u>Re</u> 186.2	76 <u>Os</u> 190.2	77 <u>Ir</u> 190.2	78 <u>Pt</u> 195.1	79 <u>Au</u> 197.0	80 <u>Hg</u> 200.5	81 <u>Tl</u> 204.4	82 <u>Pb</u> 207.2	83 <u>Bi</u> 209.0	84 <u>Po</u> (210)	85 <u>At</u> (210)	86 <u>Rn</u> (222)
7	87 <u>Fr</u> (223)	88 <u>Ra</u> (226)	89 <u>Ac</u> ~ (227)	104 <u>Rf</u> (257)	105 <u>Db</u> (260)	106 <u>Sg</u> (263)	107 <u>Bh</u> (262)	108 <u>Hs</u> (265)	109 <u>Mt</u> (266)	110 --- 0	111 --- 0	112 --- 0	113 --- 0	114 --- 0	115 --- 0	116 --- 0	117 --- 0	118 --- 0
Lanthanide Series*			58 <u>Ce</u> 140.1	59 <u>Pr</u> 140.9	60 <u>Nd</u> 144.2	61 <u>Pm</u> (147)	62 <u>Sm</u> 150.4	63 <u>Eu</u> 152.0	64 <u>Gd</u> 157.3	65 <u>Tb</u> 158.9	66 <u>Dy</u> 162.5	67 <u>Ho</u> 164.9	68 <u>Er</u> 167.3	69 <u>Tm</u> 168.9	70 <u>Yb</u> 173.0	71 <u>Lu</u> 175.0		
Actinide Series~			90 <u>Th</u> 232.0	91 <u>Pa</u> (231)	92 <u>U</u> (238)	93 <u>Np</u> (237)	94 <u>Pu</u> (242)	95 <u>Am</u> (243)	96 <u>Cm</u> (247)	97 <u>Bk</u> (247)	98 <u>Cf</u> (249)	99 <u>Es</u> (254)	100 <u>Fm</u> (253)	101 <u>Md</u> (256)	102 <u>No</u> (254)	103 <u>Lr</u> (257)		

Properties of Mercury

Unique Chemical and Physical Properties

- Electrical Properties
- Only metal liquid at room temperature
- Tolerant to wide temperature changes
- Abundant and inexpensive



Where Does Hg Come From And Where Does It Go?

- Natural sources
 - Volcanoes, erosion, weathering of rock, forest fires
- Human origins
 - Burning of wastes and fossil fuel fuels (esp. coal)
- Global reservoir
 - Mercury that is re-emitted to the environment from human as well as natural activities
- Transport
 - Travel via prevailing winds (power plants in the midwest)

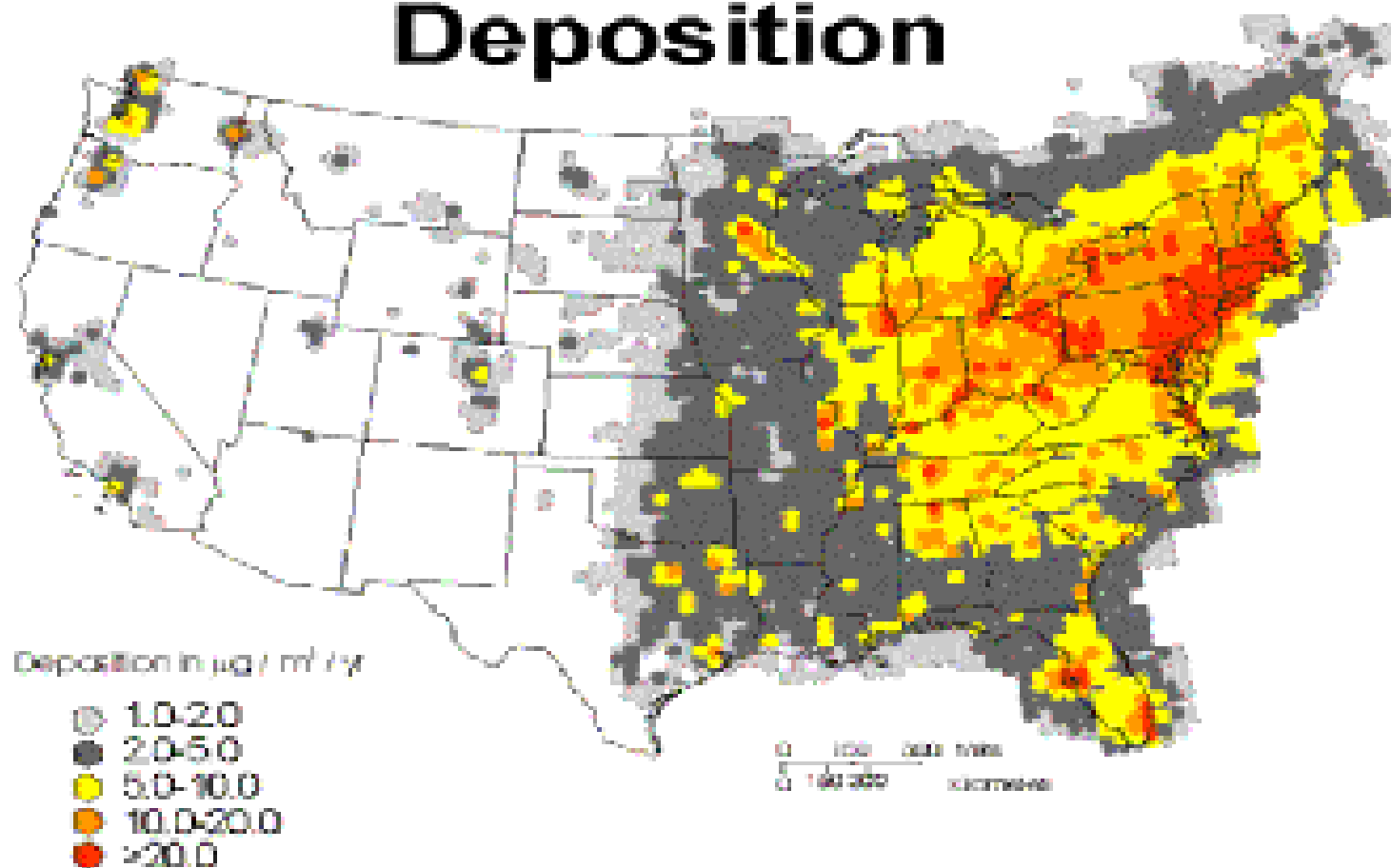


Mercury in Products & Processes

- Used since 2000 BC
- Many common uses
 - Switches, thermostats, thermometers, light bulbs, medical devices, toys & games, sneakers
- Formulated products
 - Some vaccines, lab test kits, mercurochrome
- Industrial processes
 - Making chlorine and gold mining

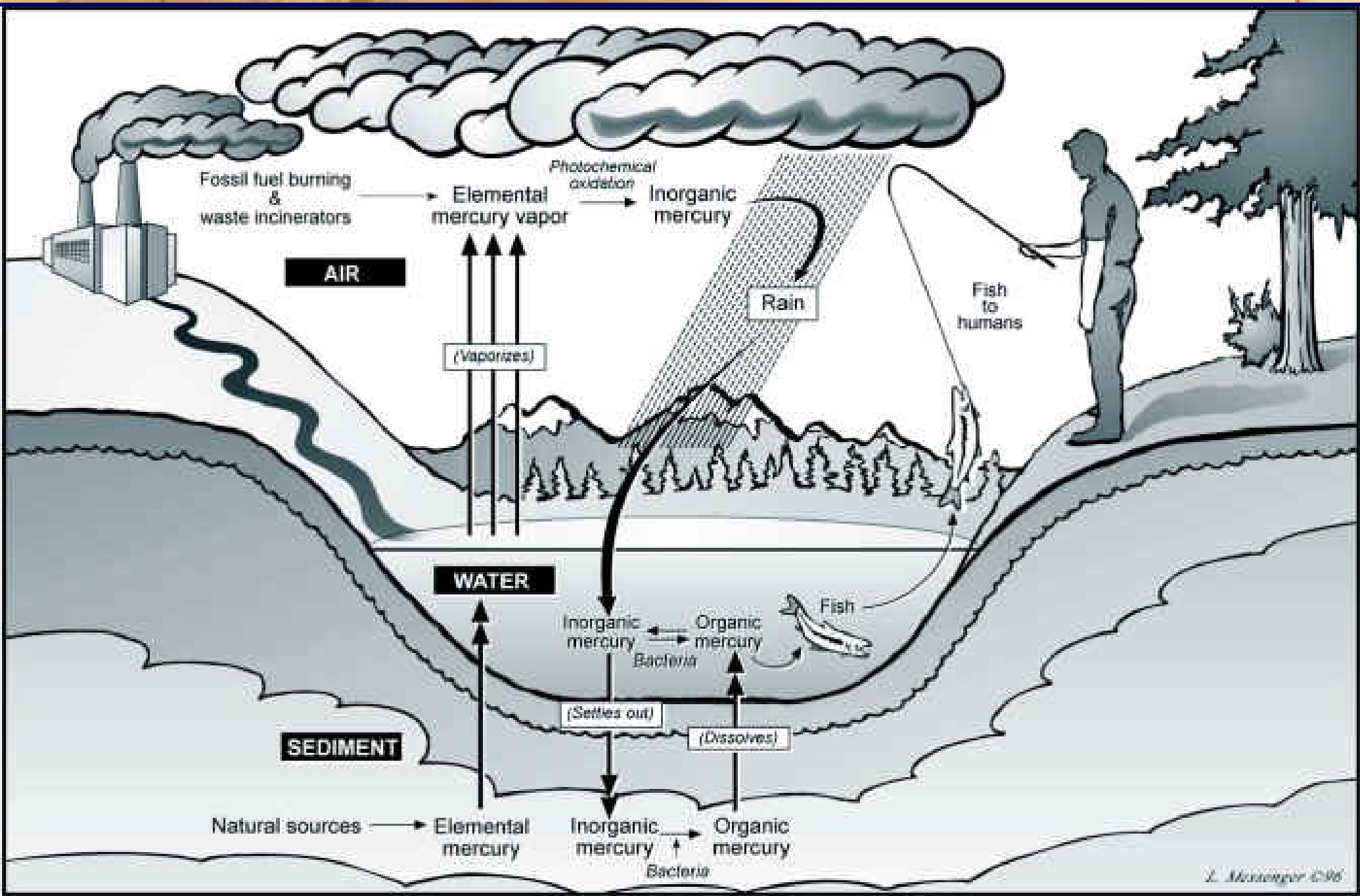


National Atmospheric Hg Deposition

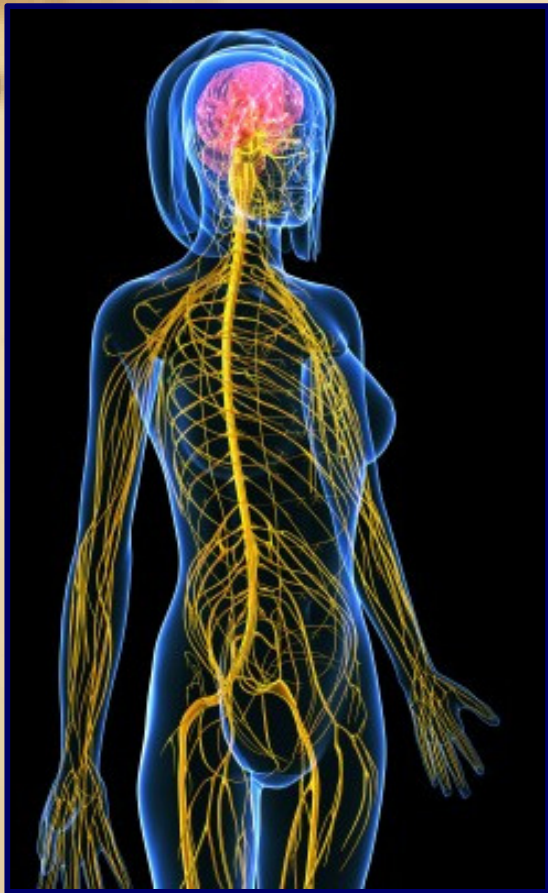


 **USGS**

Source: US EPA, 1996, Mercury Report to Congress



Symptoms and Health Effects



- Central nervous system
 - Loss of hearing or sight
 - Loss of memory
 - Lack of coordination, muscle spasms
- Kidney and liver damage
- Tingling and numbness in toes or fingers
- Personality changes



Going Mad? (mercury inhalation)



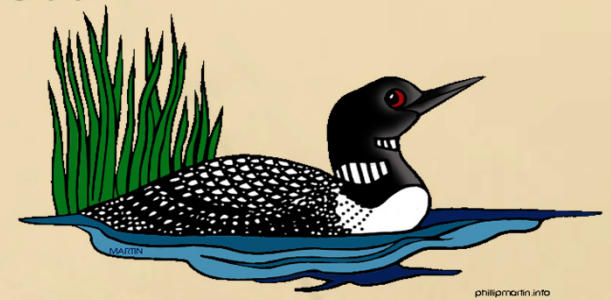
Hat Makers (late 1800s)



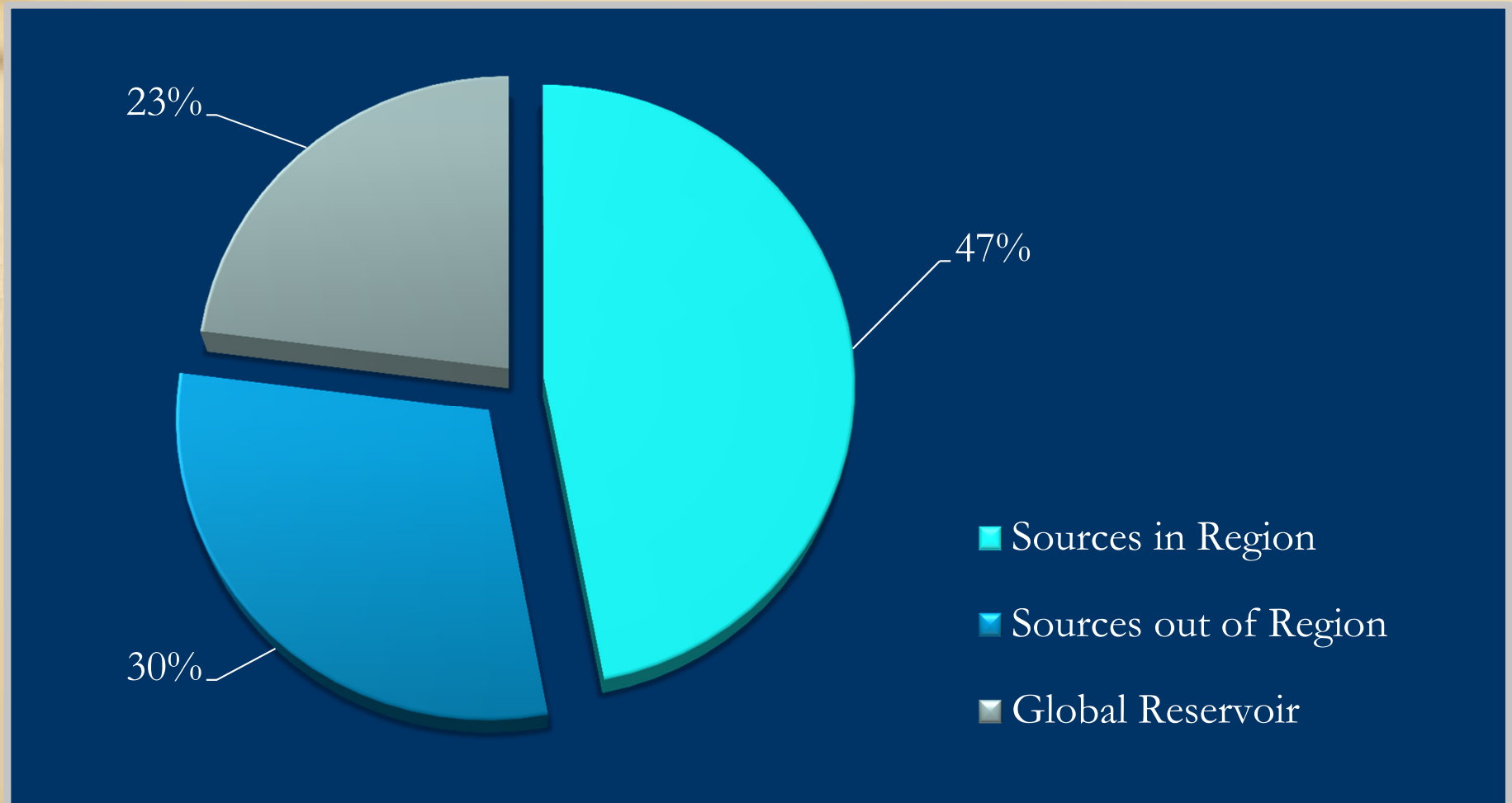
Lighthouse keepers

ENVIRONMENTAL EFFECTS

- Plants
 - Decreased chlorophyll production
 - Inhibits growth
 - Damages leaves
- Wildlife: Loons, eagles, otter, mink, herons, snapping turtles
 - Primary exposure thru fish consumption
 - Reproductive effects are greatest concern
 - Other effects are similar to humans



Estimated Sources of Hg Deposited in the Northeast (1998)

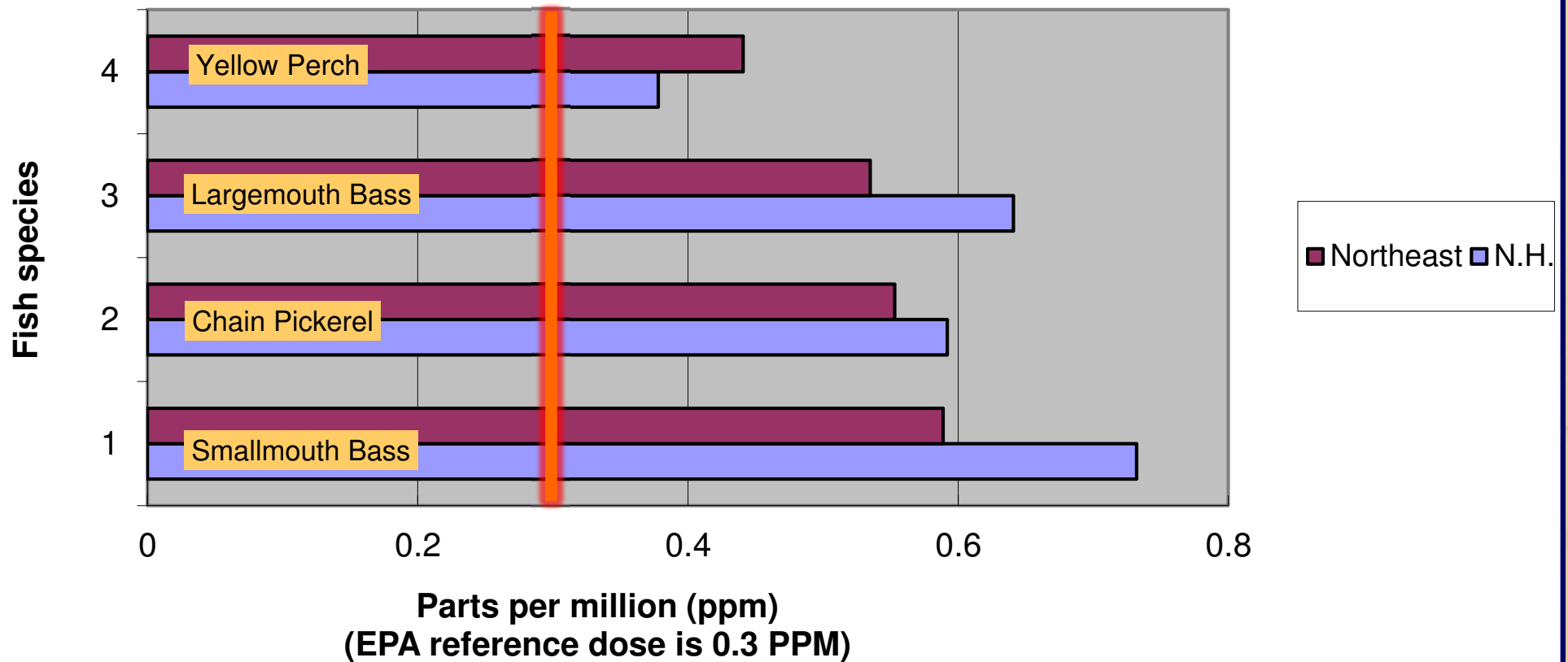


History of Hg Reduction in NH

- Early 1990's - Hg sampling / advisory issued
- Early reduction activities
 - Alkaline batteries, paint, pesticides, packaging
- 1998 NE Mercury Report
- 1998 NH Mercury Reduction Strategy & NEG/ECP Mercury Action Plan
 - Emissions Inventory MWCs, MWIs, Fossil fuels
 - Reduction Goals:
 - 50% by 2003
 - 75% by 2010
 - Virtual Elimination



Hg Values for Selected Fish Species Northeast and New Hampshire



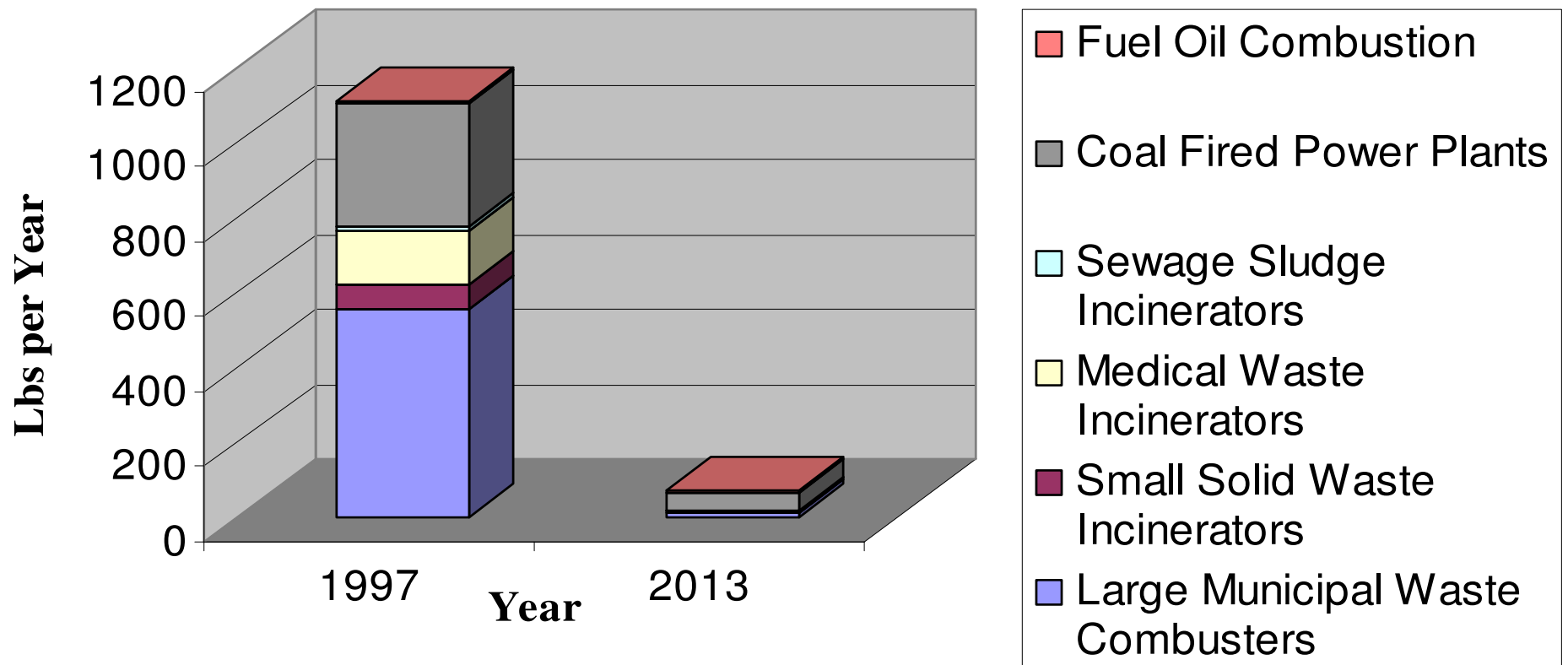
ACTIONS IMPLEMENTED

- **Emissions Reductions**
 - MWCs
 - MWIs
 - Coal-fired utilities (pending)
 - Other fuels (uncertainty in emissions factors)
- **Hg Products Legislation**
 - Certain products banned and/or restricted
 - Installation of dental amalgam separators
- **Outreach & Education Initiatives**
 - Healthcare
 - Communities & Schools
 - MV Recycling Facilities
 - HVAC



Reduction in NH Mercury Emissions

Major Mercury Emissions 1997 and 2013

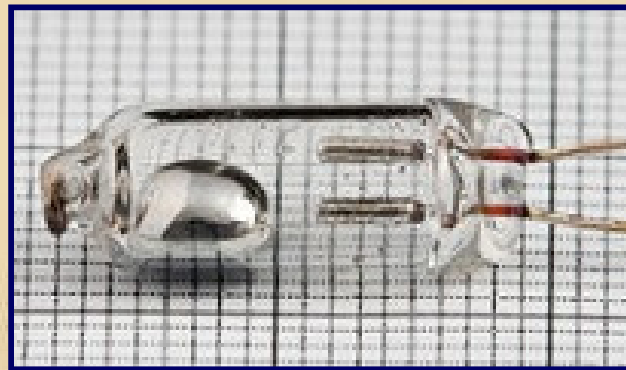


Mercury-Added Product Sales Ban

RSA 149-M:53

effective

January 1, 2008



Prohibits the sale of most mercury-added products by July 1, 2008.

Fluorescent lamps, Button Batteries and formulated products (reagents, compounds, etc.) are exempt.

RSA 149-M:58 Disposal Ban

Effective

January 1, 2008



“No person shall knowingly dispose of mercury-added products in solid waste landfills, transfer stations, or incinerators.”

Under RSA 149-M:58 solid waste landfills, recycling facilities, transfer stations and incinerators shall:

- Post signs at the facility
- Notify facility customers
- Implement monitoring procedures; and
- Educate customers on collection programs

Universal Wastes: Mercury

Lamps

- Straight lamps
 - T-12, T-8
- CFLs
- Circle and U-Tube
- High Intensity Discharge (HID)

Devices

- Thermometers
- Thermostats
- Button Batteries
- Tilt switches
- Manometers
- Float switches

- Fluorescent Lamps
 - Use less energy!
 - Good for the environment!



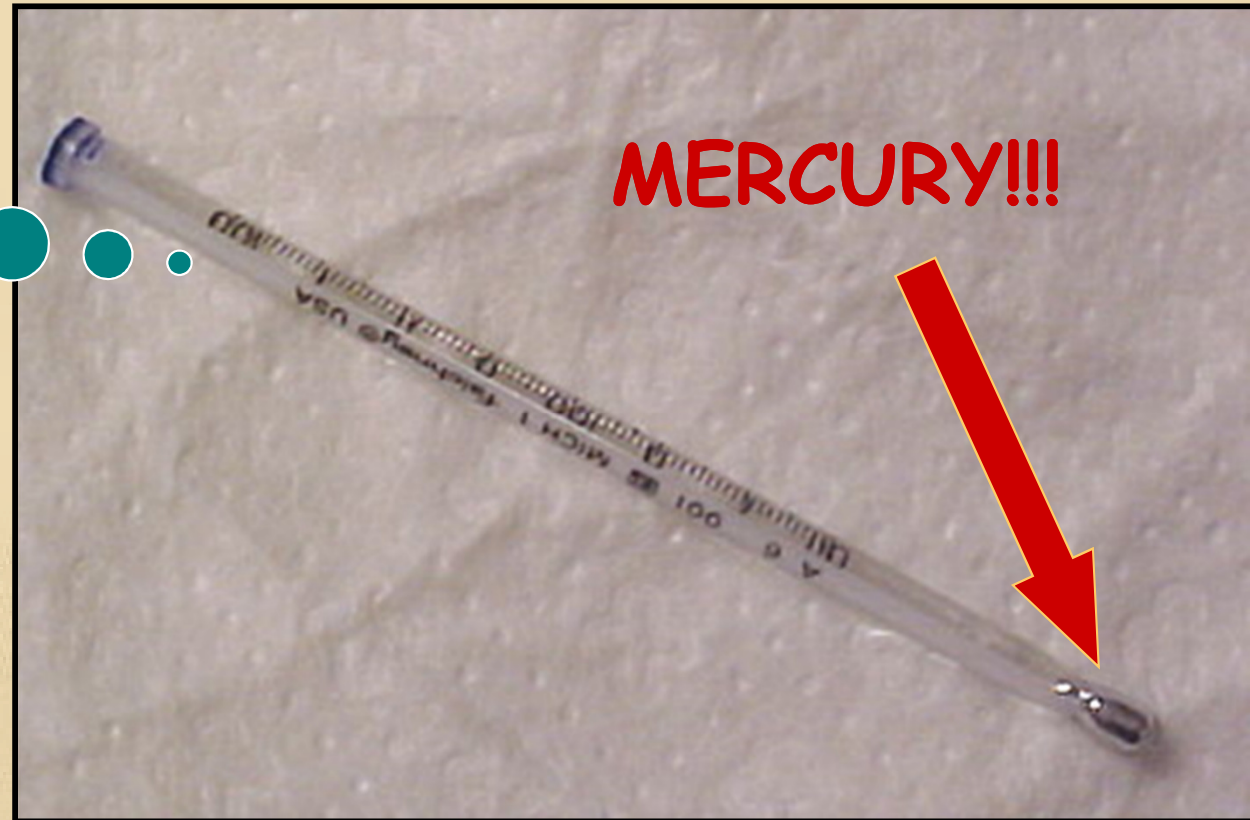
Recycle me please!

Fluorescent lights contain very little mercury- but there are MILLIONS out there!



Thermometers

Thermometers
= 1 grams of
mercury



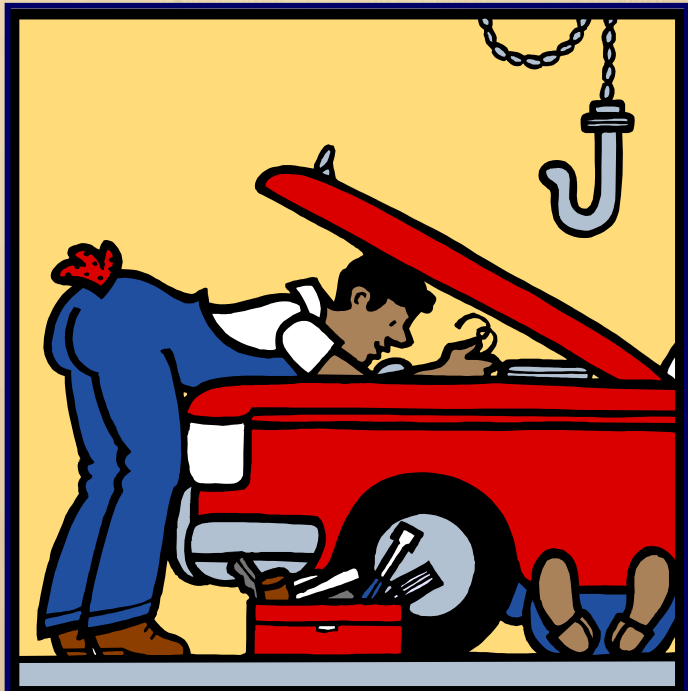
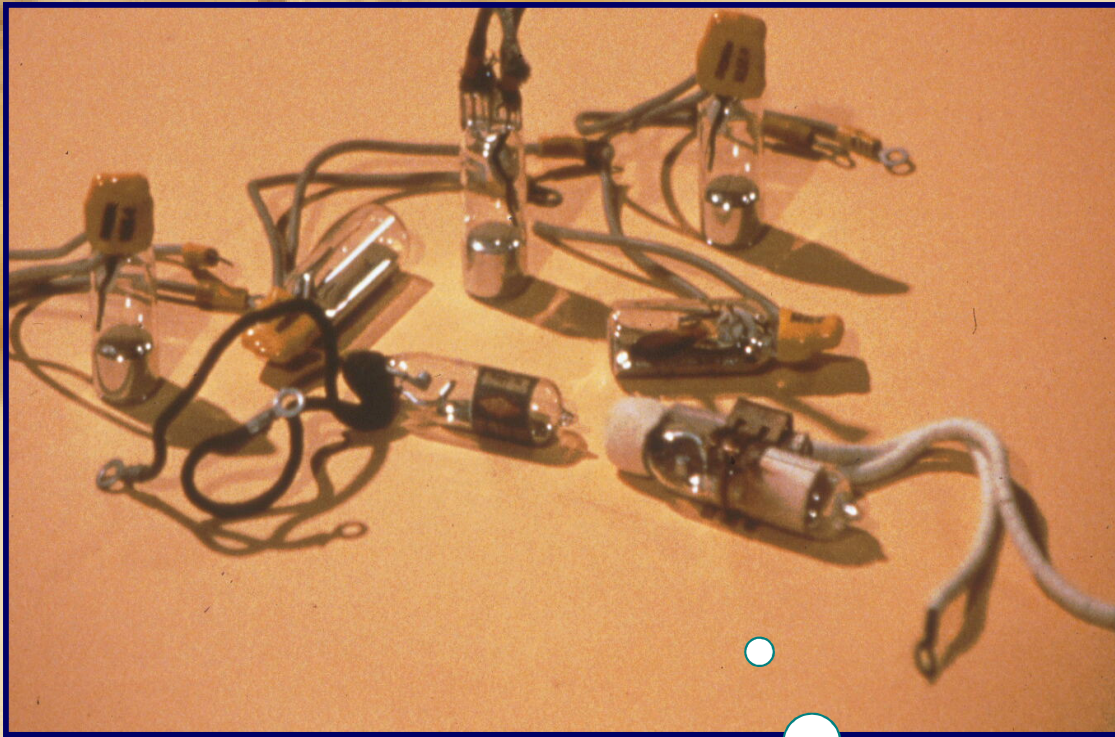
...but non-mercury
alternatives exist

Button Batteries & Thermostats



Thermostat
= 3 grams
of mercury

Switches



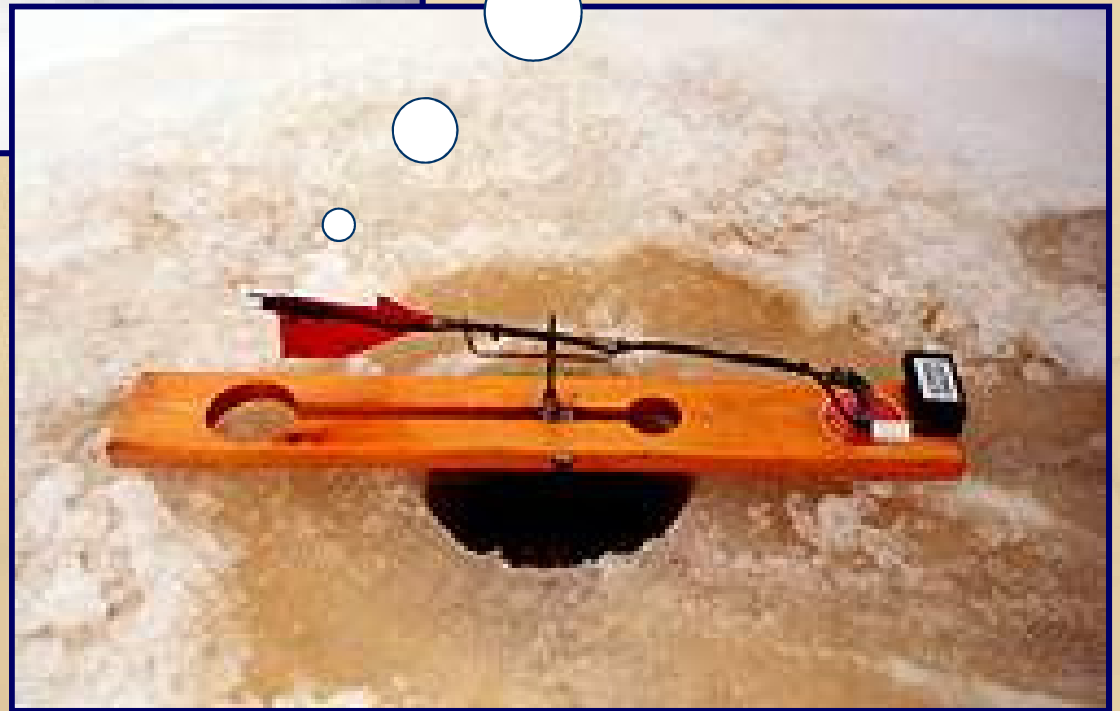
Switches
= 1 to 5
grams of
mercury



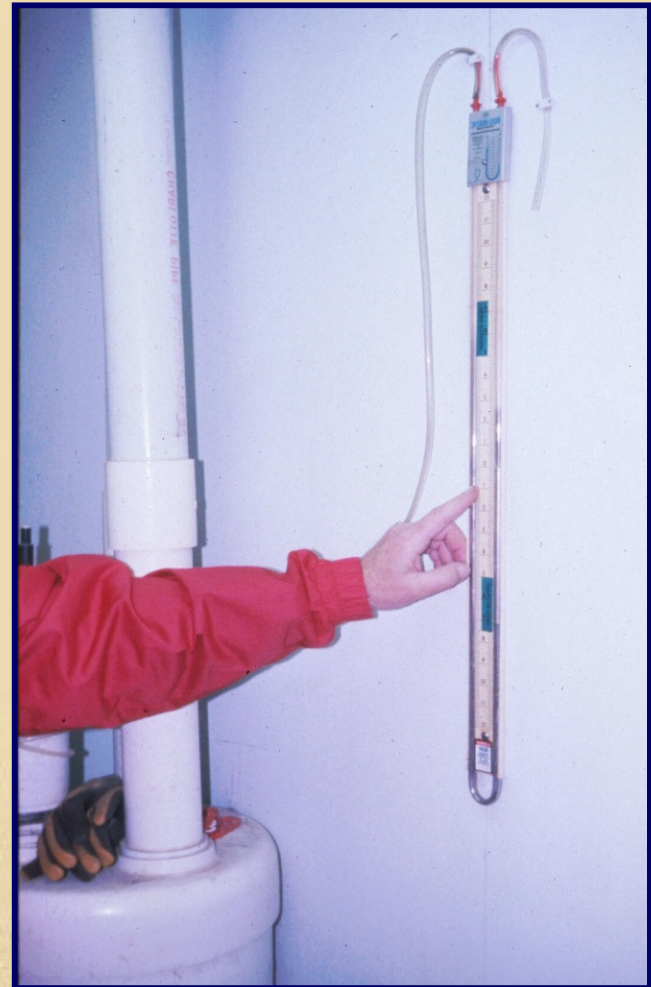
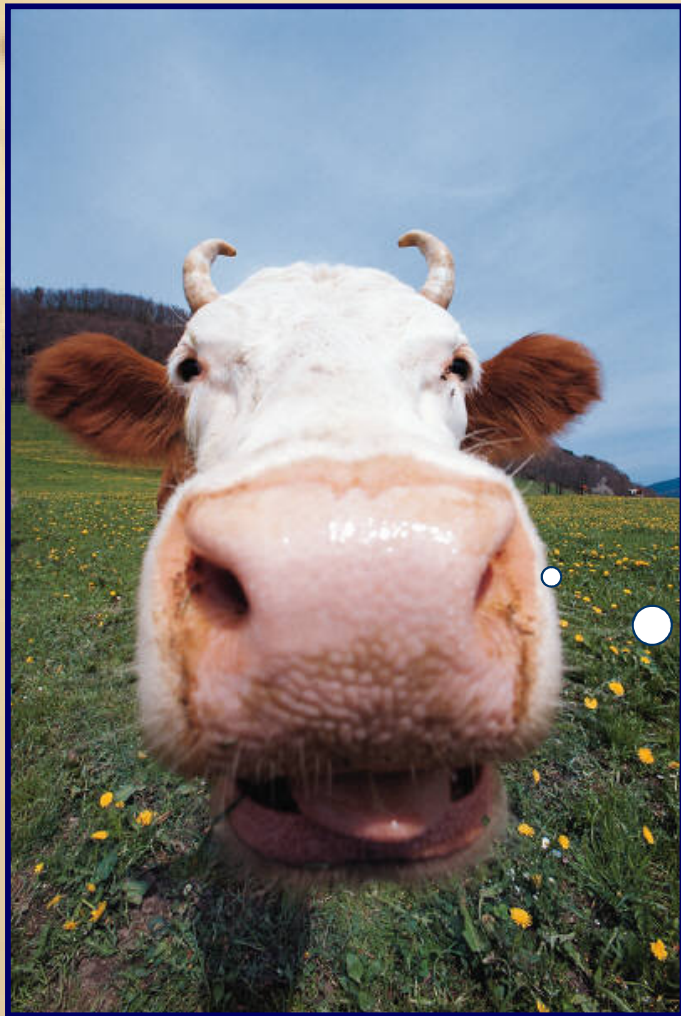


Isn't it
ironic?

Contain up
to 0.5
grams of
mercury



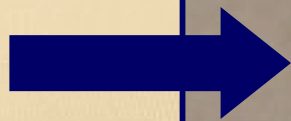
Mercury manometers



Keeps me
happy!

How much mercury is in a lamp?

Mercury
Dose



Mercury-containing Lamps

Recycle them through:

*NH Lamp, Ballasts, Batteries and
Mercury Devices Recycling Contract*

Available to all New Hampshire
Municipal Solid Waste Facilities

CRT Processing (formerly, UniWaste)

Trenten Tully 422-7711 x205

ttully@universalrecyclers.com

Lamp Recycling "Kits"



Storage/mailling box,
shipping & recycling
costs all included in
single purchase price

4' boxes hold about 70 T-12's or
36 T-8's and cost about \$60.00

About twice as
expensive per foot as
"standard" recycling
but very convenient



Mercury-containing thermostats

Thermostat recycling bins are available to any participant, including local programs for a one-time \$25 fee



Shipping and recycling costs are included



Offered by the *Thermostat Recycling Corporation*
Call 1-888-266-0550

SUMMARY

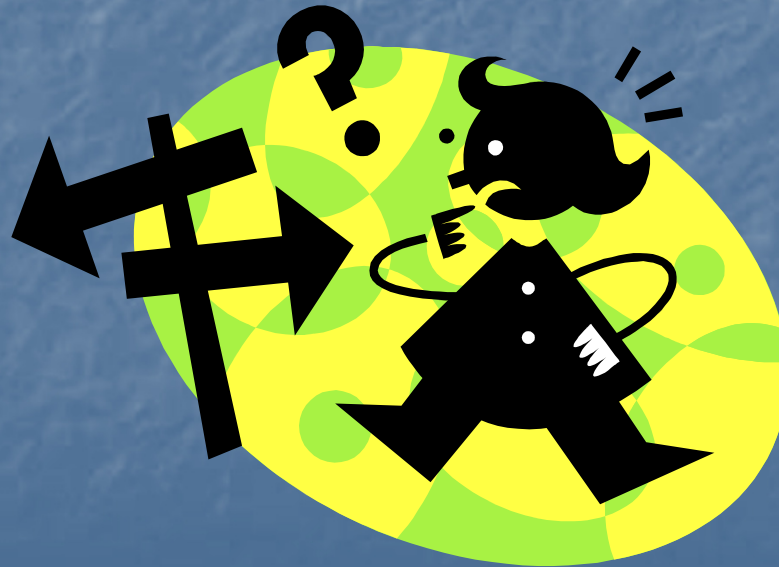
- Mercury in the environment is still a problem
- Proper collection & management of products can help a lot
- Most products can be cost-effectively collected and recycled at your transfer station
- Help is available from DES

Mercury Spill Cleanup

Fact Sheet HW-15

Mercury Spill Cleanup

- Assess the damage
 - Small spill – consider cleaning it yourself
 - Big spill – get a contractor



Mercury Spill Cleanup

- DO NOT use a vacuum



Mercury Spill Cleanup

Fact Sheet HW-15

- DO NOT use a brush or broom



Mercury Spill Cleanup

Fact Sheet HW-15

- DO NOT wash mercury-contaminated clothes in a washing machine



Mercury Spill Cleanup

Fact Sheet HW-15

- DO NOT pour mercury down drain



Mercury Spill Cleanup

Fact Sheet HW-15

1. Open windows and let the area vent
 - Prevent others from entering area



Mercury Spill Cleanup

- DO
 - Have a mercury spill kit available
 - Latex gloves
 - 2 pieces of boxboard or stiff paper
 - Sealable plastic bags or glass containers
 - Garbage bags
 - Flashlight
 - Eyedropper
 - Tweezers
 - Duct tape
 - Set of instructions



Mercury Spill Cleanup

- Cleanup from hard surfaces
 - Put on gloves



Mercury Spill Cleanup

- Cleanup from hard surfaces
 - Pick up broken glass with tweezers or 2 pieces of cardboard/stiff paper – put in sealable container

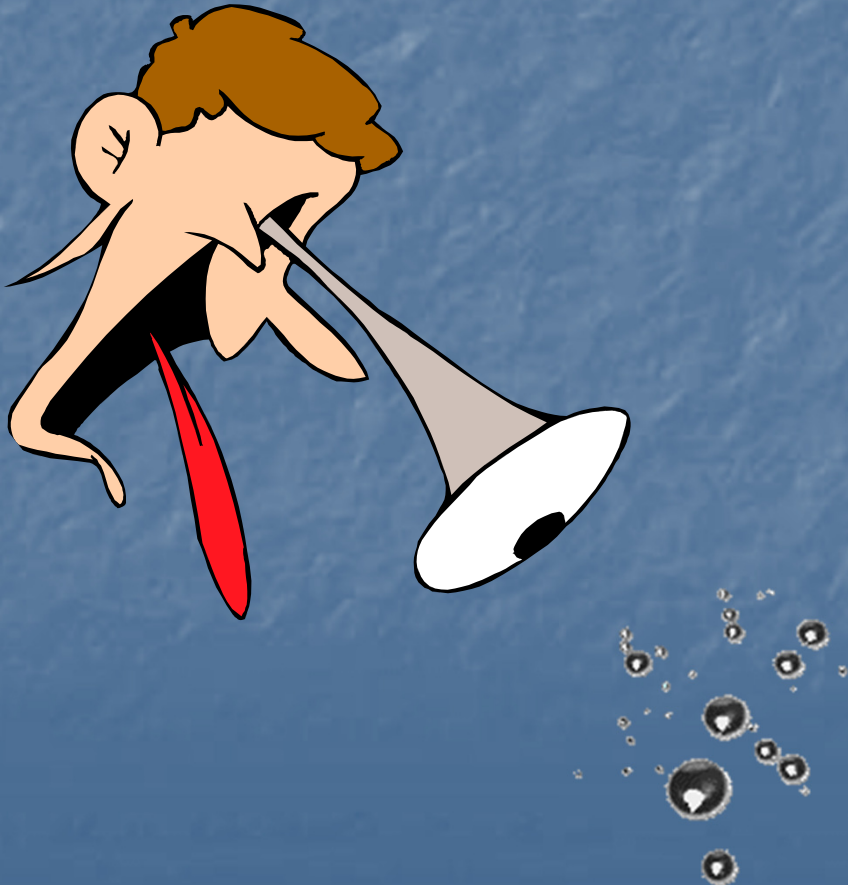


Mercury Spill Cleanup

- Use cardboard to squeegee remaining glass and mercury beads

Mercury Spill Cleanup

- Cleanup from hard surfaces
 - Use flashlight at ground level to find beads



Mercury Spill Cleanup

- Use eyedropper and/or duct tape to pick up mercury that couldn't get picked up by cardboard



Mercury Spill Cleanup

- Cleanup from Rugs and Fabrics
 - Put on gloves



Mercury Spill Cleanup

- Cleanup from Rugs and Fabrics
 - Use a sharp knife to remove contaminated section
 - Fold or roll section so mercury is trapped inside



Mercury Spill Cleanup

- Cleanup from Rugs and Fabrics
 - Put material into plastic garbage bag
 - Save for HHW event collection



QUESTIONS?

- **Questions on anything you heard today?**

THANK YOU!

- **If not, please hand in your evaluation before you leave.**
- **Take the BMP Manual if you don't already have one.**
- **Thank you for being here and have a great day!**