



# Workshop on Session Law 2010-180: Requirements and Opportunities Regarding Fluorescent Lamps and Mercury Thermostats

NC Division of Environmental Assistance and Outreach  
and  
Waste Reduction Partners



## Reasons Behind Session Law 2010-180

- Concerns about the environmental impacts from government agency disposal of lamps and thermostats.
- Concerns about government agency awareness and compliance with existing hazardous waste laws.
- Opportunities to improve government agency management of mercury-containing devices and prevent mercury pollution.



# Mercury and Human Health

- Mercury can damage central nervous system and brain function, impair kidneys, impair immune functions and have other health effects.
- Special risk for pregnant women and small children.
- Mercury is a persistent and bio-accumulative toxin, especially in its methyl-mercury form.
- Methyl mercury in fish is one of the most common types of exposure.



# Mercury Concerns in North Carolina

- According to the NC Division of Water Quality: “all surface waters in the state are considered to be impaired by mercury.”
- A statewide fish consumption advisory to limit or in some cases avoid eating certain fish, such as wild caught catfish, largemouth bass, mackerel, or tuna.



# Fluorescent Lamps and Mercury Pollution Through Disposal

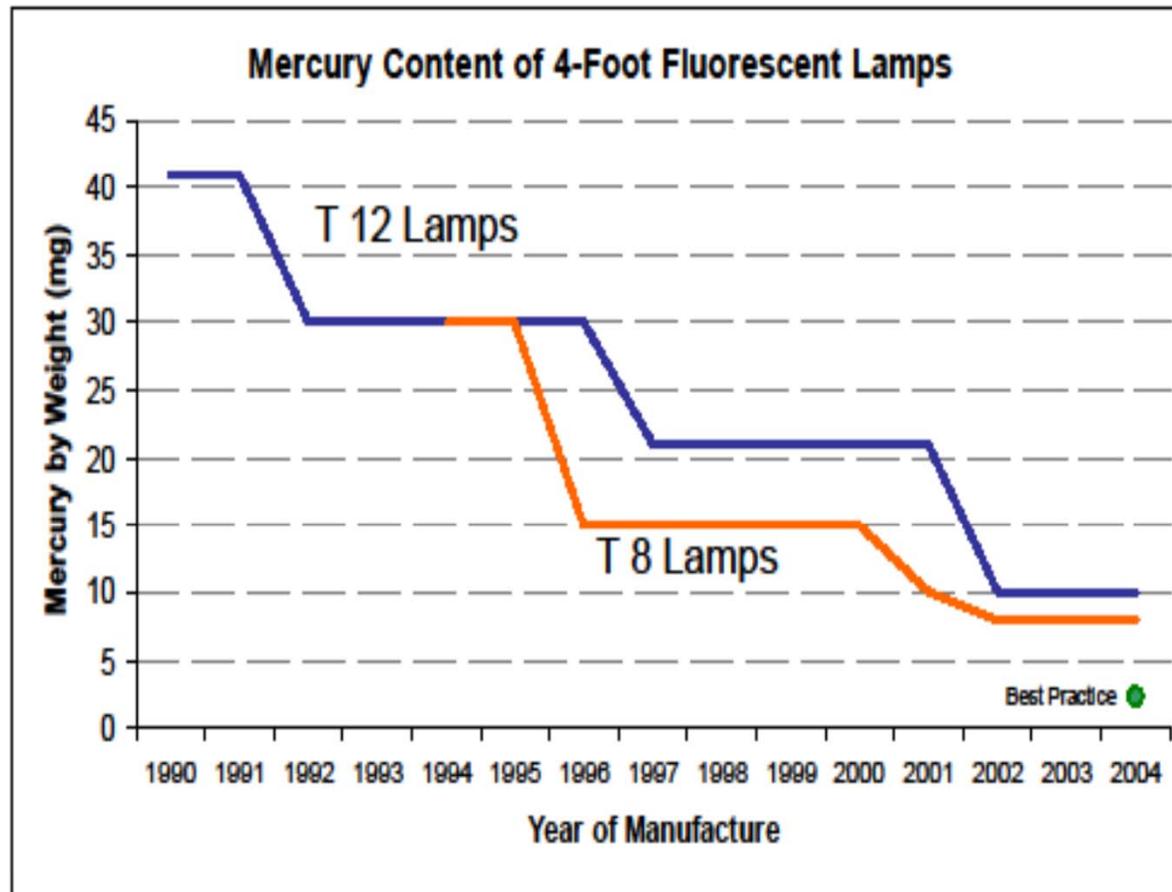
- All lamps that are disposed in the trash break, releasing mercury.
- Bulbs broken through disposal in dumpsters and waste trucks release mercury in both vapor and physical form.
- Landfill liners help control mercury effects on groundwater.
- Mercury in organic or methylated form can be released from the working face and gas vents of landfills
- Most C&D landfills are unlined and do not have gas controls



## Mercury Advantages from Fluorescent Lamps

- Over 40 percent of human-generated mercury pollution comes from coal-fired power plants.
- Important to use fluorescent lamps instead of less efficient lighting because they reduce coal power plant emissions.
- Important to also use fluorescent lighting efficiently.

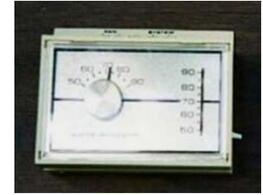
## Major advances over the last 15 years



- Reduction in mercury content in lamps has made great strides.
- But the approximate 680 million lamps in use in 2004 contain 13 tons of mercury – one ton can contaminate 1.3 billion fish.



# Mercury Thermostats



- Mercury thermostats contain 300 - 500 times as much mercury as a fluorescent lamp
- Use of mercury thermostats is declining as non-mercury alternatives become more available
  - Some states forbid the sale of mercury thermostats
- Industry has provided a very low-cost recycling solution through the Thermostat Recovery Corporation.



# Strategies for Reducing Mercury from Lamps and Thermostats

1. Use the most efficient and low mercury lamps available.
2. Explore opportunities to use fewer lamps.
3. Use non-mercury thermostats.
4. Properly manage all spent lamps and thermostats.



# Session Law 2010-180: Main Provisions

- State agencies and local governments required to establish a program to recycle fluorescent lamps and mercury thermostats.
- All affected entities must complete a one-time report on their efforts by December 1, 2011.
- Entities affected include:
  - All State Agencies
  - Community Colleges
  - Universities
  - Public Schools
  - Any political subdivision using state funds for the construction and operation of public buildings



## Session Law 2010-180: Main Provisions (continued)

- All demolition contractors or the owner of a building or structure to be demolished shall remove all fluorescent lights and mercury thermostats prior to demolition.
- Fluorescent lights and mercury thermostats banned from disposal in unlined construction and demolition landfills (and any other landfill that is unlined).



# Other Disposal Bans in NC

**G.S. 130A-309.10.**

- Tires
- White goods
- Used oil
- Lead acid batteries
- Antifreeze
- Yard waste
- Aluminum cans
- Oyster shells
- Oil filters
- Wooden pallets
- Plastic bottles
- Containers generated by ABC permit-holders
- Computer equipment and televisions (effective July 1, 2011)



# Objectives of Today's Workshop

- Increase awareness among government agencies on the requirements of Session Law 2010-180.
- Provide details on how best to comply with the Session Law and Hazardous Waste regulations.
- Help agencies understand opportunities to prevent pollution and save energy and money through lighting efficiency.



# Discussion

- Regulations that affect you
- Recycling options
- Service providers to recycle lights and pricing
- Establishing a recycling program
- Best management practices
- How the general recycling process works
- Lamp crushing

# Fluorescent Light and Mercury Thermostat Regulations

- Resource Conservation and Recovery Act (RCRA)
- Universal Waste Rule
- North Carolina Session Law 2010-180

Disposal of Untested Lamps  
in a NC landfill  
is **NOT** an Option





# Resource Conservation and Recovery Act

- According to the Subtitle C portion of the RCRA (Code of Federal Regulations, 40 CFR Part 260-279), it is a violation to transport and dispose of certain mercury-containing devices in a municipal solid waste (MSW) facility (i.e., landfill, material recovery facility, waste-to-energy facility or transfer station)
- Through their knowledge of the waste or by testing the waste, generators must determine whether a waste exhibits any of the four characteristics of hazardous waste



# Universal Waste Rule

- **Definition**
  - Universal Waste Lamp is defined as the bulb or tube portion of an electric light. Examples include, but are not limited to: fluorescent, high intensity discharge, neon, mercury vapor, high-pressure sodium and metal halide lamps
- This category does not include associated light fixtures such as ballasts



# Generator Responsibility

- All commercial, institutional, and industrial generators must follow the Universal Waste Rule:
  - Cannot dispose of hazardous waste in solid waste landfills.
  - Can dispose of fluorescent lights if they show the lights are not hazardous. This is done by conducting TCLP tests.
    - Expensive to test lights to prove they are non-hazardous.
    - Recycling is the only practical option.



# North Carolina Session Law 2010-180

- Requirements
  - Recycling of fluorescent lights and mercury thermostat from all State Agency, University, Community College and Public School buildings
  - Recycling of fluorescent lights and mercury thermostats from Local Government publically owned buildings constructed or operated with state funds
  - Program shall include procedures for convenient collection, safe storage, and proper recycling
  - The removal of fluorescent lights and mercury thermostats from structures prior to demolition



# North Carolina Session Law 2010-180

- **Bans**
  - Disposal of fluorescent lights and mercury thermostats from unlined landfills effective July 1, 2011 (regardless of generator status)
- **Reporting**
  - Report documenting compliance with law due to DENR on or before December 1, 2011
    - Identify vendor
    - Identify collection and storage procedures
    - Identify any partnerships
    - Identify proper training
    - Quantify materials collected

# What Lights Must You Recycle

- **All Fluorescent bulbs contain mercury ! Even Green Tip Bulbs!**

***Straight Tubes, U-shape, CFL's***





# North Carolina Session Law 2010-180

- **Common Misconceptions**

- Local governments are required to establish a recycling program for household lamps
- Recycling lamps requires the purchase of special packaging
  - This is only required for mail back programs
- Disposal facilities are required to establish a program to collect fluorescent light and mercury thermostats from demolition contractors



# Recycling Options

- **Fluorescent Lights**
  - State Convenience Contract 926B
  - Other Recycling Vendors
  - Mail Back Programs
  
- **Mercury Thermostats**
  - State Convenience Contract 926B
  - Mercury Thermostat Corporation



# State Convenience Contract

- N.C. State Agencies and Local Governments can recycle all fluorescent lights using Convenience Contract 926B  
<http://www.doa.state.nc.us/PandC/926b.pdf>
- Low cost option
  - Tubes – 4 cents per foot
  - CFLs & U Shape – 24 cents each
- In 2010, over 130,000 four foot tubes were recycled for less than \$21,000

# State Convenience Contract Contact Information

Contractor Name	Address / Federal ID	City, State, Zip	Contact, Phone, Fax
Cleanlites Recycling	195 Ben Abi Road  Fed. ID 31-1400474	Spartanburg, SC 29307	Ryan Rogers <a href="mailto:ryan@cleanlites.com">ryan@cleanlites.com</a> 864-579-4800 864-579-4802 Fax
Southeast Recycling Technologies	906 Chase Drive  Fed. ID 62-1624867	Johnson City, TN 37604	Stephen Barnett <a href="http://www.recyclebulbs.com">www.recyclebulbs.com</a> 423-282-2022 423-282-5151 Fax Or: Tony Ruston 423-477-2961 423-791-4073 (cell) 423-477-3081 (fax) If any problems, contact: Stephen Gross 423-477-2961 (ext. 209)



# Other Recycling Vendors

- If using a non-contract vendor do the following:
  - Ask “What is the Final Destination Facility?”
  - Ask “Can I Receive a Certificate of Recycling?”
  - Audit them
  - Conduct a site visit
- The audit and site visit have been done for you with the convenience contract
- Searchable database for other vendors:  
<http://www.p2pays.org/dmrm/start.aspx>

# Mail-back Programs

- Vendor provides packaging, postage and recycling for a fee:
  - EasyPak
  - Heritage Life Cycle
  - Veolia RecyclePak
  - Waste Management Think Green From Home
- **Costs**
  - \$1 to \$1.50 per CFL
  - Between \$.55 and \$3.27 for 4 foot tubes – average about \$1.60
- **See our website for links:**



<http://www.p2pays.org/Fluorescent/households.asp>

# Mercury Thermostat Recycling

- State Convenience Contract 926B
  - Cost \$3.50 per pound
  - Manage thermostats same as lights
- Thermostat Recycling Corporation
  - Cost \$25.00 per container
  - Container holds 100 thermostats
- <http://www.thermostat-recycle.org/>



**Recycle**  
mercury thermostats,  
**here.**

We are proud to partner with the  
 **Thermostat Recycling**  
CORPORATION  
an industry-funded non-profit  
www.thermostat-recycle.org

# Training



- **Must Inform Employees**
  - Responsibility for properly managing spent fluorescent lights and mercury thermostats
- **Must Describe**
  - Proper Handling
  - Emergency procedures



# Proper Packaging and Handling

- Universal Waste lamps must be packaged per the following:
  - A handler must manage lamps in a way that prevents release of any universal waste or component of universal waste to the environment
  - A handler must contain any lamp in containers or packages that are structurally sound, adequate to prevent breakage, and compatible with the contents of lamps
  - A container or package must be labeled or marked clearly with any one of the following phrases: **“Universal Waste Lamps”** or **“Waste Lamps”** or **“Used Lamps”**

Spent lights can be Accumulated/Stored up to **One Year**

Spent Lights must be shipped or picked up by another Handler or a Destination Facility



# Proper Spent Lamp Storage and Accumulation



# Improper Storage



# Handling Broken Lights

- Close off Room
- Adequate Ventilation
  - Open Window
- Carefully Scoop Fragments
  - Do not use Hands
  - Wipe Using Disposable Towels
  - Do not Use Vacuum
    - Disperses Mercury
- Fragments Placed
  - Sealed Plastic Bag
  - Properly Disposed





# Best Management Practice

- **Buncombe County Schools**
  - Have had program for 3 years
  - Store bulbs in central location
  - Use barrels provided for free from vendor (90)
  - Take barrel to school to fill when changing lights
  - Use lift gate truck to pick up full barrels to return to storage
  - Call for pick up when 50 barrels are full
- **Recycled 6,195 lights in 2010**
- **Using State Convenience Contract**



# Best Management Practice

- Wake Technical Community College
  - Staff are given card with handling requirements
  - Carried with ID badge
  - Use boxes to transport spent bulbs from work site to storage location
  - Store bulbs in fiber drums in central location
  - Also collect thermostats and batteries
- Recycled 5,463 lights at a cost of less than \$900 in 2010

An example of Wake Tech's universal waste requirements convenience card that is worn behind employee ID badge.



**Wake Tech SECURITY SERVICES** **Johnson Controls**

**Universal Waste**  
*Batteries & Lamps*

Wake Tech is a *Small Quantity Handler of Universal Waste* because there are < 5,000 kg (~11,000 lbs) of universal waste on campus at one time. Therefore:

Containers must be marked with:

- the words "Universal Waste"
- the accumulation start date
- one of these phrases:  
Used \_\_\_\_\_  
Waste \_\_\_\_\_  
Universal Waste – \_\_\_\_\_  
(replace blank line with either *batteries* or *lamps*)

Battery terminals must be taped or otherwise insulated to prevent contact with anything.

Containers must be closed unless in use.

Containers must be disposed of within 1 year from accumulation start date.



**UNIVERSAL WASTE**  
see example on back

Front of Card



**Wake Tech SECURITY SERVICES** **Johnson Controls**

Example of a Fully Completed Label

Wake Tech's name & address can be added any time before shipping for disposal.



**UNIVERSAL WASTE**

**UNIVERSAL WASTE**

**UNIVERSAL WASTE**

CONTENTS: *Waste lamps*

ACCUMULATION START DATE: *5/1/2011*

SHIPPER: *Wake Tech*

ADDRESS: *9101 Fayetteville Rd.*

CITY, STATE, ZIP: *Raleigh, NC 27603*

Back of Card



# BMP – Working Together Locally

- Some small towns will need to funnel lamps through a county program
- Work together to find a storage point that will work for all
- Combining programs can help reduce everyone's cost

In the long history of humankind (and animal kind, too) those who learned to collaborate and improvise most effectively have prevailed.

~ Charles Darwin



## Recycling 101: Lamp Recycling Process

- During the recycling process, commercial (permitted) recycling facilities send lamps through a closed chamber in which a vacuum is generated
- Lamps are then crushed, and the material is moved through a series of screens
- The phosphor is removed from the chamber in trays, put into a retort, and heated



# Recycling 101: Lamp Recycling Process (continued)

- The mercury vaporizes, cools, and condenses into a container
  - At 99.7% pure, it is commercial grade but not lamp grade, requiring a distillation process
  - Reclaimed mercury can be reused in new fluorescent lamps or other mercury-containing products
- Glass goes to various end uses such as fiberglass making and roadway material
- Aluminum end caps are sent to an aluminum smelter for recycling
- Zinc plated iron is sent to scrap metal handlers

# Recycling Facility



# Crushing Lamps

Is it still **Universal Waste?**

**NO!!**



# Bulb Crushing Facts

- Equipment has high upfront costs
  - Average unit \$3,500
- Once you crush lights you become a hazardous waste generator
- Long return on investment
  - Can recycle 58,000 intact lights for cost of crusher

## [Factsheet](http://p2pays.org/Fluorescent/Documents/Fluorescent-Bulb-Mgmt-Fact-Sheet-Feb-2011.pdf)

<http://p2pays.org/Fluorescent/Documents/Fluorescent-Bulb-Mgmt-Fact-Sheet-Feb-2011.pdf>



# Bulb Crushing Treatment in Containers

- Must Occur Within Accumulation Limit
  - Storage or Time Limit
  - 180 or 90 days
- Comply with Container Requirements
- Air Emissions
- Contingency Plan
- Training



# Cost Comparison

- 4 Foot Fluorescent Lamp

Recycling (cents)	HW Disposal (cents)
16	~ 25 – 50

- Not Including Cost of
  - Packaging
  - Transportation,
  - Profiling

# UW Penalties

Citation	Description	Penalty
273.13(d)(1)	two (2) boxes of 4-ft fluorescent lamps and two (2) boxes of 8-ft fluorescent lamps were not properly closed.	\$1,650
273.14(e)	one (1) box of 4-ft fluorescent lamps and two (2) boxes of 8-ft fluorescent lamps were not properly labeled.	



# Hazardous Waste Section

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- [About Us](#)
- [Frequently Asked Questions \(FAQs\)](#)
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## Division of Waste Management

The primary purpose of the Division of Waste Management (DWM) is to protect public health and the environment by assuring that solid and hazardous wastes and underground storage tanks are managed properly, and that existing contamination is cleaned up. This is accomplished through the Hazardous Waste, Solid Waste, Superfund, and Underground Storage Tank Programs. In addition, the Brownfields Program promotes redevelopment of abandoned, idle and/or under-utilized sites.

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# Summary

1. All Fluorescent lights contain mercury, regardless the shape, size or what color the ends are!
2. There are approximately **28,142,652** Million and growing mercury containing lights used in North Carolina annually.
3. If Not properly managed, handled, and recycled, this number of lights could contaminate approximately **2,215,412** Million acres of North Carolina's water ways!
4. The overexposure of mercury is detrimental to the health of humans and wildlife alike.



# Questions on Lamp and Thermostat Recycling

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# General Environmental Sustainability Contacts for State and Local Agencies

- **NC Project Green:**
  - <http://ncprojectgreen.com/>
- **Rachel Eckert**
  - [Rachel.eckert@ncdenr.gov](mailto:Rachel.eckert@ncdenr.gov)
  - 919-715-6505
- **Claudia Powell**
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  - 919-715-6532



**THANK YOU!**