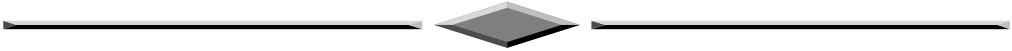




Spent Fluorescent Light Management Options for North Carolina State Agencies and Local Governments



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BACKGROUND

Beginning July 1, 2011, all state agencies are required by law to establish a program to collect and recycle the spent fluorescent lights and thermostats containing mercury that are generated in buildings which they own. The law - Session Law 2010-180, House Bill 1766 - affects all state agencies, including the General Assembly, the General Court of Justice, universities, community colleges, public schools and political subdivisions that use state funds to construct or operate public buildings.

Each agency's program must include procedures for convenient collection, safe storage, and proper recycling of spent fluorescent lights, including contractual or other arrangements with those who buy recyclable materials.

Because mercury is toxic to humans and the environment, state agencies must also comply with federal hazardous waste regulations. The management and disposal of fluorescent light bulbs are regulated under the Resource Conservation and Recovery Act (RCRA) Universal Waste Rule and Subtitle C hazardous waste regulations. Agencies that have questions about the regulatory status of fluorescent lights should contact the Division of Waste Management at (919) 707-8200.

Agencies subject to H1766 must submit a report on or before December 1, 2011, that documents their compliance with the requirements to the N.C. Department of Environment Quality and the Department of Administration. The two departments must compile the information submitted and jointly submit a report to the Environmental Review Commission by January 15, 2012.

The following information may help state agencies and local governments assess their spent fluorescent light recycling options as well as the costs.

SPENT FLUORESCENT LIGHT MANAGEMENT OPTIONS

The following two management options will help affected parties comply with H1766 and the RCRA Universal Waste Rule and Subtitle C hazardous waste regulations.

Method 1 - Recycling of Intact Fluorescent Lights: This method involves collecting, packing and accumulating intact spent fluorescent lights for shipment to a recycling facility. The intact lights can be picked up by or shipped to any properly permitted light recycler. The Division of Environmental Assistance and Customer Service recommends that agencies subject to H1766 use the vendors approved in North Carolina Convenience Contract 926B for this management method.

Convenience Contract 926B provides two vendor choices, each offering very competitive rates for the handling of fluorescent lights. To use the convenience contract, state agencies should directly contact the vendors to arrange for services. The convenience contract also offers options for recycling many other mercury-containing devices such as thermostats and ballasts, and state agencies and local governments are also strongly encouraged to take advantage of those services. Convenience Contract 926B can be found at: <https://ncadmin.nc.gov/926B>

Method 2 - Fluorescent Light Bulb Crushers: Spent light bulbs are hand-fed into fluorescent light bulb crushers. They are then vacuumed further into the machine and crushed into fragments by a spinning steel wheel. The fragments are collected in a container, usually a 55-gallon drum, which is

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attached to the crusher. A series of filters attached to the crusher unit capture the small particles, dust and mercury released during the crushing process. Once the drum is filled with bulb fragments, the crusher is moved to an empty drum and the process is repeated. Drums that are filled with crushed bulbs must be managed as hazardous waste, and the various filters must be replaced periodically and also treated as hazardous waste. Note: Compact fluorescent lights and HID lamps cannot be run through most fluorescent light crushers. The purchase of additional specially designed attachments will be required to process these types of lights.

The Division of Environmental Assistance and Customer Service strongly recommends that agencies subject to H1766 conduct a thorough cost and technical analysis before committing to the purchase and use of a bulb crusher. As discussed below, the management of spent fluorescent lamps through use of a bulb crusher may be substantially more expensive than management of the lamps through intact recycling. In addition, potential users of bulb crushers should make themselves completely aware of the regulatory and human health implications of using such devices.

POTENTIAL COSTS ASSOCIATED WITH FLUORESCENT LIGHT MANAGEMENT

Provided below are the estimated costs to use each type of fluorescent light management program. The cost projections are based on a program that uses 4-foot, T8 style fluorescent tubes. T8 bulbs were chosen based on the maximum drum capacity of the fluorescent light crusher system, which holds approximately 1,350 crushed lamps. The disposal cost per bulb using a fluorescent light crusher will be higher for agencies using T12 lamps.

1. Management through Recycling of Intact Lights Using North Carolina Convenience Contract 926B

Cost associated with managing spent bulbs using North Carolina Convenience Contract 926B:

- 1,350 fluorescent lamps at \$0.04 per foot = \$216
- Transportation costs are waived under contract for invoices more than \$200

Total potential cost to dispose of 1,350 fluorescent lamps = \$216

2. Management Using Fluorescent Light Crushers

Equipment Cost:

- Crusher unit average cost, \$3,500
- Filter costs - Most light crushers come with a 3-stage filter system. The cost and maintenance schedule for each filter varies by manufacturer. Discarded filters must be treated as hazardous waste. The filter cost list below represents the average cost and most common maintenance schedule:
 - Bag filter, must be changed twice per drum (\$57 for pack of 20 filters)
 - HEPA Cartridge, \$136, must be changed after 10 drums
 - Carbon Canister, \$1,130, must be changed after 1 million lamps
- 55-Gallon Epoxy Lined Steel Barrel, \$85 (No cost if you supply your own drum, otherwise onetime cost)

Worker Safety and Training Costs – It is recommended that initial personal monitoring for worker exposure to mercury be conducted the first time the crusher is operated to ensure proper set up and function. For questions on worker safety requirements, contact the N.C. Department of Labor, Occupational Safety and Health Division, (919) 779-8560:

- Hazmat employee training, \$250 (Needed if staff has not had previous Hazardous Communication training)
- Jerome Mercury Vapor Air Monitor, \$5,000 (Only required if initial mercury exposure is detected)

Disposal Cost – Crushed bulbs and filters must be disposed as hazardous waste. For questions on hazardous waste generator requirements, contact the NCDEQ, Division of Waste Management, Hazardous Waste Section, and (919) 508-8543:

- 55-Gallon drum of crushed bulbs and filters, \$225

- Transportation fee, \$95

Total potential cost to dispose of first drum containing 1,350 fluorescent lamps = \$9,070.

Costs to manage subsequent drums will be less over time, but total return-on-investment (ROI) for use of a bulb crusher relative to intact handling cost may not be realized for many years. A generator could recycle 57,931 4-foot lamps @ \$0.16 each using North Carolina Convenience Contract 926B for the cost of one crusher and associated equipment before crushing its first fluorescent light. That total is equivalent to 42.9 barrels of crushed lamps.

RECYCLING INTACT FLUORESCENT LIGHTS	FLUORESCENT LIGHT CRUSHER SYSTEM																		
<p><u>Recycling Cost</u></p> <p>Cost for each intact 4-foot light using North Carolina Convenience Contract 926B is \$0.16 cents each.</p> <p>Total potential cost to dispose of 1,350 T8 4-foot fluorescent lamps = \$216</p>	<p><u>Equipment Cost</u></p> <table> <tr> <td>Average crusher unit cost</td> <td style="text-align: right;">\$3500</td> </tr> <tr> <td>Mercury vapor air monitor</td> <td style="text-align: right;">5000*</td> </tr> <tr> <td>*If required</td> <td></td> </tr> <tr> <td>Employee Training (per employee)</td> <td style="text-align: right;"><u>250*</u></td> </tr> <tr> <td>*If required</td> <td></td> </tr> <tr> <td>Total Start up Cost</td> <td style="text-align: right;">**\$8,750</td> </tr> </table> <p><i>**This is the cost before the first lamp is crushed.</i></p> <p><u>Recycling Cost</u></p> <table> <tr> <td>Disposal cost (full drum)</td> <td style="text-align: right;">\$225</td> </tr> <tr> <td>Transportation costs</td> <td style="text-align: right;"><u>95</u></td> </tr> <tr> <td>Total Disposal Cost</td> <td style="text-align: right;">\$320</td> </tr> </table> <p>Total potential cost to dispose of first drum of 1,350 T8 4-foot fluorescent lamps = \$9,070</p>	Average crusher unit cost	\$3500	Mercury vapor air monitor	5000*	*If required		Employee Training (per employee)	<u>250*</u>	*If required		Total Start up Cost	**\$8,750	Disposal cost (full drum)	\$225	Transportation costs	<u>95</u>	Total Disposal Cost	\$320
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CONCLUSION

North Carolina State agencies and public schools benefit from the low cost option of the State Term Contract 926B. Therefore recycling of intact lights is generally more cost effective than using a fluorescent bulb crushing system and avoids unnecessary employee exposure to mercury vapor and other hazards. It also avoids any complications associated with becoming a generator of hazardous waste, which could include becoming subject to the regulatory requirement associated with being a small or large quantity generator of hazardous waste.

For more information from the Division of Environmental Assistance and Customer Service:

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The N.C. Division of Environmental Assistance and Customer Service provides free, non-regulatory technical assistance and training on methods to eliminate, reduce or recycle wastes before they become pollutants or require disposal. Telephone DEACS at (919) 707-8100 or toll free at (877) 623-6748, or e-mail nowaste@p2pays.org for assistance with issues in this fact sheet or any of your waste reduction concerns.