

SWANA RECYCLING
TECHNICAL ASSISTANCE STUDY

FINAL REPORT

MERCURY LAMP AND BATTERY RECOVERY
AT THE WAYNE TOWNSHIP LANDFILL



Wayne Township Landfill

Innovative. Responsible. Committed to You.

Prepared for:

CLINTON COUNTY SOLID WASTE AUTHORITY
CLINTON COUNTY, PENNSYLVANIA

Prepared by:



HARRISBURG, PENNSYLVANIA

NOVEMBER 2010

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EXHIBITS

- Exhibit A** – Proposed Universal Waste Storage Area
- Exhibit B** – Vendor Price Request and Responses
- Exhibit C** – Draft Site Safety and Contingency Plan
- Exhibit D** – Universal Waste Training PowerPoint
- Exhibit E** – Equipment and Supply Cut Sheets

SWANA RECYCLING TECHNICAL ASSISTANCE STUDY

EXECUTIVE SUMMARY

MERCURY LAMP AND BATTERY RECOVERY AT THE WAYNE TOWNSHIP LANDFILL

ES 1.0 - Introduction

The Clinton County Solid Waste Authority (CCSWA) received recycling technical assistance from Gannett Fleming, Inc. (GF) to evaluate the feasibility of accepting mercury lamps and batteries at the Wayne Township Landfill located in McElhattan, Pennsylvania. Through this evaluation, GF has completed the following:

- Identified the PADEP regulatory requirements required for the CCSWA to transition from a bi-annual Household Hazardous Waste (HHW) sponsor to a permanent Universal Waste Handler.
- Completed draft program implementation documents including:
 - a Site-Specific Safety and Contingency Plan
 - Universal Waste Training Program
 - Vendor Pricing Request
- Conducted a site visit to confirm the proposed location for Universal Waste receiving and storage.

Based on GF's evaluation, the following conclusions and recommendations are provided as a summary to the Final Report.

ES 2.0 - Conclusions

- Accepting Universal Wastes for the purpose of recycling on an ongoing basis from residents and small businesses is an environmentally responsible program that will reduce uncontrolled releases of harmful mercury and other Universal Waste chemicals into the environment that occurs during landfill disposal.
- Managing fluorescent lamps, mercury-containing devices and batteries on a permanent basis requires an increased level of safety awareness and increased care as compared to most other materials processed at the Recycling Facility. Universal Wastes have unique properties and risks, and mercury requires specific procedures and personal protective equipment (PPE) to limit the potential for cumulative health risks that can occur over long periods of time.
 - Proper PPE and safety procedures will reduce, but not entirely eliminate, exposures to mercury that will be released periodically when bulbs break.

- Universal Waste batteries can also be stored safely, but proper knowledge of battery types is critical so they are separated by type to prevent corrosion, fires or explosions.
- The proposed CCSWA permanent Universal Waste program would qualify as a “small quantity handler”, and would not require permits or material manifesting.
- The CCSWA’s current electronics vendor, UNICOR, will accept all non-alkaline batteries at no cost. Rechargeable batteries (and cell phones) can be recycled at no cost through call2recycle.
- Actual start up and annual operating costs can be reduced by the decisions the CCSWA will make regarding equipment, PPE and operations. Costs for the program are estimated as follows:

Universal Waste Program Cost Item	Estimated Cost
PPE & Containers (startup cost only)	\$1,700
Customized Storage Trailer (startup cost only)	\$5,000
Vendor Contract Services (annual estimate)	\$5,400
Labor*	\$0
Total Estimated First Year Costs	\$12,100
Total Cost Less HHW Grant (50%)	(\$6,050)
Approximate Yearly Lead-Acid Battery Revenues	(\$1,300)
Net First Year Costs to CCSWA	\$4,750

Assumptions: \$5,000 cost for storage shed includes customizing a trailer, not design and construction of a pole-type storage facility. Vendor cost includes cost for pickup, transportation and material processing, assuming the CCSWA is comparable to Elk County Universal Waste generation rates. No “new” or additional labor hours required.

- Having an adequately-sized storage area will reduce costs incurred annually to operate the program by reducing the number of pickups required annually. Vendor transportation and associated costs will be absorbed by the CCSWA.

ES 3.0 - Recommendations

Gannett Fleming recommends that the CCSWA implement a permanent Universal Waste recovery program using a flexible approach that responds to the level of participation and Universal Waste quantities. The initial startup could utilize an existing box trailer customized for material storage, and postpone construction of permanent pole-type structure until material quantities and/or other operational factors justify such a facility. Customers should be received at the front/southeast side of the Recycling Center consistent with current Recycling Facility procedures for handling other materials. The Universal Waste storage trailer should be located outside the existing Recycling Facility near the southern corner of the building (Exhibit A); adjusting employee parking as needed.

The CCSWA should give special attention to the use of PPE and other safety, handling and storage procedures to ensure consistency with the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), PA Dept. of Environmental Protection (PADEP), National Institute for Occupational Safety and Health (NIOSH) and American Institute of National Standards (ANSI) requirements and specifications. Recommended steps for implementing a Universal Waste recovery program by the CCSWA include:

Step 1 – Internal Program Review & Confirmation - Review the proposed program in detail with all affected CCSWA personnel prior to making any decision to implement this program. Disclose and provide health risk information in detail, noting the long-term occupational exposure risks. Review the proposed handling, storage and operational procedures that will be utilized to minimize risks.

Step 2 – Evaluate & Review Costs - Review the costs of the permanent Universal Waste program in order to support the decision making process. Annual costs will vary, primarily based on participation levels and the quantity and/or weights recovered.

Step 3 – Registration Update - If an internal decision is made to proceed with a permanent Universal Waste collection program, the CCSWA should:

- Notify PADEP via letter requesting lamps and batteries be added to the existing HHW registration as part of a new permanent Universal Waste program. The registration update should include the following attachments:
 - A site diagram (Universal Waste Plan) of where Universal Wastes will be handled (draft completed).
 - Proof of insurance (\$2 million general liability)
 - A Site Specific Safety Plan (draft completed)
 - Letters showing compliance with local zoning and the local fire department.

Step 4 – Finalize storage trailer/shed use or construction - A well-ventilated storage facility capable of segregating different Universal Wastes must be in place prior to accepting the proposed Universal Wastes. GF recommends that the CCSWA initially customize an available box trailer with minimum capacity to store 8 skids of lamps, with a separate area for Universal Waste batteries. If the program participation grows beyond the capacity of a storage trailer, the CCSWA should consider construction of a prefab wood frame, aluminum-sided storage area.

Step 5 – Universal Waste PPE and Supplies - Procure Universal Waste supplies and PPE that adhere to OSHA 29 CFR standards. Because OSHA requires half-faced respirators with mercury vapor cartridges be worn when mercury levels are unknown, it is recommended the CCSWA procure and periodically utilize some type of mercury air analyzer (in the storage area) in order to determine PPE requirements. Tyvek® suits and nitrile gloves are the standard recommended PPE.

Step 6 - Universal Waste Training – Complete the one hour Universal Waste training for small quantity handlers (refer to the training PowerPoint customized for the CCSWA in **Exhibit D**).

Step 7 - Public Education - Update the CCSWA website and release information identifying the date of the CCSWA will begin accepting designated Universal Wastes on a permanent basis. Provide details on acceptable materials, customer handling procedures, and the acceptable condition of materials upon arrival (e.g. no broken bulbs, no free mercury, and no leaking batteries). Education should include periodic news ads/articles.

Step 8 - Reporting and Grant Reimbursement - Submit the **Record of Operations Form** (2510-FM-LRWM0084) to PADEP on a quarterly basis and submit the **Application for Reimbursement Form** (2510-FM-LRWM0248) every six months.

General Safety Recommendations

- **Hazard Assessment:** Conduct a hazard assessment of the Universal Waste program in accordance with OSHA guidance 1910.132 to assess the dangers and to verify PPE requirements initially, each year or when the program changes.
- **PPE Selection:** Reference ANSI and NIOSH standards during PPE selection.
- **Gloves/liners:** Use nitril liners/gloves that prevent mercury residue absorption at all times when handling mercury-containing lamps and mercury-containing devices, even when they are boxed.
- **Tyvek suits:** Keep Tyvek suits on site for employee use during special conditions. During the normal workday, when boxed lamps are arriving, Tyveks may not be required but individual employees may wear them at their preference. Special conditions for Tyveks might include:
 - The arrival of multiple broken thermometers or other mercury-containing devices requiring spill cleanup.
 - Bulk and extended handling of Universal Wastes (e.g. loading large quantities)
 - One way to minimize staff exposures is to require the vendor to handle all loading of Universal Wastes.
- **Respirators:** During most open air handling of boxed mercury lamps, fitted respirators may not be required. During handling of larger quantities of mercury lamps and devices and during mercury spill clean ups when the air quality is either unknown (untested) or above the Permissible Exposure Level (PEL) as determined by an air analyzer, a half-faced air-purifying respirator with a mercury cartridge is recommended.

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1.0 INTRODUCTION

The Clinton County Solid Waste Authority (CCSWA) is committed to reducing, reusing, recycling and managing solid wastes. The CCSWA offers integrated waste management services to the County and is interested in expanding these services to include ongoing or permanent recovery of certain “universal wastes” deemed feasible for recovery by the CCSWA. Through the partnership with the Solid Waste Authority of North America (SWANA), the Pennsylvania State Association of Township Supervisors, and the Pennsylvania Department of Environmental Protection (PADEP), the CCSWA was approved for Recycling Technical Assistance to be provided by Gannett Fleming, Inc. (GF) to evaluate permanent collection of mercury lamps and batteries at the Wayne Township Landfill in Clinton County, Pennsylvania.

The CCSWA sponsors periodic household hazardous waste (HHW) events and accepts electronics at its Recycling Facility in McElhattan but does not have a permanent household hazardous or universal waste program. “Universal wastes” include certain hazardous wastes (e.g. batteries, pesticides, thermostats, oil-based finishes, photographic solutions, and mercury-containing equipment) that have been reclassified by the EPA to encourage safer material handling through recycling, and subsequently, promote protection of human health and the environment. Automotive lead-acid batteries are accepted for recycling by the CCSWA and are prohibited by municipal waste regulation from disposal at the Wayne Township landfill or other municipal waste landfills. At this time, the CCSWA intends to focus permanent collection on lamps and batteries and not add other household hazardous wastes to the program such as paints and pesticides.

Notably, publicly-operated permanent facilities for household hazardous wastes including lamp and battery recovery in Pennsylvania are uncommon. The Lancaster County Solid Waste Authority and Elk County are two permanent facilities accepting mercury containing lamps and batteries from the public and/or commercial sector. The Dauphin County Recycling Center recovers mercury containing lamps for recycling, but the program only captures mercury containing lamps from its facilities, not from the public or other private entities.

1.1 Proposed Benefit

The benefit of establishing a permanent collection program for certain universal wastes is primarily the addition of a public service and disposal option that reduces the potential for environmental impacts associated with the common alternative – disposal. Increased recovery of universal wastes for the purpose of recycling reduces the release of hazardous material into the environment. With a permanent facility, the public will have convenient access to recycle these items rather than arriving on a specific day at an occasional HHW event.

2.0 FEDERAL AND STATE REGULATIONS FOR UNIVERSAL WASTES

“**Universal wastes**” are hazardous waste deemed universal waste under the Universal Waste Rule and include batteries, mercury-containing equipment, obsolete agricultural pesticides and fluorescent/high intensity discharge lamps. The hazardous waste designation is determined when a substance fails the toxicity characteristic leaching procedure (TCLP test). For example, most mercury containing lamps fail the TCLP test or exceed the regulated mercury limit of 0.2 mg/l and sometimes fail for lead content.

Based on Pennsylvania’s interpretation of the Federal regulations regarding universal wastes, the CCSWA is prohibited from “treatment” or processing of any mercury containing light bulbs or tubes. As a result, **any permanent recovery program implemented at the CCSWA facility must be limited to the recovery of whole tubes and bulbs and cannot include intentional breakage of any tubes.** Some states allow breakage to consolidate and facilitate shipping.

OSHA does not recommend specific personal protective equipment to companies or individuals. Rather, OSHA refers users to guidance **1910.132**, which indicates that it is the responsibility of the employer to perform a hazard assessment and then implement the necessary safety procedures and PPE to protect your employees from the hazards. OSHA regulations are found at www.OSHA.gov.

2.1 The CCSWA is a Small Quantity Handler

If the CCSWA begins a permanent recovery program for mercury-containing lamps, it will be considered a small quantity handler. A small quantity handler of universal waste **must accumulate less than 11,000 pounds (5,000 kg) of total universal waste, (i.e., batteries, pesticides, mercury thermostats or mercury containing lamps) for periods up to one year.**

As a small quantity handler, the CCSWA would follow these requirements:

- Ensure any universal wastes accumulated are managed in a closed container that prevents the release of the universal waste or waste components.

- Label each container with the type of universal waste it contains.
- Accumulate universal waste no longer than one year from the date the waste was generated. Maintain records demonstrating the actual generation date.
- Ensure all employees handling a universal waste have been provided information on proper handling and emergency procedures appropriate to the types of wastes managed.
- Send universal waste to another universal waste handler and ultimately, a permitted facility.
- Completing a uniform hazardous waste manifest or keeping records of universal waste shipments is not required.
- Utilize a transporter that complies with all state (PaDOT), and federal regulatory requirements required as a handler of universal waste.
- As a “permanent” collector, the CCSWA should submit the Record of Operations form (2510-FM-LRWM0084) to PADEP on a quarterly basis.
- The CCSWA will need to submit the Application for Reimbursement form (2510-FM-LRWM0248) every six months to reimburse 50% of eligible costs.

3.0 MERCURY LAMPS AND DEVICES

Mercury lamps and mercury-containing devices that fail the TCLP test are hazardous wastes designated by the EPA as universal wastes. The following subsections provide an overview of mercury, its properties, regulation and potential health hazards.

3.1 An Introduction to Mercury

Handling mercury in any of its three forms presents health risks because mercury is a potent neurotoxin that has several routes of entry into the body. Natural and man-made mercury is in air, soil, water, products, animals and foods. Even in persons that do not handle mercury, the level of human exposure to mercury is increasing as verified by increased quantities detected in blood, hair and urine. The total global mercury concentrations in the atmosphere are rising from anthropogenic activity, primarily fossil fuel combustion. Any decisions by the CCSWA or other entity to handle mercury, particularly as part of routine operations, should be made with comprehensive understanding of the cumulative effects of mercury.

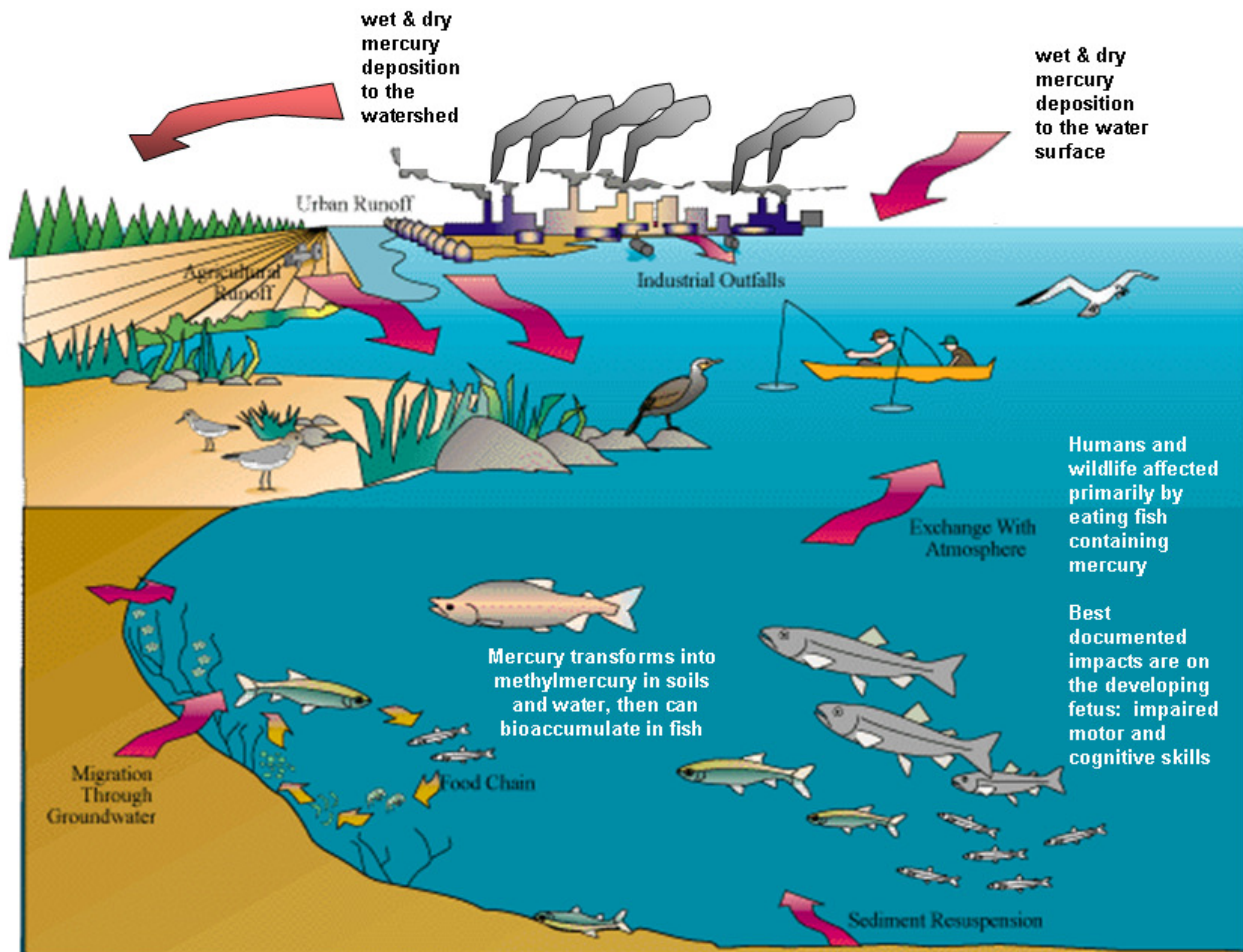
Mercury occurs naturally in three forms: metallic or **elemental mercury**, **inorganic mercury**, and **organic mercury** and all forms can enter the body. Naturally occurring mercury results from the breakdown of minerals from weathering and natural mercury release levels are relatively constant. Mining, manufacturing and combustion of fossil fuels are leading contributors to the total mercury in our environment. Humans

contribute 40% to 75% of the total mercury levels on the planet. The Agency for Toxic Substances and Disease Registry (2007) breaks down the **human contribution of mercury** as follows:

- **80%** is elemental mercury released to the air from fossil fuel combustion, mining, and smelting, and from solid waste incineration.
- **15%** is released to the soil from fertilizers, fungicides, and municipal solid waste (e.g. waste that contains discarded batteries, electrical switches, or thermometers).
- **5%** is released from industrial wastewater to water in the environment.

Atmospheric releases of mercury in the US and Canada are being curbed by regulation, including several recently implemented and pending EPA regulations that establish industrial mercury emission limits and US mercury export bans (www.epa.gov). However, mercury released from developing countries (particularly in Asia), is expected to exacerbate the mercury concentration in our atmosphere and oceans.

Exposure to methylmercury, the most toxic form of mercury to which humans and wildlife are regularly exposed, comes primarily from the consumption of contaminated fish and shellfish. The cycle of mercury as depicted by NOAA and EPA is shown in the following drawing. Methylmercury is formed from inorganic mercury by anaerobic organisms that live in aquatic systems. Methylmercury increases in concentration or biomagnifies in organisms at levels a million times higher than the level in the water (Wiener, J.G., Krabbenhoft, D.P., Heinz, G.H., and Scheuhammer, A.M., "Ecotoxicology of Mercury", 2003). Ranging from 0.730 to 0.988 PPM, Sharks, swordfish and king mackerel contain the highest concentrations of mercury (www.fda.gov).



Source: US EPA & NOAA

3.2 Pennsylvania Regulation Governing Mercury Lamp Recycling

Universal Waste Management is addressed under § 266b and subsections with **Title 25 of the PA Code**. The special requirements for exempt small quantity handlers including CCSWA are provide in full below:

§ 261a.5. Special requirements for hazardous waste generated by conditionally-exempt small quantity handlers.

- (a) The reference to 40 CFR Part 279 in 40 CFR 261.5(c) (4) and (j) (relating to special requirements for hazardous waste generated by conditionally exempt small quantity handlers) is replaced with Chapter 298 (relating to management of waste oil).
- (b) In addition to the requirements incorporated by reference, a **conditionally-exempt small quantity handler may not dispose of hazardous waste in a municipal or residual waste landfill** in this Commonwealth.

- (c) A conditionally-exempt small quantity handler complying with this subchapter and 40 CFR 261.5 is deemed to have a license for the transportation of those conditionally exempt small quantity handler wastes generated by the handler's own operation.

3.3 Low Level Mercury Handling - Case Studies & Safety Precautions

Through GF's investigations on the safe handling of mercury lamps and other mercury-containing devices, various data and industry studies raised health concerns for handling low levels of mercury, including mercury containing lamps. Some notable findings regarding handling and occupational exposures include:

- ✓ During the EPA Mercury Lamp Drum Top Crusher Study (2006) the Jerome analyzer readings demonstrate that the ambient mercury concentration increased inside the containment structure (an office sized area enclosed by non-airtight polyethylene walls) when a bulb was broken. The mercury concentration was 0.033 mg/m³ before a lamp was broken and increased to 0.169 mg/m³ four minutes after a lamp was broken. This was an increase of 400 percent in ambient mercury concentrations. These data are further supported by research performed by Aucott, et al., in which it was shown that "between 17 and 40 percent of the mercury in broken low-mercury fluorescent bulbs is released to the air during a two-week period immediately following breakage, with higher temperatures contributing to higher release rates. Possible release of and exposure to mercury vapor, as a result of broken lamps, is an important consideration as part of any operations managing fluorescent bulbs".
- ✓ During the EPA Mercury Lamp Drum Top Crusher Study (2006) where three types of bulb crushers were tested, it was concluded that the use of a respirator, or continuous air monitoring for mercury with a mercury vapor monitor, such as a Jerome or Lumex, were the only ways to ensure that operator mercury exposures remained below the OSHA permissible exposure levels (PEL) and AGCIH TLV exposure limits throughout the Study. Although the CCSWA is prohibited from crushing bulbs, and the operating conditions will be different, the study findings allude to the fact that when bulbs break, or when a container is handled that has broken bulbs, there is a chance of exposure that exceeds the PEL.
- ✓ From the EPA Mercury Lamp Drum Top Crusher Study (2006), it was concluded that the only way to eliminate unnecessary indirect mercury exposures (where a visitor or worker enters an area with elevated levels of mercury above background levels) would be to keep the ventilation of a lamp crushing room completely separate from the general building ventilation system as is done at industrial lamp recycling facilities.

- ✓ Liang et al. (1993) investigated workers in a fluorescent lamp factory with a computer-administered neurobehavioral evaluation system and a mood inventory profile. The exposed cohort (mean age 34.2 years) consisted of 19 females and 69 males exposed uninterruptedly for at least 2 years prior to the study. Exposure was monitored with area samplers and ranged from 0.008 to 0.085 mg/cu.m across worksites. No details on how the exposure profiles to account for time spent in different worksites were constructed. The average exposure was estimated at 0.033 mg/cu.m. (range 0.005 to 0.19 mg/cu.m). The average duration of working was 15.8 years for the exposed cohort. Urinary excretion was also monitored and reported to average 0.025 mg/L. The control cohort (mean age 35.1 years) consisted of 24 females and 46 males recruited from an embroidery factory. The controls were matched for age, education, smoking and drinking habits. Exposure measurements for the control cohort were not performed. The exposed cohort performed significantly worse than the control on tests of finger tapping, mental arithmetic, two-digit searches, switching attention, and visual reaction time. The effect on performance persisted after the confounding factor of chronological age was controlled. Based on these neurobehavioral effects, the Time Weighted Average (TWA) of 0.033 mg/cu.m is designated as lowest-observed-adverse-effect-level (LOAEL). Using the TWA and adjusting for occupational ventilation rates and workweek, the resultant **LOAEL is 0.012 mg/cu.m.**

4.0 UNIVERSAL WASTE BATTERIES

At this time, the CCSWA collects lead-acid batteries, which fall under the universal waste definition. Nearly all single-use and rechargeable batteries are universal waste because they exhibit the characteristics of a hazardous waste (i.e. they contain levels of cadmium, copper and/or mercury that exceed the maximum allowable Toxicity Characteristic Leaching Procedures (TCLP) test limits).

The definition of a “**Universal Waste Battery**” is a device consisting of one or more electrically connected electrochemical cells designed to receive, store, and deliver electric energy. An electrochemical cell is a system consisting of an anode, cathode, and an electrolyte, plus such connections (electrical and mechanical) as may be needed to allow the cell to deliver or receive electrical energy. The term battery also includes an intact, unbroken battery from which the electrolyte has been removed (40 CFR 273.9).

From a personal exposure standpoint, the handling of batteries is typically less dangerous than handling mercury tubes primarily because of lower level of toxicity and reduced potential for rapid route of exposure from aerosolized toxins. Due to the relative ease of handling, and due to the availability of battery recycling markets (refer to Section 6.1), it will be simple for the CCSWA to recover additional universal waste batteries.

5.0 RECYCLING CENTER SITE VISIT

The logical location on the CCSWA landfill property for accepting customers with mercury lamps, devices and batteries is at the Recycling Center. The Recycling Center is set up and staffed to accept customers to drop-off electronics and recyclables. On September 9th, GF visited the Recycling Center along with ECS&R and the CCSWA engineer. The primary focus was to review the existing Recycling Center configuration and customer and vehicle receiving in order to identify possible locations for receiving customers arriving with designated universal wastes.

Based on the facility walk-through, it was evident the receiving area needed to be at the front of the Recycling Facility to facilitate customer receiving. With this in mind, it was concluded the optimal location at the Recycling Center for universal waste storage was along the northeast side of the recycling facility (see photo to right). The orientation of the proposed Universal Waste Storage Area is shown in **Exhibit A**, the Universal Waste Plan. This determination of the proposed storage area location was made based on the following observations and considerations:



- The proposed location will keep all customers toward the front of the Recycling Center where they can be observed by staff and handled promptly. Directing customers to the rear of the facility presents traffic flow and safety concerns.
- This area is paved and level, making it suitable for adding a storage trailer or shed for temporary storage and consolidation of universal wastes.
- Although the proposed area is utilized for parking by one or two employees, there is ample paved parking area at a number of other locations away from the proposed area. If the CCSWA moves ahead with the program, new parking areas/requirements will have to be identified and communicated to staff.
- The area has sufficient room for a truck to back in to the area for periodic pickups of universal wastes.
- Located outside the main Recycling Center building, the area is separated from routine Recycling Center activities and workers. This greatly reduces the potential that staff are exposed to potential hazards (e.g. mercury vapors) associated with universal wastes when not handling these materials directly.

6.0 UNIVERSAL WASTE MARKETS

Clinton County is not located near any universal waste vendors and this will impact cost and operations. To minimize costs, it will be important to store larger quantities of universal wastes between collections by an approved vendor. Private vendors that were considered for handling the proposed universal wastes included:

AERC Recycling Solutions

2591 Mitchell Avenue
Allentown, PA 18103
Phone: (610) 797-7608
Fax : (610) 797-7696

ECS&R

3237 US Highway 19
Cochranton PA, 16314
Phone: (814) 425 - 7773

A short pricing request was prepared for the purpose of identifying a cost-competitive and legally-permitted vendor to come to the recycling center, pick up consolidated universal wastes in a manner that assures proper transportation and recycling for the proposed universal wastes (see **Exhibit B**). Universal waste costs are presented in Section 9.0.

6.1 Battery Markets

Readily available access to several battery markets simplifies the decision making process for the CCSWA regarding adding the recovery of at least some batteries to the County recycling program. Some batteries can be added to the CCSWA program at no additional cost beyond the cost for associated labor resources.

6.1.1 UNICOR

The CCSWA currently utilizes UNICOR (trade name for Federal Prison Industries, Inc.) for its electronics recycling program, but not for batteries. UNICOR will accept the following non-alkaline batteries from the CCSWA at no costs:

- metal hydride
- lithium ion
- nickel cadmium
- lead acid

UNICOR will accept batteries in a cardboard box placed on skids like those already used by the CCSWA in the electronics program.

6.1.2 Staiman Recycling Corporation

The CCSWA uses Staiman Recycling Corporation, Inc. (Staiman's) as its outlet for lead-acid batteries. Lead-acid batteries must be recycled at and EPA-permitted or other state-approved recycling facility. Staiman's is located 20 miles from the CCSWA in Williamsport, PA. Staiman's pays the CCSWA approximately 20 cents per pound for skidded lead-acid batteries delivered to the door. Lead-acid battery collection will remain a separate activity from the proposed universal waste program. In 2009, the CCSWA generated **\$1,374** of revenue from recycling **3.8 tons** lead-acid batteries.

Staiman Recycling Corporation

201 Hepburn Street
Williamsport PA 17701
Tel: (570) 323-9494

6.1.3 call2recycle

The **call2recycle** program collects rechargeable batteries and cell phones for recycling through collection locations in the U.S. and Canada. Businesses, communities, municipalities and public agencies like the CCSWA can sign up online (www.call2recycle.org) to become a call2recycle collection location for batteries and cell phones. Items can be collected from staff and the public. There is no cost to participate or to recycle through the call2recycle program. The program works as follows:

- Sign up and receive a free collection kit including the following:
 - Collection boxes with bags
 - Pre-paid shipping labels (bulk shipping is also available)
 - Guidelines sheet with safety instructions
 - Recycle marketing materials about batteries and cell phones
- Accepts all cell phones and rechargeable batteries weighing less than 11 lbs each. Single-use alkaline batteries are not accepted in the U.S. at this time.

6.1.4 ECS&R

ECS&R accept the following batteries. Notably, they accept alkaline batteries which are not accepted by UNICOR.

- | | |
|------------------------|----------------------------------|
| • Alkaline | • Button cells: silver, mercury, |
| • Nickel cadmium | zinc air |
| • Nickel metal hydride | • Lead acid AAA |
| • Lithium | • Lead acid: wet & dry |
| • Lithium ion | • Carbon air |
| • Zinc air | • Carbon air w/mercury |

7.0 SITE SAFETY AND CONTINGENCY PLAN

PADEP requires a **Site Safety and Contingency Plan** be developed and submitted when registering a household hazardous waste program. GF assisted with the development of a draft Site Safety and Contingency Plan (**Exhibit C**). This Site Safety and Contingency Plan was developed to meet PADEP HHW registration requirements and to supplement, not change or replace, the existing Contingency Plan for Emergency Procedures as contained in Form L under PADEP Solid Waste Management Permit #100955 for the Wayne Township Landfill. The information contained in the Draft Site Safety and Contingency Plan is intended to address health and safety procedures pertaining to the proposed permanent recovery program for designated universal wastes. Where applicable, the Form L – Contingency Plan for operations on CCSWA property could be updated and/or cross reference this supplement. If the CCSWA elects to expand the HHW program to accept additional materials or otherwise change handling procedures, the Site Safety and Contingency Plan and/or Contingency Plan for Emergency Procedures should be revised accordingly.

8.0 UNIVERSAL WASTE TRAINING

CCSWA employees that will handle Universal Wastes are required to complete training in accordance with **40 CFR 273.16** for handling, safety and emergencies for Universal Waste that will be handled at the facility. Using information provided from Dauphin County, Gannett Fleming customized and updated the training program/PowerPoint presentation for the CCSWA as provided in **Exhibit D**.

9.0 UNIVERSAL WASTE PROGRAM COSTS

The CCSWA will incur startup and ongoing costs for establishing and operating a permanent universal waste recovery program. Startup costs will primarily be for the construction of a storage shed and for procurement of PPE and universal waste containers. Ongoing costs will primarily include labor and ongoing resupply of PPE and universal waste containers. It is not expected that additional labor costs would be substantive considering the program is intended to be added into the existing work flow and would utilize existing staff.

The CCSWA will be reimbursed 50% of eligible startup and ongoing costs (not wages and salaries) through the PADEP Small Business and Household Hazardous Waste Program. Most of the funds are from the Hazardous Sites Cleanup Fund, with a small portion from RCRA. The CCSWA will be eligible for reimbursement for the following:

- Wages, salaries, costs for social security workers compensation and unemployment compensation. Note: County Coordinator funds are Act 101, Section 903 funds.

- Travel expenses and related costs for training and meetings.
- Legal fees for proposals and contracts in development stage.
- Facility siting studies.
- Printing and distribution of educational materials, including postage.
- Operator/contractor mobilization fees.
- Operator/contractor fees for managing collected materials.
- On site sanitary facilities approved by PADEP.
- Land, buildings, vehicles, and equipment (owned by the sponsor).
- Design and specifications for development.
- Food for volunteers.

9.1 PPE and Container Costs

Gannett Fleming reviewed information from several industrial supply companies to obtain pricing on suitable PPE and containers for handling mercury lamps and devices and batteries. Information on PPE and supplies are provided in **Exhibit E**. The information provided in the Equipment and Supply Cost Summary in the following table is intended to give the CCSWA an understanding of costs only. Assuming startup of the program will include a comprehensive supply order of PPE, supplies, and an air quality measurement device, the costs for PPE and supplies approaches \$1,700 (eligible for 50% grant reimbursement). The actual costs for PPE and containers incurred by the CCSWA will be affected by the availability of supplies already on site (eliminating the need to purchase listed items), the actual equipment selected and confirmed vendor pricing, and actual quantities of items purchased.

Clinton County Solid Waste Authority - Permanent Universal Waste Recovery Estimated PPE and Supply Startup Costs					
Item	Qty.	Unit	Cost	Extended Cost	Description
15 mil Nitrile Gloves	1	Pk. (100)	\$198.00	\$198.00	Flock lined, resist puncture & chemicals
Silver Shield Apron	5	Each	\$18.10	\$90.50	Tested for mercury resistance
Mercury Spill Kit	1	Each	\$197.00	\$197.00	Includes small pump vac for mercury
Mercury Spill Kit Refill	1	Pack	\$48.10	\$48.10	
Dragger Gas Measurement Kit	1	Each	\$578.00	\$578.00	Mercury vapor sampler
Dragger Detector Tubes	1	Pack (10)	\$96.20	\$96.20	For mercury vapor sampling
Half-faced respirator	3	Each	\$34.00	\$102.00	
Monogoggle	3	Each	\$12.70	\$38.10	Fits snug around respirator
Sideshield Glasses	10	Each	\$3.20	\$32.00	
4" Tube Drums	2	Each	\$38.00	\$76.00	Holds 190 bulbs
6' or 8' Tube Drums	2	Each	\$28.00	\$56.00	Holds 85 bulbs
5-gallon Poly Pails	5	Each	\$10.00	\$50.00	
30-gallon Poly Drum	5	Each	\$24.00	\$120.00	
Total Estimated Cost				\$1,681.90	
Total Estimated Cost less HHW Grant (50%)				\$840.00	

Note: The necessary supplies and corresponding costs will be affected by the final selection of equipment as confirmed by CCSWA.

9.2 Storage Trailer or Shed

At this time, it is not possible to accurately estimate participation levels or quantities that will determine the size of a suitable storage facility. A separate storage shed will be required to be located on the property for the following reasons:

- To comply with PADEP and Federal Universal Wastes requirements for storage
 - Wastes must be segregated from other wastes.
 - Universal wastes must be kept dry.
 - Universal wastes must be secure.
- To assure safety of employees and the public.
- To manage costs. An adequately-sized storage shed will reduce the number of collections required between pickups over the course of a given year. A large flatbed will handle up to 8 skids and a tractor trailer can hold 22 skids.

Based on discussions with the CCSWA, it appears that the most feasible option would be to initially utilize a customized storage trailer in the Designated Storage Area. The trailer could be customized to ensure safe storage of designated universal wastes,

including proper ventilation and segregation of different waste types. In the future, after supporting data on material quantities defines storage capacity needs, the CCSWA could construct a pole-type storage shed with aluminum siding. For the purpose of this study, it is estimated that the lump sum start up costs for storage will range from \$5,000 to \$10,000.

9.3 Universal Waste Vendor Pricing – Elk County Comparative Analysis

Accurate quantities of universal wastes that will be received at the CCSWA are not predictable, but usable comparisons can be made using Elk County's permanent Universal Waste program since county demographics are similar. Using the vendor price responses contained in **Exhibit B**, Gannett Fleming completed a comparative analysis using the reported totals of universal wastes (lamps and batteries) recovered through Elk County's permanent Universal Waste program over a six-month period in 2010. As shown in the table and cost analysis below, the total cost for a vendor to arrive on site to collect universal wastes generated over a six-month period is approximately \$2,700. Transportation costs assumed for the CCSWA include one large box truck (10 skids) utilized every six months or twice a year. Assuming the quantities of lamps and weight of batteries will remain similar over a subsequent six-month period, the annual universal waste vendor costs are estimated to be \$5,400 (prior to grant reimbursement).

Clinton County Solid Waste Authority – Six-Month Comparative Cost Analysis 2010 Vendor Rates Multiplied by Elk County Totals			
Item	Quantity (bulbs) Pounds (Batteries) (Elk County – 6 months)	ECS&R Price per Lamp & Price per Pound	Extended Cost
4' Lamps	1,162	\$0.42	\$488.04
8' Lamps	738	\$0.84	\$619.92
2' U-tube	63	\$1.40	\$88.20
2' Straight	101	\$0.42	\$42.42
Halide Lamp	373	\$1.55	\$578.15
Lamp Subtotal			\$1,816.73
NiCad Batteries	27	\$0.80	\$21.60
Mixed Lithium Ion	11.5	\$3.65	\$41.98
Alkaline Batteries	319	\$0.80	\$255.20
Battery Subtotal			\$318.78
Transportation (# of trips in 6 months)	1	\$585.00	\$585.00
6-Month Cost Total			\$2,720.51

Note: Elk County totals represent a six-month period of material recovery. Annual costs would roughly double. Transportation assumes one big box truck (10 skids).

9.4 Labor Costs

Labor costs associated with the Universal Waste collection are 50% grant reimbursable. Accepting certain universal wastes during normal business hours, it is not anticipated that the CCSWA will incur substantive additional labor costs for operating the proposed program.

9.5 Cost Summary

Universal Waste Program Cost Item	Estimated Cost
PPE & Containers (startup)	\$1,700
Customized Storage Trailer (startup)	\$5,000
Vendor Contract Services (annual estimate)	\$5,400
Labor*	\$0
Total Estimated First Year Costs	\$12,100
Total Cost Less HHW Grant (50%)	(\$6,050)
Approx. yearly Lead-acid Battery Revenues	(\$1,300)
Net First Year Costs to CCSWA	\$4,750

*Assumes no hiring or use of “additional” labor through integrating recovery with existing Recycling Center activities. Cost estimate includes the start-up cost plus one year of vendor costs. Note: Certain capital costs (e.g. storage trailer, new supplies) would not occur in year two, reducing the average annual costs from year one costs.

Based on GF’s evaluation of the program, it appears economically feasible to implement for the following reasons:

- 50% funding is available for a comprehensive list of eligible startup and ongoing costs through PADEP under Act 190 of 1996, the Small Business and Household Pollution Prevention Program Act.
- There are no registration or permitting fees for small generators or handlers.
- The CCSWA recovers \$.20 per lb. (subject to market fluctuations) for lead acid batteries. In 2009, **3.8 tons** of lead-acid batteries generated **\$1,374** in revenue.
- Customer quantity limits can be set for fluorescent bulbs and other items as/if needed as a measure to manage program costs.
- Small businesses could be included and assessed a fee to participate.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusion

The Clinton County Solid Waste Authority (CCSWA) has a philosophy of “doing the right thing”. Accepting certain universal wastes for the purpose of recycling as an alternate to disposal that contributes to uncontrolled releases of harmful chemicals is the right choice. However, if a final decision is made accept fluorescent lamps, mercury-containing devices and batteries on a permanent basis, the CCSWA will be taking on the responsibility of managing hazardous wastes with unique properties and health risks. Low-level mercury handled properly with PPE poses minimal health risks, but it is unavoidable that workers handling lamps and devices will come in contact with mercury in powder and vapor forms periodically. Accepting universal waste batteries can also be done safely, but proper knowledge of battery types is critical so they are separated by type to prevent corrosion, fires or explosions.

Through Gannett Fleming’s analysis and information gathered, the following conclusions are provided regarding the proposed permanent Universal Waste recovery program:

- The CCSWA permanent Universal Waste program would qualify as a “small quantity handler”, and therefore does not require permits or material manifesting.
- The CCSWA’s current electronics vendor, UNICOR, will accept all non-alkaline batteries at no cost. Rechargeable batteries (and cell phones) can be recycled at no cost through call2recycle.
- Industry studies have shown that low-level exposure to mercury (e.g. handling whole and broken light bulbs) over time can result in occupational exposures that result in detectable adverse health impacts.
- Net first year costs to the CCSWA which includes supplies, storage trailer customization and vendor services will be less than **\$5,000** after HHW grant reimbursement. Annual vendor cost will vary based on the quantity of mercury-containing items received, but are estimated to be **\$2,700** (after grant reimbursement) based on Elk County Universal Waste quantities and 2010 costs quoted for the CCSWA.
- Having an adequately-sized storage area will impact the costs incurred annually to operate the program by reducing the number of pickups incurred annually. Vendor transportation and associated costs will be absorbed by the CCSWA.
- According to OSHA, standard dusk masks (e.g. The N95) or P100 respirators do not provide adequate protection to mercury vapors.

10.2 Recommended Implementation

Gannett Fleming recommends that the CCSWA implement the proposed Universal Waste program provided special attention is given to use of PPE and other safety, handling and storage procedures are consistent with the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) requirements and specifications.

The initial startup should utilize an existing box trailer customized for universal waste material storage (e.g. venting, segregation of materials, etc.), and postpone construction of a permanent pole-type structure until material quantities and/or other operational factors justify such a facility. Customers should be received at the front or southeast side of the receiving area consistent with current Recycling Facility procedures for handling other materials. The Universal Waste storage trailer should be located outside of the existing Recycling Facility near the southern corner of the building (**Exhibit A**).

Gannett Fleming has developed the components of the program to facilitate implementation, including the **Site Safety and Contingency Plan** and **training program**. Recommended steps for implementing the program include:

Step 1 - Internal Program Review & Confirmation - Review the proposed program in detail with all affected CCSWA personnel prior to making any decision to implement this program. Disclose and provide health risk information in detail, noting the long-term occupational exposure risks. Review the proposed handling, storage and operational procedures that will be utilized to minimize risks.

Step 2 - Evaluate & Review Costs - Review the costs of the permanent HHW program in order to support the decision making process. Annual costs will vary, primarily based on participation levels and the quantity and/or weights recovered.

Step 3 - Registration Update - If an internal decision is made to proceed with a permanent Universal Waste collection program, the CCSWA should:

- Notify PADEP via letter requesting lamps and batteries to be added to the existing HHW registration as part of a new permanent Universal Waste program. The registration update should include the following attachments:
 - A site diagram (Universal Waste Plan) of where universal wastes will be handled (draft completed).
 - Proof of insurance (\$2 million general liability)
 - A Site Specific Safety Plan (draft completed)
 - Letters showing compliance with local zoning and the local fire department.

Step 4 – Finalize storage trailer/shed use or construction - A well-ventilated storage facility capable of segregating different universal wastes must be in place prior to accepting the proposed universal wastes. GF recommends that the CCSWA initially customize an available box trailer with minimum capacity to store 8 skids of lamps, with a separate area for universal waste batteries. If the program participation grows beyond the capacity of a storage trailer, the CCSWA should consider construction of a prefab wood frame, aluminum-sided storage area.

Step 5 – Universal Waste PPE and Supplies - The CCSWA should procure universal waste supplies and PPE that adhere to OSHA 29 CFR standards. NIOSH and the U.S. Department of Health and Human Services certify respirators. According to OSHA, the CCSWA can manage mercury without a respirator when air concentration stays below the Permissible Exposure Limit (PEL). If the air quality is unknown or if the mercury vapor level exceeds standards, a half-face respirator with a mercury vapor chemical cartridge is necessary (CFR 1910.134(d)(3)). Consequently, it is recommended the CCSWA periodically utilize some type of mercury air analyzer (in the storage area) in order to determine PPE requirements. It is possible a Universal Waste vendor could let the CCSWA utilize an air analyzer occasionally so the CCSWA does not have to procure one.

Step 6 – Universal Waste Training - As required by the EPA, Gannett Fleming recommends that all CCSWA staff that will participate in the Universal Waste recovery program complete the one-hour Universal Waste training for small quantity handlers (refer to the training PowerPoint presentation customized for the CCSWA in **Exhibit D**).

Step 7 – Public Education - The CCSWA should update its website and release information identifying the date when the CCSWA will begin accepting designated universal wastes on a permanent basis. Details should be provided on accepted materials, customer handling procedures and acceptable condition upon arrival (e.g. no broken bulbs, no free mercury, and no leaking batteries). Periodic news ads/articles should also be utilized.

Step 8 – Reporting and Grant Reimbursement - In accordance with PADEP’s HHW program pertaining to permanent facilities, the CCSWA should submit the **Record of Operations Form** (2510-FM-LRWM0084) to PADEP on a quarterly basis and submit the **Application for Reimbursement Form** (2510-FM-LRWM0248) every six months.

10.2.1 General Safety Recommendations

Gannett Fleming offers the following recommendations regarding the safe implementation of the proposed Universal Waste program. Our recommendations do not replace the recommendations of the CCSWA or its Safety Officer and are include for

consideration only. Generally, the CCSWA Universal Waste programs should utilize the following safety procedures (focused on mercury related procedures):

- **Hazard Assessment:** Initially conduct a hazard assessment of the Universal Waste program in accordance with OSHA guidance 1910.132 to assess the dangers and to verify PPE requirements. Annually, and when the program changes, repeat the hazard assessment to assure safety procedures and PPE are adequate.
- **PPE Selection:** The CCSWA should reference ANSI and NIOSH standards when selecting PPE to assure the PPE is designed to provide an adequate level of protection against specific hazards.
- **Gloves/liners:** Use nitril liners/gloves that prevent mercury residue absorption into the skin at all times when handling mercury containing lamps and mercury containing devices, even when they are boxed. Certain Nitril liners/gloves will also protect against battery acids and liquids for short or extended periods of time, depending on type.
- **Tyveks:** The CCSWA should have TYVEKs on site for employee use during special conditions. During the normal workday, when boxed lamps are arriving, Tyveks may not be required but individual employees should be given the option to wear them at their preference. Special conditions for Tyveks might include:
 - The arrival of multiple broken thermometers or other mercury containing devices requiring spill cleanup.
 - Bulk and extended handling of Universal Wastes. For example, when CCSWA staff are tasked to work in the lamp storage area for an extended time to load or unload a large number of boxes filled with lamps, Tyveks are recommended to limit mercury powder residue contact.
 - One way to minimize staff exposures is to require the vendor to handle all loading of Universal Wastes.
- **Respirators:** During most open air handling of boxed mercury lamps, fitted respirators are not required. During handling of larger quantities of mercury lamps and devices and during mercury spill clean ups when the air quality is either unknown (untested) or above the PEL as determined by an air analyzer, a half faced air purifying respirator with a mercury cartridge is recommended.

EXHIBITS

Exhibit A
Proposed Universal Waste Storage Area

Exhibit A

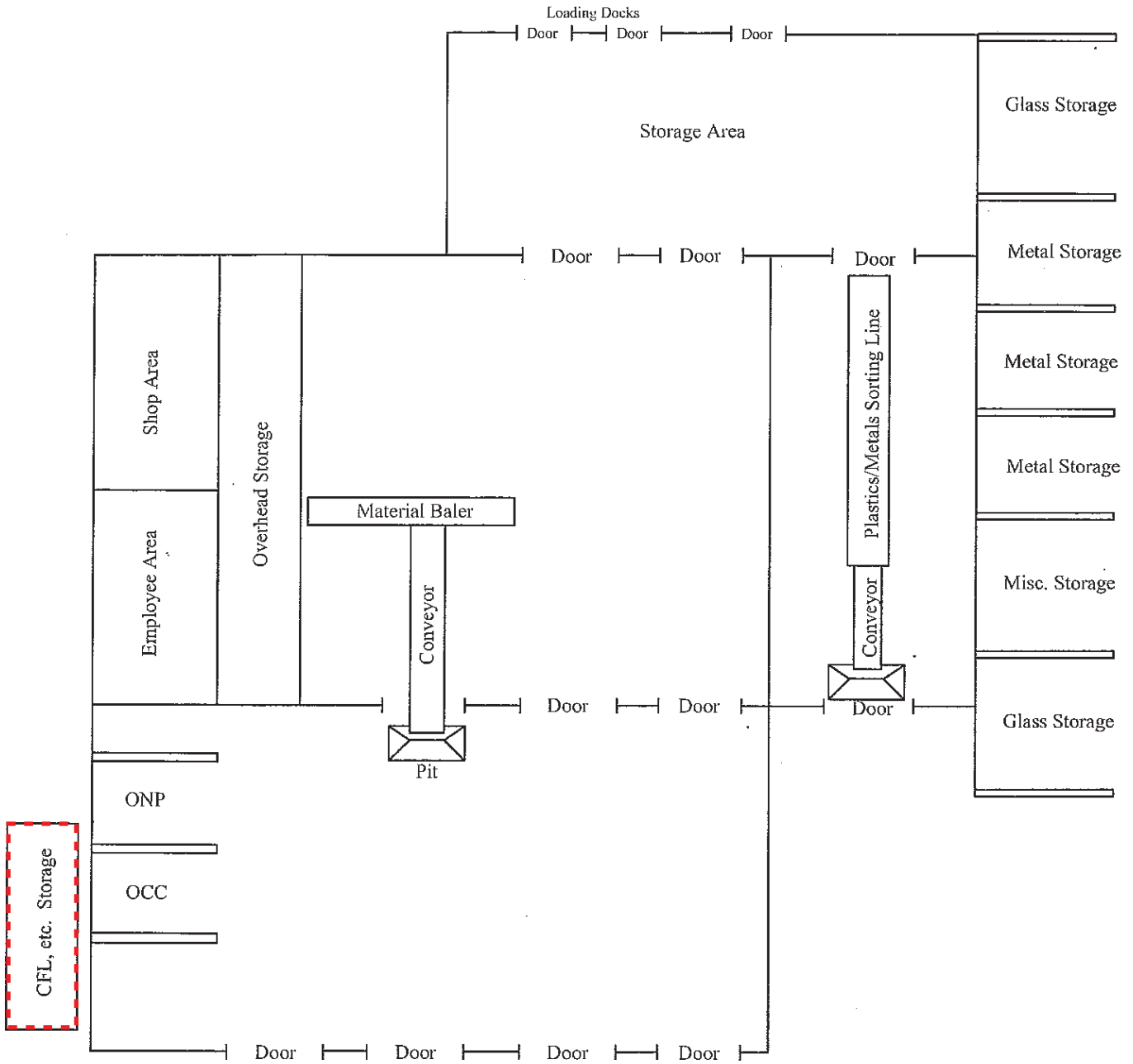


Exhibit B
Vendor Price Request and Responses
(not included in On-line version of Report)

Exhibit C
Draft Site Safety and Contingency Plan

DRAFT

**SITE SAFETY
AND
CONTINGENCY PLAN**

For:

Universal Wastes



Wayne Township Landfill

Innovative. Responsible. Committed to You.

**As presented to the
PA Department of Environmental Protection**

_____, 2010

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Exhibits

Exhibit A - 7.5 USGS Location Map

Exhibit B - Universal Waste Plan

Exhibit C - Compliance Letters

Letter of Compliance with Local Zoning

Letter of compliance with Local Fire Department

Exhibit D - General Liability Coverage

Exhibit E - Negotiated Vendor Contract

Exhibit F - Public Education Materials

Wayne Township Landfill Permanent Universal Waste Collection Program

1.0 PURPOSE

This Site Safety and Contingency Plan is prepared in accordance with the Pennsylvania Department of Environmental Protection (PADEP) registration requirements for Household/Small Business Hazardous Waste Collection Programs, including compliance with Title 25, Chapter 272.514 (contingency plan).

The Clinton County Solid Waste Authority (CCSWA) is committed to providing a safe environment for employees and visitors who could potentially be exposed to hazardous materials. The effective management of Universal Wastes is crucial to that goal. This Site Safety and Contingency Plan has been developed to describe the operating and safety requirements and procedures associated with the permanent household hazardous waste (HHW) and Universal Waste collection program operated by the CCSWA at the Wayne Township Landfill. This Plan is intended to work in conjunction with, not change or replace, the existing Contingency Plan for Emergency Procedures as contained in Form L under PADEP Solid Waste Management Permit #100955 for the Wayne Township Landfill.

2.0 DESCRIPTION AND LOCATION OF FACILITY

The permanent Universal Waste program is owned and managed by the CCSWA. Operating as an exempt “small quantity generator or handler” (accepting less than 11,000 lbs of Universal Wastes annually), the CCSWA will receive designated Universal Wastes at the Recycling Facility adjacent to the Wayne Township Landfill Located on 264 Landfill Lane in McElhattan Pennsylvania (**Exhibit A**). The Universal Waste handling area is isolated from residential receptors and institutions that are located at least ._ miles from the operation.

Facility: Wayne Township Landfill
264 Landfill Lane
McElhattan, PA17748

General Manager: Jay Alexander
264 Landfill Lane
McElhattan, PA17748
Phone: (570) 769-6977

3.0 STANDARD OPERATING PROCEDURES

The standard operating procedures identified herein for Universal Waste are intended to be integrated with the Form L – Contingency Plan for the Wayne Township Landfill. The Chain of Command and safety procedures established in Form L remain applicable to the handling of Universal Wastes and for emergencies that occur on CCSWA property. The CCSWA will utilize one (1) to three (3) CCSWA employees that have been trained on Universal Waste handling in accordance with **40 CFR 273.16** to oversee site operations and to complete necessary work tasks associated with the program. The CCSWA has a designated Emergency Coordinator (EC) as part of routine operations.

The CCSWA will not engage in any treatment or processing of HHW or Universal Wastes that is prohibited by applicable state and federal regulations. A qualified vendor will be secured for transporting and recycling certain Universal Wastes. The CCSWA will receive Universal Wastes from residents and small businesses for consolidation and temporary storage for the purpose of recycling as depicted in **Exhibit B**, Universal Waste Plan. The receiving area will be toward the front of the Recycling Center. The area has adequate space for safe traffic control and customer receiving. Customers will be handled upon arrival and assisted during unload as necessary. Universal Wastes will be inspected upon arrival and prepared for temporary storage in compatible Universal Waste containers.

The Universal Waste program will have two designated areas at the Recycling Center as shown in **Exhibit B**:

Designated Receiving Area: The area located in the front of the Recycling Center will be utilized for residents and small businesses to drop-off materials. In this area trained employees will receive and inspect Universal Waste items for leaks, spills, breakage. The receiving area will be used to prepare items for storage and will not be used for overnight storage of potentially hazardous Universal Wastes. After initial handling, Universal Wastes will be moved to the Designated Storage Area.

Designated Storage Area: A designated storage area located at the southeast side of the recycling facility (**Exhibit A**) will be used for temporary storage of materials. Temporary storage will not exceed one year from the arrival of the Universal Waste.

A temporary barrier will be set up to prevent unauthorized (e.g. public) entry into the Universal Waste storage area. The storage area is separated from other work areas by the existing wall on the southwest side of the facility. The storage area includes clear signage to facilitate segregation of different Universal Waste types. Primarily, materials will be loaded onto skids. The storage area has an impervious floor.

Clinton County Solid Waste Authority
Site Safety and Contingency Plan

To supplement the existing Form L - Contingency Plan, the standard operating procedures for Universal Waste are summarized as follows:

- The designated receiving and storage areas are located as shown in **Exhibit B** and will be identified with signage clearly visible to staff and to the public.
- All CCSWA staff that will handle Universal Wastes will complete Universal Waste training prior to handling Universal Wastes.
- The CCSWA will designate, and may change from time to time, the Universal Wastes or other eligible household hazardous wastes to be collected for the purpose of recycling by a permitted vendor.
- Visual inspection of incoming vehicles will be made to confirm deliveries are from small businesses and residents, not large commercial or industrial establishments. Security arrangements for overnight storage include restricted access to the recycling facility and Universal Waste storage area by the gated entrance secured after normal operating hours.
- Designated Universal Wastes will be separated by type, and not commingled.
- Universal Wastes will only be accepted during normal business hours when CCSWA staff is on site.
- Universal Waste containers will be covered to prevent precipitation from coming in contact with the wastes.
- In addition to routine daily observations and inspections by the Operations Supervisor and/or assignee, monthly inspections will be conducted and logged for designated receiving and storage areas to identify spills leaks, and/or other concerns.
- Following the periodic removal of Universal Wastes for delivery to a recycling facility, the storage facility will be cleaned and/or decontaminated and otherwise prepared for storage of new incoming wastes.
- Although it is not required for small quantity handlers to maintain Universal Waste manifests, materials quantities and/or weights will be recorded for the purpose of accurate record keeping and grant reimbursements.

3.1 Fluorescent Lamps

The Standard Operating Procedures for **fluorescent lamps and other mercury containing lamps** are as Follows:

1. Fluorescent lamps may be accepted from County residents and/or businesses. The CCSWA reserves the right to establish quantity and/or weight limits directed to the recycling facility by residential and/or commercial customers.
2. As fluorescent lamps are received they shall be placed inside labeled cardboard recycling/shipping boxes and separated from other wastes.

Clinton County Solid Waste Authority
Site Safety and Contingency Plan

3. All boxes used to store lamps will be labeled "Universal Waste Lamps", or similar. The date upon which lamps are initially placed in storage shall be recorded in the immediate vicinity of the storage area.
4. If bulbs are broken during placement into the shipping boxes, the debris shall be immediately cleaned up and placed for disposal.
5. Sealed boxes shall be stored and palletized until the contracted firm is notified to pick up the lamps for recycling.
6. Compact fluorescent light (CFL) bulbs are also accepted for recycling. CFL's are placed in a separate shipping box for handling by the contract firm. The date upon which CFL's are initially placed in storage shall be recorded in the immediate vicinity of the storage area.

3.2 Mercury-containing Equipment

Mercury containing devices include a device or part of a device (including thermostats, but excluding batteries and lamps) that contains elemental mercury integral to its function.

1. Mercury containing devices may be accepted from County residents and/or businesses. Large businesses or industries will be directed to a recycling facility.
2. As mercury containing devices are received they shall be separated from other wastes and placed inside containers compatible with the Universal Waste that will prevent rupture and leakage during storage and transport. The containers shall remain closed at all times, except when being added to or removed from the container.
3. All containers used to store mercury containing devices will be labeled "Universal Waste-Mercury Containing Equipment". The date upon which mercury equipment are initially placed in storage shall be recorded.
4. If mercury containing items are broken during receiving or preparation for shipping, the debris shall be immediately cleaned up and placed for disposal as follows:
 - a. Immediately contain and clean up all releases of from broken, leaking or damaged mercury-containing devices.
 - b. Place any broken or damaged devices and any residues resulting from breakage or damage in a secure container.
 - c. The container must be clean, closed and sealed, structurally sound and compatible with the broken devices. A plastic lined box, fiber drum, or a plastic bucket with a lid that seals (Note: some types of metal containers may be incompatible with mercury).
 - d. Containerized mercury-containing devices shall be stored and palletized until the contracted firm is notified for pick up.

3.3 Universal Waste Batteries

Universal waste batteries include all hazardous waste batteries such as nickel-cadmium batteries and spent lead-acid batteries covered under 40 CFR, Part 273. Batteries are broken down as follows:

Class 2 - alkaline, NiCad, carbon zinc (non mercury), nickel iron, nickel hydride, lithium ion, zinc air)

Class 3 - mercury bearing such as carbon zinc, button cell, silver oxide, mercury oxide)

Class 4 - lithium metal and magnesium.

The CCSWA will designate, and may change from time to time, the specific battery types collected by this program. The standard operating procedures for **batteries** are as follows:

1. Any universal waste battery that shows evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions will be placed into a compatible container to prevent release of any universal waste or component of a universal waste to the environment.
2. The following guidelines from 40 CFR Part 273.13(a) may be followed as applicable provided each battery cell is intact and closed:
 - a. Sorting batteries by type;
 - b. Mixing battery types in one container;
 - c. Discharging batteries so as to remove the electric charge;
 - d. Regenerating used batteries;
 - e. Disassembling batteries or battery packs into individual batteries or cells;
 - f. Removing batteries from consumer products;
 - g. Removing electrolyte from batteries.
3. Batteries will be segregated from other Universal Wastes during handling and storage.
4. Specific handling for Class 3 and Class 4 batteries include the following:
 - a. **Class 3** - Must be segregated by battery type, kept dry and placed into respective containers with any terminals taped.
 - b. **Class 4** - Must be segregated by battery type, kept dry and placed into respective containers with any terminals taped. Lithium and Magnesium batteries must not be mixed with any other type of battery to ensure chemical and USDOT compatibility. Mixing this category with others **could cause explosion or fire**. Lithium and magnesium batteries must be kept separate and placed into an open-top five-gallon pail for collection and storage.

4.0 SPILL PREVENTION AND MANAGEMENT

The following spill preventions and management procedures, including for solid wastes, are consistent with procedures contained in Form L-Contingency Plan for Emergency Procedures for the Wayne Township Landfill. These subsections address general procedures as well as certain procedures specific to Universal Wastes.

4.1 Program Provision to Prevent Spills

Spills will be prevented as follows:

1. Broken, damaged, and/or leaking Universal Wastes will not be accepted by the CCSWA program.
2. Residents and businesses will be required to deliver Universal Wastes contained in proper storage containers and packaging:
 - a. Florescent lamps must be delivered in the original packaging or otherwise contained in a secure box or containers specifically designed for bulb storage/transport.
 - b. Broken mercury containing devices with free mercury (e.g. thermometers) are prohibited.
 - c. Leaking batteries are prohibited.

4.2 Managing and Cleaning Up Spills

The CCSWA will manage small quantity spills, leaks, and broken bulbs in accordance with EPA handling procedures and CCSWA-established safety procedures established herein and as contained in the Form L Contingency Plan for the Wayne Township Landfill. For larger spills as determined by the CCSWA's Operation's Supervisor that may pose risks to CCSWA staff and/or the public, the affected area will be secured and the following agency will be contacted for clean up.

Clinton County Department of Emergency Services
22 Cree Drive, Lock Haven, PA 17745
Telephone Number: (570) 893-4090
FAX Number: (570) 893-4048

4.2a Clean up procedures

The CCSWA will immediately contain and clean up all small releases of from broken, leaking or damaged Universal Wastes provided the spill or leak is determined a small-scale, manageable occurrence by trained on-site staff. Broken or damaged universal waste items

and any residues resulting from breakage or damage will be placed in a secure container following the approved method and using the appropriate container for the waste type.

Containers will be closed and sealed, structurally sound, clean and compatible with the waste. Where applicable the containerized waste will be labeled hazardous waste and recycled or disposed in accordance with applicable requirements for hazardous wastes.

4.3 Provisions for Preventing Explosions, Fires, and Releases of Toxic or Hazardous Substances

To minimize the potential for fires and explosions at the facility, smoking on-site is prohibited except for designated areas. Consistent with the Form L Contingency Plan for the Wayne Township Landfill provisions for preventing and managing explosions, fires and releases of hazardous substances are as follows:

1. Depending on nature and extent, shut down operations and incoming traffic until assessment can be made and reroute traffic appropriately.
2. Warn nearby personnel.
3. Contact the Emergency Coordinator (EC).
4. Evaluate source of fire or smoke. Create a safety zone around the area. Request assistance over radio to transport fire extinguisher and water truck to the area.
5. If it can be completed in a safe manner, isolate or remove flammable materials in close proximity to the fire.
6. Remove or shut-off any operating equipment in close proximity to the fire.
7. If deemed necessary by the EC, call Fire Company 911.
8. If appropriate for smaller fires, fire extinguishers may be used.
9. Depending on severity, contact PADEP when the fire does or has the potential to impact facility operations, functionality or the environment. Use site personnel to control fire, if risk to employee safety can be maintained, or provide assistance to Fire Department under their direction.
10. Resume operations only after site has been released by the Fire Department and/or the EC.
11. Complete incident report and file report to regulatory agencies. Include suggestions for response improvements and recommendations for problem avoidance.

4.4 Emergency Equipment and Personnel (on site)

The CCSWA maintains a fleet of equipment typically used in landfill operations. Most of this equipment can assist emergency response teams by moving earth and other bulk materials and cleaning-up solid waste spills. All on-site heavy equipment and all buildings are equipped with at least one Class A-B-C portable fire extinguisher. Spare extinguishers are stored in the maintenance shop.

Clinton County Solid Waste Authority
Site Safety and Contingency Plan

Safety oversight during emergencies is managed by the Emergency Coordinator and in accordance with the Chain of Command and safety procedures in Form L - Contingency Plan for the Wayne Township Landfill. Equipment that will be maintained on site that may be specific to Universal Waste handling and cleanup include the following:

- First aid kit
- Mercury spill cleanup kit
- Shielded safety glasses
- Respirators (with mercury gas cartridges)
- Gloves
- Replaceable glove liners
- Tyvek suits
- Compatible Universal Waste containers (e.g. drums, bags, pails and similar containers)

5.0 QUALIFICATIONS OF PERSONNEL INCLUDING SAFETY TRAINING

All employees who handle or have responsibility for managing Universal Waste shall be trained in safety, handling and emergency procedures in accordance with the 40 CFR 273.16 appropriate to the type(s) of Universal Waste handled at the facility.

6.0 MATERIAL AND WASTE INVENTORY

Universal Wastes will be stored on site for less than one year from the date received. Materials Safety Data Sheet (MSDS) will be kept on site. Quantities and/or weights of Universal Wastes will be recorded. As applicable, the material listings and MSDS information contained in Form - L - Contingency Plan will be updated and considered congruent with this Site Safety and Contingency Plan for Universal Wastes.

Exhibit D
Universal Waste Training PowerPoint



Wayne Township Landfill

Innovative. Responsible. Committed to You.

**Universal Waste Handler
& Generator Training**

In accordance with the **Universal Waste Rule** (40 CFR 273) there are training requirements for generators, and small quantity handlers of universal waste.

These code sections state:

- [273.16] *A small quantity handler of universal waste must inform all employees who handle or have responsibility for managing universal waste. The information must describe proper handling and emergency procedures appropriate to the type(s) of universal waste handled at the facility.*
- [273.36] *A large quantity handler of universal waste must ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures, relative to their responsibilities during normal facility operations and emergencies.*

Training purpose:

- **Employee awareness of potential health risks**
- **Explain methods to minimize employee's exposure to mercury and PCB's.**
- **Explain methods of proper mercury and PCB's handling and environmentally sound disposal.**
- **Document Universal Waste training.**





The **Universal Waste Rule** inclusion for mercury lamps:

- Requires full regulatory compliance for hazardous waste if recycling is not chosen.
- The CCSWA is **prohibited from diluting or treating Universal Waste lamps** except by responding to releases (spills).
 - **NO INTENTIONAL BREAKING OR CRUSHING ANY BULBS or other MERCURY CONTAINING DEVICES!!!**
- Imposes minimal training and labeling requirements.



Proper Handling Procedures for Mercury Lamps

- All fluorescent lamps and nearly all lighting contain elemental mercury.
- Normal handling of bulbs with PPE is a low risk activity.
- Preventing breakage will minimize vapor releases of mercury. **Mercury vapor is EXTREMELY toxic.**
- It is more harmful to inhale vapor from a bead of mercury than to ingest the same bead. At room temperature mercury vaporizes readily into an invisible, odorless, and tasteless element. Warmer temps accelerate vapor release.
- Mercury levels in the breathing zone can be controlled if personnel are aware of and trained in mercury management.
- Routine inspection/cleaning for the hazard of unseen mercury in cracks, corners, carpets, and untreated storage containers.

Handling Procedures for Mercury Lamps

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Is required for handling unbroken fluorescent lamps for packaging.
 - Gloves made of leather, with nitrile liners.
 - Designate the gloves for the activity, not for other uses.
 - Dispose the inner liner after a days use
 - Safety glasses with side shields or full face shield
 - Safety toed shoes or boots



Handling Procedures for Mercury Lamps – Step 1

All employees who handle Universal Wastes shall...

- Wash hands with soap and water when beginning the work shift, before a break, and upon completion of the work shift and after any known direct contact with mercury.



- No tobacco materials, food, or beverages are permitted while working with mercury lamps.



Handling Procedures for Mercury Lamps – Step 2

- Place used lamps into new or used lamp boxes .
- Tape box ends to secure the box, but not air tight.
- Treat broken/crushed lamps a hazardous material.
 - Dispose in approved, sealable hazardous material container
- Do not transport badly damaged boxes or wet boxes. Repackage.
- Immediately after customer delivery, place lamps in the designated area.
- Cross-stack and palletize lamp boxes to maximum height of 6-feet. Secure boxes to pallet with shrink wrap or stretch film. Follow vendor requirements.

ALL PALLETS NEED TO BE:

- Labeled with 'universal waste mercury lamps'
- Marked with the accumulation start date
- Initialed by handler



Emergency Procedures for Mercury Lamp Breakage

HANDLING BROKEN LAMPS

Accidental breakage will happen. Minimize breakage and minimize exposure to employees.



PROCEDURE

- Close off the room to other parts of the buildings.
- Open doors/windows to outside to disperse any vapor that may escape.
- Leave the room & prevent others from entering area for at least 15 minutes.
- Don PPE. Carefully scoop up the fragments with a stiff paper or a broom and dust pan **(DO NOT USE YOUR HANDS!)**
- Wipe the area with a disposable paper towel to remove all glass fragments.

HANDLING BROKEN LAMPS – continued

- Do NOT use a vacuum, as this disperses the mercury over a wider area.
- Under the Universal Waste Rule, a broken hazardous lamp must be cleaned up and placed in a container. The container must be closed, structurally sound, compatible with lamps, and lacking any evidence of spillage.
- For larger quantities of broken lamps at the same time (i.e. box of lamps falling from truck), the use of Personal Protective Equipment may be required and the local County HazMat team should be contacted for assistance in the clean up effort.



Adverse effects are not expected from occasional exposure to broken lamps.

Storage Procedures for Mercury Lamps

Storage Signage

Storage areas must be clearly identified by highly visible signage.



Storage Time

Storage time is MAXIMUM of **1-year** from the first written date of accumulation.

Schedule removal by contacting the Recycling Supervisor or AERC.

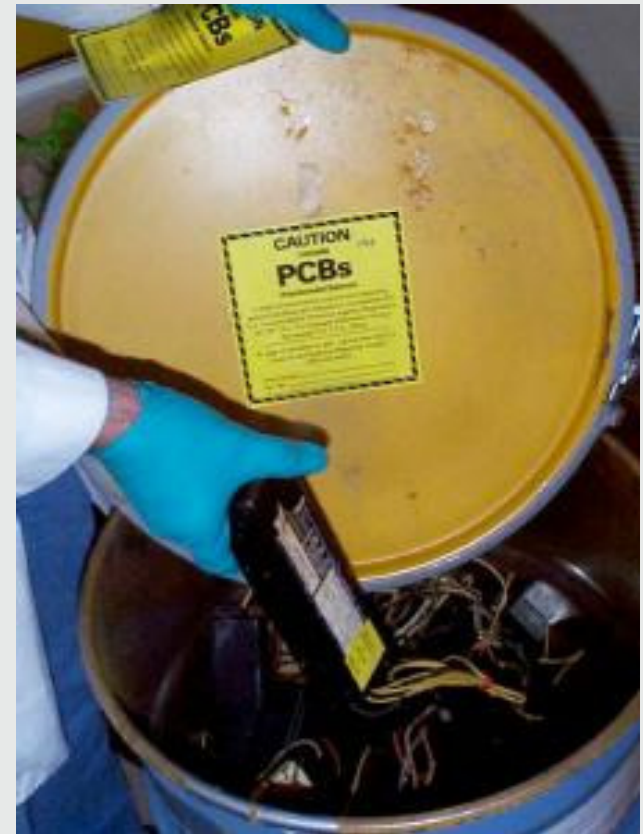
Handling & Disposal of PCB and Non-PCB Ballasts

This section of the training module is designed to ensure your exposure to PCBs is minimized and that material containing PCBs are handled and disposed of in an environmentally sound manner.

BACKGROUND:

Polychlorinated bi-phenyls (PCBs) were used in the capacitors of fluorescent lamp ballasts and in the capacitors of high intensity discharge (HID) lighting fixtures. PCBs were also found in other electrical equipment including common household appliances.

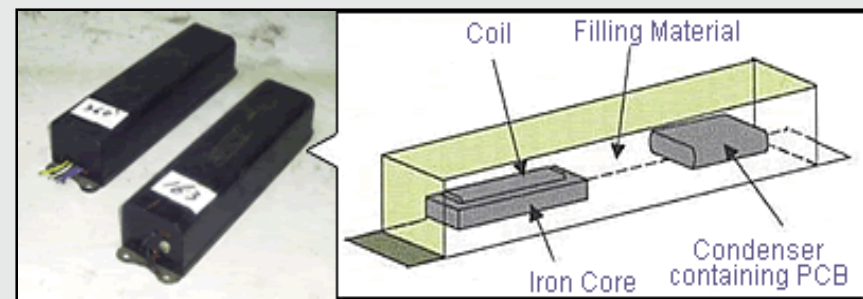
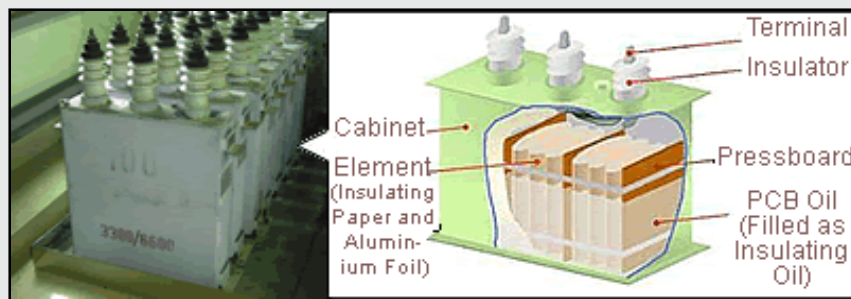
In 1978, The US EPA banned the use of PCBs as they were found to pose a health risk to humans. Mineral oils and powdered materials replaced PCBs in lamp and ballast and capacitors manufactured after 1978 and these items generally bear a label reading “NO PCBs”.



Handling & Disposal of PCB and Non-PCB Ballasts

BACKGROUND, continued:

The majority of ballasts and capacitors you will come in contact with in your day to day job activities pose no health risk. However, there are still ballasts and/or capacitors in service that contain very small amounts of PCB fluid. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids.



COMMERICAL USE OF PCBs

Although no longer commercially produced in the United States, PCBs may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include:

Transformers and capacitors;

Other electrical equipment including voltage regulators; switches; reclosers; bushings; and electromagnets;

Oil used in motors and hydraulic systems

Old electrical devices or appliances containing PCB capacitors

Fluorescent light ballasts

Cable insulation

Thermal insulation material including fiberglass, felt, foam, and cork

Adhesives and tapes

Oil-based paint

Caulking

Plastics

Carbonless copy paper

Floor finish

The PCBs used in these products were chemical mixtures made up of a variety of individual chlorinated biphenyl components, known as congeners. Most commercial PCB mixtures are known in the United States by their industrial trade names. The most common trade name is Aroclor.



Handling Procedure for Non-Leaking PCB Capacitors from Fluorescent Lamp Ballast

Employees should wear the following safety equipment:

- Gloves made of chemical resistant neoprene coated, butyl rubber or leather.
- Safety glasses with side shields or full face shield.
- Safety toed shoes or boots.



All protective equipment that comes into contact with any material leaking from a capacitor will be placed in proper containers for disposal. Employees shall wash hands with soap and water when beginning a work shift, before break, and upon completion of work shift. No tobacco materials, food, or beverages are permitted while working with lamp ballasts.

It is the employee's responsibility to ensure that these handling and disposal procedures are fully executed. The proper use of the prescribed safety equipment will protect the employee from the potential dangers of contamination from the PCBs.

Handling Procedure for Non-Leaking PCB Capacitors from Fluorescent Lamp Ballast

STEP – 1

Once removed from the fixture, the Toxic Substance Control Act (TSCA) requires that PCB ballasts be stored in approved DOT drums. The drums should be stored inside the building.

Outside storage is permitted if they are on an impervious surface, the drum lids are secured, and they are protected against weather and vandalism.



Handling Procedure for Non-Leaking PCB Capacitors from Fluorescent Lamp Ballast

STEP – 2



Separate ballast by type: PCB or Non-PCB.
Visually check for leakers, and place into drums.

NOTE:

Leaking PCB ballasts must be double bagged and placed in a drum containing at least 3 inches of vermiculite.

Handling Procedure for Non-Leaking PCB Capacitors from Fluorescent Lamp Ballast

STEP – 3

Properly label drums ‘PCB’ or ‘Non PCB’.
Secure drum lid.

CAUTION
CONTAINS
PCBs
(Polychlorinated Biphenyls)

A toxic environmental contaminant requiring special handling and disposal in accordance with U.S. Environmental Protection Agency Regulations 40 CFR 761 For Disposal Information contact the nearest U.S. EPA Office

In case of accident or spill, call toll free the U.S. Coast Guard National Response Center 800-424-8802

Also contact _____
Tel. No. _____

HAZARDOUS WASTE

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL.
IF FOUND, CONTACT THE NEAREST POLICE OR PUBLIC SAFETY AUTHORITY OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY OR THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCE CONTROL.

GENERATOR INFORMATION:
NAME _____
ADDRESS _____ PHONE _____
CITY _____ STATE _____ ZIP _____
EPA / MANIFEST ID NO. / DOCUMENT NO. _____ / _____
EPA WASTE NO. _____ CA. ACCUMULATION WASTE NO. _____ START DATE _____

CONTENTS COMPOSITION _____

PHYSICAL STATE SOLID LIQUID HAZARDOUS PROPERTIES FLAMMABLE TOXIC CORROSIVE REACTIVITY OTHER _____

D.O.T. PROPER SHIPPING NAME AND UN OR NA NO. WITH PREFIX

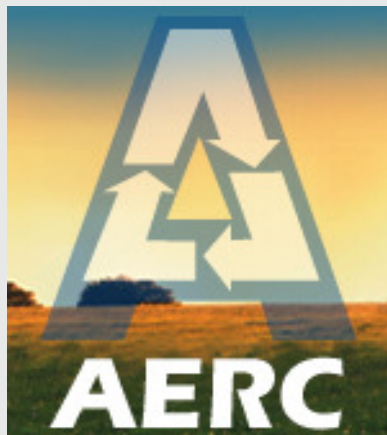
HANDLE WITH CARE!

EMED Co., Inc. • 1-800-440-3932 001540

Handling Procedure for Non-Leaking PCB Capacitors from Fluorescent Lamp Ballast

STEP – 4

- Storage time is ***MAXIMUM 30 DAYS FROM THE FIRST DATE OF ACCUMULATION. Unless otherwise advised by the PA DEP.***
- Longer periods may subject our facility to permitting and other compliance requirements.
- Schedule removal and recycling by contacting AERC through the Recycling Supervisor or Manager.



RELEASE & EXPOSURE OF PCBs



Release and Exposure of PCBs

Prior to the 1979 ban, PCBs entered the environment during their manufacture and use in the United States. Today PCBs can still be released into the environment from poorly maintained hazardous waste sites that contain PCBs; illegal or improper dumping of PCB wastes; leaks or releases from electrical transformers containing PCBs; and disposal of PCB-containing consumer products into municipal or other landfills not designed to handle hazardous waste. PCBs may also be released into the environment by the burning of some wastes in municipal and industrial incinerators.

Once in the environment, PCBs do not readily break down and therefore may remain for long periods of time cycling between air, water, and soil. PCBs can be carried long distances and have been found in snow and sea water in areas far away from where they were released into the environment. As a consequence, PCBs are found all over the world. In general, the lighter the form of PCB, the further it can be transported from the source of contamination.

PCBs can accumulate in the leaves and above-ground parts of plants and food crops. They are also taken up into the bodies of small organisms and fish. As a result, people who ingest fish may be exposed to PCBs that have bioaccumulated in the fish they are ingesting.

HEALTH EFFECTS

Health Effects

Long and frequent exposure to PCBs has been demonstrated to cause cancer, as well as a variety of other adverse health effects on the immune system, reproductive system, nervous system, and endocrine system.



Questions?

Please direct questions or concerns to:

Operations Supervisor

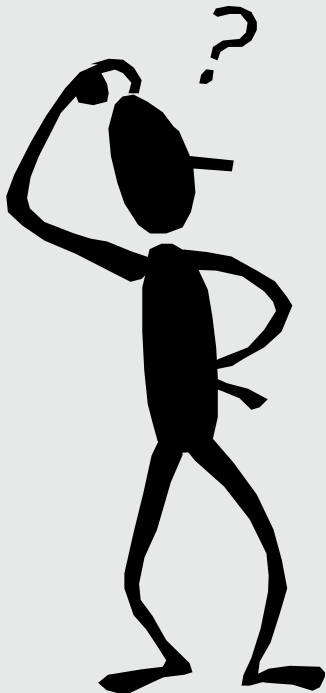


Exhibit E
Equipment and Supply Cut Sheets
(not included in on-line version of report)