

D. 9.

Closure Plan

Advanced Environmental Recycling Corporation (AERC) with Mercury Technologies International L.P. (MTI) is located on Fortune Place, West Melbourne Florida. The facility specializes in the recycling of mercury lamps and various mercury containing materials and wastes to remove the hazardous mercury constituent or characteristic, purify the materials, recover mercury, and render the original materials suitable for reuse as reclaimed materials. Unprocessed and processed materials are temporarily stored at the facility until they can be processed and/or shipped to another off-site treatment, recycling or disposal facility.

Examples of materials handled by AERC include: fluorescent and mercury containing lighting devices, mercury containing and contaminated materials, objects, devices and other manufactured items.

This closure plan is prepared to meet the closure standard of 62-737,FAC (and is modeled after the requirements specified in 40 CFR §264, Subparts G and H).

a. Closure Procedures

There will be no partial closure of the facility. It is anticipated that the operations of the facility will be conducted indefinitely. Minor changes may occur in the operation or equipment, but would not effect the scope of the plan. However, for final closure the following procedures will be implemented:

- Notification to the Florida Department of Environmental Protection (FLDEP) of intent to close the facility will be made at least 30 days prior to initiation of any closure activities.
- Cease acceptance of hazardous materials at the facility by redirecting them to an authorized hazardous waste or recycling facility for ultimate handling.
- Continue to process existing inventory of lamps and devices in the recycling, recovery and reclamation systems. Process phosphor powder from lamps in the Powder Processing Unit (PPU), process any recovered mercury in the PPU, Retort, and triple distillation systems. For closure cost estimating however, it is assumed that all this material will be shipped off-site.
- Transport any inventory of remaining waste materials not processed by facility, co-products and recovered materials to appropriate outlets, customers and authorized off-site treatment, recycling, or disposal sites.
- Visually inspect containment systems, concrete floor storage areas inside facility, pads, trenches, stormwater containment pond, and all equipment surfaces, lockers, cabinets, and shelf areas for evidence of contamination. If no visual contamination is evident, the hazardous materials containment systems will be steam washed. The resulting washwater from this activity will be sampled, analyzed, and disposed of in accordance with applicable regulations.

- All permanently mounted warning signs will be removed.
- AERC/MTI will submit appropriate certification of closure to FLDEP.

b. Maximum Inventory Estimate

The maximum inventory to be stored at the facility will be estimated in drum equivalents (although, there may be whole lamps in boxes, broken lamps, and hazardous and non-hazardous lamp components, solid objects and parts of devices and plant debris that is not in drums, but is in some other type of container). We have used drum equivalents to simplify describing the maximum inventory in the facility because there is no way of knowing the number of containers or size of each object, so the regulatory storage limits based on physical space limitations have been used to estimate the drum equivalents for each type of waste or material. This volume is summarized below:

Material (includes both unprocessed and processed material, assumed to be about 60%;40%)	Volume Estimate (drum equivalents)
1. Lighting Devices	
Fluorescent and Mercury Lamps (assume 75% of plant inventory max. of 248,400 lamps)	186,300 lamps 233 drum equivalents
Phosphor powders (assume 20% of the plant inventory max. of 1928 drums)	386 drums
2. Mercury Containing Materials	
Mercury Devices (assume 5% of plant inventory)	96 drums
Mercury, metallic	minor component, included above
3. Other	
Cleaning materials generated during closure	2 drums
Empty drums or other containers (used for storing devices, etc.)	50 containers
MAXIMUM INVENTORY ESTIMATE	717 drum equivalents and 50 empty containers

Conversion factors for estimates:

1 drum= 750 #, powdered material
1 gal= 8.3 #
1 lamp= 0.6# @4ft.
1 drum= 300 crushed lamps
1 pallet= 900 whole lamps, most lamps are stored this way
1 day= 24 operating hours; facility operates 300 days per year

c. Decontamination Procedure

During decontamination activities associated with closure, documentation, including the use of a field log, will be done in accordance with Section IV of the 8/28/95 draft SOP for sampling.

- If contamination is not observed, the storage area will be cleaned using the best available method for proper decontamination. The lamp processing, thermal treatment and storage areas will be cleaned using a combination of wiping with water and vacuuming with a treated carbon system. Walls, floors, shelves cabinets, and counter surfaces, surfaces of electrical panels, electrical conduits, light switches, electrical outlets and tops of suspended lighting fixtures will be wiped swept, vacuumed and water or steam washed. if needed, solutions of dilute nitric acid, bleach, or degreasing compound will be used. The rinsate from washing will be collected, sampled, analyzed, and disposed of in accordance with applicable regulations.
- Process equipment from the lamp recycling systems, thermal systems, materials disassembly areas, distillation, and associated components will be disassembled, cleaned, using the methods described above, and either sold to third parties for reuse, or as recycled scrap materials. Any contaminated systems or components that cannot be decontaminated or are not reused will be disassembled and shipped to an appropriate hazardous waste processing facility.
- Wipe tests from various locations throughout the facility will be analyzed. If there are hazardous levels of Hg, a solution of water or nitric acid and Merconvap[®] will be used for additional wiping and mopping. Similar procedures will be used for the other process equipment and storage areas of the facility, e.g. wiping, testing, additional cleaning if needed. If there are contaminants other than mercury present in hazardous levels, appropriate cleaning materials will be used to wash and remove them.

Confirmation of Sampling Plan for Structures, Equipment, Buildings and Outdoor Areas

Sampling and testing will be performed in accordance with the procedures outlined in the SOP for Sampling dated 8/28/95 draft, Section IV.

To ensure the process and storage area has been completely decontaminated, a series of wipe tests will be performed. A complete "scope of project" for closure, which includes methods of sampling and analysis, can be submitted to the Department prior to beginning the actual closure procedures, if requested.

The "scope of project" will consist of a sampling grid for nitric acid wipe samples. At a minimum, ten (10) 100 sq. cm. samples will be taken from

various locations and analyzed for Hg to ensure the site is not contaminated prior to final closure.

Confirmation of Soil and Surface Water Sampling-

Collection and analysis of the final FLDEP (NPDES) water discharge sample will be done and AERC will submit a report to the appropriate agencies.

Soil sampling confirmation is not applicable since no activities or hazardous materials storage occur outside the building, there is no run-off from hazardous materials storage areas, and there are no soils within several feet of where any of the facility activities occur.

Analytical Test Methods/Standards-

Analytical methods for testing mercury or other contamination are the EPA (RCRA- SW 846) recommended methods.

If any washwater or rinsate is to be discharged to surface waters, the DEP 6/94 Groundwater Guidance Concentrations of 2ppb (ug/l) total Hg will be used.

For other indoor and outdoor areas the standard of Total Hg:BDL or not greater than baseline will be used.

- If, after cleaning the facility, analysis still indicates contamination, the concrete or other storage container will be cleaned again, or removed and shipped off-site for treatment and disposal.
- After decontamination, all process equipment, vehicles, drums, other containers will be removed from the building, and any waste materials, hazardous or non-hazardous will be managed in accordance with applicable regulations.

d. Closure Schedule

It is anticipated that the operations at the facility will continue indefinitely. However, for the purpose of this plan, January of 2020 has been selected as the date when the appropriate agencies will be notified that the facility will be closed. The following schedule outlines the activities and the dates of completion.

<u>Activity</u>	<u>Date of Completion</u>
Notification to FLDEP that the facility will be closed	January 2020
Final volume of wastes received	July 2020
Begin closure procedures	September 2020
Final volume of products and materials removed from the facility	October 2020
Complete inspection of equipment, storage and process areas decontamination, and removal of any contamination, conduct sampling and analysis at	

various locations within the facility

November 2020

Submit appropriate certification to FLDEP

January 2021

The total time for closure activities has been estimated at 180 days with the first 90 days primarily utilized for the removal of inventory from the site. Due to the operations of the facility, it is anticipated that the actual time needed for the removal of inventory would actually be less than the time frames established by the regulations. Therefore, the facility does not foresee any problems complying with the time frames required.

e. Closure Cost Estimate

The closure cost estimate for the West Melbourne facility has been prepared based on the worst case conditions, which is the maximum storage of 717- 55 gallon drums of processed and unprocessed materials and up to 50 empty containers used by the facility. As explained in b. above, drums also means drum equivalents, including up to 248,400 whole lamps or processed lamp components. No disposal activities will be conducted at this facility. The estimate, therefore, is based on a worst-case of having to ship the materials off-site to a third party treatment, recycling, or disposal facility, and not the cost to the operator supplying its own equipment and labor.

The closure cost estimate will be adjusted annually for inflation using an inflation factor. This factor is derived from the annual implicit price deflator for Gross National Product as published by the U.S. Department of Commerce in its survey of current business.

The closure cost estimate will not incorporate any salvage value from the sale of hazardous wastes, structures, or equipment. Materials with potential economic value are not assumed as zero costs for the closure estimate. All unprocessed materials remaining on site will be treated as hazardous and disposed of according to regulations.

The closure cost estimate may also be amended whenever there are changes in operating plans or facility design that may affect the closure plan.

Material and Activity

Cost Estimate

1. Lighting Devices

Mercury Lamps-	\$41,940.00
Assume disposal and transportation to remove inventory of 186,300 lamps or 233 drum equivalents, unprocessed and processed, including glass and end-caps @ \$180.00/drum.	
Phosphor powders-	
Assume disposal and transportation of 232 drums unprocessed @ \$150.00/drum	\$34,800.00
Assume disposal and transportation of 154 drums processed @ \$40.00/drum	\$6,160.00

2. Mercury Containing Materials

Mercury Devices-	\$14,400.00
Assume disposal and transportation of 96 drums unprocessed and processed @ \$150.00/drum	
Mercury, metallic-	incl.
Materials generated during closure-	
Wash water and dirt collected during plant and equipment decontamination- disposal and transportation of 2 drums @ \$350.00/drum	\$700.00
Decontaminated process equipment- transportation and disposal	\$1,000.00
Disposal and transportation costs to remove inventory of 50 empty drums @ \$16.00/drum	\$800.00
Labor costs to decontaminate facility 80 hours @ \$30.00/hour	\$2,400.00
Supervision of labor 20 hours @ \$36.00/hour	\$720.00
Sampling and analytical	\$4,600.00
SUBTOTAL	<u>\$107,520.00</u>
Contingency costs @ 20 percent	\$21,504.00
Administrative costs @ 10 percent	\$10,752.00
Independent professional engineer certification	\$2,000.00
TOTAL CLOSURE COST	<u>\$141,776.00</u>

Financial Mechanism

Presently, financial assurance established for the closure of the facility is an Irrevocable Standby Letter of Credit. This will be included in this section as Attachment D.9., Financial Assurance, after DEP reviews the closure plan and at the time the permit is issued. During the life of the facility, a revised Letter of Credit will be updated in accordance with permit modifications or changes in the closure cost estimate.

Post-closure care will not be included in the closure cost estimate because AERC/MTI is operating a storage and recycling facility. Therefore, no waste residues or contaminated soils will remain at the facility after the closure activities are completed.