 **Lighting Resources, LLC**

**1007 SW 16th Lane**

**Ocala, Florida**

**Mercury Recovery Facility FLR000070565**

**FL-DEP Permit Modification Application**

Revision No. 0

**December 2013**

**ENGINEERING REPORT**

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Appendix A - Other Facility Permits

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Appendix D - Recordkeeping Forms (e.g., material tracking, inspection, training, etc.)

Appendix E - Sampling and Analysis Standard Operating Procedures

Appendix F - Closure Costs Backup Data

Appendix G - Financial Assurance Form

Appendix H - Certificate of Insurance

# 1.0 INTRODUCTION AND GENERAL INFORMATION

This Report and attached Appendices constitute a Florida Department of Environmental Protection (DEP) Permit Modification Application for a Mercury Recovery Facility located at 1007 SW 16th Lane, in Ocala (Marion County), Florida, owned and operated by Lighting Resources, LLC. This Application/Modification has been prepared to meet applicable federal and state regulatory requirements including but not limited to Rules contained within Chapter 62-737 F.A.C. (*The Management of Spent Mercury-Containing Lamps and Devices Destined for Recycling*).

## 1.1 Company Background

Lighting Resources, LLC (Lighting Resources) was originally established in March 1990 as a corporation in the State of California, and was later converted to a Limited Liability Company in January 2005 in the State of California. Lighting Resources has been providing environmentally safe and reliable, cost-effective recycling solutions for waste fluorescent lamps, ballasts, batteries, e-waste and mercury devices for over 20 years. Lighting Resources currently has facilities located in Arizona, California, Indiana, and Texas, and Florida (Ocala).

## 1.2 Facility Overview

The Mercury Recovery Facility (Facility) is located on a 1.33-acre parcel of land and consists of a 16,539 square foot, steel and masonry building, with loading areas located along the east side of the building, asphalt paved parking areas to the south and east of the building, and a paved ingress / egress located at the south edge of the property off of SW 16th Lane. The Facility building has an administrative office located at the south end (just north of the site entrance), an unprocessed material and supply storage room / area located immediately behind (north of) the administrative office, a lamp processing room / area located at the far northwest end of the building, and a processed material and supply storage room /area in the far northeast end of the building. Material receiving (unloading) and transfer (loadout) docks are located along the east side of the Facility building.

The Facility accepts mercury containing fluorescent lamps, high intensity discharge lamps, and other types of spent lamps, including incandescent and LEDs, (MCLs), mercury containing devices (MCDs), ballasts (PCB and Non-PCB), and batteries. MCLs are processed and separated into the following materials: glass, metal end caps / metal components, and mercury-containing phosphor powder. The processed and separated glass and metal materials passing TCLP (Toxicity Characteristics Leaching Procedure) for mercury (i.e., below the USEPA toxicity of 0.2 mg/l) have commercial value and are sold or reused when possible. The mercury-containing phosphor powder and MCDs are transferred by a licensed hazardous waste hauler to a permitted mercury reclamation facility for processing and recovery of the mercury content of these materials. PCB Ballast materials are transferred by a licensed hazardous waste hauler to a permitted ballast recycling facility for processing and recovery of any recyclable materials and incineration of PCB containing materials. Non-PCB Ballast materials are transferred to a recycling facility for processing and recovery of recyclable materials. Batteries are sorted by type and sent to an authorized

battery recycling facility. Batteries to be accepted may include the following:

* Automotive / large equipment lead acid type batteries; and
* Small type batteries, including:
* Alkaline,
* Gel cells,
* Lead acid
* Lithium ion,
* Lithium,
* Magnesium,
* Mercury,
* Ni-Cad,
* Ni-MH,
* Silver oxide, and
* Zinc.

Material handling / processing activities take place within the Facility building. Materials received at the Facility are sorted / processed, consolidated, and loaded into outbound transfer trailer vehicles for transport to a licensed / permitted facility authorized to receive such materials.

## 1.3 General Facility Information

General information for the Lighting Resources Facility (located in Ocala, Florida) as required by Title 40 § 270.14(b) (1), follows:

* Company Name: Lighting Resources, LLC
* Corporate Address: 1919 Williams St, Suite 350, Simi Valley, CA 93065
* Corporate Telephone Number: (805) 624-3050
* Facility Address: 1007 SW 16th Lane, Ocala FL 34471
* Facility Telephone Number: (352) 509-3001
* Facility Facsimile Number: (352) 509-3012
* Facility EPA / DEP Identification Number: FLR 000 070 565
* Facility Contact: Jason Muhlenkamp, Southeast Branch Manager

## 1.4 Other Facility Permits

Lighting Resources, LLC has the following permits or registrations:

* DEP Division of Air Management, General Air Permit Registration – received October 13, 2011 # 0830171-001 and does not expire.
* Florida Hazardous Waste Transporter Approval Certificate of Approval – effective through November 30, 2014.
* DEP Large Quantity Handler Facility for Universal Waste Lamps and Devices Registration – registered through March 1, 2014.

Please refer to **Appendix A** for copies of the above referenced documents.

## 1.5 Organization of Application

This Application has been prepared to address the information and issues required for a DEP Mercury Recovery Facility Permit. This Application has been organized into the following eleven (11) tabbed sections:

* DEP Application Form # 62-737.900(2)
* Engineering Report
* Drawings
* Appendix A - Other Facility Permits
* Appendix B - Photographic Logs
* Appendix C - Equipment / Manufacturer Specifications
* Appendix D - Recordkeeping Forms (e.g., material tracking, inspection, training, etc.)
* Appendix E - Sampling and Analysis Standard Operating Procedures
* Appendix F - Closure Costs Backup Data
* Appendix G - Financial Assurance Form
* Appendix H - Certificate of Insurance

Further details on the organization of this Application is presented on **Table 1-1** on the following page; specifically, providing the sections of the Engineering Report and Drawings and/or Appendices that correspond to the specified questions within the DEP Application Form (# 62-737.900(2)).

| **Table 1-1**  **Lighting Resources, LLC - Mercury Recovery Facility, Ocala, FL**  **Organization of Application** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Tab Name** | **Corresponding Part / Question Number(s)**  **In DEP Application Form No. 62-737.900(2)** | | | | |
| **Part I - Information** | | | | **Part II** |
| **General**  **“A”** | **Site**  **“B”** | **Land Use**  **“C”** | **Operating**  **“D”** |
| **DEP Application Form # 62-737.900(2)** | A.1 thru A.20 | B.1 thru B.2 | C.1 thru C.3 | D.1 thru D.3 | ALL |
| **Engineering Report:** |  |  |  |  |  |
| Section 1.0 – Introduction and General Information | A.21 |  |  | D.2 |
| Section 2.0 – Facility Site and Surrounding Area  Information (contains Figs 1- 6, below) |  | B.1 thru B.4 | C.1 thru C.3 |  |
| Figure 1 – USGS Topographic Map |  | B.1, B.3 |  |  |
| Figure 2 – Site and Surrounding Area  on Aerial Photo |  | B.3 | C.3 |  |
| Figure 3 – Zoning Map |  |  | C.1 |  |
| Figure 4 – Location of Surface Waters |  | B.3, B.4 |  |  |
| Figure 5 – Flood Insurance Rate Map |  | B.4 |  |  |
| Figure 6 – Site Plan on Aerial Photo |  | B.3 |  |  |
| Section 3.0 – Operating Plan |  |  |  | D.1 thru D.5, D.11 |
| Figure 7 – Air Monitoring Locations |  |  |  | D.5, D.7, D.8 |
| Section 4.0 – Emergency Procedures and  Hazardous Waste Contingency Plan |  |  |  | D.6 |
| Section 5.0 – Worker Health and Safety Plan |  |  |  | D.7 |
| Section 6.0 – Quality Control Plan |  |  |  | D.8 |
| Section 7.0 – Closure Plan |  |  |  | D.9, D.11 |
| Section 8.0 – Inspection Plan |  |  |  | D.12 |
| **Drawings:** |  |  |  |  |  |
| D1 – Site Plat of Survey |  | B.3 |  |  |
| D2 – Site Plan |  | B.3 |  | D.5 |
| D3 –Building Layout |  | B.3 |  | D.1, D.5 |
| D4 – Lamp Process Equipment Plan View |  |  |  | D.5 |
| D5 – Site Traffic |  | B.3 |  | D.5 |
| D6 – Material Flow Diagram |  | B.3 |  | D.5 |
| D7 – Facility Emergency and Evacuation Plan |  |  |  | D.5 thru D.8 |
| **Appendix A:** Other Facility Permits | A.21 |  |  |  |  |
| **Appendix B:** Photographic Logs |  | B.3 | C.3 |  |  |
| **Appendix C:** Equipment / Manufacturer Specifications |  |  |  | D.5 |  |
| **Appendix D:** Recordkeeping Forms |  |  |  | D5. thru D.8 |  |
| **Appendix E:** Sampling and Analysis SOP |  |  |  | D.5, D.9 |  |
| **Appendix F:** Closure Costs Backup Data |  |  |  | D.9 |  |
| **Appendix G:** Financial Assurance Form |  |  |  | D.9.e |  |
| **Appendix H:** Certificate of Insurance |  |  |  | D.10 |  |

# 2.0 FACILITY SITE AND SURROUNDING AREA INFORMATION

The following paragraphs provide a description of the Lighting Resources, LLC existing site property, its historical use, and its current zoning and land use of site and surrounding properties.

## 2.1 Site Location and Historical Background

The Facility Site property is located in an industrial park at 1007 16th SW Lane, in Ocala, Florida (Marion County). The subject property was originally developed in 1978 with a single warehouse building and was owned / occupied by Nation Distributors ⎯ a distributor of alcoholic beverages, until the mid-1980s. From the mid to late 1980s, Handling Systems Engineering, Inc. ⎯ a conveyor systems wholesaler occupied the property. Following the departure of Handling Systems Engineering, the property remained vacant until 1991. In 1991 an addition to the original structure was constructed at the northern portion of the original structure. The property was occupied by Van-Mor Enterprises, a motor vehicle wholesaler and builder, from 1999 until 2007. The current office area, located at the south end of the structure, was added in 2004. Mr. Todd Warriner purchased the property in 2007. The building and property remained vacant except for intermittent use as a gymnasium for a volleyball league from 2007 until purchased by Lighting Resources, LLC in December, 2010.

The Site location is presented on a USGS topographic quadrangle map and an aerial photo map on **Figures 1** and **2**, respectively, on the following pages.

## 2.2 Site and Surrounding Area Zoning and Land Use

The subject Site is located in the Ocala Industrial Park and has a current zoning designation of “M-1” – Light Industrial. Properties located immediately adjacent to the Site are also zoned M-1 and have the following uses:

*Adjacent Uses:*

* North: immediately north is a railroad spur, and north of the railroad spur is a paint shop and vacant property owned by the City of Ocala;
* South: immediately south is SW 16th Lane and the SW 17th Place viaduct, and south of the two roads are a number of vacant buildings / properties of unknown use;
* West: immediately west is a chiropractic business (“Fakhoury Chiropractic / Fakhoury Equipment Inc.”); and
* East: immediately east is property owned by the Florida Department of Transportation that appears to be vacant, and a public storage facility (“American Self Storage”).

*INSERT FIGURE 1*

*INSERT FIGURE 2*

The zoning designations of the surrounding area properties located within ¼-mile of the site are as follow:

*Surrounding Zoning:*

* North, Northwest, and West: “M-1” - Light Industrial;
* Northeast: “M-1” - Light Industrial, and “M-2” -Medium Industrial;
* East and Southeast: “M-1” - Light Industrial, “M-3” - Heavy Industrial, and “B-1A” - Limited Neighborhood Business; and
* South and Southwest: “M-1” Light Industrial, and “M-2” - Medium Industrial.

The nearest residential use area is located over 2,000-feet south from the Facility frontage road SW 16th Lane / SW 17th Place. The Site and surrounding area zoning are presented on **Figure 3** (on page 9).

## 2.3 Surface Waters and Site Drainage

Based on a review of the USGS topographic map dated 1991 (as shown on **Figure 1**), the nearest surface water appears to be a small creek that runs immediately east of and parallel to the Site’s eastern boundary. The creek appears to begin on the property immediately east and adjacent to the Site, and terminate on the property that is immediately south and adjacent to SW 16th Lane / SW 17th Street. Based on a review of aerial photo imagery dated January 2011, the same area occupied by the creek appears to be covered in vegetation.

The next nearest surface water bodies located with respect to the subject Site (ranging in distances from 140-feet to 3,500-feet) are as follows:

* East-Northeast: a square-shaped area with vegetative growth (see **Figure 2**) located approximately 140-feet east to northeast of the Site, that may serve as a storm water detention basin. The USGS map (dated 1991) presented on **Figure 1** shows this area with standing water; however, the aerial photograph (dated 2011) presented on **Figure 2**, shows only vegetation.
* East: a surface water impoundment associated with the business “Cemex Construction Materials” is located approximately 650-feet east of the Site, immediately east of SW 7th Road.
* Southeast: a surface water impoundment associated with the business “Rinker Materials” is located approximately 1,100-feet southeast of the Site, immediately south of SW 17th Place and east of SW 7th Road.
* Southwest: two surface water bodies are located over 3,500-feet southwest of the Site ⎯ both appear to be man-made stormwater detention ponds associated with residential developments.

Based on a review of topographic elevations of the Site and immediate surrounding areas from survey data presented on the Marion County Geographic Information Systems website, surface waters from the subject site appear to generally drain to the south and to the east ⎯ specifically, into roadside drainage ditches that run parallel to SW 16th Lane and SW 7th Road, respectively.

The Mercury Recovery Facility operations are limited to inside the Facility building, and therefore there is no contamination from the Facility commingling with surface water runoff nor is there a threat of contamination entering the adjacent creek (located east of the Site). The locations of the surface water bodies as described above are presented on **Figure 1** (on page 6) and on **Figure 4** (on page 11).

The Facility building is serviced by a connection to the local municipal sewer system. Specifically, wastewater from toilets / restrooms (within the building) drains into a connecting pipe that runs beneath the building and out to the municipal sewer interceptor line beneath the frontage road (south of Facility building). There are no floor drains within the Facility building nor is there a septic system on site. There is a drainage grate located immediately outside of the building in the loading dock area. In the unlikely event of a spill, liquid would drain through this grate into a catch basin / holding area for testing prior to removal from site. The catch basin has a sump pump to remove liquids.

## 2.4 100-Year Floodplains

Based on a review of the most recent Flood Insurance Rate Map (“FIRM” - Map No. 12083C0517D, dated August 2008) published by the Federal Emergency Management Agency, the subject Site is not located in the 100-year floodplain. As shown on **Figure 5** (presented on page 12), a portion of the Site has a flood zone designation of “X” which corresponds to areas outside the 100-year floodplains.

*INSERT FIGURE 3*

*INSERT FIGURE 4*

*INSERT FIGURE 5*

## 2.5 Site Conditions

The Facility property consists of approximately 1.33 acres of land having the following constructed features:

* A 16,539 square foot building constructed of masonry and sheet steel, comprising approximately 28.5% of the site;
* Asphalt paved parking areas / surfaces located along the east side of the property (east of the building), and along the south / front area of the property, comprising approximately 45% of the site;
* Concrete paved loading ramps located along the east side of the building, comprising less than 3% of the site property; and
* Unpaved / vegetated areas along the site frontage, east and west sides, and rear (north side), comprising less than 25% of the site property.

The site has a security fence with a locking gate to prohibit unauthorized access to the material receiving, handling, and storage areas. The site plat of survey and site plan are presented on **Drawing Nos. D1** and **D2**, respectively (see tabbed section “**Drawings**”). A plan view of the site property shown on an aerial photograph is presented on **Figure 6** on the following page.

## 2.6 Facility Building Layout

The building is divided into the following four areas as shown on **Drawing No. D3** (contained in tabbed section “**Drawings**”):



**Photo Inset 1: Administrative Offices**

* Administrative Offices – 1,532 square feet;
* Area A: Material Receiving, Loadout, and Staging Room – 8,750 square feet;
* Area B: Lamp Processing Room – 3,682 square feet; and
* Area C: Processed Glass and Supply Storage Room – 2,575 square feet.

Photographic logs of the Facility building (inside and outside) are presented in **Appendix B**.

### Administrative Offices

The Administrative Offices area is an addition that was added to the originally constructed building in 1991. This area is located on the south edge of the building and contains offices, reception area, restrooms, and a meeting/conference room (see **Photo Inset No. 1** to the right).

*INSERT FIGURE 6*

### Area A – Receiving, Loadout, and Staging Room

Area A is located immediately behind the Administrative Offices and is where inbound materials are received/staged, inventoried, and temporarily stored until processed and/or loaded out for transfer to an authorized and permitted reclamation facility or recycling facility. Area A has the following access points:

* South Wall Access Points: 1- overhead door (immediately west of the Administrative Offices, and 3-personnel doors. (1-door immediately west of the overhead door, and 2-doors east of the overhead door that are on the common walls shared by the Administrative Offices);
* North Wall Access Points: 1-overhead door and 1-personnel door on the common wall shared by the Lamp Processing Room, and
* East Wall Access Points: 3-overhead doors (doors are adjacent to concrete loading ramps, two are recessed below grade and the third is at grade under a canopy cover), and 1-personnel door.

The Facility access points are illustrated on **Drawing Nos. 2** and **3** (contained in tabbed section “**Drawings**”).

Area A: Flooring / Working Surface. The Area A floor has been resurfaced with concrete. Stress cracks have been filled using *Adhesives Technology Crackbond JF 311*; and the entire floor has been sealed with a protective epoxy using *Sherwin Williams Tile-Clad High Solids Coating* (see **Appendix C** for product specifications). Subsequent stress cracks are filled and sealed in a similar manner using the same products.



Photo Inset No. 2: Receiving / Loading Docks



Photo Inset No. 3: Canopied Loading Ramp

Area A: Material Receiving / Loading Docks. A concrete ramp and two receiving / loading docks are located along the east wall of Area A, for receiving trucks / vehicles with unprocessed materials and for loadout of universal waste (i.e., Mercury Containing Devices and batteries) and mercury containing phosphor powder. Two overhead doors are located over the respective docks. The concrete ramp has a below grade, recessed landing area. To ensure that material / liquid does not run off from the ramp / dock area, a grate covered trench drain has been installed in the landing area (see **Photo Inset No. 2** to the right) with a 750-gallon sump / collection tank installed beneath to collect liquid (i.e., stormwater) for testing prior to discharge.

Area A: Canopied Loading Area. A third overhead door is located just north of the receiving / loading dock area along the east edge of the building (see **Photo Inset No. 3** to the right) where a canopy extends from the building roofline east over a concrete paved surface for truck receiving or loadout operations ⎯ including moving processed metals from Area B into a dedicated trailer parked in the northeast corner of the site for later shipment offsite.



Photo Inset No. 4: Area A - West Wall, Staging / Storage Areas, and Portion of North Wall (and Overhead Door)



Photo Inset No. 5: Area A - South Wall, South

Overhead Door and Supply Storage

Area A: Other Overhead Doors. There are two additional overhead doors ⎯ one located on the north wall and one located on the south wall of Area A. The north wall overhead door is used to move the stored or staged lamps into Area B (the Lamp Processing Room) for processing; and the south wall overhead door is used to movestored supplies from Area C into the southwest corner of Area A (see **Photo Inset Nos. 4** and **5** right/below, and refer to **Drawing Nos. 2** and **3** (contained in tabbed section “**Drawings**”).

Area A: Lamp Storage. Unprocessed materials are stored on pallets along the west wall of Area A. Pallets are oriented from west to east (starting from the west wall) in ten (10) rows ⎯ with each row measuring 50-inches in width by 30-feet in length, separated by 3-foot wide aisles. Each row can accommodate seven pallets, which could be double stacked for a total of fourteen (14) standard 48-inch pallets. Rows 1 through 9 are dedicated to the storage of intact lamps, and Row 10 is dedicated to the storage of crushed lamps. Calculations are provided on the following page, demonstrating that Rows 1 through 9 provide storage for up to a maximum of 139,104 intact lamps, and Row 10 provides storage for up to a maximum of fifty-six (56) 55-gallon drums of crushed lamps double stacked.

Area A: Lamp Storage Calculation. The maximum number of intact and crushed lamps that can be stored for processing is presented the step-by-step calculation below:

* **Rows 1 through 9 -Intact Lamps**: each row has seven (7 ) pallets which can be double stacked for 14 pallets, each pallet will hold sixteen (16) lamp boxes (ea. lamp box 12” x 12” x 48”), and each lamp box will hold sixty-nine (69) lamps; therefore each pallet will accommodate the following number of lamps:

69 lamps x 16 boxes = 1,104 lamps per pallet

Each row will therefore accommodate the following number of lamps:

14 pallets x 1,104 lamps per pallet = 15,456

The total number of intact lamps that can be stored in **Rows 1 through 9** equals the following:

15,456 lamps per row x 9 rows of lamps = 139,104 Total Lamps

***Note:*** *A total number of 140,000 lamps was conservatively used in the closure cost estimate (see* ***Table 7-3*** *in* ***Section 7*** *of this Report). The maximum storage of 139,104 lamps and the closure cost estimate number of 140,000, lamps both assume lamps are four (4)-foot T-12 fluorescent tube type lamps. This assumption was conservatively made because of the following: 1) the size of these lamps are generally larger than other type lamps including CFLs, and U-Tubes; 2) it simplified the effort to calculate lamp storage and closure costs; and 3) Storage space available for all types of lamps will control the total amount of lamps actually stored not the conservative estimate. (cfl, straight, etc.)*

**Row 10 - Crushed Lamps**: has seven (7) pallets per row which could be double stacked for 14 pallets. Each pallet will hold four (4) 55-gallon drums; therefore the total number of drums that can be stored containing crushed lamps equals 56 the following:

4 drums per pallet x 14 pallets = 56 drums of crushed lamps.

*Area A*: Receiving/Staging area: Materials staged for receiving are located either at the overhead doors on the east wall of Area A or in the area to the front of the Supply Rows or Storage Rows 1 through 10. While in these staging locations the material is opened for inspection, counting, waiting for labeling per warehouse procedures. Then the material is closed and shrink wrapped and labeled and placed in storage.

### Area B - Lamp Processing Room

The Area B - Lamp Processing Room contains the *Balcan MP 8000 Lamp Processor* equipment*,* and is the only area where processing of lamps occurs.A plan view of the Balcan process equipment is presented on **Drawing No. D4** (in tabbed section “**Drawings**”).

The Lamp Processing Room floor has been resurfaced with concrete; stress cracks have been filled with *Adhesives Technology Crackbond JF 311*; and the entire floor sealed with two layers of Sherwin Williams Armor-Seal 650 SL/RC Self-Leveling/Re-Coatable Epoxy (see **Appendix C** for product specifications for the Balcan equipment and floor epoxies, adhesives, and sealants). The Lamp Processing Room has been completely insulated to R-19 value and air-conditioned for mercury vapor reduction and control purposes. The room is self-contained and sealed to retain and maximize the negative pressure environment created by the lamp processing equipment. Drums of mercury laden phosphor powder are stored within the confines of the Lamp Processing Room.

### Area C - Processed Glass and Supply Storage Room

The Processed Glass and Supply Storage Room serves as the repository for separated glass. It may also be used for general storage of boxes, containers and recyclable materials. The Processed Glass and Supply Storage Room has two overhead doors (designated north and south) located along the room’s east exterior wall and one overhead door on the west wall (designated west overhead door) to access the processing room⎯ the north and the south overhead doors are used to loadout trucks with separated glass material (refer to **Drawing No. D3** in tabbed section “**Drawings“**) and transfer supplies to Area A. Drawings D5 and D6 show the changes in the traffic routes and material handling. In each side of the room in front of the overhead doors, tracks (rails) are located for the 20 yard rolloffs to collect the separated glass material. Each set of tracks accommodates two 20 yard rolloffs (4 total). The west overhead door is used to transfer the separated glass material to the rolloffs from the processing room.

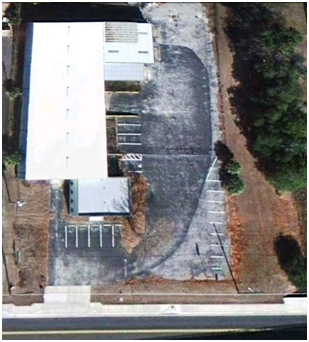


Photo Inset No. 6: Site Parking

## 2.7 Site Parking and Security

The site has asphalt paved parking areas located immediately along the south frontage of the site and along the eastern portion of the site as shown in **Photo Inset No. 6** to the right. The following parking spaces are provided on site:

* Six (6) parking spaces located immediately south and adjacent to the Administrative Offices,
* Six (6) parking spaces located immediately east and adjacent to the Administrative Offices, and
* Three (3) parking spaces located along the eastern edge of the south one-half of site.



Photo Inset No. 7: Site Security Fence

The site has a security fence with a locking gate to prohibit unauthorized access to the material receiving, handling, and storage areas. The fencing follows along the western edge, eastern edge and northern edge of the Facility property. The fencing in the southern portion of the site runs from east to west immediately behind the Administrative Offices as shown to the right in **Photo Inset No. 7** and on the Site Plan Drawing presented on **Drawing No. D2** (in tabbed section“**Drawings**”).

# 3.0 OPERATING PLAN

The following operating plan addresses the proper procedures for the handling, processing, and transport operations for the Lighting Resources, LLC - Mercury Recovery Facility located in Ocala, Florida (Facility). The Facility operates in such a manner that is protective of public health, safety, and welfare. Further, the Facility operates in accordance with applicable federal and state rules and regulations, including but not limited to Rules contained within Chapter 62-737 of the Florida Administrative Code (F.A.C.) - *The Management of Spent Mercury-Containing Lamps and Devices Destined for Recycling*.

Material handling / processing activities takes place solely within the Facility building. Materials received at the Facility are sorted / processed, consolidated, and loaded into outbound transfer vehicles for transport to a licensed / permitted facility authorized to receive such materials.

Facility personnel are appropriately trained and supervised to comply with the contents of this operating plan prior to beginning duties. A copy of the operating plan is located within the Administrative Offices and will remain available for reference to ensure proper management of Facility operations.

## 3.1 Overview of Facility Operations

The Lighting Resources Facility is by DEP definition a *Mercury Recovery Facility* that accepts for processing (i.e., mercury recovery) both intact and crushed mercury containing lamps. Lighting Resources also accepts other universal wastes for transfer to a reclamation facility or other final destination facility (i.e., recycler, treatment, or disposal type facility). Specifically, Lighting Resources Facility accepts the following mercury containing materials and universal wastes:

* Mercury Containing Lamps (MCLs) - fluorescent lamps, incandescent lamps, LED, and high intensity discharge (HID) lamps (intact and broken);
* Mercury Containing Devices (MCDs) - thermometers, thermostats, switches, relays and manometers, etc.;
* Lighting Ballasts - PCB and Non-PCB ballasts;
* Automotive / Large Equipment Lead Acid Type Batteries; and
* Small Type Batteries*:*
* Alkaline,
* Gel cells,
* Lead acid,
* Lithium ion,
* Lithium
* Magnesium,
* Mercury,
* Ni-Cad,
* Ni-MH,
* Silver oxide, and
* Zinc.

Batteries are sorted by type and sent to an authorized battery recycling facility.

### Mercury Containing Lamps

Mercury Containing Lamps (MCLs) are processed on-site and separated into the following materials:

* Glass,
* Metal end caps / metal components, and
* Mercury-containing phosphor powder.

The processing equipment ⎯specifically, removes from the separated glass and metal mercury containing phosphor powder to levels well below the hazardous waste limit for mercury of 0.2 mg/L. (Please refer to analytical test results for processed glass and metals provided in **Appendix C.**) Therefore, best efforts are made to recycle these materials. The mercury-containing phosphor powder is containerized in 55-gallon steel drums and transported offsite by a licensed hazardous waste hauler to a permitted mercury reclamation facility for processing and recovery of the mercury content of these materials.

### Mercury Containing Devices

Mercury Containing Devices (MCDs) are received for transfer only to an authorized mercury reclamation facility. Specifically, upon receipt the MCDs are containerized in approved containers and later transferred offsite to a permitted / authorized mercury reclamation facility.

### PCB and Non-PCB Ballasts

PCB Ballasts are received and transported offsite by a licensed hazardous waste hauler to a permitted facility authorized to receive / process PCB Ballasts.

Non-PCB Ballasts are placed in containers and transported offsite for recycling.

### Batteries

Upon receipt, batteries are sorted by type, placed in appropriate containers approved by LRL and transferred offsite to a permitted / authorized battery processing / recycling facility.

## 3.2 Facility Hours of Operation

The Facility has regular business hours and may operate up to 3 shifts for processing in 24 hours.

## 3.3 Facility Access and Site Security

Facility access and site security will comply with the requirements of Title 40 CFR § 264, Subpart C and Title 40 CFR § 270. A description of procedures and site controls for limiting access, prohibiting unauthorized access, and for overall security is provided in the following paragraphs.

*Security Procedures and Equipment*

Facility security is maintained through employee presence at the property during working shifts and by locking or otherwise securing overhead and personnel access doors or other means of access when the Facility is not in operation. Ample exterior lighting is provided to allow visual observation of the Facility building and premises. Gates, vehicular and personnel access doors shall be closed when not in use and locked during non-duty hours. The Facility is located within the patrol and response areas of the City of Ocala Police Department.

*24-Hour Surveillance System*

The Facility will only be accessible to employees, or authorized persons accompanied by Facility personnel. Facility access will not be available when the plant is not in operation or unattended by authorized Facility personnel. The Facility is locked when not in operation. The Facility has an intrusion alarm system that is monitored during non-duty hours as appropriate.

*Barriers and Controlled Entry*

The active portion of the Facility, the container storage area and processing equipment room, are located interior to the building structure. The Facility building itself serves as a barrier to unauthorized access during both operating and non-operating periods.

Entry to the Facility is controlled by personnel in the Administrative Offices at the south end of the building / Facility. Visitors and contractors are required to report at the Administrative Offices and if granted access to the main areas of the building, they are accompanied/ escorted by authorized Facility staff. Employees are trained to report any unauthorized access / person(s) and to escort the unauthorized person(s) to the Administrative Offices.

Drivers, entering the Facility are directed to report to receiving personnel. Facility and vehicular gates and doors are locked during non-working hours.

Signs, legible from a distance of 25-feet, are posted on the interior of the building above the container storage area located along the west wall of the building. Signs are also located on the outside of the building at both personnel doors to the permitted area from the outside. These signs bear the following words: "Notice - Unauthorized Personnel Are Not Permitted Inside Plant" and “Notice – All Visitors Must Register At Office.” The signs are in English and Spanish as they are the predominant languages of the area.

## 3.4 Facility Personnel Requirements and Training

Required training and responsibilities of Facility personnel varies depending on the assigned tasks associated with each position. Each new employee is trained in proper operational procedures, hazardous materials identification, personal protective equipment, and safety procedures in order to increase employee awareness of potential hazards associated with operations and to safeguard their well-being. Worker protection and safety is ensured through complying with standards and guidelines of the federal Occupational Safety and Health Administration (OSHA) worker safety regulations and with 62-737.800(4)(e)(1) F.A.C. Personnel are trained to be proficient in the following areas necessary for operation of the Facility:

* Safety Procedures,
* Proper Use of Personal Protective Equipment (PPE),
* Load Checking, Screening, and Rejection Requirements,
* Operating Procedures,
* Fire Control,
* First Aid,
* Emergency Procedures,
* General Housekeeping Procedures,
* Equipment Operation and Maintenance,
* Material Loading and Unloading Procedures, and
* Site Security Procedures.

### Personnel Training

Facility personnel are trained in accordance with Title 40 CFR § 265.16. Personnel must successfully complete a program of both classroom instruction and on-the-job training that teaches them to perform their duties in a manner to comply with the requirements of Title 40 CFR § 265.16, and in such a way that:

* Ensures the safe operation of the processing equipment,
* Ensures the Facility’s compliance with its emergency response procedures, and
* Ensures the Facility’s inspection methods are appropriate to identify and prevent releases to the environment.

Facility personnel are informed of the following:

* Their possible exposure to hazardous substances in their work environment, and
* The contents of the Facility’s health and safety plan.

The operator ensures that the training program includes elements required under Title 40 CFR § 265.16.

The training program is directed by a person trained in hazardous waste management procedures, and includes instruction which teaches Facility personnel hazardous waste management procedures (including emergency response and contingency plans implementation) relevant to the positions in which they are employed. Further, the training program is designed to ensure Facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems, including where applicable:

* Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;
* Key parameters for automatic material feed cut-off systems;
* Communications systems;
* Response to fires and/or explosions;
* Response to spill / release incidents; and
* Shutdown of operations.

Personnel training on the Facility’s emergency response plan includes:

Pre-emergency planning and coordination with outside parties,

* Personnel roles, lines of authority, training, and communication,
* Emergency recognition and prevention,
* Safe distances and places of refuge,
* Site security and control,
* Evacuation routes and procedures,
* Decontamination procedures,
* Emergency medical treatment and first aid,
* Emergency alerting and response procedures,
* Critique of response and follow-up, and
* PPE and emergency equipment.

Facility staff will receive the appropriate level of OSHA HAZWOPER training in accordance with OSHA regulations Title 29 CFR § 1910.120(p)(8) and § 1910.120(q).

Facility personnel are required to successfully complete the training program within six months after the date of their employment or assignment to the Facility, or to a newly assigned position at the Facility. Employees receiving training are required to work in supervised positions until they have successfully completed the training requirements. Further, Facility personnel are required to take part in continuing training including annual refreshers / review of their initial training.

The Facility operator maintains records of personnel and training at the Facility. These records will include:

* The job title for each Facility position, and the name of the employee filling each position;
* A written job description for each position including the requisite skill, education, or other qualifications, and duties assigned to each position;
* A written description of the type and amount of both introductory and continuing training that is given to each person filling a position;
* Records that document that the training or job experience has been given to, and successfully completed by facility personnel; and
* Training records on current personnel are kept until closure of the Facility. Training records on former employees are kept for at least three years from the date the employee last worked at the Facility. Personnel training records may accompany personnel transferred within the same company.

A summary of the personnel training is provided on the following page in **Table 3-1** (and also **Table 5-1**).

|  |  |
| --- | --- |
| Table 3-1  Lighting Resources, LLC - Mercury Recovery Facility, Ocala, FL  Initial New Employee Training | |
| Position Title (#) | Required Training |
| **Part I – New Employee Orientation:** | |
| All Staff | * Company policies and procedures * Mercury Right to Know * RCRA Training * Pre-placement physical requirements * Universal Waste Handler Training * Plant tour: process and safety equipment * U.S. DOT Hazardous Materials Training * OSHA Hazard Communication * Production tasks orientation * Environmental and waste control * Material handling tasks orientation |
| **Part II – Title Specific Training:** | |
| Facility Manager (1) | * 40-Hour HAZWOPER Training * Air Monitoring * Reasonable Suspicion Training |
| Operations Manager (1) | * 40-Hour HAZWOPER Training * Air Monitoring * Reasonable Suspicion Training * Forklift Certification |
| Processing Supervisor (1) | * 40-Hour HAZWOPER Training * Forklift Certification |
| Warehouse Supervisor (1) | * 40-Hour HAZWOPER Training * Air Monitoring * Forklift Certification |
| Logistics Coordinator (1) | * 24-Hour HAZWOPER Training * Reasonable Suspicion Training |
| Office Administrator (1) | * 24-Hour HAZWOPER Training * Reasonable Suspicion Training |
| Driver -CDL Class “A” (4) | * 24-Hour HAZWOPER Training * HAZMAT Endorsement |
| MCL / Lamp Processing Operators (2) | * 24-Hour HAZWOPER Training |
| **Note:** Personnel receive training on the appropriate use and types of personal protective equipment to be used at the Facility. Further, personnel are fit tested for respirator equipment. | |

After receiving training, the new employees are closely supervised during the first few months of working in the Facility (by experienced and senior employees) to ensure they understand proper procedures and protocol.

A detailed worker health and safety plan has been prepared and is presented in **Section 5** of this Report (*Worker Health and Safety Plan*). A summary of the Facility staff positions, job descriptions / responsibilities, reporting supervisors, and position requirements is presented below in **Table 3-2**.

|  |  |  |  |
| --- | --- | --- | --- |
| Table 3-2  Lighting Resources, LLC - Mercury Recovery Facility, Ocala, FL  Facility Staffing Summary | | | |
| Position Title (#) | Job Description / Responsibilities | Supervisor | Requirements |
| Facility Manager (1) | Responsible for maintaining Facility operations in accordance with the Operating Plan. Supervises overall Facility operations including worker health and safety, regulatory compliance, environmental controls, and personnel training. | Reports to Company President | College degree or equivalent work experience |
| Operations Manager (1) | Responsible for operational compliance with applicable regulations / requirements, Facility maintenance, schedules, and general recordkeeping. | Reports to Facility Manager | College degree or equivalent work experience |
| Processing Supervisor (1) | Oversees receiving and shipping production, equipment maintenance, and housekeeping. | Reports to Operations Manager | Min. H.S. diploma and 1-year experience at Lighting Resources Facility |
| Warehouse Supervisor (1) | Directly supervises unloading and inventory of incoming materials and loading of outbound material. | Reports to Operations Manager | Min. H.S. diploma and 6-months experience at Lighting Resources Facility |
| Logistics Coordinator (1) | Directly supervises facility drivers and is responsible for customer pickup / delivery services; driver USDOT compliance and training; truck / trailer maintenance / permitting; and scheduling of incoming / outgoing freight. | Reports directly to Facility Manager | Min. 2-years college or equivalent work experience and a min. 5 years of supervisory experience in related service industry |
| Office Administrator (1) | Handles invoicing, purchase orders, creates Certificates of Recycling, maintains facility operating records, billing issues | Reports directly to Facility Manager | Min. H.S. diploma and 6-months experience at Lighting Resources Facility |
| Driver -CDL Class “A” (4) | Performs over the road transportation; loading/unloading of materials using various equipment (e.g., forklift, dolly, etc.); maintains vehicle and vehicle safety checks; prepares bills of lading, manifests, logbook, trip reports; and sealing/ repacking of containers for material transport to meet DOT regulations. | Reports to Logistics Coordinator | Min. H.S. diploma or equivalent and min. 2-year successful, accident/incident-free commercial driving experience |
| Mercury Recovery Process Operator (4) | Performs production component separation of MCLs using the Balcan MP8000 equipment; performs maintenance on process equipment; unloads materials from trucks and containers as they arrive, sorts / stages materials according to category and size; and seals and replaces containers for transport. | Reports to Operations Manager / Shift Supervisor | Possesses manual dexterity, properly uses PPE, and ability to work with minimum supervision. |

## 3.5 Site Layout and Facility Building

A detailed description of the Site and Facility building layout has been provided in the previous sections (**Sections 2.5**, **2.6**, and **2.7**). Plan drawings presenting the site plat of survey, site plan, and building layout are presented on **Drawing Nos. D1** through **D3**, respectively (in tabbed section “**Drawings**”).

## 3.6 Site Traffic Flow

Site traffic enters the site at the Facility entrance located off of SW 16th Lane. Material handling trucks/vehicles (loaded and empty) are directed to proceed to the material receiving/loading docks located on the east side of the Facility building where they will either be inspected and unloaded, or are loaded out with materials for transfer offsite. A site traffic flow diagram is presented on **Drawing No. D5** (contained in the tabbed section “**Drawings**”).

## 3.7 Material Flow

Incoming materials are inspected and counted and labeled at the staging area in Area A. Lamps are moved to the lamp storage area within Area A for later processing. Batteries are staged for sorting and then stored along the north wall of Area A and later transferred offsite. PCB Ballasts are staged along the east wall of Area A (between the dock overhead doors) for later transfer offsite. Non-PCB Ballasts are staged and consolidated for transfer offsite. Lamps are moved from the lamp staging or storage area into the Area B – Lamp Processing Room for processing. Processing sorts and segregates into dedicated containers for glass, metals, and phosphor powder. The processed glass is moved into Area C for tipping into rolloffs and later transferred offsite. The containers of processed metal are moved into a dedicated trailer for later transfer offsite. The phosphor powder containers are staged in Area B along the south wall for later transfer offsite.

Outbound phosphor powder containers, battery containers, and ballast containers are loaded out through dock area in Area A. The outbound rolloffs containing separated glass are loaded out either through the south or north overhead doors in Area C. The outbound processed metal containers are loaded out through the canopied loadout area located in Area A or the north or south overhead doors in Area C. A material flow diagram is presented on **Drawing No. D6** (in tabbed section “**Drawings**”).

## 3.8 Waste Acceptance Procedures

Incoming materials (i.e., lamps and universal wastes) are inspected to ensure compliance with Lighting Resources’ acceptable and permitted waste receiving policies and requirements that meet all applicable local, state, and federal rules and regulations. Accurate and up to date records are maintained for materials accepted, processed, and transferred.

### Acceptable Waste

The Lighting Resources Facility accepts only the following wastes *for processing*:

* Intact lamps including mercury containing lamps, and other non-mercury containing lamps, and
* Broken or crushed mercury containing lamps and other broken lamps.

The Facility also accepts the following universal and non-regulated wastes for transfer to an approved facility for either processing, treatment, recycling or disposal:

* Batteries,
* Mercury containing devices (MCDs),
* Non-PCB lighting ballasts, and

Lighting Resources may receive electronic waste items and items containing leaded glass. Electronic waste items received are separated and transferred to an approved facility authorized to process such wastes.

### Prohibited Waste

The Lighting Resources Facility is prohibited from processing hazardous waste other than crushed or broken mercury containing lamps. Further, the Facility is prohibited from accepting the following wastes or materials:

* Radioactive Wastes,
* Liquid Wastes,
* Biological and Medical Wastes,
* Municipal Solid Wastes,
* Flammable Wastes,
* Explosive Wastes,
* Pyrophoric Wastes,
* Ignitable Waste,
* Reactive Waste,
* Acute Hazardous Waste,
* Toxic Waste, and
* Free Liquids or Leaking Containers.

Any attempt to deliver the above materials is rejected by Lighting Resources. Waste rejection and load checking procedures are discussed further in **Section 3.9** and **Section 3.13**, respectively.

### Material Receiving and Acceptance Procedures

Upon arrival of a shipment at the Lighting Resources Facility, the following sequence of events occurs:

* The driver presents the paperwork for the load to the shipping and receiving individual who is trained to receive material into the Facility.
* Facility personnel will compare shipping documents and material description against the material profiles of the material to be received.
* If the shipping documents conform to the material profile, the truck is unloaded by personnel qualified to operate a forklift and staged in the receiving / loading dock area (inside the Facility) for inspection.
* The containers are visually inspected to verify that the shipment contains only the waste material as described in the material profile and shipping document.
* Upon verification, the shipping documents are signed acknowledging receipt of the material at the Facility. EPA Form 8700-22 copies are distributed per EPA instructions.
* Upon off-loading, each container is staged for counting and labeling. Upon completion the shipment is transferred to the appropriate storage location and logged in as received into the waste tracking system.
* Should Lighting Resources deny acceptance of the delivery, the shipment is returned to the generator or shipped to an alternate facility selected by the generator.

A comprehensive load checking program is implemented to ensure that no unauthorized wastes are accepted at the Facility. The load checking program is presented in a subsequent part of this section.

## 3.9 Waste Rejection Procedures

Wastes are rejected at the Lighting Resources Facility for the following reasons:

* The waste does not conform to the material profile documentation and the waste contains materials that the Facility is not permitted to accept.
* The delivery contains other wastes that cannot be accepted by Lighting Resources.
* An unscheduled delivery would cause Lighting Resources to exceed the permitted storage limit.

Upon discovery of the material that cannot be accepted at the Facility, the generator is contacted and notified that material is unacceptable, and therefore, rejected by Lighting Resources. The Facility will request direction from the generator as to whether the material is to be forwarded to an alternate facility that is authorized and permitted to receive such materials, or it is to be returned to the generator. Based on the instructions from the generator, the procedures listed below are used to document the rejected shipment.

* Material that is to be rejected is marked with a label noting the material as non-conforming, and will remain in the delivery vehicle, or if unloaded it is immediately reloaded into the delivery vehicle for offsite shipment either to the generator or to an alternate facility that is authorized and permitted to receive such materials.
* In the unlikely event, a non-conforming material is discovered after the material has been accepted by the Facility, the generator is immediately notified that the material is rejected, and arrangements are made for the generator to send a vehicle for pickup and delivery of materials to the generator, or to an alternate facility that is authorized and permitted to receive such materials. If arrangements cannot be made, Lighting Resources will arrange for the proper transport of the rejected materials to an authorized and permitted facility.

Rejected loads are issued a load reject form with a new bill of lading or hazardous waste manifest form for use in shipping the material back to the generator or to an alternate approved facility (please refer to **Appendix D** for copies of forms). Loads rejected are recorded onto the Load Reject Log form (refer to Appendix D). Forms and logs are maintained at the Facility available for DEP inspection*.*

Reject load forms and logs are maintained at the Facility and shall be made available for inspection. Facility forms including reject load forms and reject load logs are maintained at the Facility for a minimum period of three years.

## 3.10 Lamp and Universal Waste Handling and Containerization

Incoming materials are inspected prior to acceptance to ensure c**ompliance** with Lighting Resources’ acceptable and permitted waste receiving policies and requirements. Materials are inventoried by either physical count or weight for intact fluorescent and other kinds of intact lamps, and mercury containing devices or by weight for crushed or broken lamps, ballast, and batteries.. Lamps are stored in the designated location within Area A until they can be processed. Lamps are processed onsite using the Balcan MP8000 lamp processing equipment (in the Area B – Lamp Processing Room) for component separation (i.e., glass, metals, and phosphor powder). Other materials received (e.g., ballasts, batteries, mercury containing devices) are segregated by type, if applicable, and containerized and stored in a designated area of Area A for later shipment offsite to an authorized facility for further processing, recycling, treatment, or disposal. A Material Flow diagram is presented on **Drawing No. D6**.

### Containerization

Lamp materials are containerized and stored in the designated location within Area A for later processing. Intact lamps are containerized in lamp boxes or fiber drums or other approved container on pallets. Crushed lamps are containerized in U.S. DOT approved container and staged on pallets. Containers may be of varying dimensions and may contain lamps of different types, quantities, and dimensions. Each pallet holds containers stacked no higher than seven (7) feet, and the containers are secured with shrink-wrap, bands, or other binding after counting and labeling. If the pallet securing method impedes view of the marking/labeling of the containers, such labels/markings are provided on the exterior of the pallet packaging. The storage area will include double stacking of pallets. Refer to **Drawing No. D3** for the locations of the lamp storage areas.

Approved Container Types: U.S. DOT approved containers for shipping of lamps are used for the staging and/or storage of the MCLs. Intact lamps are stored in containers that are:

* Structurally sound,
* Adequate to prevent breakage, and
* Compatible with the contents of the lamps.

Crushed lamps are stored in 55-gallon drums, or other containers that meet U.S. DOT specifications for such wastes. Lamp containers may be used, new, or reconditioned so long as they are structurally sound, adequate to prevent breakage, and compatible with the contents of the lamps. A large variety of acceptable container types are available that meet these specifications and selection is often driven by the size, shape, and quantity of the lamps being shipped. Intact MCLs may be shipped in containers approved for the transport of the lamps as products. Crushed or broken MCLs are shipped in U.S. DOT containers approved and authorized for shipment of hazardous waste.

Pallets of lamps may be stacked one on one in the storage rows. The lower pallet should be structurally sound and adequate to prevent breakage. However, caution should be used to select appropriate lower level pallets that will support a second level.

Container Markings / Labels: Product staged in the warehouse is labeled to indicate the type of waste (e.g., “Universal Waste Lamps”), the customer or generator and date received. The tracking log will contain the order number, date received, customer name and generator information as well as the quantity of waste. Containers used for phosphor powder are marked with a “Hazardous Waste” label as required by Title 40 CFR § 262.32(b) as an Environmentally Hazardous Solid (Mercury, D009). The phosphor powder is an on-site generated by-product of the lamp processing operation. The Lighting Resources Facility does not accept phosphor powder from other sources.

Container Handling Practices. Containers are moved by forklift from the receiving/staging area to the storage or process areas. The container storage area in Area A is located along the west wall inside the building, on a sealed concrete floor slab. Containers of universal wastes remain closed during storage except when adding or removing wastes, or conducting inventory, inspection, or sampling. The container storage area is routinely inspected to ensure that the containers remain in good condition, closed, and without evidence of leakage, spillage, or other conditions that could cause or allow leakage or releases of mercury or other hazardous constituents to the environment under reasonably foreseeable conditions.

## 3.11 Final Destination of Materials

With the exception of lamps, other universal wastes and processed lamp materials are transported offsite for further processing (i.e., reclamation, recycling, or treatment) or disposal. Facilities that these materials are sent to are appropriately registered, licensed, or permitted by the states of residence. Documentation of transport to these facilities is created and maintained at the Lighting Resources Facility for a minimum period of three years. The shipping documentation shall evidence the material destination of universal waste (metals and glass). The phosphor powder test results from retorting shall provide verification of mercury separation from phosphor powder. Further, a Certificate of Destruction shall be obtained with respect to PCB Ballasts. Such documentation shall be maintained at the Lighting Resources Facility for a minimum period of three years.

The final destination facilities to be used by the Lighting Resources Facility for the processed lamp and transferred universal waste materials are described below.

* Separated Lamp Glass (cullet): Lamp glass (glass cullet) is analytically tested by an approved laboratory for compliance with Chapter 62-737.840, F.A.C. prior to release from the Facility for recycling / reuse. Only lamp glass material (cullet) passing the TCLP for mercury (i.e., below the USEPA toxicity of 0.2 mg/l) is recycled. The material is transported offsite to a commercial user(s) (i.e., commercial sandblasting, cement filler, ceramic tile maker, etc.)In the event that there are no available glass markets, the material is transported to an authorized landfill for disposal ( most likely Baseline Landfill in Marion County, Florida). Separated lamp glass material is shipped out as often needed. At a minimum weekly analytical testing is done on a composite of the daily samples of separated lamp glass (cullet) collected the prior week. *(Note, in the unlikely event that the processed lamp glass materials do not pass the TCLP for mercury, the glass would be shipped to an authorized and permitted mercury reclamation facility).*
* Separated Lamp Metals: are transported offsite to TOTALL Metal Recycling located in Granite City, Illinois for recycling of the metals (or to another approved metal recycling facility). Lamp metal scrap components are analytically tested by an approved laboratory for compliance with Chapter 62-737.840 F.A.C. prior to release from the Facility for recycling / reuse. Only lamp metal materials passing the TCLP for mercury (i.e., below the USEPA toxicity of 0.2 mg/l) are recycled. Separated lamp metal materials are shipped out as often needed. At a minimum, weekly analytical testing is done on a composite of the daily samples of processed lamp metals collected the prior week. *(Note, in the unlikely event that the processed lamp metal materials do not pass the TCLP for mercury, the metals would be shipped to an authorized and permitted mercury reclamation facility).*
* Mercury Containing Phosphor Powder: is transported offsite for recovery of the mercury to the Lighting Resources’ Mercury Reclamation Facility located in Greenwood, Indiana, or alternatively to the Veolia Environmental Services’ Mercury Reclamation Facility located in Tallahassee, Florida or another approved mercury reclamation facility. Semi-annual testing documentation is obtained from the mercury reclamation facility documenting that 99% of the mercury was recovered. Such documentation is retained on-site for a minimum of three years.
* Mercury-Containing Devices (MCDs): are transported offsite for recovery of the mercury to the Lighting Resources’ Mercury Reclamation Facility located in Greenwood, Indiana, or alternatively to the Veolia Environmental Services’ Mercury Reclamation Facility located in Tallahassee, Florida or another approved mercury reclamation facility. Semi-annual testing documentation is obtained from the mercury reclamation facility documenting that 99% of the mercury was recovered. Such documentation shall be retained on-site for a minimum of three years.
* Batteries: are transported offsite for reclamation of metals to TOTALL Metal Recycling located in Granite City, Illinois, or alternatively to either Battery Solutions, Inc. located in Howell, Michigan, or to Metal Conversion Technologies, LLC located in Cartersville, Georgia or to another approved facility.
* Non-PCB Light Ballasts: are transported offsite to TOTALL Metal Recycling located in Granite City, Illinois for recycling of metals (or to another approved metal recycling facility).
* PCB Light Ballasts: are transported offsite to the Lighting Resources’ Facility located in Phoenix, Arizona, or alternatively to Wisconsin Ballast located in Muskego, Wisconsin for decommissioning / destruction of the PCBs and reclamation of metals or to another approved facility.
* Other Non-RCRA Regulated Recyclable Materials: are transported to facilities approved for recycling of those specific commodities (e.g., cardboard, scrap metals, electronic wastes, etc.).

## 3.12 Processing Throughput and Staging/Storage Volumes

The Lighting Resources Facility processes up to 24 hours per day. The quantities of materials that the Facility will accept for processing or staging for transfer, is limited by the amount of dedicated storage space that is available on any day. A summary of the storage space that has been dedicated for the different materials that the Facility receives is presented on **Table 3-3** (on following page). Recordkeeping forms are maintained electronically (e.g., in MS® Excel spreadsheets) up to date at the Facility, specifically documenting storage volumes (refer to **Appendix D** for copies of these forms).

### Time Limitations for Storing On-Site

Lighting Resources documents and monitors the time that materials (unprocessed and processed) are received on-site to ensure compliance with applicable local, state, and federal requirements. PCB Ballasts on a Uniform Hazardous Waste Manifest are transported offsite within 24 hours of receipt. The applicable state and federal retention time restrictions are listed below:

*Regulatory Required Retention Times:*

* Intact MCLs: < 1-year
* Crushed MCLs: < 1-year
* MCDs: < 1-year
* Batteries: < 1-year
* Non-PCB Ballasts: < 1-year
* PCB Ballasts: < 1-year
* Phosphor Powder: < 90-days

| Table 3-3  Lighting Resources, LLC - Mercury Recovery Facility, Ocala, FL  Materials Handling, Storage/Staging Summary | | |
| --- | --- | --- |
| Description | Handling Description | Maximum Quantities  Staged / Stored |
| Intact Mercury Containing Lamps (MCLs) | Store then process using lamp processing equipment. The lamp materials are machine sorted into various components, and containerize for transport offsite for reclamation (i.e., mercury containing phosphor powder in 55 gallon drums), products for commercial use (i.e., separated glass in rolloffs and separated metals in 1 cubic yard boxes or drums), or disposal (i.e., separated glassing rolloffs).  The total lamp storage volume is conservatively reflected in terms of the four (4)-foot T-12 lamps for the following reasons: 1) the size of these lamps are generally larger than other type lamps including CFLs, and U-Tubes; 2) it simplified the effort to calculate lamp storage and closure costs; and 3) A total number of 140,000 lamps was conservatively used in the closure cost estimate (Table 7-3), even though the maximum storage volume of 139,104 lamps was calculated. Each lamp box is 12” x 12” x 48”, holds 69 lamps, and weighs approx. 44.6-lbs. The total weight stored is equal to 90,000 lbs: (2,016-boxes x 44.6-lbs). The total storage volume is restricted only by storage space of designated lamps. Additional numbers of lamps may be stored if a type that is much smaller than a four (4)-foot T-12. | Rows 1-9:  139,104 lamps  contained in 2,016 lamp boxes  (90,000-lbs) |
| Crushed or Broken Mercury Containing Lamps (MCLs) | Store and then process using lamp processing equipment. The machine Sorts into various components, which are containerized for transport offsite to a permitted mercury reclamation facility (i.e., mercury containing phosphor powder in 55-gallon drums), products for commercial use (i.e., separated glass in rolloffs for commercial sandblasting, cement filler, or ceramic tile and separated metals in 1 cubic yard boxes or drums), or disposal (i.e., separated glass in rolloffs). Each 55-gallon drum of crushed/broken MCLs is assumed to weigh 500-lbs. | Row 10:  Fifty-six (56) - 55-gal. drums  (28,000-lbs) |
| Mercury Containing Devices (MCDs) | Approved containers of Mercury Containing Devices are transported offsite to a permitted mercury reclamation facility. The maximum quantity stored shall be equal to Four (4) 55-gallon drums (750 lbs. per drum )of MCDs by volume or by weight which is assumed to be a total of 3,000 pounds Drums are referenced for the purpose of weight and volume only as MCDs are usually transported in smaller containers including 5 gallon buckets | Four (4) - 55-gal. drums or equivalent volume or weight (3, 000 lbs.) |
| Large and Small  Type Batteries | Sort by type, containerize in 55-gallon drums or other approved containers, and transport offsite to a battery recycling facility. Each 55-gallon drum of batteries is assumed to weigh 750-lbs. | Twenty Four (24) - 55-gal. drum  (24,000 lbs.) |
| PCB Lamp Ballasts | Received in 55-gallon steel drums, and transport offsite to a ballast recycling facility where the PCBs will either be destroyed by incineration or sent for disposal in a permitted RCRA Subtitle C – landfill. Each 55-gallon drum of PCB Lamp Ballasts is assumed to weigh 750-lbs. | Ten (10) - 55-gal. drums  (7,500 lbs.) |
| Non-PCB Lamp Ballasts | Containerize, if necessary, in 55-gallon steel drums or other approved container, and transport offsite to a scrap metal dealer. Each 55-gallon drum of Non-PCB Lamp Ballasts is assumed to weigh 750-lbs. | Thirty (30) - 55-gal. drums  (22,500 lbs) |
| Separated Glass (cullet) | Containerize in tipper, 1-cubic yard (CY) tri-ply box or gaylord box type to be consolidated in 20 yard rolloff container to be later transported offsite for commercial use (i.e. commercial sandblasting, cement filler, ceramic tile) or disposal (landfilled). Each 20 yard rolloffs assumed to weigh <30,000lbs. | Four (4) –20 Yard Rolloff containers  (120,000 lbs) |
| Separated Metals | Containerize in 55-gallon fiber drums, 1-cubic yard tri-ply box, gaylord box type or into a dedicated 20-cubic yard rolloff container to be later transported offsite for commercial scrap. Each 55-gallon drum of separated metal materials is assumed to weigh 750-lbs. | Sixty (60) - 55-gal. drums  (45,000 lbs) |
| Phosphor Powder | Containerize in 55-gallon steel drums for transport offsite to a permitted mercury reclamation facility. Each 55-gallon drum of phosphor powder is assumed to weigh 750-lbs. | Thirty-two32) - 55-gal.drums (24,000lbs) |

Battery Procedures:

Transportation is arranged with the battery recycler for transporting from the customer site to the battery recycler. Lithium-ion and lead acid batteries of any voltage along with any other battery chemistry over 9 volts, will have each terminal taped, painted, individually bagged or some other method used to prevent combustion. These batteries are stored in lined 55-gallon drums or approved container and placed on a pallet to prevent any accidental water reaching the drum base. The nearest fire extinguisher is located within 20 feet from these drums.

* Care is taken to ensure batteries are not exposed to a flammable environment.
* Batteries are stored in an area that is setback from traffic and other activities to ensure batteries are not disturbed; specifically they are stored along the North wall of Area A.
* The battery storage area is well ventilated, and a dry environment.
* The battery storage area is clearly identified as the Battery Storage Area; and within the battery storage area labeling is be placed on the sorted drums by battery types (e.g., lithium, etc.). The storage area has access to a Class D fire extinguisher.

## 3.13 Load Checking Program

A load checking (screening) program is utilized in order to detect and eliminate any attempts to deliver unauthorized wastes to the Facility. The load checking program will consist of the following components:

* Employee training on load checking procedures,
* Formal and informal checkpoints locations,
* Load checking inspections,
* Procedures for handling unauthorized wastes, and
* Recordkeeping.

The following paragraphs provide a discussion of the five load checking components.

### Employee Training on Load Checking Procedures

Facility personnel involved in material receiving, handling, and processing are trained on load checking procedures and how to recognize unauthorized wastes. Employee training on identification of unauthorized wastes includes familiarity with typical containers, markings, labels and placards that might aid in recognizing unauthorized wastes. Periodic personnel meetings are held to ensure that staff members involved with the load checking program remain aware of waste acceptance criteria.

### Formal and Informal Checkpoints Locations

Formal load checking inspections are performed and documented by employees responsible for receiving loads at the receiving dock area. Informal load checking is the responsibility of employees involved in material handling and processing activities. Employees conducting activities near the Facility entrance monitor vehicles entering the Facility, watching for potentially unauthorized waste type vehicle (e.g., placard, transporter name, etc.), and alerts management personnel if any unauthorized wastes are suspected.

### Load Checking Inspections

Formal load checking inspections are conducted on waste loads delivered to the Facility. Load checking inspections are performed by personnel receiving loads at the receiving / loading docks area. Assuming no unauthorized waste materials are found during the inspection, the driver is allowed to leave and the inspected waste material is staged for counting, labeling, and wrapping and then moved to the appropriate area of the Facility. Recordkeeping is prepared and maintained on site for a minimum of three years for loads received and accepted. Unauthorized loads are rejected and the driver is instructed to either return the material to the generator or to an alternate facility that is authorized and permitted to receive such materials. A load rejection form would be completed and maintained on site for a minimum of three years.

### Handling of Unauthorized Wastes

If unauthorized wastes are discovered during load checking activities, the Facility Manager and/or Operations Manager is promptly notified of the person and company responsible for shipping the waste, and the waste generator. The material remains on the delivery vehicle (or if material is unloaded, it is reloaded onto the delivery vehicle), the generator is immediately notified that the material is rejected, and the material is returned to the generator, or to an alternate facility that is authorized and permitted to receive such materials.

In the unlikely event, the non-conforming (unauthorized) material is discovered after the material has been accepted by the Facility, the generator is immediately notified that the material is rejected, and arrangements are made for the generator to send a vehicle for pickup and delivery of materials to the generator, or to an alternate facility that is authorized and permitted to receive such materials. If arrangements cannot be made, Lighting Resources will arrange for the proper transport of the rejected materials to an authorized and permitted facility. Rejected loads are issued a load reject form with a new bill of lading or hazardous waste manifest form (whichever is appropriate) for use in shipping the material back to the generator or to an alternate approved facility (please refer to **Appendix D** for copies of forms). Loads rejected are recorded onto the Load Reject Log form (refer to Appendix D). Forms and logs shall be maintained at the Facility available for DEP inspection for a minimum period of three years.

### Recordkeeping

Incidents and formal load checking inspections are documented in writing by employee personnel on the Bill of Lading/Manifest or count sheets and retained by the Facility for a minimum of three years. At a minimum, the following information is logged for each incident and formal inspection which takes place:

* Date and time of inspection,
* Name of the hauling firm,
* Name of the driver,
* Source of the waste as reported by the driver,
* Inspector observations, and
* Signatures of inspector and driver.

## 3.14 Material Receiving, Tracking, and Recordkeeping Procedures

Incoming loads and LRL driver pick-ups are subject to quality control (QC) procedures to ensure that each load meets the Lighting Resources, LLC waste acceptance policy and permit requirements. Prior to shipment or pick-up, customers notify Lighting Resources operational staff as to the nature and volume of the shipment. Each load is issued an Order Number that will follow the shipment through the recycling process. A bill of lading/manifest (see **Appendix D**) is generated at the time a pickup or delivery is scheduled, if required.

The transportation document prepared will either be a RCRA compliant Uniform Hazardous Waste Manifest or a Lighting Resources generated Bill of Lading/Non-Hazardous Waste manifest depending upon the waste generator’s preference and waste management practices. A bill of lading or manifest is in the possession of the driver and provided to the generator at the time of the load pick-up and acceptance. Universal waste bills of lading/non-hazardous manifests/hazardous waste manifests prepared by Lighting Resources are each assigned a unique order number. The manifest number is also entered on the tracking log to ensure accountability of documentation and positive cross-reference capability. Materials are inspected by Lighting Resources drivers at the point of origin for packaging, transport compatibility, and compliance with materials that can be accepted at the Facility. Materials and packaging compliance issues are resolved prior to acceptance of the load between the driver, LRL supervisor and materials generator. Containers or pallets of containers are labeled to ensure compliance with transportation regulations and generator/customer accountability. For materials shipped or delivered to the Lighting Resources Facility, boxes and drums are inspected for leakage, weighed, opened, and physically examined and counted.

Upon arrival of the materials at the Facility, the bills of lading/manifests are signed by Facility receiving personnel acknowledging receipt of the materials. The weight/physical count inventory is recorded on the shipping documents (bill of lading or manifest or count sheet) and subsequently entered into a computer database. The database is designed to record pertinent information about the shipment and to provide “cradle to grave” accountability of materials both received and transported offsite for additional processing, treatment, recycling or disposal. The following information (if applicable/available) is retained within the Lighting Resources’ database:

* Order Number ,
* Date of receipt of materials,
* Date of processing of materials,
* Customer name,
* Generator name,
* Customer EPA Site ID Number,
* Generator EPA ID Site Number,
* Bill of Lading/Manifest Number,
* Waste type and quantity,
* Date that hazardous residues (on site generated phosphor powder) are shipped off-site for retort mercury reclamation,
* Outbound Manifest Number,
* Transporter name,
* Name of receiving reclamation facility,
* EPA Site ID Number of receiving reclamation facility,
* Date of processing by receiving reclamation facility, and
* Certificate of Recycling/Destruction Number/Date issued by the receiving reclamation facility.

Paper documents are retained for a minimum period of three years. The original copy of the signed hazardous waste manifest is returned to the generator. If required by the generator, the original copy of the signed non-hazardous waste manifest is returned to the generator. The Certificate of Recycling issued by Lighting Resources is sent to the customer. The Certificate of Recycling bears the Order Number and the bill of lading/manifest number. Bills of lading are attached to and filed with the copy of the Certificate of Recycling alphabetically by customer or scanned and filed by invoice number. Uniform Hazardous Waste Manifests are filed separately from the receiving documents and also scanned.

## 3.15 Facility Operating Records and Records Retention

Records related to universal and hazardous waste management activities at the Facility are maintained for a minimum of three (3) years, and are made available upon request for inspection by any officer, employee, or representative of the DEP or U.S. EPA.

Information entered and maintained in the Facility operating records will include:

* Waste Disposition,
* Description of each waste received,
* Quantity (by description) of each waste received,
* Method of its storage (and processing),
* Date of receipt.
* The location and quantity of each waste, cross-referenced to the specific bill of lading/hazardous waste manifest (if a manifested waste),
* Records, analyses and results of waste characterizations and waste acceptance forms,
* Contingency plan implementation reports,
* Inspection records; results, and corrective measures,
* Notices to generators of facility permit cancellations,
* Closure cost estimates and annual updates,
* Annual hazardous waste minimization certification,
* Any notices, certifications and demonstrations received from generators, pursuant to the land disposal restrictions of Title 40 CFR § 268, and
* Other monitoring, testing, analytical data or corrective action information or data.

## 3.16 Mercury-Containing Lamp Description

The only hazardous constituent at levels of concern in the materials that are processed by Lighting Resources is mercury (USEPA Hazardous Waste Code - D009). The source of the mercury is a small droplet of elemental (liquid) mercury that is contained within the lamp interior. During the life of the lamp, the charged mercury atoms discharge ultraviolet (UV) light, which is absorbed by a phosphor coating on the inside of the cylindrical glass lamp. When energized, the phosphors emit the light seen. The mercury is instantly volatized when the lamp is turned on and re-condenses when external power is removed.

A typical 4-foot fluorescent lamp (type T-12 lamp) weighs 290 grams or about 0.64 pounds. Of this total weight, approximately 96% consists of glass with the metal end caps and phosphor powder comprising approximately 2% each of the remaining total weight. The weight of the mercury in the T-12 lamps will range between approximately 20 and 30 milligrams.

Other lamp sizes or types received for processing may include 8-foot fluorescent lamps, U-bend lamps, circle lamps, plastic coated lamps, and HID (high intensity discharge) lamps. Fluorescent and most HID lamps contain some quantity of elemental mercury. The mercury will, through use of the lamp, migrate into the phosphor powder coating on the interior fluorescent glass tube wall, phosphor coating on some HID lamps, or remain as a component of the fill gas in HID lamps. The amount of mercury in other type lamps will depend on the lamp type/size and can vary from 5 milligrams to 75 milligrams.

## 3.17 Lamp Processing Equipment and Operation

The Lighting Resources Facility uses the Balcan MP8000 equipment to process lamps. The Balcan MP8000 equipment is a completely self-contained, negative pressure lamp processor that has been designed and installed to separate, clean, and collect components of mercury containing and incandescent type lamps and other bulbs. The Balcan MP8000 can process up to 5,000 four (4)-foot fluorescent T-12 type lamps per hour through the primary in-feed conveyor while simultaneously accepting, processing, and separating glass, metal components, and mercury containing phosphor powder through the secondary process unit from crushed lamps including:

* Fluorescent lamps,
* Compact fluorescent lamps (CFL),
* Incandescent lamps, LED lamps, and
* High intensity discharge (HID) lamps.

**Photo Insets 8** and **9** below, illustrate the different types of lamps that are processed and the metal components that result from processing. The maximum annual processing capacity (annual throughput) of the Balcan MP8000 is reported by the manufacturer to be between eight (8) and ten (10) million lamps based on one 8 hour shift. A copy of the manufacturer specifications for the Balcan MP8000 is provided in **Appendix C**. The maximum annual throughput at the Lighting Resources Facility is limited by the amount of dedicated storage / staging space at the Facility, and the daily processing time of twenty-four (24) hours.



Photo Inset No. 8: Array of lamps that can be processed by the Balcan MP8000

Photo Inset No. 9 Metal components resulting from lamp processing



### Lamp Processing Flow Diagram

A process flow diagram of the Balcan lamp processing, material separation, and transport offsite is presented in the diagram below.

**BALCAN MP8000**

**LAMP PROCESSING FLOW DIAGRAM**

**Processed Separated Metal Lamp Components**

**Processed Separated**

**Lamp Glass**

**Mercury Containing**

**Phosphor Powder**

**Collect into**

**various approved containers**

**Transport to**

**Businesses for commercial use**

**or**

**Subtitle D Landfill**

**Transport to**

**Authorized and Permitted**

**Mercury Reclamation Facility**

**for further Processing**

**Transport to**

**Scrap Metal Dealer**

**Collect into tippers and consolidated in rolloff containers or**

**various approved containers**

**Containerize in**

**55-gallon steel drums**

**Intact and Crushed**

**Mercury Containing Lamps**

***Lamp Processing Flow Diagram***

The total lamp storage volume is conservatively reflected in terms of the four (4)-foot T-12 lamps for the following reasons: 1) the size of these lamps are generally larger than other type lamps including CFLs, and U-Tubes; 2) it simplified the effort to calculate lamp storage and closure costs; and 3 *Storage space available for types will control the total amount of lamps actually stored not the conservative estimate. (cfl, straight, etc.)*A total number of 140,000 lamps was conservatively used in the closure cost estimate (see **Table 7-3** in **Section 7** of this Report), even though the maximum storage volume of 139,104 lamps was calculated.

The MP8000 processing equipment consists of the following three processing sections/units, and air extraction filter units:

* Section 1 - Primary Process Unit: is where whole (intact) fluorescent tubes are loaded onto an in feed conveyor, conveyed to a crusher for separation, and conveyed to Section 3 for further processing.
* Section 2 – Secondary Process Unit: is where other types of lamps (i.e., non-linear) and crushed fluorescent tubes are loaded into a hydraulic lift chamber and conveyed to a multi-purpose rumbler for separation, and conveyed to Section 3 for further processing.
* Section 3 – Cleaning /Sorting Unit: is where materials from Section 1 and Section 2 units are conveyed for further processing; specifically, where the glass cullet and metal components are cleaned of phosphor powder and are sorted by material type (i.e., glass cullet sorted from metal components).
* Air Extraction Filter Units: the Balcan MP8000 has two (2) air extraction filter units to remove mercury bearing phosphor powder and mercury vapors from the contents of the processed lamps.

A plan view drawing of the MP8000 equipment, illustrating the different sections/units is presented on **Drawing No. D4** (included in the tabbed section “**Drawings**”). **Photo Inset 9** below presents the layout of the different units. A detailed description for each of these sections/units is provided in the following paragraphs.

Photo Inset No. 9: Section 1 - Primary Process Unit in foreground; Section 2 -Secondary Process

Unit to the right; and Section 3 - Cleaning/Sorting Unit at far backend.



### Section 1 - Primary Process Unit

Intact fluorescent tube type lamps are fed into the Section 1 - Primary Process Unit via a 10-foot in feed conveyor. Once inside the enclosed primary unit, the lamps are imploded under a negative pressure environment (i.e., vacuum) initiating the separation of glass, metal components, phosphor powder, and vaporous mercury. Following implosion, the lamp components are moved automatically to the Section 3 Unit.

### Section 2 - Secondary Process Unit

Lamps other than intact fluorescent tubes (i.e., HID, CFL, “U” tubes, crushed or broken fluorescent tubes, incandescent, halogen bulbs, etc.) are processed through the Section 2 -Secondary Process Unit. This unit consists of a fully enclosed hydraulic lift chamber, a horizontal, rotating rumbler, and an enclosed conveyor system for transporting the glass cullet and other lamp components to the Section 3 Unit for cleaning and separation. Lamps and crushed materials are introduced into the secondary unit via the hydraulic lift unit. The fully enclosed hydraulic lift unit accepts loose bulk lamps or drums of crushed lamps and lifts and tilts to pour the materials into a rumbler. The horizontal, rotating rumbler breaks intact lamps through tumbling, and separates and conveys the materials to the Section 3 Unit for cleaning and sorting.

### Section 3 – Cleaning and Sorting Unit

Processed materials from the Sections 1 and 2 units are conveyed into the Section 3 – Cleaning and Sorting Unit. The Section 3 Unit consists of two (2) horizontal, rotating / vibrating rumblers (rumblers are each 4-meters long and are similar to trommels without screens/holes). Once inside the rumblers, the glass cullet and metal components are cleaned using a high-pressure vacuum to lift and collect the phosphor powder and mercury vapors. The cleaned glass and metals are conveyed from the rumblers into a magnetic separating chamber (i.e., chamber with rotating magnets) where the ferrous metal components are separated and removed from the glass cullet. The glass cullet then gets passed through a vibrating finger screen to separate and remove any remaining non-ferrous metals for separate capture while allowing the cleaned glass cullet to pass through for collection. Following the component cleaning and separation within the Section 3 Unit, the cleaned glass cullet and cleaned metal components are collected separately into cubic yard boxes, r 55-gallon drums or tippers. The collected glass and metals are tested for residual mercury contamination prior to release for local reuse in accordance with Chapter 62.737.840 F.A.C. (please refer to the *Sampling and Analysis Standard Operating Procedures* contained in **Appendix E**).

### Air Extraction Filter Units

The Balcan MP8000 has two (2) air extraction filter units to remove mercury bearing phosphor powder and mercury vapors from the contents of the processed lamps. Mercury-bearing lamp phosphor powder and air containing mercury vapors are drawn from fifteen separate locations on the Balcan processing units to ensure maximum collection of mercury vapors, and contaminated phosphor powder. Manufacturer information for the Balcan equipment and air extraction filter units is provided in **Appendix C**.

## 3.18 Analytical Testing of Processed Lamp Components

Analytical testing has been performed on the processed lamp components at the Lighting Resources Texas, LLC Facility located in Fort Worth, Texas. This facility uses the Balcan MP8000 equipment. A summary of the testing performed and analytical results is presented in **Table 3-4** below. The analytical results show that the lamp glass and lamp metals were below the U.S. EPA regulated toxicity level for mercury of 0.2 mg/L based on the toxicity characteristic leaching procedure (TCLP). A copy of the analytical results is provided in **Appendix C**.

|  |  |  |
| --- | --- | --- |
| Table 3-4  Lighting Resources, LLC - Mercury Recovery Facility, Ocala, FL  Summary of Analytical Testing for Mercury | | |
| Material Tested | Test Method | Result |
| Lamp Glass | TCLP Metals: SW846 – 1311/7470A | 0.0149 mg/L |
| Lamp Metal End Caps | TCLP Metals: SW846 – 1311/7470A | 0.0121 mg/L |
| Phosphor Powder  Sample A-1 | TCLP Metals: SW846 – 1311/7470A | 0.0154 mg/L |
| Total Mercury: SW846 – 7471B | 69 mg/kg |
| Phosphor Powder  Sample A-2 | TCLP Metals: SW846 – 1311/7470A | 0.0862 mg/L |
| Total Mercury: SW846 – 7471B | 640 mg/kg |

## 3.19 Phosphor Powder / Mercury Vapor Capture and Air Pollution Control

The MP8000 is equipped with two air extraction filter units, each unit having a particulate capture and mercury vapor collection / filtration sub-units. The air extraction units are designed to draw off mercury-bearing phosphor powder and mercury vapor from the contents of the lamps down to a particle size of five (5) microns. Both air extraction filter units operate continuously to ensure the lamp processing is conducted under a negative pressure (i.e., under vacuum) at all times. Mercury bearing phosphor powder is collected on the unit filters down to a 5-micron particle size. Dusts finer than 5-microns and vapors that pass through the filter units are ducted to a main filter stack that contains sulfur-based activated carbon. The mercury reacts with the activated carbon and allows the exhausted air to be mercury-free.

Mercury bearing phosphor powder and air containing mercury vapors are drawn from fifteen separate locations on the processing equipment to ensure maximum collection of mercury, mercury vapors, and contaminated phosphor powder. The air and particulate filtration units are set to operate continuously for mercury vapor collection and fugitive emission prevention. The air discharge from the filtration units is vented and released directly within the confines of the lamp processing room obviating the necessity of an exterior exhaust stack(s). The environmental benefits and protections garnered are incalculable as the lamp processing machine’s integral air filtering system will continuously recirculate and clean the air potentially exposed to vaporous mercury.

HEPA filters used to separate phosphor powder are cleaned via continuous air backflow and collected in sealed 55-gallon steel drums attached directly to the air filtration units. Each drum collects powder from approximately 40,000 fluorescent lamps. When filled, drums are removed from the machine, classified as D009 characteristic hazardous waste, and staged for transport offsite to an authorized and permitted mercury reclamation facility.

Manufacturer information for the Balcan equipment and air extraction filter units is provided in **Appendix C**.

## 3.20 Air Monitoring and Air Emission Control

Internal air quality is routinely monitored for mercury vapor in the air to ensure that personnel are working in a safe environment, and to ensure that the air pollution control equipment is operating properly. Lighting Resources monitors specific areas of the Facility on a daily basis to ensure that the mercury levels are well below the OSHA Permissible Exposure Limit (PEL) of 0.1 mg/m3. Specifically, Lighting Resources utilizes a threshold limit of 0.05 mg/m3 and ensure Facility levels do not exceed this limit. The threshold limit of 0.05 mg/m3 is the recommended exposure limit (REL) established by the National Institute for Occupational Safety and Health (NIOSH). The NIOSH REL of 0.05 mg/m3 is a time weighted average for up to a 10-hour workday and a 40-hour work week.

The areas where monitoring is performed are shown on **Figure 7** on the following page. Lighting Resources takes ambient air readings using a Jerome 431 X Mercury Analyzer. Air readings are taken in the Administrative Office area and in Areas A, B, and C. The air monitoring form lists the sampling locations and air monitoring readings obtained. Air monitoring is performed every two hours throughout each work day. The air monitoring form contains the following information:

* Date and time of monitoring,
* Monitoring locations,
* Person’s name performing the monitoring, and
* Mercury vapor reading.

This mercury analyzer instrument has a sensitivity of 0.001 mg/m3. During operation of the lamp processing equipment, air monitoring also includes additional sampling of the Balcan air filtration system (in Area B – the Lamp Processing Room) to assure that it is functioning properly.

In the unlikely event the ambient room air exceeds the designated threshold limit of 0.05 mg/m3, Lighting Resources requires the use of half-mask or full-face respirators with NIOSH mercury filters /cartridges by Facility personnel until the source of the mercury has been detected and mitigated. The Facility Manager or Emergency Coordinator makes this determination. Employees are trained to use OSHA Level C protection which includes air-purifying respirators. If mercury levels exceed concentrations appropriate for Level C protection, Facility operations are immediately halted, personnel are evacuated (refer to **Drawing No. D7** for locations of Facility building evacuation points, and emergency meeting points located outside of the Facility building), and emergency responders are contacted (please refer to **Section 4** for emergency procedures). Facility operations will not resume until the Lighting Resources Emergency Coordinator determines that it is safe to do so.

INSERT FIGURE 7

In the event there are spikes in the mercury levels in localized areas, the cause is determined and appropriate remedial action is taken. A spike would typically indicate an excess lamp breakage in a given shipment with poor containment, an equipment malfunction or system leak. Air filtration media is deemed "saturated" and is replaced when mercury emissions reach the threshold limit of 0.05 mg/m3. Frequent testing in multiple locations of the Facility during operations ensures that malfunctions are corrected promptly.

Lighting Resources also has an extensive floor maintenance program to minimize potential contamination of the plant floor. Areas potentially contaminated through lamp breakage are cleaned immediately upon breakage. Lighting Resources routinely sweeps the fFacility floors. There are also sticky mats at the entrance from Area A to the Offices and from Area B Processing Room to Area A to trap any contamination from the plant floor.

## 3.21 Sampling and Analytical Testing of Processed Lamp Materials

In accordance with 62-737.840 F.A.C., Lighting Resources conducts routine sampling and analyses of the processed lamp materials prior to shipment offsite for further processing, recycling, or disposal. A brief summary of the sample collections and testing that is performed is provided below. A detailed sampling and analysis plan is provided in **Appendix E**.

### Sampling and Testing

Lighting Resources takes daily physical samples separated glass, and the separated metal from straight lamp conveyor (1) and multipurpose (2) at the point at which the materials exit the lamp processing equipment. Collected samples are representative of the materials processed during the day they were collected. At the beginning of each week and more often, as necessary, to facilitate the offsite transport of separated glass, the prior week’s daily samples are consolidated into one or more weekly composite sample(s) and submitted for chemical analysis of total mercury content (or alternatively TCLP mercury content) using an approved EPA methodology. The weekly composite sample is prepared by thoroughly mixing equal amounts of the daily samples into a single container. The results of this analysis shall be considered the *weekly composite sample of process operations*. The **total mercury content** **of the *weekly composite sample of process operations* must be less than** **3 parts per million** **(ppm)**, if the tested materials are to be shipped to a facility other than a mercury reclamation facility.

### Twelve (12)-Week Average of Mercury Content

In accordance with 62-737.840 F.A.C., Lighting Resources maintains a 12-week average value of the levels of mercury contained in the processed glass and processed metals. The 12-week average is a rolling average calculated using the most recent 12-weekly test results obtained from the weekly tested composite samples. The **12-week average for** **total mercury content** **must be less than 1 ppm**, if the tested materials are to be shipped to a facility other than a mercury reclamation facility.

## 3.22 Inspection and Maintenance Program

Facility equipment, systems, structures, and material handling / processing /storage/ staging areas are routinely inspected and maintained in a manner that ensures continued and proper operation compliant with applicable regulations. Personnel are assigned to routinely inspect and maintain the following:

* Overall facility cleanliness,
* Personal protective equipment,
* Safety and emergency equipment,
* Lamp processing equipment,
* Air handling system filters,
* Forklifts,
* Monitoring equipment,
* Material handling, processing, and staging areas (Areas A, B, and C),
* Facility floors, walls, and structures,
* Site fencing and gates,
* Site access roads,
* Receiving / loading dock area,
* Facility signage,
* Stored containers,
* Inventory of supplies,
* Employee restrooms,
* First aid equipment, and
* Spill emergency kits and equipment.

Equipment is inspected and maintained in accordance with the manufacturer's recommendations. The frequency of inspection depends upon the item. A detailed description of the Facility inspections and maintenance including scheduled frequency and lamp equipment maintenance (with photos) is provided in **Table 8-1** in **Section 8**. The inspection schedule is followed for conducting routine preventative maintenance. If equipment or associated parts are found to be faulty or worn out, the equipment shall be repaired or replaced as soon as practical. Proper equipment and supplies are available for use at the Facility during hours of operations to ensure the continued and proper operation of the Facility.

# 4.0 EMERGENCY PROCEDURES AND HAZARDOUS WASTE CONTINGENCY PLAN

The purpose of this document is to describe the Emergency Procedures and Hazardous Waste Contingency Plan (Plan) for the Lighting Resources Facility and its operations pursuant to Title 40 CFR Part § 264, Subpart D, and Chapter 62-737 F.A.C. The provisions of this Plan are to be carried out immediately whenever there is a medical emergency, or a fire, explosion, or spill / release of hazardous waste or hazardous waste constituents (mercury and other) which could threaten human health and/or the environment (in accordance with Title 40 CFR § 264.51(b)). This Plan outlines specific responsibilities and procedures for the prompt and effective response to an emergency situation. This Plan is organized by the following sections:

* Emergency Responsibilities of Emergency Coordinators,
* Emergency Contact Information,
* Regulatory Agencies Contact Information,
* Emergency Equipment,
* Medical Emergency Procedures,
* Fire and Explosion Emergency Procedures, and
* Mercury (or other Hazardous) Spill / Release Emergency Procedures.

This Emergency Procedures and Hazardous Waste Contingency Plan is designed to meet the applicable requirements of Title 40 CFR § 264, Subpart D, and Chapter 62-737 F.A.C.

## 4.1 Emergency Responsibilities of Emergency Coordinators

The Facility Manager serves as the primary Emergency Coordinator, and the Operations Manager, Logistics Coordinator, or Office Administrator will serve as the alternate Emergency Coordinator in the absence of the Facility Manager. Both the primary and alternate Emergency Coordinators have been appropriately trained to respond to emergencies that could potentially occur throughout the Facility. In the unlikely event of an emergency, the designated Emergency Coordinator is responsible for implementing the response actions outlined within this Plan.

## 4.2 Emergency Contact Information

An emergency contact list containing the names and contact phone numbers listed below, is posted in the Administrative Offices, and within Areas A, B, and C of the Facility. The emergency contact list is clearly posted in each designated area on a wall that is unobstructed from view and access.



## 4.4 Emergency Equipment

Lighting Resources shall maintain the following emergency equipment on-site and in working condition:

* Fire Extinguishers. Portable fire extinguishers are maintained in the Facility building (see **Drawing No. D7** for locations) to extinguish a fire if one should occur.
* Mercury Vacuum. Mercury vacuums (2) are maintained at the Facility for the cleanup of mercury spills and containment of mercury vapor in a HEPA / ULPA filter.
* Mercury Spill Kit. Commercial spill kits (2) are maintained in the Facility building (see **Drawing No. D7** for locations) to respond to a mercury spill if one should occur. The spill kit will include but not be limited to: absorbent powder (e.g., MerconSORB™, Hg Absorb®, etc.), absorbent sponges, pump/aspirator, a cleaning/decontaminating solution (to safely suppress Mercury vapor), nitrile gloves, safety glasses, wipes, rinse bottle, recovery bags. Directions on how to use the equipment is located in the cover of the box.
* Hazardous Material Release / Spill (*other than Mercury*). The following equipment is maintained in the Facility building to facilitate containment of a hazardous material release or spill while waiting for emergency responders to arrive and take over:
* Plastic bags and sheeting,
* Vermiculite,
* General Purpose Detergent,
* D.O.T. containers & recovery drums,
* Shovels, brooms, and various other hand tools, and
* Barricades / cones.
* Respirators. Half-Mask respirators with mercury vapor cartridges and HEPA filters are available for use in an emergency. Respirators are maintained in a cabinet located between the Areas A and B rooms of the Facility Building.
* Protective Clothing. Teak full-body coveralls (or similar) are available for use in an emergency to provide protection from fluorescent lamp powder (i.e. dust) and mercury particulates. Coveralls are maintained in a cabinet located between the Areas A and B rooms of the Facility Building.
* First Aid Kits and Eye Wash Stations. Commercial first aid kits and eye wash stations are located throughout the Facility (see **Drawing No. D7** for locations). The contents of the first aid kits or eye wash stations are used in the event of an accident.
* Mercury Vapor Analyzer. A Jerome Mercury Vapor Analyzer is maintained on-site to routinely perform air monitoring and to monitor mercury vapor emissions in an emergency. The mercury vapor analyzer is kept in the Administrative Office area.
* Communication Devices. The Emergency Coordinators carry cellular phones. Additionally, telephones are located within the Administrative Offices, Area A and Area B and are available to Facility personnel to call 911 and emergency assistance.

## 4.5 Medical Emergency Procedures

Employee injuries at the site shall be reported immediately to the Emergency Coordinator in charge. The Emergency Coordinator shall determine whether the injury is minor and can be attended to on-site, or whether the injury is a medical emergency that warrants immediate attention by a medical professional offsite. The Emergency Coordinator shall implement the procedures outlined below in the event of an on-site injury.

### Emergency Coordinator Medical Emergency Procedures

1. Quickly evaluate the type and extent of injury. If the injury is determined to be a medical emergency follow steps 2 through 7 below.
2. Contact Ocala 911 Emergency Services with the location and details of injured party, and assign a worker to stand at the Facility entrance to direct incoming emergency services personnel upon their arrival.
3. Move injured personnel ONLY if failure to do so will result in additional harm or injury.
4. Begin emergency first aid as needed on injured personnel (including CPR if needed) until emergency services personnel arrive on site and take over scene.
5. If injury is a result of an operational activity, instruct workers accordingly with appropriate emergency response to remove the risk of further injury.
6. Notify the applicable local, state, and federal agencies of such emergency as required by specific regulations.
7. Document incident and response, and maintain documentation on file for a minimum period of three years.

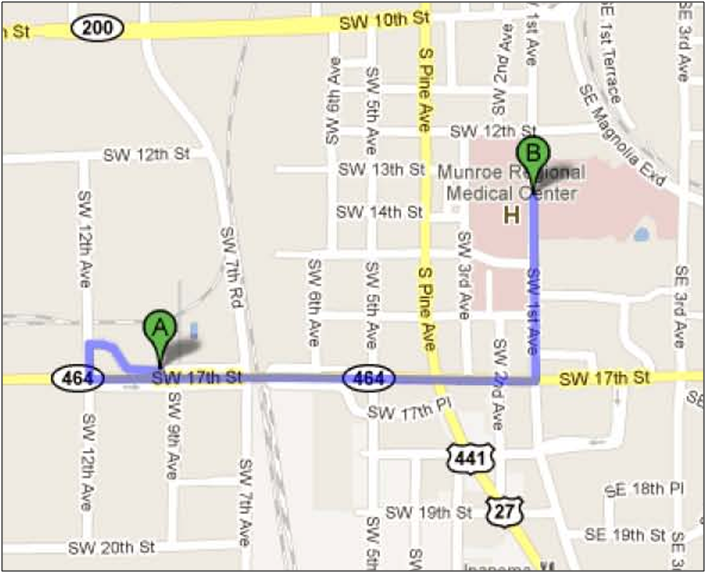
### First Aid Stations

First Aid supplies for minor injuries are available at five (5) first aid stations located throughout the Facility as shown on **Drawing No. D7**. As part of employee safety training, staff is shown where first aid stations are located.

### Local Medical Facility

The Ocala Regional Medical Center is located at 1431 SW 1st Ave, in Ocala, Florida, Telephone: 352-351-7200 and is approximately 1.1 miles from the Lighting Resources Facility as shown in the map on the following page.

*Emergency Route to Ocala Regional Medical Center*



## 4.6 Fire and Explosion Emergency Procedures

If a fire or explosion occurs at the Facility, notify the Emergency Coordinator immediately. A description of the incident including the location and extent as well as the threat to life or property shall be given. The Emergency Coordinator implements the procedures outlined below in the event of a fire or explosion emergency.

### Emergency Coordinator Fire and Explosion Emergency Procedures

1. Quickly notify site personnel by public address system or in person, specifically instructing non-emergency trained personnel to quickly evacuate the Facility, and instructing emergency trained personnel where to assembly to assist in response effort.
2. Evaluate the situation to determine if injuries are involved. If serious injuries are involved, quickly move injured parties to a safe location (as necessary) and notify Ocala 911 Emergency Services relaying the site location and emergency situation. Assign the appropriate staff person to wait at the Facility entrance to direct emergency services personnel upon arrival.
3. Instruct emergency trained personnel to begin firefighting activities (as necessary) with available fire extinguishers if this can be done without threat to their safety. If mercury-containing materials are involved, ensure that workers are wearing proper respirators and other required personal protective equipment (PPE).
4. Begin and/or supervise first aid on injured parties as needed.
5. Evacuate workers immediately at any time that continued firefighting activities endanger them (points of evacuation throughout the Facility building, and meeting locations outside of Facility building are presented on **Drawing No. D7**).
6. Continue with and/or supervise appropriate emergency and/or first aid procedures until relieved by emergency service personnel.
7. If the incident involves mercury containing materials, inform emergency service personnel upon arrival, the need to use respirators and any other PPE, and if necessary provide emergency service personnel with appropriate PPE.
8. Notify the applicable local, state, and federal agencies of the fire or explosion emergency as required by specific regulations.
9. Document incident and response, and maintain documentation on file for a minimum period of three years.

### Fire Detection and Suppression Equipment

The following detection and fire suppression equipment are available at the Facility:

* Smoke and fire detection systems,
* Nine (9) Type A fire extinguishers,
* Two (2) Type C fire extinguishers, and
* Fire hydrant located at front of property.

The locations of the fire extinguishers are shown on **Drawing No. D7** (tabbed section “**Drawings**”). As part of employee emergency training, staff is shown where fire extinguishers are located.

## 4.7 Mercury (or other Hazardous) Spill / Release Emergency Procedures

If a spill or release of mercury or other hazardous material occurs at the Facility, it is the duty of the Emergency Coordinator to provide the appropriate emergency response to prevent a threat to life or the environment. The Emergency Coordinator must be advised of any spill immediately and will make the necessary decisions necessary to implement an emergency response plan. The Emergency Coordinator shall implement the procedures outlined below in the event of a spill or release of mercury (or other hazardous material).

### Emergency Coordinator Procedures for Mercury Spill / Release at Facility:

1. Quickly evaluate the situation to determine if injuries are involved. If serious injuries are involved, quickly move injured parties to a safe location (as necessary) and notify Ocala 911 Emergency Services relaying the site location and emergency situation. Assign the appropriate staff person to wait at the Facility entrance to direct emergency services personnel upon arrival. Note: move injured parties to safety ONLY if it can be done without threat of additional injury. If movement is not possible, immediately place the injured party on oxygen.
2. Notify personnel not wearing respirators to evacuate the affected spill / release area (points of evacuation throughout the Facility building, and meeting locations outside of Facility building are presented on **Drawing No. D7**).
3. Begin and/or supervise first aid on injured personnel as necessary. Immediately cover open wounds to protect from exposure. Continue first aid until relieved by emergency services personnel.
4. Instruct workers wearing respirators to immediately spray calcium polysulfide wetting solution (or other equivalent product for suppression of mercury vapors) on spilled mercury containing materials.
5. Upon arrival, advise emergency services personnel of the need to use respirators and provide to them if necessary.
6. Use contained mercury vacuum system to collect spilled mercury containing materials. Keep mercury containing materials wet with calcium polysulfide solution (or other equivalent product for suppression of mercury vapors).
7. Wash floor with trisodium phosphate, HgX®, MERCONTM or other approved equivalent product; vacuum residue with contained collection system; and allow the washed area to air dry.
8. Check mercury vapor level with direct reading using a Mercury Vapor Analyzer. Continue to wear respirators until mercury vapor level drops below 0.05 mg/m3.
9. Notify the applicable local, state, and federal agencies of incident as required by specific regulations.
10. Document incident and response, and maintain documentation on file for a minimum period of three years.

*Emergency Coordinator Procedures* *for Other Hazardous Material Spills / Release:*

1. Quickly evaluate the situation to determine if injuries are involved. If serious injuries are involved, quickly move injured parties to a safe location (as necessary) and notify Ocala 911 Emergency Services relaying the site location and emergency situation. Assign the appropriate staff person to wait at the Facility entrance to direct emergency services personnel upon arrival. Note: move injured parties to safety ONLY if it can be done without threat of additional injury. If movement is not possible, immediately place the injured party on oxygen.
2. Notify personnel to evacuate spill / release area and wait for emergency responders to contain and cleanup spill / release (points of evacuation throughout the Facility building, and meeting locations outside of Facility building are presented on **Drawing No. D7**).
3. Begin and/or supervise first aid on injured personnel as necessary. Immediately cover open wounds to protect from exposure. Continue first aid until relieved by emergency services personnel.
4. Notify the applicable local, state, and federal agencies of incident as required by specific regulations.
5. Document incident and response, and maintain documentation on file for a minimum period of three years.
6. Notify the applicable local, state, and federal agencies of incident as required by specific regulations.
7. Document incident and response, and maintain documentation on file for a minimum period of three years.

If a spill or release of mercury occurs en route to the Facility, it is the duty of the Emergency Coordinator to provide the appropriate emergency response to prevent a threat to life or the environment. The Emergency Coordinator is to be advised of any spill immediately and makes the necessary decisions necessary to implement an emergency response plan. The Emergency Coordinator will implement the procedures outlined below.

### Emergency Coordinator and Driver Procedures for Mercury Spill En Route to Facility

1. Quickly evaluate the situation to determine if injuries are involved. If serious injuries are involved, quickly move injured parties to a safe location (as necessary) and notify 911 Emergency Services relaying the site location, emergency situation, and assistance needed. Note: move injured parties to safety ONLY if it can be done without threat of additional injury.
2. Notify personnel not wearing respirators to evacuate the affected spill area. Use vehicle Warning Triangles to mark the spill area and to warn other motorists of the accident site.
3. Begin and/or supervise first aid on injured personnel. Immediately cover open wounds to protect from mercury exposure. Continue first aid until relieved by emergency services personnel.
4. Drivers will put on appropriate PPE (respirator, Tyvek suit, gloves, etc.), and cover any mercury contaminated materials leaking or seeping from the vehicle with a mercury absorbent type powder or decontaminant powder (e.g., MerconSORB™, Hg Absorb®, HgX®, or other approved equivalent). The affected spill area is to be covered with a tarp after powder is applied to prevent airborne spread of the spill.
5. Advise emergency services personnel of the need to use respirators and provide to them if necessary.
6. Do not open vehicle cargo area door until Emergency Coordinator and/or emergency response team is on site unless you can be reasonably sure that container (lamps, lamp boxes, etc.) breakage is very limited and that opening the vehicle cargo container will not contribute to additional release of mercury contaminated materials.
7. Upon notification of a spill incident by a Company driver or emergency services personnel, the Emergency Coordinator will immediately notify the following agencies of the spill event:

* Florida DEP Emergency Response Office: 407-893-3337,
* State Warning Point: 800-320-0519,
* National Response Center: 800-424-8802, and
* Emergency Response Team .Chem-tel 800-255-3924

1. The Emergency Coordinator will depart the scene only after the scene has been appropriately contained and remediated by the emergency response team.
2. Notify the applicable local, state, and federal agencies of incident as required by specific regulations.
3. Document incident and response, and maintain documentation on file for a minimum period of three years.

# 5.0 WORKER HEALTH AND SAFETY PLAN

The Worker Health and Safety Plan has been developed to protect the health and safety of Lighting Resources personnel and the general public, to be protective of the environment, and to comply with applicable local, state, and federal regulations (including but not limited to OSHA and DEP regulations). New personnel will receive comprehensive health and safety training prior to actual participation in production work at the Facility. Subsequent to receiving training, the new employees are closely supervised during the first few months of working in the Facility (by experienced and senior employees) to ensure they understand and follow proper procedures and protocol.

Worker health and safety training are performed on an ongoing basis, beginning with the initial new employee training, and continuing with monthly safety meetings, and yearly refresher training. This Plan is organized by the following sections:

* Fire Prevention and Control Procedures,
* Lockout/Tagout Procedures,
* Equipment Safety,
* General Safety Procedures,
* Air Monitoring, and
* Personnel Training.

## 5.1 Fire Prevention and Control Procedures

Facility personnel are trained on fire prevention and control procedures to minimize the threat of fire at the Facility, to be protective of their health and safety, and the public health and safety, and to be protective of the environment.

### Fire Prevention

Steps are taken to minimize the threat of fire at the Facility. These steps will include but are not limited to employee training, prohibition of smoking, and use of fire detection and suppression equipment. Each preventive step is discussed further in the following paragraphs.

### Employee Training

Employees are made aware of the common site specific fire hazards, the fire prevention and control procedures, and the proper evacuation routes and designated meeting areas in the event of a fire. Employees are instructed on the proper use of portable fire extinguishers.

### Prohibition of Smoking

Because combustible materials may be exposed, smoking will not be allowed within the Facility. Signs are displayed indicating the designated smoking areas.

### Fire Detection and Suppression Equipment

The Facility is outfitted with smoke and fire detection devices, and portable fire extinguishers. This equipment shall be inspected monthly to ensure they are in good working order. A licensed contractor will perform service on the fire extinguishers annually, or following each use.

## 5.2 Lockout / Tagout Procedures

Site personnel are trained on lockout / tagout procedures; specifically, personnel are taught the importance of using such procedures, which personnel are authorized to perform lockout / tagout of equipment, and under what circumstances will lockout / tagout be used.

### Lockout / Tagout

The purpose of this procedure is to establish the minimum requirements for the lockout/tagout of energy. It shall be used to ensure that before an employee performs servicing or maintenance activities where the unexpected energization or start-up of machines or equipment or release of stored energy could cause injury to employees, potentially hazardous energy shall be controlled by lockout/tagout methods.

Rules for Using Lockout / Tagout Procedures: Equipment shall be locked out/tagged out to protect against accidental or inadvertent operation when such operation could cause injury. At such time employees shall be instructed to not operate any switch, valve or other energy-isolating device bearing a lock/tag. Equipment which may not be locked out must, at a minimum, be tagged out to notify employees that the equipment is not safe for use.

Responsibility: The Facility Manager shall ensure that employees are properly instructed on lockout/tagout procedures, and on the safety significance of these procedures. If outside contractors are to be used to perform service or maintenance on machines or equipment at the Facility, Lighting Resources and the contractor will familiarize each other with their respective lockout/tagout procedures.

Requirements for Locks / Tags. The following is a list of requirements for lockout / tagout devices to be used at the Facility:

* *Durable*: Devices must be durable for the environment in which they are placed. Tags must be resistant to the site conditions and remain legible for the period of time that they are used.
* *Standardized*: Across the site, locks and tags must be standardized by color, shape or size. Tags must also use a standard print and format.
* *Substantial*: Locks must not be capable of being removed without the use of excessive force or unusual techniques. Tags must not be able to be removed inadvertently or accidentally. In addition, tags must be attached with a non-reusable type of attachment.
* *Identifiable*: Tag must identify the employee that marked the device. For tags on energized equipment, the tag must provide a specific warning against operation of the machine or equipment.

Preparation for Lockout / Tagout: An investigation shall be made to locate and identify energy sources to be certain which switch, valve or other energy isolating devices apply to the equipment to be locked out/tagged out. More than one energy source may be involved. Questionable energy source problems shall be resolved before job authorization is obtained and lockout / tagout commences.

Sequence of Lockout/Tagout Procedures: The following is the sequence of lockout / tagout procedures that must be followed at the Facility:

1. Only an authorized employee may execute lockout / tagout procedures.
2. Notify affected employees that a lockout / tagout is required and the reason it is required.
3. If the equipment is operating, shut it down by the normal stopping procedure.
4. Verify that isolation and de-energization of the machine or equipment has been accomplished.
5. Follow equipment-specific repair or maintenance procedures.

Restoring Equipment to Normal Operations: The following is the sequence of procedures to follow when restoring equipment to normal operations:

1. Only the employee who originally locked out/tagged out the equipment may remove the devices, unless otherwise authorized by the Facility Manager.
2. After the servicing and/or maintenance are complete and equipment is ready for normal operation, check the area around the machines or equipment to ensure that no one is exposed.
3. After tools have been removed from the affected machine or equipment, guards have been reinstalled and personnel are clear of the area, remove lockout or tagout devices. Operate the energy isolating devices to restore energy to the machine or equipment.
4. Notify employees that lockout/tagout devices have been removed from the machine or equipment.

## 5.3 Equipment Safety

Facility personnel are trained to implement the following safety procedures when operating equipment:

* Immediately report malfunctions,
* Check equipment before starting,
* Use steps and hand holds,
* Keep steps clean,
* Inspect area before operating equipment,
* Operate from driver’s seat only,
* Wear seat belts,
* Never mount operating/moving equipment,
* Keep attachments low,
* Check blind areas,
* Keep enough clearance,
* Avoid excessive speed/power,
* Park on level ground,
* Lower attachments to ground when parked,
* Avoid leaving equipment unattended,
* Always work with adequate lighting,
* Clean equipment before repairing,
* Be aware of nearby personnel,
* Check work area, and
* Use audible vehicle reverse movement warning devices.

## 5.4 General Safety Procedures

Special attention is paid to safety and steps are taken to minimize the risk to personal safety. These topics discussed below include communications and security, personal protective equipment and confined space entry.

### Hazard Communications and Security

Electrical service and telephones are available for regular and emergency communications. Should any part of the Facility be vandalized, Lighting Resources will immediately notify the Police Department. The portion of the site or equipment that has been vandalized is inspected to determine the amount of damage. If equipment is determined to be unsafe it is locked out/ tagged out until maintenance can be performed.

### Personal Protective Equipment

Employees at the Facility are required to wear proper personal protective equipment (PPE). Required PPE may include gloves, hearing protection, eye protection, hard hats, steel-toed boots, chemical protective coveralls, half-face or full-face respirators or a combination of the above as required for specific tasks or work areas. Employees are trained in the proper use and care of PPE and are fit tested for respirator equipment as appropriate.

### Confined Space Entry

In the event that a confined space entry must occur, proper notification procedures are followed to help ensure that accidents do not occur at the Facility. A confined space is considered to be a space that is large enough and so configured that it can be bodily entered to perform work, with limited or restricted means of entry or exit, but is not designed for continuous employee occupancy. Employees are trained in the procedures for recognizing and conducting confined space entries.

## 5.5 Air Monitoring

Designated employees (See Table 3-1 are trained on air monitoring procedures at the Facility. Monitoring points, proper use and maintenance of monitoring equipment, monitoring documentation, action level, and frequency of monitoring are included as part of the training. Air monitoring of the Facility are conducted every two hours during each operating day to ensure that personnel are working in a safe environment. A detailed discussion of the air monitoring procedures is provided in **Section 3.20**.

## 5.6 Personnel Training

The primary objectives of the personnel training program are as follows:

* To make employees aware of the potential hazards they may encounter;
* To provide the knowledge and skill training necessary to protect employee health and safety, and the environment;
* To make workers aware of the purpose, and the limitations of process and safety equipment; and
* To ensure that workers can respond to emergencies.

The personnel training program consists of initial new employee training, monthly safety meetings, and a yearly formal refresher training program conducted or coordinated by the Facility Manager.

### Initial New Employee Training

Initial new employee training is conducted for new employees under the direction of the Facility Manager. Facility personnel are trained in accordance with Title 40 CFR § 265.16. Specifically, personnel must successfully complete a program of both classroom instruction and on-the-job training that teaches them to perform their duties in a manner to comply with the requirements of Title 40 CFR § 265.16. The initial new employee training is comprehensive and is provided to new employees. The new employees are closely supervised during the first few months of working in the Facility (by experienced and senior employees including the Facility Manager and Operations Manager) to ensure they understand and follow proper procedures and protocol.

The training is broken down into two parts: Part I consists of new employee orientation provided to new employees covering corporate and Facility policies and training relevant to the Facility; and Part II training which is position / title specific training consists of OSHA, RCRA, DOT and other regulatory training. A summary of the training provided to new employees is provided on the following page on **Table 5-1**. A detailed discussion of personnel training is also provided in **Section 3.4** of this Report.

|  |  |
| --- | --- |
| Table 5-1  Lighting Resources, LLC - Mercury Recovery Facility, Ocala, FL  Initial New Employee Training | |
| Position Title (#) | Required Training |
| **Part I – New Employee Orientation:** | |
| ALL Staff | * Company policies and procedures * Mercury Right to Know * RCRA Training * Pre-placement physical requirements * Universal Waste Handler Training Plant tour: process and safety equipment * OSHA Hazard Communication * U.S. DOT Hazardous Materials Training * Production tasks orientation * Environmental and waste control * Material handling tasks orientation |
| **Part II – Title Specific Training:** | |
| Facility Manager (1) | * 40-Hour HAZWOPER Training Air Monitoring * Reasonable Suspicion Training |
| Operations Manager (1) | * 40-Hour HAZWOPER Training * Air Monitoring * Reasonable Suspicion Training * Forklift Certification |
| Processing Supervisor (1) | * 40-Hour HAZWOPER Training * Forklift Certification |
| Warehouse Supervisor (1) | * 40-Hour HAZWOPER Training * Air Monitoring * Forklift Certification |
| Logistics Coordinator (1) | * 24-Hour HAZWOPER Training * Reasonable Suspicion Training |
| Office Administrator (1) | * 24-Hour HAZWOPER Training * Reasonable Suspicion Training |
| Driver -CDL Class “A” (4) | * 24-Hour HAZWOPER Training * Hazmat Endorsement |
| MCL / Lamp Processing Operators (2) | * 24-Hour HAZWOPER Training |
| **Note:** Personnel receive training on the use and types of personal protective equipment to be used at the Facility as appropriate. Further, personnel are fit tested for respirator equipment. | |

### Monthly Safety Meetings

Monthly safety meetings are held to reinforce and review basic safety principles. In order to maintain safety awareness Facility employees will participate in the monthly safety meetings. The topics for the monthly safety meetings will review any incidents occurring on-site during the past month and various topics taken from the *Worker Health and Safety Plan or other sources*. Topics may include:

Site control and works zones

Hazardous chemical and waste management

Plant process and safety equipment

Resource Conservation and Recovery Act (RCRA)

Toxic Substance Control Act (TSCA)

Review of Material Safety Data Sheets (MSDS)

Receipt, processing, and material handling procedures

U.S. DOT – Safe Transportation of Hazardous Materials

Security policies and procedures

Waste storage, staging, pre-shipment, and disposal policies, methods, and procedures

Good housekeeping policies and procedures

Emergency Prevention and Preparedness:

Waste Analysis Plan

Emergency contingency plan

Decontamination / clean-up procedures

Personal protective equipment and air purifying respirator training

Air monitoring

Basic and advanced first aid training

Emergency site evacuation

Fire safety and fire extinguisher training

Lamp processing equipment use and safety

Forklift use and safety

Lockout / tagout procedures

### Yearly Refresher Training

Facility employees will receive the OSHA 8-Hour HAZWOPER refresher course to ensure that employees maintain current with their OSHA HAZWOPER certification.

U.S. DOT Safe Transportation of Hazardous Materials – The refresher course is currently on an every three year refresher schedule. Additional training as required due to changes in the laws. New employees are scheduled within the 6 months of their start date.

OSHA HAZ Com is included in the US DOT Safe Transportation However, new employees may take it separately to complete it within the 6 month period.

# 6.0 QUALITY CONTROL PLAN

This Quality Control Plan has been prepared to comply with applicable state and federal regulations including but not limited to 62-737.800(f) F.A.C. The Quality Control Plan includes the following components:

* Operating Practices and Procedures,
* Facility Inspections,
* Waste Identification Procedures,
* Sampling and Analysis Procedures, and
* Air Monitoring and Emission Control Procedures.

Lighting Resources ensures compliance by adherence to its materials handling and processing procedures, inspections and monitoring programs, and an aggressive waste acceptance and analysis procedures.

## 6.1 Operating Practices and Procedures

Quality assurance practices commence at the time of materials receipt. Drivers conduct inspection of materials offered for transport at customer facilities prior to acceptance. Unauthorized waste materials are be refused. Containers are inspected for safety and compliance with applicable regulations. Lighting Resources’ drivers are provided bills of lading or uniform hazardous waste manifests as appropriate. Additionally, material labels compliant with Title 40 CFR § 273 and Title 49 CFR § 172 are provided to the drivers and generators.

Materials delivered to the Facility by common carrier or directly by the generator are inspected for acceptance at the receiving dock by trained Lighting Resources personnel. Materials that are not authorized or are non-compliant due to improper containment, labeling, or other reason, are refused and the generator is immediately notified. A detailed waste acceptance program and load checking program are described in detail in **Section 3**.

Deliveries to the Facility are scheduled in advance when possible so that necessary tracking and inventory forms are available upon arrival. Material transport and receipt documents are reviewed and signed by the Operations Manager, Warehouse Supervisor, or Office Administrator for accurate preparation and completion. Information for materials received is entered into the Lighting Resources waste tracking database. Paper copies of documents, bills of lading, uniform hazardous waste manifests, inventory count sheets, etc., are maintained on site for a minimum of three (3) years.

### Daily Operations Procedural Review

The Office Administrator will update the material tracking forms daily. Additionally, the Facility Manager or designee will prepare a daily inspection report. (See **Appendix D**). Reports are maintained on site for a minimum of three (3) years.

### Training

In-depth personnel training is provided to employees and covers Facility operations and procedures, applicable job tasks, and regular health and safety training. Personnel training is discussed further in **Section 3.4** and **Section 5.6** of this Report.

### Equipment Performance

Equipment performance is monitored on a daily basis. Visual and audible keys are the primary indicators that the machinery is functioning as designed. Visual inspection of the discharge of glass readily identifies malfunctions; reduction in glass clarity or excessive lamp metals mixed in the glass discharge provides immediate indication that the Balcan MP8000 may not be functioning correctly.

The Balcan MP8000 has a number of catchment drawers designed to capture materials that are not properly processed or passed through the system. These catchment drawers are removed from the machine and emptied as needed and reviewed as part of the end-of-shift equipment inspection.

The Facility will use the Jerome Model 431X Mercury Vapor Analyzer as its mercury vapor detection device. Designated employees have been trained in its use and adjustment. Mercury vapor level readings are taken daily every two hours and provide indications regarding filter status and operation. If significantly increased mercury readings are observed, a special inspection is conducted immediately to determine the cause of the elevated reading and to perform necessary repairs or adjustments. The mercury vapor analyzer requires annual calibration and parts replacement. Lighting Resources will return the meter to the Arizona Instruments Company for the necessary maintenance and calibration within the manufacturers’ recommended service interval each year and will maintain the appropriate calibration and service records on site. Please refer to **Section 3.20** for more detailed information on air monitoring and emission control procedures.

Additionally, routine sampling and laboratory testing is conducted to analyze for residual mercury levels on the processed lamp glass and metals. If elevated levels are observed, an investigation is conducted to determine the cause and perform any necessary mitigation (please refer to **Appendix E** for the *Sampling and Analysis Standard Operating Procedures*).

## 6.2 Facility Inspections

Lighting Resources personnel conducts regular inspections of the Facility to ensure personnel health and safety, site security, proper operational practices, acceptable equipment operation, and compliance with applicable regulations. The Inspection Plan is presented in **Section 8**, and copies of inspection and monitoring forms are provided in **Appendix D**.

## 6.3 Waste Identification Procedures

The waste identification procedures are designed to ensure that Facility personnel possess sufficient information regarding the properties of the waste streams, and to ensure the safe handling, staging, and processing of materials in a manner that is protective of human health and the environment. The specific universal hazardous wastes handled and / or processed at the Facility is well defined and characterized.

Bills of lading and/or manifests are required for incoming material loads. Facility personnel review paperwork for each incoming load at the receiving / loading dock area, to ensure they are in proper order and accurately reflect what is being delivered. Further, loads are visually inspected to ensure there are no unauthorized materials, materials are properly contained, and containers are appropriately labeled (please refer to **Section 3** for a detailed discussion on waste acceptance procedures and load checking). Following inspection/staging the material containers are moved into the various material storage areas on-site for either processing (i.e., lamps) or transfer offsite (i.e., mercury containing devices, ballasts, and batteries). Containers are identified as follows:

* Intact mercury containing lamps (Area A),
* Crushed mercury containing lamps (Area A),
* Mercury containing devices (Area A),
* Batteries (Area A),
* Lamp ballasts (Area A),
* Mercury containing phosphor powder (Area B),
* Separated glass (Area C), and
* Separated metals (parked trailer outside building).

The above-listed materials are readily identifiable and do not possess other hazardous constituent or chemical characteristics of concern other than that associated with mercury.

### Incoming Materials

Data from both the U.S. EPA and the fluorescent and HID lamp manufacturers indicate that the types of lamps processed at the Facility normally exceed the 0.20 mg/kg TCLP toxicity threshold for mercury. Incoming lamps will therefore are assumed to be hazardous wastes, and testing of the incoming lamp materials will not be routinely conducted. Other materials (mercury containing devices, ballasts, and batteries) are accepted on-site for transfer to another facility for reclamation, treatment, recycling, or disposal (please refer to **Section 3** for further information).

## 6.4 Sampling and Analysis Procedures

In accordance with 62-737.840 F.A.C., Lighting Resources conducts routine sampling and analyses of the processed lamp materials prior to shipment offsite for further processing, reclamation, recycling, or disposal. A brief summary of the sample collections and testing that are performed is provided below. A detailed sampling and analysis plan is provided in **Appendix E**.

### Sampling and Testing

Lighting Resources takes daily physical samples of the separated glass and metal materials, individually, at the point at which the materials exit the lamp processing equipment. Collected samples are representative of the materials processed during the day they were collected. At the beginning of each week or more often if operations warrant, the prior week’s daily samples are consolidated into one weekly composite sample and submitted for chemical analysis of total mercury content (or alternatively TCLP mercury content) using an approved EPA methodology. The weekly composite sample is prepared by thoroughly mixing equal amounts of the daily samples into a single container. Sampling and testing is performed for both separated glass and metals individually. The results of this analysis shall be considered the *weekly composite sample of process operations*. The **total mercury content** **of the *weekly composite sample of process operations* must be less than** **3 parts per million** **(ppm)**, if the tested materials are to be shipped to a facility other than a mercury reclamation facility.

### Twelve (12)-Week Average of Mercury Content

In accordance with 62-737.840 F.A.C., Lighting Resources maintains a 12-week average value of the levels of mercury contained in the processed glass and processed metals. The 12-week average is a rolling average calculated using the most recent 12-weekly test results obtained from the weekly tested composite samples. The **12-week average for** **total mercury content** **must be less than 1 ppm**, if the tested materials are to be shipped to a facility other than a mercury reclamation facility.

## 6.5 Air Monitoring and Emission Control Procedures

Internal air quality is routinely monitored for mercury emissions in the air to ensure that personnel are working in a safe environment, and to ensure that the air pollution control equipment is operating properly. Lighting Resources will monitor specific areas of the Facility on a daily basis to ensure that the mercury levels are well below the OSHA PEL of 0.1 mg/m3. Specifically, Lighting Resources shall maintain levels below a threshold of 0.05 mg/m3 and ensure Facility levels do not exceed this limit. The threshold limit of 0.05 mg/m3 is the recommended exposure limit (REL) established by the National Institute for Occupational Safety and Health (NIOSH). The NIOSH REL of 0.05 mg/m3 is a time weighted average for up to a 10-hour workday and a 40-hour workweek.

The areas where monitoring is performed are shown on **Figure 7** (presented in **Section 3.20**). Lighting Resources takes ambient air readings using a Jerome 431 X mercury analyzer. Air readings are taken in the Administrative Office area and in Areas A, B, and C. The air monitoring form will list the sampling location and air monitoring readings obtained. Air monitoring is performed every two hours throughout each work day.

In the event there are spikes in the mercury levels, the cause is determined and appropriate remedial action is taken. A spike would typically indicate an excess lamp breakage in a given shipment with poor containment, an equipment malfunction or system leak. Air filtration media is deemed "saturated" and is replaced when mercury emissions reach the threshold limit of 0.05 mg/m3. Frequent testing in multiple locations of the Facility during operations will ensure that malfunctions are corrected promptly.

Lighting Resources also has an extensive floor maintenance program to minimize potential contamination of the plant floor and use sticky mats to further minimize potential contamination. Please refer to **Section 3.20** for a more detailed discussion of the air monitoring and emission control procedures.

# 7.0 CLOSURE PLAN

This Closure Plan has been prepared to meet the closure requirements of 62-737 F.A.C. A closure date for the Lighting Resources Facility has not been established and it is anticipated that the Facility will remain open and operate indefinitely. For purposes of this closure plan, a nominal date of twenty years from issuance of this permit has been chosen; therefore, the date for which closure activities would begin was assumed to be January 2032. It is recognized, however, that the term of permits issued by the DEP is five (5) years and will require periodic renewal.

## 7.1 Closure Procedures

It is anticipated that the Facility will remain open and operate indefinitely. However, for purposes of this Closure Plan the procedures for final closure of the Facility are the following:

* Notification of intent to close will be provided by Lighting Resources to DEP and to current clients at a minimum of 30 days prior to initiating any closure activities.
* Cease acceptance of universal wastes and lamp materials. Advance notice to clients will be provided so that they can redirect their materials to other authorized / permitted facilities.
* Complete the processing of existing inventory of lamps (MCLs); the sorting/segregation and containerization of other materials for loadout (batteries, ballasts, mercury containing devices, lamp glass, lamp metals, and phosphor powder, etc.).
* Transport 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, floors, walls, ceilings, and equipment surfaces inside the Facility building for evidence of contamination. If visual contamination is suspected then sampling, analytical testing, and decontamination procedures will be followed in accordance with procedures outlined in **Section. 7.3** and **Appendix E** of this Report.
* If no visual contamination is evident, the hazardous materials containment systems will be steam washed. The resulting wash water from this activity will be sampled, analyzed, and disposed of in accordance with applicable regulations.
* Lighting Resources will submit appropriate certification of closure to DEP.

## 7.2 Maximum Inventory Estimate

With the exception of the unprocessed MCLs (whole lamps) and lamp glass cullet, the maximum inventory to be stored at the Facility was estimated in drum equivalents and by weight. Drum equivalents and estimated weights (shown in parenthesis) were used in order to prepare the closure cost estimate. Most of the service vendors had provided pricing based on number of drums or poundage. The maximum storage limits based on physical space limitations were used to estimate the volumes presented in **Table 7-1** on the following page.

|  |  |  |
| --- | --- | --- |
| **1Table 7-1**  **Lighting Resources, LLC – Mercury Recovery Facility, Ocala, FL**  **Maximum Material Inventory at Closure** | | |
| **Material** | **Volume Estimate** | **Assumptions** |
| Mercury Containing Devices (MCDs) | Four (4) 55-gallon drums (3,000 lbs) | Assumed volume based on maximum available on-site storage for MCDs (refer to **Table 3-2** in Section 3 of this Report for full description of assumptions) |
| **Mercury Containing Lamps (MCLs):** | | |
| Unprocessed MCLs | 140,000 type T-12, 4-ft fluorescent lamps (90,000-lbs) | Volume was intentionally assumed higher (140,000 MCLs) than the maximum on-site storage of 139,104 lamps in order to provide a conservative closure cost estimate (refer to **Table 3-2** in Section 3 of this Report for full description of assumptions) |
| Processed / Crushed MCLs | Fifty-Six (56) 55-gallon drums (28,000-lbs) | Assumed volumes based on maximum available on-site storage (refer to **Table 3-2** in Section 3 of this Report for full description of assumptions) |
| Phosphor Powder (containing mercury) | Thirty-two (32) 55-gallon drums  (24,000-lbs) |
| Separated Lamp Glass (cullet) | Four (4) Rolloffs (<30,000 x 4 = 120,000 lbs) |
| Separated Lamp Metals | Sixty (60) 55-gallon drums (45,000-lbs) |
| **Lamp Ballasts:** | | |
| Non-PCB Lamp Ballasts | Thirty (30) 55-gallon drums (22,500-lbs) | Assumed volumes based on maximum available on-site storage (refer to **Table 3-2** in Section 3 of this Report for full description of assumptions) |
| PCB Lamp Ballasts | Ten (10) 55-gallon drums (7,500-lbs) |
| **Batteries:** | | |
| Large and small type batteries | Twenty-four (24) 55-gallon drum (750 lbs each for 18,000 lbs) | Assumed volumes based on maximum available on-site storage (refer to **Table 3-2** in Section 3 of this Report for full description of assumptions) |

## 7.3 Decontamination Procedures

A detailed discussion of decontamination procedures is provided in **Appendix E** of this Report. A summary of the decontamination procedures is outlined below:

* Facility Equipment: If contamination is visually observed or suspected on equipment, the following steps will be taken to decontaminate the affected equipment:
* Disassemble equipment if possible.
* Wash thoroughly with ES7X® laboratory detergent (or approved equivalent) and hot tap water using a brush to remove particulate matter or surface film.
* Rinse thoroughly with deionized water and allow to air dry.
* Using wipe samples confirm equipment is completely decontaminated.
* If laboratory results of wipe samples confirm equipment is clean, then proceed to next step. If results indicate equipment is still contaminated, repeat above steps as necessary until a clean confirmation is obtained.
* Wrap equipment completely with plastic (“shrink”) wrap or containerize to prevent contamination during staging and transport.
* Area B Lamp Processing Room Equipment: The lamp process equipment and associated components in the Lamp Processing Room (Area B) will be disassembled, cleaned, using the methods described above, and either sold to third parties for reuse, or as recycled scrap materials.
* Areas A, B, and C Surfaces: Wipe samples of all surfaces (including but not limited to floors, walls, and ceilings) will be collected from all material handling, processing, and staging areas (i.e., Areas A, B, and C) throughout the Facility and will be analyzed for mercury. If there are hazardous levels of mercury, the following steps will be followed to decontaminate:

*For solid surfaces (including floors and half walls):*

* Using a solution of deionized water and mercury cleaning chemicals (e.g., ES7X® or approved equivalent), wipe and mop affected surfaces.
* Take wipes samples and test subsequent to cleaning / decontamination efforts.
* If laboratory results of wipe samples confirm surface area is clean, then stop. If results indicate surface is still contaminated, repeat above steps as necessary until a clean confirmation is obtained. This step will be repeated until the areas have been tested clean.

*For areas with batting / insulation (including ceilings and areas above half walls):*

* If batting is intact, vacuum surface using a mercury HEPA / ULPA filtered vacuum (i.e., use only a mercury removal vacuum that has appropriate filters).
* Take wipe samples of the vacuumed surface to confirm if surface is clean.
* If laboratory results of wipe samples confirm surface is clean, then stop. If results indicate surface is still contaminated, repeat above steps as necessary until a clean confirmation is obtained.
* If batting is not intact, completely remove batting and containerize in lined 55-gallon drums. Transport drums using a licensed hazardous waste hauler to a facility authorized and permitted to receive such materials.
* Vacuum the exposed surface from where the batting was removed using the mercury HEPA / ULPA filtered vacuum that has been exposed from the area where batting was removed using a mercury HEPA / ULPA filtered vacuum (i.e., use only a mercury removal vacuum that has appropriate filters).
* Take wipe samples of the vacuumed surface in area where batting was removed to confirm if surface is clean.
* If laboratory results of wipe samples confirm surface is clean, then stop. If results indicate the surface is contaminated, repeat above steps as necessary until a clean confirmation is obtained.
* All Other Areas: If contamination is visually observed or suspected on other areas specifically not listed above, steps will be taken to decontaminate and clean the affected area using the appropriate methods described above (and detailed in **Appendix E**), and repeated as necessary until the affected area tests clean.

If contamination is not observed from sampling and testing activities (as outlined above and in **Appendix E**), the subject area(s) will be cleaned using the best available method for proper decontamination. The lamp processing and storage areas will be cleaned using a combination of wiping with water and vacuuming with a treated carbon system. Walls, floors, and other surfaces (electrical conduits, light switches, outlets, tops of suspended lighting fixtures, etc.) 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.

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

Confirmation sampling and testing will be performed in accordance with the procedures outlined in the *Sampling and Testing Standard Operating Procedures* (see **Appendix E**). To ensure the Facility has been completely decontaminated, a series of wipe samples and tests will be performed. A detailed *Closure Sampling and Testing Plan* that would include the methods, sample location diagrams, and frequency for sampling and testing can be submitted to DEP in advance of beginning closure activities for review and approval.

*Confirmation of Soil Sampling*

Confirmation sampling and testing of soils will be performed in accordance with the procedures outlined in the *Sampling and Testing Standard Operating Procedures* (see **Appendix E**). Areas determined to be contaminated will be over excavated, containerized, and transported offsite by a licensed hazardous waste hauler to a RCRA Subtitle C landfill facility authorized and permitted to dispose of such materials. A detailed Closure Sampling and Testing Plan that would include the methods, sample location diagrams, and frequency for sampling and testing can be submitted to DEP in advance of beginning closure activities for review and approval.

*Analytical Test Methods/Standards*

Analytical methods for testing mercury or other contamination are the EPA (RCRA- SW 846) recommended methods. After decontamination, process equipment, vehicles, drums, other containers will be removed from the building, and waste materials, hazardous or non-hazardous will be managed in accordance with applicable regulations.

## 7.4 Closure Schedule

For purposes of this closure plan, a nominal date of twenty years from issuance of this permit has been chosen; therefore, the date for which closure activities would begin was assumed to be May 2032. Milestones for the completion of closure activities are listed in **Table 7-2** on the following page. The estimated time to complete closure is approximately four months. Therefore, the Facility does not foresee any problems complying with required closure timeframe of 180-days.

|  |  |  |
| --- | --- | --- |
| **Table 7-2**  **Lighting Resources, LLC – Mercury Recovery Facility, Ocala, FL**  **Closure Schedule** | | |
| **Activity** | **Time to Complete** | **Assumptions** |
| Notification given to FL-DEP that Facility will be closing | *(advance notice will be given prior to closure)* | *Conservatively* assume a 60-day advance notice |
| **Facility Closure Activities Begin May 1, 2032:** | | |
| Final volume of processed materials and universal wastes transported offsite to other facilities for further processing, recycling, and/or disposal | Two weeks (10-days) |  |
| Dismantling / dis-assembly of lamp process equipment | Two weeks (10- days) | Assumes 2-man crew on site |
| Decontamination of dismantled lamp process equipment, containers, floors, and walls (includes sampling and lab testing of rinsate) | Three weeks (15-days) | Assumes 2-man crew working 5-days on site + total of 10-days for lab testing |
| Sampling / testing of soils | Six (6) days | Assumes 1-person / 1-day on site to collect samples + total of 5-days for lab testing |
| Removal / transport of dismantled / decontaminated equipment and containers to a metal recycler | Two weeks (10-days) |  |
| Removal / transport of contaminated materials / wastes (sample wipes, rinsate, filters, etc.) to a treatment / disposal facility | Two weeks (10-days) |  |
| Conduct final site inspection, and prepare and submit Closure Certification Report to DEP | Three weeks (15-days) |  |
| **TOTAL CLOSURE TIME: 15-weeks and 1-day** | **CLOSURE COMPLETION DATE:**  **Mid- to Late August 2032** | |

## 7.5 Closure Cost Estimate

The closure cost estimate for the Lighting Resources Facility has been prepared based on the following worst-case conditions:

* Maximum Facility storage volumes for materials,
* Materials will be transferred off-site to a third party reclamation, treatment, recycling, or disposal facility,
* No salvage value for decommissioned structures or equipment,
* Materials with potential economic value are assumed to have zero dollar value, and
* Decommissioning, decontamination, and sampling / testing will be performed by a third party consultant.

The closure cost estimate is adjusted annually for inflation using DEP’s inflation factors. Further, the closure cost estimate is amended whenever there are changes in operating plans or Facility design that may affect the closure plan. The closure cost estimate is provided on **Table 7-3** on the following pages. The cost estimate electronic spreadsheet file with backup data is also provided in **Appendix F** (includes Excel spreadsheet file on USB Flash Drive and service provider pricing sheets).

INSERT TABLE 7-3 (page 1 of 5)

INSERT TABLE 7-3 (page 2 of 5)

INSERT TABLE 7-3 (page 3 of 5)

INSERT TABLE 7-3 (page 4 of 5)

INSERT TABLE 7-3 (page 5 of 5)

## 7.6 Financial Assurance Mechanism

The financial assurance that has been established for the closure of the Facility is a Trust Fund Agreement (DEP Form # 62-730.900(4)(e)). A copy of the financial assurance form is provided in **Appendix G**. During the life of the Facility, the financial assurance is revised / updated in accordance with permit modifications or changes in the closure cost estimate. Post-closure care is not included in the closure cost estimate since no wastes or waste residues will remain at the Facility after the closure activities are completed.

## 7.7 Closure Certification

Final closure of the Facility will be certified by the operator and a third party professional engineer registered in the State of Florida. The closure certification will be submitted within 60 days of completion of closure activities. The third party engineer will be present during critical points of the closure and subsequent to completing closure activities for a final site inspection.

The third party engineer will prepare a closure certification report for submittal to DEP. The certification report will contain the following documentation:

* Volume of waste and waste residue removed;
* Written description of the method of waste handling and transport;
* Copies of waste manifests, shipping papers, or bills of lading for the off-site treatment, recycling, or disposal of materials (i.e., wastes, waste residues, recoverable materials) removed from the site during closure;
* Written description of the decontamination, and sampling and testing methods used, including handling methods (i.e., containers, preservatives, ice chests, and chain of custody forms);
* Complete documentation of analytical test results;
* Written chronological summary of closure activities and associated costs;
* Photographic documentation of closure activities;
* Written description of field tests performed, methods and results;
* Daily field logs; and
* Plan drawings of sample locations and areas remediated pursuant to closure activities.

# 8.0 INSPECTION PLAN

This section presents in **Tables 8-1** and **8-2** (on following pages) a description of the items that are routinely inspected, monitored, and maintained daily and on each operating shift. Inspections, monitoring, and maintenance activities are documented using designated Facility recordkeeping forms contained in **Appendix D**. The inspection / monitoring / maintenance forms will include but not be limited to the following:

* General housekeeping in the various areas of the building (floors and equipment are clean),
* Material inventory and determination of retention times (ensure no materials retained for greater than 10 days),
* Visual inspection of containers for labels/dates and condition,
* Aisle spacing between storage/staging rows,
* Is the lamp storage area arranged in accordance with the Plan,
* First aid stations fully stocked,
* Spill kits fully stocked,
* Worker safety inspection (personnel are wearing appropriate personal protective equipment, “PPE,” and are conducting operations in accordance with Facility Plans,
* Fire protection and control equipment is in working order and unobstructed / accessible,
* Visual inspection and repairs of floors, walls, ceilings for cracks and/or gaps,
* Inventory of necessary supplies (boxes, drums, filters, etc.),
* Air monitoring equipment for proper working order,
* Air monitoring readings collected in each area of the building,
* Routine maintenance of equipment, and
* Inspection, cleaning, and maintenance of Facility equipment including but not limited to the Balcan Lamp Processing Equipment (e.g., removal of debris, replacement of belts, filters, and worn parts, etc.).

Inspections are conducted daily/weekly/monthly to ensure that Facility operations are being conducted correctly and in a safe manner; tools and equipment/machinery are in proper working order; safety and emergency equipment is properly maintained and unobstructed; and the Facility is secure and undamaged. If inspections reveal operational, safety or security issues, or potential issues, the problems are documented and corrective actions are taken immediately.

Inspections and monitoring are documented (on the appropriate forms) and signed by the personnel conducting them. Completed and signed forms are maintained at the Facility for a minimum of three (3) years. Records are made available to regulatory agencies upon request.

| **Table 8-1**  Lighting Resources, LLC - Mercury Recovery Facility, Ocala, FL  **Inspection and Monitoring Schedule** | |
| --- | --- |
| **Inspection Item** | **Frequency** |
| **Monitoring Equipment:** | |
| Air Emissions Monitoring Equipment and Readings | Every 2 Hours |
| **Health and Safety:** | |
| First Aid Kit Contents / Expiration Dates | Monthly |
| Spill Kit Contents / Expiration Dates | Monthly |
| Wash Stations | Monthly |
| Spill Control Equipment: Brooms, Pans, HEPA / ULPA Vacuums, Absorbents | Monthly |
| Respirators/Respirator Cartridges Inventory | Monthly |
| Emergency Contact List/Evacuation Plans | Monthly |
| Emergency Shower and Eye Wash | Monthly |
| Hearing Protection | Monthly |
| Protective Eye Glasses | Monthly |
| Fire Extinguisher Status | Monthly or after each use |
| Telephone / Communication Devices | Monthly |
| Emergency Exits | Monthly |
| Facility Signs | Monthly |
| **Facility Security:** | |
| Door Locks | Daily |
| Vehicle Locks | Daily |
| Security Fence and Gate | Daily |
| Log In / Log Out Procedures at Office | Daily |
| **Area A - Lamp Staging / Storage Area:** | |
| Overall Cleanliness | Daily |
| Floor Slab | Monthly |
| Signs | Monthly |
| Area Walls and Ceiling | Monthly |
| Aisle Space | Daily |
| Pallets | Daily |
| Container Condition | Daily |
| Container Closures | Daily |
| Containers Labeled , Dated, and Signed | Daily |
| Container Stacking/Storage | Daily |
| Containers Logged In | Daily |
| Container Status / Retention Time | Daily |
| Supply Storage and Inventory | Monthly |
| **Area A - Related Material Handling, Staging, and Management Areas:** | |
| Overall Cleanliness | Daily |
| Load /Unloading Areas, | Daily |
| Battery Sorting / Staging Area | Daily |
| Area Floors, Walls, and Ceiling | Daily |
| **Area B - Lamp Processing Room & Equipment Inspection and Maintenance:** | |
| Overall Cleanliness | Daily |
| Lamp Feed Table | Daily |
| Broken Glass | Daily |
| Conveyors | Daily |
| Conveyor Drawers (remove and empty) | Daily |
| Conveyor Belts (inspect for wear, damage, debris) | Daily |
| Universal Rumbler Drawers (check, remove, empty) | Daily |
| Vibrating Flat Bed Grid (check and clear) | Daily |
| Flexible Pipework (inspected) | Weekly |
| Internal Inspection (remove rumbler side panels) | Monthly |
| Rumbler Wheels | Weekly |
| Sweep Floor | Daily |
| Tools & Flammables put away | Daily |
| Trash & Cardboard picked up | Daily |
| Phosphor Powder Staging Area | Daily |
| Floors, Walls, and Ceiling | Daily |
| **Area C – Separated Glass and Supply Storage Room:** | |
| Overall Cleanliness | Daily |
| Floor Slab | Monthly |
| Signs | Monthly |
| Separated Glass Rolloff Condition | Weekly |
| Separated Glass Rolloff Log with Tipper Number Date | Daily |
| Separated Glass Rolloff Volume Status / Retention Time | Daily |
| Floors, Walls, and Ceilings | Daily |

| **Table 8-1**  Lighting Resources, LLC - Mercury Recovery Facility, Ocala, FL  **Inspection and Monitoring Schedule** | |
| --- | --- |
| **Inspection Item** | **Frequency** |
| **Loading Dock Area:** | |
| Overall Cleanliness | Daily |
| Drainage Grate and Sump | Daily |
| Pallets | Daily |
| Trash & Cardboard | Daily |
| **Forklifts & Miscellaneous:** | |
| Forklifts | Daily |
| Receiving & Production Workstation | Daily |