RCRA Part B Permit Renewal Application
Retriev Technologies, Inc.
Lancaster, Ohio

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Revision 0.4

Submitted to:
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295 Quarry Road
Lancaster, Ohio 43130

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F. Part A Application
Certification Statement [OAC 3745-50-42(D)]

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Ed Green  Sr. Vice President
Name, Title

01/27/2017
Date

Signature
1.0 Introduction

Retriev Technologies, Incorporated (“Retriev”, “facility”, “site”, or “property”) is a permitted hazardous waste facility specializing in the management, reutilization, and recycling of all types of industrial/military, automotive, and household batteries. Battery identification, collection, consolidation, and recycling services are provided to industry, government, and the public. Retriev is a privately held corporation whose ownership is comprised of Kinsbursky Brothers, Inc.; Terry, George, and Mike Adams; and the Alpert Group. Prior to corporate restructuring, Retriev was formerly known as Toxco, Inc.

In accordance with the requirements of applicable Ohio hazardous waste rules and regulations under Subtitle C of the Resource Conservation and Recovery Act (RCRA), Retriev submitted a permit application for storage of hazardous waste in containers on October 4, 2002. The permit application was subsequently updated on December 17, 2004. Effective December 21, 2005, Retriev received an Ohio Hazardous Waste Facility Installation and Operation Permit (Permit) that authorized the facility to store hazardous waste in containers. Since issuance of the Permit, Retriev submitted a request for and received approval of several Permit modifications. Section A.3 of the Permit indicates an expiration date of ten years after the date of journalization (i.e., December 21, 2015). As such, this Permit renewal application has been prepared in accordance with Ohio Administrative Code (OAC) 3745-50-40(D).

1.1 Applicable Rules and Regulations

Retriev is permitted only to store hazardous waste in containers. All other activities performed by Retriev are exempt or excluded from permitting. This section is intended to identify and briefly discuss key rules and regulations that are applicable to Retriev. This section is not intended to be an exhaustive review. As appropriate, both State (OAC) and Federal (CFR) rules and regulations are referenced.

RCRA Subtitle C permitting applies to the treatment, storage, and disposal of hazardous wastes unless exempt or excluded. In order for a material to be identified as a hazardous waste, it must first meet the definition of a discarded material and a solid waste. Simply put, discarded materials are potentially anything produced by a facility other than products used for their intended purpose, and they include recyclable materials. Solid wastes are a subset of discarded materials and generally consist of abandoned materials, certain recyclable materials, and materials inherently waste-like. Solid wastes are defined in 40 CFR 261.2 and OAC 3745-27-01. Determining whether recyclable materials are solid wastes is based on how the recyclable materials are classified and the type of recycling activity. This relationship is presented in table form in 40 CFR 261.2 and OAC 3745-51-02. Hazardous wastes, which are a subset of solid wastes, are identified based on listing
and/or characteristic as presented in 40 CFR 261.3 and OAC 3745-51-03. If identified as a hazardous waste, some materials can be managed as universal waste in accordance with 40 CFR 273 and OAC 3745-273. Finally, as defined in 40 CFR 260.10 and OAC 3745-50-10(A)(133), recycling is considered a form of treatment.

Within the solid waste and hazardous waste rules and regulations, various exclusions and exemptions exist. Identification and discussion of all Federal and State exclusions and exemptions is beyond the intent of this section. Rather, key State exclusions and exemptions applicable to Retriev are summarized in Table 1-1. Table 1-1 also summarizes the applicable State rules and regulations, which require Retriev to maintain a Permit for storage of hazardous waste in containers. Other rules and regulations beyond those presented in Table 1-1 may be applicable to Retriev. As such, Table 1-1 should only be utilized for general information. When considering these applicable rules and regulations as a whole, the storage of some types of materials requires Retriev to maintain a Permit, while the recycling process itself and other activities do not require a Permit.

### 1.2 Excluded and Exempt Activities

Based on the applicable rules and regulations discussed in Section 1.1, there are numerous activities performed by Retriev that are either excluded or exempt from some or all hazardous waste management requirements and thus are not applicable to Retriev’s Permit. Key excluded or exempt activities are identified and briefly discussed in Table 1-2, along with a cross reference to the corresponding State rules and regulations in Table 1-1. Normally, it is not necessary to include which activities are excluded or exempt from the Permit application. However, there are instances in this Permit renewal application in which an excluded or exempt activity is briefly identified as part of a discussion pertaining to the permitted activity or another required topic. As such, Table 1-2 is intended to provide clarity.

### 1.3 Terminology

There are several terms used throughout this Permit renewal application that warrant definition to avoid confusion. The following definitions are intended to apply only to the context of this Permit renewal application.

**Acid Battery:** Wet cell, dry cell, or gel cell battery with an acidic (i.e., pH <7) electrolyte. Specific types of acid batteries are presented in Section 3.0 and Attachment A.

**Alkali Battery:** Wet cell and dry cell battery with a basic (i.e., pH >7) electrolyte. Specific types of alkali batteries are presented in Section 3.0 and Attachment A.
Alkaline Battery: Generic term for a zinc manganese dioxide dry cell battery, which is one type of alkali battery.

Battery: A finished manufactured article consisting of one or more electrically connected electrochemical cells designed to receive, store, and deliver electric energy. A battery is inclusive of battery components.

Battery Components: Assemblies, segments, or parts of batteries from manufacturers and scrap dealers.

Big Green Box (BGB): Battery collection and recycling program for consumer batteries generated by households and businesses that arrive as universal waste.

Electrolyte: The caustic solution recovered from the exempt wet alkali battery recycling process and the acidic solution recovered from the exempt lead acid battery recycling process.

Permit: Ohio Hazardous Waste Facility Installation and Operation Permit under RCRA Subtitle C.

Regulated material: Wastes and materials identified as hazardous and subject to requirements of Retriev’s Permit.

Non-regulated material: Wastes and materials (hazardous or non-hazardous) that are not subject to requirements of Retriev’s Permit.

Pass-Through Batteries: Batteries received by Retriev that are a universal waste and not recycled by Retriev. These batteries are managed by Retriev under the Large Quantity Handler of Universal Waste regulations and transferred to a downstream recycler. Therefore pass-through batteries do not count toward permitted storage capacity (unless placed in a permitted storage unit) and do not require financial assurance for closure. Retriev will clearly label all pass-through batteries as such.

1.4 Application Content and Format

This Permit renewal application includes applicable information required by OAC 3745-50-41, 3745-50-43, and 3745-50-44. For ease of review and reference, information is organized in a manner that is generally consistent with Ohio EPA’s Permit review checklists. Figures, tables, and plates that are referenced throughout the main text of this Permit renewal application are consolidated into like named sections. Attachments to this Permit renewal application are stand-alone documents with their own figures, tables,
plates, and/or appendices. As appropriate, the main text references these attachments. The certification statement, as required by OAC 3745-50-42(D) is provided on page v.
2.0 Facility Description

This section provides a basic description of the facility. Additional details regarding hazardous waste management and operation of the permitted storage units are provided as necessary in other sections.

2.1 Facility Location

Retriev is located within an industrial park near the intersection of Quarry Road and Commerce Street in Lancaster, Fairfield County, Ohio. The facility maintains two addresses, which correspond to the main buildings at 265 and 295 Quarry Road. The property is approximately 36.8 acres in size and consists of one parcel (053-50034-00) and bound by railroad tracks to the north, Quarry Road to the east, Commerce Street to the south, and another facility property to the west. Property zoning is heavy industrial (Figure 2-1). Latitude and longitude of the approximate center of the property is 39.712505, -82.545954.

The topography across the site is relatively flat, ranging from approximately 826 to 830 feet mean sea level (ft msl) (Plate 1). Facility buildings and paved areas are located on the northeastern portion of the site. A 0.86 acre storm water retention pond is located in the central portion of the site. An aerial photograph of the site is provided as Figure 2-2. There are no storm sewers at the site or along the adjacent roads. The majority of storm water from the active portion of the site is conveyed as sheet flow toward the retention pond. Storm water from parking areas and entrances is directed toward ditches along Quarry Road. The retention pond is designed for a 25-year/24-hour storm event, with an overflow that directs storm water to vegetated acreage located within the south and southwest portions of the site. Storm water that does not infiltrate into this vegetative acreage is conveyed by roadside drainage ditches that discharge to an intermittent unnamed tributary to Pleasant Run, located approximately 1,000 ft southeast of the site (Plate 1).

A wind rose for the period of December 1, 2013 through December 1, 2014 is provided as Figure 2-3. Data used to generate the wind rose was collected from the Fairfield County airport (approximately 8 miles northwest of the site). As shown on Figure 2-3, winds are predominantly from the southwest. Maximum sustained wind speeds are approximately 11 to 17 knots (12.7 – 19.6 mph). Calm winds (less than 1 knot), which are not able to be shown on the wind rose occurred approximately 9% of the time.

With the exception of one oil/gas well, there are no wells onsite or within 1,000 ft of the property boundary. The oil/gas well is located approximately 1,000 ft southwest of the property boundary (Plate 1). The operating status of the well is unknown.
2.2 Facility Layout

There are two main buildings at the site, one located at 265 Quarry Road and the other located at 295 Quarry Road. Within each of these buildings is a permitted storage unit. The permitted storage unit within the 265 Quarry Road building is identified as the “265 storage unit”. The permitted storage unit within the 295 Quarry Road building is identified as the “295 storage unit”. A site map is provided as Plate 2 which shows the approximate footprints of the permitted storage units as well as other site features and facility operation areas. Figures 2-4 and 2-5 show information similar to Plate 2 but are split between 265 and 295 Quarry Road, respectively.

2.2.1 265 Quarry Road Building Construction

The 265 Quarry Road building was constructed in circa 1970 and was originally utilized by a previous owner for the construction of (bending, polishing, and tinting) automotive glass. The building consists of three conjoined buildings with a total area of approximately 190,000 ft². Building construction consists of concrete block with partial aluminum veneer. Steel support columns are spaced at 20ft to 40ft intervals. The conjoined buildings are separated by concrete block walls with overhead fire doors and man doors. Several truck loading/unloading docks are present on the south and east sides of the building, many of which are located completely within the footprint of the building structure. A sprinkler system is installed throughout the building. There are two utility buildings attached to the main building structure, which are not included as part of the 190,000 ft². A 3,200ft² pole building is located south of the main building structure.

2.2.2 295 Quarry Road Building Construction

The 295 Quarry Road building was constructed in 2010 and has a total area of approximately 73,200 ft². Building construction consists of concrete block with partial aluminum veneer. Steel support columns are spaced at 50ft intervals. Overhead doors and loading/unloading docks are present on the north side of the building. A sprinkler system is installed throughout the building.

2.3 Traffic Information

Vehicle access to the facility is provided by Quarry Road, which connects with State Route 22 approximately one-quarter mile north of the facility. A traffic light is located at the intersection of State Route 22 and Quarry Road. Adjacent to the northern property boundary of the facility is an active yet infrequently utilized railroad line. The railroad line is clearly marked where it crosses Quarry Road; however, there are no gates or lights. The railroad line is slightly raised, which provides additional visibility.
There is one main entrance to the facility, which provides vehicle access through the fence via a gate. The facility name and addresses are clearly identified for inbound traffic. Inbound and outbound semi-trucks and pickup trucks are the primary vehicles that utilize the main entrance. The main entrance is also used as an exit, thus the traffic pattern within the facility fence is somewhat circular (Plate 2). In addition to inbound and outbound traffic, intra facility traffic will occur between the 265 and 295 buildings for the transfer of materials. Intra facility traffic will be coordinated by facility supervisors so as to not interfere with inbound and outbound traffic. The facility speed limit is 10 mph, is clearly posted in several locations, and is enforced by Retriev supervisors. Several secondary access entrances are also present along Quarry Road for visitors and personnel. These secondary entrances allow access to parking lots outside of the facility fence.

Quarry Road consists of a 30 ft wide paved surface with 4 ft wide gravel berms. Construction was based on Ohio Department of Transportation specifications and is rated to withstand the weight of fully loaded (i.e., 40-ton) semi-trucks without surface deflection. The main facility entrance and interior roadways are paved with reinforced concrete and also rated to withstand the weight of fully loaded semi-trucks. The width of the main facility entrance and interior roadways is variable, but can accommodate multiple lanes of traffic.

Traffic volume associated with cars and pickup trucks fluctuates throughout the day, with the heaviest volumes during shift changes. Assuming three shifts of facility operation, daily traffic volume may range from 50 to 75 cars and pickup trucks. Traffic volume associated with semi-trucks is somewhat dependent on facility production rates. It is estimated that 10 to 15 semi-trucks enter and exit the facility on a daily basis. Semi-trucks, when fully loaded, typically weigh less than 40 tons or as limited by DOT.

### 2.4 Floodplain Information

The Retriev property is found on the Flood Insurance Rate Map (FIRM) for Fairfield County, Panel Number 258 of 425. This FIRM was revised on January 6, 2012, which identified the Retriev property within Zone AE of the 100-year floodplain. Prior to the January 6, 2012 revision of the FIRM (including the time in which the initial Permit application was prepared), the Retriev property was not within the 100-yr floodplain.

As a result of the 2012 revised FIRM, Retriev incorporated applicable flood-related requirements within their Permit renewal application for the 265 and 295 storage units. However, based on Retriev’s knowledge of the area surrounding their property, Retriev believed that the 2012 FIRM was not an accurate representation of the 100-year floodplain. As such, Retriev contracted EMH&T in 2017 to perform a floodplain study. This study culminated in the preparation of a Letter of Map Revision (LOMR) that presents a more
accurate representation of the 100-year floodplain and demonstrates that the Retriev property is not located within the 100-year floodplain. The LOMR was submitted to the Federal Emergency Management Agency (FEMA). On July 6, 2018, FEMA issued an updated FIRM Panel Number 258 of 425 with an effective date of November 20, 2018. The updated 2018 FIRM (Plate 3) indicates that the Retriev property is located within Zone X (outside of both the 100-year and 500-year floodplains). Therefore, flood-related requirements are not applicable to Retriev.

2.5 Waste Placement Prohibitions and Seismic Considerations

Retriev will not place any non-containerized or bulk liquid hazardous waste in any salt dome formation, salt bed formation, underground mine, or cave. This type of placement is prohibited by regulation.

Based on review of several interactive internet-based maps depicting deep structures, faults, and seismic epicenters published on the United States Geological Survey and Ohio Department of Natural Resources websites, the facility is not located within two hundred feet of a fault which has had displacement in the Holocene time (i.e., past 10,000 years). In fact, the maps did not identify a fault anywhere within Fairfield County.
3.0 Waste Characteristics

The materials received by Retriev, including wastes, consist of batteries and battery components, which are considered manufactured articles. Therefore, material identification primarily relies on visual inspection. Some of the materials may contain characteristic waste codes D001 through D011 and could be identified as hazardous wastes. It should be noted that only lithium batteries may be identified as D001 by the generators, as some generators take a very conservative approach to the classification of the batteries. Some of the materials may not be considered hazardous waste upon receipt or after recycling (e.g., scrap metals, non-regulated/excluded/exempt solid wastes, and universal wastes). The types of batteries and battery components accepted by Retriev include, but may not be limited to the following:

Acidic Batteries

Wet Filled:
   Lead Acid Automotive Batteries
   Lead Acid Industrial/Military Batteries

Sealed Cell:
   Gel Cell Lead Acid Batteries

Alkali Batteries

Wet Filled:
   Nickel Cadmium Batteries
   Nickel Iron Batteries
   Zinc Carbonaire Batteries

Dry Cell:
   Zinc Manganese Dioxide Batteries (non-regulated material)
   Carbon Zinc Batteries
   Nickel Metal Hydride Batteries (including absorbed mat)
   Nickel Hydrogen Batteries
   Silver Oxide Batteries
   Mercury-Containing Batteries
   Magnesium Batteries
   Nickel Cadmium Batteries
Lithium Batteries
   Lithium Primary Batteries
   Lithium Ion Batteries

Waste characteristics and procedures associated with waste identification are discussed in the Waste Analysis Plan (Attachment A).
4.0 Process Information

Retriev performs battery identification, collection, consolidation, and recycling services. As discussed in Section 1.2, many of the activities are excluded or exempt from some or all hazardous waste management requirements and thus are not applicable to Retriev's Permit. The permitted units at the facility consist of the 265 and 295 storage units. Process information related to the permitted units and general management of hazardous wastes is provided below. Retriev may elect to manage, store, and track other materials (e.g., scrap metals, non-regulated/excluded/exempt solid wastes, universal wastes, and pass-through batteries) in a manner that is consistent with that of hazardous wastes. However, these materials are not regulated under Retriev's Permit and therefore not specifically discussed, with one exception. The waste acceptance procedures for BGB batteries (universal waste) is slightly different than that of the other types of hazardous waste received by Retriev. Therefore, brief discussion as pertaining to BGB is provided as appropriate.

4.1 Hazardous Waste Receiving

Upon arrival, hazardous wastes will be unloaded at either the 265 or 295 building. For enclosed transport vehicles, unloading will be performed at a dock or entrance that allows the rear gate of the transport vehicle to be under the roof of the building structure or against the walls of the building structure such that the exposure of hazardous wastes to outside elements does not occur during unloading. Flatbed transport vehicles may also be utilized, in which case, the containers are exposed to outside elements during transport and unloading. However, the containers are designed for outside elements such that their contents are not exposed.

At the 265 building, hazardous waste will be unloaded by fork lift, pallet jack, or other suitable means. Following unloading, waste acceptance procedures will be performed as described in the Waste Analysis Plan (Attachment A). Waste acceptance procedures may be performed in close proximity to the transport vehicle or within the designated staging area that is located within the footprint of the 265 storage unit (Figure 2-4 and Plate 2). For the purposes of this renewal application, close proximity is defined as within 100 ft of the transport vehicle and within building cover. The boundary of the designated staging area within the footprint of the 265 storage unit is identified by painted lines. Hazardous wastes that are unloaded and placed within close proximity to the transport vehicle must be transferred to the staging area.

As discussed in the Waste Analysis Plan (Attachment A), further identification or subsequent repackaging or sorting may be required in addition to the initial visual inspection performed as part of hazardous waste acceptance procedures. These exempt
activities, if necessary, may be performed in the staging area within the footprint of the 265 storage unit or within a designated sorting area. However, hazardous wastes placed within the staging area will be removed from the staging area within three days after receipt at the facility.

At the 295 building, hazardous waste and BGB universal waste will be unloaded by forklift, pallet jack, or other suitable means. Following unloading, waste acceptance procedures will be performed as described in the Waste Analysis Plan (Attachment A). For hazardous waste, the waste acceptance procedures will be performed in close proximity to the transport vehicle or within the designated staging area (Figure 2-5 and Plate 2). Hazardous wastes that are unloaded and placed within the immediate vicinity of the transport vehicle must be transferred to the staging area, 295 storage unit, or recycling area. For BGB universal waste, the waste acceptance procedures will begin in close proximity to the transport vehicle or within the designated staging area. The BGB universal waste will be weighed, tagged, and transferred to the BGB sorting area within the 295 building (Figure 2-5 and Plate 2). Alternatively, another sorting area or permitted storage unit may be utilized. Completion of these activities will constitute receipt of the BGB universal waste. Each pallet within the sorting area (or permitted storage unit) will be marked with the date that the first box was placed for easy tracking of storage time. The pallets containing the BGB universal waste will be sorted within the sorting area within the 295 building (Figure 2-5 and Plate 2). Each container used for sorting will be marked with the earliest date corresponding to the pallet from which material was removed for sorting. When each container of sorted waste is filled, the waste acceptance procedure will be completed by labeling the container with a bar code and entering it into the facility's tracking and recordkeeping system. BGB sorting will be completed within one year of receipt.

Hazardous waste and BGB universal waste that is received by the facility and placed in a staging area can remain within the staging area up to three days after receipt, followed by subsequent transfer to the 265 or 295 storage unit or to another location for processing (e.g., recycling/sorting/repackaging). The three-day time limit associated with staging prior to storage or processing is based on facility operating schedule and logistics. Specifically, the three-day time limit will allow adequate time for availability of appropriate personnel to move hazardous waste out of the staging area following extended weekends, holiday breaks, and other short-term shutdowns. Compliance with the three-day time limit will be demonstrated by evaluation of container tracking labels during daily inspections (Section 5.2).
4.2 Hazardous Waste Shipping

Outbound hazardous wastes will be loaded for shipping at the 265 building by fork lift, pallet jack, or other suitable means. Loading will be performed at a dock or entrance that allows the rear gate of the transport vehicle to be under the roof of the building structure or against the walls of the building structure such that the exposure of hazardous wastes to outside elements does not occur during loading. Loading of the hazardous wastes at a dock or entrance may occur by transferring directly from the 265 storage unit, the staging area located within the footprint of the 265 storage unit, a recycling area, or a less than 90 day storage area. Transfer of hazardous wastes from a recycling area to a dock or entrance for loading will be performed within the time identified within Section 4.3.

Potential hazardous wastes to be recycled at the 295 building consist of lithium ion batteries and components. Following recycling, the materials will no longer exhibit a potential characteristic of hazardous waste. Therefore, management requirements of materials that have been recycled at the 295 building are not applicable to Retriev’s Permit. However, hazardous wastes may be generated in association with wastewater treatment or air pollution control equipment within the 295 building. If hazardous waste is generated, it will be placed in a properly designated area prior to shipment. Sorting of BGB universal waste may result in the identification of hazardous waste. If BGB hazardous waste is identified, it will be placed in a permitted storage unit prior to further processing.

4.3 Hazardous Waste Transfer and Staging Associated with Recycling

Recycling activities will require the transfer of hazardous wastes to and from the permitted storage units. Staging of the hazardous wastes adjacent to the recycling processes in preparation for recycling will also be necessary at both the 265 and 295 buildings. Transfer of hazardous waste will be performed by fork lift, pallet jack, or other suitable means. Hazardous waste can be staged adjacent to an associated recycling process prior to recycling for up to three days. Following recycling, hazardous waste can remain within the footprint of the recycling areas for up to three days from the point of generation by recycling. Specific locations for staging adjacent to recycling processes or placement following the point of generation by recycling are not identified as these locations may change based on available space and productivity. However, all staging prior to recycling and placement following the point of generation by recycling will be within the footprints of the recycling areas as identified on Figures and Plates. In addition to the three-day time limit for staging adjacent to a recycling area, no more than 10,000 pounds of hazardous waste will be staged prior to recycling at any given time.
Upon transferring containers to a recycling process, a staging form will be completed that indicates the date in which the container was placed adjacent to recycling, a date stamp will be placed directly on the container, or a tracking label will be placed directly on the container. The staging form, if utilized, will remain in the vicinity of the applicable recycling process. Compliance with the three-day time limit will be demonstrated by evaluation of the staging form, date stamp, or tracking label during daily inspections (Section 5.2).

To the extent possible, lithium ion batteries to be recycled within the 295 building will be stored within the 295 storage unit. However, there may be instances when it is necessary for Retriev to transfer lithium ion batteries between the 265 and 295 storage units. Transfer of unsorted BGB universal waste or sorted hazardous waste between the 265 and 295 buildings may also be necessary. If transfer is necessary, an enclosed vehicle will be utilized. Loading and unloading will be performed at a dock or entrance that allows the rear gate of the transport vehicle to be under the roof of the building structure or against the walls of the building structure such that the exposure of hazardous wastes to outside elements does not occur during loading. Secondary containment during transfer between buildings will not be necessary as lithium ion batteries do not contain free liquids. BGB prohibits shipment of batteries containing free liquids; however, these battery types are occasionally received by Retriev. In the event a sorted hazardous BGB battery containing free liquids must be transferred between the 265 and 295 building, a containment pallet will be utilized. Storage time for a hazardous waste will not be reset if transferred between permitted storage units.

Occasionally a recycling process will be shut down for maintenance activities or other factors such as economic climate. A short-term shut down will be less than or equal to 30 days. A long-term shut down will be greater than 30 days. If a short-term shut down occurs, Ohio EPA will not be notified and Retriev will manage hazardous wastes within the footprint of the associated recycling area in accordance with the above time and weight limit restrictions for staging. If a long term shut down occurs, Ohio EPA will be notified within 30 days of the shut down. During a long-term shut down, Retriev will manage hazardous wastes within the footprint of the associated recycling area in accordance with the above time and weight limit restrictions for staging. In addition, Retriev will determine if the batteries chemistries associated with the shut down will be managed as pass-through. If pass-through management is elected, Retriev will indicate such in their long-term shut down notification to Ohio EPA.

### 4.4 Description of the Permitted Storage Units

There are two permitted storage units at the facility: the 265 storage unit and the 295 storage unit. Hazardous wastes that are transferred from the transport vehicle, the staging area, or

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from recycling processes (Table 1-2) are stored up to one year within the permitted storage units. Additionally, Retrieve has the ability to store hazardous waste beyond one year if in accordance with the requirements of OAC 3745-270-50(C). The combined permitted storage capacity of these two units is 6 million pounds. Of the 6 million pounds, the following is a breakdown of permitted storage capacity limitations by battery chemistry.

- lead-bearing = 5,500,000 pounds
- lithium ion = 250,000 pounds
- nickel cadmium (NiCD) and nickel metal hydride (NiMH) = 240,000 pounds
- all other chemistries (including damaged pass-through) = 10,000 pounds

Although pass-through batteries do not count toward the permitted storage capacity, if they are damaged upon receipt, they are no longer a universal waste and will be managed as a hazardous waste. Therefore, damaged pass-through batteries are included in the “all other chemistries” group.

4.4.1 265 Storage Unit

The 265 storage unit consists of four contiguous areas that share perimeter and interior berms (Figure 2-4 and Plate 2). For ease of discussion, these four areas are referred to as 265-1, 265-2, 265-3, and 265-4. Several rollover berms are associated with the 265 storage unit to allow forklift access. The total area of the 265 storage unit (measured from perimeter berm centerlines) is approximately 56,709 sf. A 7,750 sf staging area identified by painted lines is located within 265-4 and is included as part of the total area of the 265 storage unit. The base of the 265 storage unit is defined as the 265 building concrete floor.

All waste codes accepted by the facility (D001 through D011) can be stored in containers within the 265 storage unit. The permitted capacity of the 265 storage unit is 5,800,000 pounds. Hazardous waste and unsorted BGB universal waste is counted toward this permitted storage capacity from the time it arrives at the facility to the time it is shipped from the facility if located anywhere within the 265 building. If after processing/recycling, the material is no longer identified as a hazardous waste and is not placed within the 265 storage unit, it will not count toward the permitted storage capacity. Non-hazardous wastes and other materials will only count toward the permitted storage capacity if located within the 265 storage unit. The secondary containment system associated with the 265 storage unit allows for the storage of containers with free liquids. Assuming that a wet cell battery typically contains approximately 10% by weight of free liquids (i.e., electrolyte), a total of no greater than 580,000 pounds (i.e., 58,000 gallons at 10 pounds per gallon) of free liquids will be present within the 265 storage unit (265-1, 265-2, 265-3, and 265-4) if all batteries are wet cell. As discussed below, the secondary containment system exceeds the minimum required capacity.
The secondary containment system consists of concrete rollover berms, perimeter berms, and interior berms, as well as chemical-resistant seals and coatings. Concrete joints and berms are sealed with waterstops. The concrete berms and base of the 265 storage unit are sealed with an epoxy coating. Both the waterstops and epoxy coating are resistant to the acid and alkali electrolyte liquids. The facility may utilize any type of waterstops and epoxy coating so long as the safety data sheets and/or product description generally convey compatibility to existing waterstops and epoxy coating and resistance to acid and alkali electrolyte. A detail drawing of the 265 storage unit and secondary containment system is provided as Figure 4-1.

OAC 3745-55-75(B)(3) requires that a secondary containment system have sufficient capacity to contain ten percent of the volume of containers or the volume of the largest container, whichever is greater. As previously discussed, the total possible volume of electrolyte within containers which can be stored in the 265 storage unit is 58,000 gallons, which is greater than the volume of electrolyte in any single container. Therefore, the 265 secondary containment system must have a capacity of at least 5,800 gallons (i.e., 58,000 gallons x 0.1). An example pallet layout (Figure 4-2), which accounts for the container management practices identified in Section 4.5, was generated to support secondary containment capacity calculations. The calculations provided in Table 4-1 demonstrate that the net secondary containment capacity (i.e., gross capacity minus displacements from rollover berms, pallets, and fixed obstructions) of the 265 storage unit is greater than the minimum required capacity of 5,800 gallons. In addition, each of the four areas within the 265 storage unit (265-1, 265-2, 265-3, and 265-4) has an individual net secondary containment capacity that is greater than the cumulative minimum required capacity of 5,800 gallons. The calculated net secondary containment capacity is reflected on Figure 4-1.

4.4.2 295 Storage Unit

The 295 storage unit consists of an approximate 1,771 sf area of the 295 building concrete floor (Figure 2-5 and Plate 2). The 295 storage unit is permitted to store D001 through D011 waste in containers. There is not a secondary containment system associated with the 295 storage unit; therefore, hazardous wastes containing free liquids cannot be stored within the 295 storage unit unless appropriate secondary containment is provided (e.g., spill pallet). The waste acceptance procedure discussed in the Waste Analysis Plan (Attachment A) will identify if free liquids are present within the hazardous wastes to be placed within the 295 storage unit. Storage of hazardous wastes containing free liquids within the 295 storage unit are not anticipated to be substantial based on the type of hazardous waste to be delivered to the 295 building (lithium ion batteries and components). The most likely hazardous wastes that may contain free liquids are those that could be generated from wastewater treatment and air pollution control equipment within the 295 building.
The permitted capacity of the 295 storage unit is 200,000 pounds. Hazardous waste and unsorted BGB universal waste is counted toward this permitted storage capacity from the time it arrives at the facility to the time it is shipped from the facility if located anywhere within the 295 building. If after processing/recycling, the material is no longer identified as a hazardous waste and is not placed within the 295 storage unit, it will not count toward the permitted storage capacity. Non-hazardous wastes and other materials will only count toward the permitted storage capacity if located within the 295 storage unit. A 900 sf inbound lithium ion battery staging area identified by painted lines is located outside of the 295 storage unit (Figure 2-5 and Plate 2).

4.5 Containers

Various types of containers may be received, utilized, and shipped by Retriev. A basic description of these containers for purposes of this Permit renewal application consists of the following:

- Drum – typically 55-gallons and steel construction with lid; may include smaller drum or bucket with lid; actual construction material and volume can vary; up to four 55-gallon drums per pallet; the number of smaller drums/buckets per pallet may vary.
- Bulk Pallet Box – corrugated box, typically double or triple wall construction with lid, typical volume of one cubic yard; actual construction material and volume can vary.
- Corrugated Box – corrugated box with lid or enclosed on all sides; actual construction material and volume can vary; multiple corrugated boxes per pallet.
- Crate – typically wood construction and enclosed on all sides; actual construction material and volume can vary; multiple crates per pallet.
- Tote – typically plastic construction and enclosed on all sides; actual construction material and volume can vary; multiple totes per pallet.
- Battery Casing – primary container for intact batteries; typically constructed of polyethylene, polypropylene, steel or aluminum; actual construction material can vary; multiple battery casings per pallet or within other containers.
- Pallet – typically wood construction; may or may not be shrink-wrapped or banded; within the context of this Permit renewal application, the pallet itself is considered a container when batteries and battery components are stacked directly onto the pallet.
Containers must be properly labeled as discussed in Section 4.5.3 and the Waste Analysis Plan (Attachment A). Containers are typically DOT-approved for transportation of hazardous waste under 49 CFR 173 and therefore must consist of compatible construction with respect to their contents. Because the permitted capacity of the storage units is based on weight, a maximum number of containers or pallets that may be stored are not applicable.

4.5.1 Container Management Practices

General container management practices were discussed in Sections 4.1 through 4.3. Hazardous waste containers must be kept closed during storage, except when adding or removing waste. While in storage, during recycling, or movement on-site, the containers are handled in a manner to prevent the rupture or leakage of waste. Only HAZWOPER trained personnel (refer to Section 7.0) can transport containers within the facility.

Regular inspection of the Permitted storage areas is performed based on the inspection schedule provided in Section 5.2. Inspections are conducted to monitor the condition of containers (e.g., open/closed, labeled, leaking), configuration, and condition of the 265 storage unit secondary containment. Containers that show evidence of deterioration, leakage, or ruptured, will be transferred to containers in good condition. Spilled or leaked liquid waste will be cleaned up from the base of the permitted storage units or other facility areas. Response will be performed in a timely manner; typical 15 to 30 minutes from discovery. Liquids from spills or leaks will be collected with absorbents, a wet vacuum, or other suitable means. If possible, the collected liquids will be managed with electrolyte from recycling operations. Otherwise, the collected liquids, absorbents, and/or housekeeping equipment (e.g., gloves, rags, etc.) associated with a hazardous waste release will be managed as hazardous waste for offsite treatment or disposal by an appropriately licensed facility.

Sufficient aisle space is maintained by Retriev to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the facility in an emergency. The OAC does not require a specific distance for aisle space. Outside of facility buildings there are roadways for vehicle traffic (Plate 2). Within facility buildings there are open areas/aisles for forklift traffic (Figures 2-4 and 2-5). In addition, Retriev complies with the buffer zone requirements of the National Fire Protection Association’s flammable and combustible codes.

For the permitted storage units, Retriev has established specific aisle space requirements. Eighteen (18) inches of aisle space will be maintained along the perimeter of the permitted storage units. The eighteen (18) inches is measured from the centerline of a perimeter berm. If a perimeter berm is not present, the measurement is taken from the outer painted
edge of a perimeter boundary line. Interior (i.e., inside a permitted storage unit) berms and interior painted boundary lines are not subject to the perimeter aisle space requirement. Thirty (30) inches of aisle space will be maintained between rows within the permitted storage units. A grouping of two pallets side-by-side is considered the width of a row. As necessary, wider aisle space between rows of containers may be established for forklift traffic. Thirty (30) inches of clearance will also be maintained around structural support columns and any other fixed equipment (e.g., baghouse, electric panel, eyewash station, etc.) within the permitted storage units. These specific aisle space requirements for the permitted storage units ensure unobstructed access for emergency response actions as well as inspections. These specific aisle space requirements do not apply to the staging area located within the footprint of the 265 storage unit.

A specified stacking height of containers within a permitted storage unit is not required by the OAC. Therefore, Retriev has established a stacking height procedure based on common industrial practice that accounts for worker safety, stability, and ease of inspection. This procedure will be followed for containers and pallets of wastes and materials within the permitted storage units, regardless of the regulatory status of the wastes and materials. Hazardous wastes staged outside of the permitted storage units will also follow this procedure. Based on the types of containers managed by Retriev, the following stacking limits will be observed:

- Bulk pallet boxes that are approximately one cubic yard will be stacked up to two high (irrespective of the number of pallets);
- 55-gallon drums on pallets will be stacked up to three high (three drums and three pallets high), with up to four 55-gallon drums per pallet;
- Palletized batteries and battery components will be stacked up to 84 inches, irrespective of the number of pallets; and
- Containers not otherwise identified above will be stacked no higher than 120 inches; this includes but not limited to corrugated boxes, crates, totes, smaller drums/buckets, and smaller bulk pallet boxes.

4.5.2 Special Requirements for Ignitable, Reactive, or Incompatible Wastes

Based on the locations of the Permitted storage units, containers holding ignitable or reactive hazardous wastes will be stored at least 50 ft from the property boundary (Figures 2-4 and 2-5 and Plate 2). Ignitable and reactive hazardous wastes will also be adequately separated and protected from sources of ignition or reaction, including open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks, spontaneous ignition, and radiant heat.
Among the hazardous wastes managed by Retriev, wet cell acidic and wet cell alkali batteries are considered incompatible based on their types of electrolytes. However, potential hazards associated with incompatible wastes at the facility are considered low based on the fact that DOT allows both wet cell acidic and wet cell alkali batteries to be transported as Class 8 Corrosive on the same vehicle without a means of separation (e.g., berms, curbs, etc.) and the concentration of acid or alkali within the electrolytes is typically less than 10%. It should be understood that lithium batteries (primary and ion) are not considered incompatible with other battery types.

To minimize potential hazards at the facility, incompatible hazardous wastes will not be placed in the same container or in an unwashed container that previously held an incompatible waste. In addition, incompatible hazardous wastes will not be placed in the same row within the 265 storage unit. Wet cell batteries cannot be stored within the 295 storage unit so there are no incompatibility issues. If two adjacent rows contain an incompatible hazardous waste (i.e., wet cell acidic and wet cell alkali batteries) and are not separated by an interior concrete berm, the rows will be isolated from one another using portable berms or equivalent methods to avoid mixing should a spill or release occur. The placement of a portable berm or equivalent method between two rows does not affect the minimum required aisle space. Therefore, placement may be anywhere within the aisle. Personnel training (Section 7.0), container tracking labels (Section 4.5.3 and Attachment A), and inspections (Section 5.2) will ensure proper segregation procedures are followed for incompatible wastes. In addition, when portable berms or equivalent methods are utilized, signage will be placed at both ends of the separation device to indicate adjacent rows contain incompatible wastes and that a separation device must be utilized.

The above requirements, coupled with proper hazardous waste identification (per the Waste Analysis Plan; Attachment A) and information in Sections 5.2 and 5.7, demonstrate that Retriev will take precautions to prevent reactions of ignitable or reactive waste, or between incompatible wastes and other materials. The requirement related to placement of incompatible wastes and use of portable berms and signage does not apply to the staging area located within the footprint of the 265 storage unit or adjacent to recycling processes. However, Retriev will separate incompatible wastes, to the extent possible, within these areas and follow the general requirements identified in this section and Section 5.7.
4.5.3 Tracking and Recordkeeping

Retriev will utilize manual documentation or a computer-based program for material (including waste) acceptance, container tracking, and operating record requirements. During waste acceptance, a label with bar code is affixed to each container, which supersedes any other labels affixed by the generator. The bar code allows Retriev to account for on-site movement of waste through acceptance, storage, recycling, and transfer off-site. The computer-based program provides for updates and notifications, as well as the ability to access waste profile information. Information that can easily be obtained from the computer-based program, as it becomes available, to support compliance and inspection includes, but is not limited to the following:

- facility and location of material/waste;
- type of material/waste;
- gross, tare, and net weights;
- descriptions (e.g., pass-through materials); and
- generation or creation date.

Further discussion of tracking and recordkeeping is provided in Section 5.2 and Attachment A.
5.0 Procedures to Prevent Hazards

Protection of employees, the general public, and the environment is a priority for Retriev. This section describes the measures that are in place and the procedures that will be taken to minimize the possibility of an accident or emergency at the facility. Retriev is not requesting a waiver of security procedures and equipment or an exemption from preparedness and prevention requirements. Additional relevant information is presented in the Contingency Plan (Attachment B).

5.1 Security Information

Security procedures and equipment at the facility assure that only employees, contractors, waste delivery personnel, and authorized visitors are allowed to enter the active portion of the Retriev property. Visitors are accompanied at all times by a qualified facility employee when they are within a process or storage area. Any unauthorized person is escorted immediately from the facility premises. Adherence to security procedures is monitored by the Environmental Manager.

A permanent seven foot-high fence with barb wire surrounds the majority of the active portion of the property. As shown on Plate 2, there are two continuity breaks in the fence where it connects to the 265 and 295 buildings. Entry into the facility is controlled by gates and doors. The fence has one main locking gate located on the east side of the property near the guard house and several secondary gates. During first-shift operating hours, the main gate and nearby fence man doors can remain open. If open, an inbound truck can call the receiving department utilizing the prominently marked phone adjacent to the main gate for additional direction if necessary. During second and third shifts and when facility operations are not occurring, the main gate and nearby fence man doors are locked and only opened temporarily by authorized facility personnel. The secondary gates are locked at all times unless providing access for authorized personnel, emergency and maintenance equipment, specific facility activities, and, when necessary, are used as emergency exits. Access to the facility also can be gained through man doors on the 265 and 295 buildings. With the exception of the office reception entrance at the 295 building, building man doors located outside of the fence are locked.

Perimeter inspections are performed on a quarterly basis. Any anomalies in the fencing and gates or suspicious conditions will be immediately reported to management. Retriev has video surveillance cameras throughout the facility that are active on a 24-hour basis. In addition, perimeter doors are equipped with alarms that are active when facility operations are idle (e.g., weekend or holiday).
Warning signs stating “Danger – Unauthorized Personnel Keep Out” or similar language are posted on perimeter fences, gates, and man doors. These warning signs are legible from a distance of at least 25 feet. Additional health and safety warning signs are posted for facility personnel and visitors within the facility.

Select emergency responders and public utility companies (e.g., Fire Department, natural gas and electric companies, and water pollution control board) have keys to the facility gates to gain access if facility personnel are not on site.

5.2 Inspections

The inspection program at the facility is designed to prevent, detect, and respond to malfunctions, deterioration, operator error, and discharges which may cause or lead to the release of hazardous waste to the environment or create a threat to human health. A written inspection schedule (Table 5-1) has been developed to demonstrate communication and alarm systems, fire protection equipment, spill control equipment, and decontamination equipment are tested and maintained to ensure proper operation at the time of an emergency. The written inspection schedule also addresses operating and structural equipment, the permitted storage units, and containers.

5.2.1 Frequency of Inspection

The inspection program covers both the general facility and permitted storage units. The general facility inspection involves facility equipment, structures, or buildings not directly related to the 265 and 295 permitted storage units. Inspections are conducted according to the schedule in Table 5-1, which is maintained at the facility. The inspection frequencies identified in Table 5-1 are based on the rate of possible deterioration or probability of an environmental or human health incident occurring between inspections. If Retriev proposes to reduce the frequency or scope of inspections identified in Table 5-1, a Permit modification request will be submitted to Ohio EPA. However, if Retriev elects to increase the frequency or scope of inspections identified in Table 5-1, a Permit modification would not be required.

5.2.2 Inspection Logs

Inspections are conducted by designated individuals who have the training and authority to conduct the required inspections, perform necessary evaluations and hazard assessments, and initiate appropriate corrective actions. The inspection schedule (Table 5-1) details the points of inspection.
The facility has developed an inspection procedure and log. These are change-controlled documents/software that must go through an internal approval process when any changes are made. The log can be printed and manually completed or generated and directly populated using the facility’s computer-based tracking and recordkeeping program (Section 4.5.3 and Attachment A). The actual inspection procedure and log have been purposely excluded from this Permit renewal application to provide Retriev with the flexibility to update these inspection procedures and logs without the need for a Permit modification in instances when Retriev elects to increase the inspection frequency or scope beyond that reflected in Table 5-1. The minimum elements included in the inspection procedure and/or log are:

- personal protective equipment required during the inspection;
- the location(s) or area(s) that the inspection apply to (as identified in Table 5-1);
- frequency of inspection;
- potential hazards and problems that may be encountered;
- personnel to notify;
- procedure for completing the inspection form;
- detailed description of actions required for each inspection step; and
- procedure for remedial action.

Completed inspection logs/populated recordkeeping program files will be kept at the facility for at least 3 years from the date of the inspection. Each inspection log will include the date and time of the inspection, the name of the person(s) completing the inspection, and a description of any notable observations made during the inspection.

Any deterioration or malfunction of equipment or structures revealed by inspections will be addressed within a time period that will prevent an environmental or health hazard. The date and nature of any subsequent repairs or corrective actions will be recorded on the inspection log on which the problem was identified. If necessary, a separate corrective action log and/or work order will also be prepared. Appropriate facility managers will review all inspection logs, corrective action recommendations, corrective action related documents, and inspect completed corrective action activities.

### 5.3 Design and Operation of Facility

The facility is designed, constructed, maintained, and operated in a manner that minimizes the possibility of a fire, explosion, or release of hazardous waste or hazardous constituents to air, soil, surface water, or groundwater that could threaten human health or the environment. Refer to Sections 2.0 and 4.0 for further discussion of facility design and operation.
5.4 Equipment Requirements

Internal and external communications systems, emergency equipment, and water for fire control are discussed in the subsections below. Facility personnel involved with management of hazardous waste have immediate access to one or more communication devices and types of emergency equipment.

5.4.1 Internal and External Communication Systems

The facility has several types of internal communication systems used to provide immediate emergency information. These systems include the following:

- Telephones located throughout the facility capable of making internal and external calls;
- Two-way radios for various facility personnel, which may include but may not be limited to, forklift and warehouse operators, breaking technicians, maintenance staff, guards, and managers;
- Cellular phones for various facility personnel;
- Audible alarms with flashing strobes/beacons that are activated by red emergency alarm buttons located at key areas throughout the facility; and
- Fire alarm system that is activated with the building sprinkler system to notify anyone onsite as well as appropriate offsite emergency responders.

5.4.2 Emergency Equipment

Emergency equipment, including portable fire extinguishers, spill control equipment, decontamination equipment, and personnel protective equipment are available at the facility. Numerous Class ABC fire extinguishers are conspicuously mounted throughout the facility buildings such that travel to a fire extinguisher is no more than 75 feet. Additional emergency equipment is strategically located at various facility locations and includes, but is not be limited to, drums and overpacks, coveralls, boots, gloves, face shields, respirators and cartridges, first aid kits, generators, water pumps, absorbent material, vacuums and shovels, air monitoring equipment, and ventilation fans.
5.4.3 Water for Fire Control

The facility is equipped with water at adequate volume and pressure to supply water hose streams and automatic sprinklers. Both the 265 and 295 buildings are equipped with a sprinkler system that is activated by heat melting a fusible link in the sprinkler head. Fire hydrants are installed at strategic locations throughout the facility. The City of Lancaster maintains a 1,000,000-gallon firewater tank located less than two miles from the facility that feeds the facility process and potable water lines. A dedicated service line that feeds the sprinkler systems is also connected to the City main.

5.4.4 Aisle Space Requirements

Sufficient aisle space is maintained by Retriev to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the facility in an emergency. In addition, Retriev complies with the buffer zone requirement of the National Fire Protection Association’s flammable and combustible codes, which requires at least three feet be maintained where necessary to provide access to doors, windows, and standpipe connections. Aisle space requirements for specific areas are discussed in Section 4.5.1.

5.5 Arrangements with Local Authorities

Arrangements with offsite emergency services and local authorities are discussed in the Contingency Plan (Attachment B). These organizations consist of police department, fire department, emergency response teams, the local hospital, and Ohio EPA, which may be called upon in the event of fire, explosion, or release at the facility. Correspondence, agreements, and any refusal of agreements with these groups will be maintained as part of the facility operating record.

5.6 Preventive Procedures, Structures, and Equipment

Preventive procedures, structures, and equipment used at the facility to prevent hazards during loading and unloading of hazardous waste, prevent run-off from hazardous waste handling areas, prevent contamination of water supplies, mitigate effects of equipment failure and power outages, and prevent undue exposure of personnel to hazardous waste are discussed in the subsections below.
5.6.1 Loading and Unloading Operations

The facility receives and ships materials in various types of containers. Hazards associated with loading and unloading are reduced through procedural methods, safe equipment operation, and structural features. Section 4.0 discusses procedures for proper transfer and placement of materials shipped and received. Only properly trained personnel are permitted to operate fork lifts and other equipment used for loading and unloading of materials. Material loading and unloading activities will occur under building cover (with the exception of flatbed transport vehicles at the 295 building). General secondary containment for materials containing free liquids will be provided during loading and unloading activities by docks that are sloped to a sump, portable spill kits, and/or the building itself.

5.6.2 Run-off

Grading of pervious and paved areas of the site is intended to convey precipitation away from building structures and prevent flooding. Building roof drains also convey precipitation away from the buildings. The permitted storage units are located within buildings. Secondary containment, both passive (e.g., berms) and active (e.g., spill kit), are present at those areas that manage hazardous waste containing free liquids, thereby preventing run-off from occurring. Passive secondary containment is discussed in greater detail in Section 4.0.

5.6.3 Water Supplies

The facility is supplied with potable water by the City of Lancaster. The City obtains the majority of its potable water supply from the Miller Park Well Field (approximately 3 miles west of the facility) and the South Well Field (approximately 4 miles south of the facility), both of which draw from the Hocking River buried valley aquifer.

The municipal water supply is protected from Retriev’s waste management activities by engineering and administrative controls as well as facility location. The facility is not located within the wellhead protection zones (1-yr and 5-yr groundwater travel time zones) associated with the Miller Park Well Field and South Well Field. Backflow preventers are installed in the water lines servicing the facility to prevent water used within the facility from re-entering the City’s potable water main. The facility has a connection to the City of Lancaster sanitary sewer system. All wastewater discharged to the sanitary system must meet the facility’s permitted discharge limits that are issued by the local publically owned treatment works (POTW). As appropriate, wastewater pretreatment and sampling are performed by the facility in accordance with their POTW-issued discharge permit. Groundwater protection is discussed in Section 9.0.
5.6.4 Equipment and Power Failure

In the event of a power failure, the facility will not receive shipments from generators and facility operations will be halted. Major power outages and associated equipment failures will not result in hazardous conditions due to the following:

- Emergency lighting throughout the facility;
- Passive lighting is available during daylight hours from translucent paneling associated with the 265 building and sky lights associated with the 295 building;
- Emergency lights are mounted above battery breaking areas;
- Forklifts are equipped with lighting that allows safe use in the dark;
- Emergency eyewash stations and showers are operable without power;
- Two-way radios, telephones, and cellular phones are available; and
- Emergency exit signs are self-illuminating and visible without power.

5.6.5 Personnel Protective Equipment

Retriev ensures that personnel are protected from undue exposure to hazardous waste and hazardous constituents by implementing various engineering controls and requiring the use of appropriate personnel protective equipment (PPE). Areas of the facility where hearing and/or respiratory protection is required prior to entering are clearly posted with signs outside the areas. For those duties that require hearing protection, respiratory protection, and/or other specific equipment, facility personnel and contractors performing these duties are fully trained on the use, location, and required types of the PPE. Other personnel, such as visitors, are notified of the basic PPE requirements and are escorted at all times when in an operations area. Safety showers and eye wash stations are located throughout the facility. The buildings are ventilated throughout, with certain processes and areas equipped with additional ventilation. Safety data sheets for various chemicals at the facility are maintained and available to all personnel.

5.7 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes

Retriev takes extensive precautions to prevent fires, reactions, and explosions of ignitable, reactive, and incompatible wastes. Procedures have been developed to clearly identify, label, segregate, and properly manage waste that is ignitable, reactive, or incompatible with other waste. These precautions are discussed below and in Section 4.5.2.

Smoking is severely restricted on-site. Smoking is not permitted in any of the facility buildings. Designated smoking areas are identified outdoors. “No Smoking” signs are posted in conspicuous locations throughout the facility and verbal warnings are also given.
to visitors. Open flames other than those related to smoking are also confined to specific locations of the facility and are monitored and permitted through the EHS Department. Electrical grounding is provided for containers, tanks, and transport vehicles during operations involving reactive wastes. Spark-proof tools must be utilized during the handling of reactive wastes. Wiring and electrical equipment at the facility must meet appropriate National Fire Protection Association codes, including those associated with hazardous locations.

Improper handling of ignitable or reactive waste or the mixing of incompatible waste is avoided by proper waste identification (Waste Analysis Plan; Attachment A) and following standard operating procedures. Retriev will take precautions to prevent reactions which:

- Generate extreme heat or pressure, fire or explosions, or violent reactions (procedures include the use of heat-sensing equipment for screening containers of lithium ion batteries);
- Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment;
- Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions;
- Damage the structural integrity of the equipment, systems, structures or other parts of the facility;
- Through other like means, threaten human health and the environment.

Retriev requires generators to prepare and provide waste profile documentation. As discussed in the Waste Analysis Plan (Attachment A), Retriev performs a visual inspection of all waste as part of the acceptance procedure to ensure proper identification. Specific waste information may also be available from previous waste management experiences, industry experience, and reliable scientific literature. The facility’s inspection program (Section 5.2), training program (Section 7.0), and Waste Analysis Plan (Attachment A) ensure proper management of ignitable, reactive, or incompatible waste.
6.0 Contingency Plan

Retriev has prepared a Contingency Plan (Attachment B) in accordance with the requirements of OAC 3745-54-50 through 3745-54-56 that is designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned release of hazardous waste and hazardous constituents to air, soil, or surface water. The provisions of the Contingency Plan will be implemented whenever the previously indicated circumstances occur. A copy of the Contingency Plan is maintained at the facility and by outside groups that may be called upon to provide emergency services (e.g., police and fire departments, hospitals, Ohio EPA, and local emergency response teams). The Contingency Plan will be periodically reviewed and amended as specified by regulation. The general content of the Contingency Plan consists of the following:

- Actions facility personnel must take in response to fires, explosions, or any unplanned release of hazardous waste or hazardous waste constituents;
- Arrangements with local authorities and emergency response groups to coordinate emergency services;
- Contact information for the facility emergency coordinators;
- List of emergency equipment at the facility, as well as the equipment location, physical description, and outline of capabilities; and
- Evacuation plan for facility personnel.
7.0 Personnel Training

The personnel training program conducted by Retriev prepares personnel to safely maintain and operate the facility in accordance with the requirements of OAC 3745-50-44(A)(12) and OAC 3745-54-16 and applicable sections of 29 CFR 1910.120 and 49 CFR. Facility personnel are trained according to their hazardous waste management responsibilities and their response requirements during an emergency.

Applicable personnel will receive initial (introductory) training relevant to their position and to the operations of the facility. Applicable personnel will also receive annual refresher (continuing) training. The continuing training will be performed on a calendar-year basis and within 15 months of the previous continuing training. Introductory and continuing training will be implemented through a variety of mechanisms, such as, on- and off-site classroom instruction, hands-on and on-the-job training, required reading assignments, SOP review, interactive computer training, safety meetings, one-on-one instruction, shift meetings, and review of written procedures, regulations, guidance documents, and industry publications.

Personnel working in job categories with duties that include direct handling and management of hazardous waste may not conduct unsupervised hazardous waste activities before completing the training required for their position. The required introductory training must be completed within six months of employment at the facility, assignment to the facility, or transfer to a new position within the facility, whichever is relevant.

The Environmental Manager and/or Health & Safety Manger will direct the personnel training program. If the Environmental Manager and/or Health & Safety Manager position is open, the Facility Manager will provide direction. The minimum requirement to direct the personnel training program is OSHA Hazardous Waste Operations and Emergency Response Training under 29 CFR 1910.120. Trainers will be qualified to instruct personnel about the subject matter that is being presented in training. Such trainers will have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they will have the academic credentials and instructional experience necessary for teaching the subjects. Trainers will demonstrate competent instructional skills and knowledge of the applicable subject matter. When appropriate, the Environmental Manager, Health & Safety Manager, or Facility Manager can employ the services of a qualified outside service to conduct personnel training.

Job positions that are applicable to the personnel training program are identified in Table 7-1. The types of introductory and continuing training associated with each job position are also identified in Table 7-1. An outline of the content included in each type of training and a description of each job position is provided as Attachment C. Table 7-1 and
Attachment C demonstrate that the personnel training program is designed to address actual job tasks and provides instruction on relevant topics, including hazardous waste management and emergency response (contingency plan implementation).

Retriev will maintain names of personnel that fill the job positions identified in Table 7-1. A record of the introductory and continuing training and job experience completed by applicable personnel will also be maintained by Retriev. The form(s) used for recordkeeping purposes will clearly indicate an employee’s start date, relevant training requirements, and dates of completed training so that tracking and receipt of training occurs in a timely manner. Training records of current personnel will be kept until closure of the facility. Training records of former personnel will be kept at least three years from the date that was last worked at the facility.
8.0 Closure

If facility operations were to cease, the permitted storage units will be closed as required by OAC 3745-55-10. As such, a Closure Plan for the 265 and 295 storage units was prepared in accordance with OAC 3745-55-11 through 3745-55-15. The Closure Plan is included as Attachment D and consists of the following components:

- introduction;
- facility and unit-specific descriptions;
- list of hazardous waste;
- closure performance standard and type of closure;
- closure activities;
- decontamination efforts;
- management of waste;
- air emissions and wastewater;
- personnel health and safety;
- oversight and certification;
- closure cost estimate and financial assurance; and
- closure schedule.

As discussed in the Closure Plan, post-closure care is not expected to be required. Post-closure of a permitted storage unit will only become necessary in the event that all waste cannot be practicably removed. If this were to occur, a survey plat will be prepared per OAC 3745-55-16 and a post-closure plan will be prepared and implemented in accordance with the requirements of OAC 3745-55-17 through 3745-55-20.

In accordance with applicable requirements of OAC 3745-55-40 through 3745-55-51, a written cost estimate to close the permitted storage units has been prepared and a mechanism for financial assurance (including liability requirements) has been established (Attachment E). The closure cost estimate, financial assurance, and liability requirements are discussed in the Closure Plan.
9.0 Groundwater Protection

Treatment, storage, and disposal facilities (TSDFs) that manage hazardous waste in landfills, surface impoundments, land treatment units, and some waste piles, referred to as “regulated units,” are required to implement a groundwater monitoring program to detect releases of hazardous constituents to the underlying groundwater. The Retriev facility does not contain regulated units, as defined in OAC 3745-54-90(A)(2), or anticipate managing hazardous waste in landfills, surface impoundments, land treatment units, or waste piles. Storage of hazardous waste at the facility occurs indoors within engineered units. In addition, areas of the facility that manage hazardous waste containing free liquids are equipped with adequate secondary containment. Based on this information, groundwater monitoring requirements are not applicable to the facility and the additional information pertaining to the protection of groundwater identified in OAC 3745-50-44(B) is not required as part of this permit application.

This understanding is consistent with that discussed with Ohio EPA in preparation of the original Permit application in 2002.
10.0 Corrective Action

The owner or operator of a facility seeking a permit for the treatment, storage, or disposal of hazardous waste must institute corrective action as necessary to protect human health and the environment for releases of hazardous waste or constituents from waste management units at the facility. A waste management unit (WMU) is defined in OAC 3745-50-10 as

“any discernible unit at which solid waste, hazardous waste, infectious waste (as those terms are defined in Chapter 3734. of the Revised Code), construction and demolition debris (as defined in Chapter 3714. of the Revised Code), industrial waste, or other waste (as those terms are defined in Chapter 6111. of the Revised Code) has been placed at any time, irrespective of whether the unit was intended for the management of solid waste, hazardous waste, infectious waste, construction and demolition debris, industrial waste, or other waste. Such units include any area at a facility at which solid waste, hazardous waste, infectious waste, construction and demolition debris, industrial waste, or other waste has been routinely and systematically released.”

OAC 3745-50-44(D)(1) requires the following information be provided for each WMU at a facility seeking a permit:

(a) The location of the unit on the topographic map required under paragraph (A)(19) of this rule.
(b) Designation of type of unit.
(c) General dimensions and structural description (supply any available drawings).
(d) When the unit was operated.
(e) Specification of all wastes that have been managed at the unit, to the extent available.

OAC 3745-50-44(D)(2) requires the owner or operator of any facility containing one or more WMUs to submit all available information pertaining to any release of hazardous wastes or hazardous constituents from such unit or units.

In 2003, prior to TSD activities, a detailed examination of past activities at the property was conducted to establish the existence or non-existence of past WMUs and any reported spills or releases. The report concludes that there are no known past WMUs or reportable releases that would support any corrective action. Ohio EPA indicated its agreement with this assessment in Module E of the facility’s Modified Ohio Hazardous Waste Facility Installation and Operation Permit (Effective Date of August 15, 2014), which was initially
issued December 21, 2005, stating “Ohio EPA agrees with the assessment that there are no known past WMUs or reportable releases at the facility.”

Through day to day operations, WMUs now exist at the facility. As a commercial TSDF which recycles batteries (considered waste in most cases), the creation of WMUs is unavoidable. The facility’s WMUs are listed in Table 10-1. For each WMU, the following information is provided: identification number, name, general location, type of unit, period of operation, type of waste managed (including hazardous waste code if applicable), dimensions, documented releases to the environment, structural description, engineering controls, and release potential. In several cases, nearby WMUs which handle similar waste as part of a process were grouped together into a single WMU. These combined WMUs are identified on Table 10-1. WMU locations are shown with site topography on Plate 4. OAC rule 3745-50-44(D)(1) requires that available structural drawings are include for each of the units. As indicated through a note on Table 10-1, drawings, of varying detail, are available for some, but not all of the WMUs. In most cases, the available drawings will not be specific to individual units and will likely be of limited use for RCRA Corrective Action purposes. For this reason, drawings are not provided, but will be made available to Ohio EPA upon request.

As part of the facility’s health and safety program, Retriev utilizes mobile boot wash units and PPE accumulation cans in multiple locations throughout both the 265 and 295 buildings. The mobile boot wash units are located near exits in the production areas. They hold approximately three gallons of water which is replaced on a regular basis and transferred manually to the facility’s wastewater treatment system. The PPE accumulation cans are typically 55-gallon containers, in which used disposable PPE is placed. Contents of the can are transferred on a regular basis to the hazardous waste rolloff. The PPE accumulation cans are located throughout the operations areas, in many cases within the footprint of WMUs. The locations, however, do change dependent upon operations and health and safety requirements. Based on their size, the mobile nature, indoor setting, and regular emptying, Retriev believes that the mobile boot wash units and PPE accumulation cans are de minimus in nature; similar to trash cans located in each of the buildings offices and bathrooms and should not be considered WMUs for the purposes of RCRA Corrective Action. For this reason, the boot wash units and PPE accumulation cans are not identified in Table 10-1 or discussed further.

With the exception of the Solid Waste Storage Area (No. 17), each of the WMUs is located within either building 265 or 295. All of the units are separated from soil by at least six inches of concrete, which in many cases is coated. Additional engineering controls are present at many of the WMUs as identified in Table 10-1. One documented release to the environment has occurred at the facility. This occurred in 2013 due to an oven bag house fire and resulted in a release to air. Documentation of the release has been previously submitted to Ohio EPA. Based on the age of the facility, indoor location for most of
WMUs, existing engineering controls, and the general lack of documented releases, the potential for release to the environment from the facility’s WMUs is low and Corrective Action is not warranted at this time.
Wind Rose Diagram, Fairfield County Airport, December 1, 2013 to December 1, 2014.

Wind data downloaded from Weatherunderground.com

Fairfield County Airport, December 1, 2013 to December 1, 2014.
Staging Area
7,750 Sq. Ft.

Electrical Panel
Painted Line

Electrical Panel
12,909 Sq. Ft.
Net Containment = 3,073.3 Cu. Ft.

13,800 Sq. Ft.
Net Containment = 3,257.5 Cu. Ft.

10,000 Sq. Ft.
Net Containment = 2,314.5 Cu. Ft.

Concrete Rollover Berm
10'L x 5'W x 5.5"H (Detail 2/1)

Concrete Rollover Berm
10'L x 40'W x 3.5"H (Detail 2/1)

Concrete Rollover Berm
10'L x 10'W x 3.5"H (Detail 2/1)

Concrete Berm
3.5"H x 8"W (Detail A/1)

Concrete Berm
5.5"H x 8"W (Detail A/1)

Torching Station

100'

134.3'

100'

140'

Eyewash Station

4" Existing Concrete Slab
#6 Rebar Full Length of Run Wire-Tied to #5 Rebar
4" Vinylex PVC Water Stop
#5 Rebar Pin Epoxy Anchored @ 2’ O.C. Min 2” into Existing Slab
2" Saw Cut and Removal 2" Min
8” Height Varies
5 1/2” Beaking Areas
3 1/2” Storage Areas

Concrete to be 6 Bag High-Early Ready Mix Concrete with Fiber Bonding Agent to be Used to Bond Old and New Concrete

Steel Mesh Min 24” Width, Length Varies Depending on Roll Over Berm Width (New Roll Over Berms Only)
#5 Rebar Pin Epoxy Anchored @ 2’ O.C. Min 2” into Existing Slab. Min Rebar Lengths Varies from 9” in Beaking Areas to 7” in Storage Area
4” Vinylex PVC Water Stop Continuous Top Existing 6” Concrete Slab Saw Cut and Remove 2”Dx8”W Existing Concrete Slab Bottom Existing 6” Concrete Slab

Legend
- Concrete Rollover Berm
- Concrete Berm of Permitted Storage Unit
- Structural Column

Notes: All information is approximate. Design details transferred from 10/30/2006 Drawing DG9003 Rev 7 prepared by David M. Gubanc, PE.

Distances measured from centerline of berm.
Concrete berms and base of permitted storage unit sealed with epoxy coating. Concrete joints sealed with water stops.

Area and net containment of 265-4 includes the Staging Area.

Total Net Containment of 265-1, 265-2, 265-3, and 265-4 areas is approximately 13,401.8 cubic feet.
Example Pallet Layout - 265 Storage Unit, Retriev Technologies, Inc., Lancaster, Ohio

Legend

- Concrete Rollover Berm
- Concrete Berm of Permitted Storage Unit
- Structural Column
- Pallet

Notes: A grouping of two pallets is considered the width of a row.

Pallets assumed to be 48" x 40".
18" aisle space maintained from perimeter concrete berm.
30" aisle space maintained between rows.
30" clearance maintained around structural columns and other obstructions.
Pallet layout is considered an example for secondary containment capacity calculation purposes. 1,252 pallets assumed.
All information is approximate.
<table>
<thead>
<tr>
<th>#</th>
<th>Topic</th>
<th>Citation</th>
<th>Requirement/Exclusion/Exemption</th>
<th>RCRA Subtitle C Permitting Required for Retriev?</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spent Material</td>
<td>OAC 3745-51-01(C)(1)</td>
<td>Requirement: Defined as a solid waste</td>
<td>No</td>
<td>Spent material is defined as any material that has been used and as a result of contamination can no longer serve the purpose for which it was produced without processing. Spent material is a solid waste when recycled or disposed and therefore can potentially be identified as a hazardous waste.</td>
</tr>
<tr>
<td>2</td>
<td>Scrap Metal - General</td>
<td>OAC 3745-51-01(C)(6)</td>
<td>Requirement: Defined as a solid waste</td>
<td>No</td>
<td>Scrap metal is defined as bits and pieces of metal parts that may be combined together with bolts or soldering, which when worn out can be recycled. Scrap metal is a solid waste when recycled or disposed and therefore can potentially be identified as a hazardous waste. Scrap metal does not include metal-containing wastes with a significant liquid component (e.g., wet cell batteries).</td>
</tr>
<tr>
<td>3</td>
<td>&quot;Excluded Scrap Metal&quot;</td>
<td>OAC 3745-51-04(A)(13)</td>
<td>Exclusion: Not a waste</td>
<td>No</td>
<td>&quot;Excluded scrap metal&quot; includes processed scrap metal, unprocessed home scrap metal, and unprocessed prompt scrap metal that is recycled. &quot;Excluded scrap metal&quot; is not a waste and therefore cannot be a hazardous waste.</td>
</tr>
<tr>
<td>4</td>
<td>Recyclable Materials (Hazardous) - Scrap Metal</td>
<td>OAC 3745-51-06(A)(3)(b)</td>
<td>Exemption: Not subject to hazardous waste rules and regulations</td>
<td>No</td>
<td>Scrap metal as defined in OAC 3745-51-01(C)(6) and not excluded under OAC 3745-51-04(A)(13), when identified as a hazardous waste based on OAC 3745-51-03(A) is not subject to hazardous waste rules and regulations if recycled.</td>
</tr>
<tr>
<td>5</td>
<td>Storage of Spent Lead Acid Batteries Prior to Reclamation</td>
<td>OAC 3745-51-06(A)(2)(d)</td>
<td>Exemption: Not subject to OAC 3745-51-06; Requirement: Subject to OAC 3745-266-80</td>
<td>Yes</td>
<td>Per OAC 3745-266-80(A)(4) and (B)(2), spent lead acid batteries that are reclaimed other than through regeneration and are stored prior to reclamation are subject to hazardous waste management requirements or universal waste requirements.</td>
</tr>
<tr>
<td>6</td>
<td>Recyclable Materials (Hazardous) - Storage before Recycling</td>
<td>OAC 3745-51-06(C)(1)</td>
<td>Requirement: Subject to hazardous waste rules and regulations</td>
<td>Yes</td>
<td>A hazardous waste installation and operation permit is required unless the recyclable material is entered into the recycling process within 72hrs of arrival.</td>
</tr>
<tr>
<td>7</td>
<td>Recyclable Materials (Hazardous) - Recycling Process</td>
<td>OAC 3745-51-06(C)(1)</td>
<td>Exemption: Not subject to hazardous waste rules and regulations</td>
<td>No</td>
<td>The recycling process itself, associated with hazardous recyclable materials, is exempt from hazardous waste rules and regulations.</td>
</tr>
<tr>
<td>8</td>
<td>Hazardous Waste Management Applicability - Batteries</td>
<td>OAC 3745-51-03(A)</td>
<td>Exclusion: May not be a hazardous waste</td>
<td>No</td>
<td>Batteries that are not identified as a hazardous waste based on characteristic or listing are excluded from management as a hazardous waste.</td>
</tr>
<tr>
<td>9</td>
<td>Storage and Treatment of Hazardous Waste</td>
<td>OAC 3745-54-01(B)</td>
<td>Requirement: Subject to hazardous waste rules and regulations</td>
<td>Yes</td>
<td>The storage and treatment (e.g., recycling) of hazardous waste, unless otherwise excluded, is subject to hazardous waste rules, regulations, and permitting.</td>
</tr>
<tr>
<td>10</td>
<td>Universal Waste Applicability - Batteries</td>
<td>OAC 3745-273-02(B)(3)</td>
<td>Exclusion: May not be a universal waste</td>
<td>No</td>
<td>Batteries that are not identified as a hazardous waste are excluded from management as a universal waste.</td>
</tr>
<tr>
<td>11</td>
<td>Universal Waste - Destination Facility</td>
<td>OAC 3745-273-60(A)</td>
<td>Requirement: Subject to hazardous waste rules and regulations</td>
<td>Yes</td>
<td>A universal waste destination facility is subject to hazardous waste permitting requirements unless the universal waste is not stored or is stored less than 72 hours.</td>
</tr>
</tbody>
</table>
Table 1-2. Summary of Key Facility Activities that are Excluded or Exempt from RCRA Subtitle C Permitting, Retriev Technologies, Inc., Lancaster, Ohio

<table>
<thead>
<tr>
<th>Activity</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Acid Battery Breaking</td>
<td>265 Building</td>
<td>Commercial and industrial lead batteries (including lead acid, dry cell, and gel cell) are recycled via manual and automated methods to recover lead and lead oxide cells. Battery terminals and tabs are disassembled. Cases are split, the acid electrolyte is drained, the plates are removed, and the plastic is washed and granulated. Lead oxide plates are placed in containers or onto pallets and stored in the permitted storage unit prior to sale and offsite shipment. Scrap metals are placed in containers and staged prior to sale and offsite shipment. Granulated plastic is placed in containers and staged for sale and offsite shipment or disposed of. Acid electrolyte is collected and transferred to a spent sulfuric acid tank for subsequent pretreatment and discharge to the POTW or offsite disposal.</td>
</tr>
<tr>
<td>Wet Nickel Battery Breaking</td>
<td>265 Building</td>
<td>Wet cell nickel-containing batteries are prepared via manual and automated methods for retort operations. Battery terminals and tabs are disassembled. Cases are split, the alkaline electrolyte is drained, the cells are removed, and the plastic is washed and granulated. The nickel plates are placed in containers and stored in the permitted storage unit prior to or transferred directly to retort operations or is staged prior to sale and offsite shipment. The cadmium plates are placed in containers and staged prior to shredding and transferred directly to retort operations or is staged for sale or offsite disposal. The scrap metals are placed in containers and staged prior to sale and offsite shipment. Granulated plastic is placed in containers and staged for sale and offsite shipment or disposed of. Alkaline electrolyte is collected and transferred to a spent potassium hydroxide tank for subsequent pretreatment and discharge to the POTW or offsite disposal.</td>
</tr>
<tr>
<td>Retort Operations</td>
<td>265 Building</td>
<td>Nickel-containing batteries are recycled via manual and automated methods to recover iron nickel alloy and produce cadmium ingots. Dry cell batteries are disassembled and the plastic is stored in the permitted storage unit prior to offsite disposal. The dry cell material and wet cell shredded material from wet nickel battery breaking operations are placed in a retort body with an attached condenser/wet scrubber and oven. Heating, swelling, and cleaning cycles are performed. Iron nickel alloy, cadmium ingots, and metal powders are placed in containers and stored in the permitted storage unit prior to sale and offsite shipment. The wastewater from the condenser/wet scrubber unit is transferred to a holding tank for subsequent offsite disposal or is staged for sale and offsite shipment or offsite disposal.</td>
</tr>
<tr>
<td>Battery Sorting</td>
<td>265 Building</td>
<td>Some battery types are not recycled by Retriev. These batteries are sorted, consolidated, and packaged. Sorting is manually performed on a specially designed table. The batteries are stored in the permitted storage unit prior to sale and offsite shipment.</td>
</tr>
<tr>
<td>RGB Battery Sorting</td>
<td>295 Building</td>
<td>All Big Green Box (RGB) universal waste batteries are sorted, consolidated, and containerized. Sorting is manually performed on specially designed tables. The sorted batteries are stored in a permitted storage unit or other appropriate location based the battery disposal (i.e., hazardous or solid waste) prior to further processing.</td>
</tr>
<tr>
<td>265 Wastewater Pretreatment</td>
<td>265 Building</td>
<td>Wastewater and other liquids are generated in association with lead acid battery breaking, wet cell alkaline battery breaking, and floor washing. Unless disposed offsite, the wastewater and liquids are pretreated onsite prior to discharge to the City of Lancaster POTW. The pretreatment system includes tank storage, neutralization, and filtration. Filtration sludge is shipped offsite for disposal.</td>
</tr>
<tr>
<td>Alkaline Battery Recycling</td>
<td>295 Building</td>
<td>Alkaline batteries from consumer sources are recycled via manual and automated methods to recover zinc oxide and manganese oxide. The batteries undergo a process that includes breaking, screening, digestion, filtration, and drying. Metallic and non-metallic materials that are separated during the initial recycling steps are placed in containers and staged for sale and offsite shipment. The zinc oxide and manganese oxide are packaged and staged for sale and offsite shipment. Generated wastewater is recycled in the process or transferred to the pretreatment system. Filtration sludge is recycled in the process.</td>
</tr>
<tr>
<td>Lithium Ion Battery Recycling</td>
<td>295 Building</td>
<td>Lithium ion batteries from electric vehicle packs are recycled via manual and automated methods to recover carbon lithium metal-oxide. The batteries undergo a process that includes deassembly, breaking, screening, precipitation, and filtration. Metallic and non-metallic materials that are separated during the initial recycling steps are placed in containers and staged for sale and offsite shipment or offsite disposal. The carbon lithium metal-oxide is packaged and staged for sale and offsite shipment. Generated wastewater is recycled in the process, transferred to the pretreatment system, or directly discharged to the POTW.</td>
</tr>
<tr>
<td>295 Wastewater Treatment</td>
<td>295 Building</td>
<td>Wastewater is generated in association with alkaline and lithium ion battery recycling and floor washing. Unless recycled in the process or disposed offsite, the wastewater is pretreated onsite prior to discharge to the City of Lancaster POTW. If appropriate, the wastewater from lithium ion recycling may be directly discharged to the POTW without pretreatment. The pretreatment system includes tank storage, neutralization, and filtration. Filtration sludge is recycled back into the process.</td>
</tr>
<tr>
<td>Non-Hazardous Waste/Material Management</td>
<td>263 and 295 Buildings</td>
<td>Management of wastes and materials not identified as hazardous may include, but may not be limited to, receiving, staging, sorting, storing, and transferring.</td>
</tr>
</tbody>
</table>

Notes: The above activities, as performed by Retriev, are not subject to RCRA Subtitle C permitting, however, some hazardous waste rules and regulations may be applicable.
Table 4-1. Gross and Net Secondary Containment Volume Calculations – 265 Storage Unit, Retrieval Technologies, Inc., Lancaster, Ohio, Revision 1

Assumptions and Conditions

Effective Perimeter and Interior Concrete Berm Dimensions = 3.5″H * 8″W
Concrete Rollover Berm Displacement:
40′W x 10′L = (480′W x 120′L x 3.5″H x 0.5) / 1,728ci/cf = 29.2cf
10′W x 10′L = (120′W x 120′L x 3.5″H x 0.5) / 1,728ci/cf = 7.3cf
5′W x 10′L = (60′W x 120′L x 3.5″H x 0.5) / 1,728ci/cf = 3.7cf
5′W x 10′L = (60′W x 120′L x 5.5″H x 0.5) / 1,728ci/cf = 5.8cf
Torching Station Displacement = (4,590si * 3.5″) / 1,728ci/cf = 9.3cf
Torching Station Baghouse Displacement = (24,840si * 3.5″) / 1,728ci/cf = 50.4cf
Heater Displacement = (4,896si * 3.5″) / 1,728ci/cf = 10.0cf
Pallet Construction and Displacement:
solid top and bottom = (48″ * 40″ x 0.75″ * 2) / 1,728ci/cf = 1.7cf
cross bracing = (3.5″ * 1.5″ * 48″ * 3) / 1,728ci/cf = 0.5cf
total displacement 100% submerged = 1.7cf + 0.5cf = 2.2cf
Structural Column Displacement = Negligible
Cumulative Minimum Capacity Required = 5,800gal = 775.3cf

265-1 Storage Unit Secondary Containment Capacity
Gross Unit Volume (berm centerline to centerline) = 10,000sf * (3.5″/12″/ft) = 2,916.6cf
Effective Gross Unit Volume (berm interior to interior) = 9,867sf * (3.5″/12″/ft) = 2,877.9cf
Net Volume = 2877.9cf – 3.7cf – 5.8cf – 5.8cf – 9.3cf – 50.4cf – (2.2cf * 222) = 2,314.5cf

265-2 Storage Unit Secondary Containment Capacity
Gross Unit Volume (berm centerline to centerline) = 13,800sf * (3.5″/12″/ft) = 4,025.0cf
Effective Gross Unit Volume (berm interior to interior) = 13,637sf * (3.5″/12″/ft) = 3,977.5cf
Net Volume = 3,977.5cf – 7.3cf – 29.2cf – 3.7cf – (2.2cf * 309) = 3,257.5cf

265-3 Storage Unit Secondary Containment Capacity
Gross Unit Volume (berm centerline to centerline) = 12,909sf * (3.5″/12″/ft) = 3,765.2cf
Effective Gross Unit Volume (berm interior to interior) = 12,842sf * (3.5″/12″/ft) = 3,745.6cf
Net Volume = 3,745.6cf – 29.2cf – 7.3cf – (2.2cf * 289) = 3,073.3cf

265-4 Storage Unit Secondary Containment Capacity
Gross Unit Volume (berm centerline to centerline) = 20,000sf * (3.5″/12″/ft) = 5,833.3cf
Effective Gross Unit Volume (berm interior to interior) = 19,826sf * (3.5″/12″/ft) = 5,782.6cf
Net Volume = 5,782.6cf – 7.3cf – 29.2cf – 29.2cf – 10.0cf – (2.2cf * 432) = 4,756.5cf

Cumulative Secondary Containment Capacity
Net Volume = 2,314.5cf + 3,257.5cf + 3,073.3cf + 4,756.5cf = 13,401.8cf
Adequacy: 13,401.8cf available greater than 775.3cf required

Cox-Colvin & Associates, Inc.
<table>
<thead>
<tr>
<th>Inspection Category</th>
<th>Frequency</th>
<th>Points of Inspection</th>
</tr>
</thead>
</table>
| **General**         | Daily     | • Warning signage is in place  
|                     |           | • Machine guards in place and working properly  
|                     |           | • Minimum 30 inches of aisle space maintained  
|                     |           | • Floor clean and free of debris  
|                     |           | • Water, fire, service, and gas lines properly marked  
|                     |           | • Outside conditions do not interfere with work  
|                     |           | • Guard, deadman switches, and machine safety devices operating correctly  
|                     |           | • Perimeter inspection  
|                     |           | • Floor grating structural condition  
|                     |           | • Proper stacking height of containers  
|                     |           | • Container time limit in staging adjacent to recycling process  
|                     |           | • Material storage tanks properly labeled  
|                     |           | • Storage tank level switches operational  
|                     |           | • Container time limit in less than 90 day storage areas  
|                     |           | • Eye wash and shower stations clean and functional  
|                     |           | • Oil storage area clean and drums properly marked  
|                     |           | • Evidence of leaks near containers  
|                     |           | • Emergency equipment containers full and accessible  
|                     |           | • Sump in recycling areas free of liquid and debris  
|                     |           | • Rain event in last 24 hours  
|                     |           | • Parameters of scrubber checked and recorded  
|                     |           | • Emergency equipment inventoried  
|                     |           | • Container condition (visual deterioration)  
|                     |           | • Container time limit in staging prior to storage or shipping  
|                     |           | • Personnel protective equipment inventoried and functional  
|                     |           | • Materials are properly label and segregated  
|                     |           | • Visual condition of storage tanks  
|                     |           | • Perimeter Fence/Security (Quarterly)  
| **265 Permitted Storage Unit** | Daily     | • Leaking containers  
|                     |           | • Container condition  
|                     |           | • Bern and ramp condition  
|                     |           | • Incompatible wastes properly segregated  
|                     |           | • Container time limit in temporary staging area/battery sorting  
|                     |           | • Spills observed  
|                     |           | • Containers properly labeled  
|                     |           | • Cracks or gaps in base  
|                     |           | • Available capacity  
| **295 Permitted Storage Unit** | Daily     | • Only containers without free liquids present  
|                     |           | • Container condition  
|                     |           | • Cracks or gaps in base of unit  
|                     |           | • Incompatible wastes properly segregated  
|                     |           | • Spills observed  
|                     |           | • Containers properly labeled  
|                     |           | • Available capacity  

Notes:
Daily frequency is Sunday through Saturday, regardless of facility operation schedule.
Refer to actual inspection procedure and log for additional information on points of inspection.
Corrective actions will be performed if necessary; flood control corrective actions will be completed within 45 days of initial documentation.

Revision 2
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<tbody>
<tr>
<td>Introductory [I] / Continuing [C]</td>
<td>[I]</td>
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<td>Health &amp; Safety Mgr</td>
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</tbody>
</table>

The Facility Manager, Environmental Manager, or Health & Safety Manager will direct the personnel training program.

The Supervisor/Lead job position may be associated with various departments, but will receive the same training.

The required introductory training [I] must be completed within six months of employment at the facility, assignment to the facility, or transfer to a new position within the facility, whichever is relevant.

The continuing training [C] will be performed on a calendar-year basis and within 15 months of the previous continuing training.

Personnel working in job positions with duties that include direct handling and management of hazardous waste may not conduct unsupervised hazardous waste activities before completing the training required for their position. HAZWOPER Emergency Response and 8-Hr training will include a brief overview of installation procedures of the portable/modular wall for flood protection of the 265 storage unit.
<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Type</th>
<th>Period of Operation</th>
<th>Waste Managed</th>
<th>Approximate Dimensions</th>
<th>Documented Releases to the Environment</th>
<th>General Description of Structure</th>
<th>Engineering Controls</th>
<th>Release Potential</th>
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<tbody>
<tr>
<td>1</td>
<td>Retort Operations</td>
<td>Recycling Process</td>
<td>2006 - Present</td>
<td>D006 Solids, D006 and D018 Sludge</td>
<td>107 ft x 132 ft (irregular)</td>
<td>Dust in Baghouse Fire 12/18/13 only release to atmosphere*</td>
<td>Enclosed Building, Concrete Floor, Baghouses</td>
<td>Low</td>
<td></td>
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<tr>
<td>2</td>
<td>Retort Holding Tank</td>
<td>Above-Ground Storage Tank (Tank 02)</td>
<td>2006 - Present</td>
<td>D002 and D009 Liquids</td>
<td>2,500-gallon Tank</td>
<td>None</td>
<td>Plastic tank holding modified liquids from condenser box, designated &lt;90 Day Area</td>
<td>Enclosed Building, Concrete Floor, Double-Wall Tanks, Level and Leak Sensors</td>
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<tr>
<td>3</td>
<td>Dehydro, Muffle Monitor, and Drum</td>
<td>Recycling Process</td>
<td>2006 - Present</td>
<td>D006 Solids</td>
<td>79 ft x 32 ft</td>
<td>None</td>
<td>Drum of Solids</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<td>4</td>
<td>90 Day Storage Near Tank 02</td>
<td>Recycling Process</td>
<td>2006 - Present</td>
<td>D006 and D018 Solids</td>
<td>20 ft x 36 ft</td>
<td>None</td>
<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<tr>
<td>5</td>
<td>Wat Nickel Battery Breaking</td>
<td>Recycling Process</td>
<td>2006 - Present</td>
<td>D002 and D009 Liquids, D006 Solids</td>
<td>15 ft x 53 ft (irregular)</td>
<td>None</td>
<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<td>6</td>
<td>KCH Waste Holding Tank</td>
<td>Above-Ground Storage Tank (Tank 03)</td>
<td>2006 - Present</td>
<td>D002 and D009 Liquids</td>
<td>2,500-gallon Tank</td>
<td>None</td>
<td>None</td>
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<tr>
<td>7</td>
<td>90 Day Storage Near Office Cubes</td>
<td>Recycling Process</td>
<td>2006 - Present</td>
<td>D001 through D010 Solids and Liquids</td>
<td>40 ft x 36 ft</td>
<td>None</td>
<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
<td>Low</td>
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<td>8</td>
<td>Hazardous Waste Reeloff</td>
<td>Hazardous Waste Reeloff</td>
<td>2005 - Present</td>
<td>D006 and D008 Solids</td>
<td>40 ft x 40 ft (Reeloff)</td>
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<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<tr>
<td>9</td>
<td>Solid Waste Dumper</td>
<td>Solid Waste Dumper</td>
<td>2005 - Present</td>
<td>D006 and D008 Solids</td>
<td>10 to 20 Yard</td>
<td>None</td>
<td>None</td>
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<td>10</td>
<td>R&amp;D -90 Day Storage</td>
<td>Recycling Process</td>
<td>2006 - Present</td>
<td>D006 Solids</td>
<td>35 ft x 5 ft</td>
<td>None</td>
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<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<tr>
<td>11</td>
<td>Lead Battery Autoreducer</td>
<td>Recycling Process</td>
<td>2005 - 2009 (currently Active)</td>
<td>D002 and D009 Liquids, D006 Solids</td>
<td>120 ft x 39 ft</td>
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<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<td>12</td>
<td>205 Wastewater Pretreatment</td>
<td>Wastewater Treatment System</td>
<td>2004 - Present</td>
<td>D002, D006, and D008 Liquids, D006 and D008 Solids</td>
<td>103 ft x 27 ft</td>
<td>None</td>
<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<td>13</td>
<td>Lead Acid Battery Renewal</td>
<td>Recycling Process</td>
<td>2004 - Present</td>
<td>D002 and D009 Liquids, D006 Solids</td>
<td>60 ft x 40 ft</td>
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<td>14</td>
<td>Universal Waste &lt;1 Year Storage</td>
<td>Recycling Process</td>
<td>2004 - Present</td>
<td>D006 Solids</td>
<td>35 ft x 40 ft (irregular)</td>
<td>None</td>
<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<tr>
<td>15</td>
<td>280-1 Pivotal Storage Unit</td>
<td>Pivotal Storage Unit</td>
<td>2003 - Present</td>
<td>D001 through D010 Solids and Liquids</td>
<td>100 ft x 100 ft</td>
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<td>None</td>
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<td>16</td>
<td>282-2 Pivotal Storage Unit</td>
<td>Pivotal Storage Unit</td>
<td>2005 - Present</td>
<td>D001 through D010 Solids and Liquids</td>
<td>100 ft x 140 ft</td>
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<td>None</td>
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<tr>
<td>17</td>
<td>Solid Waste Storage Area</td>
<td>Solid Waste Storage Area</td>
<td>2003 - Present</td>
<td>D001 through D010 Solids and Liquids</td>
<td>100 ft x 134 ft (irregular)</td>
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<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<td>18</td>
<td>Alkaline Battery Charging Area</td>
<td>Solid Waste Storage Area</td>
<td>2014 - Present</td>
<td>Solid Waste</td>
<td>76 ft x 24 ft</td>
<td>None</td>
<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<tr>
<td>19</td>
<td>Alkaline Battery Recycling</td>
<td>Recycling Process</td>
<td>2014 - Present</td>
<td>Solid Waste</td>
<td>231 ft x 50 ft</td>
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<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<td>20</td>
<td>258 Wastewater Pretreatment</td>
<td>Wastewater Treatment System</td>
<td>2015 - Present</td>
<td>Nonhazardous Wastewater</td>
<td>31 ft x 28 ft</td>
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<td>21</td>
<td>Laboratory Waste &lt;90 Day Storage</td>
<td>Recycling Process</td>
<td>2014 - Present</td>
<td>D002 through D010 Liquids</td>
<td>30 ft x 8 ft</td>
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<td>None</td>
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<td>22</td>
<td>Influent Storage Area</td>
<td>Universal Waste Storage Area</td>
<td>2010 - Present</td>
<td>D001 through D010 Solids and Solid Waste</td>
<td>48 ft x 24 ft</td>
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<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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<td>23</td>
<td>Lithium Ion Battery Recycling</td>
<td>Recycling Process</td>
<td>2015 - Present</td>
<td>D001 Solids and Solid Waste</td>
<td>213 ft x 36 ft (irregular)</td>
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<td>Enclosed Building, Concrete Floor, Double-Wall Tanks, Level Sensors</td>
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<td>24</td>
<td>90 Day Storage and Big Green Box</td>
<td>Recycling Process</td>
<td>2015 - Present</td>
<td>D001 through D010 Solids and Solid Waste</td>
<td>96 ft x 20 ft</td>
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<td>280 Pivotal Storage Unit</td>
<td>Pivotal Storage Unit</td>
<td>2016 - Present</td>
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<td>77 ft x 23 ft</td>
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<td>Staging Area</td>
<td>Staging Area</td>
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<td>D001 through D010 Solids and Liquids</td>
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<td>27</td>
<td>Sorting Area</td>
<td>Sorting Area</td>
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<td>D001 through D010 Solids and Liquids</td>
<td>60 ft x 40 ft</td>
<td>None</td>
<td>None</td>
<td>Enclosed Building, Concrete Floor, Baghouse</td>
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</table>

*Notification and follow up information was provided to Ohio EPA
*Note: Design drawings for some WMFs are available with varying degrees of detail.
Appendix A

Supporting Documentation for Floodplain
Floodplain Engineering Analysis

Cox-Colvin & Associates, Inc.
December 22, 2015
C675-15-001

Nick M. Petruzzi, PE, CPG
Cox-Colvin & Associates, Inc.
7750 Corporate Blvd
Plain City, OH 43064

Re: Floodplain Remapping Assessment
Retriev Technologies, Inc.
265 Quarry Road – Building 265
Permitted Hazardous Waste Storage Unit
Lancaster, Ohio

Dear Mr. Petruzzi,

In accordance with our proposal and your authorization on June 18, 2015, Stone Environmental Engineering and Science, Inc. (STONE) has completed the assessment of the remapping of the floodplain elevation and of potential solutions to protect the permitted hazardous waste storage unit in Building 265 at the Retriev facility in Lancaster, Ohio, the “site.”

BACKGROUND INFORMATION

Retriev is a permitted hazardous waste facility specializing in the management, reutilization, and recycling of all types of industrial/military, automotive, and household batteries. The Retriev site is located in the eastern portion of Lancaster, Ohio, 1,300 feet southeast of Pleasant Run (stream), a tributary of the Hocking River. Figure 1 “Vicinity Map” of the Appendix illustrates the location of the Retriev site. Figure 2 “Site Map” illustrates the site features and stream locations.

In January 2012, the Federal Emergency Management Agency (FEMA) revised their Flood Insurance Rate Map (FIRM). This revision resulted in the site being in the 100-year or 1% chance floodplain (Zone AE). The FIRM and Flood Insurance Study (FIS) mapping indicates that the 1% flood water will be 1 to 3 feet above the finished floor of the facility. A copy of the FEMA FIRM is presented as Figure 4 in the Appendix.

Retriev’s existing Resource Conservation and Recovery Act (RCRA) Subpart B permit is being reviewed for renewal by the Ohio Environmental Protection Agency (OEPA). As a result of the 2012 revised FIRM, and as indicated by OEPA, the Retriev facility must provide the following information as identified in Ohio Administrative Code (OAC) 3745-50-44(A)(11)(d), specifically:

(i) Engineering analysis to indicate the various hydrodynamic and hydrostatic forces expected to result at the site as a consequence of a one-hundred-year flood.
(ii) Structural or other engineering studies showing the design of operational units (i.e., the storage units) and flood protection devices (devices to be identified as options) at the facility and how these will prevent washout.

FACILITY DETAILS

Cox - Colvin provided the following data to STONE for the Retriev facility:

- Site location Map
- Site Plan
- Building 265 Floor Plan with spot elevation at existing permitted hazardous waste storage unit

Retriev is located on an approximate 87 acre site which is bordered by Quarry Road to the east and a railroad track to the north. There are two main buildings at the site, one located at 265 Quarry Road and the other located at 295 Quarry Road. The area between the two buildings and along Quarry Road is predominantly concrete and asphalt parking lot.

Within each of the buildings is a permitted hazardous waste storage unit. The permitted storage unit within the 265 Quarry Road building is identified as the “265 storage unit”. The permitted storage unit within the 295 Quarry Road building is identified as the “295 storage unit”. The 265 storage unit consists of coated concrete berms and floor. The 295 storage unit consists of an area on the concrete floor identified by painted lines. The 265 Building is the northern most building and houses the permitted hazardous waste unit that will require protection from flood water. Retriev has elected to develop a procedure to transfer hazardous waste out of the 295 storage unit in lieu of providing flood protection per OAC 3745-50-44(A)(11)(d)(iii).

The 265 building is approximately 185,600 square feet and contains the recycling operation of the lead acid and alkali batteries. It also houses the 36,709 square foot storage unit where batteries are stored on pallets prior to and after recycling. The perimeter of this area is approximately 960 linear feet and is presently surrounded by a 4 to 6 inch high curb and drive-over berm. The floor and curb in the storage unit are coated with protective epoxy. Maintenance personnel indicated that all utility ports are grouted closed within the permitted hazardous waste storage unit. The average finished floor elevation in the unit is 831.2. Figure 2 “Site Map” illustrates the 265 Building and the existing permitted hazardous waste unit.

ASSESSMENT & ANALYSIS

Facility Evaluation

On July 2, 2015, Stuart Ravary of STONE met with Joseph Acker, Jr. and John Glassburn of Retriev and Nick M. Petruzzi of Cox-Colvin on site to discuss and review the project scope, Retriev’s operations, and the 265 Building. On July 16, 2015, STONE visited the site with Felix Cestari (structural engineer). During these site visits the operations and facility details were discussed and observed. Retriev reported that building plans or drawing details were not
available with the exception of a copy of a structural floor plan that was provided.

The 265 building appears to be supported on steel H section columns and the bar and angle roof joists provide an estimated 25-foot overhead clearance. The floor consists of a concrete slab which was reported to be 6 to 10 inches thick. The slab appeared to be in fair condition with some cracking. Some utility access ports were noted throughout the floor slab, however, maintenance staff indicated that most electric lines were from overhead. It was noted that a major electrical service line lies below the slab and runs north and south around the east/west midpoint.

Within the storage unit the material to be recycled was stacked on pallets and appeared to be well organized. The aisles were clear of miscellaneous debris. Reportedly, both the interior and exterior floor is cleaned routinely to minimize cross contamination. Within the storage unit a dedicated forklift is utilized for this zone to minimize the transport of hazardous waste to outside the permitted unit.

The building itself is constructed of masonry block wall with H beam sections embedded in the block wall at 40-feet on center. From observation of wall openings it appeared that the block was not grouted, and no evidence of vertical reinforcing bar was readily detected. Horizontal wall joint truss style reinforcing was observed in one location.

From the plan sheet provided to STONE, there are six openings for truck loading docks around the building perimeter and 15 service doors.

**Analysis**

The OAC 3745-50-44(A)(11)(d), states that engineering analysis is to be performed to determine the various hydrodynamic and hydrostatic forces expected to result at the site as a consequence of a one-hundred-year or 1% chance flood. Additionally, the proposed flood protection devices must be designed by an engineer and explanation provided as to how the devices will be utilized at the facility and their efficacy in preventing washout.

**Flood Elevations at Facility**

STONE obtained the FEMA flood map (FIRM) and insurance study (FIS) from the FEMA web site at [https://msc.fema.gov/portal/search](https://msc.fema.gov/portal/search). The FIRM shows that the 1% chance flood crosses the Retriev property (Figure 4). The highest water elevation is located on the northeast corner of the property near the intersection of Quarry Road and the railroad tracks. At this location the flood elevation is shown to be 835.2 (reported in the FIS as cross section L as illustrated on Figures 2 and 3). The flood water elevation drops as it flows toward the southwest corner of the 265 Building to an approximate elevation of 831.8 (reported in the FIS as cross section K).

To obtain an estimate of flood elevations across the 265 Building floor, STONE interpolated between the known cross sections L and K on the FIRM. Figure 3 – “FEMA 100 year flood elevations” shows the 265 Building footprint, the existing storage unit, and the reported and interpolated flood elevations from FEMA.
Hydrostatic Forces
Based on the flood elevations and the finished floor elevation, 2 feet of water could be present in the permitted hazardous waste storage unit in Building 265 during a 100-year flood event. As a result of that height of water, hydrostatic forces will be acting on any structure that is to be installed to protect the permitted hazardous waste storage unit. With a finished floor elevation of 831.2 and a flood elevation at the northeast corner storage unit equal to 833.2, the resultant maximum force acting on a wall would be 125 pounds measured at 8 inches above the finished floor. Although the flood elevation (water height) drops throughout the building as shown on Figure 3, for the purpose of this report the maximum resultant hydrostatic force is used.

Hydrodynamic Forces
Hydrodynamic forces would be expected in areas with current (moving water) such as the building exterior on the upstream side or northeast area of the structure. The FIS shows that the velocity at cross sections K and L in the floodway are 2.7 and 3 feet per second (fps). This results in a pressure force of 8 pounds per square foot (psf) in the floodway. The northeast corner of the 265 Building is more than 1,200 to 1,500 feet from the floodway, and therefore flood flow velocities would be estimated around 1 fps. Resultant hydrodynamic forces would be less than 2 psf against the building in this area.

In addition, the permitted hazardous waste storage unit lies within the building interior. The flood water during the 100 year flood water as it rises to the finished floor level would need to penetrate the building openings and various obstacles throughout the facility. The permitted hazardous waste storage unit is expected to experience flow velocities of less than 1 fps during the 100-year flood based on the flow velocities and distances mentioned above and consequently, very small, if any, hydrodynamic forces as the water seeps into the building.

Structural Analysis
Using the forces described above, STONE assessed and developed potential options to resist the flooding forces and washout of the hazardous waste storage unit. Multiple options were considered and analyzed to protect the hazardous waste storage unit in Building 265 in accordance with the OAC requirements. Presently the FEMA Flood Insurance program requires that a building be protected to 1-foot above the base flood elevation. Although the flood protection options are not specifically for insuring the building and contents, it is protecting Retriev from a release of hazardous waste. Therefore all options were detailed to provide 12 inches of flood free-board. Therefore, at the northeast corner of the hazardous waste storage unit the top of wall would be elevation 834.2.

- Vertical Extension of Existing Curb or flood gate. One option is to extend the height of the existing curb that surrounds the permitted hazardous waste storage unit to an elevation of 834.2. The curb extension could be a permanent concrete wall or a designed temporary flood gate/wall system that is manufactured, stored on site, and installed prior to flooding.

- Inflatable tube. STONE researched the use of a water inflatable bladder to surround the permitted hazardous waste storage unit. The device proposed by DAM-IT-DAMS, INC. of Grand Blanc, Michigan is a tubular bladder that would essentially seal off the area by filling a long oblong tube (rolled out along the perimeter of the storage area) with water. The oversized water-filled tube would provide the counter weight to hold the interpolated
maximum of 2 feet of water out of the storage unit. The effective height of the water filled tube should meet or exceed Elevation 834.2.

- Exterior retaining structure. This option considers constructing an exterior retaining structure consisting of concrete and sheet piling to protect the entire building. The present building shell would not be sufficient to withstand the hydrostatic and dynamic forces of the 100-year flood event. As such, this option would require providing the structural reinforcement and waterproofing along the 1,960 foot building perimeter. The building perimeter protection on the Quarry Road (east) side would be 3 to 4 feet in height. The west end of the structure would require very little reinforcement as the flood elevations taper off to below the floor slab elevation. Along the north side the building the exterior grade changes from approximately floor slab elevation to a couple of feet below finished floor. However, the flood elevation also tapers off as it flows to the west. We estimate needing a protective wall of 3 to 5 feet high along the north side. The exterior grades on the south side of the 265 Building are lower to allow for the truck docks. We estimate that as much as 6 to 8 feet of structural wall would be required on the south side of the building. The truck dock and man doors would also require temporary stop logs in the event of flooding.

- Exterior levee. Another exterior option would be to provide an earthen levee around the entire building and parking lot area. The levee would be required along Quarry Road and the entrances into Retriev would require a structural flood gate that would be closed prior to flooding. Without specific topographic site data we estimated that the height of the levee would range from 5 to 9 feet around the perimeter of the 265 building. Construction of the levee would need to be approved by the Lancaster Floodplain Administrator and the ODNR Dam Safety regulatory agency.

CONCLUSIONS AND RECOMMENDATIONS

Because FEMA has revised the FIRM at the Retriev site, floodwater elevations are now mapped above the finished floor elevation at the permitted hazardous waste storage unit in Building 265. To provide protection from potential floodwaters, protection could be provided for solely the hazardous waste storage unit or expanded to include the entire building in order to meet the OEPA requirements.

The following options are being provided based on OAC requirements to resist the flood water forces and prevent a washout of the permitted hazardous waste storage units. Presently the FEMA Flood Insurance program requires that a building be protected to 1-foot above the 100-year flood elevation. Although the flood protection options are not specifically considered for insuring the building and contents, they are protecting Retriev from a release of hazardous waste. Therefore, the options have been detailed to provide 12 inches of flood free-board. For reference, the northeast corner of the hazardous waste storage area should be protected to Elevation 834.2.
Option 1 - Cast In Place Concrete Reinforced Wall

This option would entail constructing a cast in place 8-inch wide concrete wall and foundation around the perimeter of the permitted hazardous waste storage unit located inside the 265 Building. The wall height could vary as the flood profile drops off as it flows from northeast to southwest. The maximum height would be 3.0 feet at the northeast corner of the hazardous waste storage area. The wall would require a 3-foot wide by 10-inch thick foundation. All concrete would be placed with internal steel reinforcement. The wall would be formed and installed with a cast in place bottom water stop. Access into and out of the walled area via the roll-over berms would require that temporary stop logs be manufactured and stored on site and closed prior to flooding.

In utilizing a permanent concrete wall, ingress and egress will be limited. Although the wall is only 3 feet tall, it would be a visual block to some areas in the storage unit. Manpower would be needed in the event of an impending flood to install stop logs at the gates.

Option 1a – Temporary Stop Log Wall

Stop log units fabricated of either steel or aluminum could be manufactured specifically for the site. Storage space would be required as the logs are only in use in the event of a flood. It is anticipated that the stop logs would be 3.0 feet high and 8 feet wide. A rubber seal attached to the bottom and sides and a support post on one end would be utilized. These units attach to the floor by installing permanent, threaded dowels into an 18-inch diameter by 3-foot deep concrete anchors where the end support posts would be bolted to the floor and connected to the adjoining stop log.

The installation of the doweling and anchors would require that an anchor be installed every 8 feet along the perimeter and at each corner of the storage unit. We estimate that installation of the estimated 130 anchors would take about 3 to 4 weeks.

Because the stop logs would be used in the event of an impending flood, the logs would need to be stored in an area where they would be protected and have little risk of damage. During a flood event, extra staff may be required to facilitate installation. However, as the stop logs are only used during a flood event, they will not interfere with the normal, daily operations.

Option 2 - Temporary Geomembrane Tube

The geomembrane bladder would provide flood water protection of the permitted hazardous waste storage unit inside Building 265. This would be accomplished by filling long, oblong tubes with water and then rolling them out along the perimeter of the storage unit. The oversized water-filled tube would provide the counter weight to hold and seal the flood water out of the storage unit. These tubes would be constructed of reinforced flexible polypropylene and enclosed in a non-woven geotextile for abrasion durability. The sections would be made short enough to be manageable for installation and storage. Each section would have fill/drain ports and would be attached to the adjoining section with an overlapping connection, details of which will be provided by the manufacturer.
This option would require a dependable water source with high volume flow at a critical time of need. A total of 150,000 gallons of water would be needed to fill the tubes. If city water is used as this source, there may also be extra fees. The tubes will only be used during a flood event therefore; Retriev will need to store them safely on site in an area with little risk of damage. During a flood event, extra staff may be required to facilitate speedy installation. Because of their temporary nature, the tubes will not interfere with normal daily operations.

**Option 3 – Floodproofing the Building Exterior Wall**

Flood proofing the entire building perimeter would require significant structural amendments to the immediate exterior of the building. The structural addition could consist of a sheet pile wall and concrete filler between the sheet pile and the existing masonry block building wall.

All building doors would require stop logs to be manufactured and stored on site and installed prior to flooding. This option is very expensive but would protect all areas and equipment inside the building along with the building itself.

**Option 4 – Levee for Floodproofing the Building Area**

This option entails constructing a levee around the entire building. The levee would be, on average, 6 feet tall with 6 foot wide crest and 3:1 (horizontal to vertical) side slopes. Entrances to the parking and plant access would require a flood wall and stop logs to facilitate closing the levee for flood events. We would anticipate 4 to 6 of these openings at Quarry Road and at crossings between the 265 and 295 Buildings.

With a perimeter of approximately 2,600 linear feet, we estimate a required 15,000 cubic yards of select cohesive soil fill to be used as the levee. Because the levee would withhold water from entering this area and possibly push the flood water to other areas, this approach would require approval from the Lancaster Floodplain Manager and the Ohio Department of Natural Resources Dam Safety.

This option would protect all areas and equipment inside the building, in the parking lots and outside storage within the levee. It would not reinforce the building itself. Stop logs for the ingress and egress points would need to be put in place prior to flooding. Construction of a levee would require significant coordination with the City and County Engineer.
<table>
<thead>
<tr>
<th>Option</th>
<th>Protection</th>
<th>Pros</th>
<th>Cons</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast in place reinforced concrete wall</td>
<td>HW* storage unit</td>
<td>• permanent • low maintenance • minor change in operational procedures</td>
<td>• restricts access • restricts visibility • facility disruption during construction</td>
<td></td>
</tr>
<tr>
<td>Temporary stop log wall</td>
<td>HW storage unit</td>
<td>• temporary • no change in operational procedure • flexible and fairly easy to change configuration with added storage space</td>
<td>• requires storage area • requires installation effort at onset of flood event • rubber seals require maintenance</td>
<td>Aluminum very little maintenance and light. Steel needs painted and heavier to handle</td>
</tr>
<tr>
<td>Temporary Geomembrane tube</td>
<td>HW storage unit</td>
<td>• no change in operational procedure • flexible and fairly easy to change configuration with added storage space</td>
<td>• requires storage area • requires installation effort at onset of flood event • requires a known and reliable source of water</td>
<td>Hydrant flow is about 750 gpm which would fill 150,000 gallon tubes in around 4 hours.</td>
</tr>
<tr>
<td>Structural flood proofing exterior building walls</td>
<td>Building</td>
<td>• protects and reinforces building and all interior equipment and utilities • no interruption to internal operations</td>
<td>• longer construction time • ingress/egress require flood gates</td>
<td></td>
</tr>
<tr>
<td>Levee to surround building</td>
<td>Perimeter and building</td>
<td>• protects building and all interior equipment and utilities • no interruption to internal operations</td>
<td>• longer construction time • limited ingress/egress to Retrieve facility • requires floodplain manager and ODNR approval • ingress/egress require flood gates</td>
<td></td>
</tr>
</tbody>
</table>

*HW- Hazardous Waste
ADDITIONAL CONSIDERATIONS

Action Limits for Installation

If Retriev selects a “temporary” flood wall system to protect the hazardous waste storage area, the installation of the protection system will need to take place prior to the increase of flood water. As indicated on the Flood Insurance Study (FIS) the 10% chance flood is approximately 0.7 feet lower than the 1% flood. Therefore, it appears that the 10% flood would still be high enough to flood the hazardous waste storage area.

However, because flooding depends on many variables such as rate and duration of the storm event, the antecedent ground conditions (frozen, dry, saturated), consistent watershed land cover, conveyance through the stream and other considerations, a specific rainfall amount cannot be used to predict a specific flood elevation. For instance, as reported in the FIS flooding in Pleasant Run occurred and over topped SR 22 as an extended but isolated rainfall of 3.7 to 4.1 inches. However, large flooding of the Hocking River valley did not occur during this event. In another instance the National Oceanic and Atmospheric Administration (NOAA) reported 4.55 inches of rainfall near the center of the City of Lancaster on January 5, 2004, however Retriev did not encounter any flooding on that day. Furthermore, the FIS did not analyze the effect of the railroad track and ballast that exists 200 feet east of the Retriev building during floods less than the 1% flood. Based on the railroad location and elevation, the railroad bed may provide a small buffer for the facility during lower rainfall events.

The FIS uses the Type II distribution 24 hour rainfall to model the FEMA Flood maps. The table below shows the rainfall amount for the various frequency storms in the Lancaster, Ohio area. This rainfall information was obtained from the NOAA Precipitation Frequency (PF) website.

<table>
<thead>
<tr>
<th>Rainfall (inches)*</th>
<th>Average recurrence interval (years)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.17 (2.02–2.35)</td>
</tr>
<tr>
<td>2</td>
<td>2.60 (2.41–2.81)</td>
</tr>
<tr>
<td>5</td>
<td>3.20 (2.97–3.46)</td>
</tr>
<tr>
<td>10</td>
<td>3.69 (3.41–3.98)</td>
</tr>
<tr>
<td>25</td>
<td>4.38 (4.04–4.72)</td>
</tr>
<tr>
<td>50</td>
<td>4.95 (4.54–5.33)</td>
</tr>
<tr>
<td>100</td>
<td>5.55 (5.06–5.96)</td>
</tr>
</tbody>
</table>

*based point precipitation frequency estimates with 90% confidence intervals

Given this data, historic records and understanding that the railroad track may provide some buffer in lower rainfall events, it is suggested that actual installation of the flood wall be scheduled when the rainfall in the area meets the 3.5 inch threshold. However, predicting exactly when to begin installing the flood wall will depend on monitoring current and past weather conditions along with visually noting stream encroachment in the fields and the surrounding area near the facility, while considering other environmental factors that may affect flooding. The ability and timing to prepare and mobilize a crew to access the facility to complete the installation should also be considered. For a system requiring installation prior to a
flood event, a procedural plan should be developed outlining timing, personnel assignments, monitoring process, equipment, and any other items needed to address timely installation of the system.

**Permitting and Final Design**

Once Retriev selects the option determined the best solution for their facility, STONE will be pleased to provide a detailed design, cost estimate, and construction documents for bidding and construction. Be aware, all new construction will likely require local and/or State approval, permits and fees for building and site upgrades.

Sincerely,

Stone Environmental Engineering & Science, Inc.

Mary E. Sharrett, PE, LEED AP  
President

Stuart Ravary, PE, CFM  
Senior Project Engineer

Submitted: 1 electronic copy (PDF) via e-mail

**Appendix**

Figure 1 – Vicinity Map  
Figure 2 – Site Map  
Figure 3 – FEMA 100 year flood elevations  
Figure 4 – FEMA FIRM
Muscle Wall Design Package
RetrievTech Technical Information and Calculations

<table>
<thead>
<tr>
<th>Document Number:</th>
<th>MWD-00055</th>
<th>Rev:</th>
<th>04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author:</td>
<td>C. Lewis</td>
<td>Date:</td>
<td>151209</td>
</tr>
</tbody>
</table>
# Materials and Chemical Compatibility

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Duration of Deployment</th>
<th>Material</th>
<th>Coating</th>
<th>Resistance to H2SO4 ≤ 10%</th>
<th>Resistance to KOH ≤ 10%</th>
<th>UV Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-106</td>
<td>Straight MuscleWall, 4′ High</td>
<td>Temporary</td>
<td>Low Density Polyethylene</td>
<td>none</td>
<td>Excellent: 30 day constant exposure shows no damage.</td>
<td>Excellent: 30 day constant exposure shows little or no damage.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
<tr>
<td>MW-601</td>
<td>Corner, MuscleWall, 4′ High</td>
<td>Temporary</td>
<td>Low Density Polyethylene</td>
<td>none</td>
<td>Excellent: 30 day constant exposure shows no damage.</td>
<td>Excellent: 30 day constant exposure shows little or no damage.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
<tr>
<td>MW-130</td>
<td>Liner, 0.030 Thick PE Woven Sheet</td>
<td>Temporary</td>
<td>Low Density Polyethylene</td>
<td>none</td>
<td>Excellent: 30 day constant exposure shows no damage.</td>
<td>Excellent: 30 day constant exposure shows little or no damage.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
<tr>
<td>MW-503.02</td>
<td>Foam Seal</td>
<td>Temporary</td>
<td>PU-EVA</td>
<td></td>
<td>Good.</td>
<td>Good.</td>
<td>Not exposed.</td>
</tr>
<tr>
<td>MW-FC-504.03</td>
<td>Spray Foam</td>
<td>Temporary</td>
<td>Polyurethane</td>
<td>none</td>
<td>Good. Darkening effect, but intact after 26 weeks exposure.</td>
<td>Excellent.</td>
<td>Not exposed.</td>
</tr>
<tr>
<td>MW-635.01</td>
<td>Back Brace</td>
<td>Temporary</td>
<td>A-36 Steel, Galvanized</td>
<td>Powder coated</td>
<td>Fair if power coating is intact.</td>
<td>Good if power coating is intact.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
<tr>
<td>92240A715</td>
<td>Bolt, 1/2-13 x 1.5</td>
<td>Temporary</td>
<td>18-8 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>93980A350</td>
<td>Concrete Anchor, 1/2-13 Thread</td>
<td>Permanent</td>
<td>316 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>91950A033</td>
<td>Washer, 1/2″</td>
<td>Temporary</td>
<td>316 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>92240A550</td>
<td>Bolt, 3/8-16 x 1.75</td>
<td>Temporary</td>
<td>18-8 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>93988A570</td>
<td>Concrete Anchor, 3/8-16 Thread</td>
<td>Permanent</td>
<td>316 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>92949A708</td>
<td>Plug Screw, 1/2-13</td>
<td>Permanent</td>
<td>18-8 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>7505A55</td>
<td>Anchor Epoxy</td>
<td>Permanent</td>
<td>Epoxy</td>
<td>none</td>
<td>Good.</td>
<td>Excellent. 30 day constant exposure shows little or no damage.</td>
<td>Not exposed.</td>
</tr>
<tr>
<td>MW-FC-503.01</td>
<td>Liner Clamp Bar</td>
<td>Temporary</td>
<td>A-36 Steel</td>
<td>Rubber Dipped</td>
<td>Good as long as coating is not compromised.</td>
<td>Excellent as long as coating is not compromised.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
</tbody>
</table>
Leakage Rate from Testing

- Testing of clamp seal was done to determine expected leakage rates.
- Testing was done using a containment with 4 feet of water.
- Water loss was calculated over time by measuring water depth change.
- Initial high rate of change of water level likely due to settling of liner rather than actual water loss.
- After initial stabilization of the system with water, typical leakage rate is 0.3 gal/ wall/ hr.
Set-up Time Estimates

- **Permanent Installation Items**
  - Drill and set anchors
    - 1434 anchors x 3min/anchor = 72 man hours

- **Temporary Installation Items**
  - Assemble walls
    - 174 walls x .5 min/wall x 2 people = 3 man hours
  - Install liner
    - 180 clamp bars x 6min ea = 87.3 man hours
    - 2 inside corners x 30 min = 1 man hour
    - 6 outside corners x 10 min = 1 man hour
    - 6 seams x 15 min = 1.5 man hours
  - Install back braces
    - 174 back braces x 2 min = 5.8 man hours
  - Strap Liner
    - 198 straps x 1 min = 3.3 man hours
  - Total man hours for temporary installation 103 man hours
  - Assumes skid steer or forklift available to bring walls and liner on site
  - Parallel use of labor acceptable to shorten total calendar time
    - 8.5 hrs with 12 person crew
    - 12.9 hrs with 8 person crew
    - 25.7 hours with 4 person crew
Hydrostatic and Hydrodynamic Force Calculations

- From analysis provided by Stone, water velocity inside building 265 would be “less than 1 ft/sec.
- At 36” of water depth, the hydrodynamic force with 1 ft/sec water velocity on each wall is 35 lbf.
- The hydrostatic force with 36” water is 1686 lbf.
- Total hydraulic forces acting to slide wall: 1721 lbf.

\[
\begin{align*}
\rho_{\text{water}} &= 1000 \frac{\text{kg}}{\text{m}^3} \\
h &= 36 \text{ in} \quad w = 72 \text{ in} \\
P_{\text{wall}} &= \rho_{\text{water}} \cdot g \cdot h \quad P_{\text{wall}} = 1.301 \text{ psi} \\
A_{\text{wall}} &= w \cdot h \quad A_{\text{wall}} = 1.672 \text{ m}^2 \\
V_{\text{water}} &= 1 \frac{\text{ft}}{s} \\
F_{\text{wall,hd}} &= \rho_{\text{water}} \cdot A_{\text{wall}} \cdot V_{\text{water}}^2 \\
&= 35 \text{ lbf} \\
F_{\text{wall}} &= \frac{P_{\text{wall}}}{2} \cdot A_{\text{wall}} \\
&= (1.686 \cdot 10^3) \text{ lbf}
\end{align*}
\]
Reacting Structure

- One back brace will be placed at the rear of each wall to resist sliding and tipping.
- Sliding friction between the wall and set-up surface has been determined empirically.
- Liner tension and friction also resist sliding and add additional margin, but are not included in this analysis.
Sliding Load Analysis

- One rear brace per wall
  - Each brace is secured 1x ½” concrete anchor secured with epoxy
  - Force shown below is shear force at anchor with wall friction included
  - See separate stamped analysis for anchor capacity
  - Stamped analysis excludes favorable wall friction contribution (more conservative)

\[
W_{\text{wall}} := 110 \cdot \text{lbf} \quad \text{Weight of un-filled 4’ wall}
\]

\[
f_{\text{wall}} := \frac{1100}{1400} \cdot W_{\text{wall}} \quad \text{Friction data from testing}
\]

\[
F_{\text{hyd}} := F_{\text{wall}} + F_{\text{wall\_hd}} \quad \text{Hydrostatic load}
\]

\[
F_{\text{net}} := F_{\text{hyd}} - f_{\text{wall}} \quad F_{\text{net}} = 1634.052 \text{ lbf}
\]

\[
F_{\text{hyd}} = (1.72 \cdot 10^{3}) \text{ lbf}
\]
Tipping Load Analysis

- Assume 1x concrete anchors at back brace
- This analysis uses empirical test data to show the wall has margin against tipping
- Factor of Safety against tipping with 36” water is 5.07
- Independent stamped analysis analyzes back brace for structural strength and yielding

\[ W_{wall} = 110 \cdot \text{lb} \quad \text{Weight of empty 4' high MuscleWall} \]

\[ F_{\text{hydrostatic}} = 1686 \cdot \text{lb} \]

\[ F_{\text{hydrodynamic}} = 35 \cdot \text{lb} \]

\[ R_{brc} = \frac{(10060 + 2997)}{2} \cdot \text{lb} \quad \text{Tested strength of 2 back braces on a single 4foot high MuscleWall} \]

\[ R_{brc} = 6529 \cdot \text{lb} \quad \text{Calculate Stabilizing Moment} \]

\[ M_{\text{stab}} = (W_{wall} \cdot 11.94 \cdot \text{in}) + (R_{brc} \cdot 16 \cdot \text{in}) \]

\[ M_{\text{stab}} = (1.058 \cdot 10^5) \cdot \text{in} \cdot \text{lb} \quad \text{Calculate Tipping Moment} \]

\[ M_{\text{tip}} = (F_{\text{hydrostatic}} \cdot 12 \cdot \text{in} + F_{\text{hydrodynamic}} \cdot 18 \cdot \text{in}) \]

\[ M_{\text{tip}} = (2.086 \cdot 10^4) \cdot \text{in} \cdot \text{lb} \quad \text{Factor of safety against tipping} \]

\[ f_{\text{safety}} = \frac{M_{\text{stab}}}{M_{\text{tip}}} \quad f_{\text{safety}} = 5.07 \]
**Step 1**
With forklift unload trailer and strategically place bundles throughout area for deployment.

**Step 2**
Always remove the upside-down wall first. One person on each side lifts the wall up, freeing the securing pegs, then lowers the wall to a comfortable carrying position.

**Step 3**
When removing the right-side up wall one person stands on each side, slides the wall to the edge, then lowers the wall to a comfortable carrying position. Dropping the Muscle Wall could cause damage and/or personal injury. Handle with care.

**Step 4**
One person on each side of the Muscle Wall raises it and rests it on top of the connecting wall until ready to slide into place. Be sure to exercise proper lifting techniques and to keep hands free of the joint while the Muscle Wall is sliding into place.

**Step 5**
Be sure that the toe of the Muscle Wall is facing the water.

**Step 6**
If corners are being used, one or two people raise and slide the corner piece into the connecting wall. When using corners two safety straps per connection are required.
Step 7
Once walls are set in place begin filling walls with water using the trash pump. In most situations filling walls half way is all that is necessary.

Step 8
Put safety straps through the Muscle Wall in the closest holes to the joint. Tighten only the top strap for now. The straps need to be fed into the Muscle Wall from the side without the toe.
Clamp Bar Option

- When dealing with liner always exercise extreme caution to avoid ripping, tearing, or puncturing the liner in any way.
- Exercise extreme caution anytime holes are being cut in the liner.

**Step 1**  
Spray a layer of foam adhesive on the ground in front of the toe of the Muscle Wall.

**Step 2**  
Lay the flat foam on top of the adhesive along the entire length of your wall.

**Step 3**  
Unroll and unfold the liner over the wall so the edge of the liner in front of the wall ends where your foam is laid.

**Step 4**  
Fold back the edge of the liner, spray another layer of foam adhesive on top of the flat foam, and then replace the liner so it is sealed to the foam.
Step 5
Lay the clamp bar over the liner and the foam beneath the liner.

Step 6
Secure the clamp bar by installing the recommended bolts and washers.

Step 7
Place the 4 foot Muscle Wall brace over the wall and ensure that the brace connects to the back of the wall as pictured above.

Step 8
Secure the 4 foot Muscle Wall brace by installing the recommended bolts and washers.

Step 9
If seaming of the liner is required, run a line of seaming tape along the seam and then an additional line on each side of your initial line.

Step 10
Put another strip of seaming tape perpendicular to your seam approximately every six inches.
**Step 1**
Disconnect straps, roll up, and place in a storage container. Remove liner from the wall and fold for future installations. Properly dispose of any contaminated sand and/or sand bags.

**Step 2**
If foam was used to secure the liner to asphalt, scrape up as much of the foam as you can, sweep up, and dispose of.

**Step 3**
If foam was used to secure the liner to asphalt, use a pressure washer to clean up the rest of the residue from the foam.

**Step 4**
Empty the Muscle Wall by using the bung wrench to unscrew the bung plugs on the backside of each wall. Place bung plugs in a secure location where they won’t be lost or broken. The trash pump can also be used to pump the water out of the walls.

**Step 5**
Disconnect each Muscle Wall. One person on each side lifts the wall up until the wall is free of its connection.

**Step 6**
Stack the walls together in the same fashion as they were shipped. Turn one of the walls upside down and lay it on another wall ensuring that the pegs on top of each Muscle Wall are secured into the holes on the toe of the other wall.
Step 7
Stack the Muscle Wall back on their original pallets in the same fashion as they were shipped. Ensure that all of the male ends of the walls are on the same side. Run a safety strap all the way around the bundle securing it to the pallet. Transport to storage location.
<table>
<thead>
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**NOTES:**
1. DESIGN IS FOR MAX HEIGHT OF 3 FEET OF WATER WITH HYDRODYNAMIC PRESSURE NOT TO EXCEED 1 FPS. FOR ADDITIONAL ASSEMBLY INFORMATION, REFER TO THE FOLLOWING MUSCLEWALL STANDARD OPERATING PROCEDURES (SOP'S):
   a. 4ft Wall Deployment - Flood Control
   b. 4ft Wall Takedown - Flood Control
   c. Liner Deployment - Flood Control - Clamp Bar Option
Stamp by Ben Jennings is limited to the anchor bolt design to concrete with the assumption that concrete is 4,000 psi compressive strength. All other wall components are by others and this seal in no way represents that those elements were designed or reviewed by us.
NOTES:

2. BOND ALL CONCRETE ANCHORS IN PLACE WITH ITEM NUMBER 13. FOLLOW ALL MANUFACTURER’S INSTRUCTIONS FOR INSTALLATION OF INSERT USING EPOXY. PROVIDE CONTINUOUS INSPECTION BY SPECIAL INSPECTOR DURING INSTALLATION OF EPOXY. ANCHORS TO BE INSTALLED IN COMPETENT UN-CRACKED CONCRETE WITH COMPRESSIVE STRENGTH OF AT LEAST 4000 PSI. ADDITIONALLY, ANCHORS AND SURROUNDING CONCRETE SHOULD BE INSPECTED ANNUALLY FOR SIGNS OF DEGRADED STRENGTH.

3. USE HOLE NEAREST WALL. DO NOT USE SECOND HOLE.

Stamp by Ben Jennings is limited to the anchor bolt design to concrete with the assumption that concrete is 4,000 psi compressive strength. All other wall components are by others and this seal in no way represents that those elements were designed or reviewed by us.
Stamp by Ben Jennings is limited to the anchor bolt design to concrete with the assumption that concrete is 4,000 psi compressive strength. All other wall components are by others and this seal in no way represents that those elements were designed or reviewed by us.

NOTES:

4. INSTALL STRAPS AND TIGHTEN RATCHETS BEFORE INSTALLING LINER.

5. TYPICAL HOLE SPACING FOR LINER CLAMP BAR.
NOTE 6

3/8"-16 ANCHOR HOLE DETAIL SHOWN WITH DEBRIS PLUG INSTALLED

1/2"-13 ANCHOR HOLE DETAIL SHOWN WITH DEBRIS PLUG INSTALLED

NOTE 6

3/8"-16 Anchor Bolt Detail Shown with Debris Plug Installed

1/2"-13 Anchor Bolt Detail Shown with Debris Plug Installed

NOTES:

6. KEEP DEBRIS PLUG SCREWS IN PLACE WHenever MUSCLEWALL SYSTEM IS NOT DEPLOYED TO MINIMIZE DEBRIS ENTRY INTO ANCHOR HOLES.

7. CONCRETE SLAB THICKNESS MUST BE AT LEAST 5 INCHES THICK FOR ANCHOR INSTALLATION.

Stamp by Ben Jennings is limited to the anchor bolt design to concrete with the assumption that concrete is 4,000 psi compressive strength. All other wall components are by others and this seal in no way represents that those elements were designed or reviewed by us.

MUSCLE WALL
FLOOD AND CONTAINMENT SOLUTIONS

PROPRIETARY
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DO NOT SCALE DRAWING

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DO NOT SCALE DRAWING
8. WHEN APPLYING LINER SEAM TAPE IN TEMPERATURES LESS THAN 60 F, USE HEAT GUN TO ACTIVATE ADHESIVE FOR BEST BOND. USE CAUTION TO AVOID MELTING ANY LINER MATERIAL.

9. FOR INLINE SEAMS AT THE END OF A ROLL OF LINER, OVERLAP LINER FROM NEW ROLL OVER EXISTING INSTALLED LINER BY 5’. TAPE NEW LINER TO THE BACK OF EXISTING LINER 5’ FROM THE END OF THE EXISTING LINER. THEN BEGAN INSTALLING NEW LINER. ONCE THE NEW LINER IS INSTALLED ON THE WALL, APPLY TAPE TO OUTSIDE SEAM WHERE OLD LINER ENDS. ENSURE THAT SEAM LAYS FLAT AND IS FREE FROM PLEATS THAT COULD CREATE LEAK PATHS.

10. FOR INSIDE CORNERS, A SEPARATE INSERT IS REQUIRED. INSTALL STRAIGHT SECTIONS OF LINER INTO CORNER. CUT LINER APPROXIMATELY 6” FROM CORNER. INSTALL CORNER INSERT OVER LINER AND TAPE SEAMS. ENSURE THAT NO PLEATS EXIST THAT COULD CREATE LEAK PATHS. INSTALL CLAMP BAR OVER LINER AND CORNER INSERT MATERIAL.

11. FOR OUTSIDE CORNERS, NO SEPARATE INSERT PIECE IS REQUIRED. MAINTAIN LEADING EDGE OF LINER AT CLAMP BAR PUCKER AND PLEAT FREE. EXCESS LINER MATERIAL LAYING OVER THE WALL WILL BE PLEATED. ENSURE PLEATS DO CONTINUE TO AND COMPROMISE SEAL IN CLAMP BAR REGION.
STRUCTURAL CALCULATIONS

PROJECT NAME:
RETRIEVTECH
BASED ON DRAWINGS DATED 12/8/2015

PREPARED FOR:
MUSCLE WALL

APEX DESIGN GROUP
15241 BEN MAUGHAN
12/8/2015

Reviewed by: Ben Jennings
6.13.16

APEX PROJECT #: 15241
PREPARED BY: BEN MAUGHAN
DATE: 12/8/2015

Reviewed by: Ben Jennings

These calculations were prepared solely for the client and project listed on the cover sheet. They shall not be copied or used for the benefit of any other party or project.
Narrative:
This calculation package has been prepared to show that the steel pipe brace and the concrete anchors can support a 3 ft tall flood load with minor dynamic loading. The muscle wall itself is not part of the scope of this calculation package. The loads are defined below.

\[
\rho_{\text{water}} := 1000 \ \text{kg/m}^3
\]

\[
h := 36 \ \text{in} \quad \text{Water height acting against wall}
\]

\[
w := 72 \ \text{in} \quad \text{Steel brace to brace spacing}
\]

\[
P_{\text{wall}} = \rho_{\text{water}} \cdot g \cdot h = 1.3 \ \text{psi}
\]

\[
A_{\text{wall}} := w \cdot h = 18 \ \text{ft}^2
\]

\[
V_{\text{water}} := 1 \cdot \frac{\text{ft}}{\text{s}} \quad \text{Calculation of flow and dynamic water force has been provided by others. Verify dynamic force meets design requirements.}
\]

\[
F_{\text{wall, hd}} := \rho_{\text{water}} \cdot A_{\text{wall}} \cdot V_{\text{water}}^2 = 34.9 \ \text{lbf} \quad \text{Static Force from dynamic flow acting on Wall at 18\" from ground surface}
\]

\[
F_{\text{wall}} := \frac{P_{\text{wall}}}{2} \cdot A_{\text{wall}} = 1685.6 \ \text{lbf} \quad \text{Static Force from stationary water acting on Wall at 12\" from ground surface}
\]

Wall distributes the forces described above to each brace as shown in Figure 1.

---

Figure 1: Free Body Diagram
Wall Brace Calculations, Using ASCE 7-10 as the design guideline.

Distribute Resultant Water Loads to Steel Brace (approximately a simple beam)

Brace is placed at 6 ft o.c. maximum, 3/4" Dia. A53 Grade B Steel Pipe

\[
RxnTop := \frac{1}{3} \cdot 1686 \text{ lbf} + \frac{1}{2} \cdot 35 \text{ lbf} = 580 \text{ lbf}
\]

\[
RxnBtm := \frac{2}{3} \cdot 1686 \text{ lbf} + \frac{1}{2} \cdot 35 \text{ lbf} = 1142 \text{ lbf}
\]

Brace is Analysed in RISA-3D Structural Software (See Next Pages)

Brace is sufficient for forces placed on it as described above.
See appendix for RISA-3D analysis specifics
Muscle Wall Brace

Loads: BLC 1, Lateral Load
### Hot Rolled Steel Properties

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### Joint Reactions

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RISA-3D Version 14.0.0 [X:\...\2015\15241 Muscle Wall\Calcs\Muscle Wall Actual Shape.R3D]
### Joint Reactions

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RISA-3D Version 14.0.0  [X:\...\2015\15241 Muscle Wall\Calcs\Muscle Wall Actual Shape.R3D]  Page 2
Wall Brace Calculations

Concrete Anchor Design, Using ACI 318-11 Appendix D as the design guideline

- **Uplift** := 1323 lbf (LRFD) Reaction at concrete anchor after placing the forces on the brace from RISA-3D
- **Shear** := 2411 lbf (LRFD) Reactions at concrete anchor after placing the forces on the brace from RISA-3D

Use Wej-it POWER-Sert Adhesive Insert Anchors, Size 1/2"-13 grade A316 Stainless Steel, In 4,000 psi concrete minimum, Using Inject-TITE AWF Epoxy.

*Special Inspection Required.

ACI 318-11 Appendix D Anchor Calculations For Adhesive Anchor in Tension and Shear

D.5.2.2 Concrete Breakout Tension Design

Design is for an anchor that does not have edge effects and is at least 6 inches from a concrete edge

\[ h_{ef} := 4 \text{ in} \]

\[ f'_c := 4000 \text{ psi} \]

\[ A_{Nco} := 9 \cdot h_{ef}^2 = 144 \text{ in}^2 \]

\[ A_{Nc} := A_{Nco} = 144 \text{ in}^2 \]

\[ \psi_c := 1.4 \]

\[ N_b := k_e \cdot \sqrt{f'_c \cdot h_{ef}^{1.5}} \cdot \sqrt{\frac{\text{psi}}{\text{in}}} = 8601.4 \text{ lbf} \]

\[ N_{eb} := \frac{A_{Nc}}{A_{Nco}} \cdot \psi_c \cdot N_b = 12042 \text{ lbf} \]

\[ \phi := 0.65 \]

\[ \phi \cdot N_{eb} = 7827.3 \text{ lbf} \]

Embedment

Minimum concrete compressive strength

For post installed anchors

D.5.2.2 Concrete Breakout Eqn.

Phi factor, See D.4.3

Uncracked Concrete Tension Capacity
Wall Brace Calculations

Concrete Anchor Design (Continued)

D.5.5.2 Adhesive Bond Tension Design

Design is for an anchor that does not have edge effects and is at least 4 inches from a concrete edge.

\[ d_a := 0.5 \text{ in} \quad \tau_{uncr} := 650 \text{ psi} \quad \text{Uncracked Concrete Design} \]

\[ c_{Na} := 10 \cdot d_a \cdot \sqrt{\frac{\tau_{uncr}}{1100 \text{ psi}}} = 3.8 \text{ in} \quad \text{Minimum Edge Distance} \]

\[ A_{Nao} := (2 \cdot c_{Na})^2 = 59.1 \text{ in}^2 \]

\[ A_Na := A_{Nao} = 59.1 \text{ in}^2 \quad \text{Single Anchor Design} \]

\[ N_{ba} := \tau_{uncr} \cdot \pi \cdot d_a \cdot h_{ef} = 4084.1 \text{ lbf} \quad \text{D.5.5.2 Adhesive Bond} \]

\[ N_a := \frac{A_{Na}}{A_{Nao}} \cdot N_{ba} = 4084.1 \text{ lbf} \]

\[ \phi := 0.65 \quad \text{Phi factor, See Section D.4.3} \]

\[ \phi \cdot N_a = 2654.6 \text{ lbf} \quad \text{Uncracked Concrete Tension Capacity} \]

\[ TensionCapacity := \min (\phi \cdot N_a, \phi \cdot N_{cb}) = 2654.6 \text{ lbf} \]

D.6.2 Concrete Breakout Shear Design

Design is for an anchor that does not have edge effects and is at least 6 inches from a concrete edge.

\[ h_a := 5 \text{ in} \quad \text{Concrete Thickness} \]

\[ c_{a1} := 1.5 \cdot h_{ef} = 6 \text{ in} \]

\[ A_{Vco} := 4.5 \cdot (c_{a1})^2 = 162 \text{ in}^2 \]

\[ A_Vc := A_{Vco} = 162 \text{ in}^2 \]

\[ l_e := h_{ef} = 4 \text{ in} \]
Wall Brace Calculations

Concrete Anchor Design (Continued)

\[ V_{b1} := 7 \cdot \left( \frac{l_c}{d_a} \right)^{0.2} \cdot \sqrt{d_a} \cdot \sqrt{f'_c} \cdot \sqrt{\frac{psi}{(c_a1)^{1.5}}} = 6973.6 \text{ lbf} \quad \text{Eqn. D-33} \]

\[ V_{b2} := 9 \cdot \sqrt{f'_c} \cdot \sqrt{\frac{lbf}{in}} \cdot (c_a1)^{1.5} = 8365.6 \text{ lbf} \quad \text{Eqn. D-34} \]

\[ V_b := \min (V_{b1}, V_{b2}) = 6973.6 \text{ lbf} \]

\[ \psi_h := \sqrt{\frac{1.5 \cdot c_a1}{h_a}} = 1.3 \]

\[ V_{eb} := \frac{A_{Vc}}{A_{Vco}} \cdot \psi_c \cdot V_b = 9763.1 \text{ lbf} \]

\[ \phi := 0.65 \quad \text{Phi factor, See Section D.4.3} \]

\[ \phi \cdot V_{eb} = 6346 \text{ lbf} \quad \text{Uncracked Concrete Shear Capacity} \]

D.6.2 Concrete Pryout Shear Design

Design is for an anchor that does not have edge effects and is at least 6 inches from a concrete edge

\[ k_{cp} := 2.0 \quad \text{Where hef} > 2.5 \text{ in, } k_{cp} = 2.0 \]

\[ N_{cp} := \min (N_a, N_{eb}) = 4084.1 \text{ lbf} \]

\[ V_{cp} := k_{cp} \cdot N_{cp} = 8168.1 \text{ lbf} \]

\[ \phi := 0.65 \]

\[ \phi \cdot V_{cp} = 5309.3 \text{ lbf} \quad \text{Uncracked Concrete Shear Capacity} \]

\[ \text{ShearCapacity} := \min (\phi \cdot V_{eb}, \phi \cdot V_{cp}) = 5309.3 \text{ lbf} \]
Wall Brace Calculations

Concrete Anchor Design (Continued)

Combined Tension and Shear Loading of The Anchor, Section D.7.3

\[ \text{ShearCapacity} = 5309.3 \text{ lbf} \]

\[ \text{Shear} = 2411 \text{ lbf} \]

\[ \text{TensionCapacity} = 2654.6 \text{ lbf} \]

\[ \text{Uplift} = 1323 \text{ lbf} \]

\[ \text{Unity} := \frac{\text{Uplift}}{\text{TensionCapacity}} + \frac{\text{Shear}}{\text{ShearCapacity}} = 0.95 \]

\[ \text{if}(\text{Unity} > 1.2, \text{"No Good"}, \text{"OK"}) = \text{"OK"} \]

Therefore install 1/2" diameter POWER-Sert Adhesive Anchor Insert that will accept a bolt using Inject-TITE AWF Epoxy.

Flood load cannot be a sustained load over more than a few months

Minimum Anchor Edge Distance required by ACI 318-11 appendix D for adhesive anchors is 8 inches

Special Inspection Required for adhesive (epoxy) anchor installation
### Bar Moment Capacity

*AISC 360-10 Chapter F, Section 11 (ASD)*

#### Rectangular Bar Moment

For the plate at the base of the pipe frame brace

From the tension reaction we get the design moment below

\[ 943 \text{ lbs} \times 1 \text{ in} = 943 \text{ lb in} \]

- **\( M_u = 943 \text{ lb in} \)**
- **\( b = 5.5 \text{ in} \)**  Width of the plate to bend is 5.5 inches
- **\( h = 0.1825 \text{ in} \)**  Depth of the plate to bend is 0.1825 inches
- **\( L_b = 4 \text{ in} \)**
- **\( E = 29000 \text{ ksi} \)**
- **\( F_y = 36 \text{ ksi} \)**
- **\( C_b = 1 \)**
- **\( S = 0.030530729 \text{ in}^3 \)**
- **\( Z = 0.045796094 \text{ in}^3 \)**
- **\( \Omega = 1.67 \)**

Yielding

\[ M_y (\text{lb in}) = 1,648.66 \text{ lb in} \] \hspace{1cm} *Eqn. F11-1*

**Yielding Controls**

LTB

\[ M_y (\text{lb in}) = \text{LTB Does Not Apply lb in} \] \hspace{1cm} *Eqn. F11-2*

\[ F_{cr} (\text{lb}) = 2,283,253,425 \text{ lb} \] \hspace{1cm} *Eqn. F11-4*

\[ M_{ny} (\text{lb in}) = \text{NA lb in} \] \hspace{1cm} *Eqn. F11-3*

\[ M_y/\Omega (\text{lb in}) = 987.22 \text{ lb in} \] \hspace{1cm} ok

Therefore the plate is sufficiently thick

*this calculation is for one way bending but in fact there is two way bending occurring and the calculation is conservative.*
APPENDIX

POWER-Sert Performance Data
Description
The POWER-Sert Adhesive Anchor is a proprietary internally threaded insert designed for use with structural adhesive. Our unique undercut design requires less adhesive and a shallow embedment while providing superior holding values in a variety of materials. Our exclusive FRICTION-FIT™ locks adhesive in place and allows immediate fastening of the fixture during cure time*. The POWER-Sert adhesive insert anchor is the ultimate problem solver!

Key Features & Benefits
- Machine lathed from a single piece of steel or stainless steel – no weak points
- Unique undercut design with knurling provides superior holding values
- Slightly larger bottom lobe creates a keying effect at the deepest anchor point
- Exclusive FRICTION-FIT™ allows immediate fastening of fixture while adhesive cures*
- No need to move equipment or fixtures to be fastened - ideal for in-place use**
- Easy installation - no special tools required
- Close edge distance and spacing
- Shallow embedment
  - Helps avoid rebar and drill-through
  - Adhesive bond and shallow embedment minimize effects of cone failure
- Vibration-resistant – adhesive bond withstands more seismic vibration loading than most standard mechanical anchors
- Acceptable materials
  - Normal Weight Concrete
  - Light Weight Concrete
  - Solid Masonry

Applications
- Car Lifts
- Pallet Racking
- Guard Rails
- Machine Anchoring
- Marine Applications
- Bridge Work

Specifications, Listings and Approvals
Anchor Thread Diameters: 1/4” - 1”

Materials:
- Zinc Plated Carbon Steel
  - AISI C1020 Carbon Steel
  - ASTM B633 Type III, SC1
- Type 304 and 316 Stainless Steel

NOTES:
* FRICTION-FIT™ without full adhesive cure is for light-duty temporary holding only and produces far less than advertised ultimate holding values.
** Pre-drilled hole in fixture must be large enough to accommodate correct size of carbide-drill bit.

WARNING: NSTB safety recommendations prohibit the use of adhesive anchors in sustained overhead load anchoring applications
Installation Information

Instructions
1. Select the proper size drill bit from the estimating guide. Drill the hole perpendicular to the work surface. To assure full holding power, do not ream the hole or allow the drill to wobble.

2. Thoroughly clean hole with oil-free compressed air and a stiff nylon or wire brush. Repeat cleaning process 3 times. Dust and debris left in hole will significantly reduce the holding capacity of the anchor.

3. Inject Inject-TITE Adhesive into hole to approximately 1/3 to half full. Fill from bottom of hole up.

4. Choose a bolt equal in length to the thread depth plus the material depth. Thread bolt into POWER-Sert anchor so that offset is equal to the thickness of material to be fastened. Insert POWER-Sert anchor into hole with slight twisting motion.

5. Drive anchor home with several sharp hammer blows to the head of the nut.

6. Allow epoxy to cure prior to applying maximum load.

NOTE: Always wear safety glasses. Follow the drill manufacturer's safety instructions. Use only solid carbide-tipped drill bits meeting ANSI B212.15 diameter standards.

Installation Data

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<tr>
<th>Thread Size (UNC)</th>
<th>Drill Bit Dia. (in.)</th>
<th>Anchor Size (in.)</th>
<th>Thread Depth (in.)</th>
<th>Min. Hole Depth (in.)</th>
<th>Estimated Anchors Per Adhesive Tube</th>
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<td>1-3/4</td>
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Cure Times

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<td>100F (38C)</td>
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1. Cure Time is time required before adhesive reaches ultimate strength. Minimum Cure Time is the minimum time required before the design or allowable load may be applied. AWF epoxy must COMPLETELY cure before loads are applied, so it has no “minimum” cure time.
2. Anchors are to be undisturbed during minimum cure time.
3. “FS” indicates Fast Set is recommended.
4. “AWF” indicates All Weather Formula is recommended.
Performance Data

Ultimate Tensile Strengths for Static Loads in 4,000 psi Concrete

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<th>Fast-Set Ultimate Tensile Strength (lbs.)</th>
<th>AWF Ultimate Tensile Strength (lbs.)</th>
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*Allowable load capacities are calculated using an applied safety factor of 4:1

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*Allowable load capacities are calculated using an applied safety factor of 4:1

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<th>Hole Depth (in.)</th>
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<th>AWF Ultimate Tensile Strength (lbs.)</th>
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*Allowable load capacities are calculated using an applied safety factor of 4:1

*Shear values are determined by the shear values of the bolt in conjunction with the insert.

- Ultimate values are shown. For static loads, use one-fourth of the maximum tensile and shear capacities for the recommended 4:1 safety factor.

- Information provided only for the use of a qualified design engineer. Use of technical data by persons not qualified could cause serious damage, injury, or even death.

- Install POWER-Sert anchors only with epoxy supplied with anchors or Wej-It Fastening Systems adhesive products.

- Use cure times recommended by epoxy manufacturer before applying full load to anchor.

Edge Distance & Spacing

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<td>–</td>
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### Order Information

#### Zinc-Plated Carbon Steel

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For more information, please contact:

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**Phone:** 203-857-2200

**Fax:** 203-857-2201 • **E-mail:** sales@wejit.com

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(See Attachments A-F in Separate Folders)
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Cox-Colvin & Associates, Inc.
1.0 Introduction

Retriev Technologies, Incorporated ("Retriev", “facility”, “site”, or “property”) is a permitted hazardous waste facility specializing in the management, reutilization, and recycling of all types of industrial/military, automotive, and household batteries. Battery identification, collection, consolidation, and recycling services are provided to industry, government, and the public. Effective December 21, 2005, Retriev received an Ohio Hazardous Waste Facility Installation and Operation Permit (Permit) that authorized the facility to store hazardous waste in containers as part of its battery recycling operations. All other hazardous waste activities performed by Retriev are exempt or excluded from permitting.

A Waste Analysis Plan (WAP) was originally prepared as part of Retriev’s 2002 Permit application and has been subsequently modified on several occasions. As part of Retriev’s Permit renewal application, this WAP has been updated and is an attachment to the renewal application. The purpose of this WAP is to describe how Retriev will collect the information necessary to properly “analyze” waste in accordance with their Permit and applicable regulatory considerations. A copy of this WAP will be available at the facility at all times.

The materials received by Retriev, including wastes, consist of manufactured batteries and battery components. The content and chemistry of the batteries are, in most cases, well understood and do not vary within a specific battery type. Identification primarily relies upon visual observation as discussed in this WAP. Because there is no laboratory analysis necessary, it should be understood that many of the components identified in regulations and guidance that are typically included in a WAP are not applicable to Retriev.

There are several terms used throughout this WAP that warrant definition to avoid confusion. The following definitions are intended to apply only to the context of this WAP.

- **Acid Battery**: Wet cell, dry cell, or gel cell battery with an acidic (i.e., pH <7) electrolyte. Specific types of acid batteries are presented in Section 3.0 and Attachment A.

- **Alkali Battery**: Wet cell and dry cell battery with a basic (i.e., pH >7) electrolyte. Specific types of alkali batteries are presented in Section 3.0 and Attachment A.

- **Alkaline Battery**: Generic term for a zinc manganese dioxide dry cell battery, which is one type of alkali battery.
Battery: A finished manufactured article consisting of one or more electrically connected electrochemical cells designed to receive, store, and deliver electric energy. A battery is inclusive of battery components.

Battery Components: Assemblies, segments, or parts of batteries from manufacturers, recyclers, and scrap dealers.

Big Green Box (BGB): Battery collection and recycling program for consumer batteries generated by households and businesses that arrive as universal waste.

Electrolyte: The caustic solution recovered from the exempt wet alkali battery recycling process and the acidic solution recovered from the exempt lead acid battery recycling process.

Permit: Ohio Hazardous Waste Facility Installation and Operation Permit under RCRA Subtitle C.

Regulated material: Wastes and materials identified as hazardous and subject to the requirements of Retriev’s Permit.

Non-regulated material: Wastes and materials (hazardous or non-hazardous) that are not subject to the requirements of Retriev’s Permit.

Pass-Through Batteries: Batteries received by Retriev that are a universal waste and not recycled by Retriev. These batteries are managed by Retriev under the Large Quantity Handler of Universal Waste regulations and transferred to a downstream recycler. Therefore pass-through batteries do not count toward permitted storage capacity (unless placed in a permitted storage unit) and do not require financial assurance for closure. Retriev will clearly label all pass-through batteries as such.
2.0 Facility Description

Retrieval is located within an industrial park near the intersection of Quarry Road and Commerce Street in Lancaster, Fairfield County, Ohio. The facility maintains two addresses, which correspond to the main buildings at 265 and 295 Quarry Road. The property is approximately 36.8 acres in size and consists of one parcel (053-50034-00), which is bound by railroad tracks to the north, Quarry Road to the east, Commerce Street to the south, and another facility property to the west (Figure 2-1). Property zoning is heavy industrial. Latitude and longitude of the approximate center of the property is 39.712505, -82.545954.

Within each of the buildings is a permitted storage unit that can be used to store containers for up to one year. The permitted storage unit within the 265 Quarry Road building is identified as the “265 storage unit”. The 265 storage unit consists of four contiguous areas that share perimeter and interior berms (Figure 2-2). For ease of discussion, these four areas are referred to as 265-1, 265-2, 265-3, and 265-4. Several rollover berms are associated with the 265 storage unit to allow forklift access. The total area of the 265 storage unit (measured from perimeter berm centerlines) is approximately 56,709 square feet (sf). A 7,750 sf staging area identified by painted lines is located within 265-4 and is included as part of the total area of the 265 storage unit. All waste codes accepted by the facility can be stored in containers within the 265 storage unit. The secondary containment system associated with the 265 storage unit allows for the storage of containers with free liquids. The permitted capacity of the 265 storage unit is 5,800,000 pounds.

The permitted storage unit within the 295 Quarry Road building is identified as the “295 storage unit”. The 295 storage unit consists of an approximate 1,771 sf area of the 295 building concrete floor (Figure 2-3). All waste codes accepted by the facility can be stored in containers within the 295 storage unit. There is not a secondary containment system associated with the 295 storage unit; therefore, hazardous wastes containing free liquids cannot be stored within the 295 storage unit, unless appropriate secondary containment is provided (e.g., spill pallet). The permitted capacity of the 295 storage unit is 200,000 pounds. A 900 sf inbound lithium ion battery staging area identified by painted lines is located outside of the 295 storage unit (Figure 2-3).

Additional detail regarding the permitted storage units and exempt/excluded activities is presented within the main document of the Permit renewal application.
3.0 Waste Characteristics

The materials received by Retriev, including wastes, consist of batteries and battery components, which are considered manufactured articles. Some of the materials may contain characteristic waste codes D001 through D011 and could be identified as hazardous wastes. However, some of the materials may not be considered hazardous waste upon receipt or after recycling (e.g., scrap metals, non-regulated materials/excluded/exempt solid wastes, and universal wastes).

Retriev may elect to manage materials other than hazardous wastes in a manner that is consistent with that of hazardous wastes (e.g., placement within a permitted storage unit). However, these materials are not regulated under Retriev’s Permit and therefore not specifically discussed. The types of batteries and associated battery components accepted by Retriev include, but may not be limited to, the following:

**Acidic Batteries**
- Wet Filled:
  - Lead Acid Automotive Batteries
  - Lead Acid Industrial/Military Batteries
- Sealed Cell:
  - Gel Cell Lead Acid Batteries

**Alkali Batteries**
- Wet Filled:
  - Nickel Cadmium Batteries
  - Nickel Iron Batteries
  - Zinc Carbonaire Batteries
- Dry Cell:
  - Zinc Manganese Dioxide Batteries (non-regulated material)
  - Carbon Zinc Batteries
  - Nickel Metal Hydride Batteries (including absorbed mat)
  - Nickel Hydrogen Batteries
  - Silver Oxide Batteries
  - Mercury-Containing Batteries
  - Magnesium Batteries
  - Nickel Cadmium Batteries
Lithium Batteries
  Lithium Primary Batteries
  Lithium Ion Batteries

For each of the above types of batteries and battery components, a representative safety data sheet (SDS) developed by a battery manufacturer is provided in Appendix A (Appendix A is not intended to include a SDS from every battery manufacturer). Based on the physical and chemical descriptions provided in the SDSs, the applicable hazardous waste codes are identified in Table 3-1. Only lithium batteries have the potential to be identified as D001 by the generators, as some generators take a very conservative approach to the classification of the batteries. It should be understood that the manufacturers of the batteries and battery components may identify slightly different chemistries, in terms of trace metals, for the same battery types. Therefore, Table 3-1 does not reflect hazardous constituents that may be present in trace amounts. Likewise, D001 through D011 waste codes beyond those reflected in Table 3-1 may be associated with some of the batteries and battery components due to the conservative approach some generators use to characterize their batteries. However, the characteristic waste codes will be limited to those accepted by Retriev (i.e., D001 through D011). Table 3-1 and the SDSs included in Appendix A should only be used as a general guide.
4.0 Computer-Based Waste Acceptance, Container Tracking, and Recordkeeping

Retriev will utilize manual documentation or a computer-based program for material (including waste) acceptance, container tracking, and recordkeeping requirements. This section will focus on use of the computer-based program, termed the CRM/tracking system ("system"). Manual documentation, if utilized, will follow a similar procedure. Retriev personnel have the ability to enter and import information, query and export information, generate logs, and/or track information with notifications. The system operates both locally (at the facility) or remotely with an internet connection. The security features of the system require a user name and password to log in and limits each user to a specified level of clearance based on their job responsibilities, thereby ensuring program integrity.

In general, the system is an integrated system comprised of a Client Relationship Management software that stores customer, generator, transporter, and downstream facility-specific information to be associated with the inventory via the inventory management tracking software. The system serves as a centralized data management resource for the Retriev operating record. The system is used to assign each container of material received with unique inventory identification and to document the storage, processing, and shipments of hazardous waste, hazardous materials, and non-regulated yields from the recycling processes. The system can cross reference the source of each container of hazardous waste received from off-site and the materials generated or stored from the on-site recycling processes. The system is also used to record all outbound shipments of hazardous waste. The software may be updated or replaced periodically.

Information that can easily be obtained from the system, as it becomes available, to support compliance and inspection includes, but is not limited to the following:

- facility and location of material/waste;
- type of material/waste;
- gross, tare, and net weights;
- descriptions (e.g., pass-through materials); and
- generation or creation date.
5.0 Waste Acceptance Procedure

A conceptual decision flow chart of the waste acceptance procedure is provided as Figure 5-1. The waste acceptance procedure begins with the client completing a material profile and general service agreement (MPSA). For each client, one or more facilities, locations, and generators may be identified in the MPSA. An example MPSA is provided in Appendix B. Upon receipt of the completed MPSA, Retriev customer service personnel upload a copy to the CRM and input additional information as necessary. A Retriev supervisor must review and approve or disapprove the MPSA or request that the client amend and resubmit the MPSA. Once approved, the MPSA is identified as such and the client is notified.

Upon receipt of material, shipping paper(s) are reviewed by Retriev to ensure they are properly completed and conform to the material identified in the associated MPSA. Shipping papers may include, but may not be limited to, a profile, bill of lading, and hazardous/non-hazardous manifest. Review of shipping papers will be performed prior to unloading the material. If shipping papers are unacceptable or the materials are non-conforming, Retriev will notify the client/generator to reconcile. If the issue cannot be reconciled or the materials cannot be accepted, the material will be rejected by Retriev. If rejected, Retriev will properly manage the material while making arrangements to forward the material to another permitted facility or back to the client/generator. Management of rejected material may include transferring to a staging area (if unloaded before rejection occurs) or keeping the material on the truck.

If material is accepted by Retriev, the material will be unloaded and operating record entries initiated. Data will be entered into the system and copies of accepted shipping papers will be uploaded to the system. The material is weighted at the time of receipt and the weight is recorded in the system.

Following unloading, a container inspection of the material will be performed for purposes of identification and conformance with the shipping papers and MPSA. The container inspection may be performed in close proximity to the transport vehicle, within the designated staging area that is located within the footprint of the 265 storage unit, or the designated staging area within the 295 building. For the purposes of this renewal application, close proximity is defined as within 100 ft of the transport vehicle and within building cover. As indicated previously, batteries and battery components are manufactured articles, therefore, identification primarily relies on visual observation. The visual inspection will include the evaluation of markings, container type and integrity, and chemistry. In most cases, visual inspection will easily identify the material. If further verification is necessary, Retriev will rely on their industry knowledge, reliable scientific literature, and/or by request of additional information from the generator or manufacturer.
Cox-Colvin & Associates, Inc.

(fixed known). There are no reasonably anticipated circumstances in which analytical testing would need to be performed by Retriev. If container leaks are identified during the visual inspection, Retriev will take appropriate measures to contain the leaks and repackage the material if necessary.

Waste acceptance procedures may include further verification (as discussed above) or subsequent repackaging or sorting. Further verification will be performed within the immediate vicinity of the transport vehicle, the staging area within the footprint of the 265 storage unit, or the staging area within the 295 building. Materials that ultimately conform based on the visual inspection (and additional verification, if necessary) are accepted for storage for processing. In some instances, initial sorting may be necessary and will be performed within the immediate vicinity of the transport vehicle, the staging area within the footprint of the 265 storage unit, or the staging area within the 295 building. There may also be instances in which additional sorting or repackaging is required after removal from a storage unit prior to processing.

During the waste acceptance procedure, a label with bar code is affixed to each container. This Retriev label supersedes any other labels affixed by the generator. The bar code allows Retriev to account for on-site movement of waste through acceptance, storage, recycling, and transfer off-site. If non-regulated batteries and battery components are incorrectly labeled by the generator as universal waste, Retriev may correct the name when affixing their label. Labeling will clearly identify if batteries are managed as pass-through. Retriev will ensure that universal waste labels are affixed to containers of pass-through batteries. If a battery that is initially intended to be pass-through is determined to be leaking or damaged upon receipt, it is no longer a universal waste and will be managed as a hazardous waste.

The waste acceptance procedures for BGB batteries (universal waste) is slightly different than the waste acceptance procedures described above for the other types of hazardous waste received by Retriev. For BGB universal waste, the waste acceptance procedures will begin in close proximity to the transport vehicle or within the designated staging area. The BGB universal waste will be weighed, tagged, and transferred to the less than 90 day storage area within the 295 building (Figure 2-3). Alternatively, another less than 90 day storage area or permitted storage unit may be utilized. Completion of these activities will constitute receipt of the BGB universal waste. Each pallet within the less than 90 day storage area (or permitted storage unit) will be marked with the date that the first box was placed for easy tracking of storage time. The pallets containing the BGB universal waste will be sorted within the less than 90 day storage area within the 295 building (Figure 2-3). Each container used for sorting will be marked with the earliest date corresponding to the pallet from which material was removed for sorting. When each container of sorted waste is filled, the waste acceptance procedure will be completed by labeling the container with a bar code and entering it into the facility’s tracking and recordkeeping system.
6.0 Requirements for Ignitable, Reactive, and Incompatible Wastes

Retriev takes extensive precautions to prevent fires, reactions, and explosions of ignitable, reactive, and incompatible wastes. Procedures have been developed to clearly identify, label, segregate, and properly manage waste that is ignitable, reactive, or incompatible. Proper identification is discussed below. Precautions are discussed in Sections 4.5.2 and 5.7 of the Permit renewal application.

The waste acceptance procedure discussed in Section 5.0, specifically the MPSA and visual inspection, is used to identify those wastes that are ignitable, reactive, and incompatible. As indicated in Table 3-1, only lithium and lithium ion batteries have the potential to be identified as ignitable and/or reactive. Incompatible wastes are wet cell acidic and wet cell alkali batteries (Section 3.0) based on their types of electrolytes. However, potential hazards associated with incompatible wastes at the facility are considered low based on the fact that DOT allows both wet cell acidic and wet cell alkali batteries to be transported on the same vehicle without a means of separation (e.g., berms, curbs, etc.) and the concentration of acid or alkali within the electrolytes is typically less than 10%.
7.0 Requirements Pertaining to Land Disposal Restrictions

The land disposal restrictions (LDR) program found in OAC 3745-270 requires that hazardous wastes destined for land disposal be treated to reduce the toxicity and/or mobility of its hazardous constituents. Basically, the LDR program applies to everyone who handles hazardous waste except conditionally exempt small quantity generators. Although Retriev receives hazardous waste for recycling, a small portion of the received waste cannot be recycled and must be disposed at another facility. Similarly, Retriev’s recycling processes also produce a small volume of hazardous waste residue that must be disposed at another facility. Therefore, the LDR program applies to Retriev and most likely the majority of the generators.

LDR requirements attach to the hazardous waste at the point of generation. As such, an LDR notification form is included in the MPSA for the generator/customer to complete (refer to Appendix B for an example). Any yields (residues) generated by Retriev from the battery recycling processes that are subject the LDR will be identified as such to the downstream facility at the time of the arrangement for off-site management. Retriev will not use dilution to treat wastes that are restricted from land disposal unless allowed by regulation. Retriev will also follow land disposal prohibitions related to ignitable and corrosive wastes, and wastes with toxicity characteristics for metals.
1.0 Introduction

Effective November 14, 2017, Retriev Technologies, Inc. (Retriev) renewed their Ohio Hazardous Waste Facility Installation and Operation Permit (Permit) that authorized the facility to store hazardous waste in containers as part of its battery recycling operations. Attachment A of the Retriev Permit renewal application consists of the Waste Analysis Plan (WAP). The purpose of the WAP is to describe how Retriev will collect the information necessary to properly “analyze” waste in accordance with their Permit and applicable regulatory considerations. The materials received by Retriev, including wastes, consist of manufactured batteries and battery components. The content and chemistry of the batteries are, in most cases, well understood and do not vary within a specific battery type. As such, identification primarily relies upon visual observation. Therefore, laboratory analysis was not included in the WAP.

Effective March 28, 2018, US EPA issued Retriev the Federal portion of their Permit to address air emission standards for equipment (40 CFR 264 Subpart BB) and containers (40 CFR 264 Subpart CC). Retriev anticipates it will demonstrate exemption to Subpart BB by maintaining records in accordance with 40 CFR 264.1064(k). Whereas, Retriev will comply with the applicable Subpart CC requirements for Level 1 containers (not in light material service). In order to demonstrate Subpart BB exemption and comply with applicable Subpart CC requirements for Level 1 containers, waste analysis is necessary. Per 40 CFR 264.1063(d), the analysis to demonstrate exemption to Subpart BB must be performed in accordance with a WAP containing the information presented in 40 CFR 264.13(b). Therefore, this document was prepared to reflect information presented in 40 CFR 264.13(b), as necessary, and is considered an addendum to Retriev’s WAP. This addendum also includes procedures to demonstrate a material is applicable to a Level 1 container.
2.0 Parameters for Analysis and Test Methods

Exemption to Subpart BB requires that the hazardous waste contain less than 10 percent by weight organics. To determine the concentration of organics in hazardous waste, Retriev will perform a three-step approach. The first step will consist of identifying hazardous waste that contacts or is contained within applicable Subpart BB equipment. The second step will consist of utilizing knowledge (e.g., generator, manufacturer, institutional) and the material profile to determine whether any of the hazardous waste identified in the first step contains organics. The third step will consist of analyzing the hazardous waste that is known to contain organics by Method 9060A (total organic carbon). Method 9060A is identified in 40 CFR 264.1063(d) as an acceptable test method for determining Subpart BB applicability.

As part of compliance with Subpart CC Level 1 container requirements, Retriev will demonstrate through sampling that the hazardous waste in applicable Subpart CC containers is such that the containers are not in light material service. As defined in 40 CFR 265.1081, light material service means the container is used to manage a material for which both of the following conditions apply: the vapor pressure of one or more of the organic constituents in the material is greater than 0.3 kilopascals (kPa) at 20 °C; and the total concentration of the pure organic constituents having a vapor pressure greater than 0.3 kPa at 20 °C is equal to or greater than 20 percent by weight. In order to identify vapor pressures, the individual organic constituents in the hazardous waste must be known. However, analysis of total organic carbon by Method 9060A will confirm that organics are not present at a concentration equal to or greater than 20 percent by weight, thus making the need to analyze individual VOCs and determine vapor pressure unnecessary. This approach will confirm that the associated containers are indeed Level 1.

In the unlikely event that applicable hazardous waste is determined to contain at least 20 percent by weight organics by Method 9060A, Retriev will further analyze the hazardous waste for Appendix IX VOCs by Method 8260 to determine the individual VOCs and their associated vapor pressures. Hazardous wastes associated with lithium-bearing battery chemistries that are analyzed for Appendix IX VOCs will also be analyzed for ethanol and methanol (via Method 8015), and dimethyl carbonate, diethyl carbonate, and ethyl methyl carbonate (via Method 8260).

3.0 Sampling Methods and Frequency

It is anticipated that hazardous waste requiring one or more of the analyses identified in Section 2.0 will consist of either sludge or liquid. In either case, the hazardous waste will be accessible for direct collection. For sludge sampling, clean gloves of compatible material will be worn and a grab sample will either be transferred to the laboratory jar by Cox-Colvin & Associates, Inc.
hand or a clean disposable container will be used to transfer the sludge to the laboratory jar. Total organic carbon analysis and VOC analysis will each require one 4-oz glass jar. Each glass jar will be filled such that there is no headspace remaining to reduce the possibility of volatilization.

For liquid sampling, clean gloves of compatible material will be worn and a grab sample will be collected in a clean disposable container and then transferred to the laboratory bottles. Total organic carbon analysis will require one 250-mL HDPE bottle preserved with H2SO4. Appendix IX VOC analysis will require two 40-mL glass vials preserved with HCl, methanol and ethanol analysis will require two 40-mL unpreserved glass vials. Carbonate VOC analysis will require two 40-mL glass vials preserved with HCl.

Sampling for total organic carbon will be performed at least once per year for each applicable hazardous waste stream. If chemical variation within the waste stream is known or anticipated to be present due to a change in the manufacturing or recycling process, additional sampling will be performed as determined necessary by Retriev. There will be no minimum frequency for VOC analyses as the necessity will be dictated by the results of the total organic carbon analyses.

### 4.0 Recordkeeping and Reporting

If exemption is maintained, Subpart BB reporting to US EPA will not be required. Retriev will follow the recordkeeping requirements identified in 40 CFR 264.1064(k) for demonstration of exemption to Subpart BB. Specifically, the following information will be maintained in the facility operating record:

- Design capacity of the hazardous waste management unit – the management unit will consist of the equipment that is potentially applicable to Subpart BB (e.g., pumps, hose, pipes, fittings, etc.); the make, model, capacity, etc. will be recorded.

- Statement of the hazardous waste influent to and effluent from the hazardous waste management unit – a general description of the hazardous waste associated with the equipment identified above and whether the hazardous waste is heavy liquid; heavy liquid is not a gas/vapor or light liquid (refer to previous definition of light liquid service).

- Up-to-date analytical results and any necessary supporting information – the required analytical to support Subpart BB exemption is discussed in Section 2.0 and 3.0.
There are no recordkeeping requirements identified in 40 CFR 264.1089 or reporting requirements identified in 40 CFR 264.1090 associated with Subpart CC Level 1 container compliance. However, Retriev will maintain information in their operating record that supports compliance with the requirements of Level 1 containers found in 40 CFR 264.1086(c). This information will pertain to the type of containers utilized, opening and closing procedures, and inspection requirements.
Decision Flow Chart for Waste Acceptance,
Retriev Technologies, Inc.,
Lancaster, Ohio

Notes: Batteries and battery components are manufactured articles. Identification primarily relies upon visual observation as discussed in Section 5.0 of the Waste Analysis Plan. Decision flow chart is conceptual and subject to slight variation.

If necessary, obtain generator permission to reconcile or re-classify/re-identify the material correctly and record in operating record and shipping papers as required.
Table 3-1. Potential Hazardous Constituents and Potential Waste Codes Associated with Batteries and Battery Components, Retriev Technologies, Inc., Lancaster, Ohio

<table>
<thead>
<tr>
<th>Type</th>
<th>Battery Category</th>
<th>Applicable Hazardous Constituent and CAS No.</th>
<th>Applicable Waste Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Acid Automotive Batteries</td>
<td>Acidic Wet Cell</td>
<td>Lead (7439-92-1), Antimony (7440-36-0)</td>
<td>D002, D008</td>
</tr>
<tr>
<td>Lead Acid Industrial/Military Batteries</td>
<td>Acidic Wet Cell</td>
<td>Lead (7439-92-1), Antimony (7440-36-0)</td>
<td>D002, D008</td>
</tr>
<tr>
<td>Gel Cell Lead Acid Batteries</td>
<td>Acidic Sealed Cell</td>
<td>Lead (7439-92-1)</td>
<td>D008</td>
</tr>
<tr>
<td>Lithium and Lithium Ion Batteries</td>
<td>Lithium</td>
<td>None</td>
<td>D001, D003</td>
</tr>
<tr>
<td>Nickel Cadmium Batteries</td>
<td>Alkali Wet Cell</td>
<td>Nickel (7440-02-0), Cadmium (7440-43-9)</td>
<td>D002, D006</td>
</tr>
<tr>
<td>Nickel Iron Batteries*</td>
<td>Alkali Wet Cell</td>
<td>Nickel (7440-02-0)</td>
<td>D002</td>
</tr>
<tr>
<td>Zinc Carbonaire Batteries*</td>
<td>Alkali Wet Cell</td>
<td>None</td>
<td>D002</td>
</tr>
<tr>
<td>Zinc Manganese Dioxide Batteries*</td>
<td>Alkali Dry Cell</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Carbon Zinc Batteries*</td>
<td>Alkali Dry Cell</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Nickel Metal Hydride Batteries (including absorbed mat)</td>
<td>Alkali Dry Cell</td>
<td>Nickel (7440-02-0), Cadmium (7440-43-9)</td>
<td>D006</td>
</tr>
<tr>
<td>Nickel Hydrogen Batteries</td>
<td>Alkali Dry Cell</td>
<td>Nickel (7440-02-0), Cadmium (7440-43-9)</td>
<td>D006</td>
</tr>
<tr>
<td>Silver Oxide Batteries</td>
<td>Alkali Dry Cell</td>
<td>Silver (7440-22-4)</td>
<td>D011</td>
</tr>
<tr>
<td>Mercury-Containing Batteries</td>
<td>Alkali Dry Cell</td>
<td>Mercury (7439-97-6)</td>
<td>D009</td>
</tr>
<tr>
<td>Magnesium Batteries</td>
<td>Alkali Dry Cell</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Nickel Cadmium Batteries</td>
<td>Alkali Dry Cell</td>
<td>Nickel (7440-02-0), Cadmium (7440-43-9)</td>
<td>D006</td>
</tr>
</tbody>
</table>

Notes:
Applicable hazardous constituents are those listed in the Appendix to OAC 3745-51-11.
Manufacturers of the batteries and battery components may identify slightly different chemistries, in terms of trace metals, for the same battery types; therefore hazardous constituents that may be present in trace amounts are not reflected in this table.
D001 through D011 waste codes other than those reflected in this table may be associated with batteries and battery components, but will be limited to to those accepted.
*Foreign-produced batteries and battery components may contain trace mercury (7439-97-6; D009).
Appendix A

Representative Safety Data Sheets on CD
As a courtesy to our customers, Energizer has prepared copyrighted Product Safety Datasheets to provide information on the different Eveready/Energizer battery systems. As defined in OSHA Hazard Communication Standard, Section 1910.1200 (c), Eveready/Energizer batteries are manufactured “articles”, which do not result in exposure to a hazardous chemical under normal conditions of use. For this reason, Material Safety Datasheets are not required. The information and recommendations set forth herein are made in good faith, for information only, and are believed to be accurate as of the date of preparation. However, ENERGIZER BATTERY MANUFACTURING, INC., MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM REFERENCE ON IT.

PRODUCT SAFETY DATASHEET

PRODUCT NAME: Eveready / Energizer Battery

TRADE NAMES: ENERGIZER, ENERGIZER e², INDUSTRIAL ZMA, HERCULES, EVEREADY, WONDER

CHEMICAL SYSTEM: Alkaline Manganese Dioxide-Zinc

SECTION 1 - MANUFACTURER INFORMATION

Energizer Battery Manufacturing, Inc.
25225 Detroit Rd.
Westlake, OH 44145
Telephone Number for Information: 800-383-7323 (USA / CANADA)
Date Prepared: August 2008

SECTION 2 - HAZARDS IDENTIFICATION

Under normal conditions of use, the battery is hermetically sealed.

Ingestion: Swallowing a battery can be harmful. Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

Inhalation: Contents of an open battery can cause respiratory irritation.

Skin Contact: Contents of an open battery can cause skin irritation and/or chemical burns.

Eye Contact: Contents of an open battery can cause severe irritation and chemical burns.

SECTION 3 - INGREDIENTS

IMPORTANT NOTE: The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

<table>
<thead>
<tr>
<th>MATERIAL OR INGREDIENT</th>
<th>PEL (OSHA)</th>
<th>TLV (ACGIH)</th>
<th>% / wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphite (CAS# 7782-42-5)</td>
<td>15 mg/m³ TWA (total dust)</td>
<td>2 mg/m³ TWA (respirable fraction)</td>
<td>2-6</td>
</tr>
<tr>
<td></td>
<td>5 mg/m³ TWA (respirable fraction)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manganese Dioxide (CAS# 1313-13-9)</td>
<td>0.2 mg/m³ TWA (as Mn)</td>
<td>5 mg/m³ Ceiling (as Mn)</td>
<td>30-45</td>
</tr>
<tr>
<td>Potassium Hydroxide (CAS# 1310-58-3)</td>
<td>None established</td>
<td>2 mg/m³ Ceiling</td>
<td>4-8</td>
</tr>
<tr>
<td>Zinc (CAS# 7440-66-6)</td>
<td>None established</td>
<td>None established</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 mg/m³ TWA PNOR* (total dust)</td>
<td>None established</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 mg/m³ TWA PNOR* (respirable fraction)</td>
<td>None established</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 mg/m³ TWA PNOC** (total dust)</td>
<td>None established</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 mg/m³ TWA PNOC** (respirable fraction)</td>
<td>None established</td>
<td></td>
</tr>
<tr>
<td>Non-Hazardous Components</td>
<td>None established</td>
<td>None established</td>
<td>18-22</td>
</tr>
<tr>
<td>Steel (iron CAS# 7439-89-6)</td>
<td>None established</td>
<td>None established</td>
<td></td>
</tr>
<tr>
<td>Water, Paper, Plastic and Other</td>
<td>None established</td>
<td>None established</td>
<td></td>
</tr>
</tbody>
</table>

* PNOR: Particulates not otherwise regulated
**PNOC: Particles not otherwise classified

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SECTION 4 – FIRST AID MEASURES

**Ingestion:** Do not induce vomiting or give food or drink. Seek medical attention immediately. CALL NATIONAL BATTERY INGESTION HOTLINE for advice and follow-up (202-625-3333) collect day or night.

**Inhalation:** Provide fresh air and seek medical attention.

**Skin Contact:** Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

**Eye Contact:** Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

SECTION 5 - FIRE FIGHTING MEASURES

In case of fire, it is permissible to use any class of extinguishing medium on these batteries or their packing material. Cool exterior of batteries if exposed to fire to prevent rupture.

Fire fighters should wear self-contained breathing apparatus.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

To cleanup leaking batteries:

**Ventilation Requirements:** Room ventilation may be required in areas where there are open or leaking batteries.

**Eye Protection:** Wear safety glasses with side shields if handling an open or leaking battery.

**Gloves:** Use neoprene or natural rubber gloves if handling an open or leaking battery.

Battery materials should be collected in a leak-proof container.

SECTION 7 - HANDLING AND STORAGE

**Storage:** Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life.

**Mechanical Containment:** If potting or sealing the battery in an airtight or watertight container is required, consult your Energizer Battery Manufacturing, Inc. representative for precautionary suggestions. Batteries normally evolve hydrogen which, when combined with oxygen from the air, can produce a combustible or explosive mixture unless vented. If such a mixture is present, short circuits, high temperature, or static sparks can cause an ignition.

Do not obstruct safety release vents on batteries. Encapsulation (potting) of batteries will not allow cell venting and can cause high pressure rupture.

**Handling:** Accidental short circuit for a few seconds will not seriously affect the battery. Prolonged short circuit will cause the battery to lose energy, and can cause the safety release vent to open. Sources of short circuits include jumbled batteries in bulk containers, metal jewelry, metal covered tables or metal belts used for assembly of batteries into devices.

If soldering or welding to the battery is required, consult your Energizer Battery Manufacturing, Inc. representative for proper precautions to prevent seal damage or short circuit.

**Charging:** This battery is manufactured in a charged state. It is not designed for recharging. Recharging can cause battery leakage or, in some cases, high pressure rupture. Inadvertent charging can occur if a battery is installed backwards.

**Labeling:** If the Eveready / Energizer Battery label or package warnings are not visible, it is important to provide a package and/or device label stating:

**WARNING:** do not install backwards, charge, put in fire, or mix with other battery types. May explode or leak causing injury. Replace all batteries at the same time.

Where accidental ingestion of small batteries is possible, the label should include:
Keep away from small children. If swallowed, promptly see doctor; have doctor phone (202) 625-3333 collect.

**SECTION 8 - EXPOSURE CONTROLS/ PERSONAL PROTECTION**

**Ventilation Requirements:** Not necessary under normal conditions.

**Respiratory Protection:** Not necessary under normal conditions.

**Eye Protection:** Not necessary under normal conditions.

**Gloves:** Not necessary under normal conditions.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point @ 760 mm Hg (°C)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg @ 25°C)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Density (g/cm³)</td>
<td>2.0 – 3.0</td>
</tr>
<tr>
<td>Percent Volatile by Volume (%)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid</td>
</tr>
<tr>
<td>Solubility in Water (% by weight)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Appearance and Odor</td>
<td>Solid object / no odor</td>
</tr>
</tbody>
</table>

**SECTION 10 - STABILITY AND REACTIVITY**

Alkaline batteries do not meet any of the criteria established in 40 CFR 261.2 for reactivity.

**SECTION 11 - TOXICOLOGICAL INFORMATION**

Alkaline batteries are not hazardous waste. Under normal conditions of use, alkaline batteries are non-toxic.

**SECTION 12 - ECOLOGICAL INFORMATION**

Issues such as ecotoxicity, persistence and bioaccumulation are not applicable for articles.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

Dispose of in accordance with all applicable federal, state and local regulations. Appropriate disposal technologies include incineration and land filling.
SECTION 14 - TRANSPORT INFORMATION

In general, all batteries in all forms of transportation (ground, air, or ocean) must be packaged in a safe and responsible manner. Regulatory concerns from all agencies for safe packaging require that batteries be packaged in a manner that prevents short circuits and be contained in “strong outer packaging” that prevents spillage of contents. All original packaging for Energizer alkaline batteries has been designed to be compliant with these regulatory concerns.

SECTION 15 - REGULATORY INFORMATION

Batteries marketed by Energizer Battery Manufacturing, Inc. are not classified as dangerous goods by the US Department of Transportation or the major international regulatory bodies and are therefore not regulated.

SARA/TITLE III - As an article, this battery and its contents are not subject to the requirements of the Emergency Planning and Community Right-To-Know Act.

SECTION 16 - OTHER INFORMATION

None.
DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF July 1998

FSC: 6140
NIIN: 012034697
Manufacturer's CAGE: 16764
Part No. Indicator: B
Part Number/Trade Name: ALL MODELS OF DELCO BATTERIES

General Information

Item Name: BATTERY, STORAGE, LEAD-ACID, WET CHARGED, MAINTENANCE FREE
Company's Name: GENERAL MOTORS CORP, DELCO REMY DIV
Company's Street: 2401 COLUMBUS AVE
Company's P. O. Box: 2439
Company's City: ANDERSON
Company's State: IN
Company's Country: US
Company's Zip Code: 46018-9986
Company's Emerg Ph #: 317-646-7800
Company’s Info Ph #: 317-646-7800
Distributor/Vendor # 1: CELL ENERGY INC (916-484-7974)
Distributor/Vendor # 1 Cage: 1U269
Distributor/Vendor # 2: 
Distributor/Vendor # 2 Cage: 
Distributor/Vendor # 3: 
Distributor/Vendor # 3 Cage: 
Distributor/Vendor # 4: 
Distributor/Vendor # 4 Cage: 
Safety Data Action Code: D
Safety Focal Point: D
Record No. For Safety Entry: 003
Tot Safety Entries This Stk#: 005
Status: SE
Date MSDS Prepared: 22FEB93
Safety Data Review Date: 27JUN94
Supply Item Manager: CX
MSDS Preparer's Name: RICHARD GALLAGHER
Preparer's Company:
Preparer's St Or P. O. Box:
Preparer's City:
Preparer's State:
Preparer's Zip Code:
Other MSDS Number:
MSDS Serial Number: BTRBG
Specification Number: UNKNOWN
Spec Type, Grade, Class: UNKNOWN
Hazard Characteristic Code: J6
Unit Of Issue: EA
Unit Of Issue Container Qty: UNKNOWN
Type Of Container: UNKNOWN
Net Unit Weight: UNKNOWN

Report for NIIN: 012034697

NRC/State License Number: UNKNOWN
Net Explosive Weight: N/R
Net Propellant Weight-Ammo: UNKNOWN
Coast Guard Ammunition Code: N/R

Ingredients/Identity Information

Page 1
Proprietary: NO
Ingredient: SULFURIC ACID (SARA III)
Ingredient Sequence Number: 01
Percent: 37
Ingredient Action Code:
Ingredient Focal Point: D
NIOSH (RTECS) Number: WS5600000
CAS Number: 7664-93-9
OSHA PEL: 1 MG/M3
ACGIH TLV: 1 MG/M3; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: WATER
Ingredient Sequence Number: 02
Percent: BALANCE
Ingredient Action Code:
Ingredient Focal Point: D
NIOSH (RTECS) Number: ZC0110000
CAS Number: 7732-18-5
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: LEAD (SARA III)
Ingredient Sequence Number: 03
Percent: >90
Ingredient Action Code:
Ingredient Focal Point: D
NIOSH (RTECS) Number: OF7525000
CAS Number: 7439-92-1
OSHA PEL: SEE 1910.1025
ACGIH TLV: 0.15 MG/M3, DUST; 9394
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: LIQUID, SOLID.
Boiling Point: 233F, 112C
Melting Point: N/K
Vapor Pressure (MM Hg/70 F): 2.730 MMHG
Vapor Density (Air=1): N/R
Specific Gravity: 1.280 AVERAGE
Decomposition Temperature: N/R
Evaporation Rate And Ref: N/R

Report for NIIN: 012034697

Solubility In Water: MISCIBLE
Percent Volatiles By Volume: N/R
Viscosity: N/R
pH: <1.0
Radioactivity: N/R
Form (Radioactive Matl):
Magnetism (Milligauss): N/P
Corrosion Rate (IPY): N/R
Autoignition Temperature: N/R

Fire and Explosion Hazard Data
Flash Point: N/R
Flash Point Method: N/P
Lower Explosive Limit: N/R
Upper Explosive Limit: N/R
Extinguishing Media: NONE SPECIFIED BY MANUFACTURER.
Special Fire Fighting Proc: RECOMMENDED SELF-CONTAINED BREATHING APPARATUS
IF BATTERIES ARE INVOLVED IN FIRE. TOXIC FUMES FROM BURNING PLASTIC, ACID
FUMES AND VAPORS CAN OCCUR.
Unusual Fire And Expl Hazards: WHILE BATTERIES ARE BEING CHARGED, HYDROGEN
GAS IS GENERATED. AVOID OPEN FLAME, SPARKS OR LIGHTED MATCHES. ACID, AN
OXIDIZER, CAN IGNITE COMBUSTIBLES ON CONTACT

Reactivity Data
Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: OXIDIZING OR REDUCING MATERIALS.
Hazardous Decomp Products: WHEN HEATED, CAN EMIT HIGHLY TOXIC FUMES.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): N/R

Health Hazard Data
LD50-LC50 Mixture: TLV: 1 MG/M3
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: CONTACT WITH SULFURIC ACID RESULTS IN RAPID
DESTRUCTION OF BODY TISSUE (BURNS).
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: ACCORDING TO THE IARC, OCCUPATIONAL EXPOSURE
TO STRONG INORGANIC ACID MIST IS CARCINOGENIC TO HUMANS.
Signs/Symptoms Of Overexp: NONE SPECIFIED BY MANUFACTURER.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: INHALATION-DO NOT EXCEED 1 MG/M3 TEW. REMOVE TO
FRESH AIR. GET MEDICAL ATTENTION. INGESTION-DO NOT INDUCE VOMITING. GIVE
MILK MIXED WITH EGG WHITES, IF CONSCIOUS. GET MEDICAL ATTENTION. EYE OR
SKIN CONTACT-FLUSH WITH LARGE VOLUMES OF WATER. GET MEDICAL ATTENTION.

Precautions for Safe Handling and Use
Steps If Matl Released/Spill: LIME OR SODA-TYPE COMPOUNDS MAY BE USED TO
NEUTRALIZE AND/OR FLUSH WITH LARGE VOLUMES OF WATER. CONTAIN SPILL.
Neutralizing Agent: LIME OR SODA-TYPE COMPOUNDS.
Waste Disposal Method: ACCORDING TO LOCAL, STATE AND FEDERAL REGULATIONS
FOR LEAD SCRAP OR ACID. RQ=1000 LBS.
Precautions-Handling/Storing: AVOID SKIN CONTACT WHEN CHARGING BATTERIES.
AVOID PLACING IN AREAS WHERE HYDROGEN GAS CAN BUILD UP. DO NOT PLACE NEAR
OPEN FLAMES, SPARKS OR LIT MATCH
Other Precautions: PAY ATTENTION TO LABELS ON BATTERY AND CARTONS
CONTAINING BATTERIES. LISTED AS A CARCINOGEN IN NTP, IARC OR PSHA: SULFURIC
ACID = IARC.

Control Measures
Respiratory Protection: USE NIOSH APPROVED RESPIRATORY PROTECTION IF 1 MG/M³ TWA IS EXCEEDED (ACID).
Ventilation: LOCAL EXHAUST-YES, AT CHARGING STATION.
Protective Gloves: RUBBER GLOVES.
Eye Protection: SPLASH PROOF SAFETY GOGGLES.
Other Protective Equipment: USE RUBBER BOOTS AND ACID-PROOF CLOTHING FOR MAJOR SPILLS.
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.
Suppl. Safety & Health Data: NONE

Transportation Data

Transportation Action Code: D
Transportation Focal Point: D
DOT PSN Code: BQN
DOT Symbol: B
DOT Proper Shipping Name: BATTERIES, WET, FILLED WITH ACID
DOT Class: 8
DOT ID Number: UN2794
DOT Pack Group: III
DOT Label: CORROSIVE
DOT/DoD Exemption Number: N/R
IMO PSN Code: BWD
IMO Proper Shipping Name: BATTERIES,WET,FILLED WITH ACID
IMO Regulations Page Number: 8120
IMO UN Number: 2794
IMO UN Class: 8
IMO Subsidiary Risk Label: -
IATA PSN Code: CZM
IATA UN ID Number: 2794
IATA Proper Shipping Name: BATTERIES, WET, FILLED WITH ACID
IATA UN Class: 8
IATA Subsidiary Risk Class: -
IATA Label: CORROSIVE
AFI PSN Code: CZM
Report for NIIN: 012034697

AFI Symbols:
AFI Prop. Shipping Name: BATTERIES, WET, FILLED WITH ACID
AFI Class: 8
AFI ID Number: UN2794
AFI Pack Group: III
AFI Label:
AFI Special Prov:
AFI Basic Pac Ref: 12-8
MMAC Code: NR
N.O.S. Shipping Name:
Additional Trans Data:

Disposal Data

Disposal Data Action Code:
Disposal Data Focal Point:
Rec # For This Disp Entry:
Tot Disp Entries Per NSN:
Landfill Ban Item:
Disposal Supplemental Data:
1st EPA Haz Wst Code New:
Label Data

Label Required: YES
Technical Review Date: 27JUN94
Label Date: N/R
Label Status: F
Common Name: ALL MODELS OF DELCO BATTERIES
Chronic Hazard: YES
Signal Word: WARNING!
Acute Health Hazard-None: X
Acute Health Hazard-Slight: X
Acute Health Hazard-Moderate: X
Acute Health Hazard-Severe: X
Contact Hazard-None: X
Contact Hazard-Slight: X
Contact Hazard-Moderate: X
Contact Hazard-Severe: X
Fire Hazard-None: X
Fire Hazard-Slight: X
Fire Hazard-Moderate: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Reactivity Hazard-Slight: X
Reactivity Hazard-Moderate: X
Reactivity Hazard-Severe: X
Special Hazard Precautions: DO NOT PLACE NEAR OPEN FLAMES, SPARKS OR LIT MATCH WHILE BATTERIES ARE BEING CHARGED, HYDROGEN GAS IS GENERATED. AVOID OPEN FLAME, SPARKS OR LIGHTED MATCHES. ACID, AN OXIDIZER, CAN IGNITE COMBUSTIBLES ON CONTACT IN CASE OF SPILL: LIME OR SODA-TYPE COMPOUNDS MAY BE USED TO NEUTRALIZE AND/OR FLUSH WITH LARGE VOLUMES OF WATER. CONTAIN SPILL. FIRST AID: INHALATION—DO NOT EXCEED 1 MG/M3 TEW. REMOVE TO FRESH AIR. GET MEDICAL ATTENTION. INGESTION—DO NOT INDUCE VOMITING. GIVE MILK MIXED WITH EGG WHITES, IF CONSCIOUS. GET MEDICAL ATTENTION. EYE OR SKIN CONTACT—FLUSH WITH LARGE VOLUMES OF WATER. GET MEDICAL ATTENTION.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: GENERAL MOTORS CORP, DELCO REMY DIV
Label Street: 2401 COLUMBUS AVE
Label P.O. Box: 2439
Label City: ANDERSON
Label State: IN
Label Zip Code: 46018-9986
Label Country: US
Label Emergency Number: 317-646-7800
Year Procured:
As a courtesy to our customers, Energizer has prepared copyrighted Product Safety Datasheets to provide information on the different Eveready/Energizer battery systems. As defined in OSHA Hazard Communication Standard, Section 1910.1200 (c), Eveready batteries are manufactured “articles”, which do not result in exposure to a hazardous chemical under normal conditions of use. For this reason, Material Safety Datasheets are not required. The information and recommendations set forth herein are made in good faith, for information only, and are believed to be accurate as of the date of preparation. However, ENERGIZER BATTERY MANUFACTURING, INC., MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM REFERENCE ON IT.

**PRODUCT SAFETY DATA SHEET**

**PRODUCT NAME:** Eveready Battery

**TRADE NAMES:** CLASSIC; SUPER HEAVY DUTY; INDUSTRIAL; HERCULES

**CHEMICAL SYSTEM:** Carbon Zinc

**Approximate Weight:**

**Designed for Recharge:** No

### SECTION 1 - MANUFACTURER INFORMATION

Energizer Battery Manufacturing, Inc.

25225 Detroit Rd.

Westlake, OH 44145

Telephone Number for Information:

800-383-7323 (USA / CANADA)

Date Prepared: September 2008

### SECTION 2 – HAZARDS IDENTIFICATION

Under normal conditions of use, the battery is hermetically sealed.

**Ingestion:** Swallowing a battery can be harmful. Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

**Inhalation:** Contents of an open battery can cause respiratory irritation.

**Skin Contact:** Contents of an open battery can cause skin irritation and/or chemical burns.

**Eye Contact:** Contents of an open battery can cause severe irritation and chemical burns.

### SECTION 3 - INGREDIENTS

**IMPORTANT NOTE:** The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

<table>
<thead>
<tr>
<th>MATERIAL OR INGREDIENT</th>
<th>PEL (OSHA)</th>
<th>TLV (ACGIH)</th>
<th>%/wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylene Black (CAS# 1333-86-4)</td>
<td>3.5 mg/m³ TWA (as carbon black)</td>
<td>3.5 mg/m³ TWA (as carbon black)</td>
<td>3-7</td>
</tr>
<tr>
<td>Ammonium Chloride (CAS# 12125-02-9)</td>
<td>None established</td>
<td>10 mg/m³ TWA (fume)</td>
<td>0-10</td>
</tr>
<tr>
<td>Manganese Dioxide (CAS# 1313-13-9)</td>
<td>5 mg/m³ CEILING (as Mn)</td>
<td>0.2 mg/m³ TWA (as Mn)</td>
<td>15-31</td>
</tr>
<tr>
<td>Zinc (CAS# 7440-66-6)</td>
<td>15 mg/m³ TWA PNOR* (total dust)</td>
<td>10 mg/m³ TWA PNOC** (inhalable particulate)</td>
<td>7-42</td>
</tr>
<tr>
<td></td>
<td>5 mg/m³ TWA PNOR* (respirable fraction)</td>
<td>3 mg/m³ TWA PNOC** (respirable particulate)</td>
<td></td>
</tr>
<tr>
<td>Zinc Chloride (CAS# 7646-85-7)</td>
<td>1 mg/m³ TWA (fume)</td>
<td>1 mg/m³ TWA (fume)</td>
<td>2-10</td>
</tr>
</tbody>
</table>

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SECTION 4 – FIRST AID MEASURES

**Ingestion:** Do not induce vomiting or give food or drink. Seek medical attention immediately. CALL NATIONAL BATTERY INGESTION HOTLINE for advice and follow-up (202-625-3333) collect day or night.

**Inhalation:** Provide fresh air and seek medical attention.

**Skin Contact:** Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

**Eye Contact:** Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

SECTION 5 - FIRE FIGHTING MEASURES

In case of fire, it is permissible to use any class of extinguishing medium on these batteries or their packing material. Cool exterior of batteries if exposed to fire to prevent rupture.

Fire fighters should wear self-contained breathing apparatus.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

To cleanup leaking batteries:

**Ventilation Requirements:** Room ventilation may be required in areas where there are open or leaking batteries.

**Eye Protection:** Wear safety glasses with side shields if handling an open or leaking battery.

**Gloves:** Use neoprene or natural rubber gloves if handling an open or leaking battery.

Battery materials should be collected in a leak-proof container.

SECTION 7 - HANDLING AND STORAGE

**Storage:** Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life.

**Mechanical Containment:** If potting or sealing the battery in an airtight or watertight container is required, consult your Energizer Battery Manufacturing, Inc. representative for precautionary suggestions. Batteries normally evolve hydrogen which, when combined with oxygen from the air, can produce a combustible or explosive mixture unless vented. If such a mixture is present, short circuits, high temperature, or static sparks can cause an ignition.

Do not obstruct safety release vents on batteries. Encapsulation (potting) of batteries will not allow cell venting and can cause high pressure rupture.

**Handling:** Accidental short circuit for a few seconds will not seriously affect the battery. Prolonged short circuit will cause the battery to lose energy, and can cause the safety release vent to open. Sources of short circuits include jumbled batteries in bulk containers, metal jewelry, metal covered tables or metal belts used for assembly of batteries into devices.

If soldering or welding to the battery is required, consult your Energizer Battery Manufacturing, Inc. representative for proper precautions to prevent seal damage or short circuit.

**Charging:** This battery is manufactured in a charged state. It is not designed for recharging. Recharging can cause battery leakage or, in some cases, high pressure rupture. Inadvertent charging can occur if a battery is installed backwards.
**Labeling:** If the Eveready Battery label or package warnings are not visible, it is important to provide a package and/or device label stating:

**WARNING:** do not install backwards, charge, put in fire, or mix with other battery types. May explode or leak causing injury. Replace all batteries at the same time.

Where accidental ingestion of small batteries is possible, the label should include:

Keep away from small children. If swallowed, promptly see doctor; have doctor phone (202) 625-3333 collect.

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**SECTION 8 - EXPOSURE CONTROLS/ PERSONAL PROTECTION**

**Ventilation Requirements:** Not necessary under normal conditions.

**Respiratory Protection:** Not necessary under normal conditions.

**Eye Protection:** Not necessary under normal conditions.

**Gloves:** Not necessary under normal conditions.

---

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point @ 760 mm Hg (°C)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg @ 25°C)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Density (g/cm³)</td>
<td>2.0 – 3.0</td>
</tr>
<tr>
<td>Percent Volatile by Volume (%)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid</td>
</tr>
<tr>
<td>Solubility in Water (% by weight)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Appearance and Odor</td>
<td>Solid object / no odor</td>
</tr>
</tbody>
</table>

---

**SECTION 10 - STABILITY AND REACTIVITY**

Carbon zinc batteries do not meet any of the criteria established in 40 CFR 261.2 for reactivity.

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**SECTION 11 - TOXICOLOGICAL INFORMATION**

Carbon zinc batteries are not hazardous waste. Under normal conditions of use, carbon zinc batteries are non-toxic.

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**SECTION 12 - ECOLOGICAL INFORMATION**

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Issues such as ecotoxicity, persistence and bioaccumulation are not applicable for articles.

SECTION 13 – DISPOSAL CONSIDERATIONS

Dispose of in accordance with all applicable federal, state and local regulations. Appropriate disposal technologies include incineration and land filling.

SECTION 14 – TRANSPORT INFORMATION

In general, all batteries in all forms of transportation (ground, air, or ocean) must be packaged in a safe and responsible manner. Regulatory concerns from all agencies for safe packaging require that batteries be packaged in a manner that prevents short circuits and be contained in “strong outer packaging” that prevents spillage of contents. All original packaging for Eveready carbon zinc batteries has been designed to be compliant with these regulatory concerns.

SECTION 15 - REGULATORY INFORMATION

Batteries marketed by Energizer Battery Manufacturing, Inc. are not classified as dangerous goods by the US Department of Transportation or the major international regulatory bodies and are therefore not regulated.

SARA/TITLE III - As an article, this battery and its contents are not subject to the requirements of the Emergency Planning and Community Right-To-Know Act.

SECTION 16 - OTHER INFORMATION

None.
I PRODUCT IDENTIFICATION AND USE

Manufacturers Name: Bulldog Battery Corporation
387 South Wabash Street
Wabash, Indiana 46992 USA
(800)443-3492 (For questions and emergencies)

Product Identification:
Product Name: Battery, Electric Storage
Synonyms: Industrial Lead Acid Battery
Chemical Name: N/A
Chemical Family: N/A
CAS Number: Blend

II HAZARDOUS INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Amount</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFURIC ACID 1.285 Sp.Gr.</td>
<td>20.0 - 30.0 %</td>
<td>7664-93-9</td>
</tr>
<tr>
<td>LEAD</td>
<td>60.0 - 65.0 %</td>
<td>7439-92-1</td>
</tr>
<tr>
<td>ANTIMONY</td>
<td>&lt; 3.0 %</td>
<td>7440-36-0</td>
</tr>
<tr>
<td>ARSENIC</td>
<td>&lt; 0.5 %</td>
<td>7440-38-2</td>
</tr>
</tbody>
</table>

Exposure Guidelines:

SULFURIC ACID 1.285 Sp.Gr.  ANTIMONY

OSHA PEL: 1 mg/m^3  OSHA PEL: .5 mg/m^3
ACGIH TLV: 1 mg/m^3  ACGIH TWA: .5 mg/m^3
MSHA LIMIT N/A      MSHA LIMIT N/A

LEAD  ARSENIC

OSHA PEL: .05 mg/m^3  OSHA PEL: .01 mg/m^3
ACGIH TWA: .15 mg/m^3  ACGIH TWA: .2 mg/m^3
MSHA LIMIT .15 mg/m^3  MSHA LIMIT .5 mg/m^3

III PHYSICAL DATA

Form ....: MANUFACTURED ARTICLE
Color ....: N/A
Odor ....: N/A
FLAMMABLE PROPERTIES
COC Flash Point: N/A

FLAMMABLE LIMITS IN AIR
Hydrogen Gas
LEL: 4%
UEL: 74%

EXTINGUISHING MEDIA:
Class ABC extinguisher, CO2

UNUSUAL FIRE & EXPLOSION HAZARDS:
Highly flammable hydrogen gas is generated during charging and operating of batteries. Keep heat and sparks away.

MISCELLANEOUS:
If batteries are on charge, shut off power, use positive pressure SCBA. Water applied to electrolyte generates heat and may spatter.

STABLE: YES
Conditions To Avoid (Stability): Prolonged overcharge, sources of ignition.

POLYMERIZATION:
Product will not undergo polymerization.

INCOMPATIBILITY WITH OTHER MATERIALS:
Combustibles and organic materials may cause fire and explosion. Also reacts with strong reducing agents.

DECOMPOSITION:
Sulfuric Acid: Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, hydrogen.

Route(s) of entry: Inhalation? Yes Skin? Yes Ingestion? Yes

HEALTH HAZARDS ACUTE AND CHRONIC:
Inhalation: Vapors or mist may cause severe respiratory irritation. Inhalation of dust or lead dust or fumes may cause irritation of upper respiratory tract and lungs.

Ingestion: May cause severe irritation of mouth, throat, esophagus and stomach and may cause abdominal pain, nausea, vomiting, diarrhea and cramps.

CARCINOGENICITY INFORMATION:
No known cancer hazards.
SIGNS AND SYMPTOMS OF EXPOSURE:

Acid can cause irritation of eyes, nose and throat. Breathing of mist produces respiratory difficulty. Contact with eyes and skin causes irritation and skin burns.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
Lung damage and aggravated pulmonary conditions, skin disease, and some forms of kidney, liver and neurologic disease may be aggravated by exposure.

EMERGENCY AND FIRST AID PROCEDURES:
Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention. If swallowed, give large quantities water, DO NOT INDUCE VOMITING, obtain medical treatment. Eyewash and shower stations should be made available.

VII PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Dilute spill cautiously with 5 or 6 volumes of water and neutralize gradually with sodium bicarbonate, soda ash or lime. When exposure level is not known, wear NIOSH approved positive pressure self contained respirator.

WASTE DISPOSAL METHOD:
Place in acid-resistant containers. Disposal must be made in accordance with applicable government regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
Store away from reactive materials as defined in Section VI, Reactivity Data

OTHER PRECAUTIONS:
Sodium bicarbonate, soda ash, sand or lime should be kept in same general area for emergency use. See Section IV and generation of hydrogen gas. If battery case is broken, avoid direct contact with internal components.

VIII CONTROL MEASURES

RESPIRATORY PROTECTION:
NIOSH/MSHA approved acid gas respirator when TLV is exceeded or employee is experiencing respiratory irritation. See Section V Health Hazard Data.

VENTILATION:
Local exhaust preferred where possible. Special: N/A
Mechanical ventilation acceptable with 1 to 4 changes per hour. Other: N/A

PROTECTIVE GLOVES:
Acid resistant (i.e. rubber)

EYE PROTECTION:
Chemical safety goggles or face shield.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
Acid resistant aprons, boots and protective clothing.
ADDITIONAL INFORMATION:

The data in this Material Safety Data Sheet relates only to the specific material designated herein.

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Bulldog Battery Corporation. The data on this sheet are related only to the specific material designated herein. Bulldog Battery Corporation assumes no legal responsibility for use or reliance upon these data.
MATERIAL SAFETY DATA SHEET
PRODUCT NAME: INDUSTRIAL NICKEL-CADMIUM STORAGE BATTERY

SAFT AMERICA Inc.
711 Gil Harbin Industrial Blvd.
Valdosta, GA 31601
Information: Phone 229-247-2331
Fax 229-245-2880

SAFT BRAND INDUSTRIAL NICKEL CADMIUM STORAGE BATTERY
HMIS RATINGS 3 Health 1 Flammability 2 Reactivity

1. HEALTH HAZARD INFORMATION

Effects of Overexposure
Eye Effects: Contact with electrolyte solution inside battery causes very rapid, severe damage. Extremely corrosive to eye tissues. May result in permanent blindness.

Skin Effects: Contact with electrolyte solution inside battery may cause serious burns to skin tissues. Contact with nickel compounds may cause skin sensitization, resulting in chronic eczema or nickel itch.

Ingestion: Ingestion of electrolyte solution causes tissue damage to throat area and gastro/respiratory tract. Ingestion of cadmium and/or nickel compounds causes nausea and intestinal disorders.

Inhalation: Mists generated during activation procedures may cause varying degrees of irritation to the nasal mucous membranes and respiratory tract tissues varying from mild irritation of nasal mucous membranes to damage of lung tissues proper. Inhalation of cadmium compounds may cause dry throat, cough, headache, vomiting, chest pain, and/or chills. Excessive overexposure may result in pulmonary edema, breathing difficulty, and prostration.

Carcinogenicity: NIOSH recommends that nickel and cadmium be treated as occupational carcinogens.

2. EMERGENCY FIRST AID

Battery Electrolyte (Electrolyte is 18-28% Potassium Hydroxide or KOH)

Eye Contact: Flush with plenty of water for at least 20 minutes. Get immediate medical attention.

Skin Contact: Remove contaminated clothing and flush affected areas with plenty of water for at least 20 minutes.

Ingestion: Do not induce vomiting. Dilute by giving large volumes of water or milk. Get immediate medical attention. Do not give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air. Give oxygen or artificial respiration if needed. Get immediate medical attention.

Nickel and Cadmium Compounds
Skin contact: Wash with cold water and soap.

3. SPECIAL PROTECTION INFORMATION

Perform activation procedures in a well-ventilated area. Battery operating areas must be well ventilated for removal of potentially dangerous and harmful gases generated. Normal reactions inside the battery liberate explosive and flammable hydrogen gas.

Respiratory Protection: Use NIOSH-approved mist respirator during activation and actual usage to maintain exposure levels below the TWA.

Eye Protection: Use splash goggles or face shield whenever handling a battery.

Hand Protection: If exposure to electrolyte solution or dried salts is likely, use any water-insoluble, non-permeable glove, i.e., synthetic rubber. DO NOT use leather or wool.

Other protective Equipment: Rubber boots, rubber apron or rainwear, or equivalent if exposure to electrolyte solution is likely.

4. REACTIVITY DATA

CAUTION: NEVER ACTIVATE OR TOP OFF WITH ACID.

Incompatibilities: Aluminum, zinc, tin and other active metals, acid, chlorinated and aromatic hydrocarbons, nitrocarbons, halocarbons. Trichloroethylene will react with electrolyte solution to form dichloroacetylene which is spontaneously combustible.

Hazardous Decomposition Products: Nickel compounds, cadmium compounds, and potassium hydroxide. Note that normal reactions inside battery liberate explosive and flammable hydrogen gas. Do not seal battery from atmosphere. Hazardous Polymerization will not occur.

5. FIRE AND EXPLOSION HAZARDS

<table>
<thead>
<tr>
<th>Case Material</th>
<th>Melting Point</th>
<th>Decomposition (non-violent)</th>
<th>Auto Ignition</th>
<th>Extinguishing Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>279°F</td>
<td>550°F</td>
<td>570° - 580°F</td>
<td>CO₂, Sand</td>
</tr>
<tr>
<td>Acrylic</td>
<td>210°F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polysulfone</td>
<td>374°F</td>
<td></td>
<td>1022°F (550°C)</td>
<td></td>
</tr>
</tbody>
</table>
5. FIRE AND EXPLOSION HAZARDS - continued

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS#</th>
<th>Exposures Limits</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td>7440-43-9</td>
<td>5.0 ug/m³ dust – OSHA</td>
<td>8%</td>
</tr>
<tr>
<td>Cadmium Hydroxide</td>
<td>21041-96-2</td>
<td>0.05 mg/m³ ACGIH CEILING-Fume</td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td>7440-02-0</td>
<td>1 mg/m³ – OSHA</td>
<td>9%</td>
</tr>
<tr>
<td>Nickel Hydroxide</td>
<td>1205-44-7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobalt (as Cobalt Hydroxide)</td>
<td>7440-48-4</td>
<td>0.1 mg/m³ dust – OSHA</td>
<td>≈ 0.2%</td>
</tr>
<tr>
<td>Electrolyte Solution (18-28% KOH)</td>
<td>1310-58-3</td>
<td>2 mg/m³ ACGIH CEILING-Air</td>
<td>29%</td>
</tr>
<tr>
<td>Acrylic Polymer Container</td>
<td>None Established – OSHA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polysulfone Container</td>
<td>None Established – OSHA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polypropylene container</td>
<td>None Established – OSHA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithium Hydroxide</td>
<td>1310-66-3</td>
<td>None Established – OSHA</td>
<td>&lt; 1%</td>
</tr>
<tr>
<td>Graphite</td>
<td>15 Mg/m³ use respirator</td>
<td>≈ 3%</td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>None Established – OSHA</td>
<td>≈ 39%</td>
<td></td>
</tr>
</tbody>
</table>

7. PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>2 mm Hg at 68°F</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.170 - 1.250 (electrolyte)</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Electrolyte solution is completely soluble. Remainder - is insoluble</td>
</tr>
</tbody>
</table>

8. SPILL MANAGEMENT PROCEDURES

Small electrolyte solution spills (up to 5 gallons): Flush with water and neutralize with dilute citric acid.

Large spills: Contain material in suitable containers or holding area. DO NOT allow material to enter sewers, streams, or storm conduits. Recover material with vacuum truck and dispose of properly.


9. DISPOSAL INFORMATION

Nickel-cadmium storage batteries are universal wastes under RCRA. They may be returned to SAFT for recycling. These batteries are TCLP Toxic. These batteries and the electrolyte solution they contain are considered to be corrosives. If not recycled, they must be disposed of in accordance with all federal, state, and local hazardous waste regulations.

10. PRECAUTIONS AND COMMENTS

These batteries may be highly charged and are capable of high energy discharge. Care should be taken to handle them properly to avoid shorting or misuse that will result in a rapid, uncontrolled electrical, chemical, or heat energy release.

Do not transport activated batteries without vent caps in place.

When removing battery from service, visually inspect for leakage prior to handling. If leakage has occurred follow Spill Management Procedures.

Do not allow an exposed flame or spark to come near the cells.

11. EPCRA REPORTING REQUIREMENTS

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Chemical Name</th>
<th>Percent by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-43-9</td>
<td>Cadmium</td>
<td>8%</td>
</tr>
<tr>
<td>7440-02-0</td>
<td>Nickel</td>
<td>9%</td>
</tr>
<tr>
<td>7440-48-4</td>
<td>Cobalt</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

A copy of this MSDS may be required to be filed with your local emergency planning commission, state emergency response commission, and local fire department in accordance with sections of the Emergency Planning and Community right-To-Know Act.

12. TRANSPORTATION INFORMATION

Batteries being forwarded or being returned to Saft for repair should be shipped as Hazardous Material using the following description: Batteries, Wet, Filled with Alkali, 8, UN2795, PG III.

Spent batteries being sent to Saft for recycling should be shipped as Universal Waste using the following description: Used Batteries, Wet, Filled with Alkali, 8, UN2795, PG III.

Disclaimer: This information has been compiled for sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the dated compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein. This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. It is the user’s responsibility to satisfy himself as to the suitability and completeness of this information for his own particular use. We do not accept liability for any loss or damage that may occur, whether direct, indirect, incidental or consequential, from the use of this information nor do we offer warranty against patent infringement. Additional information is available by calling the telephone number above designated for this purpose.

Revision Date: 02/09/04
1. We would like to inform our customers that these batteries are exempt articles and are not subject to the 29 CFR 1910.1200 OSHA requirement, or to the Canadian WHMIS requirements and the sheets are supplied as a service to you. For other MSDSs and related information, visit: http://www.rayovac.com/technical/msds.htm.

1. IDENTIFICATION

PRODUCT NAME: Lithium Ion Batteries

SIZES: All

EMERGENCY TELEPHONE NUMBER: 800-424-9300 (24 hr, Chemtrec)

Environmental Health & Safety Information: 608-275-2482

EDITION DATE: 03/05/2007 APPROVED BY: Kevin J. Domack

2. INGREDIENTS

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>CAS #</th>
<th>%</th>
<th>TLV*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>7439-89-6</td>
<td>15-30</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Lithium Cobalt Nickel Dioxide</td>
<td>12031-55-1</td>
<td>&lt;25</td>
<td>0.1 mg/m³ (Co, TWA)</td>
</tr>
<tr>
<td></td>
<td>12031-65-1</td>
<td></td>
<td>1.0 mg/m³ (Ni, Soluble Compounds, TWA)</td>
</tr>
<tr>
<td>Lithiated Manganese Dioxide</td>
<td>12057-17-9</td>
<td>&lt;25</td>
<td>5.0 mg/m³ (Mn, TWA)</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>3-5</td>
<td>5.0 mg/m³ (Total Dust, TWA)</td>
</tr>
<tr>
<td>Copper</td>
<td>7440-50-8</td>
<td>5-15</td>
<td>0.1 mg/m³ (Fume, TWA)</td>
</tr>
<tr>
<td>Aluminum</td>
<td>7429-90-5</td>
<td>2-8</td>
<td>15 mg/m³ (Elemental, TWA)</td>
</tr>
<tr>
<td>Nickel</td>
<td>7440-02-0</td>
<td>2-5</td>
<td>1.0 mg/m³ (Elemental, TWA)</td>
</tr>
<tr>
<td>Lithium Hexafluorophosphate</td>
<td>21324-40-3</td>
<td>1-5</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Ethylene Carbonate</td>
<td>96-49-1</td>
<td>&lt;15</td>
<td>None Established</td>
</tr>
<tr>
<td>Methyl Ethyl Carbonate</td>
<td>623-53-0</td>
<td>&lt;15</td>
<td>None Established</td>
</tr>
<tr>
<td>Dimethyl Carbonate</td>
<td>616-38-6</td>
<td>&lt;15</td>
<td>None Established</td>
</tr>
<tr>
<td>Diethyl Carbonate</td>
<td>105-58-8</td>
<td>&lt;15</td>
<td>None Established</td>
</tr>
<tr>
<td>Methyl Acetate</td>
<td>79-20-9</td>
<td>&lt;15</td>
<td>200 ppm (TWA)</td>
</tr>
<tr>
<td>Plastic, Ceramic, Other</td>
<td>--</td>
<td>&lt;20</td>
<td>--</td>
</tr>
</tbody>
</table>

*Source: OSHA CFR 29 1910.1000 Table Z-1, 2 or 3 3-01-2007

3. PHYSICAL DATA

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point @ 760 mm Hg (°C)</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg @ 25°C)</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>NA</td>
</tr>
<tr>
<td>Density (grams/cc)</td>
<td>NA</td>
</tr>
<tr>
<td>Percent Volatile by Volume (%)</td>
<td>NA</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>NA</td>
</tr>
<tr>
<td>Physical State</td>
<td>NA</td>
</tr>
<tr>
<td>Solubility in Water (% by Weight)</td>
<td>NA</td>
</tr>
<tr>
<td>pH</td>
<td>NA</td>
</tr>
</tbody>
</table>
4. **FIRE & EXPLOSION HAZARD DATA**

| Appearance and Odor: | geometric solid object |

**FLASH POINT:**
- NA
- LOWER (LEL): NA

**FLAMMABLE LIMITS IN AIR (%):**
- NA
- UPPER (UEL): NA

**EXTINGUISHING MEDIA:**
- Use water, foam or dry powder, as appropriate.

**AUTO-IGNITION:**
- NA

**SPECIAL FIRE FIGHTING PROCEDURES:**
As with any fire, wear self-contained breathing apparatus to avoid inhalation of hazardous decomposition products (See section 2).

**SPECIAL FIRE EXPLOSION HAZARDS:**
Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of flammable or corrosive materials.

5. **HEALTH HAZARD DATA**

**THRESHOLD LIMIT VALUE (TLV) AND SOURCE:**
- NA

**EFFECTS OF OVEREXPOSURE:**
None. (In fire or rupture situation see section 2 and section 4)

**EMERGENCY FIRST AID PROCEDURES:**

**Skin and Eyes:**
In the event that battery ruptures, flush exposed skin with copious quantities of flowing lukewarm water for a minimum of 15 minutes. Get immediate medical attention for eyes. Wash skin with soap and water.

For more information, visit: [http://www.nema.org/gov/ehs/committees/drybat/](http://www.nema.org/gov/ehs/committees/drybat/)

6. **REACTIVITY DATA**

**STABLE OR UNSTABLE:**
- Stable

**INCOMPATIBILITY (MATERIALS TO AVOID):**
- NA

**HAZARDOUS DECOMPOSITION PRODUCTS:**
- NA

**DECOMPOSITION TEMPERATURE (0°F):**
- NA

**HAZARDOUS POLYMERIZATION:**
- Will Not Occur

**CONDITIONS TO AVOID:**
- Avoid electrical shorting.
7. **SPILL OR LEAK PROCEDURES**

**PROCEDURES TO CONTAIN AND CLEAN UP LEAKS OR SPILLS:** In the event of a battery rupture, prevent skin contact and collect all released material in a plastic lined metal container.

**REPORTING PROCEDURE:** Report all spills in accordance with Federal, State and Local reporting requirements.

**WASTE DISPOSAL METHOD:** Manage in accordance with Federal, State and local requirements. Recycling options are available. Contact your battery distributor for details regarding recycling options or visit: [http://www.rbrc.org](http://www.rbrc.org). For additional information on disposal or recycling options, visit: [http://www.nema.org/gov/ehs/committees/drybat/](http://www.nema.org/gov/ehs/committees/drybat/).

8. **PROTECTION INFORMATION**

**RESPIRATORY PROTECTION (SPECIFY TYPE):** NA

**VENTILATION:**
- Local Exhaust: NA
- Mechanical (General): NA
- Special: NA
- Other: NA

**PROTECTIVE GLOVES:** NA

**EYE PROTECTION:** NA

**OTHER PROTECTIVE CLOTHING:** NA

9. **SPECIAL PRECAUTIONS**

**HANDLING AND STORAGE:** Store in a dry place. Storing unpackaged cells together could result in cell shorting and heat build-up. Keep battery terminals insulated when in storage or transportation.

**TRANSPORTATION-SHIPPING:** Lithium Ion rechargeable batteries are regulated during shipment by the Dept. of Transportation (USDOT) and United Nation’s (International) requirements. For more information, visit: [http://www.nema.org/gov/ehs/committees/drybat/](http://www.nema.org/gov/ehs/committees/drybat/)

10. **SARA 313**

Notification is not required because these products are article(s) that do not release a covered toxic chemical under the normal conditions of processing or use.

**NOTICE:** The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Rayovac Corporation makes no warranty expressed or implied.
As a courtesy to our customers, Energizer has prepared copyrighted Product Safety Datasheets to provide information on the different Eveready/Energizer battery systems. As defined in OSHA Hazard Communication Standard, Section 1910.1200 (c), Eveready/Energizer batteries are manufactured “articles”, which do not result in exposure to a hazardous chemical under normal conditions of use. For this reason, Material Safety Datasheets are not required. The information and recommendations set forth herein are made in good faith, for information only, and are believed to be accurate as of the date of preparation. However, ENERGIZER BATTERY MANUFACTURING, INC., MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM REFERENCE ON IT.

PRODUCT SAFETY DATA SHEET

PRODUCT NAME: ENERGIZER Battery

TRADE NAME: ENERGIZER, Lithium-Iron Disulfide Battery

CHEMICAL SYSTEM: Lithium-Iron Disulfide

SECTION I - MANUFACTURER INFORMATION

Energizer Battery Manufacturing, Inc.
1359 Columbia Rd.
Westlake, OH 44145

Telephone Number for Information:
800-383-7323 (USA / CANADA)

Date Prepared: May 2008

SECTION II - HAZARDOUS INGREDIENTS

IMPORTANT NOTE: The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

<table>
<thead>
<tr>
<th>MATERIAL OR INGREDIENT</th>
<th>PEL (OSHA)</th>
<th>TLV (ACGIH)</th>
<th>% / wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Black (CAS# 1333-86-4)</td>
<td>3.5 mg/m³ TWA</td>
<td>3.5 mg/m³ TWA</td>
<td>0-4</td>
</tr>
<tr>
<td>1,2-Dimethoxyethane (CAS# 110-71-4)</td>
<td>None established</td>
<td>None established</td>
<td>2-4</td>
</tr>
<tr>
<td>1,3-Dioxolane (CAS# 646-06-0)</td>
<td>None established</td>
<td>20 ppm</td>
<td>5-9</td>
</tr>
<tr>
<td>Graphite (CAS# 7782-42-5)</td>
<td>15 mg/m³ TWA (total dust) 5 mg/m³ TWA (respirable fraction)</td>
<td>2 mg/m³ TWA (respirable fraction)</td>
<td>0-4</td>
</tr>
<tr>
<td>Iron Disulfide (CAS# 1309-36-0)</td>
<td>None established</td>
<td>None established</td>
<td>24-35</td>
</tr>
<tr>
<td>Lithium or Lithium Alloy (CAS# 7439-93-2)</td>
<td>None established</td>
<td>None established</td>
<td>5-8</td>
</tr>
<tr>
<td>Lithium Iodide (CAS# 10377-51-2)</td>
<td>None established</td>
<td>None established</td>
<td>0.5-3</td>
</tr>
</tbody>
</table>

SECTION III - FIRE AND EXPLOSION HAZARD DATA

In case of fire where lithium batteries are present, flood area with water or smother with a Class D fire extinguishant appropriate for lithium metal, such as Lith-X. Water may not extinguish burning batteries but will cool the adjacent batteries and control the spread of fire. Burning batteries will burn themselves out. Virtually all fires involving lithium batteries can be controlled by flooding with water. However, the contents of the battery will react with water and form hydrogen gas. In a confined space, hydrogen gas can form an explosive mixture. In this situation, smothering agents are recommended. A smothering agent will extinguish burning lithium batteries.

Emergency Responders should wear self-contained breathing apparatus. Burning lithium-iron disulfide batteries produce toxic and corrosive lithium hydroxide fumes and sulfur dioxide gas.

SECTION IV - HEALTH HAZARD DATA
Lithium Iron Disulfide Batteries
May 2008

Under normal conditions of use, the battery is hermetically sealed.

**Ingestion:** Swallowing a battery can be harmful.

Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

If battery or open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately. CALL NATIONAL BATTERY INGESTION HOTLINE for advice and follow-up (202-625-3333) collect, day or night.

**Inhalation:** Contents of an open battery can cause respiratory irritation. Provide fresh air and seek medical attention.

**Skin Absorption:** Dimethoxyethane and dioxolane may be absorbed through the skin, causing localized inflammation.

**Skin Contact:** Contents of an open battery can cause skin irritation and/or chemical burns. Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

**Eye Contact:** Contents of an open battery can cause severe irritation and chemical burns. Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

**Note:** Carbon black is listed as a possible carcinogen by International Agency for Research on Cancer (IARC).

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**SECTION V - PRECAUTIONS FOR SAFE HANDLING AND USE**

**Storage:** Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life. In locations that handle large quantities of lithium batteries, such as warehouses, lithium batteries should be isolated from unnecessary combustibles.

**Mechanical Containment:** If potting or sealing the battery in an airtight or watertight container is required, consult your Energizer Battery Manufacturing, Inc. representative for precautionary suggestions. Do not obstruct safety release vents on batteries. Encapsulation of batteries will not allow cell venting and can cause high pressure rupture.

**Handling:** Accidental short circuit for a few seconds will not seriously affect the battery. Prolonged short circuit will cause the battery to lose energy, generate significant heat and can cause the safety release vent to open. Sources of short circuits include jumbled batteries in bulk containers, metal jewelry, metal covered tables or metal belts used for assembly of batteries into devices. Damaging a lithium battery may result in an internal short circuit.

The contents of an open battery, including a vented battery, when exposed to water, may result in a fire and/or explosion. Crushed or damaged batteries may result in a fire.

If soldering or welding to the battery is required, consult your Energizer representative for proper precautions to prevent seal damage or short circuit.

**Charging:** This battery is manufactured in a ready-to-use state. It is not designed for recharging. Recharging can cause battery leakage or, in some cases, can cause the safety release vent to open. Inadvertent charging can occur if a battery is installed backwards.

**Labeling:** If the Energizer label or package warnings are not visible, it is important to provide a package and/or device label stating:

WARNING: Battery can explode or leak and cause burns if installed backwards, disassembled, charged, or exposed to water, fire or high temperature.

Where accidental ingestion of small batteries is possible, the label should include:

WARNING: (1) Keep away from small children. If swallowed, promptly see doctor; have doctor phone (202) 625-3333 collect. (2) Battery can explode or leak and cause burns if installed backwards, disassembled, charged, or exposed to water, fire or high temperature.

**Disposal:** Dispose in accordance with all applicable federal, state and local regulations.
### SECTION VI - SPECIAL PROTECTION INFORMATION

**Ventilation Requirements:** Not necessary under normal conditions. Room ventilation may be required in areas where there are open or leaking batteries.

**Respiratory Protection:** Not necessary under normal conditions. Avoid exposure to electrolyte fumes from open or leaking battery.

**Eye Protection:** Not necessary under normal conditions. Wear safety glasses with side shields if handling an open or leaking battery.

**Gloves:** Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery.

### SECTION VII - REGULATORY INFORMATION

In general, the transportation of primary lithium cells and batteries is regulated as UN3090 by the International Civil Aviation Organization, International Air Transport Association, International Maritime Dangerous Goods Code and the US Department of Transportation. However, Energizer lithium-iron disulfide batteries are exempt from the majority of regulatory requirements of UN3090 because they meet the requirements of Special Provision A45. (They contain less than 1 gram of lithium and pass the tests defined in UN model regulation section 38.3)

The batteries must meet the following criteria for shipment:
- For air shipments, meet the requirements listed in Special Provision A45 of the International Air Transport Association Dangerous Goods Regulations.
- Meet the requirements for the US Department of Transportation listed in 49 CFR 173.185.
- With limited exceptions, the transport of primary lithium batteries is prohibited aboard passenger aircraft. Refer to August 9th, 2007 Federal Register (Hazardous Materials; Transportation of Lithium Batteries) for additional rules that are effective on January 1, 2008.

By complying with the requirements specified above, Lithium Batteries are not otherwise regulated as Dangerous Goods.

Lithium Batteries manufactured, packaged and shipped by Energizer Battery Manufacturing, Inc. meet the requirements specified above. Any Lithium Batteries subsequently repackaged or reshipped are required to meet all of the requirements specified above.

SARA/TITLE III - As an article, this battery and its contents are not subject to the requirements of the Emergency Planning and Community Right-To-Know Act.
As a courtesy to our customers, Energizer has prepared copyrighted Product Safety Datasheets to provide information on the different Eveready/Energizer battery systems. As defined in OSHA Hazard Communication Standard, Section 1910.1200 (c), Eveready/Energizer batteries are manufactured “articles”, which do not result in exposure to a hazardous chemical under normal conditions of use. For this reason, Material Safety Datasheets are not required. The information and recommendations set forth herein are made in good faith, for information only, and are believed to be accurate as of the date of preparation. However, ENERGIZER BATTERY MANUFACTURING, INC., MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM REFERENCE ON IT.

PRODUCT SAFETY DATA SHEET

PRODUCT NAME: ENERGIZER Battery
TRADE NAME: ENERGIZER, Lithium-Manganese Dioxide Battery
CHEMICAL SYSTEM: Lithium-Manganese Dioxide

SECTION I - MANUFACTURER INFORMATION
Manufactured for: Energizer Battery Manufacturing, Inc.
1359 Columbia Rd.
Westlake, OH 44145

Telephone Numbers for Information:
800-383-7323 (USA / CANADA)

Date Prepared: September 2007

SECTION II - HAZARDOUS INGREDIENTS

IMPORTANT NOTE: The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

<table>
<thead>
<tr>
<th>MATERIAL OR INGREDIENT</th>
<th>PEL (OSHA)</th>
<th>TLV (ACGIH)</th>
<th>% / wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Black</td>
<td>3.5 mg/m³ TWA</td>
<td>3.5 mg/m³ TWA</td>
<td>0-1</td>
</tr>
<tr>
<td>(CAS# 1333-86-4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,2-Dimethoxyethane</td>
<td>None established</td>
<td>None established</td>
<td>0-6</td>
</tr>
<tr>
<td>(CAS# 110-71-4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,3-Dioxolane</td>
<td>None established</td>
<td>None established</td>
<td>0-8</td>
</tr>
<tr>
<td>(CAS# 646-06-0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphite</td>
<td>15 mg/m³ TWA (total dust)</td>
<td>2 mg/m³ TWA (respirable fraction)</td>
<td>0-3</td>
</tr>
<tr>
<td>(CAS# 7782-42-5)</td>
<td>5 mg/m³ TWA (respirable fraction)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithium or Lithium Alloy</td>
<td>None established</td>
<td>None established</td>
<td>1-6</td>
</tr>
<tr>
<td>(CAS# 7439-93-2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithium Perchlorate</td>
<td>None established</td>
<td>None established</td>
<td>0-3</td>
</tr>
<tr>
<td>(CAS# 7791-03-9)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATERIAL OR INGREDIENT</th>
<th>PEL (OSHA)</th>
<th>TLV (ACGIH)</th>
<th>% / wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium Trifluoromethanesulfonate</td>
<td>None established</td>
<td>None established</td>
<td>0-3</td>
</tr>
<tr>
<td>(CAS# 33454-82-9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithium Trifluoromethanesulfonimide</td>
<td>None established</td>
<td>None established</td>
<td>0-3</td>
</tr>
<tr>
<td>(CAS# 90076-65-6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manganese Dioxide</td>
<td>5 mg/m³ Ceiling (as Mn)</td>
<td>0.2 mg/m³ TWA (as Mn)</td>
<td>12-42</td>
</tr>
<tr>
<td>(CAS# 1313-13-9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propylene Carbonate</td>
<td>None established</td>
<td>None established</td>
<td>0-8</td>
</tr>
<tr>
<td>(CAS# 108-32-7)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION III - FIRE AND EXPLOSION HAZARD DATA

In case of fire where lithium batteries are present, apply a smothering agent such as METL-X, sand, dry ground dolomite, or soda ash, or flood the area with water. A smothering agent will extinguish burning lithium batteries. Water may not extinguish burning batteries but will cool the adjacent batteries and control the spread of fire. Burning batteries will burn themselves out. Virtually all fires involving lithium batteries can be controlled with water. When water is used, however, hydrogen gas may evolve. In a confined space, hydrogen gas can form an explosive mixture. In this situation, smothering agents are recommended.

Fire fighters should wear self-contained breathing apparatus. Burning lithium-manganese dioxide batteries produce toxic and corrosive lithium hydroxide fumes.

SECTION IV - HEALTH HAZARD DATA

Under normal conditions of use, the battery is hermetically sealed.

Ingestion: Swallowing a battery can be harmful.

Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

If battery or open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately.
CALL NATIONAL BATTERY INGESTION HOTLINE for advice and follow-up (202-625-3333) collect, day or night.

Inhalation: Contents of an open battery can cause respiratory irritation. Provide fresh air and seek medical attention.

Skin Absorption: Dimethoxyethane, dioxolane, and lithium trifluoromethanesulfonate may be absorbed through the skin, causing localized inflammation.

Skin Contact: Contents of an open battery can cause skin irritation and/or chemical burns. Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

Eye Contact: Contents of an open battery can cause severe irritation and chemical burns. Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

Note: Carbon black is listed as a possible carcinogen by International Agency for Research on Cancer (IARC).

SECTION V - PRECAUTIONS FOR SAFE HANDLING AND USE

Storage: Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life.

Mechanical Containment: Containment of this battery in a manner that obstructs or defeats the safety vent or electrical disconnect mechanisms designed into this battery can result in fire and/or explosion and cause personal injury and device damage. This battery is not designed to be potted, enclosed in hermetic overpackaging, or sealed by any means that prevents free operation of the designed safety mechanisms.

Handling: Accidental short circuit for a few seconds will not seriously affect the battery. Prolonged short circuit will cause the battery to lose energy, and can cause the safety release vent to open. Sources of short circuits include jumbled batteries in bulk containers, metal jewelry, metal covered tables or metal belts used for assembly of batteries into devices.

If soldering or welding to the battery is required, consult your Energizer Battery Manufacturing, Inc. representative for proper precautions to prevent seal damage or short circuit.

Charging: This battery is manufactured in a charged state. It is not designed for recharging. Recharging can cause battery leakage or, in some cases, high pressure rupture. Inadvertent charging can occur if a battery is installed backwards.

Labeling: If the Energizer label or package warnings are not visible, it is important to provide a package and/or device label stating:

WARNING: FIRE, EXPLOSION, and BURN HAZARD. DO NOT OPEN BATTERY, DISPOSE OF IN FIRE, HEAT ABOVE 100°C (212°F), EXPOSE CONTENTS TO WATER, RECHARGE, PUT IN BACKWARDS, MIX WITH USED OR OTHER BATTERY TYPES - MAY EXPLODE OR LEAK AND CAUSE PERSONAL INJURY.

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GENERAL EXCEPTION: At a minimum use Eveready label or package warnings.

SPECIFIC EXCEPTIONS: For the L522 battery only, the appropriate warning is:

WARNING: FIRE, EXPLOSION, and BURN HAZARD. DO NOT OPEN BATTERY, DISPOSE OF IN FIRE, HEAT ABOVE 75°C (167°F), EXPOSE CONTENTS TO WATER, RECHARGE, PUT IN BACKWARDS, MIX WITH USED OR OTHER BATTERY TYPES - MAY EXPLODE OR LEAK AND CAUSE PERSONAL INJURY.

Where accidental ingestion of small batteries is possible, the label and/or immediate packaging should also include:

WARNING: (1) KEEP AWAY FROM SMALL CHILDREN. IF SWALLOWED, PROMPTLY SEE DOCTOR; HAVE DOCTOR PHONE (202) 625-3333 COLLECT. In addition to the appropriate warning copy shown above.

Some photo lithium batteries use the following warning:

BATTERY CAN EXPLODE OR CAUSE BURNS IF DISSASSEMBLED, RECHARGED, OR EXPOSED TO WATER, FIRE, OR HIGH TEMPERATURE.

Disposal: Dispose in accordance with all applicable federal, state and local regulations.

SECTION VI - SPECIAL PROTECTION INFORMATION

Ventilation Requirements: Not necessary under normal conditions.

Respiratory Protection: Not necessary under normal conditions.

Eye Protection: Not necessary under normal conditions. Wear safety glasses with side shields if handling an open or leaking battery.

Gloves: Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery.

SECTION VII - REGULATORY INFORMATION

In general, the transportation of primary lithium cells and batteries is regulated by the International Civil Aviation Organization, International Air Transport Association, International Maritime Dangerous Goods Code and the US Department of Transportation. The batteries must meet the following criteria for shipment:

• For air shipments, meet the requirements listed in Special Provision A45 of the International Air Transport Association Dangerous Goods Regulations.
• Meet the requirements for the US Department of Transportation listed in 49 CFR 173.185.
• With limited exceptions, the transport of primary lithium batteries is prohibited aboard passenger aircraft. Refer to August 9th, 2007 Federal Register (Hazardous Materials; Transportation of Lithium Batteries) for additional rules that are effective on January 1, 2008.

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Lithium Batteries manufactured, packaged and shipped by Energizer Battery Manufacturing, Inc. meet the requirements specified above. Any Lithium Batteries subsequently repackaged or reshipped are required to meet all of the requirements specified above.

SARA/TITLE III - As an article, this battery and its contents are not subject to the requirements of the Emergency Planning and Community Right-To-Know Act.
1. We would like to inform our customers that these batteries are exempt articles and are not subject to the 29 CFR 1910.1200 OSHA requirement, or to the Canadian WHMIS requirements and the sheets are supplied as a service to you. For other MSDSs and related information, visit: http://www.rayovac.com/technical/msds.htm.

2. THESE BATTERIES MAY NOT BE SUITABLE FOR LANDFILL DISPOSAL (SEE SECTION 7).

1. **IDENTIFICATION**

   **PRODUCT NAME**: Mercuric Oxide Batteries

   **SIZES**: All

   **EMERGENCY TELEPHONE NUMBER**: 800-424-9300 (24 hr, Chemtrec)

   Environmental Health & Safety Information: 608-275-2482

   **EDITION DATE**: 03/05/2007

   **APPROVED BY**: Kevin J Domack

2. **INGREDIENTS**

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>CAS #</th>
<th>%</th>
<th>TLV*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>7439-97-6</td>
<td>30-40</td>
<td>0.1 ug/m³ (Inorganic, TWA)</td>
</tr>
<tr>
<td>Steel</td>
<td>7439-89-6</td>
<td>30- 40</td>
<td>--</td>
</tr>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
<td>10 - 15</td>
<td>5 mg/m³ (ZnO, Fume, TWA)</td>
</tr>
<tr>
<td>Potassium Hydroxide</td>
<td>1310-58-3</td>
<td>1 - 5</td>
<td>C2 mg/m³ (STEL)</td>
</tr>
<tr>
<td>Manganese Dioxide</td>
<td>1313-13-9</td>
<td>3-7</td>
<td>C5.0 (Mn, TWA)</td>
</tr>
</tbody>
</table>

   *Source: OSHA 29 CFR 1910.1000 Table Z-1,2 or 3  3-01-2007

3. **PHYSICAL DATA**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point @ 760 mm Hg (°C):</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg @ 25°C):</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Density (Air = 1):</td>
<td>NA</td>
</tr>
<tr>
<td>Density (grams/cc):</td>
<td>NA</td>
</tr>
<tr>
<td>Percent Volatile by Volume (%):</td>
<td>NA</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1):</td>
<td>NA</td>
</tr>
<tr>
<td>Physical State:</td>
<td>NA</td>
</tr>
<tr>
<td>Solubility in Water (% by Weight):</td>
<td>NA</td>
</tr>
<tr>
<td>pH:</td>
<td>NA</td>
</tr>
<tr>
<td>Appearance and Odor:</td>
<td>geometric solid object</td>
</tr>
</tbody>
</table>

NA = Not Applicable
4. **FIRE & EXPLOSION HAZARD DATA**

| **FLASH POINT:** | NA | **LOWER (LEL):** | NA |
| **FLAMMABLE LIMITS IN AIR (%):** | NA | **UPPER (UEL):** | NA |
| **EXTINGUISHING MEDIA:** | Use water, foam or dry powder, as appropriate. |
| **AUTO-IGNITION:** | NA |

**SPECIAL FIRE FIGHTING PROCEDURES:** As with any fire, wear self-contained breathing apparatus to avoid inhalation of hazardous decomposition products (See section 2).

**SPECIAL FIRE EXPLOSION HAZARDS:** Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of flammable or corrosive materials.

5. **HEALTH HAZARD DATA**

| **THRESHOLD LIMIT VALUE (TLV) AND SOURCE:** | NA |
| **EFFECTS OF OVEREXPOSURE:** | None. (In fire or rupture situation see section 2 and section 4) |

**EMERGENCY FIRST AID PROCEDURES:**

**Skin and Eyes:**
In the event that battery ruptures, flush exposed skin with copious quantities of flowing lukewarm water for a minimum of 15 minutes. Get immediate medical attention for eyes. Wash skin with soap and water.

**Swallowing:**
Ingestion of a battery can be harmful. Call The National Capital Poison Center (800-222-1222), day or night, for advice and follow-up.

For more information, visit: [http://www.nema.org/gov/chs/committees/drybat/](http://www.nema.org/gov/chs/committees/drybat/).

6. **REACTIVITY DATA**

| **STABLE OR UNSTABLE:** | Stable |
| **INCOMPATIBILITY (MATERIALS TO AVOID):** | NA |
| **HAZARDOUS DECOMPOSITION PRODUCTS:** | NA |
| **DECOMPOSITION TEMPERATURE (0°F):** | NA |
| **HAZARDOUS POLYMERIZATION:** | Will Not Occur |
| **CONDITIONS TO AVOID:** | Avoid electrical shorting. |
7. **SPILL OR LEAK PROCEDURES**

**PROCEDURES TO CONTAIN AND CLEAN UP LEAKS OR SPILLS:** In the event of a battery rupture, prevent skin contact and collect all released material in a plastic lined metal container.

**REPORTING PROCEDURE:** Report all spills in accordance with Federal, State and Local reporting requirements.

**WASTE DISPOSAL METHOD:** Reclaim per Federal, State and Local disposal requirements. For additional information on disposal or recycling options, visit: [http://www.nema.org/gov/ehs/committees/drybat/](http://www.nema.org/gov/ehs/committees/drybat/)

8. **PROTECTION INFORMATION**

<table>
<thead>
<tr>
<th>RESPIRATORY PROTECTION (SPECIFY TYPE):</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>VENTILATION:</td>
<td>NA</td>
</tr>
<tr>
<td>Local Exhaust:</td>
<td>NA</td>
</tr>
<tr>
<td>Mechanical (General):</td>
<td>NA</td>
</tr>
<tr>
<td>Special:</td>
<td>NA</td>
</tr>
<tr>
<td>Other:</td>
<td>NA</td>
</tr>
</tbody>
</table>

| PROTECTIVE GLOVES:                     | NA |
| EYE PROTECTION:                        | NA |
| OTHER PROTECTIVE CLOTHING:            | NA |

9. **SPECIAL PRECAUTIONS**

**HANDLING AND STORAGE:** Store in a dry place. Storing unpackaged cells together could result in cell shorting and heat build-up.

**TRANSPORTATION-SHIPPING:** These are "batteries, dry" and are not considered to be a "hazardous material" per the Dept. of Transportation (USDOT) regulations or "dangerous goods" per the International Air Transport Association (IATA) regulations. Shipments must comply with the general duty clause of USDOT 49 CFR 172.102 (a) (1) special provision 130, “to prevent shorting potential while transporting.”

10. **SARA 313**

Notification is not required because these products are article(s) that do not release a covered toxic chemical under the normal conditions of processing or use.

**NOTICE:** The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Rayovac Corporation makes no warranty expressed or implied.
MATERIAL SAFETY DATA SHEET

1. We would like to inform our customers that these batteries are exempt articles and are not subject to the 29 CFR 1910.1200 OSHA requirement, or to the Canadian WHMIS requirements and the sheets are supplied as a service to you. For other MSDSs and related information, visit: http://www.rayovac.com/technical/msds.htm.

2. THESE BATTERIES ARE NOT SUITABLE FOR LANDFILL DISPOSAL (SEE SECTION 7).

1. IDENTIFICATION

PRODUCT NAME: Nickel Cadmium Batteries

SIZES: All

EMERGENCY TELEPHONE NUMBER: 800-424-9300 (24 hr, Chemtrec)

Environmental Health & Safety Information: 608-275-2482

EDITION DATE: 03/05/2007

APPROVED BY: Kevin J. Domack

2. INGREDIENTS

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>CAS #</th>
<th>%</th>
<th>TLV*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel and compounds</td>
<td>7440-02-0</td>
<td>20-30</td>
<td>1.0 mg/m³ (Soluble Compounds, TWA)</td>
</tr>
<tr>
<td>Steel</td>
<td>7439-89-6</td>
<td>15 - 25</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Cadmium and compounds</td>
<td>7440-43-9</td>
<td>12-25</td>
<td>5 ug/m³ (TWA)</td>
</tr>
<tr>
<td>Potassium Hydroxide</td>
<td>1310-58-3</td>
<td>5 - 10</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Sodium Hydroxide</td>
<td>1310-73-2</td>
<td>&lt;4</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Lithium Hydroxide</td>
<td>1310-65-2</td>
<td>&lt;4</td>
<td>None Established</td>
</tr>
<tr>
<td>Cobalt and compounds</td>
<td>7440-48-4</td>
<td>&lt;2</td>
<td>0.1 mg/m³ (TWA)</td>
</tr>
<tr>
<td>Water, paper, plastic, other</td>
<td>--</td>
<td>Balance</td>
<td>--</td>
</tr>
</tbody>
</table>


3. PHYSICAL DATA

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point @ 760 mm Hg (°C)</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg @ 25°C)</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>NA</td>
</tr>
<tr>
<td>Density (grams/cc)</td>
<td>NA</td>
</tr>
<tr>
<td>Percent Volatile by Volume (%)</td>
<td>NA</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>NA</td>
</tr>
<tr>
<td>Physical State</td>
<td>NA</td>
</tr>
<tr>
<td>Solubility in Water (% by Weight)</td>
<td>NA</td>
</tr>
<tr>
<td>pH</td>
<td>NA</td>
</tr>
<tr>
<td>Appearance and Odor</td>
<td>geometric solid object</td>
</tr>
</tbody>
</table>

NA = Not Applicable
4. **FIRE & EXPLOSION HAZARD DATA**

<table>
<thead>
<tr>
<th>FLASH POINT:</th>
<th>NA</th>
<th>LOWER (LEL):</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLAMMABLE LIMITS IN AIR (%):</td>
<td>NA</td>
<td>UPPER (UEL):</td>
<td>NA</td>
</tr>
<tr>
<td>EXTINGUISHING MEDIA:</td>
<td>Use water, foam or dry powder, as appropriate.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUTO-IGNITION:</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SPECIAL FIRE FIGHTING PROCEDURES:** As with any fire, wear self-contained breathing apparatus to avoid inhalation of hazardous decomposition products (See section 2).

**SPECIAL FIRE EXPLOSION HAZARDS:** Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of flammable or corrosive materials.

5. **HEALTH HAZARD DATA**

| THRESHOLD LIMIT VALUE (TLV) AND SOURCE: | NA |
| EFFECTS OF OVEREXPOSURE: | None. (In fire or rupture situation see section 2 and section 4) |

**EMERGENCY FIRST AID PROCEDURES:**

**Skin and Eyes:**
In the event that battery ruptures, flush exposed skin with copious quantities of flowing lukewarm water for a minimum of 15 minutes. Get immediate medical attention for eyes. Wash skin with soap and water.

**Swallowing:**
Ingestion of a battery can be harmful. Call The National Capital Poison Center (800-222-1222), day or night, for advice and follow-up.

For more information, visit: [http://www.nema.org/gov/chs/committees/drybat/](http://www.nema.org/gov/chs/committees/drybat/).

6. **REACTIVITY DATA**

| STABLE OR UNSTABLE: | Stable |
| INCOMPATIBILITY (MATERIALS TO AVOID): | NA |
| HAZARDOUS DECOMPOSITION PRODUCTS: | NA |
| DECOMPOSITION TEMPERATURE (0°F): | NA |
| HAZARDOUS POLYMERIZATION: | Will Not Occur |
| CONDITIONS TO AVOID: | Avoid electrical shorting. |

NA = Not Applicable
7. **SPILL OR LEAK PROCEDURES**

PROCEDURES TO CONTAIN AND CLEAN UP LEAKS OR SPILLS: In the event of a battery rupture, prevent skin contact and collect all released material in a plastic lined metal container.

REPORTING PROCEDURE: Report all spills in accordance with Federal, State and Local reporting requirements.

WASTE DISPOSAL METHOD: Waste Nickel Cadmium Batteries are considered a USEPA Hazardous Waste (D006). Their collection and recycling are required under US Federal Law. Contact your battery distributor or retailer or contact the Rechargeable Battery Recycling Corporation (RBRC) at 800-BATTERY or at http://www.rbrc.org/ for details. For additional information on disposal or recycling options, visit: http://www.nema.org/gov/ehs/committees/drybat/

8. **PROTECTION INFORMATION**

RESPIRATORY PROTECTION (SPECIFY TYPE): NA

VENTILATION: Local Exhaust: NA

Mechanical (General): NA

Special: NA

Other: NA

PROTECTIVE GLOVES: NA

EYE PROTECTION: NA

OTHER PROTECTIVE CLOTHING: NA

9. **SPECIAL PRECAUTIONS**

HANDLING AND STORAGE: Store in a dry place. Storing unpackaged cells together could result in cell shorting and heat build-up.

TRANSPORTATION-SHIPPING: These are "batteries, dry" and are not considered to be a "hazardous material" per the Dept. of Transportation (USDOT) regulations or "dangerous goods" per the International Air Transport Association (IATA) regulations. Shipments must comply with the general duty clause of USDOT 49 CFR 172.102 (a) (1) special provision 130, “to prevent shorting potential while transporting.”

10. **SARA 313**

Notification is not required because these products are article(s) that do not release a covered toxic chemical under the normal conditions of processing or use.

NOTICE: The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Rayovac Corporation makes no warranty expressed or implied.
1. IDENTIFICATION

PRODUCT NAME:  Nickel Metal Hydride Batteries

SIZES:  All

EMERGENCY TELEPHONE NUMBER:  800-424-9300 (24 hr, Chemtrec)

Environmental Health & Safety Information:  608-275-2482

EDITION DATE:  03/05/2007  APPROVED BY: Kevin J. Domack

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<th>CAS #</th>
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<th>TLV*</th>
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<td>7440-02-0</td>
<td>30-40</td>
<td>1.0 mg/m$^3$ (Soluble Compounds, TWA)</td>
</tr>
<tr>
<td>Steel</td>
<td>--</td>
<td>15 - 25</td>
<td>--</td>
</tr>
<tr>
<td>Potassium Hydroxide</td>
<td>1310-58-3</td>
<td>10-15</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Cobalt and compounds</td>
<td>7440-48-4</td>
<td>4-8</td>
<td>0.1 mg/m$^3$ (TWA)</td>
</tr>
<tr>
<td>Manganese</td>
<td>7439-96-5</td>
<td>&lt;2</td>
<td>C5.0 mg/m$^3$ (TWA)</td>
</tr>
<tr>
<td>Aluminum</td>
<td>7429-90-5</td>
<td>&lt;1</td>
<td>15 mg/m$^3$ (Total Dust,TWA)</td>
</tr>
<tr>
<td>Lanthanides, Zinc</td>
<td>7440-66-6(Zn)</td>
<td>5 - 20</td>
<td>5 mg/m$^3$ (ZnO, Fume, TWA)</td>
</tr>
<tr>
<td>Water, paper, plastic, other</td>
<td>--</td>
<td>Balance</td>
<td>--</td>
</tr>
</tbody>
</table>

*Source: OSHA 29 CFR 1910.1000 Table Z-1, 2 or 3  3-01-2007

3. PHYSICAL DATA

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<th>Property</th>
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</tr>
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<td>Density (grams/cc):</td>
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</tr>
<tr>
<td>Percent Volatile by Volume (%):</td>
<td>NA</td>
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<tr>
<td>Evaporation Rate (Butyl Acetate = 1):</td>
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<tr>
<td>Physical State:</td>
<td>NA</td>
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</tr>
<tr>
<td>pH:</td>
<td>NA</td>
</tr>
<tr>
<td>Appearance and Odor:</td>
<td>geometric solid object</td>
</tr>
</tbody>
</table>

NA = Not Applicable
4. **FIRE & EXPLOSION HAZARD DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>FLASH POINT</td>
<td>NA</td>
</tr>
<tr>
<td>LOWER (LEL)</td>
<td>NA</td>
</tr>
<tr>
<td>FLAMMABLE LIMITS IN AIR (%)</td>
<td>NA</td>
</tr>
<tr>
<td>UPPER (UEL)</td>
<td>NA</td>
</tr>
<tr>
<td>EXTINGUISHING MEDIA</td>
<td>Use water, foam or dry powder, as appropriate.</td>
</tr>
<tr>
<td>AUTO-IGNITION</td>
<td>NA</td>
</tr>
</tbody>
</table>

**SPECIAL FIRE FIGHTING PROCEDURES:** As with any fire, wear self-contained breathing apparatus to avoid inhalation of hazardous decomposition products (See section 2).

**SPECIAL FIRE EXPLOSION HAZARDS:** Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of flammable or corrosive materials.

5. **HEALTH HAZARD DATA**

**THRESHOLD LIMIT VALUE (TLV) AND SOURCE:** NA

**EFFECTS OF OVEREXPOSURE:** None. (In fire or rupture situation see section 2 and section 4)

**EMERGENCY FIRST AID PROCEDURES:**

**Skin and Eyes:**
In the event that battery ruptures, flush exposed skin with copious quantities of flowing lukewarm water for a minimum of 15 minutes. Get immediate medical attention for eyes. Wash skin with soap and water.

**Swallowing:**
Ingestion of a battery can be harmful. Call The National Capital Poison Center (800-222-1222), day or night, for advice and follow-up.

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6. **REACTIVITY DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>STABLE OR UNSTABLE</td>
<td>Stable</td>
</tr>
<tr>
<td>INCOMPATIBILITY (MATERIALS TO AVOID)</td>
<td>NA</td>
</tr>
<tr>
<td>HAZARDOUS DECOMPOSITION PRODUCTS</td>
<td>NA</td>
</tr>
<tr>
<td>DECOMPOSITION TEMPERATURE (0°F)</td>
<td>NA</td>
</tr>
<tr>
<td>HAZARDOUS POLYMERIZATION</td>
<td>Will Not Occur</td>
</tr>
<tr>
<td>CONDITIONS TO AVOID</td>
<td>Avoid electrical shorting.</td>
</tr>
</tbody>
</table>
7. **SPILL OR LEAK PROCEDURES**

**PROCEDURES TO CONTAIN AND CLEAN UP LEAKS OR SPILLS:** In the event of a battery rupture, prevent skin contact and collect all released material in a plastic lined metal container.

**REPORTING PROCEDURE:** Report all spills in accordance with Federal, State and Local reporting requirements.

**WASTE DISPOSAL METHOD:** Waste Nickel Metal Hydride Batteries are NOT considered a USEPA Hazardous Waste. Their collection and recycling are not required under US Federal Law. Contact your battery distributor for details regarding recycling and disposal options or visit: [http://www.rbrc.org](http://www.rbrc.org). For additional information on disposal or recycling options, visit: [http://www.nema.org/gov/ehs/committees/drybat/](http://www.nema.org/gov/ehs/committees/drybat/)

8. **PROTECTION INFORMATION**

**RESPIRATORY PROTECTION (SPECIFY TYPE):** NA

**VENTILATION:**
- Local Exhaust: NA
- Mechanical (General): NA
- Special: NA
- Other: NA

**PROTECTIVE GLOVES:** NA

**EYE PROTECTION:** NA

**OTHER PROTECTIVE CLOTHING:** NA

9. **SPECIAL PRECAUTIONS**

**HANDLING AND STORAGE:** Store in a dry place. Storing unpackaged cells together could result in cell shorting and heat build-up.

**TRANSPORTATION-SHIPPING:** These are "batteries, dry" and are not considered to be a "hazardous material" per the Dept. of Transportation (USDOT) regulations or "dangerous goods" per the International Air Transport Association (IATA) regulations. Shipments must comply with the general duty clause of USDOT 49 CFR 172.102 (a) (1) special provision 130, “to prevent shorting potential while transporting.”

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I. PRODUCT IDENTIFICATION

MANUFACTURER
Exide Technologies
13000 Deerfield Parkway, Bldg. 200
Alpharetta, GA 30004

CHEMICAL/TRADE NAME
Maintenance Free Battery
(as used on label)
Valve Regulated Battery
Sealed Lead-Acid Battery

CHEMICAL FAMILY/CLASSIFICATION
Electric Storage Battery

FOR INFORMATION
Primary: MACTEC Engineering and Consulting, Inc.
Attention: Juliann Cothran (770) 421-3485
Secondary: Environmental, Safety & Health
Attention: Eric Murray (800) 523-4622
Fred Ganster (610) 921-4052

DATE ISSUED: February 1, 2008

FOR EMERGENCY
CHEMTREC (800) 424-9300
CHEMTREC INTERNATIONAL (703) 527-3887 – Collect
24-hour Emergency Response Contact
Ask for Environmental Coordinator

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS Number</th>
<th>% by Wt.</th>
<th>OSHA</th>
<th>ACGIH</th>
<th>NIOSH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inorganic compounds of:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
<td>60-68</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Tin</td>
<td>7440-31-5</td>
<td>0.30</td>
<td>2000</td>
<td>2000</td>
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</tr>
<tr>
<td>Calcium</td>
<td>7440-70-2</td>
<td>0.03</td>
<td>-</td>
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<tr>
<td>Silver</td>
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<td>100</td>
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<tr>
<td>Aluminum</td>
<td>7429-90-5</td>
<td>0.004</td>
<td>5000</td>
<td>10000</td>
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</tr>
<tr>
<td><strong>Electrolyte (hydrogel)</strong></td>
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<td></td>
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</tr>
<tr>
<td>Sulfuric Acid (Diluted sulfuric acid in solid state, percentage acid: 38.5%, percentage water: 61.5%)</td>
<td>7664-93-9</td>
<td>17-22</td>
<td>1000</td>
<td>200</td>
<td>1000</td>
</tr>
<tr>
<td>Silicon dioxide</td>
<td>60676-86-0</td>
<td>4-6</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Case Material:</strong> Polypropylene</td>
<td>9003-07-0</td>
<td>4-12</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

NOTE: Inorganic lead and electrolyte (water and sulfuric acid solution) are the primary components of every battery manufactured by Exide Technologies or its subsidiaries. Other ingredients may be present dependent upon battery type. Polypropylene is the principal case material of automotive and commercial batteries.

III. PHYSICAL DATA - ELECTROLYTE

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point</td>
<td>203°F-240°F (for S.G. range)</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>100%</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl acetate=1)</td>
<td>Less Than 1</td>
</tr>
<tr>
<td>Appearance and Odor</td>
<td>A white transparent gel; no apparent odor. A battery is a manufactured article; no apparent odor.</td>
</tr>
<tr>
<td>Specific Gravity (H2O=1)</td>
<td>1.230 to 1.350</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg) 77°F</td>
<td>17 to 11 (for S.G. range)</td>
</tr>
<tr>
<td>Vapor Density (AIR=1)</td>
<td>Greater than 1</td>
</tr>
<tr>
<td>% Volatiles by Weight</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

IV. FIRE AND EXPLOSION HAZARD DATA

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash Point:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Flammable Limits:</td>
<td>LEL = 4.1% (Hydrogen Gas in air) ; UEL = 74.2%</td>
</tr>
<tr>
<td>Extinguishing media:</td>
<td>CO2; foam; dry chemical</td>
</tr>
<tr>
<td>Special Fire Fighting Procedures: Use positive pressure, self-contained breathing apparatus. Beware of acid splatter during water application and wear acid-resistant clothing, gloves, face and eye protection. If batteries are on charge, shut off power to the charging equipment, but, note that strings of series connected batteries may still pose risk of electric shock even when charging equipment is shut down.</td>
<td></td>
</tr>
</tbody>
</table>
IV.  FIRE AND EXPLOSION HAZARD DATA (CONTINUED)

Unusual Fire and Explosion Hazards:
In operation, batteries generate and release flammable hydrogen gas. They must always be assumed to contain this gas which, if ignited by burning cigarette, naked flame or spark, may cause battery explosion with dispersion of casing fragments and corrosive liquid electrolyte. Carefully follow manufacturer's instructions for installation and service. Keep away all sources of gas ignition and do not allow metallic articles to simultaneously contact the negative and positive terminals of a battery.

V.  REACTIVITY DATA

Stability:  Stable  X  Unstable

Conditions to Avoid: Prolonged overcharge at high current; sources of ignition.

Incompatibility: (materials to avoid)
Electrolyte: Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulfur trioxide gas, strong oxidizers, and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas.

Lead compounds: Avoid contact with strong acids, bases, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen, and reducing agents.

Hazardous Decomposition Products:
Electrolyte: Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, hydrogen sulfide.

Lead compounds: Temperatures above the melting point are likely to produce toxic metal fume, vapor, or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.

VI.  HEALTH HAZARD DATA

Routes of Entry:
Electrolyte: Harmful by all routes of entry.

Lead compounds: Hazardous exposure can occur only when product is heated above the melting point, oxidized or otherwise processed or damaged to create dust, vapor, or fume.

Inhalation:
Electrolyte: Breathing of sulfuric acid vapors or mists may cause severe respiratory irritation.

Lead compounds: Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.

Ingestion:
Electrolyte: May cause severe irritation of mouth, throat, esophagus, and stomach.

Lead compounds: Acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea, and severe cramping. This may lead rapidly to systemic toxicity.

Skin Contact:
Electrolyte: Severe irritation, burns, and ulceration.

Lead compounds: Not absorbed through the skin.

Eye Contact:
Electrolyte: Severe irritation, burns, cornea damage, blindness.

Lead compounds: May cause eye irritation.

Effects of Overexposure - Acute:
Electrolyte: Severe skin irritation, damage to cornea may cause blindness, upper respiratory irritation.

Lead compounds: Symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances, and irritability.

Effects of Overexposure - Chronic:
Electrolyte: Possible erosion of tooth enamel; inflammation of nose, throat, and bronchial tubes.
VI. HEALTH HAZARD DATA (CONTINUED)

Lead compounds: Anemia; neuropathy, particularly of the motor nerves, with wrist drop; kidney damage; reproductive changes in both males and females.

Carcinogenicity:
Electrolyte: The National Toxicology Program (NTP) and the International Agency for Research on Cancer (IARC) have classified "strong inorganic acid mist containing sulfuric acid" as a Category I carcinogen, a substance that is carcinogenic to humans. This classification does not apply to sulfuric acid solutions in static liquid state or to electrolyte in batteries. Batteries subjected to abusive charging at excessively high currents for prolonged periods of time without vent caps in place may create a surrounding atmosphere of the offensive strong inorganic acid mist containing sulfuric acid.

Lead compounds: Listed as a 2B carcinogen, likely in animals at extreme doses. Proof of carcinogenicity in humans is lacking at present.

Medical Conditions Generally Aggravated by Exposure:
Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions. Contact of electrolyte (water and sulfuric acid solution) with skin may aggravate skin diseases such as eczema and contact dermatitis. Contact of electrolyte (water and sulfuric acid solution) with eyes may damage cornea and/or cause blindness. Lead and its compounds can aggravate some forms of kidney, liver, and neurologic diseases.

Emergency and First Aid Procedures:

Inhalation: Electrolyte: Remove to fresh air immediately. If breathing is difficult, give oxygen.

Lead compounds: Remove from exposure, gargle, wash nose and lips; consult physician.

Ingestion: Electrolyte: Give large quantities of water; do not induce vomiting; consult physician.

Lead compounds: Consult physician immediately.

Skin: Electrolyte: Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely, including shoes.

Lead compounds: Wash immediately with soap and water.

Eyes: Electrolyte and Lead compounds: Flush immediately with large amounts of water for at least 15 minutes; consult physician immediately.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storage: (No hazards under normal usage as the sulfuric acid is immobilized in a gel structure)
Store batteries under roof in cool, dry, well-ventilated areas that are separated from incompatible materials and from activities that may create flames, spark, or heat. Keep away from metallic objects that could bridge the terminals on a battery and create a dangerous short-circuit. Single batteries pose no risk of electric shock but there may be increasing risk of electric shock from strings of connected batteries exceeding three 12-volt units.

Charging:
There is a possible risk of electric shock from charging equipment and from strings of series connected batteries, whether or not being charged. Shut-off power to chargers whenever not in use and before detachment of any circuit connections. Batteries being charged will generate and release flammable hydrogen gas. Charging space should be ventilated. Keep battery vent caps in position. Prohibit smoking and avoid creation of flames and sparks nearby. Wear face and eye protection when near batteries being charged.

Spill or Leak Procedures:
Stop flow of material, contain/absorb small spills with dry sand, earth, and vermiculite. Do not use combustible materials. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bicarbonate, lime, etc. Wear acid-resistant clothing, boots, gloves, and face shield. Do not allow discharge of un-neutralized acid to sewer. Neutralized acid must be managed in accordance with approved local, state, and federal requirements. Consult state environmental agency and/or federal EPA.

Waste Disposal Methods:
Spent batteries: Send to secondary lead smelter for recycling.

Electrolyte:
Place neutralized slurry into sealed acid resistant containers and dispose of as hazardous waste, as applicable. Large water diluted spills, after neutralization and testing, should be managed in accordance with approved local, state, and federal requirements. Consult state environmental agency and/or federal EPA.
VII. PRECAUTIONS FOR SAFE HANDLING AND USE (CONTINUED)

Precautionary Labeling:
- POISON - CAUSES SEVERE BURNS
- DANGER - EXPLOSIVE GASES
- CORROSIVE - CONTAINS SULFURIC ACID
- KEEP AWAY FROM CHILDREN

VIII. CONTROL MEASURES

Engineering Controls and Work Practices: Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant. Handle batteries cautiously in an upright position. Make certain vent caps are on securely. If battery case is damaged, avoid bodily contact with internal components. Wear protective clothing, eye and face protection, when charging or handling batteries.

Respiratory Protection: None required under normal conditions. When concentrations of sulfuric acid mist are known to exceed PEL, use NIOSH or MSHA-approved respiratory protection.

Protective gloves: None required under normal conditions. If battery case is damaged, rubber or plastic acid-resistant gloves with elbow-length gauntlet.

Eye Protection: None required under normal conditions. If battery case is damaged, chemical goggles or face shield.

Emergency Flushing: In areas where water and sulfuric acid solutions are handled in concentrations greater than 1%, emergency eyewash stations and showers should be provided, with unlimited water supply.

Other Protection: Acid-resistant apron. Under severe exposure or emergency conditions, wear acid-resistant clothing, gloves, and boots.

IX. OTHER REGULATORY INFORMATION

NFPA Hazard Rating for sulfuric acid:

- Flammability (Red) = 0
- Health (Blue) = 3
- Reactivity (Yellow) = 2

Sulfuric acid is water-reactive if concentrated.

TRANSPORTATION: Wet (filled with electrolyte) batteries are regulated by U.S. DOT as hazardous material, as provided in 49 CFR 173.159:

- Proper Shipping Name: Battery, wet, filled with acid
- Hazard Class/Division: 8
- ID Number: UN2794
- Packing Group: III
- Label Required: Corrosive

Note: Exide batteries which have met the test requirements for “non-spillable wet electric storage batteries,” as provided in 49 CFR 173.159(d) and IATA/ICAO, are non-regulated when protected against short circuits, kept upright, and securely packaged. Contact your Exide representative to determine which non-spillable batteries have met these requirements.

RCRA: Spent lead-acid batteries are not regulated as hazardous waste when recycled. Spilled sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number D002 (corrosivity).

CERCLA (Superfund) and EPCRA:

(a) Reportable Quantity (RQ) for spilled 100% sulfuric acid under CERCLA (Superfund) and EPCRA (Emergency Planning and Community Right to Know Act) is 1,000 lbs. State and local reportable quantities for spilled sulfuric acid may vary.

(b) Sulfuric acid is a listed "Extremely Hazardous Substance" under EPCRA, with a Threshold Planning Quantity (TPQ) of 1,000 lbs.

(c) EPCRA Section 302 notification is required if 1,000 lbs or more of sulfuric acid is present at one site. An average automotive/commercial battery contains approximately 5 lbs. of sulfuric acid. Contact your Exide representative for additional information.

(d) EPCRA Section 312 Tier Two reporting is required for non-automotive batteries if sulfuric acid is present in quantities of 500 lbs or more and/or if lead is present in quantities of 10,000 lbs or more.
IX. OTHER REGULATORY INFORMATION (CONTINUED)

(e) Supplier Notification: This product contains toxic chemicals that may be reportable under EPCRA Section 313 Toxic Chemical Release Inventory (Form R) requirements. For a manufacturing facility under SIC codes 20 through 39, the following information is provided to enable you to complete the required reports:

<table>
<thead>
<tr>
<th>Approximate Toxic Chemical</th>
<th>CAS Number</th>
<th>% by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
<td>60-68</td>
</tr>
<tr>
<td>Sulfuric Acid/Water Solution</td>
<td>7664-93-9</td>
<td>17-22</td>
</tr>
</tbody>
</table>

If you distribute this product to other manufacturers in SIC Codes 20 through 39, this information must be provided with the first shipment of each calendar year.

Note: The Section 313 supplier notification requirement does not apply to batteries that are "consumer products".

CAA:
Exide Technologies supports preventative actions concerning ozone depletion in the atmosphere due to emissions of CFC's and other ozone depleting chemicals (ODC's), defined by the USEPA as Class I substances. Pursuant to Section 611 of the Clean Air Act Amendments (CAAA) of 1990, finalized on January 19, 1993, Exide established a policy to eliminate the use of Class I ODC's prior to the May 15, 1993 deadline.

TSCA:
Ingredients in Exide's batteries are listed in the TSCA Registry as follows:

<table>
<thead>
<tr>
<th>CAS NO.</th>
<th>TSCA Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfuric acid (H$_2$SO$_4$) 7664-93-9</td>
<td>Listed</td>
</tr>
<tr>
<td>Lead (Pb) 7439-92-1</td>
<td>Listed</td>
</tr>
<tr>
<td>Lead Oxide (PbO) 1317-36-8</td>
<td>Listed</td>
</tr>
<tr>
<td>Lead Sulfate (PbSO$_4$) 7446-14-2</td>
<td>Listed</td>
</tr>
<tr>
<td>Calcium (Ca) 7440-70-2</td>
<td>Listed</td>
</tr>
<tr>
<td>Tin (Sn) 7440-31-5</td>
<td>Listed</td>
</tr>
<tr>
<td>Silver (Ag) 7440-22-4</td>
<td>Listed</td>
</tr>
<tr>
<td>Aluminum (Al) 7429-90-5</td>
<td>Listed</td>
</tr>
</tbody>
</table>

CANADIAN REGULATIONS:
All chemical substances in this product are listed on the CEPA DSL/NDSL or are exempt from list requirements.

CALIFORNIA PROPOSITION 65:
"WARNING: This product contains lead, a chemical known to the State of California to cause cancer, or birth defects or other reproductive harm."

PREPARED BY: ENVIRONMENTAL, SAFETY AND HEALTH DEPARTMENT
EXIDE TECHNOLOGIES
13000 DEERFIELD PKWY., BLDG. 200
ALPHARETTA, GA 30004

VENDEE AND THIRD PERSONS ASSUME THE RISK OF INJURY PROXIMATELY CAUSED BY THE MATERIAL IF REASONABLE SAFETY PROCEDURES ARE NOT FOLLOWED AS PROVIDED FOR IN THE DATA SHEET, AND VENDOR SHALL NOT BE LIABLE FOR INJURY TO VENDEE OR THIRD PERSONS PROXIMATELY CAUSED BY ABNORMAL USE OF THE MATERIAL EVEN IF REASONABLE PROCEDURES ARE FOLLOWED.

ALL PERSONS USING THIS PRODUCT, ALL PERSONS WORKING IN AN AREA WHERE THIS PRODUCT IS USED, AND ALL PERSONS HANDLING THIS PRODUCT SHOULD BE FAMILIAR WITH THE CONTENTS OF THIS DATA SHEET. THIS INFORMATION SHOULD BE EFFECTIVELY COMMUNICATED TO EMPLOYEES AND OTHERS WHO MIGHT COME IN CONTACT WITH THE PRODUCT.

WHILE THE INFORMATION ACCUMULATED AND SET FORTH HEREIN IS BELIEVED TO BE ACCURATE AS OF THE DATE HEREOF, EXIDE TECHNOLOGIES MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE FOR THEIR PARTICULAR CIRCUMSTANCES.

ANY PHOTOCOPY MUST BE OF THIS ENTIRE DOCUMENT
1. IDENTIFICATION

PRODUCT NAME: Silver Oxide Batteries

SIZES: All

EMERGENCY TELEPHONE NUMBER: 800-424-9300 (24 hr, Chemtrec)

Environmental Health & Safety Information: 608-275-2482

EDITION DATE: 03/05/2007

APPROVED BY: Kevin J. Domack

2. INGREDIENTS

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>CAS #</th>
<th>%</th>
<th>TLV*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>&lt;0.5</td>
<td>.01 mg/m³ (TWA)</td>
</tr>
<tr>
<td>Steel</td>
<td>7439-89-6</td>
<td>37 – 41</td>
<td>--</td>
</tr>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
<td>30 – 40</td>
<td>5.0 mg/m³ (ZnO, Fume, TWA)</td>
</tr>
<tr>
<td>Potassium Hydroxide</td>
<td>1310-58-3</td>
<td>1 – 3</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>&lt;0.25</td>
<td>15 mppcf (TWA)</td>
</tr>
<tr>
<td>Mercury</td>
<td>7439-97-6</td>
<td>&lt;0.9**</td>
<td>0.1 ug/ m³ (Inorganic, TWA)</td>
</tr>
<tr>
<td>Manganese Dioxide</td>
<td>1313-13-9</td>
<td>&lt;2.5</td>
<td>C5.0 mg/ m³ (Mn, TWA)</td>
</tr>
<tr>
<td>Water, paper, plastic, other</td>
<td>---</td>
<td>---</td>
<td>Balance</td>
</tr>
</tbody>
</table>

*Source: OSHA 29 CFR 1910.1000 Table Z - 1, 2 or 3 3-01-2007

** All Silver Oxide cells contain less than 25 mg/cell of mercury.

3. PHYSICAL DATA

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point @ 760 mm Hg (°C):</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg @ 25°C):</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Density (Air = 1):</td>
<td>NA</td>
</tr>
<tr>
<td>Density (grams/cc):</td>
<td>NA</td>
</tr>
<tr>
<td>Percent Volatile by Volume (%):</td>
<td>NA</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1):</td>
<td>NA</td>
</tr>
<tr>
<td>Physical State:</td>
<td>NA</td>
</tr>
<tr>
<td>Solubility in Water (% by Weight):</td>
<td>NA</td>
</tr>
<tr>
<td>pH:</td>
<td>NA</td>
</tr>
<tr>
<td>Appearance and Odor:</td>
<td>geometric solid object</td>
</tr>
</tbody>
</table>
4. FIRE & EXPLOSION HAZARD DATA

FLASH POINT: NA  LOWER (LEL): NA
FLAMMABLE LIMITS IN AIR (%): NA  UPPER (UEL): NA
EXTINGUISHING MEDIA: Use water, foam or dry powder, as appropriate.
AUTO-IGNITION: NA

SPECIAL FIRE FIGHTING PROCEDURES: As with any fire, wear self-contained breathing apparatus to avoid inhalation of hazardous decomposition products (See section 2).

SPECIAL FIRE EXPLOSION HAZARDS: Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of flammable or corrosive materials.

5. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV) AND SOURCE: NA

EFFECTS OF OVEREXPOSURE: None. (In fire or rupture situation see section 2 and section 4)

EMERGENCY FIRST AID PROCEDURES:

Skin and Eyes:
In the event that battery ruptures, flush exposed skin with copious quantities of flowing lukewarm water for a minimum of 15 minutes. Get immediate medical attention for eyes. Wash skin with soap and water.

Swallowing:
Ingestion of a battery can be harmful. Call The National Capital Poison Center (800-222-1222), day or night, for advice and follow-up.

For more information, visit: http://www.nema.org/gov/ehs/committees/drybat/.

6. REACTIVITY DATA

STABLE OR UNSTABLE: Stable
INCOMPATIBILITY (MATERIALS TO AVOID): NA
HAZARDOUS DECOMPOSITION PRODUCTS: NA
DECOMPOSITION TEMPERATURE (0°F): NA
HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: Avoid electrical shorting.
7. SPILL OR LEAK PROCEDURES

PROCEDURES TO CONTAIN AND CLEAN UP LEAKS OR SPILLS: In the event of a battery rupture, prevent skin contact and collect all released material in a plastic lined metal container.

REPORTING PROCEDURE: Report all spills in accordance with Federal, State and Local reporting requirements.

WASTE DISPOSAL METHOD: Reclaim or dispose of in an approved, secured landfill after required pretreatment, per Federal, State and Local disposal requirements. For additional information on disposal or recycling options, visit: http://www.nema.org/gov/ehs/committees/drybat/

8. PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE): NA

VENTILATION:  
Local Exhaust: NA  
Mechanical (General): NA  
Special: NA  
Other: NA

PROTECTIVE GLOVES: NA

EYE PROTECTION: NA

OTHER PROTECTIVE CLOTHING: NA

9. SPECIAL PRECAUTIONS

HANDLING AND STORAGE: Store in a dry place. Storing unpackaged cells together could result in cell shorting and heat build-up.

TRANSPORTATION-SHIPPING: These are "batteries, dry" and are not considered to be a "hazardous material" per the Dept. of Transportation (USDOT) regulations or "dangerous goods" per the International Air Transport Association (IATA) regulations. Shipments must comply with the general duty clause of USDOT 49 CFR 172.102 (a) (1) special provision 130, “to prevent shorting potential while transporting.”

10. SARA 313

Notification is not required because these products are article(s) that do not release a covered toxic chemical under the normal conditions of processing or use.

NOTICE: The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Rayovac Corporation makes no warranty expressed or implied.
Appendix B

Example Material Profile and General Service Agreement
### Material Profile and General Service Agreement

#### Customer Information

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Contact</th>
<th>EPA ID</th>
<th>PO Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>City</th>
<th>State</th>
<th>Postal Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Phone</th>
<th>Alternate Phone</th>
<th>Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Generator Information

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Contact</th>
<th>EPA ID</th>
<th>NAICS</th>
<th>SIC</th>
<th>COR Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<table>
<thead>
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<th>City</th>
<th>State</th>
<th>Postal Code</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Phone</th>
<th>Alternate Phone</th>
<th>Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Certification

I hereby certify as an authorized representative of the Customer and Generator(s) that the information submitted in this Material Profile is a true and accurate description of the material(s) to be delivered to Company. Further, I certify that any and all relevant information related to material(s) either known or suspected, including any risks of potential hazards, has been disclosed to Company personnel. In addition, I certify that I have reviewed the General Service Agreement included below and agree to be bound by its terms, except to the extent that a separate written agreement is entered into with Company, in which case the terms of that separate written agreement, where in conflict, will supersede the terms of the General Service Agreement.

<table>
<thead>
<tr>
<th>Signature</th>
<th>Name</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### General Service Agreement

The following General Service Agreement ("Agreement") is entered into by the Customer (as described above) and the Company (as defined below) to govern the performance of Services (as defined below), including the related obligations and requirements of each party. This Agreement forms the entire agreement between the Customer and the Company, except if the Customer and the Company execute a separate written agreement regarding the delivery of Services, then where in conflict, the terms of that separate written agreement will supersede this General Service Agreement.

1. **“Company”**. For purposes of this Agreement, the term Company is used interchangeably to refer to three separate but affiliated entities: (i) Kinsbursky Brothers Inc., a California corporation, with a place of business at 125 E Commercial St. A, Anaheim, CA 92801 ("CA"); (ii) Retriev Technologies Inc., a Delaware corporation, with a place of business at 265 Quarry Rd SE, Lancaster, OH 43130 ("OH"); and (iii) Toxco Waste Management Ltd. D/B/A Retriev Technologies, a British Columbia corporation, with a place of business at 9384 Highway 22A, Trail, BC V1R 4W6 ("BC"). Customer agrees and acknowledges that it is entering this Agreement with all three entities, and that this agreement shall equally bind and obligate the Customer to all three entities as if three separate agreements had been directly and solely entered into with each.

2. **“Services”**. Company will accept all materials described in EXHIBIT A for recycling, reclamation, disposal, reutilization, and/or any other proper management technique. In addition, Company may accept and perform Services on materials not described in Exhibit A ("Special Materials") if the Customer has completed and submitted a Material Profile Addendum that states the chemical and physical properties of the Special Materials, and Company at its sole discretion has approved the same. Nevertheless, Company may visually inspect all shipments received from Customer, and if a shipment is found to contain materials that do not conform to Exhibit A or any Material Profile Addendum, then Company reserves the right to reject the materials back to the Customer. The Customer may, within a reasonable amount of time, direct Company to either reject the entire shipment or just the non-conforming materials. Customer is responsible for paying all costs associated with the rejection of materials, including but not limited to: (1) return shipping; and/or (2) Company labor for repackaging of materials that are otherwise unsafe for transportation or not in compliance with applicable shipping regulations. Title to materials shall transfer to Company when the materials are received and accepted at a Company recycling or consolidation facility. Title to non-conforming materials shall not transfer, unless Company in its sole discretion agrees to accept the materials.
Material Profile and General Service Agreement

3. Quotes and Payment. Company shall, from time to time, or upon the request of the Customer, provide a quote/PO for its Services. A quote/PO shall be effective for no more than thirty (30) days, unless stated otherwise on the quote/PO. The quote/PO will be based on the weight of materials and/or the number of units comprising the materials, and for this purpose Company’s weights and counts shall govern. If the Customer delivers materials that are not listed on an active quote/PO, then the Default Pricing set forth in Exhibit B shall govern; further if material is not listed in Exhibit B, then Company shall charge a reasonable rate based on its costs to manage the materials. Nevertheless, Company at its sole discretion may approve a more beneficial price for the Customer at any time. Payment terms shall be net thirty (30) days, whether payment is due to the Company or to the Customer. All prices shall be in U.S. Dollars ($USD) unless expressly stated otherwise.

4. Additional Fees. A sorting fee of $0.15 per pound will be added to material containers that have a discrepancy of 10% or greater. A repackaging fee of $60.00 per man hour will be charged for repackaging materials that are not in compliance with applicable shipping regulations (including but not limited to, batteries that have not been properly insulated, e.g. lithium batteries packaged in oil) or for repackaging materials that are otherwise unsafe for transportation (including, but not limited to, damaged batteries). Reasonable disassembly and discharge fees may apply for large format battery packs, if in Company’s sole discretion pack disassembly and/or discharge is required to ensure safe processing. An additional data entry fee of $50.00 will be charged for each shipping paper (e.g. bill of lading, manifest) accepted by Company that represents less than 1,000 pounds gross weight of total material. Company does not accept electronic waste in isolation, but recognizes electronic waste may be combined with batteries and difficult for the Customer to separate; accordingly Company may charge $0.65/lb. for any electronic waste received from Customer. Company may waive or reduce these additional fees at its sole discretion.

5. Company Warranties. Company warrants that: (i) it possesses the necessary permits, certifications, and approvals to manage the Customer’s material(s) in conformance with all federal, state and local law; (ii) it shall perform the Services in a manner consistent with the level of care and skill ordinarily exercised by other professional service providers under similar circumstances at the time the Services are performed; and (iii) it shall comply with all federal, state, provincial and local laws, ordinances and/or regulations applicable to the performance of its Services.

6. Customer Warranties. Customer warrants that: (i) it shall package all materials in conformance with all federal, state, provincial and local laws, including, but not limited to, the Federal Hazmat Regulations set forth in 49 CFR parts 171-180 when shipping within the United States and the regulations made under the Transportation of Dangerous Goods Act, 1992 when shipping within Canada; (ii) if it has submitted any samples, then that sample is representative as defined in 40 CFR 261 or by using an equivalent method; and (iii) it shall comply with all other federal, state, provincial and local laws, ordinances and/or regulations applicable to its performance under this Agreement.

7. Mutual Disclaimer. THE FOREGOING WARRANTIES ARE EXCLUSIVE, AND ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR IMPLIED, INCLUDING THE WARRANTY OF MERCHANTABILITY AND ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

8. Limitation of Liability. IN NO EVENT SHALL EITHER PARTY BE LIABLE TO THE OTHER, EITHER IN CONTRACT OR IN TORT, FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES.

9. Force Majeure. Any delay or failure in the performance of Services by Company shall be excused if and to the extent caused by the occurrence of a Force Majeure. Company shall give notice to the Customer of a Force Majeure event upon it becoming known to Company. “Force Majeure” means an event beyond the control of Company, which prevents it from complying with any of its obligations, including but not limited to: (1) act of God (such as, but not limited to, fires, explosions, earthquakes, drought, tidal waves and floods); (2) war (whether war be declared or not), hostilities, invasion, act of foreign enemies, or embargo; (3) rebellion, revolution, insurrection, or military or usurped power, or civil war; (4) riot, strikes, or lock outs; or (5) acts or threats of terrorism.

10. ITAR Regulations. In accordance with the International Traffic in Arms Regulations (ITAR), the Customer shall not deliver to Company any articles listed in the United States Munitions List. Customer shall indemnify Company against any and all actions, proceedings, losses, claims, costs, damages and expenses suffered by Company due to the Customer’s violation of this provision.

11. Execution. In the event that any signature is delivered by facsimile transmission or by e-mail delivery of a data file, such signature shall create a valid and binding obligation with the same force and effect as if such facsimile or data file signature page were an original.

12. Severability. In the event that any provision of this Agreement conflict with the law under which it is to be construed or if any such provision is held invalid by a competent authority, such provision will be deemed to be restated to reflect as nearly as possible the original intentions of the Parties in accordance with applicable law. The remainder of this Agreement will remain in full force and effect.

13. Miscellaneous. This Agreement shall be governed and construed in accordance with the laws of California, excluding that State’s choice-of-law principles, and all claims relating to or arising out of this Agreement, or the breach thereof, whether sounding in contract, tort or otherwise, shall likewise be governed by the laws of California, excluding that State’s choice-of-law principles. Any dispute arising under or in connection with this Agreement or related to any matter which is the subject of the Agreement shall be subject to the exclusive jurisdiction of either (1) the state courts located in Orange County, California; and/or (2) the federal courts located in the Central District of California. Neither Party may assign its rights or delegate its duties without the prior written consent of the other. An attempted assignment or delegation in violation of this clause is null and void. The failure by one Party to require performance of any provision of this Agreement shall not affect that Party’s right to require performance at any time thereafter, nor shall a waiver of any breach or default constitute a waiver of any subsequent breach or default, or a waiver of this provision.

<table>
<thead>
<tr>
<th>Profile Number</th>
<th>Approval Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company’s Issuance of the profile number to the left acknowledges the acceptability of Customer’s materials into Company facility, and confirms this facility has the appropriate permit(s), or exemption(s) by the appropriate regulatory agencies, to conduct the Services described above.</td>
<td></td>
</tr>
</tbody>
</table>
**Exhibit A - Battery Identification and Packaging Guidelines**

The tables shown below list battery types acceptable under this Material Profile and Service Agreement. Packaging requirements as set forth in the hazardous materials regulations found in Title 49 of the Code of Federal Regulations are also stated. These packaging requirements must be strictly adhered to when transporting batteries. Any other materials, articles, packages or descriptions not identified specifically below must be described on a Material Profile Addendum and approved by Company management before shipment; otherwise these material, articles, packages or descriptions are subject to rejection at Company’s sole discretion.

**KEY: Battery Identification, Packaging Guidelines and Default Pricing**

<table>
<thead>
<tr>
<th>Battery Chemistry and Form Factor</th>
<th>United Nations Identification Number and Proper Shipping Name per Title 49</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Battery category or unique characteristic</strong></td>
<td><strong>Customer specific or unconventional batteries types (SDS REQUIRED)</strong></td>
</tr>
<tr>
<td>Application or sub category</td>
<td>Please describe below (include the application of the battery): Prior facility approval required</td>
</tr>
</tbody>
</table>

**Significant regulatory citations applicable to the shipping and packaging of this battery type.**

<table>
<thead>
<tr>
<th>Waste Codes</th>
<th>Handling Codes</th>
</tr>
</thead>
</table>

**Wet Filled Lead Acid Batteries**

**UN2794, Batteries, Wet Filled with Acid, 8, PGIII**

<table>
<thead>
<tr>
<th>Industrial</th>
<th>Military</th>
<th>Automotive</th>
<th>Other (SDS required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forklift</td>
<td>Tank</td>
<td>Auto</td>
<td>Please describe below (include the application of battery):</td>
</tr>
<tr>
<td>Telecom</td>
<td>Submarine</td>
<td>Truck</td>
<td></td>
</tr>
<tr>
<td>Absolyte</td>
<td>Missile</td>
<td>Motorcycle</td>
<td></td>
</tr>
<tr>
<td>Industrial Cells</td>
<td>Aircraft</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


| RCRA Waste Codes: D002, D008 |
| CA Waste Codes: 181, 551, 612, 724, 791, 792 |
| Handling Codes | H010, H141 |

**Sealed Cell Lead Acid Batteries**

**UN2800, Batteries, Wet, Non-Spillable, 8, PGIII**

<table>
<thead>
<tr>
<th>Non-Spillable</th>
<th>Other (SDS required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gel Cell</td>
<td>Please describe below (include the application of battery):</td>
</tr>
<tr>
<td>Gates</td>
<td></td>
</tr>
<tr>
<td>Sealed Absolyte</td>
<td></td>
</tr>
</tbody>
</table>


| RCRA Waste Codes: D002, D008 |
| CA Waste Codes: 181, 551, 612, 724, 791, 792 |
| Handling Codes | H010, H141 |

**Dry Cell Alkaline, NiCd, NiMH, Mg, Ag, Hg Batteries**

**Batteries, Dry, Sealed, NOS**

<table>
<thead>
<tr>
<th>Consumer Dry Cell Batteries</th>
<th>Other (SDS required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaline for Disposal</td>
<td>Please describe below (include the application of battery):</td>
</tr>
<tr>
<td>Alkaline for Recycling</td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td></td>
</tr>
<tr>
<td>Nickel Cadmium</td>
<td></td>
</tr>
<tr>
<td>Nickel-Metal Hydride</td>
<td></td>
</tr>
<tr>
<td>Silver-Oxide</td>
<td></td>
</tr>
<tr>
<td>Zinc Carbon</td>
<td></td>
</tr>
</tbody>
</table>


| RCRA Waste Codes: D002, D006, D009, D011 |
| CA Waste Codes: 121, 122, 123, 132, 141, 181, 612 |
| Handling Codes | H141 |
### Exhibit A - Battery Identification and Packaging Guidelines

<table>
<thead>
<tr>
<th>Wet Cell, Nickel Cadmium, Nickel, Zinc Batteries</th>
<th>Other (SDS required)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wet Alkali Batteries</strong></td>
<td>Please describe below (include the application of battery):</td>
</tr>
<tr>
<td>Nickel Iron</td>
<td></td>
</tr>
<tr>
<td>Zinc Carbonaire w/o Mercury</td>
<td></td>
</tr>
<tr>
<td>Zinc Carbonaire w/ Mercury</td>
<td></td>
</tr>
<tr>
<td>Industrial Nickel Cadmium</td>
<td></td>
</tr>
<tr>
<td><strong>UN2795, Batteries, Wet Filled With Alkali, 8, PGII</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sealed Alkali Cell Batteries</th>
<th>Other (SDS required)</th>
<th>Brand/OEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Vehicle Nickel-Metal Hydride</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lithium Ion Batteries (rechargeable)</th>
<th>Other (SDS required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium Cobalt Oxide</td>
<td>Please describe below (include the application of battery):</td>
</tr>
<tr>
<td>Lithium Iron Phosphate</td>
<td></td>
</tr>
<tr>
<td>Lithium Manganese Oxide</td>
<td></td>
</tr>
<tr>
<td>Lithium Nickel Cobalt Aluminum Oxide</td>
<td></td>
</tr>
<tr>
<td>Lithium Nickel Manganese Cobalt Oxide</td>
<td></td>
</tr>
<tr>
<td>Lithium Polymer</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lithium Metal Batteries (non-rechargeable)</th>
<th>Other (SDS required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium Metal Batteries</td>
<td>Please describe below (include the application of battery):</td>
</tr>
<tr>
<td>Lithium Calcium Chromate</td>
<td></td>
</tr>
<tr>
<td>Lithium Iron Disulfide</td>
<td></td>
</tr>
<tr>
<td>Lithium Manganese Dioxide</td>
<td></td>
</tr>
<tr>
<td>Lithium Sulfur Dioxide</td>
<td></td>
</tr>
<tr>
<td>Lithium Sulphuryl Chloride</td>
<td></td>
</tr>
<tr>
<td>Lithium Thiocyanyl Chloride</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40 CFR 273.9 defines Universal Waste Batteries as whole intact batteries, therefore broken, leaking or damaged batteries should be managed as a hazardous waste. 49 CFR 172.101(c)(9) (paraphrased) requires the word waste to precede the shipping name when shipping broken, leaking or damaged batteries. 40 CFR 261.20 (Paraphrased) requires that broken, leaking, or damaged batteries that exhibit a waste characteristic be identified by any and all applicable hazardous waste code(s) as shown below:</td>
<td>W309</td>
<td>G11, G15, G27</td>
<td>40 CFR 261.24 (CCR 66261.24)</td>
<td>D009</td>
<td>40 CFR 261.24 (CCR 66261.24)</td>
<td>D010</td>
</tr>
</tbody>
</table>
Exhibit C – Land Disposal Restriction (LDR) Notification

Pursuant to 40 CFR 268.7, Customer is “notifying Company that under this Material Profile, Service Agreement and LDR I am shipping batteries (non-wastewater) that, when not identified as a universal waste and when identified by the EPA waste numbers and subcategories listed below, are subject to land disposal restrictions and the corresponding treatment standards.”

<table>
<thead>
<tr>
<th>Waste Code</th>
<th>Waste Description and Subcategories</th>
<th>Technology Based Treatment Standard</th>
<th>Numeric Treatment Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>D001</td>
<td>Ignitable Characteristic Solids (Lithium, magnesium batteries only)</td>
<td>DEACT and meet §268.48 standards.</td>
<td></td>
</tr>
<tr>
<td>D002</td>
<td>Corrosive Characteristic (sulfuric acid and potassium hydroxide)</td>
<td>DEACT and meet §268.48 standards.</td>
<td></td>
</tr>
<tr>
<td>D003</td>
<td>Reactive Characteristic Water reactive subcategory based on 261.23 (a) (2) (3) and (4)</td>
<td>DEACT and meet §268.48 standards.</td>
<td></td>
</tr>
<tr>
<td>D004</td>
<td>Arsenic Characteristic</td>
<td></td>
<td>5.0 mg/l TCLP and meet §268.48 standards</td>
</tr>
<tr>
<td>D005</td>
<td>Barium Characteristic</td>
<td></td>
<td>21 mg/l TCLP and meet §268.48 standards</td>
</tr>
<tr>
<td>D006</td>
<td>Cadmium Characteristic</td>
<td></td>
<td>0.11 mg/l TCLP and meet §268.48 standards</td>
</tr>
<tr>
<td>D006</td>
<td>Cadmium Containing Batteries</td>
<td>RTHR</td>
<td></td>
</tr>
<tr>
<td>D007</td>
<td>Chromium Characteristic</td>
<td></td>
<td>0.60 mg/l TCLP and meet §268.48 standards</td>
</tr>
<tr>
<td>D008</td>
<td>Lead Characteristic</td>
<td></td>
<td>0.75 mg/l TCLP and meet §268.48 standards</td>
</tr>
<tr>
<td>D008</td>
<td>Lead Acid Batteries (note this standard only applies to lead acid batteries that are</td>
<td>RLEAD</td>
<td></td>
</tr>
<tr>
<td>Sub Category</td>
<td>identified as RCRA hazardous wastes and that are not excluded from regulations under</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>the land disposal restriction of 40 CFR 268 or exempted under other EPA regulations (see</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 CFR 266.80).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D009</td>
<td>Mercury Characteristic ³260mg/l total Hg (inorganic)</td>
<td>RMERC</td>
<td>0.025 mg/l TCLP and meet §268.48 standards</td>
</tr>
<tr>
<td>D009</td>
<td>Mercury Characteristic ²260 mg/l total Hg (inorganic)</td>
<td></td>
<td>5.7 mg/l TCLP and meet §268.48 standards</td>
</tr>
<tr>
<td>Sub Category</td>
<td></td>
<td></td>
<td>0.14 mg/l TCLP and meet §268.48 standards</td>
</tr>
<tr>
<td>D010</td>
<td>Selenium characteristic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D011</td>
<td>Silver characteristic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All treatment standards listed as expressed in 40 CFR §268.40 for NON-Wastewater’s only.

CA Regulated Waste | Waste Description | Treatment Standard |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-RCRA</td>
<td>Consumer Alkaline Batteries</td>
<td>Are not prohibited from Land disposal per CCR title 22, Division 4.5, Chapter 18 article 3</td>
</tr>
</tbody>
</table>

California regulated waste only.

The material identified by the waste codes listed above do not meet the definition of debris [solid material exceeding a 60 mm particle size that is intended for disposal and that is a: (i) manufactured object; (ii) plant or animal matter; or (iii) natural geological material] because they are not Characteristic wastes intended for disposal.

[Check One] Does the waste listed above contain any underlying hazardous constituents as listed in 40 CFR §268.48?

☐ Yes   ☐ No

If yes, please indicate underlying constituents on next page by circling all that apply.

I certify and warrant that the information that appears on this form and any appended documents is true and correct. I have correctly indicated how my waste is to be managed in accordance with 40 CFR 268. My certification is based on personal examination of the information submitted or is based on inquiries of the individuals responsible for obtaining the information.

Signature ___________________________ Name ___________________________ Title ___________________________ Date __________________
Exhibit C – Land Disposal Restriction Notification: Underlying Constituents (Circle all that Apply)
Regulated Constituent
(organic)
A2213
Acenaphthylene
Acenaphthene
Acetone
Acetonitrile
Acetophenone
2‐Acetylaminofluorene
Acrylamide
Acrylonitrile
Aldicarb Sulfone
Aldrin
Analine
Anthracene
Alpha‐BHC
Beta‐BHC
Delta‐BHC
Gamma‐BHC (lindane)
Barban
Bendiocarb
Bendiocarb phenol
Benomyl
Benzene
Benz (a) anthracene
Benzal chloride
Benzo (b) fluoranthene
Benzo (k) fluoranthene
Benzo (g,h,I) perylene
Benzo (a) pyrene
Bromodichloromethane
Bromomethane / methyl bromide
4‐Bromophenyl phenyl ether
n‐Butyl alcohol
Butylate
Butyl benzyl phthalate
2‐sec‐butyl‐4.6‐dinitrophenol /dinoseb
Carbaryl
Carbenzadim
Carbofuran
Carbofuran phenol
Carbon Disulfide
Chlordane (aloha and gamma isomers)
Carbon tetrachloride
Carbosulfan
p‐Chloroaniline
Chlorobenzene
2‐Chloro‐1,3‐butadiene
Chlorodibromomethane
Chloroethane
bis(2‐Chloroethoxy)methane
bis(2‐Chloroethyl)ether
Chloroform
bis(2‐Chloroisopropyl)ether
p‐Chloro‐m‐cresol
Chloromethane/Methyl chloride
2‐Chloronapthalene
2‐Chlorophenol
3‐Chloropropylene
Chrysene
o‐Cresol
Cresol (m‐ and p‐ isomers)
m‐Cumenyl methylcarbamate
Cyclohexanone

NWW Standard
(mg/kg)
1.4
3.4
3.4
160
1.8
9.7
140
23
84
0.28
0.066
14
3.4
0.066
0.066
0.066
0.066
1.4
1.4
1.4
1.4
10
3.4
6.0
6.8
6.8
6.8
1.8
15
0.11
15
2.6
1.4
2.8
2.5
0.14
1.4
0.14
1.4
4.8mg/l TCLP
0.26
6.0
1.4
16
6.0
0.28
15
6.0
7.2
6.0
6.0
7.2
14
30
5.6
5.7
30
3.4
5.6
5.6
1.4
0.75 mg/l TCLP

Regulated Constituent
(organic)
o,p‐DDD
p,p‐DDD
o,p‐DDE
p,p‐DDE
o,p‐DDT
p,p‐DDT
Dibenz (a.h) anthracene
1,2‐Dibromo‐3‐chloropropane
1,2‐Dibromoethane/Ethylene dibromide
Dibromomethane
m‐Dichlorobenzene
o‐Dichlorobenzene
p‐Dichlorobenzene
Dichlorofluoromethane
1,1‐Dichloroethane
1,2‐Dichloroethane
trans‐1,2‐Dichloroethylene
2,4‐dichlorophenol
2,6‐Dichlorophenol
2,4‐Dichlorophenoxyacetic acid/2,4‐D
1,2‐Dichloropropane
cis‐1,3‐Dichloropropylene
trans‐1,3‐Dichloropropylene
Dieldrin
Diethylene glycol, dicarbamate
Diethyl phthalate
2,4‐Dimethyl phenol
Dimethyl phthalate
Dimetilan
Di‐n‐butyl phthalate
1,4‐Dinitrobenzene
4,6‐Dinitro‐o‐cresol
2,4‐Dinitrophenol
2,4‐Dinitrotoluene
2,6‐Dinitrotoluene
Di‐n‐octyl phthalate
Di‐n‐propylnitrosoanine
1,4‐Dioxane
Diphenylamine
Diphenylnitrosoamine
Disulfoton
Dithiocarbamates (total)
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
EPTC
Ethyl Acetate
Ethyl benzene
Ethyl cyanide/propenitrile
Ethyl ether
bis(2‐Ethylhexyl)phthalate
Ethyl methacrylate
Famphur
Fluoranthene
Fluorene
Flourene
Formetanate hydrochloride
Formparanate
Heptachlor
Heptachlor epoxide

NWW Standard
(mg/kg)
.087
.087
.087
.087
.087
.087
8.2
15
15
15
6.0
6.0
6.0
7.2
6.0
6.0
30
14
14
10
18
18
18
0.13
1.4
28
14
28
1.4
28
2.3
160
160
28
28
28
14
170
13
13
6.2
28
0.066
0.13
0.13
0.13
0.13
1.4
33
10
360
160
28
160
15
3.4
3.4
3.4
1.4
1.4
0.066
0.066

Regulated Constituent
(organic)
Hexachlorobenzene
Hexachloroburadiene
Hexachlorocyclopentadine
HxCDDs (all Hexachlorodibenzo‐p‐dioxans
HxCDFs (all Hexachlorodibenzofurans)
Hexachloroethane
Hexachloropropylene
Indeno (1,2,3‐c,d)pyrene
Iodomethane
Isobutyl alcohol
Isodrin
Isolan
Isosafrol
Kepone
Methacrylonitrile
Methanol
Methapyrilene
Methiocarb
Methomyl
Methoxychlor
3‐Methylcholanthrene
4,4‐methylene bis(2‐chloroaniline)
Methylene Chloride
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl methacrylate
Methyl parathion
Metolcarb
Mexacarbate
Molinate
Napthalene
o‐Nitroaniline
p‐Nitroaniline
Nitrobenzene
5‐Nitro‐o‐toluidine
o‐Nitrophenol
p‐Nitrophenol
N‐Nitrosodiethylamine
N‐Nitrosodimethylamine
N‐Nitroso‐di‐n‐butylamine
N‐Nitrosomethylethylamine
N‐Nitrosomorpholine
N‐Nitrosopiperidine
N‐Nitrosopyrrolidine
Oxamyl
Parathion
Total PCBs (sum of all PCB isomers, or all aroclors)
Pebulate
Pentachlorobenzene
Pentachlorodibenzo‐p‐dioxins
Pentachlorodibenzofurans
Pentachloroethane
Pentachlorobenzene
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
o‐Phenylenediamine
Phorate
Phthalic acid
Phthalic anhydride
Physostigmine

NWW Standard
(mg/kg)
10
5.6
2.4
0.001
0.001
30
30
3.4
65
170
0.066
1.4
2.6
0.13
84
0.75 mg/l TCLP
1.5
1.4
0.14
0.18
15
30
30
36
33
160
4.6
1.4
1.4
1.4
5.6
14
28
14
28
13
29
28
2.3
17
2.3
2.3
35
35
0.28
4.6
10
1.4
10
0.001
0.001
6.0
4.8
7.4
16
5.6
6.2
5.6
4.6
28
28
1.4

Regulated Constituent
(organic)
Physostigmine salicylate
Promecarb
Pronamide
Propham
Propoxur
Prosulfocarb
Pyrene
Pyridine
Safrole
Silvex/2,4,5‐tp
1,2,4,5‐Tetrachlorobenzene
Tetrachlorodibenzo‐p‐dioxins
Tetrachlorodibenzofurans
1,1,1,2‐Tetrachloroethane
1,1,2,2‐Tetrachloroethane
Tetrachloroethylene
2,3,4,6‐Tetrachlorophenol
Thiodicarb
Thiophanate‐methyl
Tirpate
Toluene
Toxaphene
Triallate
Tribromomethane/Bromoform
2,4,6‐Tribromomethane/Bromoform
2,4,6‐Tribromophenol
1,2,4‐Trichlorobenzene
1,1,1‐Trichloroethane
1,1,2‐Trichloroethane
Trichloroethylene
Trichloromonofluoro Methane
2,4,5‐Trichlorophenol
2,4,6‐Trichlorophenol
2,4,5‐Trichlorophenoxyacetic acid/2,4,5‐T
1,2,3‐Trichloropropane
1,1,2‐Trichloro‐1,2,2‐trifluoroethane
Trimethylamine
tris‐(2,3‐Dibromoproyl) phosphate
Vernolate
Vinyl Chloride
Xylenes (sum of o‐,m‐,p‐isomers
Regulated Constituent
(inorganic)
Antimony
Arsenic
Barium
Berylium
Cadmium
Chromium (Total)
Cyanides (Total)
Cyanides (Amenable)
Lead
Mercury (NWW from retort)
Mercury (all others)
Nickel
Selenium
Silver
Thallium
Vanadium
Zinc

NWW Standard
(mg/kg)
1.4
1.4
1.5
1.4
1.4
1.4
8.3
16
22
7.9
14
0.001
0.001
6.0
6.0
6.0
7.4
1.4
1.4
1.4
10
2.6
1.4
15
15
7.4
19
6.0
6.0
6.0
30
7.4
7.4
7.9
30
30
1.5
0.10
1.4
6.0
30
NWW Standard
(mg/l) TCLP
1.15
5.0
21
1.22
0.11
0.60
590
30
0.75
0.20
0.025
11
5.7
0.14
0.20
1.6
4.3

7


# Exhibit D – Additional Location(s)

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<th>Facility Name</th>
<th>Contact</th>
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### Exhibit E – Third Party Generator(s)

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<th>Foreign Entity?</th>
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Reprint page as needed:
Page # ______ of ______
## Material Profile Addendum

### Shipping Information

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<th>Subsidiary Hazard Class</th>
<th>UN/NA Number</th>
<th>PG</th>
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<th>RQ Substance/Waste</th>
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<td>[ ] Yes  [ ] No</td>
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Other Shipping Name

---

### Physical Characteristics

**Color**

- None
- Mild
- Strong

**Odor**

- None
- Mild
- Strong

**Layers**

- Single Phase
- Bi-Layered
- Multi-Layered

**Physical State at 70° Fahrenheit**

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<tr>
<th>Liquid %</th>
<th>Solid %</th>
<th>Sludge %</th>
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<th>Compressed Gas %</th>
<th>Dispersible Solids %</th>
<th>Non-Dispersible Solids %</th>
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**Other Parameters**

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<th>Ash (weight %)</th>
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<th>Open Cup</th>
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**Metals**

- N/A
- None Present
- Less than Regulatory Levels

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<th>ppm</th>
<th>mg/l</th>
<th>mg/kg</th>
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**Chemical Composition**

All Constituents Must be Identified

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<th>Range</th>
<th>Actual</th>
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## Certification

I hereby certify as an authorized representative of the Customer and Generator that the information submitted in this Material Profile Addendum is a true and accurate description of the material(s) to be delivered to Company. Further, I certify that any and all relevant information related to material(s) either known or suspected, including any risks of potential hazards, has been disclosed to Company.

**Signature**

**Name**

**Title**

**Date**
Contingency Plan
Retriev Technologies, Inc.
Lancaster, Ohio

June 22, 2015
Revision 0.3

Submitted to:
Retriev Technologies, Inc.
295 Quarry Road
Lancaster, Ohio 43130

Submitted by:
Cox-Colvin & Associates, Inc.
7750 Corporate Blvd.
Plain City, Ohio 43064
(614) 526-2040
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3.0 Implementation ............................................................................................................. 3-1

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1.0 Introduction

Retriev Technologies, Incorporated (“Retriev”, “facility”, “site”, or “property”) is a permitted hazardous waste facility specializing in the management, reutilization, and recycling of all types of industrial/military, automotive, and household batteries. Battery identification, collection, consolidation, and recycling services are provided to industry, government, and the public. Effective December 21, 2005, Retriev received an Ohio Hazardous Waste Facility Installation and Operation Permit (Permit) that authorized the facility to store hazardous waste in containers as part of its battery recycling operations. All other hazardous waste activities performed by Retriev are exempt or excluded from permitting.

A Contingency Plan was originally prepared as part of Retriev’s 2002 Permit application and has been subsequently modified on several occasions. As part of Retriev’s Permit renewal application, this Contingency Plan has been updated and is an attachment to the renewal application. The purpose of this Contingency Plan is to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water. The provisions of this Contingency Plan will be implemented immediately whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment. A copy of this Contingency Plan will be available at the facility at all times.

1.1 Facility Description

Retriev (owner/operator) is located within an industrial park near the intersection of Quarry Road and Commerce Street in Lancaster, Fairfield County, Ohio. The facility maintains two addresses, which correspond to the main buildings at 265 and 295 Quarry Road. The property is approximately 36.8 acres in size and consists of one parcel (053-50034-00), which is bound by railroad tracks to the north, Quarry Road to the east, Commerce Street to the south, and another facility property to the west (Figures 1-1 and 1-2). Property zoning is heavy industrial. Latitude and longitude of the approximate center of the property is 39.712505, -82.545954.

Within each of the buildings is a permitted storage unit that can be used to store containers for up to one year. The permitted storage unit within the 265 Quarry Road building is identified as the “265 storage unit”. The 265 storage unit consists of four contiguous areas that share perimeter and interior berms (Figure 1-2). For ease of discussion, these four areas are referred to as 265-1, 265-2, 265-3, and 265-4. Several rollover berms are associated with the 265 storage unit to allow forklift access. The total area of the 265 storage unit (measured from perimeter berm centerlines) is approximately 56,709 square feet (sf). A 7,750 sf staging area identified by painted lines is located within 265-4 and is
is included as part of the total area of the 265 storage unit. All waste codes accepted by
the facility can be stored in containers within the 265 storage unit. The secondary
containment system associated with the 265 storage unit allows for the storage of
containers with free liquids. The permitted capacity of the 265 storage unit is 5,800,000
pounds.

The permitted storage unit within the 295 Quarry Road building is identified as the “295
storage unit”. The 295 storage unit consists of an approximate 1,771 sf area of the 295
building concrete floor (Figure 1-2). All waste codes accepted by the facility can be stored
in containers within the 295 storage unit. There is not a secondary containment system
associated with the 295 storage unit; therefore, hazardous wastes containing free liquids
cannot be stored within the 295 storage unit unless appropriate secondary containment is
provided (e.g., spill pallet). The permitted capacity of the 295 storage unit is 200,000
pounds.

Additional detail regarding the permitted storage units and exempt/excluded activities is
presented within the Permit renewal application.

1.2 Floodplain Information

The Retriev property is found on the Flood Insurance Rate Map (FIRM) for Fairfield
County, Panel Number 258 of 425. This FIRM was revised on January 6, 2012, which
identified the Retriev property within Zone AE of the 100-year floodplain. Prior to the
January 6, 2012 revision of the FIRM (including the time in which the initial Permit
application was prepared), the Retriev property was not within the 100-yr floodplain.

As a result of the 2012 revised FIRM, Retriev incorporated applicable flood-related
requirements within their Permit renewal application for the 265 and 295 storage units.
However, based on Retriev’s knowledge of the area surrounding their property, Retriev
believed that the 2012 FIRM was not an accurate representation of the 100-year floodplain.
As such, Retriev contracted EMH&T in 2017 to perform a floodplain study. This study
culminated in the preparation of a Letter of Map Revision (LOMR) that presents a more
accurate representation of the 100-year floodplain and demonstrates that the Retriev
property is not located within the 100-year floodplain. The LOMR was submitted to the
Federal Emergency Management Agency (FEMA). On July 6, 2018, FEMA issued an
updated FIRM Panel Number 258 of 425 with an effective date of November 20, 2018.
The updated 2018 FIRM (Plate 1) indicates that the Retriev property is located within Zone
X (outside of both the 100-year and 500-year floodplains). Therefore, flood-related
requirements are not applicable to Retriev.
2.0 Emergency Coordinators

The Environmental Manager serves as the primary Emergency Coordinator for the facility. When the Environmental Manager is absent, his/her trained alternates assume the duties of the Emergency Coordinator. An Emergency Coordinator will be on site or on call, within a short distance of the facility, at all times. Table 2-1 is a list of the primary and alternate Emergency Coordinators, and includes their address and both office and mobile telephone numbers.

The Emergency Coordinator is thoroughly familiar with all aspects of this Contingency Plan, all operations and activities at the facility, the location and characteristics of waste managed, the location of all records within the facility, and the facility layout. In addition, the Emergency Coordinator (both primary and alternates) has the authority to commit the resources needed to implement this Contingency Plan.

In the event an emergency is declared, as defined by this Contingency Plan, the primary Emergency Coordinator, when on site, assumes direct responsibility for the coordination of all emergency response activities. However, the primary Emergency Coordinator may delegate this authority to an alternate Emergency Coordinator at their discretion. In the absence of the primary Emergency Coordinator, an alternate Emergency Coordinator will assume responsibility. Alternate Emergency Coordinators may be replaced by an Emergency Coordinator higher up on the list in Table 2-1 as they appear on the scene.
3.0 Implementation

This Contingency Plan will be implemented whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents that could threaten human health or the environment. Instances when this Contingency Plan may be implemented include, but are not limited to, the following:

Fire

- any fire that is beyond the employee’s ability to control with a fire extinguisher; whereas a small, incipient fire that is easily, safely, and quickly extinguished would not require implementation of this Contingency Plan
- a fire involving hazardous waste/material in storage, at the point of generation/use, at an accumulation area, or during transfer to/from a vehicle;
- a fire that causes the release of toxic fumes;
- a fire that could possibly spread or has spread to off-site areas; and
- when the use of water or other fire suppressants could result in contaminated runoff.

Explosion

- an explosion that causes or may cause a fire or other hazardous conditions;
- an explosion that causes the release of toxic fumes; and
- an explosion that results in the release of hazardous waste/material.

Spill

- a spill involving hazardous waste/material in storage, at the point of generation/use, at an accumulation area, or during transfer to/from a vehicle that cannot be easily contained by an employee using spill response equipment;
- a spill that could result in the release of a significant quantity of flammable, corrosive, or toxic waste/material;
- a spill that cannot be contained onsite;
- a spill that is contained onsite but has the potential for groundwater contamination; and
- a spill in which the quantity of material spilled exceeds the Reportable Quantity of that material.
If one or more of the above events occur, emergency response procedures in Section 4.0 will be performed.
4.0 Emergency Response Procedures

If a fire, explosion, spill, or injury as described in Section 3.0 occurs, the emergency response procedures in this section will be performed. These emergency response procedures cover notification, identification of hazardous materials, assessment, control, prevention of reoccurrence/spread, storage and treatment of release material, incompatible waste, post-emergency equipment maintenance, and container spills and leakage.

4.1 Notification

Notification of emergency incidents involve both internal and external communication. Internal communication alerts on-site personnel of possible dangers; provides for an ordered shut down of operations in the affected area and work area evacuation, if necessary; and signals appropriate facility personnel to respond to the emergency if capable. External communications serve to summon assistance in responding to the emergency or transporting injured personnel; appraise emergency response agencies/parties of the status of the situation so their resources may be mobilized, if needed; and comply with regulatory reporting responsibilities. The procedures below will be followed in the event of an emergency.

- The first employee to observe an emergency will contact their respective supervisor immediately and state the nature of the emergency. If an immediately life threatening situation occurs, the employee is authorized to activate audible alarms with flashing strobes/beacons by use of the red emergency alarm buttons located at key areas throughout the facility.

- After being notified of the emergency, the supervisor will immediately identify the hazardous materials involved with the emergency and assess possible hazards to human health and the environment. Following identification and assessment, the supervisor will notify the Emergency Coordinator. The identification and assessment may also be performed by the Emergency Coordinator if he/she is already at the emergency area before being notified by the supervisor.

- The Emergency Coordinator will instruct properly trained facility personnel to attempt to contain or control the emergency situation if possible without endangerment. The Emergency Coordinator will also instruct properly trained facility personnel to perform other emergency duties.

- If the emergency involves a fire or explosion that requires implementation of this Contingency Plan, the Emergency Coordinator (or a person delegated by the Emergency Coordinator) will contact the Lancaster Fire Department by calling 911.

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The person calling 911 will remain on the phone until directed to hang up and will provide the following information:

- facility location;
- nature of the emergency (e.g., fire, explosion, injury, etc.);
- number of injured personnel (if applicable/known);
- type or nature of injuries (if applicable/known); and
- volume and source of release (if applicable/known).

- If the emergency is beyond the immediate control of trained facility personnel, the Emergency Coordinator will initiate an evacuation of the affected area, the building, or the entire facility, as appropriate. An evacuation within the facility will be signaled by activating audible alarms with flashing strobes/beacons by use of the red emergency alarm buttons located at key areas throughout the facility. An evacuation route map is provided as Figure 7-1. If the Emergency Coordinator believes that evacuation of local areas beyond the facility property may be advisable, he/she must immediately notify the City of Lancaster Fire Department and the Fairfield County Local Emergency Planning Committee (LEPC) and be available to help decide whether local areas should in fact be evacuated.

- If an injury has occurred related to a fire, explosion, or spill, the associated Supervisor or the Emergency Coordinator will immediately begin compiling all information pertinent to the accident. This includes, but may not be limited to, conditions prior to and at the time of the accident, contributing factors, persons directly and indirectly involved, witnesses and their statements, and what actually occurred at the moment of the accident.

- Whenever there is an emergency situation consisting of imminent or actual harm or hazard to human health or the environment, the Emergency Coordinator must notify the Ohio EPA 24-hour emergency response team at 800-282-9378 and provide the following information:
  - name and telephone number of reporter;
  - name and address of the facility;
  - time and type of incident;
  - name and quantity of material(s) involved;
  - the extent of injuries, if any; and
  - an assessment of the possible hazards to human health or the environment outside the facility.
As appropriate, the Emergency Coordinator will contact other authorities and outside parties for assistance (Table 4-1). Prior to resuming operations in an affected area, the facility will notify the Director of Ohio EPA and local authorities that cleanup procedures (Sections 4.4 and 4.7) and post-emergency equipment maintenance (Section 4.8) have been adequately completed.

### 4.2 Identification of Hazardous Materials

During an emergency, the supervisor of the area in which the emergency occurs or the Emergency Coordinator will immediately identify the character, source, amount, and extent of released materials. The initial identification method will be based on visual inspection of the released material and location of the release. Visual inspection will be supplemented with facility operating records and information in the facility tracking system. The tracking system can provide information about material in a particular location, as well as material which may be located in close proximity to the area involved in the emergency.

In the unlikely event that the source of the material involved in the emergency cannot be determined, a sample of the solid and/or liquid will be collected if conditions are safe. The collected solid will be carefully mixed with water to determine if a reaction occurs. If a reaction does occur, it would suggest material related to lithium-bearing batteries and battery components. The pH of the collected liquid would be measured to allow the type of material to be categorized as acidic or alkaline, which will also allow a determination of whether neutralization is necessary. This testing information will provide the immediate information for emergency control and cleanup actions to commence. Facility personnel will utilize appropriate personnel protective equipment for safe management of the materials involved in the emergency.

The areas/processes at the facility that pose the greatest threat and the associated dangers consist of the following:

- retort operations area in 265 building – explosion and fire;
- lithium ion battery storage in 265 and 295 buildings – fire; and
- wet nickel and lead acid battery breaking areas in 265 building – spill.

### 4.3 Assessment

Concurrent with the identification of the released material discussed in Section 4.2, the supervisor of the area in which the emergency occurs or the Emergency Coordinator will assess possible hazards to human health and the environment that may have resulted due
to a fire, release, or explosion. The supervisor or Emergency Coordinator will follow the steps below to determine the extent of possible hazards:

- identify materials and quantities involved in the incident as well as materials in close proximity (Section 4.2);
- review the safe handling procedures of the materials involved in the incident;
- determine the possible release or exposure pathways by reviewing facility features, topography, meteorological conditions, physical/chemical properties of the material involved, and other appropriate information;
- assess the effects of any toxic, irritating, or asphyxiating gases that may be generated or the effects of any hazardous surface water from run-off or chemical agents that may be used to control fire and heat-induced explosions.

The above assessment will be completed utilizing safety data sheets, regulatory guidance, and additional emergency release information sources such as the United States Department of Transportation Emergency Response Guidebook and the National Institutes of Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards. Based on the assessment of the incident, the supervisor or Emergency Coordinator will determine the following:

- can the appropriately trained facility personnel handle the emergency;
- is outside assistance necessary;
- is a partial or a complete site evacuation necessary;
- is an evacuation of the surrounding area recommended; and
- what are the proper control procedures for the response.

### 4.4 Control Procedures

General control procedures were discussed as part of the notification procedures in Section 4.1. In addition to these general control procedures, the facility will implement specific control procedures in the event of a fire, explosion, release, or flood as summarized below.

#### 4.4.1 Fire or Explosion

If the emergency involves a fire or explosion, regardless of the ability for facility personnel to control the situation, the Emergency Coordinator (or a person delegated by the Emergency Coordinator) will contact the Lancaster Fire Department by calling 911 and
provide the information specified in Section 4.1. The Emergency Coordinator will instruct properly trained facility personnel to attempt to contain or control the fire using a hand-held extinguisher if possible without endangerment. If the automated fire suppression system or fire boxes are activated, a facility alarm is sounded and simultaneously notifies the Lancaster Fire Department. The facility will alert the fire department if an ambulance is also required. The Emergency Coordinator will ensure that the following procedures are followed:

- work in affected areas will be shut down immediately;
- personnel not actively involved in controlling the fire will be evacuated from the area;
- possible sources of ignition in the affected area, including electrical equipment, process equipment, heating, ventilation, air conditioning, and exhaust systems will be shut down;
- nearby material containers will be isolated or removed from the area to prevent further spread of the fire or release, if this can be accomplished safely;
- injured personnel will be treated by qualified medical personnel and taken to a hospital for treatment if needed;
- when the Emergency Coordinator, with the concurrence of the Lancaster Fire Chief, determines that the emergency has been controlled, an all-clear announcement will be made;
- a fire watch will be posted if warranted
- all emergency equipment in the affected area will be cleaned and fit to use before plant operations in the affected area resume (Section 4.8).

### 4.4.2 Release

Batteries and battery components that contain liquid electrolytes are stored and processed in areas that are constructed with passive secondary containment (concrete berms). This ensures that accidental releases will be contained until cleaned up. Spills of small quantities, should they occur, will be cleaned up by using appropriate absorbent materials, pads, or other suitable means. Any absorbent material or pads will then be placed in a drum and managed as a hazardous waste, if appropriate. Large spills (or other circumstance described in Section 3.0) may require the implementation of this Contingency Plan.
In the event of a large spill, the Emergency Coordinator will consider the type of waste, location, and source of the spill, quantity, potential for fire or explosion, direction of flow for a liquid or vapor release, and the potential contamination of environmental media. If the Emergency Coordinator determines that an emergency condition exists, the Lancaster Fire Department and outside contractor will be notified. The Emergency Coordinator will ensure that the following procedures are followed:

- any person who comes in contact with spilled material will wash off the chemical in the emergency showers located throughout the facility operations areas, change clothing, and/or seek outside medical attention to minimize the risk of personal injury in a timely manner;

- work in affected areas will be shut down immediately;

- personnel not actively involved in controlling the release will be evacuated from the area;

- assure that all non-essential (to handle the situation) persons leave the affected area.

- appropriate protective clothing will be worn by facility personnel that are instructed to assist with containing the release;

- if the release contains a flammable substance, all portable sources of ignition within 50 feet will be removed, electricity within the affected area will be turned off (if the incident occurs at darkness, portable lights and a portable generator may be used as appropriate for the emergency situation), and a fire watch will be posted if warranted (it is anticipated that flammable substances will not be present at the facility above reportable quantities);

- if a release should occur outside of, or escapes from, a containment area, it may be necessary to control the movement of the material by creating temporary earthen dikes, applying dry absorbent, closing valves, or trenching to a holding point;

- if the release is due to a leak, an attempt will be made to stop the leak and to minimize the volume of material released by valving, waste transfer, or other appropriate measures;

- large releases contained in sumps or secondary containment will be pumped into an unaffected, compatible waste management unit such as another tank or a tank truck;

- neutralization will be performed as appropriate;
• absorbent materials and appropriate equipment will be used to collect the residual waste liquids that cannot be pumped out; all spent absorbent materials will be collected and managed as hazardous waste, unless determined otherwise;

• when the Emergency Coordinator, with the concurrence of the Lancaster Fire Chief, determines that the emergency has been controlled, an all-clear announcement will be made;

• under the direction of the Emergency Coordinator, all affected structures will be cleaned, if necessary, once the all-clear announcement has been made;

• if a release occurs or migrates outside of a building onto an unpaved surface, the contaminated material will be removed and disposed of properly; shovels and drums for small areas or bulldozers and trucks for large areas will be used as appropriate; after the initial clean-up, the Emergency Coordinator will direct soil sampling and analysis to ensure that all contaminated materials have been removed.

4.5 Prevention of Recurrence/Spread of Fires, Explosions, or Releases

The procedures which have been adopted to prevent a recurrence or spread of fires, explosions, or releases include stopping processes and operations in affected areas, collecting and containing the released waste, removing, and recovering or isolating the waste as described in Sections 4.1 through 4.4 of this Contingency Plan. Additionally relevant procedures to prevent hazards are discussed in Section 5.0 of the Part B application. If the facility stops operations in response to a fire, explosion, or release, the Emergency Coordinator or designee will monitor for leaks, pressure build up, gas generation, or ruptures in valves, pipes, or other equipment whenever appropriate.

4.6 Storage and Treatment of Released Material and Impacted Environmental Media

Once the immediate emergency has been resolved, the Emergency Coordinator will direct the cleanup and disposal of residues, recovered wastes, contaminated soil, standing water, or any other contaminated materials. This cleanup will occur as soon as possible in order
to avoid further contamination or incident recurrence. The material will be considered hazardous unless demonstrated otherwise and will be managed as on-site generated waste or impacted environmental media, as appropriate. Released material, cleanup residues, and impacted environmental media may be analyzed, as necessary, to determine the appropriate management procedures.

The collected material will be stored in tanks or containers that are compatible with the chemical and physical properties of the material. Depending on the volume of material, storage may be within an existing permitted storage unit or other designated location. To the extent possible, the facility will process the material in-house. Any material that cannot be processed by the facility will be transported off site for appropriate management.

4.7 Incompatible Waste

Treatment and storage of incompatible waste will not be permitted in affected areas until cleanup procedures are completed. In addition, the cleanup of the release must be completed before operations may resume in the affected area. If the Emergency Coordinator deems it necessary, wastes or other materials stored in the affected area that present a hazard due to incompatibility will be removed as part of the emergency response effort. This can be accomplished by actions such as pumping “at risk” tank contents to alternate tanks or manually removing “at risk” containers while preventing the combination of incompatible wastes. To determine whether incompatible material is stored in the affected area, the Emergency Coordinator will review known information concerning the waste or material stored in the area, means of containment, physical location, container integrity, and the waste or material involved in the incident. Characteristics such as ignitability, corrosivity, and reactivity will be relevant in assessing potentially incompatible combinations.

4.8 Post-Emergency Equipment Maintenance

All emergency equipment used in response and cleanup efforts will be properly disposed or decontaminated at the end of cleanup operations. Decontamination procedures may include, but may not be limited to, a pressurized water rinse, scrubbing equipment with brushes and water-compatible solvent cleaning solutions, or steam cleaning. The decontamination wastewater along with other materials used for the cleanup or response will be stored in appropriate containers for characterization and management. All emergency equipment and materials used in the response will be inspected, repaired, or replaced, as necessary, and stored in their correct locations prior to resuming operations in the affected area.
4.9 Container Spills and Leakage

Containers that are not in good condition (e.g., structural defects) or are damaged will be managed to prevent or minimize leaks. This may involve repairing the container if possible, repacking or transferring the waste, or overpacking the container. When a container is leaking, action will be taken to contain the spill or release by:

- investigating to see if a closure mechanism is defective or needs tightened;
- adding appropriate absorbent;
- re-orienting the container to reduce the flow to the defective area; and
- repairing the container, if possible.

Applicable labeling and storage requirements of a new container or overpack will followed. Any cleanup material generated will be properly contained and managed. The floor and other affected surfaces will be decontaminated. Decontamination procedures may include, but may not be limited to, a pressurized water rinse, scrubbing with brushes and water-compatible solvent cleaning solutions, or steam cleaning. All emergency equipment and materials used in the response will be inspected, repaired, or replaced, as necessary, and stored in their correct locations prior to resuming operations in the affected area.
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Containers that are not in good condition (e.g., structural defects) or are damaged will be managed to prevent or minimize leaks. This may involve repairing the container if possible, repacking or transferring the waste, or overpacking the container. When a container is leaking, action will be taken to contain the spill or release by:

- investigating to see if a closure mechanism is defective or needs tightened;
- adding appropriate absorbent;
- re-orienting the container to reduce the flow to the defective area; and
- repairing the container, if possible.

Applicable labeling and storage requirements of a new container or overpack will followed. Any cleanup material generated will be properly contained and managed. The floor and other affected surfaces will be decontaminated. Decontamination procedures may include, but may not be limited to, a pressurized water rinse, scrubbing with brushes and water-compatible solvent cleaning solutions, or steam cleaning. All emergency equipment and materials used in the response will be inspected, repaired, or replaced, as necessary, and stored in their correct locations prior to resuming operations in the affected area.
5.0 Emergency Equipment

Emergency equipment and spill recovery materials are available at designated locations throughout the facility. The emergency equipment will be maintained in good working order. Table 5-1 provides a list of emergency equipment and spill recovery materials, as well as the associated specifications/capabilities. Locations of the emergency equipment and spill recovery materials are shown on Figure 5-1. Personnel protective equipment is utilized as part of routine facility operations and is therefore readily available for use during emergency and decontamination efforts. Emergency equipment and spill recovery materials are inspected as identified in Section 5.2 of the Part B application.

Internal and external communications systems and water for fire control are also available to provide immediate emergency information. These systems include the following:

- telephones located throughout the facility capable of making internal and external calls;

- two-way radios for various facility personnel, which may include but may not be limited to, forklift and warehouse operators, breaking technicians, maintenance staff, guards, and managers;

- cellular phones for various facility personnel;

- audible alarms with flashing strobes/beacons that are activated by red emergency alarm buttons located at key areas throughout the facility; and

- fire alarm system that is activated with the building sprinkler system to notify anyone onsite as well as appropriate offsite emergency responders.

The facility is equipped with water at adequate volume and pressure to supply water hose streams and automatic sprinklers. Both the 265 and 295 buildings are equipped with a sprinkler system that is activated by heat melting a fusible link in the sprinkler head. Fire hydrants are installed at strategic locations throughout the facility. The City of Lancaster maintains a 1,000,000-gallon firewater tank located less than two miles from the facility that feeds the facility process and potable water lines. A dedicated service line that feeds the sprinkler systems is also connected to the City main.
6.0 Coordination Agreements

Arrangements have been made with the City of Lancaster Police and Fire Departments, the local hospital (Fairfield Medical Center), and the Fairfield County LEPC to familiarize themselves with various aspects of the facility, including:

- layout of the facility;
- properties of hazardous waste handled at the facility and associated hazards;
- places where facility personnel would normally be working;
- entrances to and roads inside the facility;
- possible evacuation routes; and
- types of injuries or illnesses which could result from fires, explosions, or releases at the facility.

In the event that multiple police departments, fire departments, and/or other agencies assist in an incident at the facility, the City of Lancaster (both fire and police) will have primary authority over other departments, unless they relinquish their authority. The facility will document any refusal of other agencies to enter into a coordination agreement with the facility. This documentation will be maintained in the facility operating record.

The facility also has arrangements with the Ohio EPA emergency response team and various emergency response contractors and equipment suppliers to provide assistance and/or supplies, if necessary, during an incident. Table 4-1 provides a list of outside emergency contacts.
7.0 Evacuation Plan

As discussed in Section 4.1, if the emergency is beyond the immediate control of trained facility personnel, the Emergency Coordinator will initiate an evacuation of the affected area, the building, or the entire facility, as appropriate. An evacuation within the facility will be signaled by activating audible alarms with flashing strobes/beacons by use of the red emergency alarm buttons located at key areas throughout the facility. If the Emergency Coordinator believes that evacuation of local areas beyond the facility property may advisable, he/she must immediately notify City of Lancaster Fire Department and the Fairfield County LEPC and be available to help decide whether local areas should in fact be evacuated.

If evacuation is necessary, the evacuation route identified in Figure 7-1 will be followed to the primary or secondary rally point. If an alternate evacuation route to the primary or secondary rally point is necessary, it will be identified by the Emergency Coordinator or designee. Facility personnel are familiarized through the training program with the facility layout and evacuation procedure. Contractors are made familiar with the evacuation procedures prior to working at the facility. Visitors will either be familiarized with the evacuation procedures when arriving at the facility or will be accompanied by facility personnel.
8.0 Required Reports

The facility will note in the operating record the time, date, and details of any incident that requires implementing the Contingency Plan. Within 15 days after the incident, the facility will submit a written report of the incident to the Director of the Ohio EPA. The report will include:

- name, address, and telephone number of the owner or operator;
- name, address, and telephone number of the facility;
- date, time, and type of incident (e.g., fire, explosion);
- name and quantity of material(s) involved;
- the extent of injuries, if any;
- an assessment of actual or potential hazards to human health or the environment, when applicable;
- estimated quantity and disposition of recovered material that resulted from the incident; and
- any other information Ohio EPA may require.
9.0 Copies of the Contingency Plan

A copy of the Contingency Plan will be maintained at the facility as well as distributed to the following authorities and outside parties:

- City of Lancaster Police Department;
- City of Lancaster Fire Department;
- Fairfield Medical Center
- Fairfield County LEPC; and
- Ohio EPA.
10.0 Amendment of the Contingency Plan

The facility will immediately amend this Contingency Plan when the facility’s Permit is revised and requires a change to the Contingency Plan. The facility will also immediately amend this Contingency Plan if any of the following occur:

- the Contingency Plan fails in an emergency;
- the facility is modified in a way that increases the potential for fires, explosions, or release of hazardous waste or hazardous waste constituents;
- the Director of Ohio EPA requires a change;
- the list of emergency coordinators change; and/or
- the list of emergency equipment changes.
Approximate Location of Portable/Modular Wall for Flood Control,
Retriev Technologies, Inc.,
Lancaster, Ohio
Please Note: Pages of this application which contain facility staff personal/home phone numbers have been removed from this web-available version of the document

To review redacted copies of these removed pages, please contact DERR’s record management staff at (614) 644-2924.

Thank you.
Table 4-1. Outside Emergency Contacts List, Retriev Technologies, Inc., Lancaster, Ohio

<table>
<thead>
<tr>
<th>Organization</th>
<th>Telephone</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Lancaster Fire Department</td>
<td>911 or 740-687-6640</td>
<td>1596 E Main St, Lancaster, Ohio 43130</td>
</tr>
<tr>
<td>City of Lancaster Police Department</td>
<td>911 or 740-687-6688</td>
<td>130 S Broad St, Lancaster, Ohio 43130</td>
</tr>
<tr>
<td>Fairfield Medical Center</td>
<td>911 or 740-687-8000</td>
<td>401 N Ewing St, Lancaster, Ohio 43130</td>
</tr>
<tr>
<td>Ohio EPA Emergency Response</td>
<td>800-282-9378</td>
<td>50 West Town St, Suite 700, Columbus, Ohio 43215</td>
</tr>
<tr>
<td>Ohio EPA Director's Office</td>
<td>614-644-2782</td>
<td>50 West Town St, Suite 700, Columbus, Ohio 43215</td>
</tr>
<tr>
<td>National Response Center</td>
<td>800-424-8802</td>
<td>Ariel Rios Building (5104A), 1200 Pennsylvania Ave NW, Washington DC 20460</td>
</tr>
<tr>
<td>Fairfield County LEPC</td>
<td>740-652-4357</td>
<td>241 West Main St, Suite 100, Lancaster, Ohio 43130</td>
</tr>
<tr>
<td>City of Lancaster Water Pollution Control</td>
<td>740-687-6664</td>
<td>800 Lawrence St, Lancaster, Ohio 43130</td>
</tr>
<tr>
<td>CHEMTREC</td>
<td>1-800-424-9300</td>
<td>1300 Wilson Boulevard, Arlington, VA 22209</td>
</tr>
<tr>
<td>UST Environmental Inc.</td>
<td>740-862-1554</td>
<td>8374 Lancaster-Newark Rd. NE, Baltimore, OH 43105</td>
</tr>
</tbody>
</table>
Table 5-1. Emergency Equipment List, Retriev Technologies, Inc., Lancaster, Ohio

<table>
<thead>
<tr>
<th>Emergency Equipment</th>
<th>Quantity</th>
<th>Specifications/Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorbent materials</td>
<td>10</td>
<td>Contain and collect liquid releases, compatible with acids and caustics</td>
</tr>
<tr>
<td>Brooms and shovels</td>
<td>3</td>
<td>Contain and collect sludge/solid releases</td>
</tr>
<tr>
<td>Caution Tape</td>
<td>3 Rolls</td>
<td>Access control</td>
</tr>
<tr>
<td>Chemical Gloves</td>
<td>5</td>
<td>For spill or releases</td>
</tr>
<tr>
<td>Drum overpacks</td>
<td>2</td>
<td>Contain leaking or damaged drums up to 55-gallons</td>
</tr>
<tr>
<td>Drums</td>
<td>2</td>
<td>Contain or collect liquid, sludge, or solid releases</td>
</tr>
<tr>
<td>Duct Tape</td>
<td>3 Rolls</td>
<td>Secures containers of liquid, sludge, or solids and provides secure seals on PPE</td>
</tr>
<tr>
<td>Eye wash stations</td>
<td>23</td>
<td>Flush chemicals from eyes</td>
</tr>
<tr>
<td>Fire extinguishers</td>
<td>2</td>
<td>Standard Class A, B, C for small fires</td>
</tr>
<tr>
<td>First aid kits</td>
<td>1</td>
<td>Treat minor injuries</td>
</tr>
<tr>
<td>High pressure water sprayer</td>
<td>1</td>
<td>Clean residual contamination</td>
</tr>
<tr>
<td>Nylon rope</td>
<td>1</td>
<td>For rescue or secure of area</td>
</tr>
<tr>
<td>Portable generators</td>
<td>1</td>
<td>Operate emergency equipment or lighting</td>
</tr>
<tr>
<td>Portable lighting</td>
<td>2</td>
<td>Eluminate areas for emergency response</td>
</tr>
<tr>
<td>Portable pumps</td>
<td>2</td>
<td>Contain and collect liquid releases, compatible with acids and caustics</td>
</tr>
<tr>
<td>Portable ventilation fans</td>
<td>1</td>
<td>Ventilate atmosphere near an emergency area</td>
</tr>
<tr>
<td>Rain gear</td>
<td>4</td>
<td>For command post and other necessary personnel assisting</td>
</tr>
<tr>
<td>Safety showers</td>
<td>1</td>
<td>Flush chemicals from skin and clothing</td>
</tr>
<tr>
<td>Safety showers/eyewash combinations</td>
<td>11</td>
<td>Flush chemical from skin and clothing and flush chemicals from eyes</td>
</tr>
<tr>
<td>Sodium bicarbonate/lime</td>
<td>1</td>
<td>Neutralize acids</td>
</tr>
<tr>
<td>Spill response kits</td>
<td>2</td>
<td>Contain or collect liquid, sludge, or solid releases, compatible with acids and caustics; contains goggles or face shield, gloves, face masks or respirators, tyvek coveralls or other full-body synthetic suit, rain gear, boots, absorbent material, non-sparking tools, waste bags and/or waste drums, and cation tape</td>
</tr>
<tr>
<td>Squeegees</td>
<td>2</td>
<td>Contain and collect liquid releases, compatible with acids and caustics</td>
</tr>
<tr>
<td>Telephones</td>
<td>2 Systems</td>
<td>In-plant communication</td>
</tr>
<tr>
<td>2-way radios</td>
<td>4</td>
<td>General instruction or command communication with office or outside</td>
</tr>
</tbody>
</table>

Various types of personnel protective equipment are utilized during routine facility operations and is available for emergency response. Communications and alarm systems are summarized in Section 5.0 of the Contingency Plan and not included in this table.

Refer to Figure 5-1 for locations of select emergency response equipment.

This list of emergency response equipment will be updated whenever there is a key change in availability and type of equipment.

Cox-Colvin Associates, Inc.
RetrievTech Technical Information and Calculations

<table>
<thead>
<tr>
<th>Document Number:</th>
<th>MWD-00055</th>
<th>Rev:</th>
<th>04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author:</td>
<td>C. Lewis</td>
<td>Date:</td>
<td>151209</td>
</tr>
</tbody>
</table>
## Materials and Chemical Compatibility

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Duration of Deployment</th>
<th>Material</th>
<th>Coating</th>
<th>Resistance to H₂SO₄ &lt; 10%</th>
<th>Resistance to KOH &lt; 10%</th>
<th>UV Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-106</td>
<td>Straight MuscleWall, 4' High</td>
<td>Temporary</td>
<td>Low Density Polyethylene</td>
<td>none</td>
<td>Excellent: 30 day constant exposure shows no damage.</td>
<td>Excellent: 30 day constant exposure shows little or no damage.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
<tr>
<td>MW-601</td>
<td>Corner, MuscleWall, 4' High</td>
<td>Temporary</td>
<td>Low Density Polyethylene</td>
<td>none</td>
<td>Excellent: 30 day constant exposure shows no damage.</td>
<td>Excellent: 30 day constant exposure shows little or no damage.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
<tr>
<td>MW-130</td>
<td>Liner, 0.030 Thick PE Woven Sheet</td>
<td>Temporary</td>
<td>Low Density Polyethylene</td>
<td>none</td>
<td>Excellent: 30 day constant exposure shows no damage.</td>
<td>Excellent: 30 day constant exposure shows little or no damage.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
<tr>
<td>MW-503.02</td>
<td>Foam Seal</td>
<td>Temporary</td>
<td>PU-EVA</td>
<td>none</td>
<td>Good. Darkening effect, but intact after 26 weeks exposure.</td>
<td>Good. Darkening effect, but intact after 26 weeks exposure.</td>
<td>Not exposed.</td>
</tr>
<tr>
<td>MW-FC-504.03</td>
<td>Spray Foam</td>
<td>Temporary</td>
<td>Polyurethane</td>
<td>none</td>
<td>Good. Darkening effect, but intact after 26 weeks exposure.</td>
<td>Good. Darkening effect, but intact after 26 weeks exposure.</td>
<td>Not exposed.</td>
</tr>
<tr>
<td>MW-635.01</td>
<td>Back Brace</td>
<td>Temporary</td>
<td>A-36 Steel, Galvanized</td>
<td>Powder Coated</td>
<td>Fair if power coating is intact.</td>
<td>Good if power coating is intact.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
<tr>
<td>92240A715</td>
<td>Bolt, 1/2-13 x 1.5</td>
<td>Temporary</td>
<td>18-8 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>93980A380</td>
<td>Concrete Anchor, 1/2-13 Thread</td>
<td>Permanent</td>
<td>316 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>91950A033</td>
<td>Washer, 1/2&quot;</td>
<td>Temporary</td>
<td>316 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>92240A55</td>
<td>Bolt, 3/8-16 x 1.75</td>
<td>Temporary</td>
<td>18-8 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>93980A570</td>
<td>Concrete Anchor, 3/8-16 Thread</td>
<td>Permanent</td>
<td>316 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>92940A708</td>
<td>Plug Screw, 1/2-13</td>
<td>Permanent</td>
<td>18-8 Stainless Steel</td>
<td>none</td>
<td>Fair.</td>
<td>Excellent. No effect.</td>
<td>Excellent. No effect.</td>
</tr>
<tr>
<td>7505A55</td>
<td>Anchor Epoxy</td>
<td>Permanent</td>
<td>Epoxy</td>
<td>none</td>
<td>Good.</td>
<td>Excellent: 30 day constant exposure shows little or no damage.</td>
<td>Not exposed.</td>
</tr>
<tr>
<td>MW-FC-503.01</td>
<td>Liner Clamp Bar</td>
<td>Temporary</td>
<td>A-36 Steel</td>
<td>Rubber Dipped</td>
<td>Good as long as coating is not compromised.</td>
<td>Excellent as long as coating is not compromised.</td>
<td>Excellent. Withstands in excess of 10 years in full sun.</td>
</tr>
</tbody>
</table>
Leakage Rate from Testing

- Testing of clamp seal was done to determine expected leakage rates.
- Testing was done using a containment with 4 feet of water.
- Water loss was calculated over time by measuring water depth change.
- Initial high rate of change of water level likely due to settling of liner rather than actual water loss.
- After initial stabilization of the system with water, typical leakage rate is 0.3 gal/ wall/ hr.
Set-up Time Estimates

- **Permanent Installation Items**
  - Drill and set anchors
    - 1434 anchors x 3min/anchor = 72 man hours

- **Temporary Installation Items**
  - Assemble walls
    - 174 walls x .5 min/wall x 2 people = 3 man hours
  - Install liner
    - 180 clamp bars x 6min ea = 87.3 man hours
    - 2 inside corners x 30 min = 1 man hour
    - 6 outside corners x 10 min = 1 man hour
    - 6 seams x 15 min = 1.5 man hours
  - Install back braces
    - 174 back braces x 2 min = 5.8 man hours
  - Strap Liner
    - 198 straps x 1 min = 3.3 man hours
  - Total man hours for temporary installation 103 man hours
  - Assumes skid steer or forklift available to bring walls and liner on site
  - Parallel use of labor acceptable to shorten total calendar time
    - 8.5 hrs with 12 person crew
    - 12.9 hrs with 8 person crew
    - 25.7 hours with 4 person crew
Hydrostatic and Hydrodynamic Force Calculations

- From analysis provided by Stone, water velocity inside building 265 would be “less than 1 ft/sec.
- At 36” of water depth, the hydrodynamic force with 1 ft/sec water velocity on each wall is 35 lbf
- The hydrostatic force with 36” water is 1686 lbf
- Total hydraulic forces acting to slide wall: 1721 lbf

\[
\begin{align*}
\rho_{\text{water}} & := 1000 \cdot \frac{\text{kg}}{\text{m}^3} \\
h & := 36 \cdot \text{in} \quad w := 72 \cdot \text{in} \\
P_{\text{wall}} & := \rho_{\text{water}} \cdot g \cdot h \quad P_{\text{wall}} = 1.301 \ \text{psi} \\
A_{\text{wall}} & := w \cdot h \quad A_{\text{wall}} = 1.672 \ \text{m}^2 \\
V_{\text{water}} & := 1 \cdot \frac{\text{ft}}{\text{s}} \\
F_{\text{wall,hd}} & := \rho_{\text{water}} \cdot A_{\text{wall}} \cdot V_{\text{water}}^2 \quad F_{\text{wall,hd}} = 35 \ \text{lbf} \\
F_{\text{wall}} & := \frac{P_{\text{wall}}}{2} \cdot A_{\text{wall}} \quad F_{\text{wall}} = \left(1.686 \cdot 10^3\right) \ \text{lbf}
\end{align*}
\]
Reacting Structure

- One back brace will be placed at the rear of each wall to resist sliding and tipping
- Sliding friction between the wall and set-up surface has been determined empirically
- Liner tension and friction also resist sliding and add additional margin, but are not included in this analysis
Sliding Load Analysis

- One rear brace per wall
  - Each brace is secured 1x ½” concrete anchor secured with epoxy
  - Force shown below is shear force at anchor with wall friction included
  - See separate stamped analysis for anchor capacity
  - Stamped analysis excludes favorable wall friction contribution (more conservative)

\[
\begin{align*}
W_{\text{wall}} &= 110 \cdot \text{lbf} \quad \text{Weight of un-filled 4’ wall} \\
\frac{f_{\text{wall}}}{1400} &= \frac{1100}{W_{\text{wall}}} \quad \text{Friction data from testing} \\
F_{\text{hyd}} &= F_{\text{wall}} + F_{\text{wall, hd}} \quad \text{Hydrostatic load} \\
F_{\text{net}} &= F_{\text{hyd}} - f_{\text{wall}} \\
F_{\text{hyd}} &= (1.72 \cdot 10^3) \text{lbf} \\
F_{\text{net}} &= 1634.052 \text{lbf}
\end{align*}
\]
Tipping Load Analysis

- Assume 1x concrete anchors at back brace
- This analysis uses empirical test data to show the wall has margin against tipping
- Factor of Safety against tipping with 36” water is 5.07
- Independent stamped analysis analyzes back brace for structural strength and yielding

\[
\begin{align*}
W_{wall} &= 110 \text{ lbf} \quad \text{Weight of empty 4' high MuscleWall}

F_{hydrostatic} &= 1686 \text{ lbf}

F_{hydrodynamic} &= 35 \text{ lbf}

R_{brc} &= \frac{(10060 + 2997)}{2} \text{ lbf} \quad \text{Tested strength of 2 back braces on a single 4foot high MuscleWall}

R_{brc} &= 6529 \text{ lbf} \quad \text{Calculate Stabilizing Moment}

M_{stab} &= (W_{wall} \cdot 11.94 \text{ in}) + (R_{brc} \cdot 16 \text{ in})

M_{stab} &= (1.058 \cdot 10^5) \text{ in \cdot lbf} \quad \text{Calculate Tipping Moment}

M_{tip} &= (F_{hydrostatic} \cdot 12 \text{ in} + F_{hydrodynamic} \cdot 18 \text{ in})

M_{tip} &= (2.086 \cdot 10^4) \text{ in \cdot lbf} \quad \text{Factor of safety against tipping}

f_{safety} &= \frac{M_{stab}}{M_{tip}} \quad f_{safety} = 5.07
\end{align*}
\]
Step 1
With forklift unload trailer and strategically place bundles throughout area for deployment.

Step 2
Always remove the upside-down wall first. One person on each side lifts the wall up, freeing the securing pegs, then lowers the wall to a comfortable carrying position.

Step 3
When removing the right-side up wall one person stands on each side, slides the wall to the edge, then lowers the wall to a comfortable carrying position. Dropping the Muscle Wall could cause damage and/or personal injury. Handle with care.

Step 4
One person on each side of the Muscle Wall raises it and rests it on top of the connecting wall until ready to slide into place. Be sure to exercise proper lifting techniques and to keep hands free of the joint while the Muscle Wall is sliding into place.

Step 5
Be sure that the toe of the Muscle Wall is facing the water.

Step 6
If corners are being used, one or two people raise and slide the corner piece into the connecting wall. When using corners two safety straps per connection are required.
Step 7
Once walls are set in place begin filling walls with water using the trash pump. In most situations filling walls half way is all that is necessary.

Step 8
Put safety straps through the Muscle Wall in the closest holes to the joint. Tighten only the top strap for now. The straps need to be fed into the Muscle Wall from the side without the toe.
Clamp Bar Option

- When dealing with liner always exercise extreme caution to avoid ripping, tearing, or puncturing the liner in any way.
- Exercise extreme caution anytime holes are being cut in the liner.

**Step 1**
Spray a layer of foam adhesive on the ground in front of the toe of the Muscle Wall.

**Step 2**
Lay the flat foam on top of the adhesive along the entire length of your wall.

**Step 3**
Unroll and unfold the liner over the wall so the edge of the liner in front of the wall ends where your foam is laid.

**Step 4**
Fold back the edge of the liner, spray another layer of foam adhesive on top of the flat foam, and then replace the liner so it is sealed to the foam.
Step 5
Lay the clamp bar over the liner and the foam beneath the liner.

Step 6
Secure the clamp bar by installing the recommended bolts and washers.

Step 7
Place the 4 foot Muscle Wall brace over the wall and ensure that the brace connects to the back of the wall as pictured above.

Step 8
Secure the 4 foot Muscle Wall brace by installing the recommended bolts and washers.

Step 9
If seaming of the liner is required, run a line of seaming tape along the seam and then an additional line on each side of your initial line.

Step 10
Put another strip of seaming tape perpendicular to your seam approximately every six inches.
Step 1
Disconnect straps, roll up, and place in a storage container. Remove liner from the wall and fold for future installations. Properly dispose of any contaminated sand and/or sand bags.

Step 2
If foam was used to secure the liner to asphalt, scrape up as much of the foam as you can, sweep up, and dispose of.

Step 3
If foam was used to secure the liner to asphalt, use a pressure washer to clean up the rest of the residue from the foam.

Step 4
Empty the Muscle Wall by using the bung wrench to unscrew the bung plugs on the backside of each wall. Place bung plugs in a secure location where they won’t be lost or broken. The trash pump can also be used to pump the water out of the walls.

Step 5
Disconnect each Muscle Wall. One person on each side lifts the wall up until the wall is free of its connection.

Step 6
Stack the walls together in the same fashion as they were shipped. Turn one of the walls upside down and lay it on another wall ensuring that the pegs on top of each Muscle Wall are secured into the holes on the toe of the other wall.
Step 7
Stack the Muscle Wall back on their original pallets in the same fashion as they were shipped. Ensure that all of the male ends of the walls are on the same side. Run a safety strap all the way around the bundle securing it to the pallet. Transport to storage location.
### NOTES:

1. DESIGN IS FOR MAX HEIGHT OF 3 FEET OF WATER WITH HYDRODYNAMIC PRESSURE NOT TO EXCEED 1 FPS. FOR ADDITIONAL ASSEMBLY INFORMATION, REFER TO THE FOLLOWING MUSCLEWALL STANDARD OPERATING PROCEDURES (SOP’S):
   a. 4ft Wall Deployment - Flood Control
   b. 4ft Wall Takedown - Flood Control
   c. Liner Deployment - Flood Control - Clamp Bar Option

### Table

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>QTY.</th>
<th>PART NO.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>174</td>
<td>MW-106</td>
<td>4 FOOT WALL, STRAIGHT FEET</td>
</tr>
<tr>
<td>2</td>
<td>1100</td>
<td>MW-503.02</td>
<td>FOAM, SEAL</td>
</tr>
<tr>
<td>3</td>
<td>182</td>
<td>MW-635.01</td>
<td>BACK BRACE</td>
</tr>
<tr>
<td>4</td>
<td>182</td>
<td>92240A715</td>
<td>CAP SCREW, 1/2-13 X 1.5</td>
</tr>
<tr>
<td>5</td>
<td>182</td>
<td>91950A033</td>
<td>WASHER, 1/2&quot;</td>
</tr>
<tr>
<td>6</td>
<td>182</td>
<td>MW-902</td>
<td>CONCRETE ANCHOR, 1/2&quot;</td>
</tr>
<tr>
<td>7</td>
<td>180</td>
<td>MW-FC-503.01.R01</td>
<td>6 FOOT CLAMP</td>
</tr>
<tr>
<td>8</td>
<td>1260</td>
<td>92240A630</td>
<td>CAP SCREW, 3/8-16 X 1.75</td>
</tr>
<tr>
<td>9</td>
<td>1260</td>
<td>91950A031</td>
<td>WASHER, 3/8&quot;</td>
</tr>
<tr>
<td>10</td>
<td>1260</td>
<td>MW-901</td>
<td>CONCRETE ANCHOR, 3/8&quot;</td>
</tr>
<tr>
<td>11</td>
<td>9</td>
<td>MW-601_02</td>
<td>FOUR FOOT CORNER</td>
</tr>
<tr>
<td>12</td>
<td>198</td>
<td>MW-800.01</td>
<td>2&quot; RATCHET STRAP</td>
</tr>
<tr>
<td>13</td>
<td>59</td>
<td>MW-903</td>
<td>EPOXY</td>
</tr>
<tr>
<td>14</td>
<td>5</td>
<td>MW-130</td>
<td>LINER WOVEN PE .030, 250 FT</td>
</tr>
<tr>
<td>15</td>
<td>1260</td>
<td>92949A614</td>
<td>SOCKET HEAD CAP SCREW</td>
</tr>
<tr>
<td>16</td>
<td>174</td>
<td>92949A708</td>
<td>SOCKET HEAD CAP SCREW</td>
</tr>
<tr>
<td>17</td>
<td>58</td>
<td>MW-FC-504.03</td>
<td>CAN, SPRAY FOAM</td>
</tr>
<tr>
<td>18</td>
<td>2</td>
<td>MW-132</td>
<td>INSERT, INSIDE CORNER</td>
</tr>
<tr>
<td>19</td>
<td>2</td>
<td>MW-131</td>
<td>LINER TAPE, 100FT ROLL</td>
</tr>
</tbody>
</table>

**UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES**

**TOLERANCES ARE:**

- FRACTIONS   DECIMALS ANGLES
- X.X ± 0.2 IN  X.X ± 0.020 IN  X.X ± 0.5
- X.XXX ± 0.005 IN  X.XXX ± 0.1

**MATERIAL:** SEE BOM

**DO NOT SCALE DRAWING**

**FLOOD AND CONTAINMENT SOLUTIONS**

**SITE DRAWING, RETRIEVTech**

**MUSCLEWALL®**

**PROPRIETARY**

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Stamp by Ben Jennings is limited to the anchor bolt design to concrete with the assumption that concrete is 4,000 psi compressive strength. All other wall components are by others and this seal in no way represents that those elements were designed or reviewed by us.
NOTES:
2. BOND ALL CONCRETE ANCHORS IN PLACE WITH ITEM NUMBER 15. FOLLOW ALL MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION OF INSERT USING EPOXY. PROVIDE CONTINUOUS INSPECTION BY SPECIAL INSPECTOR DURING INSTALLATION OF EPOXY. ANCHORS TO BE INSTALLED IN COMPETENT UN-CRACKED CONCRETE WITH COMPRESSIVE STRENGTH OF AT LEAST 4000 PSI. ADDITIONALLY, ANCHORS AND SURROUNDING CONCRETE SHOULD BE INSPECTED ANNUALLY FOR SIGNS OF DEGRADED STRENGTH.
3. USE HOLE NEAREST WALL. DO NOT USE SECOND HOLE.

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NOTES:

4. INSTALL STRAPS AND TIGHTEN RATCHETS BEFORE INSTALLING LINER.
5. TYPICAL HOLE SPACING FOR LINER CLAMP BAR.
**NOTES:**

6. KEEP DEBRIS PLUG SCREWS IN PLACE WHENEVER MUSCLEWALL SYSTEM IS NOT DEPLOYED TO MINIMIZE DEBRIS ENTRY INTO ANCHOR HOLES.

7. CONCRETE SLAB THICKNESS MUST BE AT LEAST 5 INCHES THICK FOR ANCHOR INSTALLATION.

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8. WHEN APPLYING LINER SEAM TAPE IN TEMPERATURES LESS THAN 60 F, USE HEAT GUN TO ACTIVATE ADHESIVE FOR BEST BOND. USE CAUTION TO AVOID MELTING ANY LINER MATERIAL.

9. FOR INLINE SEAMS AT THE END OF A ROLL OF LINER, OVERLAP LINER FROM NEW ROLL OVER EXISTING INSTALLED LINER BY 5’. TAPE NEW LINER TO THE BACK OF EXISTING LINER 5’ FROM THE END OF THE EXISTING LINER. THEN BEGIN INSTALLING NEW LINER. ONCE THE NEW LINER IS INSTALLED ON THE WALL, APPLY TAPE TO OUTSIDE SEAM WHERE OLD LINER ENDS. ENSURE THAT SEAM LAYS FLAT AND IS FREE FROM PLEATS THAT COULD CREATE LEAK PATHS.

10. FOR INSIDE CORNERS, A SEPARATE INSERT IS REQUIRED. INSTALL STRAIGHT SECTIONS OF LINER INTO CORNER. CUT LINER APPROXIMATELY 6” FROM CORNER. INSTALL CORNER INSERT OVER LINER AND TAPE SEAMS. ENSURE THAT NO PLEATS EXIST THAT COULD CREATE LEAK PATHS. INSTALL CLAMP BAR OVER LINER AND CORNER INSERT MATERIAL.

11. FOR OUTSIDE CORNERS, NO SEPARATE INSERT PIECE IS REQUIRED. MAINTAIN LEADING EDGE OF LINER AT CLAMP BAR PUCKER AND PLEAT FREE. EXCESS LINER MATERIAL LAYING OVER THE WALL WILL BE PLEATED. ENSURE PLEATS DO CONTINUE TO AND COMPROMISE SEAL IN CLAMP BAR REGION.
These calculations were prepared solely for the client and project listed on the cover sheet. They shall not be copied or used for the benefit of any other party or project.
Narrative:
This calculation package has been prepared to show that the steel pipe brace and the concrete anchors can support a 3 ft tall flood load with minor dynamic loading. The muscle wall itself is not part of the scope of this calculation package. The loads are defined below.

\[ \rho_{\text{water}} := 1000 \, \frac{kg}{m^3} \]

\[ h := 36 \, \text{in} \quad \text{Water height acting against wall} \]

\[ w := 72 \, \text{in} \quad \text{Steel brace to brace spacing} \]

\[ P_{\text{wall}} := \rho_{\text{water}} \cdot g \cdot h = 1.3 \, \text{psi} \]

\[ A_{\text{wall}} := w \cdot h = 18 \, \text{ft}^2 \]

\[ V_{\text{water}} := 1 \cdot \frac{ft}{s} \quad \text{Calculation of flow and dynamic water force has been provided by others. Verify dynamic force meets design requirements.} \]

\[ F_{\text{wall,hd}} := \rho_{\text{water}} \cdot A_{\text{wall}} \cdot V_{\text{water}}^2 = 34.9 \, \text{lbf} \quad \text{Static Force from dynamic flow acting on Wall at 18'' from ground surface} \]

\[ F_{\text{wall}} := \frac{P_{\text{wall}}}{2} \cdot A_{\text{wall}} = 1685.6 \, \text{lbf} \quad \text{Static Force from stationary water acting on Wall at 12'' from ground surface} \]

Wall distributes the forces described above to each brace as shown in Figure 1.

![Free Body Diagram](image-url)
Wall Brace Calculations, Using ASCE 7-10 as the design guideline.

Distribute Resultant Water Loads to Steel Brace (approximately a simple beam)

Brace is placed at 6 ft o.c. maximum, 3/4" Dia. A53 Grade B Steel Pipe

\[ RxnTop := \frac{1}{3} \cdot 1686 \text{ lbf} + \frac{1}{2} \cdot 35 \text{ lbf} = 580 \text{ lbf} \]

\[ RxnBtm := \frac{2}{3} \cdot 1686 \text{ lbf} + \frac{1}{2} \cdot 35 \text{ lbf} = 1142 \text{ lbf} \]

Brace is Analysed in RISA-3D Structural Software (See Next Pages)

Brace is sufficient for forces placed on it as described above.
See appendix for RISA-3D analysis specifics
Muscle Wall Brace

Loads: BLC 1, Lateral Load

-1.142k
-0.58k

SK - 2
Dec 8, 2015 at 12:13 PM
Muscle Wall Actual Shape.R3D
# Hot Rolled Steel Properties

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# Joint Loads and Enforced Displacements (BLC 1 : Lateral Load)

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# Load Combination Design

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### Member AISC 14th(360-10): LRFD Steel Code Checks

| LC | Member | Shape | UC Max | Loc[ft] | Shear[ft] | Dir|phi|Pn| phi|Mn| phi|Mn| Cb | Eqn |
|----|--------|-------|--------|---------|----------|----|-----|----|------|----|------|----|-----|----|----|
| 1  | 1      | M1    | PIPE .75 | 1.027 | 0 .275 | 2.45 | 6.514 | 9.828 | .247 | .247 | 2.245 | H1-1b |
| 2  | 1      | M2    | PIPE .75 | .099  | 0 .002 | 0    | 7.369 | 9.828 | .247 | .247 | 1.311 | H1-1b |
| 3  | 1      | M3    | PIPE .75 | .345  | 0 .032 | 0    | 8.453 | 9.828 | .247 | .247 | 2.241 | H1-1b |
| 4  | 1      | M4    | PIPE .75 | .296  | 0 .009 | 0    | 8.525 | 9.828 | .247 | .247 | 1.293 | H1-1b |
| 5  | 1      | M5    | PIPE .75 | .621  | .32   | .181 | 9.762 | 9.828 | .247 | .247 | 1.927 | H1-1b |
| 6  | 1      | M6    | PIPE .75 | .642  | 0 .048 | 0    | 7.703 | 9.828 | .247 | .247 | 2.254 | H1-1b |
| 7  | 1      | M7    | PIPE .75 | 1.045 | 2.094 | .063 | 7.368 | 9.828 | .247 | .247 | 2.197 | H1-1b |
| 8  | 1      | M8    | PIPE .75 | 1.025 | 0 .128 | 0    | 9.814 | 9.828 | .247 | .247 | 1.101 | H1-1b |
| 9  | 1      | M9    | PIPE .75 | .785  | 0 .280 | 0    | 9.819 | 9.828 | .247 | .247 | 1.274 | H1-1b |
| 10 | 1      | M10   | PIPE .75 | .359  | 0 .351 | 0    | 9.819 | 9.828 | .247 | .247 | 2.157 | H1-1b |
| 11 | 1      | M11   | PIPE .75 | .684  | .128  | .348 | 9.817 | 9.828 | .247 | .247 | 1.461 | H1-1b |
| 12 | 1      | M12   | PIPE .75 | 1.022 | .092  | .292 | 9.823 | 9.828 | .247 | .247 | 1.148 | H1-1b |
| 13 | 1      | M13   | PIPE .75 | .634  | 0 .263 | 0    | 9.821 | 9.828 | .247 | .247 | 1.277 | H1-1b |
| 14 | 1      | M14   | PIPE .75 | .000  | 0 .000 | 0    | 9.216 | 9.828 | .247 | .247 | 1 | H1-1b |

### Joint Reactions

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RISA-3D Version 14.0.0 [X:\....\2015\15241 Muscle Wall\Calcs\Muscle Wall Actual Shape.R3D]
### Joint Reactions

**(ASD Reactions)**

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<td>COG (ft):</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COG (ft):** NC   NC   NC
Wall Brace Calculations

Concrete Anchor Design, Using ACI 318-11 Appendix D as the design guideline

\[ \text{Uplift} := 1323 \text{ lbf} \]  
\[ \text{Shear} := 2411 \text{ lbf} \]  
(LRFD) Reaction at concrete anchor after placing the forces on the brace from RISA-3D

(LRFD) Reactions at concrete anchor after placing the forces on the brace from RISA-3D

Use Wej-it POWER-Sert Adhesive Insert Anchors, Size 1/2"-13 grade A316 Stainless Steel, In 4,000 psi concrete minimum, Using Inject-TITE AWF Epoxy.  
*Special Inspection Required.

ACI 318-11 Appendix D Anchor Calculations For Adhesive Anchor in Tension and Shear

D.5.2.2 Concrete Breakout Tension Design

Design is for an anchor that does not have edge effects and is at least 6 inches from a concrete edge

\[ h_{ef} := 4 \text{ in} \]  
\[ f'_{c} := 4000 \text{ psi} \]  
Embedment

Minimum concrete compressive strength

\[ A_{Nco} := 9 \cdot h_{ef}^2 = 144 \text{ in}^2 \]  
\[ k_e := 17 \]  
\[ A_{Nc} := A_{Nco} = 144 \text{ in}^2 \]  
For post installed anchors

\[ \psi_{c} := 1.4 \]  
\[ N_b := k_e \cdot \sqrt{f'_{c} \cdot h_{ef}^{1.5} \cdot \sqrt{\frac{psi}{in} \cdot \frac{in}{in}}} = 8601.4 \text{ lbf} \]  
D.5.2.2 Concrete Breakout Eqn.

\[ N_{eb} := \frac{A_{Nc}}{A_{Nco}} \cdot \psi_{c} \cdot N_b = 12042 \text{ lbf} \]  
\[ \phi := 0.65 \]  
\[ \phi \cdot N_{eb} = 7827.3 \text{ lbf} \]  
Phi factor, See D.4.3

Uncracked Concrete Tension Capacity
Concrete Anchor Design (Continued)

D.5.5.2 Adhesive Bond Tension Design

Design is for an anchor that does not have edge effects and is at least 4 inches from a concrete edge

\[ d_a := 0.5 \text{ in} \quad \tau_{uncr.} := 650 \text{ psi} \]

Uncracked Concrete Design

\[ c_{Na} := 10 \cdot d_a \cdot \sqrt{\frac{\tau_{uncr.}}{1100 \text{ psi}}} = 3.8 \text{ in} \]

Minimum Edge Distance

\[ A_{Nao} := (2 \cdot c_{Na})^2 = 59.1 \text{ in}^2 \]

\[ A_N := A_{Nao} = 59.1 \text{ in}^2 \]

Single Anchor Design

\[ N_{ba} := \tau_{uncr} \cdot \pi \cdot d_a \cdot h_{ef} = 4084.1 \text{ lbf} \]

D.5.5.2 Adhesive Bond

\[ N_a := \frac{A_N}{A_{Nao}} \cdot N_{ba} = 4084.1 \text{ lbf} \]

\[ \phi := 0.65 \]

Phi factor, See Section D.4.3

\[ \phi \cdot N_a = 2654.6 \text{ lbf} \]

Uncracked Concrete Tension Capacity

\[ TensionCapacity := \min (\phi \cdot N_a, \phi \cdot N_{cb}) = 2654.6 \text{ lbf} \]

D.6.2 Concrete Breakout Shear Design

Design is for an anchor that does not have edge effects and is at least 6 inches from a concrete edge

\[ h_a := 5 \text{ in} \]

Concrete Thickness

\[ c_{a1} := 1.5 \cdot h_{ef} = 6 \text{ in} \]

\[ A_{Vco} := 4.5 \cdot (c_{a1})^2 = 162 \text{ in}^2 \]

\[ A_V := A_{Vco} = 162 \text{ in}^2 \]

\[ l_e := h_{ef} = 4 \text{ in} \]
Concrete Anchor Design (Continued)

\[ V_{b1} := \left( 7 \cdot \left( \frac{l_e}{d_a} \right)^{0.2} \cdot \sqrt{d_a} \right) \cdot \sqrt{f'_c} \cdot \sqrt{\psi} \cdot \left( c_{a1} \right)^{1.5} = 6973.6 \text{ lbf} \quad \text{Eqn. D-33} \]

\[ V_{b2} := 9 \cdot \sqrt{f'_c} \cdot \sqrt{\frac{lbf}{in}} \cdot \left( c_{a1} \right)^{1.5} = 8365.6 \text{ lbf} \quad \text{Eqn. D-34} \]

\[ V_b := \min (V_{b1}, V_{b2}) = 6973.6 \text{ lbf} \]

\[ \psi_h := \sqrt{\frac{1.5 \cdot c_{a1}}{h_a}} = 1.3 \]

\[ V_{eb} := \frac{A_{Vc}}{A_{Vco}} \cdot \psi_c \cdot V_b = 9763.1 \text{ lbf} \]

\[ \phi := 0.65 \quad \text{Phi factor, See Section D.4.3} \]

\[ \phi \cdot V_{eb} = 6346 \text{ lbf} \quad \text{Uncracked Concrete Shear Capacity} \]

D.6.2 Concrete Pryout Shear Design

Design is for an anchor that does not have edge effects and is at least 6 inches from a concrete edge.

\[ k_{cp} := 2.0 \quad \text{Where \( hef > 2.5 \text{ in} \), \( k_{cp} = 2.0 \)} \]

\[ N_{cp} := \min (N_a, N_{cb}) = 4084.1 \text{ lbf} \]

\[ V_{cp} := k_{cp} \cdot N_{cp} = 8168.1 \text{ lbf} \]

\[ \phi := 0.65 \]

\[ \phi \cdot V_{cp} = 5309.3 \text{ lbf} \quad \text{Uncracked Concrete Shear Capacity} \]

\[ \text{ShearCapacity} := \min (\phi \cdot V_{eb}, \phi \cdot V_{cp}) = 5309.3 \text{ lbf} \]
Concrete Anchor Design (Continued)

Combined Tension and Shear Loading of The Anchor, Section D.7.3

\[ ShearCapacity = 5309.3 \text{ lbf} \]

\[ Shear = 2411 \text{ lbf} \]

\[ TensionCapacity = 2654.6 \text{ lbf} \]

\[ Uplift = 1323 \text{ lbf} \]

\[ Unity := \frac{Uplift}{TensionCapacity} + \frac{Shear}{ShearCapacity} = 0.95 \]

\[ \text{if}(Unity > 1.2, \text{“No Good”, “OK”}) = \text{“OK”} \]

Therefore install 1/2" diameter POWER-Sert Adhesive Anchor Insert that will accept a bolt using Inject-TITE AWF Epoxy.

Flood load cannot be a sustained load over more than a few months

Minimum Anchor Edge Distance required by ACI 318-11 appendix D for adhesive anchors is 8 inches

Special Inspection Required for adhesive (epoxy) anchor installation
Bar Moment Capacity
AISC 360-10 Chapter F, Section 11 (ASD)

Rectangular Bar Moment

For the plate at the base of the pipe frame brace

From the tension reaction we get the design moment below

\[ 943 \text{ lbs} \times 1 \text{ in} = 943 \text{ lb in} \]

\[ M_u = 943 \text{ lb in} \]

Width of the plate to bend is 5.5 inches

\[ b = 5.5 \text{ in} \]

Depth of the plate to bend is 0.1825 inches

\[ h = 0.1825 \text{ in} \]

\[ L_b = 4 \text{ in} \]

\[ E = 29000 \text{ ksi} \]

\[ F_y = 36 \text{ ksi} \]

\[ C_b = 1 \]

\[ S = 0.030530729 \text{ in}^3 \]

\[ Z = 0.045796094 \text{ in}^3 \]

\[ \Omega = 1.67 \]

Yielding

\[ M_{yu} \text{ (lb in)} = 1,648.66 \text{ lb in} \quad \text{Eqn. F11-1} \]

Yielding Controls

LTB

\[ M_u \text{ (lb in)} = \text{LTB Does Not Apply \ lb in} \quad \text{Eqn. F11-2} \]

\[ F_{cr} \text{ (lb)} = 2,283,253,425 \text{ lb} \quad \text{Eqn. F11-4} \]

\[ M_{yu} \text{ (lb in)} = \text{NA \ lb in} \quad \text{Eqn. F11-3} \]

\[ M_u/\Omega \text{ (lb in)} = 987.22 \text{ lb in} \quad \text{ok} \]

Therefore the plate is sufficiently thick

*this calculation is for one way bending
but in fact there is two way bending occurring
and the calculation is conservative.
APPENDIX

POWER-Sert Performance Data
Description
The POWER-Sert Adhesive Anchor is a proprietary internally threaded insert designed for use with structural adhesive. Our unique **undercut design requires less adhesive and a shallow embedment** while providing superior holding values in a variety of materials. Our exclusive **FRICTION-FIT™** locks adhesive in place and allows immediate fastening of the fixture during cure time*. The POWER-Sert adhesive insert anchor is the ultimate problem solver!

**Key Features & Benefits**
- Machine lathed from a single piece of steel or stainless steel – no weak points
- Unique undercut design with knurling provides superior holding values
- Slightly larger bottom lobe creates a keying effect at the deepest anchor point
- Exclusive **FRICTION-FIT™** allows immediate fastening of fixture while adhesive cures*
- No need to move equipment or fixtures to be fastened - ideal for in-place use**
- Easy installation - no special tools required
- Close edge distance and spacing
- Shallow embedment
  - Helps avoid rebar and drill-through
  - Adhesive bond and shallow embedment minimize effects of cone failure
- Vibration-resistant – adhesive bond withstands more seismic vibration loading than most standard mechanical anchors
- Acceptable materials
  - Normal Weight Concrete
  - Light Weight Concrete
  - Solid Masonry

**Applications**
- Car Lifts
- Pallet Racking
- Guard Rails
- Machine Anchoring
- Marine Applications
- Bridge Work

**Specifications, Listings and Approvals**

**Anchor Thread Diameters:** 1/4” - 1”

**Materials:**
- Zinc Plated Carbon Steel
  - AISI C1020 Carbon Steel
  - ASTM B633 Type III, SC1
- Type 304 and 316 Stainless Steel

**NOTES:**
* FRICTION-FIT™ without full adhesive cure is for light-duty temporary holding only and produces far less than advertised ultimate holding values.
** Pre-drilled hole in fixture must be large enough to accommodate correct size of carbide-drill bit.

**WARNING:** NSTB safety recommendations prohibit the use of adhesive anchors in sustained overhead load anchoring applications.
Installation Information

Instructions

1. Select the proper size drill bit from the estimating guide. Drill the hole perpendicular to the work surface. To assure full holding power, do not ream the hole or allow the drill to wobble.

2. Thoroughly clean hole with oil-free compressed air and a stiff nylon or wire brush. Repeat cleaning process 3 times. Dust and debris left in hole will significantly reduce the holding capacity of the anchor.

3. Inject Inject-TITE Adhesive into hole to approximately 1/3 to half full. Fill from bottom of hole up.

4. Choose a bolt equal in length to the thread depth plus the material depth. Thread bolt into POWER-Sert anchor so that offset is equal to the thickness of material to be fastened. Insert POWER-Sert anchor into hole with slight twisting motion.

5. Drive anchor home with several sharp hammer blows to the head of the nut.

6. Allow epoxy to cure prior to applying maximum load.

NOTE: Always wear safety glasses. Follow the drill manufacturer’s safety instructions. Use only solid carbide-tipped drill bits meeting ANSI B212.15 diameter standards.

Installation Data

<table>
<thead>
<tr>
<th>Thread Size (UNC)</th>
<th>Drill Bit Dia. (in.)</th>
<th>Anchor Size (in.)</th>
<th>Thread Depth (in.)</th>
<th>Min. Hole Depth (in.)</th>
<th>Estimated Anchors Per Adhesive Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.5/9.3oz Cartridge</td>
</tr>
<tr>
<td>1/4 –20</td>
<td>5/16</td>
<td>5/6 x 1-9/16</td>
<td>1/2</td>
<td>1-3/4</td>
<td>165 463 590</td>
</tr>
<tr>
<td>3/8 –16</td>
<td>1/2</td>
<td>1/2 x 2-3/4</td>
<td>1</td>
<td>3-1/4</td>
<td>32 86 110</td>
</tr>
<tr>
<td>1/2 – 13</td>
<td>5/8</td>
<td>5/8 x 3-11/16</td>
<td>1</td>
<td>4-1/8</td>
<td>19 51 64</td>
</tr>
<tr>
<td>5/8 – 11</td>
<td>7/8</td>
<td>7/8 x 5-3/14</td>
<td>1-1/2</td>
<td>6-1/4</td>
<td>6 17 22</td>
</tr>
<tr>
<td>3/4 – 10</td>
<td>1</td>
<td>1 x 6/12</td>
<td>1-1/2</td>
<td>7-1/2</td>
<td>5 11 14</td>
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<tr>
<td>1 – 8</td>
<td>1-1/2</td>
<td>1-1/2 x 8-1/2</td>
<td>2</td>
<td>9-1/2</td>
<td>2 4 5</td>
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Cure Times

<table>
<thead>
<tr>
<th>Minimum Substrate Temp.</th>
<th>Cure Time</th>
<th>Minimum Cure Time</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>AWF</td>
<td>Standard Set</td>
</tr>
<tr>
<td>-15F (-26C)</td>
<td>36 hrs</td>
<td>AWF</td>
</tr>
<tr>
<td>0F (-18C)</td>
<td>24 hrs</td>
<td>AWF</td>
</tr>
<tr>
<td>40F (5C)</td>
<td>90 min</td>
<td>FS</td>
</tr>
<tr>
<td>65F (18C)</td>
<td>45 min</td>
<td>48 hrs</td>
</tr>
<tr>
<td>70F (21C)</td>
<td>35 min</td>
<td>36 hrs</td>
</tr>
<tr>
<td>80 F (32C)</td>
<td>30 min</td>
<td>24 hrs</td>
</tr>
<tr>
<td>100F (38C)</td>
<td>25 min</td>
<td>12 hrs</td>
</tr>
</tbody>
</table>

1. Cure Time is time required before adhesive reaches ultimate strength. Minimum Cure Time is the minimum time required before the design or allowable load may be applied. AWF epoxy must COMPLETELY cure before loads are applied, so it has no “minimum” cure time.

2. Anchors are to be undisturbed during minimum cure time.

3. “FS” indicates Fast Set is recommended.

4. “AWF” indicates All Weather Formula is recommended.
### Performance Data

#### Ultimate Tensile Strengths for Static Loads in 4,000 psi Concrete

<table>
<thead>
<tr>
<th>Carbon Steel</th>
<th>Thread Size (UNC)</th>
<th>Drill Bit Dia. (in.)</th>
<th>Hole Depth (in.)</th>
<th>Fast-Set Ultimate Tensile Strength (lbs.)</th>
<th>AWF Ultimate Tensile Strength (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/4 – 20</td>
<td>5/16</td>
<td>1-3/4</td>
<td>3380</td>
<td>3540</td>
</tr>
<tr>
<td></td>
<td>5/16 – 18</td>
<td>7/16</td>
<td>2-3/4</td>
<td>7500</td>
<td>7880</td>
</tr>
<tr>
<td></td>
<td>3/8 – 16</td>
<td>1/2</td>
<td>3-1/4</td>
<td>10630</td>
<td>9220</td>
</tr>
<tr>
<td></td>
<td>1/2 – 13</td>
<td>5/8</td>
<td>4-1/8</td>
<td>15110</td>
<td>13110</td>
</tr>
<tr>
<td></td>
<td>5/8 – 11</td>
<td>7/8</td>
<td>6-1/4</td>
<td>26300</td>
<td>26300</td>
</tr>
<tr>
<td></td>
<td>3/4 – 10</td>
<td>1</td>
<td>7-1/2</td>
<td>46000</td>
<td>32430</td>
</tr>
<tr>
<td></td>
<td>1 – 8</td>
<td>1-1/2</td>
<td>9-1/2</td>
<td>64000</td>
<td>–</td>
</tr>
</tbody>
</table>

*Allowable load capacities are calculated using an applied safety factor of 4:1

<table>
<thead>
<tr>
<th>304 Stainless Steel</th>
<th>Thread Size (UNC)</th>
<th>Drill Bit Dia. (in.)</th>
<th>Hole Depth (in.)</th>
<th>Fast-Set Ultimate Tensile Strength (lbs.)</th>
<th>AWF Ultimate Tensile Strength (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3/8 – 16</td>
<td>1/2</td>
<td>3-1/4</td>
<td>9930</td>
<td>9380</td>
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<td></td>
<td>1/2 – 13</td>
<td>5/8</td>
<td>4-1/8</td>
<td>14810</td>
<td>15650</td>
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</tbody>
</table>

*Allowable load capacities are calculated using an applied safety factor of 4:1

<table>
<thead>
<tr>
<th>316 Stainless Steel</th>
<th>Thread Size (UNC)</th>
<th>Drill Bit Dia. (in.)</th>
<th>Hole Depth (in.)</th>
<th>Fast-Set Ultimate Tensile Strength (lbs.)</th>
<th>AWF Ultimate Tensile Strength (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/4 – 20</td>
<td>5/16</td>
<td>1-3/4</td>
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<td>5/16 – 18</td>
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<td>2-3/4</td>
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<td>7550</td>
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<td></td>
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<td>3-1/4</td>
<td>10140</td>
<td>9380</td>
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<td>4-1/8</td>
<td>13390</td>
<td>16690</td>
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<td></td>
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<td>1-1/2</td>
<td>9-1/2</td>
<td>64000</td>
<td>–</td>
</tr>
</tbody>
</table>

*Allowable load capacities are calculated using an applied safety factor of 4:1

*Shear values are determined by the shear values of the bolt in conjunction with the insert.
- Ultimate values are shown. For static loads, use one-fourth of the maximum tensile and shear capacities for the recommended 4:1 safety factor.
- Information provided only for the use of a qualified design engineer. Use of technical data by persons not qualified could cause serious damage, injury, or even death.
- Install POWER-Sert anchors only with epoxy supplied with anchors or Wej-It Fastening Systems adhesive products.
- Use cure times recommended by epoxy manufacturer before applying full load to anchor.

#### Edge Distance & Spacing

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Embed. Depth (in.)</th>
<th>Min Edge Dist. (in.)</th>
<th>Min. Spacing (in.)</th>
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</thead>
<tbody>
<tr>
<td>Carbon Steel</td>
<td>304ss</td>
<td>316ss</td>
<td></td>
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<tr>
<td>PS2-14</td>
<td>–</td>
<td>PS6-16</td>
<td>1-5/8</td>
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<tr>
<td>PS2-56</td>
<td>–</td>
<td>PS6-56</td>
<td>2-3/8</td>
</tr>
<tr>
<td>PS2-38</td>
<td>PSS-38</td>
<td>PS6-38</td>
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<tr>
<td>PS2-12</td>
<td>PSS-12</td>
<td>PS6-12</td>
<td>3-3/4</td>
</tr>
<tr>
<td>PS2-58</td>
<td>–</td>
<td>PS6-58</td>
<td>5-3/4</td>
</tr>
<tr>
<td>PS2-34</td>
<td>–</td>
<td>PS6-34</td>
<td>6-1/2</td>
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<tr>
<td>PS2-1</td>
<td>–</td>
<td>PS6-1</td>
<td>8-1/2</td>
</tr>
</tbody>
</table>

*Allowable load capacities are calculated using an applied safety factor of 4:1

*Shear values are determined by the shear values of the bolt in conjunction with the insert.
- Ultimate values are shown. For static loads, use one-fourth of the maximum tensile and shear capacities for the recommended 4:1 safety factor.
### Order Information

#### Zinc-Plated Carbon Steel

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Thread Size (UNC)</th>
<th>Anchor Size (in.)</th>
<th>Box Quantity</th>
<th>Carton Quantity</th>
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<tbody>
<tr>
<td>PS2-14</td>
<td>1/4 - 20</td>
<td>5/16 x 1-9/16</td>
<td>100</td>
<td>800</td>
</tr>
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<td>PS2-56</td>
<td>5/16 - 18</td>
<td>7/16 x 2-3/8</td>
<td>100</td>
<td>800</td>
</tr>
<tr>
<td>PS2-38</td>
<td>3/8 - 16</td>
<td>1/2 x 2-3/4</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>PS2-12</td>
<td>1/2 - 13</td>
<td>5/8 x 3-11/16</td>
<td>25</td>
<td>200</td>
</tr>
<tr>
<td>PS2-58</td>
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<td>7/8 x 5-3/4</td>
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<td>80</td>
</tr>
<tr>
<td>PS2-34</td>
<td>3/4 - 10</td>
<td>1 x 6-1/2</td>
<td>5</td>
<td>40</td>
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<td>PS2-1</td>
<td>1 - 8</td>
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#### Type 304 Stainless Steel

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<th>Anchor Size (in.)</th>
<th>Box Quantity</th>
<th>Carton Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSS-38</td>
<td>3/8 - 16</td>
<td>1/2 x 2-3/4</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>PSS-12</td>
<td>1/2 - 13</td>
<td>5/8 x 3-11/16</td>
<td>25</td>
<td>200</td>
</tr>
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</table>

#### Type 316 Stainless Steel

<table>
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<th>Catalog No.</th>
<th>Thread Size (UNC)</th>
<th>Anchor Size (in.)</th>
<th>Box Quantity</th>
<th>Carton Quantity</th>
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<tr>
<td>PSS-38</td>
<td>3/8 - 16</td>
<td>1/2 x 2-3/4</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>PSS-12</td>
<td>1/2 - 13</td>
<td>5/8 x 3-11/16</td>
<td>25</td>
<td>200</td>
</tr>
<tr>
<td>PSS-1</td>
<td>1 - 8</td>
<td>1-1/2 x 8-1/2</td>
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<td>15</td>
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</tbody>
</table>

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Closure Plan
265 and 295 Storage Units
Retriev Technologies, Inc.
Lancaster, Ohio

June 22, 2015
Revision 0.5

Submitted to:
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265 Quarry Road
Lancaster, Ohio 43130

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I.0 Introduction

Retriev Technologies, Incorporated (“Retriev”, “facility”, “site”, or “property”) is a permitted hazardous waste facility. In accordance with the requirements of the applicable Ohio hazardous waste rules and regulations under Subtitle C of the Resource Conservation and Recovery Act (RCRA), Retriev submitted a permit application for storage of hazardous waste in containers on October 4, 2002. Effective December 21, 2005, Retriev received an Ohio Hazardous Waste Facility Installation and Operation Permit (Permit) that authorized the facility to store hazardous waste in containers as part of its battery recycling operations. A Closure Plan, prepared by David M. Gubanc on behalf of Retriev, was included in the 2002 Permit application and subsequently revised several times. The most recent revision of the Closure Plan was dated October 6, 2006 (Appendix A). The Closure Plan described the necessary steps to conduct RCRA closure of a permitted storage unit.

Section A.3 of the Permit indicates an expiration date of ten years after the date of journalization (i.e., December 21, 2015). During preparation of the Permit renewal application, Retriev elected to incorporate a second storage unit. Therefore, a revision to the 2006 Closure Plan was required to address the necessary steps to conduct RCRA closure of two permitted storage units. This Closure Plan represents the required revision and has been prepared by Cox-Colvin & Associates, Inc. (Cox-Colvin) in accordance with the requirements of OAC 3745-55-10 through 3745-55-15. In addition, provisions of the Ohio EPA Division of Hazardous Waste Management’s Closure Plan Review Guidance (CPRG) (Ohio EPA, 2009) have been incorporated and previous language related to excluded or exempt units/activities has been removed. Amendments of this Closure Plan will be performed, as necessary, in accordance with OAC 3745-55-12(C).

I.1 Site Location and Description

Retriev is located within an industrial park near the intersection of Quarry Road and Commerce Street in Lancaster, Ohio. The property is approximately 36.8 acres in size and consists of one parcel (053-50034-00) that is bound by railroad tracks to the north, Quarry Road to the east, Commerce Street to the south, and another facility property to the west (Figure 1-1). Property zoning is heavy industrial. Latitude and longitude of the approximate center of the property is 39.712505, -82.545954. The facility maintains two addresses, which correspond to the main buildings at 265 and 295 Quarry Road.

Within each of the two main buildings is a permitted storage unit. The permitted storage unit within the 265 Quarry Road building is identified as the “265 storage unit.” The permitted storage unit within the 295 Quarry Road building is identified as the “295 storage unit.” Plate 1 shows the approximate footprints of the permitted storage units as well as
other site features and facility operation areas. Figures 1-2 and 1-3 show information similar to Plate 1 but are split between 265 and 295 Quarry Road, respectively.

Retriev specializes in the management, reutilization, and recycling of all types of industrial/military, automotive, and household batteries. Battery identification, collection, consolidation, and recycling services are provided to industry, government, and the public. Retriev is permitted only to store hazardous waste in containers. All other industrial activities performed by Retriev are exempt or excluded from permitting and thus not subject to this Closure Plan.

### 1.2 Environmental Setting

The facility is located in Lancaster, Fairfield County Ohio and lies just within the Illinoian Glaciated Allegheny Plateau Physiographic Provinces (Ohio Division of Geological Survey, 1998). The Illinoian Glaciated Allegheny Plateau is described as dissected rugged hills with loess and older drift on ridgetops but absent on bedrock slopes. Till and outwash overlies Devonian- to Pennsylvanian-age shales, siltstones, and sandstones. Surface soil at the site (non-backfill) consists of silty clay loam. A custom site soil resource report, using U.S. Department of Agriculture data is provided in Appendix B. Agriculture accounts for roughly 68% of the land usage in Fairfield County, with woodlands, industry, and residential use making up the remainder [Ohio Department of Natural Resources (ODNR), 1996]. The Hydrologic Atlas for Ohio (ODNR, 1991) reports an average annual temperature of approximately 50 degrees Fahrenheit for Fairfield County. Precipitation averages 36 inches per year for the county.

The topography across the site is relatively flat, ranging from approximately 826 to 830 ft msl. Facility buildings and paved areas are located on the northeastern portion of the site. A 0.86 acre storm water retention pond is located in the central portion of the site. There are no storm sewers at the site or along the adjacent roads. The majority of storm water from the active portion of the site is conveyed as sheet flow toward the retention pond. Storm water from parking areas and entrances is directed toward ditches along Quarry Road. The retention pond is designed for a 25-year/24-hour storm event, with an overflow that directs storm water to vegetated acreage located within the south and southwest portions of the site. Storm water that does not infiltrate into this vegetative acreage is conveyed by roadside drainage ditches that discharge to an intermittent unnamed tributary to Pleasant Run, located approximately 1,000 ft southeast of the site.

Based on review of ODNR well logs associated with facilities within the same industrial park as Retriev, the near surface geology is somewhat variable. Clay is identified to depths as deep as 15 ft below ground surface. Depth to groundwater appears to be at some interval below the clay within sand and gravel. Groundwater pollution potential for Fairfield County was evaluated by ODNR (1996). The study relied on the DRASTIC method (Aller
et al, 1987) to assign a potential for contamination at the surface to reach groundwater based on depth-to-groundwater, net recharge, aquifer media, soil media, topography, impact of the vadose zone media, and hydraulic conductivity of the aquifer. Numerical pollution potential values for Fairfield County, ranged from 48 (lower potential) to 182 (higher potential). Based on the DRASTIC method, ODNR assigned a setting code of 7D (Buried Valley) and a pollution potential value of 164 for the site. This numerical value has no intrinsic meaning, but can be readily compared to a value obtained for other settings in the county and state. The relatively high score for the site is attributable primarily to a shallow depth to groundwater and relatively permeable vadose zone.
2.0 List of Hazardous Waste

The wastes received by Retriev consist of batteries and battery components, which are considered manufactured articles. The waste streams may contain characteristic waste codes D001 through D011. However, some of the waste streams may not be considered hazardous waste upon receipt or after recycling. Waste identification primarily relies on visual inspection as described in Retriev’s Waste Analysis Plan.

Retriev may elect to manage materials other than hazardous wastes in a manner that is consistent with that of hazardous wastes (e.g., placement within a permitted storage unit). Because materials other than hazardous wastes may be located within the permitted storage units at the time of closure and hazardous waste inventory changes on a daily basis, the specific list of hazardous waste subject to this Closure Plan cannot be determined with certainty. The types of batteries and associated battery components that may be identified as a hazardous waste and may be present at the time of closure, include, but may not be limited to the following:

**Acidic Batteries**
- Wet Filled:
  - Lead Acid Automotive Batteries
  - Lead Acid Industrial/Military Batteries
- Sealed Cell:
  - Gel Cell Lead Acid Batteries

**Alkali Batteries**
- Wet Filled:
  - Nickel Cadmium Batteries
  - Nickel Iron Batteries
  - Zinc Carbonaire Batteries
- Dry Cell:
  - Carbon Zinc Batteries
  - Nickel Metal Hydride Batteries (including absorbed mat)
  - Nickel Hydrogen Batteries
  - Silver Oxide Batteries
  - Mercury-Containing Batteries
  - Magnesium Batteries
  - Nickel Cadmium Batteries

**Lithium Batteries**
- Lithium Primary Batteries
- Lithium Ion Batteries
For each of the above types of batteries and battery components, the applicable hazardous constituents listed in the Appendix to OAC 3745-51-11 are identified in Table 2-1, along with applicable characteristic waste codes. Only lithium batteries have the potential to be identified as D001 by the generators, as some generators take a very conservative approach the classification of the batteries. It should be understood that the manufacturers of the batteries and battery components may identify slightly different chemistries, in terms of trace metals, for the same battery types. Therefore, Table 2-1 does not reflect hazardous constituents that may be present in trace amounts. Likewise, D001 through D011 waste codes beyond those reflected in Table 2-1 may be associated with some of the batteries and battery components. However, the characteristic waste codes will be limited to those accepted by Retriev (i.e., D001 through D011). Table 2-1 should only be used as a general guide.
3.0 Description of Hazardous Waste Management Units to be Closed

The permitted units at the facility consist of the 265 and 295 storage units. Hazardous wastes that are transferred from staging areas or from recycling processes are stored up to one year within the permitted storage units. A description of these units is provided in the subsections below. Aside from storage, many of the activities performed at the facility are excluded or exempt from some or all hazardous waste management requirements and thus are not applicable to Retriev’s Permit or closure under OAC 3745-55-10 through 3745-55-15.

3.1 265 Storage Unit

The 265 storage unit consists of four contiguous areas that share perimeter and interior berms (Figure 1-2 and Plate 1). For ease of discussion, these four areas are referred to as 265-1, 265-2, 265-3, and 265-4. Several rollover berms are associated with the 265 storage unit to allow fork lift access. The total area of the 265 storage unit (measured from perimeter berm centerlines) is approximately 56,709 square feet (sf). A 7,750 sf staging area identified by painted lines is located within 265-4 and is included as part of the total area of the 265 storage unit. The base of the 265 storage unit is defined as the 265 building concrete floor. Use of the 265 storage unit began in 2003.

All waste codes accepted by the facility (D001 through D011) can be stored in containers within the 265 storage unit. The permitted capacity of the 265 storage unit is 5,800,000 pounds, which includes the capacity of the staging area within 265-4. The secondary containment system associated with the 265 storage unit allows for the storage of containers with free liquids. Assuming that a wet cell battery typically contains approximately 10% by weight of free liquids (i.e., electrolyte), a total of no greater than 580,000 pounds (i.e., 58,000 gallons at 10 lbs per gallon) of free liquids will be present within the 265 storage unit if all batteries are wet cell. The secondary containment system consists of concrete rollover berms, perimeter berms, and interior berms, as well as chemical-resistant seals and coatings. Concrete joints and berms are sealed with waterstops. The concrete berms and base of the 265 storage unit are sealed with an epoxy coating. Both the waterstops and epoxy coating are resistant to the acid and alkali electrolyte liquids. A detail drawing of the 265 storage unit and secondary containment system is provided as Figure 3-1.

OAC 3745-55-75(B)(3) requires that a secondary containment system have sufficient capacity to contain ten percent of the volume of containers or the volume of the largest container, whichever is greater. As previously discussed, the total possible volume of electrolyte within containers which can be stored in the 265 storage unit is 58,000 gallons,
which is greater than the volume of electrolyte in any single container. Therefore, the 265 secondary containment system must have a capacity of at least 5,800 gallons (i.e., 58,000 gallons \times 0.1). The net secondary containment capacity (i.e., gross capacity minus displacements from rollover berms, pallets, and fixed obstructions) of the 265 storage unit is greater than the minimum required capacity of 5,800 gallons. In addition, each of the four areas within the 265 storage unit (265-1, 265-2, 265-3, and 265-4) have an individual net secondary containment capacity that is greater than the cumulative minimum required capacity of 5,800 gallons. The calculated net secondary containment capacity is reflected on Figure 3-1. Refer to Retreiv’s Permit renewal application for secondary containment calculations.

Routine inspections of the 265 storage unit and associated containers are performed by Retreiv. Any deterioration of the 265 storage unit or containers that is identified during an inspection is addressed within a time period that will prevent an environmental or health hazard. To date, there have been several documented releases from containers located within the 265 storage unit. These container releases were addressed by Retreiv in a timely manner. There have been no observations or documentation that suggests a release from the 265 storage unit has occurred.

3.2 295 Storage Unit

The 295 storage unit consists of an approximate 1,771 sf area of the 295 building concrete floor (Figure 1-3 and Plate 1). The perimeter of the 295 storage unit is identified by painted lines. Use of the 295 storage unit may begin in 2015. The 295 storage unit is permitted to store D001 through D011 waste in containers. There is not a secondary containment system associated with the 295 storage unit; therefore, hazardous wastes containing free liquids cannot be stored within the 295 storage unit unless appropriate secondary containment is provided (e.g., spill pallet). It is anticipated that the majority of hazardous waste stored at 295 will consist of lithium ion batteries and components. The permitted capacity of the 295 storage unit is 200,000 pounds.

Routine inspections of the 295 storage unit and associated containers are performed by Retreiv. Any deterioration of the 265 storage unit or containers that is identified during an inspection is addressed within a time period that will prevent an environmental or health hazard. To date, there have been no documented releases within or from the 295 storage unit.

3.3 Maximum Inventory of Waste

OAC 3745-55-12 requires an estimate of the maximum inventory of waste which could be on-site at one time, in storage at the facility. As discussed in Section 2.0, materials other than hazardous wastes may be located within the permitted storage units at the time of
closure and hazardous waste inventory changes on a daily basis. However, for the purposes of this Closure Plan, Retriev has conservatively assumed that both permitted storage units contain only hazardous waste and at a quantity that is equivalent to the maximum permitted storage capacity. At the time of closure, it is assumed that the facility-wide permitted storage capacity of 6,000,000 lbs consists of the following:

- lead-bearing = 5,500,000 pounds
- lithium ion = 250,000 pounds
- nickel cadmium (NiCd) and nickel metal hydride (NiMH) = 240,000 pounds
- all other chemistries (including damaged pass-through) = 10,000 pounds

Batteries received by Retriev that are a universal waste and not recycled by Retriev are pass-through. These batteries are managed by Retriev under the Large Quantity Handler of Universal Waste regulations and transferred to a downstream recycler. Therefore pass-through batteries do not count toward permitted storage capacity (unless placed in a permitted storage unit) and do not require financial assurance for closure. Retriev will clearly label all pass-through batteries as such. If batteries initially intended to be pass-through are damaged upon receipt, they are no longer a universal waste and will be managed as a hazardous waste. Therefore, damaged pass-through batteries are included in the above "all other chemistries" group. The above quantities of battery types are reflected in the development of the updated closure cost estimate (Section 10.0).
4.0 Closure Performance Standard and Type of Closure

Closure will be conducted through removal of hazardous waste within the 265 and 295 permitted storage units. Closure by removal meets the closure performance standard specified in OAC 3745-55-11, in that closure will:

- minimize the need for further maintenance; and
- control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or atmosphere.

The concept of closure by removal requires that the hazardous waste be removed from the units and waste residue be removed or decontaminated to such a degree that no additional regulatory control under the hazardous waste rules is required. This option is also referred to as unrestricted clean closure. The closure also will be considered final closure, in that all permitted hazardous waste management units at the site will be closed in accordance with applicable regulations. To achieve the above closure performance standard:

- waste will be removed from the permitted storage units;
- surfaces of the permitted storage units will be decontaminated;
- an integrity evaluation of the permitted storage units performed; and
- soil samples will be collected beneath the 265 and 295 storage units.

The procedures for closure activities are described in Section 5.0. Based on the facility operating record and the type and properties of waste stored, it is anticipated that soil removal will not be necessary. However, this assumption will be re-evaluated at the time of closure through integrity evaluation and soil sampling.
5.0 Closure Activities

Closure activities for the 265 and 295 storage units are described in the following subsections.

5.1 Waste Removal

At the time of closure, materials within the permitted storage units may consist of hazardous and non-hazardous batteries and battery components, as well as recovered materials from Retriev’s recycling operations. If the facility is still operational at the time closure activities begin, batteries and battery components will be processed by Retriev to the extent possible.

The materials within the permitted storage units and those processed by Retriev as part of closure will be properly containerized and/or palletized. Retriev will also ensure that the materials are properly labeled for shipment. Materials either will be directly loaded onto trucks using fork lifts or other suitable means or temporarily staged near a loading dock. If temporarily staged, the materials will only be staged during the day in which loading will occur. All loading will be performed under cover of building structures. Applicable Department of Transportation regulations will be followed for shipment of materials and appropriately licensed transporters utilized. The destinations of the wastes are discussed in Section 6.0.

5.2 Surface Decontamination

Decontamination of the surfaces associated with the permitted storage units (e.g., base, berm, ramp) will rely on a triple wash/rinse procedure. Prior to each wash/rinse, gross contamination that cannot be “slurred” will be removed from the surfaces by vac truck. The wash step will consist of scrubbing all surfaces with a detergent solution. The detergent solution will be selected based on compatibility with concrete, the chemical-resistant seals and coatings of the 265 storage unit, and the hazardous constituents identified in Table 2-1. Once the wash step is complete, all surfaces will be power/steam rinsed with heated potable water. All liquids generated from the wash/rinse will be directed to a collection point and transferred into a vac truck. This wash/rinse process will be completed a total of three times. Permanent structures or equipment within the footprints of the storage units (e.g., support columns) will be included in the triple wash/rinse process, but will be limited to a height of 3 feet above the base of the storage unit.

Upon completion, the cleaning equipment and personnel protective equipment utilized will be placed in a container. It is anticipated that approximately one-third gallon of wash/rinse liquids will be generated for each square foot of surface that is triple washed/rinsed.
Therefore, a total of approximately 20,000 gallons of wash/rinse liquids will be generated from decontamination of the two permitted storage units. To limit the spread of contamination, plastic sheeting and portable disposable spill berms will be utilized, as appropriate, during decontamination activities. The management of wastes is discussed in Section 6.0.

Surface decontamination using the above triple wash/rinse procedure will be considered a performance-based approach and will therefore meet the closure performance standard. As part of this performance-based approach, an integrity evaluation will be performed, in part, to visually determine and document that wastes have been adequately removed through decontamination. The integrity evaluation is discussed in the next subsection.

5.3 Integrity Evaluation

After the surfaces of the permitted storage units are decontaminated, an integrity evaluation will be performed. The integrity evaluation will assess the adequacy of surface decontamination and the condition of the chemical-resistant seals and coatings associated with the 265 storage unit. Structural integrity will be based on the absence or presence of cracks and erosion of the concrete. The definition of a “clean debris surface” (Table 1 of OAC 3745-270-45) will be used as a general guide to determine the adequacy of decontamination efforts, although, it may not be possible to remove all staining from the concrete, seals, and coatings. Therefore, decontamination will be considered adequate regardless of observed staining if the percentage of visible waste is limited to no more than specified by the definition of a clean debris surface. The condition of the chemical-resistance seals and coatings will be based on the absence or presence of chips, cracks, bubbles, etc.

To perform the integrity evaluation, the surfaces of the permitted storage units will be divided into an appropriate number of grid squares. Each grid square will be numbered and the evaluation results (i.e., structural integrity, adequacy of decontamination, and condition of chemical-resistant seals and coatings) of that grid square documented on field logs. Dated photographs will also be taken, as appropriate, and referenced to specific grid square(s).

5.4 Soil Sampling

The 265 storage unit is permitted to store wastes containing free liquids. To date, there have been several documented releases from containers located within the 265 storage unit. These container releases were addressed by Retriev in a timely manner. There have been no observations or documentation that suggests a release from the 265 storage unit has occurred. As such, Retriev does not believe that soil beneath the 265 storage unit has been impacted by a release from the unit. However, because the potential exists for hazardous
constituent migration, soil sampling associated with the 265 storage unit will be performed as verification. The 295 storage unit is not permitted to store wastes containing free liquids unless secondary containment is provided. Therefore, since the potential exists for the storage of wastes containing free liquids, soil sampling associated with the 295 storage unit will be performed. There have been no documented releases from the 295 storage unit. The objectives of soil sampling, as presented in this Closure Plan, consist of the following:

- Determine if hazardous constituents have been released from the storage units; and if so
- Define the horizontal and vertical extent of soil contamination and the maximum concentration of contaminants.

The 2006 Closure Plan indicated that a total of 14 soil samples would be collected from 14 locations. However, these locations were generally described to be outside of the 265 storage unit. Retriev now believes it would be more appropriate to collect soil samples beneath the 265 storage unit. Prior to the 265-4 expansion, the footprint of the 265 storage unit was approximately 36,709 sf (Figure 3-1). Therefore, each of the 14 soil samples would represent approximately a 2,622 sf area (approximately 50 ft spacing). With the 265-4 expansion, the total area of the 265 storage unit is approximately 56,709 sf (Figure 3-1). Therefore, a total of 22 soil boring locations are required based on extrapolation. Figure 5-1 identifies the locations of the 22 soil borings, spaced approximately 50 ft apart. Applying the approximate extrapolation used for the 265 storage unit, 2 soil borings will be completed within the 295 storage unit (Figure 5-2).

At each of the 24 soil boring locations, the concrete (approximately 6 inches thick) will be cored or hammered and one soil core will be collected to approximately 4 ft below grade using a disposable acetate liner and direct push technology. Grab samples will be collected for laboratory analysis from the core at 2 ft and 4 ft below grade (finished floor elevation). Construction details of the 265 storage unit are limited. However, it is anticipated that the 2 ft sample will be within the concrete subgrade and the 4 ft sample will be within native soil or soil backfill. For the 295 storage unit, the 2 ft sample will be within concrete subgrade and the 4 ft sample will be within soil backfill or native soil. The direct push drive shoe, if reused, will be decontaminated between sample locations with detergent wash and distilled water rinse. It is anticipated that approximately two gallons of wastewater will be generated from decontamination activities. The wastewater will be mixed with and absorbed by the soil cuttings. The soil cuttings, concrete cores, and personnel protective equipment utilized during sampling will be placed in a container for subsequent management as discussed in Section 6.0.

The soil samples will be placed in laboratory-provided containers and shipped on ice under standard chain-of-custody procedures to a commercial analytical laboratory for analysis of metals listed as hazardous constituents in Table 2-1. These metals are summarized in Table
Along with sample container types, preservatives, holding times, and analytical methods. Results will be reported to the method detection limit that is current at the time of closure.

Upon receipt of laboratory results, the data will be reviewed and validated for compliance with quality control requirements following appropriate guidance outlined in the Ohio EPA Tier I Data Validation Manual (Ohio EPA, 2011). Following validation, the data will be evaluated to determine if a release from the 265 storage unit to underlying soil has occurred. Retreiv has currently elected to not establish site-specific background concentrations for metals, but may do so at any time in the future. If site-specific background concentrations are not developed, the soil sampling data will be compared against the Alternate Metal Standards (AMS) listed in Table B-1 of the CPRG. However, in the case of silver, an AMS is not available. Therefore, if silver is detected, a site-specific background concentration will be established. If the concentrations of all metals in soil are below site-specific background or the AMS, no further closure activities will be required. However, if one or more metals equal or exceed site-specific background or the AMS, it will be concluded that a release from the 265 or 295 storage unit has occurred.

If a release from the 265 or 295 storage unit is determined to have occurred, the horizontal and vertical extent of contamination will be evaluated by comparison of data against site-specific background or the AMS. Extent will be considered adequately defined for the purposes of closure when two consecutive analytical results in the horizontal and vertical directions are below site-specific background or the AMS. If additional soil sampling is necessary to define the extent of contamination, Retreiv will identify the additional location(s) and sample depth interval(s). The acquisition, analysis, and validation of additional soil samples, if necessary, will be consistent with the procedures previously described. However, only those metals which require additional extent determination will be analyzed.

Following extent determination, the soil sampling data will be evaluated against generic risk-based standards to determine the location and volume of soil, if any, requiring removal. Because an evaluation for the need to conduct a removal action is completely hypothetical at this point, the most current EPA Regional Screening Levels (RSLs) for residential or industrial soil will be utilized as the standards. Retreiv understands that if the industrial RSLs are utilized, an environmental covenant restricting the land use to non-residential will be necessary. If Retreiv elects to perform a risk assessment, utilize standards other than RSLs, or if removal is determined to be necessary, an amendment to this Closure Plan will be prepared and submitted to Ohio EPA for review and approval. Additional closure activities will not be performed until the amended Closure Plan is approved.
6.0 Management of Waste

Wastes will be generated during waste removal, surface decontamination, and soil sampling activities. It is anticipated that soil removal will not be necessary. The types of waste, methods of characterization and recycling/disposal, and anticipated volumes are summarized below. Appropriately licensed transporters and recycling and disposal facilities will be identified at the time of closure.

6.1 Wastes from Waste Removal

Wastes from removal include those materials located within the permitted storage units at the time of closure. For the most part, much of this material would not typically be considered waste based on their inherent value and intended recycling. It is anticipated that all the materials to be removed from the permitted storage units, including those processed by Retriev as part of closure, will be accepted by appropriate recycling facilities. If a recycling facility is not available or will not accept a specific type of material, that material will be properly characterized by Retriev utilizing the procedures in their Waste Analysis Plan, and disposed at a licensed Subtitle C or Subtitle D facility as appropriate unless there is a land band. If a land band is present for a specific type of battery or battery component, the most appropriate management method will be selected (e.g., retort). If Subtitle C disposal is required, Land Disposal Restriction (LDR) requirements found in OAC 3745-270 will be followed. If empty containers are generated as part of waste removal activities, the containers will be verified by Retriev as being empty in accordance with OAC 3745-51-07. The empty containers will be transported offsite for reconditioning and reuse or as scrap. The estimated maximum quantity of waste that will be recycled or disposed as part of waste removal activities is 6,000,000 pounds.

6.2 Wastes from Surface Decontamination

Surface decontamination activities will generate gross contamination, used non-disposable cleaning equipment, personnel protective equipment, and possibly plastic sheeting and/or portable disposable berms. The gross contamination will be collected in vac trucks with the wash/rinse liquids. The used non-disposable cleaning equipment will be decontaminated using the same triple wash/rinse procedure as the storage unit and retained by the decontamination contractor. The other wastes (personnel protective equipment, and possibly plastic sheeting and/or portable disposable berms) will be placed into two 55-gallon containers. Retriev will rely on generator knowledge and conservatively dispose of the wastes in the containers at a licensed Subtitle C facility and will follow applicable LDR requirements.

Approximately 20,000 gallons of wash/rinse liquids will also be generated. If the facility is still operational at the time closure activities begin, the wash/rinse liquids will be
transferred from totes or portable tanks to Retriev’s wastewater pretreatment system located within the 265 Quarry Rd building. If pretreated, the wash/rinse liquids will be discharged to the City of Lancaster publically owned treatment works (POTW) in accordance with the facility’s discharge permit. The filter cake generated from pretreatment (assumed to be less than one cubic yard) will be characterized based on generator knowledge, disposed as hazardous waste a licensed Subtitle C facility, and will follow applicable LDR requirements. If pretreatment is not performed, the 20,000 gallons of wash/rinse liquids will be sampled for analysis of TCLP RCRA metals and corrosivity, and disposed at a licensed Subtitle C or Subtitle D facility as appropriate.

6.3 Investigation Derived Waste

Soil sampling activities will generate soil cuttings, concrete cores, wastewater from decontamination of equipment, and personnel protective equipment (i.e., investigation derived waste). It is anticipated that approximately two gallons of wastewater will be generated and will be mixed with and absorbed by the soil cuttings. The total volume of soil cuttings, concrete cores, and personnel protective equipment is anticipated to be less than 14 cubic feet and will be placed in 55-gallon container(s) pending results of the soil samples. Based on the results, the wastes will be disposed of at a licensed Subtitle C or Subtitle D facility as appropriate. If necessary, a sample will be collected from the soil cuttings and analyzed for TCLP metals to support the method of waste disposal. If Subtitle C disposal is required, LRD requirements will be followed.
7.0 Air Emissions and Wastewater

With the exception of power/steam rinsing, air emissions from closure activities will not be generated or will be very minimal, such that mitigation actives will not be necessary. For power/steam rinsing, limited air emissions may be generated, primarily consisting of fugitive water vapors/mist. As necessary, plastic sheeting will be utilized and appropriate health and safety measures will be employed as discussed in Section 8.0.

Wastewater will be generated during surface decontamination and soil sampling activities. The management of this wastewater is discussed in Section 6.0. As discussed in Section 6.0, some wastewater may be discharged to the POTW after pretreatment. Discharge to the POTW will only be performed if Retriev maintains an active discharge permit at the time of closure and the requirements of the discharge permit are met.
8.0 Personnel Health and Safety

Applicable Occupational Safety and Health Administration (OSHA) requirements, as well as Retriev and contractor health and safety policies will be followed by all personnel directly involved with closure activities, including Ohio EPA personnel and visitors. Prior to site closure work, a project specific health & safety plan (HASP) will be prepared. The site specific HASP will be prepared in accordance with US EPA, OSHA, and National Institute of Safety and Health (NIOSH) guidelines and requirements. The HASP will include, at a minimum, the following information:

- site description;
- onsite organization and coordination;
- chemical hazards;
- environmental monitoring methods;
- physical hazards;
- appropriate levels of personnel protective equipment based on the nature of hazards to be encountered;
- contingency plans to deal with emergencies and accidental exposures;
- an emergency contact list;
- fugitive emissions management;
- work areas subject to the closure-related health and safety requirements; and
- personnel decontamination procedures and methods, and proper disposal or decontamination of PPE used during closure activities.
9.0 **Oversight and Certification**

Following completion of closure activities, a closure certification report will be completed in accordance with OAC 3745-55-15 by an independent professional engineer registered in the State of Ohio. The professional engineer or his/her representative will be present during critical closure activities, which include, but may not be limited to:

- Waste removal;
- Surface decontamination;
- Integrity evaluation; and
- Soil sampling.

Only periodic oversight by the professional engineer or his/her representative will be necessary during waste removal and surface decontamination. Verification of waste removal will be completed while providing oversight of surface decontamination. Periodic oversight of surface decontamination will be performed in a manner that will result in observation of each of the three wash/rinse procedures to be performed. At a minimum, the closure certification report will include the following information:

- a copy or reference of the approved closure plan;
- copies of applicable Ohio EPA and Retriev correspondence;
- a description of closure activities;
- the volume of waste generated and removed;
- analytical results of waste characterization;
- analytical results and data validation associated with soil sampling;
- copy of the POTW discharge permit and supporting information (if applicable);
- integrity evaluation documentation;
- documentation that the closure performance standards defined in the approved closure plan have been achieved;
- shipping manifests or bills of lading associated with the disposal or recycling of wastes, as applicable; and
- a certification statement [in accordance with OAC 3745-50-42(D)] signed by the owner/operator and the independent registered professional engineer.
10.0 Closure Cost Estimate and Financial Assurance

Retriev is required to prepare a detailed cost estimate in accordance with OAC 3745-55-42 for closure of the facility. There are four criteria identified in OAC 3745-55-42(A) that must be addressed when preparing the closure cost estimate:

Criteria 1: The closure cost estimate must equal the cost of final closure at the point in the facility’s active life when the extent and manner of its operation would make closure the most expensive, as indicated by its closure plan.

Criteria 2: The closure cost estimate must be based on the costs to the owner or operator of hiring a third party to close the facility. A third party is a party who is neither a parent nor a subsidiary of the owner or operator. The owner or operator may use costs for on-site disposal if he can demonstrate that on-site disposal capacity will exist at all times over the life of the facility.

Criteria 3: The closure cost estimate may not incorporate any salvage value that may be realized with the sale of hazardous wastes, facility structures or equipment, land, or other assets associated with the facility at the time of closure.

Criteria 4: The owner or operator may not incorporate a zero cost for hazardous wastes that might have economic value.

Retriev has prepared a revised closure cost estimate, in current dollars, that fulfills the intent of OAC 3745-55-42, addresses each of the above criteria, and reflects the activities presented in this Closure Plan. This revised closure cost estimate consists of re-established unit rates rather than updating the unit rates in the previous closure cost estimate for inflation. A brief discussion is provided below as to how each of the above criteria has been addressed in the revised closure cost estimate.

Criteria 1 has been addressed by assuming that both the 265 and 295 storage units contain, at the time of closure, only batteries and battery components that could be identified as hazardous waste and are present in a quantity that equals the maximum permitted storage capacity. The assumption as to quantities of types of hazardous batteries and battery components is discussed in Section 3.3. In reality, the storage units will likely contain hazardous and non-hazardous wastes and recovered materials in a quantity that is less than the maximum permitted storage capacity. It is not the intent of Criteria 1 to select the most expensive method for management of the waste at the time of closure. The method of waste management should be selected based on efficiency and common industry practice that is currently available and likely to be available at the time of closure. The selected methods of waste management are discussed as part of Criteria 3 and 4.
Criteria 2 has been addressed by assuming that a third party will complete all aspects of the closure and that Retriev will not process remaining inventory of hazardous waste within the permitted storage units or pretreat wastewater that is generated from surface decontamination. In reality, Retriev will likely perform various closure-related activities, especially waste removal.

Criteria 3 and 4 are inter-related in that all closure activities must have an incurred cost even if there is a net sum positive or zero value. However, the regulations do not stipulate the degree to which a cost must be incurred if the reality is a net sum positive or zero value. All of the hazardous batteries and battery components that Retriev receives have economic value. As discussed in Section 3.3, it is assumed that 5,500,000 lbs of the permitted storage capacity consists of lead-bearing hazardous waste battery types. It is also assumed that 250,000 lbs lithium ion, 240,000 lbs NiCd and NiMH, and 10,000 lbs of all other battery chemistries represent the remaining portion of the facility’s permitted storage capacity. For the purposes of this closure plan, it is conservatively assumed that the 10,000 lbs of “all other battery chemistries” consists entirely of mercury-containing batteries.

The hazardous waste battery types that represent the 5,500,000 lbs consist of lead acid and other commonly recycled lead-bearing chemistries. According to US EPA and Battery Council International, 96% to 98% of all battery lead is recycled, with lead acid batteries being at the top of the most highly recycled consumer product. In fact, the majority of states, including Ohio, have laws that require recycling and prohibit the disposal of lead acid batteries. Recycling of lead acid batteries has occurred in this country for nearly 75 years. Therefore, lead acid batteries clearly have an inherent positive economic value that has been firmly established. As such, it would be completely unreasonable to assume for the purposes of the closure cost estimate that 5,500,000 lbs of the hazardous waste battery types should be managed at a premium cost.

To satisfy the regulatory requirements, Retriev has assigned a $0.001 per pound cost incurred for removal of lead-bearing hazardous waste battery types. This $0.001 per pound cost is supported by the contract from Sanders Lead Company in the revised closure cost estimate, which indicates they will load, transport, and process the battery types at zero cost. The other types of hazardous batteries and battery components assumed to be present at the time of closure (NiCd, NiMH, mercury-containing, and lithium ion) will also be recycled. However, recycling of mercury-containing batteries and battery components does not have as long of history or is as well established. Therefore, Retriev has conservatively assumed for the purposes of the closure cost estimate that full market price must be paid to retort mercury-containing batteries (due to land ban) during removal activities. The cost to load, transport, and process 10,000 lbs of mercury-containing batteries is supported by the backup from AERC Recycling Solutions in the revised closure cost estimate. For NiCd, NiMH, and lithium ion batteries and battery components, Retriev has assumed that full-marked price must be paid to sort, load, and transport, with the costs
being specified by the receiving facility or based on Retriev’s standard rates. However, Retriev has assigned a $0.001 per pound cost incurred for recycling of lithium ion batteries and battery components. This $0.001 per pound cost is supported by the contract from Call2Recycle, Inc. in the revised closure cost estimate, which indicates they will recycle the battery types at zero cost. Retriev has assigned a $0.35 per pound cost incurred for recycling of NiCd and NiMH batteries and battery components. This $0.35 per pound cost was identified by International Metals Reclamation Company, LLC in the revised closure cost estimate as full-market price.

Retriev continues to maintain financial assurance for closure of the facility in accordance with OAC 3745-55-43 and 3745-55-47. The revised closure cost estimate and proof of financial assurance are attached to Retriev’s Permit renewal application. Following Ohio EPA approval of the updated closure cost estimate, the cost covered by the financial assurance mechanism will be adjusted within 60 days. Thereafter, the closure cost estimate will be updated and the financial assurance mechanism will be adjusted on an annual basis to account for inflation within 60 days prior to the anniversary date of the establishment of the financial assurance mechanism in accordance with OAC 3745-55-42(B).
II.0 Closure Schedule

OAC 3745-55-12(D) requires that the expected date of the start of closure activities be no later than 30 days after receiving the final volume of hazardous waste. OAC 3745-55-13 requires that Retriev remove hazardous waste from the permitted storage units and complete closure activities within 90 days and 180 days, respectively, after receiving the final volume of hazardous waste. Closure will be conducted in accordance with the following schedule.

- **Days 1-14:** contracting, scheduling, and planning;
- **Days 15-90:** process and/or remove hazardous waste remaining in permitted storage units;
- **Days 91-140:** perform surface decontamination, integrity evaluation, and soil sampling;
- **Days 141-160:** analysis of soil samples;
- **Days 161-180:** validate and evaluate soil sampling results; and
- **Days 181-240:** prepare and submit closure certification report.

For the purposes of this closure plan, the above schedule assumes that additional soil sampling (beyond the initial 10 locations) and soil removal will not be necessary. A written minimum 45 day notice will be provided to Ohio EPA regarding the expected start of closure activities. Ohio EPA will also be notified at a minimum 5 working days prior to the start of waste removal, surface decontamination, integrity evaluation, and soil sampling activities. As the above schedule indicates, the closure certification report will be prepared and submitted to Ohio EPA within 60 days of completing closure activities. The completion of closure activities is considered to have occurred after soil sampling results are evaluated. If this schedule cannot be met due to unexpected events, Retriev will request an extension from Ohio EPA within 30 days of determining the need for the extension in accordance with the requirements of OAC 3745-55-12(C) and 3745-55-13(C).

It is currently unknown how the permitted storage units, including the 265 secondary containment, will be used upon completion of closure.
12.0 References


Ohio Department of Natural Resources, 1996, Ground Water Pollution Potential of Fairfield County, Ohio, Report No. 41, Division of Water, Water Resources Section.


State Route 22
Pleasant Run
Railroad Line
265 Quarry Rd
Building
Commerce Street
Quarry Road
Unnamed Tributary to Pleasant Run
295 Quarry Rd
Building

Property Boundary
Oil/Gas Well (ODNR Search - Operational Status Unknown)

Retriev Buildings Overlaid Onto Map.
**Legend**

- Concrete Rollover Berm
- Concrete Berm of Permitted Storage Unit
- Structural Column

Notes: All information is approximate. Design details transferred from 10/30/2006.

Drawing DG9003 Rev 7 prepared by David M. Gubanc, PE.

Distances measured from centerline of berm.

Concrete berm and base of permitted storage unit sealed with epoxy coating.
Concrete joints sealed with water stops.

Area and net containment of 265-4 includes the Staging Area.

Total Net Containment of 265-1, 265-2, 265-3, and 265-4 areas is approximately 13,401.8 cubic feet.
265 Storage Unit Soil Boring Locations, Retriev Technologies, Inc., Lancaster, Ohio

Legend

- Concrete Rollover Berm
- Concrete Berm of Permitted Storage Unit
- Structural Column
- Proposed Soil Boring

Notes: All information is approximate.

Soil boring locations spaced approximately 50 ft apart.

At each soil boring location, grab samples will be collected at 2 ft and 4 ft below the base (floor) of the storage unit.
Legend

- Extent of Permitted Storage Unit
- Proposed Soil Boring

Notes: All information is approximate.

Soil boring locations spaced approximately 38.5 ft apart.

At each soil boring location, grab samples will be collected at 2 ft and 4 ft below the base (floor) of the storage unit.

295 Storage Unit Soil Boring Locations,
Retriev Technologies, Inc.,
Lancaster, Ohio

Figure
5-2
Revision 1
<table>
<thead>
<tr>
<th>Type</th>
<th>Battery Category</th>
<th>Applicable Hazardous Constituent and CAS No.</th>
<th>Applicable Waste Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Acid Automotive Batteries</td>
<td>Acidic Wet Cell</td>
<td>Lead (7439-92-1), Antimony (7440-36-0)</td>
<td>D002, D008</td>
</tr>
<tr>
<td>Lead Acid Industrial/Military Batteries</td>
<td>Acidic Wet Cell</td>
<td>Lead (7439-92-1), Antimony (7440-36-0)</td>
<td>D002, D008</td>
</tr>
<tr>
<td>Gel Cell Lead Acid Batteries</td>
<td>Acidic Sealed Cell</td>
<td>Lead (7439-92-1)</td>
<td>D008</td>
</tr>
<tr>
<td>Lithium and Lithium Ion Batteries</td>
<td>Lithium</td>
<td>None</td>
<td>D001, D003</td>
</tr>
<tr>
<td>Nickel Cadmium Batteries</td>
<td>Alkali Wet Cell</td>
<td>Nickel (7440-02-0), Cadmium (7440-43-9)</td>
<td>D002, D006</td>
</tr>
<tr>
<td>Nickel Iron Batteries*</td>
<td>Alkali Wet Cell</td>
<td>Nickel (7440-02-0)</td>
<td>D002</td>
</tr>
<tr>
<td>Zinc Carbonaire Batteries*</td>
<td>Alkali Wet Cell</td>
<td>None</td>
<td>D002</td>
</tr>
<tr>
<td>Zinc Manganese Dioxide Batteries*</td>
<td>Alkali Dry Cell</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Carbon Zinc Batteries*</td>
<td>Alkali Dry Cell</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Nickel Metal Hydride Batteries (including absorbed mat)</td>
<td>Alkali Dry Cell</td>
<td>Nickel (7440-02-0), Cadmium (7440-43-9)</td>
<td>D006</td>
</tr>
<tr>
<td>Nickel Hydrogen Batteries</td>
<td>Alkali Dry Cell</td>
<td>Nickel (7440-02-0), Cadmium (7440-43-9)</td>
<td>D006</td>
</tr>
<tr>
<td>Silver Oxide Batteries</td>
<td>Alkali Dry Cell</td>
<td>Silver (7440-22-4)</td>
<td>D011</td>
</tr>
<tr>
<td>Mercury-Containing Batteries</td>
<td>Alkali Dry Cell</td>
<td>Mercury (7439-97-6)</td>
<td>D009</td>
</tr>
<tr>
<td>Magnesium Batteries</td>
<td>Alkali Dry Cell</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Nickel Cadmium Batteries</td>
<td>Alkali Dry Cell</td>
<td>Nickel (7440-02-0), Cadmium (7440-43-9)</td>
<td>D006</td>
</tr>
</tbody>
</table>

Notes:
- Applicable hazardous constituents are those listed in the Appendix to OAC 3745-51-11.
- Manufacturers of the batteries and battery components may identify slightly different chemistries, in terms of trace metals, for the same battery types; therefore hazardous constituents that may be present in trace amounts are not reflected in this table.
- D001 through D011 waste codes other than those reflected in this table may be associated with batteries and battery components, but will be limited to those accepted.
- *Foreign-produced batteries and battery components may contain trace mercury (7439-97-6; D009).
Table 5-1. Summary of Laboratory Methods, Holding Times, Preservatives, and Sampling Containers for Select Metals in Soil, Retriev Technologies, Inc., Lancaster, Ohio

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Method</th>
<th>Holding Time</th>
<th>Container</th>
<th>Preservative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium</td>
<td>SW846 6010B</td>
<td>6 months</td>
<td>4-oz glass jar</td>
<td>4°C storage</td>
</tr>
<tr>
<td>Lead</td>
<td>SW846 6010B</td>
<td>6 months</td>
<td>4-oz glass jar</td>
<td>4°C storage</td>
</tr>
<tr>
<td>Mercury</td>
<td>SW846 7471</td>
<td>28 days</td>
<td>4-oz glass jar</td>
<td>4°C storage</td>
</tr>
<tr>
<td>Nickel</td>
<td>SW846 6010B</td>
<td>6 months</td>
<td>4-oz glass jar</td>
<td>4°C storage</td>
</tr>
<tr>
<td>Silver</td>
<td>SW846 6010B</td>
<td>6 months</td>
<td>4-oz glass jar</td>
<td>4°C storage</td>
</tr>
<tr>
<td>Zinc</td>
<td>SW846 6010B</td>
<td>6 months</td>
<td>4-oz glass jar</td>
<td>4°C storage</td>
</tr>
</tbody>
</table>

All parameters will be reported to the method detection limit.
Appendix A

2006 Closure Plan on CD
Lancaster, Ohio Facility
Waste Battery Storage
Closure Plan

Submitted by:
Toxco, Inc.
265 Quarry Road
Lancaster, OH 43130

Submitted to:
Ohio EPA – Central District Office
Hazardous Waste Management
Lazarus Government Center – 5th Floor
Lazarus Government Center
122 S. Front Street
Columbus, OH 43215
and
Ohio EPA – Central Office
Hazardous Waste Management
Regulatory and Information Services Section
Lazarus Government Center
122 S. Front Street
Columbus, OH 43215

Prepared by: David M. Gubanc, P.E.

Date: October 30, 2006  Revision: 3
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1. **Description of Facility**

This section provides a general description of the Toxco Battery Recycling facility, also known as Toxco Battery Storage Facility; in accordance with OAC 3745-50-44.

**Name of Facility:** Toxco Battery Storage Facility

**Owner and Operator:** Toxco, Inc.
125. Commercial Blvd.
Anaheim, CA 92801

**Responsible Officials:** Edward D. Green
Vice President, East Region Operations
265 Quarry Road
Lancaster, OH 43130

**Facility Mailing Address:** Toxco, Inc.
265 Quarry Road
Lancaster, OH 43130

**Facility Location:** 265 Quarry Road
Lancaster, OH 43130
2 miles east of Lancaster, ¼ mile south of the intersection of State route 22 and Quarry Road in Fairfield County

**U.S. EPA I.D. Number:** OHD071654958

**Geographic Location:** 39 degrees 42 minutes 48 seconds N,
082 degrees 32 minutes 41 seconds W

### 1.1 General Facility Description

Toxco specializes in the management, recycling and reutilization of all types of industrial and commercial batteries, including, but not limited to lead acid and nickel/cadmium batteries. On commencement of operations the facility will provide collection and consolidation of waste batteries along with battery recycling operations. In general, batteries will be divided into acid and alkaline categories. Detailed battery chemistries are discussed in the Waste Analysis Plan, in Section A.3 of the RCRA Part B Permit, effective 12/21/2005.

The Toxco Battery Storage and Recycling facility is located in an industrial facility previously used for the production of automotive glass, at 265 Quarry Road, Lancaster, Ohio, 43130. It sits on a 36.8-acre site located at the southwest corner of the intersection of Quarry Road and the Conrail Railroad, in a 200+ acre
industrial park on the east side of the city. Toxco’s corporate offices are in Anaheim, California. Three private business partners own Toxco, Inc., they include, Adams Steel Inc., Kinsbursky Brothers Inc., and portions of the Alpert Group. Toxco, Inc. and its affiliates employ about 450 people.

Attachment 1 of the RCRA Part B Permit is a topographic map showing the Toxco facility boundaries with two-foot contour intervals of elevation. Exempt Battery recycling activities are located inside the building immediately adjacent to and across the aisle from a 35,200 square foot bermed container storage area.

The Toxco facility is located in a heavy industrial zoned district. Toxco’s northern border is adjacent to a moderate industrial zoned district. Surrounding manufacturing concerns includes letharge (lead oxide pellet production), automotive and plastic recycling and other light and heavy manufacturing

1.2 Facility Layout General

The facility is laid out from east to west and is broken into 3 separate buildings divided by 8” concrete masonry block (CMU) walls. The eastern building has an area of 44,800 square feet, the western building 12,300 square feet, and the middle building having the largest area of 133,320 square feet. The middle building has 4 to 6 foot high, Lucite sheets at the ceiling wall interface for passive lighting purposes. Between the middle and eastern buildings are 2 – 10 foot wide roll-up doors. The western building is divided in half (East-West) by a CMU wall.

The facility is of Type 2C construction incorporating concrete and masonry with partial aluminum veneer exterior. Steel supports the roof at 40-foot square intervals. The facility has a total of 190,420 square feet under roof. A standard 7-foot fence topped by three strands of barbwire encloses the facility, and is secured on the north and south ends of the easternmost concrete wall of the facility. The fence is at an average distance of about 120 feet from the building.

General entry into the facility is from the east-side, adjacent to Quarry Road, or from the south side, through a gated entry and past a guardhouse located on Quarry Road. The east and south side of the facility are paved for traffic. The east-side doors and entrances are not currently used. The paving on the east-side is 320’ long by 90’ wide, extending from the east wall of the building to Quarry Rd. The south side is paved 670’ along the length of the building by an average 80’ wide.

A 2-story office area in the southeast corner of the eastern building is 50’ x 75’. A 2-story office area in the center of the middle building is 30-foot square, and a 20-foot by 40-foot 2-story area is in the western building. There are 3 attached utility buildings on the north side of the facility, one attached to each building. There is a 40 x 80 foot unattached pole building on the central south side of the facility, 89.8 feet from the building.
Truck unloading sites include 9 doors on the south side of the facility within the fenced in area. 8 of these unloading areas are indoors, allowing the whole tractor and trailer or container to be unloaded indoors. Three (3) truck-unloading doors are on the south side of the facility.

Eleven (11) man-doors allowing entry into the building are enclosed behind the fence, with 7 of these on the south side of the facility. Three (3) man-doors allow entry from the east side of the facility.

1.3 Natural Features/Utilities

Drainage of the property is naturally directed toward the southwest. The elevation change across the 36.8-acre property is only 4 feet, with a low spot immediately south of the fence, in the approximate center of the property. There are no storm sewers either along the road or on the Toxco property. Storm water swales are located south of the building, directing surface water to the wooded "low spot", and from there to the cultivated acreage to the south. Storm water is managed as sheet flow in a southwesterly direction. Pleasant Run flows in a southwest direction, and is located 3000 feet to the west-southwest of the facility.

The overall elevation of the property changes from 830 feet on the northeast corner to 826 feet on the southwest corner. The facility floor is at an elevation of 832 feet maintaining a grade of at least 2 feet above the grade of the surrounding land and 4 feet above the truck dock areas.

In the containment storage area run off is controlled by several curbs. A drawing of the exempt recycling area and the container storage area inside the building is found in the section entitled “Detailed Drawing of Units to be Closed”

There are no injection wells located at the recycling facility. There are no monitoring wells located on the grounds of the recycling facility.

The property is located completely outside the 100-year floodplain. The Flood Insurance Rate Maps for the portion of Fairfield County where the facility is located are included as Attachments 2 and 2a of the RCRA Part B Permit. The facility is delineated on the maps, which are identified as panels 4 and 6 of map 390161, revised April 17, 1989.

Prevailing winds are from the southwest and west. Maximum average wind speed is 5.4 to 8.5 knots. A wind rose for the Columbus Metropolitan airport is found in Attachment 4 of the RCRA Part B Permit.

The Facility is serviced with potable water (Fairfield County Water & Sewer Commission), natural gas and electricity. The entire building is sprinklered and equipped with fire hose connections within the fence line of the facility. There are no drinking water wells on the property.
2. **Description of Hazardous Waste Management Units to Be Closed**

For the purposes of this permit, Toxco, Inc, considers the facility to be separated into two major areas, the exempted recycling/breaking and wastewater treatment operations area, and the permitted container-storage and management area. The areas where batteries will be handled and stored includes the Battery Storage Area (permitted), the unloading/loading docks, the breaking/recycling area and the wastewater treatment area.

The exempt recycling and wastewater collection, storage and treatment operations are located in a 4,000 square feet area (Lead Acid Battery Breaking), a 4,320 square foot area (Alkali Battery Breaking) and a 4,480 square foot area (wastewater treatment). Secondary containment is installed around single walled tanks, filter presses and pumps that could leak or spill and both breaking areas. Rollover ramps are used to gain access into the curbed containment areas.

The permitted containerized waste storage area will utilize approximately 35,200 square feet of the facility. The general dimensions are as follows:

- **Overall Length** – 300 ft
- **Average Width** 122 ft (100’min, 140’max)

Maximum height of curbs around the storage area will be 3.5 inches with 5-foot and 10-foot wide rollover ramps.

Details are shown in the “Detailed Drawing of the Unit to be Closed”.
3. Map of Facility

The Aerial photo image below of the Toxco Facility is in a North/South orientation and is at 1”=500’ scale. The railroad track is on the north, Quarry Road on the East, Commerce Drive on the South and the Ohio Oxide facility on the west. Total acreage is 36.8 A.
4. **Detailed Drawing of Unit to be Closed**

The Waste management unit to be closed is the container storage area inside the Toxco facility building, totally within what is referred to as “Building 2”. The area is completely sprinklered and will be constructed in 3 phases over 24 months.

5. **Lists of Hazardous Wastes that may be found in the Storage Unit**
   
   Group 1 – Lead / Acid Batteries  
   Group 2 – Nickel / Cadmium Batteries  
   Group 3 – Nickel Batteries  
   Group 4 – Zinc / Carbon Batteries  
   Group 5 – Silver Batteries  
   Group 6 – Mercury Batteries  
   Group 7 – Magnesium Batteries  
   Group 8 – Lithium Batteries  
   Group 9 - Alkali and acidic electrolyte
6. **Removal of Wastes**

6.1 **Batteries**

Batteries in inventory will be shipped off site as universal waste to battery recycling facilities. Materials will need to be staged, manifested, loaded on trucks, transported to the authorized universal waste recycler. Batteries will need to be received and accepted by the selected recycler.

In the event universal waste recycling facilities are not available, the batteries will need to be drained, with the electrolyte being disposed as wastewater, and the plates and cases characterized and disposed as either hazardous or non-hazardous solid waste.

Land disposal restrictions (LDR) will need to be addressed, especially for Cadmium and Lead. Since any hazardous wastes would be classified as characteristic, the Hazardous Waste Management Tree described in the Ohio EPA guidance (Figure 4) will be followed. The steps consist of treating the waste to remove the characteristic and underlying hazardous constituents to comply with 40 CFR 268 LDR requirements, and eventually dispose of the material as a non-hazardous waste.

The types of battery chemistries that could be required to be shipped off site for recycling/disposal are listed in Section 5

6.2 **Wastewater**

The contents of each tank will be pumped out to tanker trucks. To the extent possible, tank contents will be pumped out using equipment and following procedures normally used during operations. Operating records and characterization of existing residual material will be used to determine the appropriate disposition of the stored materials. Materials will be segregated into alkaline and acidic waste streams.

In the worst case, the wastewater will be handled as characteristic hazardous waste. In the best circumstance the wastewater will be disposed as non-hazardous industrial waste. Since the plan is to obtain approval to discharge treated wastewater to the Fairfield County Sewer Commission, the likelihood is high that all contained wastewater will be able to be treated and discharged to the sanitary sewer.

6.3 **Wastes from Exempt Battery Recycling**

The following wastes are expected to be generated at the Lancaster facility from the activity of exempt battery recycling, and are in fact generated at Toxco’s Battery Recycling facility in Anaheim, California.
- KOH (Potassium Hydroxide)
- H₂SO₄ (Sulfuric Acid)
- Pocket Plastic (Clear plastic from small industrial Ni/Cd batteries)
- Poly Pro (Poly Propylene) (from lead acid batteries)
- Poly Ethylene (from lead acid batteries)
- SAN (Styrene Acrylonitrile plastic) (from lead acid batteries)
- Filter cake – from wastewater treatment operation

Each of these wastes, if hazardous are characteristic waste. Therefore, the disposal process will follow the Hazardous Waste Management Tree described in Figure 4 of the Ohio EPA guidance. The steps consist of treating the waste to remove the characteristic and underlying hazardous constituents to comply with 40 CFR 268 LDR requirements, and eventually dispose of the material as a non-hazardous waste.

7. Schedule for Closure

When Toxco decides to close the facility, notices shall be sent to generators employing Toxco’s services to inform them of the pending discontinuation of receiving their waste and materials.

The Ohio EPA Division of Hazardous Waste Management (DHWM) shall be informed in writing at least forty five (45) days prior to the date that final closure is expected to begin, in accordance with OAC 3745-55-12(D)(1). All hazardous wastes shall be removed from the site within 90 days of receipt of the final shipment of waste and the closure activities shall be completed within 180 days. Removal of waste and decontamination or dismantling of equipment will proceed in accordance with OAC 3745-55-12(E), which allows the owner or operator to remove hazardous wastes and decontaminate or dismantle equipment in accordance with the approved closure plan at any time before or after notification of partial or final closure.

The following schedule is proposed for final closure of the facility after receiving the final volume of waste batteries:

Schedule of Closure Activities

<table>
<thead>
<tr>
<th>Closure Activity</th>
<th>Day Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing of all remaining waste inventory and/or Removal to a TSD facility.</td>
<td>Days 0 – 90 and as allowed in OAC 3745-55-12(E)</td>
</tr>
<tr>
<td>Decontamination and Cleaning of facility as required, including tank and ancillary equipment.</td>
<td></td>
</tr>
</tbody>
</table>
Decontamination and Cleaning of Secondary Containment Systems.

<table>
<thead>
<tr>
<th>Description</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil survey, concrete coring, sampling and analysis (as required)</td>
<td>90 – 120</td>
</tr>
<tr>
<td>Contingency for excavating, sampling, analyzing and removal of contaminated soil and concrete from site. (Only as required)</td>
<td>120 - 170</td>
</tr>
<tr>
<td>General Site Closure complete</td>
<td>170 to 180</td>
</tr>
<tr>
<td>Closure Administration and Certification</td>
<td>180</td>
</tr>
</tbody>
</table>

8. Air Emissions and Wastewater

8.1 Prevention of Releases to the Atmosphere

A release of hazardous waste or hazardous constituents to the air that may have adverse effects on human health or the environment is unlikely. Batteries are maintained in separate storage rows, separated by at least 30 inches, so that no cross contamination of the incompatible reactive wastes will occur. The boiling point of the acids is greater than 220 F, and their vapor pressure is under 80 mmHg (1/10th of an atmosphere) at room temperatures, indicating that although corrosive, vapor release will be minimal to nil.

8.2 Prevention of Run-Off From Waste Handling Areas

Prevention of runoff from the Battery handling areas is accomplished in several ways. The battery storage containment area’s concrete floors are sealed with an appropriate sealer and/or epoxy coating. Spills of liquid electrolyte will be absorbed if small and wet vacuumed and transferred to wastewater storage tanks if larger than several gallons. The curbed areas are segregated from the plant sewer system, and any accumulated waste will be emptied into either the acidic or alkali liquid storage tanks, which expect to be connected to the wastewater treatment system.

Ramped unloading docks will prevent runoff within the truck docks. The truck stations are sloped down towards the unloading areas and a sump will provide runoff and secondary containment. Unloading can be accomplished with the complete trailer and tractor enclosed within the facility. If a spill occurs during unloading that damages all waste batteries on a 2,500-pound pallet, a predicted maximum volume of 25 gallons may be released within the storage containment
area. Each sump holds 27 gallons, which is 100% of a catastrophic loss due to damage or spill.

The Battery container storage area is designed to hold 192% percent of the maximum predicted electrolyte volume, thereby exceeding compliance with the administrative code by a factor of 20.

The sealed concrete dikes and floors will contain runoff from the storage tanks. In the unlikely event that a spill or leak is detected in the outer wall of the double wall tank, the material would be collected in the diked area. Depending on the volume, the liquid would either be absorbed with chemically compatible absorbent and dispose the residue as a solid waste, or wet vacuumed and transferred to a storage tank and processed as wastewater.

8.3 Prevention of Water Supply Contamination

Groundwater contamination is prevented through discharge prevention of any hazardous electrolyte material onto unprotected ground. The Battery container storage area is constructed of sealed or epoxy coated concrete and curbs to collect leaks or spills.

The waste batteries are predominantly solid shell construction and contain only minimal electrolyte liquid. If there should be a release outside the containment areas, the release will be contained by diking, or blocking the flow of material with absorbents, socks, or similar temporary barriers. Any contaminated materials will be disposed of to an approved hazardous TSD facility. This is an unlikely event as all Battery material handling will be in the active storage or breaking areas, contained by curbs, dikes, sumps, etc. Spills should be able to be reclaimed and electrolyte moved to the appropriate storage tanks.

All the measures discussed will decrease the risk of contamination of the water supply to negligible levels. All Battery storage handling and breaking operations shall be performed on sealed or epoxy coated concrete and any spills or leaks that do occur shall be cleaned up immediately.

Any contamination from trucks and moisture e.g. truck entering the facility during a rainstorm, is contained via the ramped unloading areas, sumps and secondary containment curbs located within the facility, as discussed above. The pavement on the south of the building slopes to the southwest so that rainwater flows away from the facility.
9. **Personnel Health and Safety**

9.1 **Health and Safety Plan**

Prior to initiating Closure activities, Toxco will prepare and promulgate a Health and Safety Plan for use by employees, contractors and agency personnel that participate in the closure. The Health and Safety Plan will assure that the following OSHA standards are addressed as they may apply to the activity of removing batteries, associated waste and wastewater and decontamination activities.

- 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response)
- 29 CRF 1910.1000 (Air contaminants)
- 29 CFR 1910.1200 (Hazard Communication)
- 29 CFR 1926 (Safety and Health Regulations for Construction)

In addition to the above, guidance provided by the NIOSH Guidance Manual for Hazardous Waste Site Activities will be consulted.

The Health and Safety Plan will be available at the facility, and a copy maintained at the office of the individual or company responsible for implementing the closure.

9.2 **Hazardous Material Training**

Training is the key to the prevention of adverse employee exposure. All personnel at Toxco involved in closure activities shall be trained in procedures for properly performing operations including handling hazardous wastes and responding to emergency situations. Included in the training shall be instruction in the use and care of personal protective equipment and the location and use of safety showers and eyewash units that are located at strategic points throughout the facility.

Furthermore, during the course of closure, personnel monitoring may be performed to document exposure to lead and cadmium. During the course of closure, monitoring equipment, safety and emergency systems, security devices, and operating and structural equipment will remain in place and in operational status to prevent, detect, or respond to human health or environmental hazards caused by exposure to hazardous waste.

When transferring wastes or cleaning up hazardous waste spills is required, the worker(s) shall wear the appropriate personal protective equipment.

The facility has internal and external communications and alarm systems to notify personnel of emergency situations and provide instructions for response, evacuation, etc.
The Integrated Contingency Plan will be revised as necessary and be implemented as necessary to mitigate damage that may be the result of fire, explosion or release of hazardous waste.

10. Decontamination Efforts

10.1 Preparation for Decontamination

Preparation for decontamination activities may include, but are not limited to the following: 1) The installation of a decontamination pad in the vicinity of the work area. 2) The installation of absorbent booms along the edge of secondary containment. 3) The installation of a plastic liner around the secondary containment, or installation of a collection basin to collect run off. It is not clear which one of these measures, if any, will be selected, since it is likely the facility will be modified between start up and closure. Toxco will notify Ohio EPA at least five (5) business days in advance of conducting decontamination activities and will inform the Ohio EPA at that time which of the above mentioned methods will be used to prepare the decontamination area to capture rinseate and any other waste constituents.

10.2 Tank Decontamination

Access to the tanks is obtained by removing man-ways. Once the tanks have been opened, they will be provided with positive ventilation. The tanks will then be inspected to determine the approximate quantity and physical properties of any residual material. Following characterization of the residuals (using operating records, visual inspection and field testing), a determination will be made as to effective removal and disposition. Residuals removed from RCRA permit-exempt waste storage tanks will be managed as a hazardous waste unless they can be shown analytically to no longer exhibit any hazardous characteristics.

Because the storage tanks are considered ‘confined space’, ‘CONFINED SPACE ENTRY PROCEDURES WILL BE FOLLOWED WHENEVER ENTERING A TANK.’

Prior to any person entering a tank, waste and residual materials will be removed to the fullest extent possible using a vacuum truck, pumps, scrapers, and/or shovels. Waste tanks and piping will then be decontaminated using a high-pressure wash system and/or with steam.

Decontamination of piping, pumps, etc. will be accomplished through flushing rinse water into and out of the RCRA permit-exempt waste storage tanks.
The amount of decontamination fluids used will be kept to a minimum in order to limit the amount of impacted material that must be disposed of. Rinse water will be transported off-site for treatment and or disposal. A sample of the final rinse water will be collected and analyzed for contaminants using methods in US EPA Publication SW-846. A tank will be considered decontaminated if the rinseate meets the “Clean Standard” specified in the Ohio EPA guidance of 1 mg/l for both inorganic and organic hazardous constituents.

Following decontamination, all man-ways and access points will be exposed, allowing the oxygen levels to remain adequate. All appurtenant piping, fittings, and pumping equipment will be disconnected and removed. Cleaning and flushing of this piping may be done prior to, during, or after the tank cleaning. Tanks will be left in place after decontamination, or will be sold for reuse or scrap.

10.3 Tank Secondary Containment Structures

After the tanks and equipment have been decontaminated, the secondary containment structure will be examined for evidence of spills or residual, such as staining. The containment structure will be decontaminated by brushing down all surfaces and subsequently pressure washing the surface with a detergent solution. The rinse water will be transported offsite to an approved waste management facility. Following washing, the containment structure will be rinsed with water. Samples of the final rinse water from decontamination of tanks and secondary containment systems will be collected. One sample of the rinse water in each tank and for each secondary containment tank system (pumped from the rinsed containment system) shall be collected and analyzed for decontamination verification. The same Clean Standard of 1 mg/l applies.

10.4 Container Storage Area Closure Procedures

The initial step of closure of a container storage area is the removal of the containers from the storage areas, and sorting them by ability to process onsite or not. Whenever possible, containerized wastes will be processed on site. Inventory will be removed by opening/breaking containers and transferring electrolyte to storage tanks that are part of the wastewater treatment system. Residual materials will be removed from containers to the extent possible by standard breaking operating procedures. The containers will be inspected to verify that they are ‘RCRA’ empty. RCRA empty containers will be transported offsite to be either reconditioned and reused or scrapped.

After all wastes have been removed from the storage area, the secondary containment surfaces, sumps, and floor drains will be examined for evidence of spills or impact. The containment structure will be decontaminated by brushing down all surfaces and subsequently pressure washing the surfaces with a detergent solution. Following sampling and analysis, the rinse water will be transported offsite for final disposition. After washing, the containment
structure will be rinsed with water. Sampling and analyzing the final rinse water following the same procedures described in section 10 of the Closure Plan will verify decontamination.

Rinse water will be treated onsite, as appropriate, in equipment that has not yet been decontaminated or it will be transported to a treatment facility for treatment and disposal. Any rinse water generated in a tank or secondary containment system, which handled hazardous waste will be handled as a hazardous waste if testing using SW-8476 method determines that there are detectable levels of hazardous constituents in the rinse water. Furthermore, any rinse water meeting the definition of a hazardous waste will be managed as hazardous. Rinse water not exhibiting the characteristics of hazardous waste (determined by testing) will be handled as non-hazardous.

When all components of the secondary containment system have been decontaminated, the closure of the unit will be completed. All waste generated during closure will be treated and disposed of in appropriate permitted or approved facilities as outlined in section 15 of the Closure Plan.

11. Remediation Standards for Soils (Including Ground Water)

Every effort will be made to complete clean closure of the container storage area. The remediation standards for all inorganic metals will conform to Ohio EPA guidance.

11.2 Naturally Occurring Elements or Compounds

Not including the fill around the building and parking areas. Toxco is positioned on Patton, Silty Clay Loam as that soil is defined in the Fairfield County Soil Survey, USDA, September 2002, Interim Report. The Chemical Composition of Patton Soil is defined as follows:

<table>
<thead>
<tr>
<th>Cation Exchange Cap.</th>
<th>PH</th>
<th>% Organic Matter</th>
<th>meq/100g</th>
</tr>
</thead>
<tbody>
<tr>
<td>%CaCO3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depths of 0 to 15 inches:</td>
<td>6.6 to 7.3</td>
<td>3 to 5</td>
<td>22 to 31</td>
</tr>
<tr>
<td>Depths of 15 to 48 inches:</td>
<td>6.1 to 7.8</td>
<td>1 to 3</td>
<td>16 to 25</td>
</tr>
<tr>
<td>Depths of 48 to 80 inches:</td>
<td>6.6 to 8.4</td>
<td>0.5 to 1</td>
<td>13 to 22</td>
</tr>
</tbody>
</table>

Compared to other soils in Fairfield County, Patton soil is more impermeable than other agricultural soils and less effective for agricultural purposes. Due to the thickness of Patton soil encountered in nearby well installations, it is unlikely that contamination will be readily mobilized.

The closest water well is on the Ohio Oxide property immediately west of Toxco, and Patton Silty Clay Loam was encountered between 5 feet to 15 feet below surface. The well number is 720416, constructed 12/9/1991.
11.2.1 Alternative A - Comparison to Background Conditions

A comprehensive Phase I Environmental Assessment performed by Environmental Data Resources in June, 2003 demonstrated that previous activity at the 265 Quarry Road facility did not result in any reportable emissions, releases or adverse events that could be construed as contaminating soil or surface water. Based on the results of this analysis, Ohio EPA was queried as to the relevance of conducting background soil analysis. The results of that response are included here as documentation of Toxco’s decision to forego background soil sampling and analysis. In the alternative, Toxco will submit to the use of Generic Remediation Standards as the “Clean Closure” criteria.

Date: Wed, 18 Jun 2003 17:09:23 -0400
From: "Jennifer Rockhold"
<jennifer.rockhold@epa.state.oh.us>
To: <edgreen@kinsbursky.com>
Subject: Re: Document
Mime-Version: 1.0
Content-Type: text/plain; charset=US-ASCII
Content-Transfer-Encoding: 7bit
Content-Disposition: inline
X-Mozilla-Status2: 00000000

Ed,

After looking through this first document, I have to say that it is really up to you whether you want to do the background sampling before operation of the facility commences. If this document makes you confident enough that when you finally go through closure that there will be no contamination from previous practices, then you don't have to do any sampling. But from a regulatory perspective, we (meaning Ohio EPA) can't necessarily go back to this document and say what the background levels are/were. So it's really up to you with what makes you more comfortable. If Toxco is confident in the information this document provides and wants to wait until closure to do sampling, then that is fine. BUT if you can find some sampling data in the other document you were talking about, that could most likely be used as the background data set and to establish background conditions at the site. Meaning these numbers, if legitimate, could be used at the time of closure for background levels. We'd have to look at them first of course to determine if they are accurate and follow our rules and guidance. Also, I don't think doing just 6 samples would do anything for anyone. Twelve really is the minimum we typically
accept to establish background conditions. It has to do with the statistical analysis performed on the data, and twelve data points gives more accurate results.

Let me know what you think and if you can get a hold of some sampling data. I'll be in at 7:00 Thursday morning until 11.

Thanks,
Jenny Rockhold
(614) 644-2976

11.2.2. Alternative B- Comparison to Generic Remediation Standards

Toxco recognizes the following Generic Remediation Standards (GRS) will apply to soil samples collected at closure, consisting of both samples from around the building and under the concrete floor.

<table>
<thead>
<tr>
<th>Metal</th>
<th>GRS (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium</td>
<td>140</td>
</tr>
<tr>
<td>Cadmium</td>
<td>1.25</td>
</tr>
<tr>
<td>Chromium</td>
<td>22</td>
</tr>
<tr>
<td>Lead</td>
<td>37</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.13</td>
</tr>
<tr>
<td>Nickel</td>
<td>33</td>
</tr>
<tr>
<td>Zinc</td>
<td>90</td>
</tr>
</tbody>
</table>

Toxco understands the GRS are developed from drinking water standards for the target metals, and are therefore health based standards. Toxco also recognizes the controversy concerning the GRS for Arsenic, and may opt to establish a site specific soil background level for Arsenic within the first year of starting operations. Arsenic is not one of the principal metals used in battery manufacturing, therefore Arsenic contamination of soil from batteries is highly unlikely.

11.2.3. Closures Involving Characteristic Wastes Only

In the event soils are determined to exceed the GRS at time of closure, the material will be measured against Characteristic Hazardous Waste standards. In the event the soil is determined to be a characteristic hazardous waste, it will be managed similar to waste materials, as described in Section 6.3. If concentrations of metals in soils are above GRS and below characteristic waste criteria, the material will be disposed off site as a solid waste.

A minimum 6-inch cut will be collected from the affected area and disposed as solid waste. Once the contaminated soil is removed, testing will presume and the procedure repeated until “Clean Closure” is achieved.
11.3 Compounds not Naturally Occurring

Since Toxco recycles batteries, the typical materials associated with its process, and not naturally occurring are lead (Pb), cadmium (Cd), zinc (Zn) and nickel (Ni). These are the metals that are regularly analyzed and managed from an employee exposure perspective. The liquid wastes, potassium hydroxide and sulfuric acid and treatment chemicals such as magnesium hydroxide are ubiquitous materials, and are found in great quantities in agriculture. For that reason sulfur, potassium and magnesium are not materials of concern from a contamination perspective.


Toxco will adhere to the published guidance in performing the statistical analysis of soil samples at the time of closure in determining levels of contaminants of concern, and comparing those levels to the Generic Remediation Standards (GRS)

12.1 Introduction

Clean Closure of the Container Storage area is the objective. As noted above, a Background Remedial Standard that would yield remediation standards higher than the Generic Remediation Standards is highly unlikely. This is based on an ASTM standard Phase I assessment that past activities did not result in any adverse environmental impacts or incidents at the 265 Quarry Road address.

12.2 Determination of the Number of Samples

Ohio EPA guidance suggests 12 samples is the minimum sample size, and at least two additional samples should be added in the event an outlier is encountered, and the sample must be removed from the population. Total sample would be 14, with 2 being in the building, adjacent to the breaking area.

12.3 Data Comparison

Results will be tabulated and the means and standard deviations will be calculated for the first 6 and then 12 samples to assure the data is normal, and subject to statistical analysis.

12.4 Test for Normality

Normality will be tested by using the T-test and any of the other tests suggested in the Ohio EPA guidance. Specifically the tests contained in the Shapiro paper; “How to Test Normality and Other Distributional Assumptions, American Society for Quality Control”, Statistics Division, Milwaukee, WI will be consulted.
12.5 Test for Outliers

Outliers are defined as data points that are at least two standard deviations (2 sigmas) greater than the mean, using a set of 12 samples without the outlier in the data set. There are no outliers on the negative side of the mean. Therefore, values that contain non-detectable levels of metals will still included in the population. Most likely detection level for the contaminant will be used as the value. This is because the GRS is so much higher than the detection limit, that a population of samples that use the detection limit will still have a T-test adjusted value less than the GRS. The upper quartile range calculations, as explained in the guidance, may be used as a comparison to the 2 sigma test.

12.5.1 Outliers Screening Considerations

It is difficult to predict where the outliers will be. However, since the Ohio Oxide Corp. operates immediately west of the Toxco facility, soil in the proximity of roof drains will need to be approached cautiously. If airborne lead from the oxide company is deposited on the roof and moved to the surface by rainfall, there is some likelihood of higher lead levels. If Toxco decides to collect samples at downspout exits, it will consider it an “extra” sample, and not part of the 12 sample population.

12.6 Remarks

As noted in the guidance, final proof of clean closure will occur when the t-test is conducted on the log transformed site data and the GRS. Toxco does not plan to conduct background sampling and analysis, but is comfortable relying on GRS as the remediation standard for Clean Closure. Toxco will also follow the guidance for samples that yield non-detectable results. It is difficult to predict the percentage of samples that will be below detection levels, but 15% to 50% will not be unreasonable (i.e. 2 to 6 samples show undetectable levels of metals of concern).

12.7 Statistical Analysis Step-by-Step Guidance

As noted in the guidance, Toxco will develop its sampling plan to prove Clean Closure to follow the steps in specific order as follows:

- Select sufficient samples at time of Closure (12 plus 2)
- Note number of Non-detects. Include in the population using detection limit.
- Test for normality with selected data set.
- Test for outliers. Use 2-sigma or Quaritile test.
- Calculate target concentrations of Sample (also referred to as Confirmation data set) (mean + 2 x standard deviation)
• Compare Target (Confirmation) concentrations to Generic Remedial Standards for metals of Concern (Cadmium, Lead, Nickel and Zinc). If target values less than GRS, Clean closure has been achieved.

13. **Risk-Based Remediation Standards**

It is unlikely Toxco will need to utilize this approach, due to the minimum soil contamination risk presented by its indoor operation and the minimal previous activity discovered through the Phase I assessment.

14. **Sampling Plan and Analytical Procedures**

Based on a preliminary review of the guidance, the sampling plan will conform to what would be required for a low to no risk facility.

14.1 **Sampling Grid Calculations**

Proceeding through the steps recommended in the Guidance:
• Slope Factor, based on Carcinogen potency is <0.91 mg/kg/day, obtaining a score of 1
• Potency of Systemic Toxicants < 3um/kg-day, obtaining a score of 3
• Risk of Exposure Matrix Result: Between 10 and 12, depending the Water partition coefficient ($K_d$)
• Soil Sampling Intensity Matrix: $1 + 3 + 11 = 15$ Composite SIF.
• Hot Spot Sampling, with SIF > 6, select 8 foot grid in the vicinity of roof downspout discharge area. Shape factor 0.8
• Number of Samples for Soil Sampling in a Homogeneous Contamination Scenario, with SIF >6, 29 samples.
• Area of interest is 10 feet away from the building (out of the fill) on the south, west and north of the container storage area, 150,000 square feet. Grid Interval is Square root of $150,000/29 = 72$ft.

14.2 **Examples of the Sampling Grid Calculations**

Upon Closure, Toxco will evenly space its sample points equidistant around the facility, starting at the partition between building 1 and 2 and going around the building at intervals no larger than 72 feet. This would put 5 samples on the south edge, 5 samples on the north side and 4 samples on the west side of the building. The hot spot selections would be inside the building, in close proximity to the breaking areas.

15. **Description of Removal Efforts and Treatment Processes**

Removal Efforts will depend in large part on the result of the Clean Closure analysis, and the level of cleaning required to achieve the 1 mg/l rinseate standard.
for tanks and storage area. It is likely, that surface removal, rather than pad
demolition will achieve the contamination level considered “clean” by Ohio EPA
guidance. That being the case, the curbs will be left in place, and the soil sampling
performed to achieve Clean Closure.

If soil removal is required, Toxco will perform this activity in phases, removing
no less than 6-inch lifts at each phase. The results of the soil analysis will be used
to select the primary targets.

16. **Certification**

Toxco will retain the services of an independent Registered Profession Engineer
to perform the certification, prepare the certification document and sign the
Certification Statement. The certification document will contain the following:

- The certification statement as found in OAC 3745-50-42(D)
- The approved Closure Plan
- The volume of Waste removed.
- All correspondence regarding closure activity after Ohio EPA approval.
- Details of sampling and analysis methods.
- Laboratory records
- Narrative of Closure activities
- Photographs and drawings (if appropriate)
- Confirmation of Clean Closure
- Signature of Owner/Operator and the qualified, independent, registered,
  professional engineer.

The certification language is as follows:
"I certify under penalty of law that this document and all attachments were
prepared under my direction or supervision in accordance with a system designed
to assure that qualified personnel properly gather and evaluate the information
submitted. Based on my inquiry of the person or persons who manage the system,
or those persons directly responsible for gathering the information, the
information is, to the best of my knowledge and belief, true, accurate, and
complete. I am aware that there are significant penalties for submitting false
information, including the possibility of fine and imprisonment for knowing
violations."

17. **Cost Estimate for Closure**

Detailed Closure costs, using third party estimates, based on RS Means
Estimating manuals can be found in Attachment 11a to the RCRA Part B Permit.
The total cost estimate is $170,000 for a 36,000 square foot container storage
area.
Custom Soil Resource Report for Fairfield County, Ohio

January 2, 2015
Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the
individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.
The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Fairfield County, Ohio
Survey Area Data: Version 14, Sep 18, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 27, 2012—Mar 10, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
Map Unit Legend

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pa</td>
<td>Patton silty clay loam</td>
<td>40.5</td>
<td>49.5%</td>
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<tr>
<td>Pb</td>
<td>Patton silty clay loam, rarely flooded</td>
<td>16.3</td>
<td>19.9%</td>
</tr>
<tr>
<td>Uy</td>
<td>Urban land-Udorthents complex</td>
<td>25.0</td>
<td>30.6%</td>
</tr>
<tr>
<td><strong>Totals for Area of Interest</strong></td>
<td></td>
<td><strong>81.9</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If
intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An undifferentiated group is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.
Fairfield County, Ohio

Pa—Patton silty clay loam

Map Unit Setting
- National map unit symbol: 5s8x
- Elevation: 300 to 1,140 feet
- Mean annual precipitation: 31 to 48 inches
- Mean annual air temperature: 46 to 57 degrees F
- Frost-free period: 130 to 225 days
- Farmland classification: Prime farmland if drained

Map Unit Composition
- Patton and similar soils: 80 percent
- Minor components: 20 percent
- Estimates are based on observations, descriptions, and transects of the map unit.

Description of Patton

Setting
- Landform: Depressions on glacial lakes (relict)
- Landform position (three-dimensional): Flat
- Parent material: Glaciolacustrine deposits

Typical profile
- H1 - 0 to 15 inches: silty clay loam
- H2 - 15 to 48 inches: silty clay loam
- H3 - 48 to 80 inches: stratified silt loam to silty clay loam

Properties and qualities
- Slope: 0 to 2 percent
- Depth to restrictive feature: More than 80 inches
- Natural drainage class: Very poorly drained
- Runoff class: Negligible
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
- Depth to water table: About 0 inches
- Frequency of flooding: None
- Frequency of ponding: Frequent
- Calcium carbonate, maximum in profile: 25 percent
- Available water storage in profile: High (about 11.9 inches)

Interpretive groups
- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 2w
- Hydrologic Soil Group: B/D

Minor Components

Fitchville
- Percent of map unit: 10 percent
- Landform: Lake plains
- Landform position (three-dimensional): Tread

Glenford
- Percent of map unit: 10 percent
**Pb—Patton silty clay loam, rarely flooded**

**Map Unit Setting**
- **National map unit symbol:** 5s8y
- **Elevation:** 340 to 1,140 feet
- **Mean annual precipitation:** 31 to 48 inches
- **Mean annual air temperature:** 46 to 57 degrees F
- **Frost-free period:** 130 to 200 days
- **Farmland classification:** Prime farmland if drained

**Map Unit Composition**
- **Patton and similar soils:** 80 percent
- **Minor components:** 20 percent
- Estimates are based on observations, descriptions, and transects of the map unit.

**Description of Patton**

**Setting**
- **Landform:** Depressions on glacial lakes (relict)
- **Landform position (three-dimensional):** Flat
- **Parent material:** Glaciolacustrine deposits

**Typical profile**
- **H1 - 0 to 18 inches:** silty clay loam
- **H2 - 18 to 56 inches:** silty clay loam
- **H3 - 56 to 80 inches:** stratified loam to silt loam to silty clay loam

**Properties and qualities**
- **Slope:** 0 to 2 percent
- **Depth to restrictive feature:** More than 80 inches
- **Natural drainage class:** Poorly drained
- **Runoff class:** Negligible
- **Capacity of the most limiting layer to transmit water (Ksat):** Moderately high (0.20 to 0.60 in/hr)
- **Depth to water table:** About 0 to 6 inches
- **Frequency of flooding:** Rare
- **Frequency of ponding:** Frequent
- **Calcium carbonate, maximum in profile:** 25 percent
- **Available water storage in profile:** High (about 12.0 inches)

**Interpretive groups**
- **Land capability classification (irrigated):** None specified
- **Land capability classification (nonirrigated):** 2w
- **Hydrologic Soil Group:** B/D
Minor Components

**Fitchville**
- Percent of map unit: 10 percent
- Landform: Lake plains
- Landform position (three-dimensional): Tread

**Glenford**
- Percent of map unit: 5 percent
- Landform: Lake plains
- Landform position (three-dimensional): Tread

**Aetna**
- Percent of map unit: 5 percent
- Landform: Flood plains
- Landform position (three-dimensional): Tread

Uy—Urban land-Udorthents complex

Map Unit Setting
- National map unit symbol: 5s9v
- Mean annual precipitation: 34 to 42 inches
- Mean annual air temperature: 48 to 55 degrees F
- Frost-free period: 140 to 180 days
- Farmland classification: Not prime farmland

Map Unit Composition
- Urban land: 60 percent
- Udorthents and similar soils: 40 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Udorthents

Properties and qualities
- Depth to restrictive feature: More than 80 inches
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
References


Custom Soil Resource Report


Plates
<table>
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<th>Activity</th>
<th>Cost</th>
<th>Unit</th>
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*Refer to Sections 3.3 and 10.0 of the Closure Plan for additional information
All costs assume work is completed by independent third parties
Backup for select activity costs is included in application
Please Note: Pages of this application which contain financial assurance mechanism details specific to policy or account numbers have been removed from this web-available version of the document.

To review redacted copies of these removed pages, please contact DERR’s record management staff at (614) 644-2924.

Thank you.
# HAZARDOUS WASTE PERMIT INFORMATION FORM

## 1. Facility Permit Contact

| First Name: | Ed |
| MI: | |
| Last Name: | Green |
| Contact Title: | Senior Vice President |
| Phone: | 740-653-6290 |
| Email: | edgreen@retrievtech.com |

## 2. Facility Permit Contact Mailing Address

- **Street or P.O. Box:** 265 Quarry Road
- **City, Town, or Village:** Lancaster
- **State:** Ohio
- **Country:** USA
- **Zip Code:** 43130

## 3. Operator Mailing Address and Telephone Number

- **Street or P.O. Box:** 265 Quarry Road
- **City, Town, or Village:** Lancaster
- **State:** Ohio
- **Phone:** 740-653-6290
- **Country:** USA
- **Zip Code:** 43130

## 4. Facility Existence Date

- Facility Existence Date (mm/dd/yyyy): 07/01/2000

## 5. Other Environmental Permits

<table>
<thead>
<tr>
<th>A. Facility Type (Enter code)</th>
<th>B. Permit Number</th>
<th>C. Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>P 0 1 1 5 8 4 1</td>
<td>Ohio EPA Air Pollution PTIO (LIB Recycling Line)</td>
</tr>
<tr>
<td>E</td>
<td>P 1 0 1 L W P C D</td>
<td>City of Lancaster Wastewater Discharge (265)</td>
</tr>
<tr>
<td>E</td>
<td>P 1 0 9 L W P C D</td>
<td>City of Lancaster Wastewater Discharge (295)</td>
</tr>
</tbody>
</table>

## 6. Nature of Business:

Retriev specializes in the management, reutilization, and recycling of various types of industrial/military, automotive, and household batteries. Battery identification, collection, consolidation, and recycling services are provided to industry, government, and the public.
7. Process Codes and Design Capacities – Enter information in the Section on Form Page 3

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. If more lines are needed, attach a separate sheet of paper with the additional information. For “other” processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in Item 8.

B. PROCESS DESIGN CAPACITY – For each code entered in Item 7.A; enter the capacity of the process.

1. AMOUNT – Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.

2. UNIT OF MEASURE – For each amount entered in Item 7.B(1), enter the code in Item 7.B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.

C. PROCESS TOTAL NUMBER OF UNITS – Enter the total number of units for each corresponding process code.

---

### Process Codes and Design Capacities Table

<table>
<thead>
<tr>
<th>Process Code</th>
<th>Process</th>
<th>Appropriate Unit of Measure for Process Design Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>D80</td>
<td>Landfill</td>
<td>Acre-feet; Hectares-meter; Acres; Cubic Meters; Hectares; Cubic Yards</td>
</tr>
<tr>
<td>D81</td>
<td>Land Treatment</td>
<td>Acres or Hectares</td>
</tr>
<tr>
<td>D82</td>
<td>Ocean Disposal</td>
<td>Gallons Per Day or Liters Per Day</td>
</tr>
<tr>
<td>D83</td>
<td>Surface Impoundment</td>
<td>Gallons; Liters; Cubic Meters; or Cubic Yards</td>
</tr>
<tr>
<td>D99</td>
<td>Other Disposal</td>
<td>Any Unit of Measure Listed Below</td>
</tr>
<tr>
<td>S01</td>
<td>Container</td>
<td>Gallons; Liters; Cubic Meters; or Cubic Yards</td>
</tr>
<tr>
<td>S02</td>
<td>Tank Storage</td>
<td>Gallons; Liters; Cubic Meters; or Cubic Yards</td>
</tr>
<tr>
<td>S03</td>
<td>Waste Pile</td>
<td>Cubic Yards or Cubic Meters</td>
</tr>
<tr>
<td>S04</td>
<td>Surface Impoundment</td>
<td>Gallons; Liters; Cubic Meters; or Cubic Yards</td>
</tr>
<tr>
<td>S05</td>
<td>Drip Pad</td>
<td>Gallons; Liters; Cubic Meters; Hectares; or Cubic Yards</td>
</tr>
<tr>
<td>S06</td>
<td>Containment Building Storage</td>
<td>Cubic Yards or Cubic Meters</td>
</tr>
<tr>
<td>S99</td>
<td>Other Storage</td>
<td>Any Unit of Measure Listed Below</td>
</tr>
<tr>
<td>T01</td>
<td>Tank Treatment</td>
<td>Gallons Per Day; Liters Per Day</td>
</tr>
<tr>
<td>T02</td>
<td>Surface Impoundment</td>
<td>Gallons Per Day; Liters Per Day</td>
</tr>
<tr>
<td>T03</td>
<td>Incinerator</td>
<td>Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Metric Tons Per Hour; or Million BTU Per Hour</td>
</tr>
<tr>
<td>T04</td>
<td>Other Treatment</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Short Tons Per Day; BTUs Per Hour; Gallons Per Day; Liters Per Hour; or Million BTU Per Hour</td>
</tr>
<tr>
<td>T80</td>
<td>Boiler</td>
<td>Gallons; Liters; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; or Million BTU Per Hour</td>
</tr>
</tbody>
</table>

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### Storage Table

<table>
<thead>
<tr>
<th>Process Code</th>
<th>Process</th>
<th>Appropriate Unit of Measure for Process Design Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>T81</td>
<td>Cement Kiln</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Pounds Per Hour; BTU Per Hour; Liters Per Hour; Kilograms Per Hour; or Million BTU Per Hour</td>
</tr>
<tr>
<td>T82</td>
<td>Lime Kiln</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Million BTU Per Hour</td>
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<tr>
<td>T83</td>
<td>Aggregate Kiln</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T84</td>
<td>Phosphate Kiln</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T85</td>
<td>Coke Oven</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T86</td>
<td>Blast Furnace</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T87</td>
<td>Smelting, Melting, or Refining Furnace</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T88</td>
<td>Titanium Dioxide Chloride Oxidation Reactor</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T89</td>
<td>Methane Reforming Furnace</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T90</td>
<td>Pulping Liquor Recovery Furnace</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T91</td>
<td>Combustion Device Used in the Recovery of Sulfur Values from Spent Sulfuric Acid</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
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<tr>
<td>T92</td>
<td>Halogen Acid Furnaces</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T93</td>
<td>Other Industrial Furnaces Listed in 40 CFR 260.10</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
<tr>
<td>T94</td>
<td>Containment Building Treatment</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Hour; BTU Per Hour</td>
</tr>
</tbody>
</table>

---

### Treatment Table

<table>
<thead>
<tr>
<th>Process Code</th>
<th>Process</th>
<th>Appropriate Unit of Measure for Process Design Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>X01</td>
<td>Open Burning/Open Detonation</td>
<td>Any Unit of Measure Listed Below</td>
</tr>
<tr>
<td>X02</td>
<td>Mechanical Processing</td>
<td>Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Kilograms Per Hour; Gallons Per Day; Liters Per Hour; BTU Per Hour; Kilograms Per Hour; Metric Tons Per Day; Short Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Day; or Million BTU Per Hour</td>
</tr>
<tr>
<td>X03</td>
<td>Thermal Unit</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Short Tons Per Day; BTU Per Hour; or Million BTU Per Hour</td>
</tr>
<tr>
<td>X04</td>
<td>Geologic Repository</td>
<td>Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Short Tons Per Day; BTU Per Hour; or Million BTU Per Hour</td>
</tr>
<tr>
<td>X99</td>
<td>Other Subpart X</td>
<td>Any Unit of Measure Listed Below</td>
</tr>
</tbody>
</table>

---

### Unit of Measure Table

<table>
<thead>
<tr>
<th>Unit of Measure</th>
<th>Unit of Measure Code</th>
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</thead>
<tbody>
<tr>
<td>Gallons</td>
<td>G</td>
</tr>
<tr>
<td>Gallons Per Hour</td>
<td>E</td>
</tr>
<tr>
<td>Gallons Day</td>
<td>U</td>
</tr>
<tr>
<td>Liters</td>
<td>L</td>
</tr>
<tr>
<td>Liters Per Hour</td>
<td>H</td>
</tr>
<tr>
<td>Liters Per Day</td>
<td>V</td>
</tr>
<tr>
<td>Short Tons Per Hour</td>
<td>D</td>
</tr>
<tr>
<td>Short Tons Per Day</td>
<td>N</td>
</tr>
<tr>
<td>Metric Tons Per Hour</td>
<td>W</td>
</tr>
<tr>
<td>Metric Tons Per Day</td>
<td>S</td>
</tr>
<tr>
<td>Pounds Per Day</td>
<td>J</td>
</tr>
<tr>
<td>Kilograms Per Hour</td>
<td>X</td>
</tr>
<tr>
<td>Kilograms Per Day</td>
<td>B</td>
</tr>
<tr>
<td>Hectacre-meter</td>
<td>F</td>
</tr>
<tr>
<td>Hectare</td>
<td>Q</td>
</tr>
<tr>
<td>BTU Per Hour</td>
<td>I</td>
</tr>
</tbody>
</table>
### 7. Process Codes and Design Capacities (Continued)

**EXAMPLE FOR COMPLETING Item 7 (shown in line number X-1 below):** A facility has a storage tank, which can hold 533.788 gallons.

<table>
<thead>
<tr>
<th>Line Number</th>
<th>A. Process Code (From list above)</th>
<th>B. PROCESS DESIGN CAPACITY</th>
<th>C. Process Total Number of Units</th>
<th>For Official Use Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1) Amount (Specify)</td>
<td>(2) Unit of Measure</td>
<td></td>
</tr>
<tr>
<td>X 1</td>
<td>S 0 2</td>
<td>533.788</td>
<td>G 001</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>S 0 1</td>
<td>1333.33</td>
<td>Y 02</td>
<td></td>
</tr>
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<td>2</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>8</td>
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<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1 2</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the line sequentially, taking into account any lines that will be used for “other” process (i.e., D99, S99, T04, and X99) in Item 8.

### 8. Other Processes (Follow instructions from Item 7 for D99, S99, T04, and X99 process codes)

<table>
<thead>
<tr>
<th>Line Number (Enter #s in sequence with Item 7)</th>
<th>A. Process Code (From list above)</th>
<th>B. PROCESS DESIGN CAPACITY</th>
<th>C. Process Total Number of Units</th>
<th>For Official Use Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>X 2</td>
<td>T 0 4</td>
<td>100.00</td>
<td>U 001</td>
<td></td>
</tr>
</tbody>
</table>
9. Description of Hazardous Wastes - Enter Information in the Sections on Form Page 5

A. EPA HAZARDOUS WASTE NUMBER – Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY – For each listed waste entered in Item 9.A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in Item 9.A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE – For each quantity entered in Item 9.B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

<table>
<thead>
<tr>
<th>ENGLISH UNIT OF MEASURE</th>
<th>CODE</th>
<th>METRIC UNIT OF MEASURE</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>POUNDS</td>
<td>P</td>
<td>KILOGRAMS</td>
<td>K</td>
</tr>
<tr>
<td>TONS</td>
<td>T</td>
<td>METRIC TONS</td>
<td>M</td>
</tr>
</tbody>
</table>

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all listed hazardous wastes.

For non-listed waste: For each characteristic or toxic contaminant entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. Enter the first two as described above.
2. Enter “000” in the extreme right box of Item 9.D(1).
3. Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 9.E.

2. PROCESS DESCRIPTION: If code is not listed for a process that will be used, describe the process in Item 9.D(2) or in Item 9.E(2).

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in Item 9.A. On the same line complete Items 9.B, 9.C, and 9.D by estimating the total annual quantity of the waste and describing all the processes to be used to store, treat, and/or dispose of the waste.

2. In Item 9.A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Item 9.D.2 on that line enter “included with above” and make no other entries on that line.

3. Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING Item 9 (shown in line numbers X-1, X-2, X-3, and X-4 below) – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

<table>
<thead>
<tr>
<th>Line Number</th>
<th>A. EPA Hazardous Waste No. (Enter code)</th>
<th>B. Estimated Annual Qty of Waste</th>
<th>C. Unit of Measure (Enter code)</th>
<th>D. PROCESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>X 1</td>
<td>K 0 5 4</td>
<td>900</td>
<td>P</td>
<td>T 0 3 D 8 0</td>
</tr>
<tr>
<td>X 2</td>
<td>D 0 0 2</td>
<td>400</td>
<td>P</td>
<td>T 0 3 D 8 0</td>
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<tr>
<td>X 3</td>
<td>D 0 0 1</td>
<td>100</td>
<td>P</td>
<td>T 0 3 D 8 0</td>
</tr>
<tr>
<td>X 4</td>
<td>D 0 0 2</td>
<td></td>
<td></td>
<td>Included With Above</td>
</tr>
</tbody>
</table>
9. Description of Hazardous Wastes (Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)

<table>
<thead>
<tr>
<th>Line Number</th>
<th>A. EPA Hazardous Waste No. (Enter code)</th>
<th>B. Estimated Annual Qty of Waste</th>
<th>C. Unit of Measure (Enter code)</th>
<th>D. PROCESSES (1) PROCESS CODES (Enter Code)</th>
<th>(2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D 0 0 1</td>
<td>3000</td>
<td>T</td>
<td>S 0 1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>D 0 0 2</td>
<td>10000</td>
<td>T</td>
<td>S 0 1</td>
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</tr>
<tr>
<td>3</td>
<td>D 0 0 3</td>
<td>5000</td>
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<td>S 0 1</td>
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<td>4</td>
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<td>5</td>
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<td>T</td>
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<td>S 0 1</td>
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</tr>
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<td>9</td>
<td>D 0 0 9</td>
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<td>S 0 1</td>
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10. **Map**

   Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all spring, rivers, and other surface water bodies in this map area. See instructions for precise requirements.

11. **Facility Drawing**

   All existing facilities must include a scale drawing of the facility (see instructions for more detail).

12. **Photographs**

   All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, and disposal areas; and sites of future storage, treatment, or disposal areas (see instructions for more detail).

13. **Comments**

   The maximum permitted capacity of batteries and battery components within the storage units (line 1 in Section 7) is 6,000,000 pounds. To properly complete the process design capacity in Section 7 with a cubic yard unit of measure, a generalized density of batteries and battery components is assumed to be 4,500 pounds per cubic yard. Actual density can vary significantly based on type of batteries and battery components, therefore, volume should not be utilized for determining permitted capacity.
Ohio Environmental Protection Agency
RCRA SUBTITLE C SITE IDENTIFICATION

1. Reason for Submittal
   - To provide initial notification (to obtain an EPA ID Number for hazardous waste, universal waste, or used oil activities).
   - To provide subsequent notification (to update site identification information).
   - As a component of a First RCRA Hazardous Waste Part A Permit Application.
   - As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment #__________)
   - As a component of the Hazardous Waste Report for the year __________

2. Site EPA ID No.
   - EPA ID Number: OH071654958

3. Site Name
   - Name: [Name]

4. Site Location Information
   - Street Address: 265 and 295 Quarry Road
     City, Town, or Village: Lancaster
     County: Fairfield
   - State: Ohio
   - Country: USA
   - Zip Code: 43130

5. Site Land Type
   - Site Land Type: [X] Private
   - County
   - District
   - Federal
   - Indian
   - Municipal
   - State
   - Other

6. North American Industry Class. System (NAICS) Code(s) for the Site
   - A. (Primary) 421930
   - B.
   - C.
   - D.

7. Site Contact Person
   - First Name: Ed
   - MI: [MI]
   - Last Name: Green
   - Title: [Title]
   - Street or P.O. Box: 265 Quarry Road
     City, Town or Village: Lancaster
   - State: Ohio
   - Country: USA
   - Zip Code: 43130
   - E-mail: edgreen@retrievttech.com
   - Phone & Ext.: 740-653-6290
   - Fax: 740-653-3240

8. Legal Owner and Operator of the Site
   - A. Name of Site’s Legal Owner: Retriev Technologies, Inc.
     Date Became Owner (mm/dd/yyyy): 07/01/2000
     Owner Type: [X] Private
     County
     District
     Federal
     Indian
     Municipal
     State
     Other
     Street or P.O. Box: Same as Location
     City, Town, or Village: [City, Town, or Village]
     State: [State]
     Country: [Country]
     Zip Code: [Zip Code]
   - B. Name of Site’s Operator: Retriev Technologies, Inc.
     Date Became Operator (mm/dd/yyyy): 07/01/2000
     Operator Type: [X] Private
     County
     District
     Federal
     Indian
     Municipal
     State
     Other
     Street or P.O. Box: Same as Location
     City, Town, or Village: [City, Town, or Village]
     State: [State]
     Country: [Country]
     Zip Code: [Zip Code]
9. Type of Regulated Waste Activity (Mark “X” in the appropriate boxes.)

**A. Hazardous Waste Activities**

1. **Generator of Hazardous Waste**
   (choose only one of the following three categories or leave blank if not applicable)
   - [X] a. **Large Quantity Generator (LQG):**
     Greater than 1,000 kg/mo (2,200 lbs.) of non-acute hazardous waste; or
   - [ ] b. **Small Quantity Generator (SQG):**
     100 to 1,000 kg/mo (220-2,200 lbs.) of non-acute hazardous waste; or
   - [ ] c. **Conditionally Exempt Small Quantity Generator (CESQG):**
     Less than 100 kg/mo of non-acute hazardous waste

In addition, indicate other generator activities (check all that apply)
   - [ ] d. Short-Term Generator (generate from a short-term or one-time event and not from on-going processes). If “Yes”, provide an explanation in the Comments section.
   - [ ] e. United States Importer of Hazardous Waste
   - [ ] f. Mixed Waste (hazardous and radioactive) Generator

2. **Hazardous Waste Report Generator Status**
   (choose one if a Reason for Submittal is the Hazardous Waste Report)
   - [ ] a. Large Quantity Generator (LQG):
     Greater than 1,000 kg/mo (2,200 lbs.) of non-acute hazardous waste was generated at the site in any one month, or
   - [ ] b. Small Quantity Generator (SQG)
     In one or more months the site generated greater than 100kg (220 lbs) but in no month did it generate more than 1,000 kg/mo (220-2,200 lbs) of non-acute hazardous waste, or
   - [ ] c. Conditionally Exempt Small Quantity Generator (CESQG):
     The site generated no more than 100 kg (220 lbs) of non-acute hazardous waste in any one month.
   - [ ] d. Non-Generator
     The site did not generate any hazardous waste during the calendar year.

**B. Universal Waste Activities**

1. **Large Quantity Handler of Universal Waste**
   (accumulate 5,000 kg or more). Indicate types of universal waste managed at your site. (check all boxes that apply):
   - [X] a. Batteries
   - [ ] b. Pesticides
   - [ ] c. Mercury Containing Equipment
   - [X] d. Lamps

2. **Destination Facility for Universal Waste**
   Note: A hazardous waste permit may be required for this activity.

**C. Used Oil Activities**

1. **Used Oil Transporter**
   Indicate Type(s) of Activity(ies)
   - [ ] a. Transporter
   - [ ] b. Transfer Facility (at your site)

2. **Used Oil Processor and/or Re-refiner**
   Indicate Type(s) of Activity(ies)
   - [ ] a. Processor
   - [ ] b. Re-refiner

3. **Off-Specification Used Oil Burner**

4. **Used Oil Fuel Marketer**
   Indicate Type(s) of Activity(ies)
   - [ ] a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
   - [ ] b. Marketer Who First Claims the Used Oil Meets the Specifications

For Items 3 through 7, check all that apply:

3. **Transporter of Hazardous Waste**
   - [ ] a. Transporter
   - [ ] b. Transfer Facility (at your site)

4. **Treater, Storer or Disposer of Hazardous Waste**
   Note: A hazardous waste permit is required for this activity.

5. **Recycler of Hazardous Waste**
   Note: A hazardous waste permit may be required for this activity.
   - [ ] a. 72-hour Recycler

6. **Exempt Boiler and/or Industrial Furnace**
   - [ ] a. Small Quantity On-site Burner Exemption
   - [ ] b. Smelting, Melting and Refining Furnace Exemption

7. **Underground Injection Control**

8. **Receives Hazardous Waste from Off-site**
D. Eligible Academic Entities with Laboratories – Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to OAC rules 3745-52-200 through 3745-52-216

1. Opting into or currently operating under OAC rules 3745-52-200 through 3745-52-216 for the management of hazardous wastes in laboratories. Mark all that apply:
   a. College or University
   b. Teaching hospital that is owned by or has a formal written affiliation agreement with a college or university
   c. Non-profit Institute that is owned by or has a formal written affiliation agreement with a college or university

2. Withdrawing from OAC rules 3745-52-200 through 3745-53-216 for the management of hazardous waste in laboratories

10. Waste Codes for Federally Regulated Hazardous Wastes. Please list the codes for the federally regulated hazardous waste handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more space is needed.

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11. Comments


12. Certification. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

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<th>Signature of owner, operator, or an authorized representative</th>
<th>Name and Official Title (type or print)</th>
<th>Date Signed (mm-dd-yyyy)</th>
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<tr>
<td>[Signature]</td>
<td>Ed Green, Senior Vice President</td>
<td>01/27/2013</td>
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EPA 9029 (Revised 9/5/10)
EPA ID: OHD071654958
Retriev Technologies, Inc.
Lat: 39° 42' 48"
Long: -82° 32' 42"

Source: 7.5 Minute Series Quadrangle
Lancaster, Ohio (1961, Photorevised 1985);

Cox-Colvin
B ASSOCIATES, INC.
ENVIRONMENTAL SERVICES

Figure 1
Topographic Map,
Retriev Technologies, Inc.,
Lancaster, Ohio
Revision 1
Photo 6: 295 Storage Unit, 1/13/2017.
OPERATOR

Summary
Responsible for the daily operations of the Alkaline area under the direction of the Supervisor, Plant Foreman and Manager of Manufacturing Excellence.

Hours: Dependent on shift
Daily OT required on short notice.

Essential Duties & Responsibilities
- Accurately records inbound and outbound weights of material being processed.
- Keep the phases in compliance.
- Receive materials according to the Waste Analysis Plan.
- Keep accurate records of all scrap metals for recycling.
- Attaches labels to waste and material containers to identify contents.
- Work on the production line.
- Help newer employees meet their potential.
- Work with other areas of operation to improve communication and efficiency.
- Other duties as assigned.

Other Duties
- Operates forklift to move materials into or out of the department.
- Organizing, sorting and selecting materials for processing.
- May be required to assist in processing of batteries and department cleanup.
- Working with other areas of operation to improve communication and efficiency.
- Other tasks assigned as time allows.

Qualifications
The pre-placement requirements described in this section are required of all persons in this job category. Any of the personal protective equipment (PPE) described in this section may need to be worn on occasion or on a regular basis.

Supervisory Responsibilities
None

Physical Demands
The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

Training
- 40 hour HAZWOPER training will be successfully completed.
- 8 hours of annual refresher training will be provided.
- Initial training and annual refresher will include instruction on the Emergency Action Plan evacuation procedures.
- Upon placement, employee will receive on-the-job training on the specific functions of the job as listed above under Essential Duties & Responsibilities. This classroom and on-the-job training is designed to meet all OSHA and EPA requirements by instructing facility personnel how to conduct their duties in a safe and healthful manner.
- Attorney General Background Check required.

Training for DOT Hazmat functions, if applicable, will be accomplished within 90 days. Contingency plan training will be conducted within 6 months of assignment to position. This training will include:
> Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.
> Key parameters for automatic waste feed cutoff systems.
> Communication or alarm systems.
>Response to fire or explosions.
>Response to ground water contamination incidents.
Shutdown of operations.

**Decision Making**
Ability to apply common sense to carry out instructions furnished in written, oral, or diagram form. Ability to deal with problems involving several concrete variables in standardized situations.

**Financial Responsibilities**
Ability to accurately add, subtract, multiply, and divide in all units of measure, using whole numbers, common fractions, and decimals.

**Communication**
Ability to read and interpret documents such as safety rules, training material, operating and maintenance instructions, and procedures manuals. Ability to communicate effectively with other employees of the organization and management. Ability to fill out the daily production reports.

**Results of Action**

**Equipment Used**

**Work Environment**
The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

______________________________  _______________________
Employee's Signature                  Date
ALKALINE DEPARTMENT SUPERVISOR

Summary
Responsible for the day to day operations of the Alkaline area under the direction of Plant Foreman and Manager of Manufacturing Excellence.

Hours: Dependent on shift
Daily OT required on short notice.

Essential Duties & Responsibilities
- Carry out supervisory responsibilities with the organizations policies and applicable laws.
- Assigning and directing work assignments, assisting in disciplining employees, addressing complaints and resolving problems.
- Participate in any problem solving to improve production rates.
- Interact with visitors during tours/visits.
- Accurately records inbound and outbound weights of material being processed.
- Keep the phases in compliance.
- Receive materials according to the Waste Analysis Plan.
- Keep accurate records of all scrap metals for recycling.
- Attaches labels to waste and material containers to identify contents.
- Train new employees and improve knowledge of existing employees.
- May be required to work on the production line when needed.
- Help employees meet their potential.
- Monitor/manage production and inventory. Accurately complete daily production reports.
- Coordinating efforts with maintenance for repairs and improvements.
- Work with other areas of operation to improve communication and efficiency.
- Attend weekly supervisor/manager meetings and report on previous week and planned future week's activities.
- Other duties as assigned.

Other Duties
- Operates fork lift to move materials into or out of the department.
- Organizing, sorting and selecting materials for processing.
- May be required to assist in processing of batteries and department cleanup.
- Working with other areas of operation to improve communication and efficiency.
- Other tasks assigned as time allows.

Qualifications
The pre-placement requirements described in this section are required of all persons in this job category. Any of the personal protective equipment (PPE) described in this section may need to be worn on occasion or on a regular basis.

The pre-placement physical includes a pulmonary function test and completion of the OSHA Respirator Medical Evaluation Questionnaire for the purpose of determining ability to wear a respirator.

The position requires a pre-placement physical exam and biological monitoring with the purpose of comparing the physical abilities to the specific physical requirements if the job and establishing medical baselines.

Initial blood-lead/ZPP, blood and urine cadmium, and beta-2 micro globulin testing is required prior to placement if the Environmental Manager is reasonably excepted to be exposed at or above the action level to lead or cadmium on 30 or more days per year. Initial biological monitoring levels below OSHA action levels required for placement if this level of exposure is expected.

Must successfully complete all required medical surveillance.

Supervisory Responsibilities
Directly supervises all employees of the Alkaline Department. Carries out supervisory responsibilities in accordance with the organization's policies and applicable laws.

Responsibilities include: training employees, planning, assigning, and directing work, appraising performance, rewarding and disciplining employees, addressing complaints and resolving problems.

Environmental Health & Safety:
- Completeness and follow through with adherence to the company policies in regards to Retrieving Part B Hazardous Waste Permit, CFR 40, CFR 29, and CFR 49.
- Knowledge of the contents and execution of the Facility Contingency Plan.
- Learn proper cleanup of spills and be able to, at least verbally, demonstrate the proper cleanup of a spill.

Physical Demands
The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to stand, walk, bend; use hands to finger, handle, or feel objects, tools, or controls; and reach with hands and arms. The employee is occasionally required to sit, stoop or kneel; and talk or hear.

The position will occasionally require the use of a negative pressure respirator and/or the use of chemically resistant clothing such as Tyvek suits for up to the entire shift with occasional breaks.

Normal job duties require standing mostly in one place for long periods of time and taking a few steps back and forth to move batteries.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, distance vision, peripheral vision and the ability to adjust focus.

Training
- 2 year Associate Degree in business-related field OR 4 or more years of supervisory experience.
- Prior hazardous materials/hazardous waste experience is helpful.
- Employee will be certified as having received 24 hours Initial HAZWOPER training prior to placement.
- 40 hour HAZWOPER training will be successfully completed.
- 8 hours of annual refresher training will be provided.
- Initial training and annual refresher will include instruction on the Emergency Action Plan evacuation procedures.
- Upon placement, employee will receive on-the-job training on the specific functions of the job as listed above under Essential Duties & Responsibilities. This classroom and on-the-job training is designed to meet all OSHA and EPA requirements by instructing facility personnel how to conduct their duties in a safe and healthful manner.
- Attorney General Background Check required.

Training for DOT Hazmat functions, if applicable, will be accomplished within 90 days. Contingency plan training will be conducted within 6 months of assignment to position. This training will include:
> Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.
> Key parameters for automatic waste feed cutoff systems.
> Communication or alarm systems.
> Response to fire or explosions.
> Response to ground water contamination incidents.
> Shutdown of operations.

Decision Making
Ability to apply common sense to carry out instructions furnished in written, oral, or diagram form. Ability to deal with problems involving several concrete variables in standardized situations.

Financial Responsibilities
Ability to accurately add, subtract, multiply, and divide in all units of measure, using whole numbers, common fractions, and decimals.

Communication
Ability to read and interpret documents such as safety rules, training material, operating and maintenance instructions, and procedures manuals. Ability to communicate effectively with other employees of the organization and management. Ability to fill out the daily production reports.

Results of Action
Equipment Used

Work Environment
The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly exposed to toxic or caustic chemicals. The employee is frequently exposed to fumes and airborne particles. The employee occasionally works near moving mechanical parts and in outside weather conditions. The employee usually spends a portion of the day operating a forklift to move materials in and out of the processing area.

The noise level in the work environment is usually moderate to loud.

______________________________________  _______________________
Employee's Signature                        Date
BATTERY TECHNICIAN

Job Code: 
Branch: OHIO DIVISION 
Reports To: Lead Acid Supervisor 
FLSA Status: Non-Exempt 
Prepared By: Stacy DeLong 
Approved By: 

Division: 
Department: LEAD 
Pay Grade: 
Employee Type: FULL TIME 
Date Prepared: 03/21/2016 
Date Approved: 

Summary
Drains, sorts, dismantles or transfers to approved containers, various types of industrial or commercial batteries. Performs battery dismantling or other battery processing using a combination of hand or power tools and/or machinery. Assists in other departments as necessary. Able to work necessary hours.

Essential Duties & Responsibilities
Breaking/drainage batteries
- Opens industrial batteries using various tools
- Removes fasteners, connectors or other hardware from batteries with powered pneumatic or hand tools
- Pulls cells from (steel cased lead acid) batteries using electric hoists and leverage bars
- Dismantles batteries/battery cells to recover materials by using various tools
- Sorts, separates, stacks, palletizes, or otherwise handles batteries/battery plates using hoist or by hand to load into cardboard containers, drums or other approved containers.
- Empties steel battery cases and feeds empty case to forklift or conveyor
- Washes, shreds, granulates, crushes, or otherwise processes plastic battery cases
- Prepares plastic/steel cases for further management, including torching chamber operations.
- Uses hoist to pull plates from case and stacks plates for draining palletes or otherwise handles plates
- Ability to properly label is required
- Ability to pass forklift class and maintain a Retriev forklift license
- Shear Operations

Other Duties
- Performs cleanup of operations area
- Reports any unsafe conditions
- Keeps clear access to all emergency equipment in department such as fire extinguishers, fire hoses and emergency eyewash/shower stations
- Assists in any other material handling/processing functions of the department
- Assists in other departments as required
- Works in accordance with company policy and maintains a good safety record
- Performs job duties in a manner to maintain compliance to 29CFR, 49CFR and 40 CFR
- Job duties may include cross training between other departments

Qualifications
- Performs all duties in a safe manner
- Maintains good hygiene practices and demonstrates consistency in following policies and procedures
- Has an acceptable attendance record
- Follows directions carefully with little variance from instructions given
- Maintains a moderate level of production commensurate with experience level

Supervisory Responsibilities
N/A

Physical Demands
This position requires the use of a respirator for up to the entire shift with occasional breaks.

While performing the duties of this job, the employee is regularly required to stand, walk, bend, use hands to finger, handle, or feel objects, tools, or controls, and reach with hands and arms. The employee is occasionally required to sit, stoop or kneel, and talk or listen.

Normal job duties require standing mostly in place for long periods of time. The worked will be required to regularly (up to several hundred times per hour) swing a small ax or hammer, with moderate to substantial effort, in order to break plastic battery cases and lift up to 50 lbs repetitively.
Employee must pass a Fit to Work Test and Medical Physical.

Training
No prior experience or training is required for the position, but prior hazardous materials/hazardous waste experience is helpful. Upon placement, the employee will receive OJT on the specific functions of the job as listed above under Essential Duties and Responsibilities. - Torch Training may be required  
- Forklift Training may be required  
- Lockout/Tagout Training may be required

Decision Making
Able to carry out instructions furnished in written, oral or diagram form. Ability to communicate effectively with management and co-workers.

Financial Responsibilities
N/A

Communication
Ability to read and interpret documents such as safety rules, training material, operating and maintenance instructions, and procedure manuals. Ability to communicate effectively with other employees.

Health and Safety
Employee will be certified as having received 24 hours of HAZWOPER training prior to placement. 8 hours of annual refresher training will also be provided. Initial training and annual refresher will include instruction on the Emergency Action Plan evacuation procedures. The classroom and OJT training is is designated to meet all OSHA and EPA requirements by instructing facility personnel how to conduct their duties in a safe and healthful manner. Training for DOT Hazmat functions, if applicable, will be accomplished within 90 days of the employee's start date. Contingency plan training will be conducted within 6 months of assignment to the position. This training will include:
- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment
- Key parameters for automatic waste feed cutoff systems
- Communications or alarm systems
- Response to fire or explosions
- Response to ground after contamination incidents
- Shutdown of operations

Equipment Used
- Electric Hoists
- Hatchet
- Carpet Knife
- Pneumatic Chisel
- Forklift
- Granulator with Conveyor Belt System
- Water Hose

Work Environment
While performing the duties of this job, the employee regularly works with hand or power tools and is regularly exposed to fumes or airborne particles and toxic or corrosive chemicals. The employee occasionally works near moving mechanical parts on platforms.

Mechanical means should be used when available for lifting, and employees should only lift 50 lbs or less.

The noise level in the work environment ranges from moderate to very loud.

Employee’s Signature ________________________________ Date ________________________________

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ENVIRONMENTAL MANAGER

Summary
The primary responsibility of the Environmental Manager is to ensure that the facility operates in accordance with all applicable federal, state, provincial, and local environmental regulations.

Duties and responsibilities are carried out by following all corporate directives as well as by regular self-monitoring to assure continued compliance with all requirements. In carrying out these functions, this person will assert the following responsibilities:

The position reports directly to the Facility Manager. The position is responsible to the corporate EHS staff and is expected to coordinate successfully with all on site EHS personnel to meet unified compliance expectations.

Normal Business Hours: 8 a.m. to 4:30 p.m. M-Fr

Essential Duties & Responsibilities
1. Manage operations within State and Federal EPA guidelines by maintaining compliance with all aspects of Part B Permit.
2. Ensure continued facility environmental integrity by implementing BMP's (best management practices) in battery recycling process.
3. Implement applicable waste minimization procedures.
4. Ensure that all hazardous materials/hazardous wastes leaving the facility will be transported safely according to applicable DOT regulations.
5. Maintain proper inventories of hazardous materials and hazardous wastes.
6. Direct the facility personnel training program.
8. Prepare all required reports.
9. Control material handling practices in order to prevent foreseeable hazards.
10. Ensure that the Contingency Plan is ready to execute at all times including proper evacuation and/or emergency response procedures, emergency equipment readiness and training.
11. Manage and maintain Waste Tracking System.
12. Manage and maintain facility inventories.
13. Other duties as assigned.

Other Duties

Qualifications
Bachelor's Degree desired or Associates Degree with 4 years of experience in one or more of the following areas:
- Safety Management.
- Environmental Management.

Experience/Skills in the following areas:
- Thorough knowledge of ISO quality-assurance requirements.
- Considerable tact and human relations skills in interacting with all levels of management and plant employees.
- Good problem-solving and negotiating skills.
- Working knowledge of Office Suite computer programs.

Professional accreditation from any recognized authority is preferred. Accreditation's can be for any of the following areas: HR Management, ISO compliance, lead auditor or OSHA compliance.

Must have the ability to operate a computer performing spreadsheet and word-processing functions. Trained in working with Word, Excel, Power Point and Outlook (and/or other contact/date book programs).

- Performs all duties in a safe manner.
- Maintains good hygiene practices.

https://eservices.paychex.com/secure/cs_jobdescriptions_print.aspx?id=mZ7Uxg2rwSo=&n...  2/1/2017
Must be/become CPR and First-Aid Certified within 90 days of start date.
Must have a working knowledge of EPA and DOT requirements.
Follows directions carefully with little variance from instructions given.
Excellent attendance is expected. Will be at work every day unless pre-arranged with the Facility Manager and/or HR.
Must have good written and verbal communication skills.

The pre-placement requirements described in this section are required of all persons in this job category. Any of the personal protective equipment (PPE) described in this section may need to be worn on occasion or on a regular basis.

Miscellaneous personal protective equipment is required to be worn for the job including: Negative or Positive pressure half face or full face piece respirator, protective steel-toe boots, protective gloves, safety glasses or chemical splash goggles, face shield, fall protection, Tyvek suit and hearing protection. Other miscellaneous supports may be used for some functions. The pre-placement physical includes a pulmonary function test and completion of the OSHA Respirator Medical Evaluation Questionnaire for the purpose of determining ability to wear a respirator.

The position requires a pre-placement physical exam and biological monitoring with the purpose of comparing the physical abilities to the specific physical requirements if the job and establishing medical baselines.

Initial blood-lead/ZPP, blood and urine cadmium, and beta-2 micro globulin testing is required prior to placement if the Environmental Manager is reasonably excepted to be exposed at or above the action level to lead or cadmium on 30 or more days per year. Initial biological monitoring levels below OSHA action levels required for placement if this level of exposure is expected.

**Supervisory Responsibilities**

**Physical Demands**

While performing the duties of this job, the employee is regularly required to talk, hear, use hands to finger or handle objects such as computer key boards, equipment, tools, or controls, and reach with hands and arms. Work requires sitting, standing, and/or walking for periods of five hours or more, moving and examining objects at high and low reach, and reading for periods of three hours or more.

Work is varied in nature and is performed with frequent interruptions. Work requires close attention to detail and accuracy. Occasional mental stress is involved in completing QA activities with regard to physicians and ancillary departments departments and interrelationships.

The employee must regularly lift and/or move up to 5 pounds, occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include near and far vision.

The position requires the use of a respirator periodically.

**Training**

**Decision Making**

- Ability to apply common sense understanding to carry out instructions furnished in written, oral, or diagram form.
- Ability to deal with problems and conflicts involving many variables.
- Ability to interpret policies and procedures and to apply them in specific situations.

**Financial Responsibilities**

**Communication**

- Ability to read and interpret documents such as technical publications, regulations, safety rules, procedure manuals and audit forms.
- Ability to write professional correspondence.
- Ability to speak clearly and effectively, using proper dialogue in a professional manner, in a one-on-one situation with customers and other employees, both in person and on the phone.

**Results of Action**

**Equipment Used**
**Work Environment**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee regularly works both inside and/or outside. The working environment is a typical office environment, but requires occasionally walking out into the plant. The environment is typical of an industrial environment. The noise level in the work environment is normally quiet to moderate but is occasionally loud while in the plant.

Employee's Signature ____________________________ Date ____________

https://eservices.paychex.com/secure/cs_jobdescriptions_print.aspx?id=mZ7Uxg2rwSo=&n...  2/1/2017
PLANT MANAGER

Job Code: Division:
Branch: OHIO DIVISION Department: GENERAL
Reports To: Senior VP Pay Grade:
FLSA Status: Exempt Employee Type: FULL TIME
Prepared By: Michael Hunter Date Prepared: 03/13/2015
Approved By: Date Approved:

Summary
Responsible for the day to day operations of the facility under the direction of Retrieve’s VP of East Coast Operations.

Normal Hours: Open Hours may vary day to day.

Essential Duties & Responsibilities
- Carry out managerial responsibilities with the organizations policies & applicable laws.

Responsibilities include but are not limited to:
- Responsible for employee training, assigning and directing all work assignments, assisting in disciplining employees, addressing complaints and resolving problems.
- Facilitate and participate in any problem solving to improve production rates, communication and efficiency.
- Manage and communicate accurate inventory levels within the facility.
- Appropriately manage resources to assure materials are received, processed, and shipped accurately and according to Retrieve policies & procedures.
- Oversee and interact with visitors during tours/visits.
- Responsible for compliance of all areas of the facility in accordance with company policies and procedures.
- Fulfill administrative duties by attending staff meetings, implementing ideas and planned projects.
- Manage and coordinate the overall maintenance requirements of the facility in collaboration with the Maintenance Manager.
- Manage and coordinate overall site security according to Retrieve policy to ensure unauthorized personnel are accompanied while in the plant.
- Help employees meet their potential.
- Other duties as assigned.

Other Duties
- Operates forklift to move materials into or out of the department.
- Organizing, sorting and selecting material for processing.
- May be required to assist in sorting of batteries and department cleanup.
- Working with other areas of operation to improve communication efficiency.
- Other duties and tasks assigned as time allows.

Qualifications
*To perform this job successfully, an individual must be able to perform each essential duty satisfactorily. The requirements listed below are representative of the knowledge, skill, and/or ability required. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.*

- Carry out managerial responsibilities of the facility, Team Leader/s and employees to maintain compliance, keep a safe work environment and achieve production goals.
- Performs all duties in a safe environment and achieve production goals.
- Perform all duties in a safe manner and maintain good hygiene practices.
- Excellent attendance is required. Will be at work every day unless pre-arranged with VP of East Coast Operations and/or HR.
- Must be able to perform basic math and have good written verbal and communication skills.
- Working knowledge of the Tracking System and the ability to input and extract the data into the computer.
- Must pass the Attorney General Background Check.
- Collaborate with management team to ensure operations are being run efficiently and effectively to be a cost effective part of the business.

EDUCATION/TRAINING/EXPERIENCE:
- 2 year Associate Degree in business-related field OR 4 or more years of supervisory experience.
- Prior hazardous materials/hazardous waste experience are helpful.
- Employee will be certified as having received 24 hours initial HAZWOPER training prior to placement.
- 40 hour HAZWOPER will successfully be completed.

https://eservices.paychex.com/secure/cs_jobdescriptions_print.aspx?id=EJE/1FFMXko=&n... 2/1/2017
- 8 hours of annual refresher training will be provided.
- Initial training and annual refresher will include instruction on the Emergency Action Plan evacuation procedures.
- Upon placement, employee will receive on-the-job training on the specific functions of the job as listed above under Essential Duties & Responsibilities.

This classroom and on-the-job training is designed to meet all OSHA and EPA requirements by instructing facility personnel how to conduct their duties in a safe and healthful manner.
- AG background check required.

Training for DOT Hazmat functions, if applicable, will be accomplished within 90 days. Contingency plan training will be conducted within 6 months of assigned to position. This training will include:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.
- Key parameters for automatic waste feed cutoff systems.
- Response to fire or explosions.
- Response to ground water contamination incidents.
- Shutdown of operations.

**Supervisory Responsibilities**
- Responsible for overall activities of the facility and all other areas of the plant.
- Oversee EH & S activities BPO and verticle.
- Communicate any given issues to the EH & S Manager.
- Responsible for monitoring overall operations of The Big Green Box Department.
- Carry out managerial responsibilities in accordance with the organization's policies and applicable laws.

**ENVIRONMENTAL HEALTH & SAFETY**
- Knowledge of the contents and execution of the Facility Contingency Plan.
- Learn proper cleanup of spills and be able to, at least verbally, demonstrate the proper cleanup of a spill.

**Physical Demands**
The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to stand, walk, bend; use hands to finger, handle, or feel objects, tools, or controls; and reach with hands and arms. The employee is occasionally required to sit, stoop or kneel; and talk or hear.

Normal job duties require standing mostly in one place for long periods of time and taking a few steps back and forth to move batteries.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include: close vision, distance vision, peripheral vision and the ability to adjust focus.

**Training**
PRE-PLACEMENT REQUIREMENTS & PPE: The pre-placement requirements described in this section are required for persons in this job category. Any of the personal protective equipment (PPE) described in this section may need to be worn on occasion or on a regular basis.

- The position requires a pre-placement physical exam and biological monitoring with the purpose of comparing the employee's physical abilities to the specific physical requirements of the job and establishing medical baselines.
- The pre-placement physical includes a pulmonary function test and completion of the OSHA Respirator Medical Evaluation Questionnaire for the purpose of determining ability to wear a respirator.
- Initial blood-lead/ZPP, blood, urine cadmium, and beta-2 micro globulin testing is required prior to placement in order to comply with the OSHA required medical surveillance program.
- Initial biological monitoring levels must be below OSHA action levels required for placement in this department.
- Miscellaneous personal protective equipment is required to be worn for the job including; Negative or Positive pressure 1/2 face of full face piece respirator, PVC boots with steel-toe or leather steel-toe toe boots, chemical resistant gloves or leather gloves, safety glasses or chemical splash goggles, face shield, PVC apron, hard hat or bump cap and hearing protection. Other Miscellaneous supports may be used for some functions.
- Successful completion of all required medical surveillance.

**Decision Making**
Ability to apply common sense to carry out instructions furnished in written, oral or diagram form. Ability to deal with problems involving several concrete variables in standardized situations.
**Financial Responsibilities**

Ability to accurately add, subtract, multiply and divide in all units of measure, using whole numbers, common fractions, and decimals.

**Communication**

Ability to read and interpret documents, such as safety rules, training material, operating and maintenance instructions, and procedure manuals. Ability to communicate effectively with other employees of the organization and management. Ability to fill out the daily production reports.

*Strong supervisory skills are a must for this position.*

**Results of Action**

**Equipment Used**

**Work Environment**

The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly exposed to toxic or caustic chemicals. The employee is frequently exposed to fumes and airborne particles. The employee occasionally works near moving mechanical parts and in outside weather conditions. The employee usually spends a portion of the day operating a forklift to move materials in and out of the processing area.

The noise level in the work environment is usually moderate to loud.

_________________________________________    __________________________
Employee's Signature                        Date
Health and Safety Manager

Summary
The position will primarily serve as support and provide assistance in all matters aligning to the health and safety of Rehrig employees.

Hours: M-Fri.

Daily overtime may be required on short notice, including weekends.

Essential Duties & Responsibilities
Responsibilities include but are not limited to:
- OSHA regulation and requirements
- Assigning and directing work assignments, assisting in disciplining employees, addressing complaints and resolving problems.
- Participate in any problem solving to improve safety procedures.
- Medical surveillance program.
- Maintain the biological monitoring
- Carry out accident/incident investigations
- Assist in training new employees and improve knowledge of existing employees.
- Help employees meet their potential.
- Work with other areas of operation to improve the overall safety of the facilities.
- Coordinating efforts with maintenance for repairs and improvements.
- Working with other areas of operation to improve communication and efficiency.
- Organizing, sorting and satisfying the administrative needs of the safety department.
- Other duties and tasks assigned as time allows.

Other Duties
Other duties may apply as assigned.

Qualifications
- High School Diploma required/ 2 year Associates Degree preferred, but not necessary.
- Basic medical knowledge/injury evaluation experienced preferred.
- Prior Workers Compensation experience in Claims Management a real plus.
- Employee will be certified as having received 24 hours initial HAZWOPER training prior to placement
- 8 hours of annual refresher training will be provided.
- Initial training and annual refresher will include instruction on the Emergency Action Plan evacuation procedures.
- Upon placement, employee will receive on-the-job training on the specific functions of the job as listed above under Essential Duties & Responsibilities.
- This classroom and on-the-job training is designed to meet all OSHA and EPA requirements by instructing facility personnel how to conduct their duties in a safe and healthful manner.

Training for DOT Hazmat functions, if applicable, will be accomplished within 90 days. Contingency plan training will be conducted within 6 months of assignment to position. This training will include:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.
- Key parameters for automatic waste feed cutoff systems.
- Communications or alarm systems.
- Response to fire or explosions.
- Response to ground water contamination incidents.
- Shutdown of operations.

- Have experience or working knowledge of Ohio Workers Compensation and Claims Management.
- Capable of creating weekly detailed incident summaries.
- Proficient in Microsoft Word and Excel and the ability to input and extract data upon request.
- Excellent attention to detail with particular reference to administrative and investigational skills.
- Performs all duties in a safe manner and maintains good hygiene practices.
- Be of outstanding moral character with a high sense of confidentiality.
-Will be expected to become CPR and First-Aid Certified.
-Must have/gain knowledge of EPA and OSHA requirements.
-Follows directions carefully with little variance from instructions given.
-Excellent attendance is required. Will be at work every day unless pre-arranged with supervisor and or HR.
-Proficient in or demonstrate basic math skills, able to load, subtract, multiply and divide in all standard units of measurement.
-Have good written and verbal communication skills.
-Must pass Attorney General Background Check.

The position requires a pre-placement physical exam and biological monitoring with the purpose of comparing the physical abilities to the specific physical requirements if the job and establishing medical baselines.

The pre-placement physical includes a pulmonary function test and completion of the OSHA Respirator Medical Evaluation Questionnaire for the purpose of determining ability to wear a respirator.

Initial blood-lead/ZPP and blood and urine cadmium and Beta-2 micro globulin testing is required prior to placement in order to comply with the OSHA required medical surveillance program.

Initial biological monitoring levels below OSHA action levels required for placement in this department.

Miscellaneous personal protective equipment is required to be worn for the job including: Negative or Positive pressure, 1/2 face or full piece respirator, PVC boots w/ steel toe or leather steel-toe boots, chemical resistant gloves or leather gloves, safety glasses or chemical splash goggles, face shield, PVC apron, hard hat or bump cap and hearing protection. Other miscellaneous supports may be used for some functions.

**Supervisory Responsibilities**

Strong supervisory skills and administrative skills are a must for this position.

**Physical Demands**

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to stand, walk, bend; use hands to finger, handle, or feel objects, tools or controls; and reach with hands and arms. The employee is occasionally required to sit, stoop, or kneel; and talk or hear.

Normal job duties require standing mostly in one place for long periods of time and taking a few steps back and forth to move batteries.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, distance vision, peripheral vision and the ability to adjust focus.

**Training**

**Decision Making**

- Ability to apply common sense to carry out instructions furnished in written, oral, or diagram form.
- Ability to deal with problems involving several concrete variables in standardized situations.

**Financial Responsibilities**

Ability to accurately add, subtract, multiply, divide in all units of measure, using whole numbers, common fractions, and decimals.

**Communication**

Ability to read and interpret documents such as safety rules, training material, operating and maintenance instructions, and procedure manuals. Ability to communicate effectively with other employees of the organization and management. Ability to fill out the daily production reports.

**Results of Action**

**Equipment Used**
**Work Environment**

While performing duties of this job, the employee is regularly exposed to toxic or caustic chemicals. The employee is frequently exposed to fumes and airborne particles. The employee occasionally works near moving mechanical parts and in outside weather conditions. The employee usually spends a portion of the day operating a forklift to move materials in and out of the processing area.

The noise level in the work environment is usually moderate to loud.

Employee's Signature  

Date
JANITORIAL/CUSTODIAL

Job Code:                      Division:
Branch:                        Division:
Reports To:                   Department: GENERAL
FLSA Status:                  Pay Grade:
Prepared By:                  Employee Type: FULL TIME
Approved By:                  Date Prepared: 03/31/2015

Summary
Keeps office and plant area in a clean and orderly condition by performing the following duties. Assists in other departments as needed. Able to work necessary hours associated with each department.

Essential Duties & Responsibilities
- Squeegee, mop, scrub, and vacuum hallways, stairs and office space throughout the facility.
- Cleans restrooms and break areas throughout the facility.
- Use floor scrubbers as needed to clean plant areas as directed.
- Empties trash and garbage containers throughout the facility.
- Notifies the supervisor concerning need for major repairs or additions to lighting, heating, and ventilating equipment or other issues brought to the attention of the employee during daily job tasks.
- Cleans snow and debris from facility entry/exit areas.
- Maintain and communicate needed cleaning supplies with inventory.
- Assists in training new custodial employee's.
- Other duties as assigned.

FLOOR SCRUBBER:
Duties & Responsibilities include:
- Squeegee, mop, scrub, and vacuum hallways, stairs and office space throughout the facility.
- Cleans restrooms and break areas throughout the facility.
- Use floor scrubbers as needed to clean plant areas as directed.
- Empties trash and garbage containers throughout the facility.
- Notifies the supervisor concerning need for major repairs or additions to lighting, heating, and ventilating equipment or other issues brought to the attention of the employee during daily job tasks.
- Cleans snow and debris from facility entry/exit areas.
- Maintain and communicate needed cleaning supplies with inventory.
- Assists in training new custodial employee's.
- Other duties as assigned.

Other Duties
Other duties may apply as assigned.

Qualifications
- Must have or become L.P. gas scrubber certified.
- Must have or become forklift certified.
- Good verbal and communication skills.
- Must pay close attention to details.
- Must have excellent attendance record.
- Must have or gain knowledge of all chemicals used in this department.
- Must be reliable.
- Must demonstrate the ability to make mature decisions.
- Must submit a daily report of all jobs done.
- Employee needs to be familiar with all of the facility.

Supervisory Responsibilities

Physical Demands

Training
No prior experience or training is required for the position, but prior hazardous materials/hazardous waste experience is helpful. Employee will be certified as having received 24 hours initial HAZWOPER training prior to placement. 8 hours
of annual refresher training will be provided. Initial training and annual refresher will include instruction on the Emergency Action Plan evacuation procedures. Upon placement, employee will receive on-the-job training on the specific functions of the job as listed above under Essential Duties & Responsibilities. This classroom and on-the-job training is designed to meet all OSHA and EPA requirements by instructing facility personnel how to conduct their duties in a safe and healthful manner.

Training for DOT Hazmat functions, if applicable, will be accomplished within 90 days. Contingency plan training will be conducted within 6 months of assignment to position. This training will include:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.
- Key parameters for automatic waste feed cutoff systems.
- Communications or alarm systems.
- Response to fire or explosions.
- Response to ground water contamination incidents.
- Shutdown of operations.

Decision Making
- Ability to apply common sense to carry out instructions furnished in written, oral, or diagram form.
- Ability to deal with problems involving several concrete variables in standardized situations.

Financial Responsibilities
Ability to accurately add, subtract, multiply, divide in all units of measure, using whole numbers, common fractions, and decimals.

Communication
- Maintains confidentiality.
- Listens without interrupting.
- Remains open to others' ideas and tries new things.
- Job requires respect and modesty.

Results of Action

Equipment Used

Work Environment
While performing the duties of this job, the employee regularly works with hand or power tools and is regularly exposed to fumes or airborne particles and toxic or corrosive chemicals. The employee occasionally works near moving mechanical parts on platforms.

The noise level in the work environment ranges from moderate to very loud.

_________________________________________  __________________________
Employee's Signature                                      Date
MAINTENANCE

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<td>Prepared By:</td>
<td>Michael Hunter</td>
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Summary
The maintenance technician position is responsible for performing highly diversified duties to install, troubleshoot, repair and maintain production and facility equipment according to safety, predictive and productive maintenance systems and processes to support the achievement of the site’s business goals and objectives.

Essential Duties & Responsibilities
Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

Perform highly diversified duties to install and maintain production machines and the plant facility’s equipment. Provide emergency/unscheduled repairs of production equipment during production and performs scheduled maintenance repairs of production equipment during machine service. Perform simple machinist duties and responsibilities. Perform mechanic skills including, but not limited to, mechanical, electrical, pneumatic, hydraulic, troubleshooting and repair of production machines. Read and interpret equipment manuals and work orders to perform required maintenance and service. Diagnose problems, replace or repair parts, test and make adjustments. Perform regular preventive maintenance on machines, equipment and plant facilities. Perform a variety of plumbing maintenance and carpentry functions. Use a variety of hand and power tools, electric meters and material handling equipment in performing duties. Detect faulty operations, defective material and report those and any unusual situations to proper supervision. Comply with safety regulations and maintain clean and orderly work areas.

Other Duties

Qualifications
Documentation of an electrical degree, diploma, or certification of completion for studies of electricity or documentation of any state Journeyman’s Electrical License current or expired. Three years industrial maintenance experience preferred, but one year minimum. Available to work any shift including overtime, holidays, weekends, and shutdowns. Troubleshooting and problem-solving skills required. Strong electrical and mechanical knowledge preferred, including motor control, hydraulic/pneumatics, programmable logic controllers, robotics, variable frequency drives, and precision mechanical assemblies. Required experience: Maintenance, CNC, Electrical, HVAC: 1 year

Supervisory Responsibilities
This position has no supervisory responsibilities.

Physical Demands
The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to stand, walk, bend; use hands to finger, handle, or feel objects, tools, or controls; and reach with hands and arms. The employee is occasionally required to sit, stoop or kneel; and talk or hear.

The position will occasionally require the use of a negative pressure respirator and/or the use of chemically resistant clothing such as Tyvek suits for up to the entire shift with occasional breaks.

Normal job duties require standing mostly in one place for long periods of time and taking a few steps back and forth to...
move batteries.

The employee must frequently lift and/or move up to 10 pounds and occasionally lift and/or move up to 50 pounds. Specific vision abilities required by this job include close vision, distance vision, peripheral vision and the ability to adjust focus.

Training

Decision Making
Ability to apply common sense to carry out instructions furnished in written, oral, or diagram form. Ability to deal with problems involving several concrete variables in standardized situations. Ability to define problems, collect data, establish facts and draw valid conclusions. Ability to interpret an extensive variety of technical instructions in mathematical or diagram form and deal with several abstract and concrete variables.

Financial Responsibilities

Communication

Results of Action

Equipment Used

Work Environment
While performing the duties of this job, the employee is frequently exposed to fumes or airborne particles, moving mechanical parts and vibration. The noise level in the work environment and job sites can be loud.

__________________________________________________________________________
Employee's Signature

Date
NICKEL DEPARTMENT SUPERVISOR

Job Code: Division:
Branch: OHIO DIVISION Department: NICKEL
Reports To: Plant Manager Pay Grade: 
FLSA Status: Non-Exempt Employee Type: FULL TIME
Prepared By: MICHAEL HUNTER Date Prepared: 04/16/2015
Approved By: Date Approved:

Summary
Responsible for the day to day operations of the Nickel area under the direction of Retriev's Technical Director and the VP of East Coast Operations.

Hours: 6:00 a.m. to 2:30 p.m.
Daily OT required on short notice.

Essential Duties & Responsibilities
- Carry out supervisory responsibilities with the organizations policies and applicable laws.
- Assigning and directing work assignments, assisting in disciplining employees, addressing complaints and resolving problems.
- Participate in any problem solving to improve production rates.
- Interact with visitors during tours/visits.
- Accurately records inbound and outbound weights of material being processed.
- Keep the phases in compliance.
- Receive materials according to the Waste Analysis Plan.
- Keep accurate records of all scrap metals for recycling. (I.E. Nickel, Copper, Steel, etc.)
- Attaches labels to waste and material containers to identify contents.
- Train new employees and improve knowledge of existing employees.
- May be required to work on the production line when needed.
- Help employees meet their potential.
- Monitor/manage production and inventory. Accurately complete daily production reports.
- Coordinating efforts with maintenance for repairs and improvements.
- Work with other areas of operation to improve communication and efficiency.
- Attend weekly supervisor/manager meetings and report on previous week and planned future week's activities.
- Other duties as assigned.

Other Duties
- Operates forklift to move materials into or out of the department.
- Organizing, sorting and selecting materials for processing.
- May be required to assist in processing of batteries and department cleanup.
- Working with other areas of operation to improve communication and efficiency.
- Other tasks assigned as time allows.

Qualifications
The pre-placement requirements described in this section are required of all persons in this job category. Any of the personal protective equipment (PPE) described in this section may need to be worn on occasion or on a regular basis.

Supervisory Responsibilities
Directly supervises all employees of the Pb Lead Acid Department. Carries out supervisory responsibilities in accordance with the organization's policies and applicable laws.

Responsibilities include: training employees, planning, assigning, and directing work, appraising performance, rewarding and disciplining employees, addressing complaints and resolving problems.

Environmental Health & Safety:
- Knowledge of the contents and execution of the Facility Contingency Plan.
- Learn proper cleanup of spills and be able to, at least verbally, demonstrate the proper cleanup of a spill.

Physical Demands
The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

**Training**
- 2 year Associate Degree in business-related field OR 4 or more years of supervisory experience.
- Prior hazardous materials/hazardous waste experience is helpful.
- Employee will be certified as having received 24 hours initial HAZWOPER training prior to placement.
- 40 hour HAZWOPER training will be successfully completed.
- 8 hours of annual refresher training will be provided.
- Initial training and annual refresher will include instruction on the Emergency Action Plan evacuation procedures.
- Upon placement, employee will receive on-the-job training on the specific functions of the job as listed above under Essential Duties & Responsibilities. This classroom and on-the-job training is designed to meet all OSHA and EPA requirements by instructing facility personnel how to conduct their duties in a safe and healthful manner.
- Attorney General Background Check required.

Training for DOT Hazmat functions, if applicable, will be accomplished within 90 days. Contingency plan training will be conducted within 6 months of assignment to position. This training will include:
- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.
- Key parameters for automatic waste feed cutoff systems.
- Communication or alarm systems.
- Response to fire or explosions.
- Response to ground water contamination incidents.
- Shutdown of operations.

**Decision Making**
Ability to apply common sense to carry out instructions furnished in written, oral, or diagram form. Ability to deal with problems involving several concrete variables in standardized situations.

**Financial Responsibilities**
Ability to accurately add, subtract, multiply, and divide in all units of measure, using whole numbers, common fractions, and decimals.

**Communication**

**Results of Action**

**Equipment Used**

**Work Environment**
The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

______________________________
Employee's Signature

______________________________
Date
SHIPPING/RECEIVING ASSOCIATE

Summary
Ships and receives various types of industrial or commercial batteries. Assists in other departments as needed.

Essential Duties & Responsibilities

Schedule Loads:
- Schedule incoming and outgoing loads within the Material Tracking System.
- Coordinate incoming and outgoing loads with daily operations, sales and marketing.

Preparing Loads for Shipment:
- Accuracy and documentation of material being shipped in accordance with all regulatory compliance, imports/exports, permits and company policies.
- Proper material handling and packaging as required for designated facility.
- Shipments will be either Domestic or International.
- Create packaging lists with SharePoint.
- Create either a BOL or Manifest for shipment.

Receive Material and Complete Waste Analysis Plan:
- Accuracy and documentation of all material received.
- Proper material handling and packaging as required.
- Properly enter the material into the Tracking System.
- Reports any non-compliance Material Tracking System items as directed. In accordance with all regulatory compliance, import/export permits and written company policy.

Other Duties
Other duties may apply as needed.

Qualifications
- Performs all duties in a safe manner with close supervision.
- Maintains good hygiene practices and demonstrates consistency in following policies and procedures.
- Has an acceptable attendance record.
- Follows directions carefully with little variance from instructions given.
- Ability to perform basic carpentry skills, ability to read a tape measure and have basic knowledge of the operation of circular/table saws and a nail gun.
- Maintains a moderate level of production commensurate with experience level.
- AG background check required.
- Demonstrate a safe manner of forklift operation.

The pre-placement requirements described in this section are required of all persons in this job category. Any of the personal protective equipment (PPE) described in this section may need to be worn on occasion or on a regular basis.

Miscellaneous personal protective equipment is required to be worn for the job including: Negative or Positive pressure half face or full face piece respirator, PVC steel-toe/leather-toe boots, chemical resistant gloves, safety glasses or chemical splash goggles, face shield, PVC Apron, hard hat or bump cap and hearing protection. Other miscellaneous supports may be used for some functions.

The pre-placement physical includes a pulmonary function test and completion of the OSHA Respirator Medical Evaluation Questionnaire for the purpose of determining ability to wear a respirator.

The position requires a pre-placement physical exam and biological monitoring with the purpose of comparing the physical abilities to the specific physical requirements if the job and establishing medical baselines.

Initial blood-lead/ZPP, blood and urine cadmium, and beta-2 micro globulin testing is required prior to placement if the Environmental Manager is reasonably expected to be exposed at or above the action level to lead or cadmium on 30 or more days per year. Initial biological monitoring levels below OSHA action levels required for placement if this level of exposure is expected.
Must successfully complete all required medical surveillance.

**Supervisory Responsibilities**

**Physical Demands**
The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform essential functions.

While performing the duties of this job, the employee is regularly required to stand, walk, bend; use hands to finger, handle, or feel objects, tools, or controls; and reach with hands and arms. The employee is occasionally required to sit, stoop or kneel; and talk or hear.

Normal job duties require standing mostly in one place for long periods of time and taking a few steps back and forth to move batteries.

The employee must regularly lift and/or move up to 15 pounds (up to 150 times per hour), frequently lift and/or move up to 30 pounds (up to 60 times per hour), and occasionally lift up to 60 pounds (up to 30 times per day). When processing lead acid battery plates, the employee must lift and move up to 100 pounds, up to 20 times per hour. The employee must move drums weighing up to 500 pounds by hand, either by using a drum cart or by “breaking” and rolling the drum. Specific vision abilities required by this job include close vision, ability to judge distance, color vision and the ability to adjust focus.

**Training**
- Prior hazardous materials/hazardous waste experience is helpful.
- Employee will be certified as having received 24 hours initial HAZWOPER training prior to placement.
- 40 hour HAZWOPER training will be successfully completed.
- 8 hours of annual refresher training will be provided.
- Initial training and annual refresher will include instruction on the Emergency Action Plan evacuation procedures.
- Upon placement, employee will receive on-the-job training on the specific functions of the job as listed above under Essential Duties & Responsibilities. This classroom and on-the-job training is designed to meet all OSHA and EPA requirements by instructing facility personnel how to conduct their duties in a safe and healthful manner.

Training for DOT Hazmat functions, if applicable, will be accomplished within 90 days. Contingency plan training will be conducted within 6 months of assignment to position. This training will include:
> Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.
> Key parameters for automatic waste feed cutoff systems.
> Communication or alarm systems.
> Response to fire or explosions.
> Response to ground water contamination incidents.
> Shutdown of operations.

**Decision Making**
Ability to apply common sense to carry out instructions furnished in written, oral, or diagram form. Ability to deal with problems involving several concrete variables in standardized situations.

**Financial Responsibilities**
Ability to accurately add, subtract, multiply, and divide in all units of measure, using whole numbers, common fractions, and decimals.

**Communication**
Ability to read and interpret documents such as safety rules, training material, operating and maintenance instructions, and procedures manuals. Ability to communicate effectively with other employees of the organization and management.

**Results of Action**

**Equipment Used**

**Work Environment**
The work environment characteristics described here are representative of those an employee encounters while performing the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

While performing the duties of this job, the employee is regularly exposed to toxic or caustic chemicals. The employee is frequently exposed to fumes and airborne particles. The employee occasionally works near moving mechanical parts and in outside weather conditions. The employee usually spends a portion of the day operating a forklift to move materials in and out of the processing area.

The noise level in the work environment is usually moderate to loud.

__________________________  ______________
Employee's Signature            Date
TRACER

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Summary

Responsible for the daily Tracking System Support duties for Retriev Operations. Other duties are assigned as needed.

Essential Duties & Responsibilities

Entering/maintaining data into tracking system for operations
Work closely with client services to support tracking system needs
Print tags and other needed information from tracking system
Providing daily reports as needed regarding daily activities
Responsible for monitoring inventory levels and inventory aging
Other assigned duties

Other Duties

Qualifications

Follows directions carefully with little variance from instructions given
Excellent attendance is required
Must be able to perform basic math, computer skills and good written and verbal communication skills.

Supervisory Responsibilities

None

Physical Demands

While performing the duties of this job, the employee is occasionally required to stand, walk, bend, use hands, to finger, handle, or feel objects, or controls, and reach with hands and arms. The employee is frequently required to sit, talk, and hear and is occasionally required to stoop or kneel.

The employee must occasionally lift and move up to 5-10 pounds and lift and move up to 15 pounds infrequently. Specific vision abilities required by this job include close vision, ability to judge distance, color vision and the ability to adjust focus.

Training

No prior experience or training is required for the position.

Decision Making

Ability to apply common sense to carry out instructions furnished in written, oral or diagram form. Ability to deal with problems involving several concrete variables in standardized situations.

Financial Responsibilities

Communication

Results of Action

Equipment Used

https://eservices.paychex.com/secure/cs_jobdescriptions_print.aspx?id=rZ5XhzRAnms=&n... 2/1/2017
Work Environment

While performing the duties of this job, the employee is occasionally exposed to fumes or airborne particles. The noise level in the work environment ranges from low to very moderate.

__________________________________________________________________________

Employee's Signature

__________________________________________________________________________

Date

https://eservices.paychex.com/secure/cs_jobdescriptions_print.aspx?id=rZ5XhzRAmns=&n... 2/1/2017
Training Summary

Course: Accident Prevention

Course Summary

As per the Retriev site orientation and employee safety training, all Retriev new hires are given training on accident prevention. The importance of this training is to properly identify and mitigate hazards in the workplace and to generate a safety culture that all accidents are preventable. Due to hazards in the workplace, proper hazard assessments must be completed for all routine and non routine tasks. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- Incident/Accident reporting
- Incident/Accident analysis
- Types of injuries
- Hazards and Risk
- Accident Investigates
- Employee roles and responsibilities
- Post accident drug screening
**Training Summary**

**Course:** Cadmium Safety

**Course Summary**

As per 1910.1027 (Cadmium) Retriev Technology provides Cadmium safety training to all employees that could potentially be exposed to cadmium concentrations at or above the regulatory action level found in 29 CFR 1910.1027. Individual components found within this training matrix are found in the bulleted list below.

**Course Components**

- Engineering/Ventilation Controls
- Health Effects
- Air Monitoring
- Medical Surveillance
- PPE
Training Summary

Course: Communication and Alarm Systems

Course Summary

As part of the Retriev initial HAZWOPER training program and included as part of the initial site specific orientation training, employees are advised of the current intrusion alarm systems and facility alarm notifications as it pertains to each facility. Retriev currently utilizes two way radio and mobile phone communication that will be used to coordinate and advise during emergency situations. Certain designated employees are given communication devices, alarm codes and contact information for local emergency services in case of an emergency situation. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- Baltimore operations
  1. Muster point
  2. Pull stations
  3. Exit routes
  4. Emergency Contact Numbers

- 265 and 295 Lancaster Operations
  1. Muster Point
  2. Pull stations
  3. Exit Routes
  4. Emergency Contact Numbers
Training Summary

Course: Contingency Plan Implementation

Course Summary

As part of the general safety training for all employees and the requirements of the Retriev operating permit, Retriev has developed a Contingency Plan to help respond to an unexpected environmental incident. As part of the Retriev site orientation and training, employees are instructed on the importance of this plan and where copies of this plan are located. The Contingency Plan also names key employees and their role in the implementation of this plan. Please see bulleted topic below discussed during this training module.

Course Components

- What is a Contingency Plan
- Where the Contingency Plan is located
- Key employees and their roles and responsibilities.
- Components of the Contingency Plan
- Evacuation Procedures
- Spill response and Cleanup
- Basic first Aid of employees
- Decontamination (equipment and personnel)
- Reporting Requirements
Training Summary

Course: Emergency Action Plan (Evacuation)

Course Summary

As part of the general safety training for all employees and the requirements of the Retriev operating permit, Retriev has developed and emergency action plan that would outline safe evacuation of all employees in the event of a significant incident or release that would potentially cause death or serious bodily harm to Retriev personnel. Please see bulleted topic below discussed during this training module.

Course Components

- What is an Emergency Action Plan
- Emergency phone numbers.
- Alarm pull stations (locations)
- Audible and visual alarms (locations)
- Exits routes per department
- Fire Extinguisher locations and safe usage
- Supervisors (roles and responsibilities)
- Head counting
- Assembly points
Training Summary

Course: First Aid/CPR

Course Summary

As part of the requirements for managers, supervisors, and select team leaders and with regards to the safety and health of all employees, Retriev provides First Aid and CPR training via the American Red Cross or the American Heart Association to the selected groups within the company. These trained employees are designated as first responder’s for all shifts to assist in non emergency medical needs or to provide immediate care to employees during time of emergency and until proper medical teams are summoned and have arrived onsite. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- First Aid
- CPR
- AED
Training Summary
Revision 0.1

Course: Flood Control Supervisor

Course Summary
Retriev Technology provides an annual flood control supervisor course for select personnel working at Retriev Technologies that could potentially be responsible to supervise and assist with flood control procedures identified in Section 4.4.3 of the Contingency Plan. At least six Retriev personnel with a job description of Facility Manager, Environmental Manager, H&S Manager, and/or Supervisor/Lead will be required to receive the annual training. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- Review of Section 4.4.3 of Contingency Plan
- Review of MuscleWall assembly and takedown instructions
- Review list of flood control personnel maintained by the Emergency Coordinator
- Perform temporary installation of at least 10 wall sections, one of which must be an inside or outside corner section
Training Summary

Course: Right-to-Know / Safety Data Sheets

Course Summary

As per the 29 CFR 1910.1200 (Hazard Communication) and to include the new GHS Globally Harmonized System of labeling chemicals and the Retriev 24 hr HAZWOPER technician level training, all Retriev employees are provide the “Right to Know” or hazard communication training upon initial hiring and it is also provided as a refresher component during our 8 hour HAZWOPER refresher course. Individual components found within this training matrix are found in the bulleted list below. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- General requirements (29 CFR 1910.178)
- Types and classifications of Powered Industrial trucks.
- Safe operation.
- Forklift Pre-shift Inspection.
- Site specific hazards
- Battery Charging / LPG safety
- Final exam
- Operator Evaluation.
Training Summary

Course: HAZMAT/DOT/Manifesting

Course Summary

As per 49 CFR Subpart H 172.300 (et all) each person or business who offers hazardous materials for transportation shall be properly trained in accordance with this subpart. All Retriev personnel involved with tracking, packaging and shipping hazardous materials receives this training component. Listed below are subjects covered under this training module.

Course Components

- Markings
- Labels
- Placarding 49CFR 172.500-560
- Function Specific Safety Training (Emergency Response)
- Use of the Emergency Response Guidebook
- HAZCOM review
- Incident Reporting
- Manifesting Requirements
Training Summary

Course: HAZWOPER 8 hour Refresher.

Course Summary

As per 1910.120 (Hazardous Waste Operations and Emergency Response) Retriev Technology provides an 8 hour Hazwoper Refresher course for all employees working at Retriev Technologies on an annual basis following the initial 24 or 40 hour training. The HAZWOPER refresher course is required to be provided as an update to the initial 24 or 40 hour course and must be provided within 15 months of the initial training date. The components of this training included in the 8 hour class and are shown in the bulleted list below.

Course Components

- TSD Facility overview and training requirements
- DOT site specific requirements as it pertains to Retriev business
- Hazard Communication to include the GHS requirements.
- Hazard control
  1. Respiratory Protection
  2. PPE
  3. Noise
- Drum/Material handling
- Hazard/Risk assessment
- Installation overview of portable/modular wall for flood protection of 265 storage unit
Training Summary

Course: HAZWOPER Emergency Response

Course Summary

As per 1910.120 (Hazardous Waste Operations and Emergency Response) Retriev Technology provides a 24 hour Technician level course for all non supervisory personnel and a 40 hour Hazwoper course for all supervisors and managers working at Retriev Technologies that could potentially be responsible to manage or assist with onsite cleanup activities with regard to hazardous waste and hazardous substances. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- TSD Facility overview and training requirements
- Decontamination
- Emergency Response to Hazardous substances
- Emergency Response to Hazardous Waste
- Handling drum and containers
- RCRA Sites
- Medical surveillance
- Site control
- Site Characterization
- Training
- Installation overview of portable/modular wall for flood protection of 265 storage unit
Training Summary

Course: HAZWOPER

Course Summary
As per 1910.120 (Hazardous waste operations and emergency response) Retriev Technology provides at a minimum a 24 hour Hazwoper course for all employees working at Retriev Technologies. A HAZWOPER 40 hour is provided to supervisors and all managers that could potentially be involved in site cleanup activities. There are other important components of this training included in the 24 hour class and are shown in the bulleted list below.

Course Components

- TSD Facility overview and training requirements
- DOT site specific requirements as it pertains to Retriev business
- Hazard Communication to include the GHS requirements.
- Hazard control
  1. Respiratory Protection
  2. PPE
  3. Noise
- Drum/Material handling
- Hazard/Risk assessment
Training Summary

Course: Lead Safety

Course Summary

As per 1910.1025 (Lead) Retriev Technology provides Lead safety training to all employees that could potentially be exposed to lead concentrations at or above the regulatory action level found in 29 CFR 1910.1025. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- Engineering/Ventilation Controls
- Health Effects
- Air Monitoring
- Permissible Exposure Limits
- Medical Surveillance
- PPE
Training Summary

Course: Maintenance

Course Summary

As part of the on the job training for all maintenance employees, maintenance technicians must undergo extensive training before they are given the opportunity to work without direct supervision and given assignments on back shifts. Individual components found within this training program are found in the bulleted list below.

Course Components

- Facility main disconnects locations (Water, Gas, Electrical)
- LOTO
- Electrical Safety (Ark Flash)
- Retort (Oven Maintenance)
- Preventative Maintenance
- Confined Space
- Facility Security
- Rigging
- Hoist Inspections
Training Summary

Course: On the Job Training

Course Summary

Following the initial site orientation and HAZWOPER training, Retriev operations employees to include all job positions are mentored through an on-the-job training program that allows new hire employees the opportunity to continue the learning process relative to the job functions of which they were hired. On the job training is very important with respect to the safety and health of employees as well as respect to environmental compliance throughout the facility. Elements found within the on-the-job training program are listed below.

Course Components

- Area specific training, (Wet and Dry Nickel, Lead Acid, Maintenance, Janitorial, Shipping and Receiving and Facility Supervision)
- Donning and Doffing PPE (PPE Required for each department)
- Job related tool usage (Based on understanding and Performance)
- Breaking Techniques
- Housekeeping and Cleanup
- Labeling
- Material Tracking
Training Summary

Course: OSHA, RCRA, OAC

Course Summary

As per the Retriev site orientation and employee safety training, all Retriev new hires are given training on what regulatory agencies govern the operations of Retriev. The importance of this training is to provide and understanding of what regulations will define the operations as well as what penalties could be imposed for non-compliance. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- OSHA (Occupational Health and Safety Administration)
- RCRA (Resource Conservation and Recovery Act)
- OAC (Ohio Administrative Code)
Training Summary

Course: Respiratory Protection

Course Summary

As per 29 CFR 1910.134 (Respiratory Protection), all Retriev employees who are exposed to breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays or vapors shall be provided with the proper respirator suitable to protect against such contaminants. This shall be accomplished only after engineering and administrative controls have been implemented but do not reduce exposure to below regulatory limits. All Retriev employees upon hire will receive this training as part of the initial HAZWOPER 24 hour training. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- General requirements of the OSHA standard.
- Written operating procedures
- Proper selection
- Training and fitting
- Cleaning and disinfecting.
- Inspection and maintenance
- Work area surveillance
Training Summary

Course: Right-to-Know / Safety Data Sheets

Course Summary

As per the 29 CFR 1910.1200 (Hazard Communication) and to include the new GHS Globally Harmonized System of labeling chemicals and the Retriev 24 hr HAZWOPER technician level training, all Retriev employees are provide the “Right to Know” or hazard communication training upon initial hiring and it is also provided as a refresher component during our 8 hour HAZWOPER refresher course. Individual components found within this training matrix are found in the bulleted list below. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- General requirements  (29 CFR 1910.1200)
- Hazard Communication standard
- Retriev written HAZCOM program
- Location and availability of the written program.
- Labeling Requirements
- How to read labels/SDS’s
- Health and physical hazards
- Chemical Inventory
**Training Summary**

**Course:** Safe Handling/Transfer/Storage of Hazardous Materials

**Course Summary**

As part of the general site specific orientation and the 24 hour Hazwoper training, Retriev employees are provided specific training in regards to safe handling, transfer and storage of hazardous materials. The process of recycling batteries is inherently dangerous due to the electrolyte component within the chemistries of batteries and the danger associated with the recycle process itself. Because of the serious health hazards and risk associated with the process it is appropriate to provide relevant training to mitigate the risk of exposure to hazardous materials as well as a release into the environment. Listed below are subjects covered under this training module.

**Course Components**

- Site specific (Hazardous Chemical Inventory)
- Acids & Bases
- Environmental Health and Safety risks
- Engineering Controls
- PPE
- SDS’s (locations)
- Drum Safety
Training Summary

Course: Shutdown Operations

Course Summary

As part of the Retriev on the job training program and included in the initial site specific training provided upon hire, employees are taught the importance of the proper shutdown of operations to avoid safety related or environmental incidents. Proper shut down is also noted in various SOP’s that are related to equipment usage and facility safety. To ensure facility safety and to mitigate property damage it is imperative that all equipment be properly shut down. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- Dust collectors
- Retort furnaces
- Storage tanks
- Secondary containments
- Electrical mains
- Security systems
Training Summary

Course: Standard Operating Procedures

Course Summary

As per 29 CFR 1910.120 App C (HAZWOPER) (et al), Standard operating procedures are developed to minimize employee contact to hazardous substances and to minimize risk during routine tasks for each job. Retriev has compiled SOP’s for all tasks related to that each specific task and requires every employee to read and understand before performing such job related functions. It is important to mention that an SOP is a working document and while each step noted in the SOP should be followed to the letter, hazards can still be identified. When additional hazards are identified the SOP is updated and reviewed with all affected employees. Individual components found within the SOP’s are found in the bulleted list below.

Course Components

- Identify the task
- Identify tools for the job
- Identify PPE for the job
- Identify and provide sequential steps for the task
- Note the hazards associated with the task
- Identify potential risk associated with the task.
- Show examples of end result.
Training Summary

Course: Using, Repairing and Maintaining Equipment

Course Summary

As part of the Retriev on the job training program and included as part of the initial site specific training, employees are taught the importance of safe machine operation, proper maintenance and light repair of equipment related to their job function. This training is directly related to the safety of all equipment operators. Individual components found within this training matrix are found in the bulleted list below.

Course Components

- Equipment identification
- Equipment energy isolation
- Equipment maintenance
- Equipment troubleshooting
- Light equipment repair.