Lithium Battery Recycling Facilities in New York

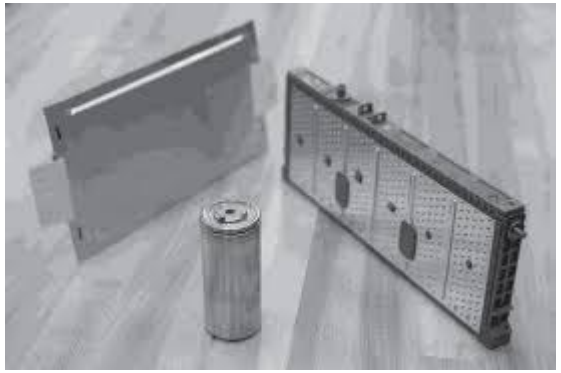
NEWMOA – Hazardous Waste Inspector Training

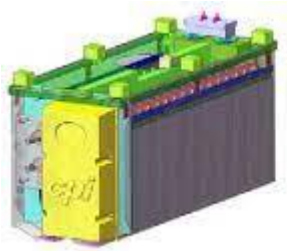
September 14, 2021

Thomas Killeen, PE
Chief, RCRA Compliance & Technical Support Section
NYSDEC Division of Materials Management

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Lithium Batteries





NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Agenda

- Regulatory History of Waste Lithium Batteries
- DEC History
- New York Laws and Regulation
- Lithium Battery Recycling Facilities
  - SungEel – Endicott, NY
  - Li-Cycle – Rochester & Webster, NY

Regulatory History of Lithium Batteries

- The first non-rechargeable lithium batteries were developed in the 1970s, but the first commercially available rechargeable lithium batteries came out in 1991.
- When RCRA became effective in 1980, these batteries were not known to the regulatory agencies.
- Until the universal waste rule went into effect, waste batteries were regulated as characteristic hazardous waste or under Part 266 Subpart G for lead acid batteries.

Regulatory History of Lithium Batteries

- When the universal waste rule for batteries was first proposed in February 1993, lithium batteries were still relatively unknown.
- The federal register for the final universal waste rule of May 11, 1995, only mentions lithium batteries once.
- The federal register specifically focused on batteries with lead, cadmium and mercury.
- New York first adopted the Universal Waste rule on November 28, 1998.

NEW YORK
STATE OF
OPPORTUNITY

Department of
Environmental
Conservation

New York Laws and Regulations

Universal Waste Rule - Batteries

Key provisions of the Universal Waste rule for Batteries:

- 374-3.1(b), 273.2 – Applicability – batteries
- 374-3.1(i), 273.6 – Definitions
- 374-3.1(i)(2) – Batteries
- 374-3.1(i)(3) – Destination Facility
- 374-3.1(i)(14) – Universal Waste Handler
- 374-3.2, 273 Subpart B – Small Quantity Handlers
- 374-3.3, Subpart C – Large Quantity Handlers

Universal Waste Rule - Batteries

Key provisions of the Universal Waste rule for Batteries cont.:

374-3.4 Subpart D – Transporters

374-3.5 Subpart E – Destination Facilities

374-3.6 Subpart F – Import Requirements

374-3.7 Subpart G – Petitions to Include other Wastes

374-3.1(b) Applicability - batteries

(1) Batteries covered under this Subpart. (i) The requirements of this Subpart apply to persons managing batteries, as described in subdivision (i) of this section, except those listed in paragraph (2) of this subdivision.

(ii) Spent lead-acid batteries which are not managed under section 374-1.7 of this Part, are subject to management under this Subpart.

(2) Batteries not covered under this Subpart. The requirements of this Subpart do not apply to persons managing the following batteries: (i) Spent lead-acid batteries that are managed under section 374-1.7 of this Part.

(ii) Batteries, as described in subdivision (i) of this section, that are not yet wastes under Part 371 of this Title, including those that do not meet the criteria for waste generation in paragraph (3) of this subdivision.

(iii) Batteries, as described in subdivision (i) of this section, that are not hazardous waste. A battery is a hazardous waste if it exhibits one or more of the characteristics identified in section 371.3 of this Title.

(3) Generation of waste batteries. (i) A used battery becomes a waste on the date it is discarded (e.g., when sent for reclamation). (ii) An unused battery becomes a waste on the date the handler decides to discard it.

374-3.1(i)(2) – Batteries

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

374-3.1(b)(4) – Destination Facility

‘Destination facility’ means a facility that treats, disposes of, or recycles a particular category of universal waste, except those management activities described in sections 374-3.2(d)(1), (3) and 374-3.3(d)(1), (3) of this Subpart. A facility at which a particular category of universal waste is only accumulated, is not a destination facility for purposes of managing that category of universal waste.

374-3.1(b)(14) – Universal Waste Handler

'Universal waste handler':

(i) Means:

('a') a generator (as defined in this subdivision) of universal waste; or

('b') the owner or operator of a facility, including all contiguous property, that receives universal waste from other universal waste handlers, accumulates universal waste, and sends universal waste to another universal waste handler, to a destination facility, or to a foreign destination.

(ii) Does not mean:

('a') a person who treats (except under the provisions of section 374-3.2(d)(1) or (3); or 374-3.3(d)(1) or (3)), disposes of, or recycles universal waste; or

('b') a person engaged in the off-site transportation of universal waste by air, rail, highway, or water, including a universal waste transfer facility.

374-3.5 Subpart E – Destination Facilities

(a) Applicability.

(1) The owner or operator of a destination facility (as defined in section 374-3.1(i) of this Subpart) is subject to all applicable requirements of Subparts 373-1, 373-2, 373-3, 374-1, Parts 376 and 621 of this Title, and the notification requirement under section 3010 of RCRA.

(2) The owner or operator of a destination facility that recycles a particular universal waste without storing that universal waste before it is recycled must comply with section 371.1(g)(3)(ii) [261.6(c)(2)]of this Title.

374-3.5 Subpart E – Destination Facilities

(b) Off-site shipments.

(1) The owner or operator of a destination facility is prohibited from sending or taking universal waste to a place other than a universal waste handler, another destination facility or foreign destination.

(2) The owner or operator of a destination facility may reject a shipment containing universal waste, or a portion of a shipment containing universal waste. If the owner or operator of the destination facility rejects a shipment or a portion of a shipment, the owner or operator must contact the shipper to notify the shipper of the rejection and to discuss reshipment of the load. The owner or operator of the destination facility must: (i) send the shipment back to the original shipper; or

(ii) if agreed to by both the shipper and the owner or operator of the destination facility, send the shipment to another destination facility.

(3) If the owner or operator of a destination facility receives a shipment containing hazardous waste that is not a universal waste, the owner or operator of the destination facility must immediately notify the appropriate department regional director of the illegal shipment, and provide the name, address, and phone number of the shipper. The department regional director will provide instructions for managing the hazardous waste.

(4) If the owner or operator of a destination facility receives a shipment of non-hazardous, non-universal waste, the owner or operator may manage the waste in any way that is in compliance with applicable Federal or State solid waste regulations.

374-3.5 Subpart E – Destination Facilities

(c) Tracking universal waste shipments.

(1) The owner or operator of a destination facility must keep a record of each shipment of universal waste received at the facility. The record may take the form of a log, invoice, manifest, bill of lading, or other shipping document. The record for each shipment of universal waste received must include the following information:

(i) The name and address of the universal waste handler, destination facility, or foreign shipper from whom the universal waste was sent.

(ii) The quantity of each type of universal waste received (e.g., batteries, pesticides, thermostats).

(iii) The date of receipt of the shipment of universal waste.

(2) The owner or operator of a destination facility must retain the records described in paragraph (1) of this subdivision for at least three years from the date of receipt of a shipment of universal waste.

RCRA Permitting Requirements

Can be found in 6 NYCRR Parts 373 and 621. They are similar to EPA's. Our Part 621 Uniform procedures require some differences in the permitting process from EPA.

All permits are also subject to the State Environmental Quality Review Act regulations as found in 6 NYCRR Part 617. This is the New York Counterpart to the National Environmental Policy Act.

New York State Industrial Hazardous Waste Siting Law

Can be found in the Environmental Conservation Law at §27-11

- Originally established in the late 70s to provide a means for New York to ensure we could meet the hazardous waste disposal capacity requirements imposed by RCRA
- Modified in the late 80s to establish a rigorous procedure to ensure that new hazardous waste facilities can prove they meet a standard for environmental safety and public necessity.

NYS Industrial Hazardous Waste Siting Law

Key Provisions:

§27-1105

1. After the publication of siting criteria pursuant to subdivision one of section 27-1103 of this title, no person may commence construction or operation of the following industrial hazardous waste treatment, storage and disposal facilities, hereinafter referred to as "facility", without having received a certificate of environmental safety and public necessity from the facility siting board as hereinafter provided:

(a) any new off-site facility;

(b) any new commercial facility, wherever situated;

(c) any new incineration facility, wherever situated;

(d) any new land disposal facility, wherever situated; and

(e) any expansion, wherever situated, of the aggregate land disposal capacity of an existing land disposal facility.

Key Provisions (Cont.)

2. Notwithstanding the provisions of subdivision one of this section, the following industrial hazardous waste treatment, storage and disposal facilities shall not be subject to the provisions of this title:

(a) A facility that does not require permits pursuant to title nine of this article;

(b) A land disposal facility located at the site of an existing land disposal facility where both the existing facility is or was and the proposed facility will be used solely for the disposal of non-incinerable residues from the on-site thermal destruction or chemical or aqueous treatment of wastes generated at the site of such facilities;

(c) A facility that has been determined by the department to have no significant environmental impact pursuant to article eight of this chapter; and

(d) Additional facilities, other than land disposal facilities, to be located at the site of an existing facility, the operation of which will be substantially similar to that of the existing facility with respect to the mode of waste management and the type and quantity of hazardous waste being managed.

DEC History with Lithium Battery Handlers

Battery Disposal Technology

- Facility located in Clarence, NY
- Operated a permitted commercial hazardous waste incineration unit primarily deactivating hazardous waste batteries. By the late 90's these were primarily Lithium based batteries.
- By 2002, the facility was owned by Safety Kleen, which was in the process of being purchased by Laidlaw.
- The facility had permitted storage in their warehouse and in their production room. The permit was in the process of being renewed in August 2002. The incinerator had a capacity of about 5 drums of batteries per shift.

Battery Disposal Technology

- The facility regularly stored approximately 100 drums of waste in their production room, despite the limited throughput of the incinerator.
- On August 14, 2002, a drum of lithium batteries caught fire. Facility personnel attempted to put out the fire, and when that was unsuccessful the fire spread, and the facility called the fire department.
- The fire Department was hesitant to use water on this type of fire, so called in a foam truck from the airport. Before the foam truck arrived, the fire had spread to additional structures forcing the fire department to begin to use water.
- The facility was severely damaged.

Battery Disposal Technology – 08/15/2002

Battery Disposal Technology – 08/15/2002

mvc - 334s.jpg

Battery Disposal Technology – 08/15/2002

mvc-345s.jpg

Battery Disposal Technology – 08/15/2002

mvc – 346s.jpg

Battery Disposal Technology – 08/15/2002

MVC-3478.JPG

Battery Disposal Technology

- The storage of excess drums in the processing room contributed to the rapid acceleration of the fire.
- The facility planned to rebuild.
- The draft renewal permit contained a set of stringent storage provisions and upgrades for the facility. Safety Kleen decided to close the facility in lieu of making the upgrades required by the draft renewal permit.

Recent Activity with Lithium Battery Recycling Facilities

First Half 2018:

- At least three separate companies contact staff of my section to inquire on the RCRA requirements for establishing a battery recycling facility at various locations throughout the state.
- At least four of our regional offices were contacted with these same type of inquiries, but not necessarily by the same set of companies.
- To the best of my knowledge, none of these initial inquiries led to a facility moving forward.
- One of the main roadblocks was the Hazardous Waste Siting Law.

Fall 2018:

Two additional facilities make contact with DEC:

- Li-Cycle, a Canadian Company
- SungEel , a Korean Company

Li-Cycle's primary consultant began the process by contacting a number of the Agency's individual programs, including Air, Water, Hazardous Waste and Solid Waste. Following the initial contact, we recommended that Li-Cycle coordinate their inquiries with our Regional Permit Administrator in our Region 8 office. This proposal was for a Hydro-metallurgical recovery process.

SungEel initial contacts with the Department were directly with our Region 7 office. Coordination under that Regional Permit administrator began earlier for this project, but somehow, the RCRA piece lagged. This proposal was for a Pyro-metallurgical recovery process.

SungEel Proposal – Endicott, NY

- SungEel proposal, which came in front of the Department in the October-November 2018 timeframe, included establishing a pyrometallurgical recycling process for lithium batteries. The site was proposed for the Huron Campus in Endicott, NY. That site was formerly occupied by IBM.
- The facility as proposed would produce four recycling streams:
  - Plastic battery casings and packaging to be sent for recycling
  - Nonferrous metal battery packaging to be sent for recycling
  - Printed circuit boards to be sent for recycling
  - Baghouse dust and ground metal powder to be sold as a product to facilities in South Korea.

SungEel Proposal – Endicott, NY

- Because the process involved a furnace in the recovery process, our Division of Air Resources was the primary focus of initial meetings with the facility. In addition, permits or registrations were being sought for Solid Waste, Chemical Bulk Storage and Petroleum Bulk Storage.
- There was some confusion over the status of this facility concerning the need for hazardous waste permits when the project was first proposed. There was an assumption that because the batteries coming into this facility were universal waste, no permit would be required.
- The first contact with our technical determinations staff in our Central Office did not occur until March 2019.

SungEel Proposal – Endicott, NY

- Central Office RCRA staff had to react to an ongoing process, rather than having significant input early in the process. The site and our Regional personnel did not realize that this site was a Universal Waste Destination Facility, and not just a Universal Waste Handler, and that any storage of the universal waste batteries at the site would subject the site to RCRA permitting.
- In addition, because a furnace was being used on batteries which would treat hazardous wastes, a determination on the hazardous waste permitting need of that unit needed to be made by our RCRA permitting section staff.
- Without going into detail, the furnace was determined to not require RCRA permitting.

SungEel Proposal – Endicott, NY

- Once the confusion over RCRA involvement was resolved, SungEel was presented with the two alternatives for Destination Facilities; to permit their storage of the batteries, or to operate with no prior storage.
- A significant portion of work we did with the SungEel involved documentation of legitimate recycling, and the need for solid waste beneficial use determinations.
- SungEel chose the later option, and obtained a warehouse facility offsite, but extremely close to their processing facility.
- The warehouse would be operated as a Large Quantity Handler of Universal Waste.
- The lack of site-specific controls within the Universal Waste rule for Lithium batteries was a concern to the surrounding community for the warehouse. One neighbor was quoted to say, “it’s not if a fire will occur, it’s when”

SungEel Proposal – Endicott, NY

- In March 2020, registrations for a Solid Waste Recyclable Handling and Recovery Facility (RHRF) and Bulk Storage were issued along with the Air State Facility (AFS) Permit.
- The RHRF registration included a financial assurance provision.
- Within weeks after the issuance of the AFS permit, information was presented to the Department by third parties, that the applicant did not disclose that per and/or poly fluoroalkyl substances (PFAS) are contained within the Lithium Batteries.
- It is unusual to re-open a permit so soon after issuance, but the Department wanted to address this issue immediately. The Department gave SungEel two options to address their presence, apply for a permit modification, or to have the manufacturers certify that the types of batteries being reclaimed did not contain the PFAS.
- It was at this point, SungEel decided to not move forward with building the recycling facility.

Li-Cycle – Rochester, NY

- First approached the Department in the Fall of 2018 with general questions presented to different program areas including, Air, Water, Hazardous Waste, Solid Waste and Bulk Storage.
- A preapplication meeting was held in our Region 8 office in June 2019 and included representatives of each of these programs.
- During that initial meeting, the site location was revealed as the Eastman Business Park. This site is owned by Kodak and is multiple square miles in size and has a RCRA permit for two storage tanks associated with a commercial solvent recycling operation run by Kodak and for a Multiple Hearth Incinerator operated by a group called RED Rochester who runs the utilities in the Park.

Li-Cycle – Rochester, NY

- Because Li-Cycle's proposed operations included a Hydro-metallurgical recycling process, the primary the primary permitting focuses were on the waste programs, with Air, Water and Bulk storage also being assessed.
- Li-Cycles advantageous choice of location from a RCRA permitting perspective was not immediately recognized.
- Initially Li-Cycle understood that they would be a Universal Waste destination facility but wanted to operate a separate Large Quantity Handler (LQH) facility on another section of Eastman Business Park, remotely located from their processing facility. We had to inform them that to operate in this manner they would need to have the LQH located outside of the Park, on property which is not contiguous to the Park, or they would need to obtain a storage permit.
- Like our work with the SungEel facility, we had extensive correspondence with Li-Cycle documenting the legitimacy of their recycling processes.

Li-Cycle – Rochester, NY

- Discussions with Li-Cycle about permitting their storage area then began. Because they were moving onto the site of a facility with an existing RCRA permit, addition of the Li-Cycle storage unit would constitute a major modification to the existing permit and not necessitate obtaining a new permit.
- The fact that the site already possessed a permit which covered existing commercial recycling operations, exempted this new storage unit from the New York State Industrial Hazardous Waste Siting Law.
- The timing of Li-Cycle being added to the existing RCRA permit was not ideal as the existing permit term was about to expire. The major modification is not being incorporated as part of the permit renewal and has caused Li-Cycle to operate in the interim period under the no prior storage options.

Li-Cycle – Rochester, NY

The facility was issued a RHRF registration on March 27, 2020, which required the facility to submit an acceptable financial assurance mechanism prior to the facility being allowed to accept batteries for recycling. This was obtained in early 2021, and the facility began to process batteries in March 2021. The company had a difficult time obtaining the required financial assurance as a small start up company.

Contact Information

Thomas Killeen, PE

Chief, RCRA Compliance & Technical Support Section

Division of Materials Management

NYS DEC

625 Broadway

Albany, NY 12233-7256

thomas.killeen@dec.ny.gov

(518) 402-8652

Connect with us:

Facebook: www.facebook.com/NYSDEC

Twitter: twitter.com/NYSDEC

Flickr: www.flickr.com/photos/nysdec

DEC.NY.GOV

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation