

Morris Lithium Battery Site

Morris, Illinois





Superior Battery Inc.
Morris, IL
June 29, 2021

Morris, IL – Morris Battery Fire 2021-2022

Superior Battery Inc. Site Plan



Warehouse Footprint
Approx. 60,000 sqft

RESIDENTIAL:
Single-Family
Neighborhoods
(South, West, North)

Morris Lithium Battery Fire

- Approximately 400,000 lbs. of batteries are stored in the building.
- Over 4,000 residents were evacuated from the neighborhood for over 3 days
- ½ mile evacuation radius ordered by Morris Fire
- US EPA conducted air monitoring and air sampling at the site perimeter and in the surrounding neighborhood. Illinois Civil Support Team (CST) assisted with air monitoring and sampling.
- Sampling was also conducted in the I&M Canal located 3 blocks from the site near the Illinois River. Illinois EPA monitored Canal and Illinois River.
- The fire was extinguished on July 10

Superior Battery Inc. building contents

- Lithium Ion and Metal 174,000 pounds
- Nickel Metal Hydride 75,000 pounds
- Nickel Cadmium 44,000 pounds
- Lead Acid 70,000 pounds
- Alkaline 25,000 pounds
- Electronic waste 56,000 pounds
- Solar panels
- Roofing materials
- Trucks/equipment

Governor of Illinois signed a Disaster Proclamation on July 2



Gubernatorial Disaster Proclamation

WHEREAS, on the morning of June 29, 2021, a large industrial fire erupted at a battery storage facility located at 900 E. Benton Street, in Morris, Grundy County, Illinois; and

WHEREAS, nearly 100 tons of lithium batteries – an unprecedented amount – were stored at the site of the fire and provide a source of fuel for the fire; and

WHEREAS, the potentially hazardous nature of the smoke from the fire prompted local officials in the City of Morris to issue an evacuation order; and

WHEREAS, at my direction, personnel from the Illinois National Guard have been deployed to the scene of the fire to assist with the response; and

WHEREAS, the presence of lithium as a source of fuel for the fire has complicated the response to the fire, and creates a potential for flare-ups that may necessitate additional fire-fighting efforts; and

WHEREAS, to prepare for potential flare-ups, immediate disaster-related purchases are required, including for measures to contain runoff from any additional fire-fighting efforts; and

WHEREAS, reports received by the Illinois Emergency Management Agency indicate that local resources and capabilities have been exhausted and that state resources are needed to respond to and recover from the effects of this fire; and

WHEREAS, these circumstances give rise to an occurrence or threat of widespread or severe damage, injury or loss of life or property resulting from fire, and constitute a disaster as provided in Section 4 of the Illinois Emergency Management Agency Act; and,

WHEREAS, it is the policy of the State of Illinois that the State will be prepared to address any disasters and, therefore, it is necessary and appropriate to make additional State resources available to ensure that Illinoisans remain safe and secure; and,

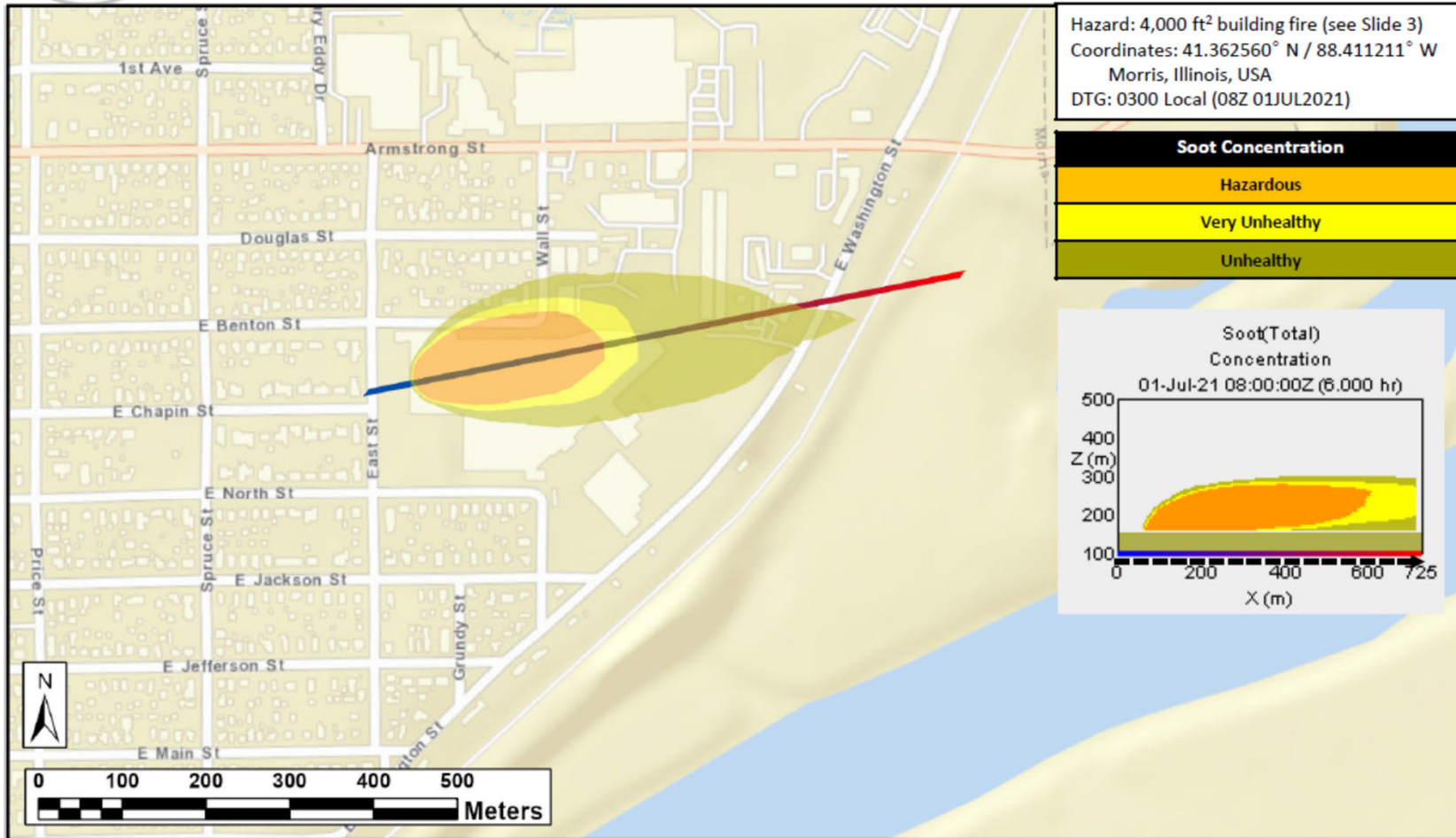
WHEREAS, these conditions provide legal justification under section 7 of the Illinois Emergency Management Act for the issuance of a proclamation of disaster; and



CUI

RFI 21-0576

Soot – Morris, Illinois – 0300 Local (08Z)





Thermal Imaging Drone



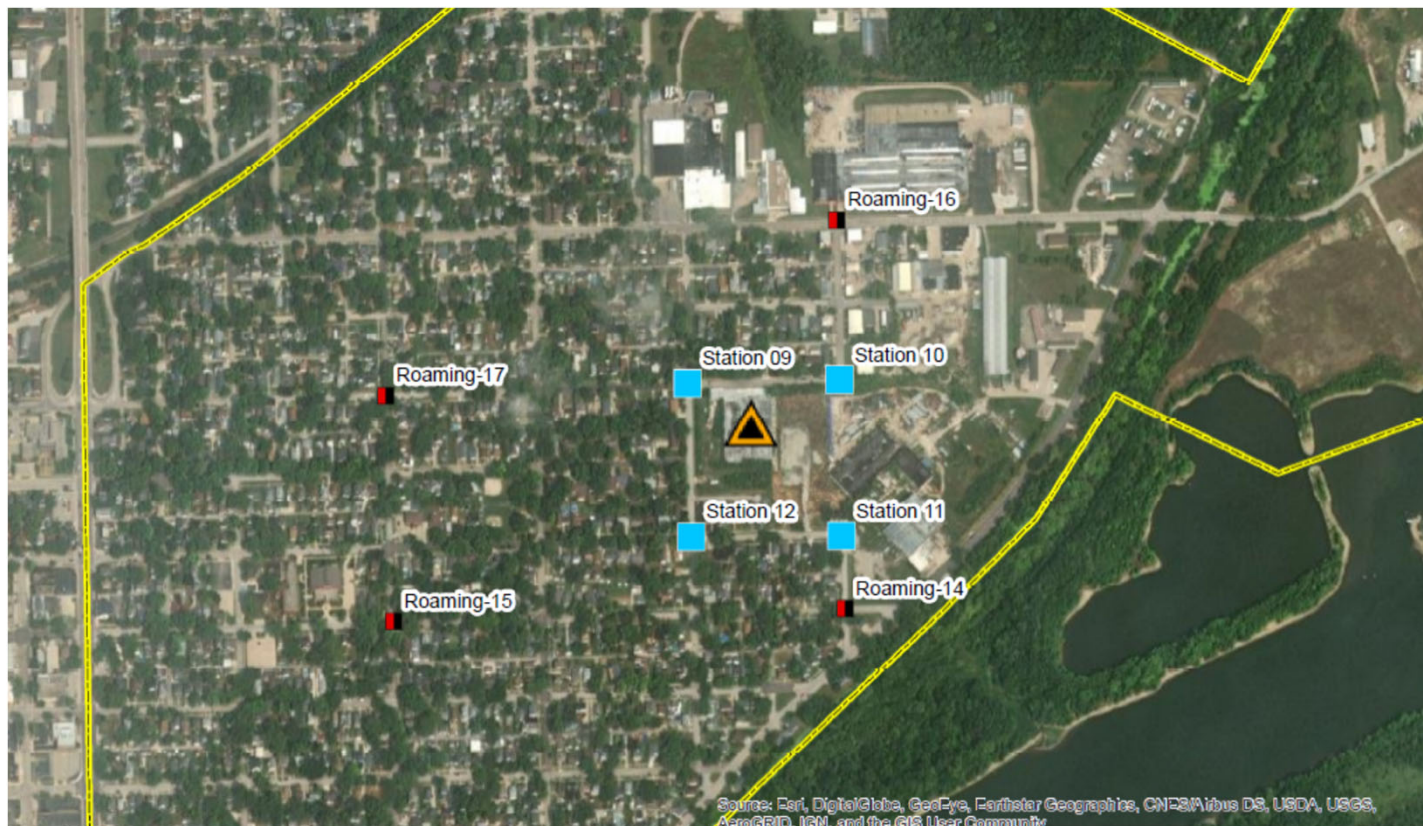






Air Sampling during the Fire

- Sampling at Site Perimeter
- Sampling in Smoke plume downwind of fire
- Sampling- Volatile organics, metals including Lithium, Lithium hydroxide







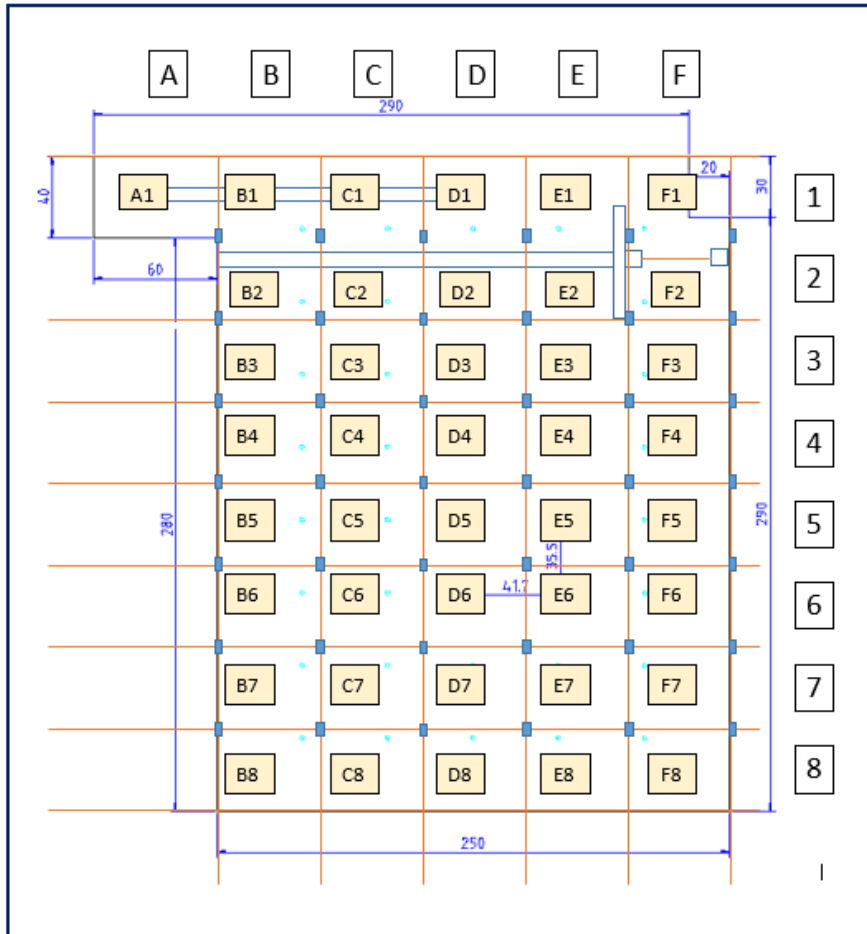






Site Cleanup

- Superior Battery Inc. signed an EPA Consent Order to conduct cleanup
- Determine structural integrity of building
- Inventory of building contents
- Sort batteries by chemistry, condition, size
- Package batteries according to DOT requirements
- Ship batteries off-site for recycling or disposal
- Dispose of fire debris
- Clean and sample concrete floor



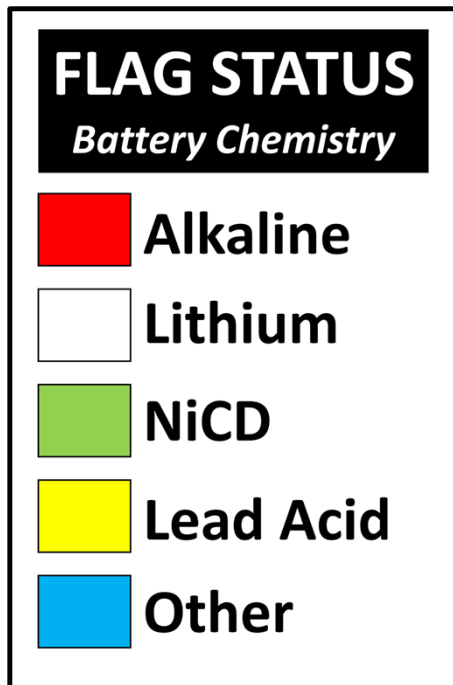
INITIAL ACTIVITIES

- The warehouse floor plan was sectioned into 40 ft x 40 ft grids that coincided with interior support columns.

	<p>Morris Battery Fire Site Morris, IL</p>	
	<p>Figure 1 Superior Battery Warehouse Floor Plan</p> <p>Date: 11/15/21 Drawn by: P. Doherty Project No.: MS-104</p>	

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Visual Indicators: Chemistry Locator Flags



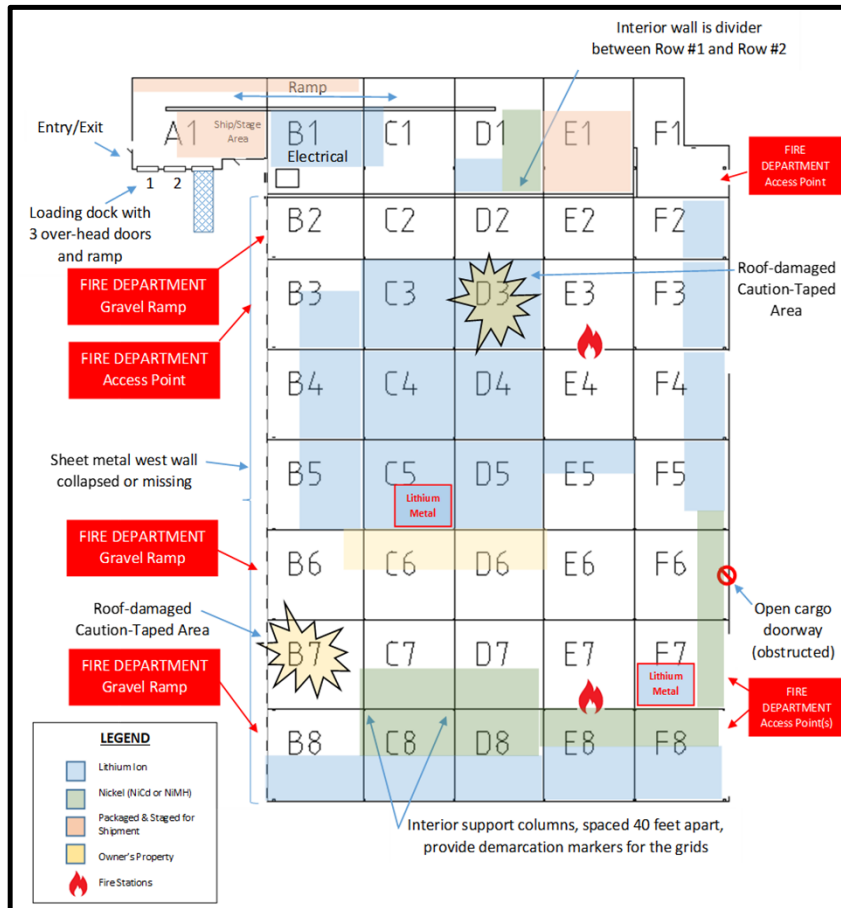
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Post Fire – Warehouse Conditions



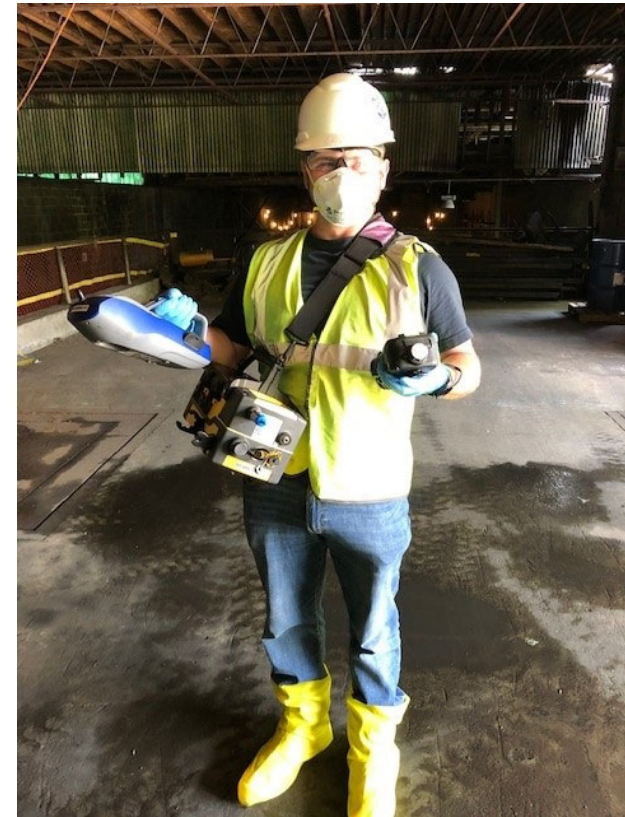
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Fire Contingency



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Health & Safety - Air Monitoring



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Warehouse Contents: Lithium Chemistry

Lithium Ion



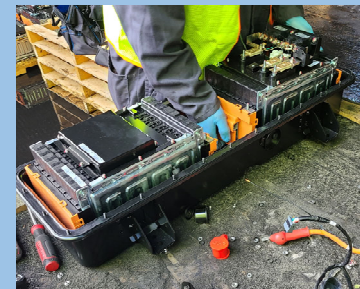
Lithium Metal



Lithium Metal
Batteries in
Equipment



Electric
Vehicle
Batteries



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Warehouse Contents: Nickel Cadmium/Metal Hydride

NiCd / NiMH Dry Cells



NiCd Wet Cells



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Warehouse Contents: Mixed Chemistry Batteries

Lead Acid



Alkaline



Electronic Waste



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Determining Lithium Chemistry

Lithium Metal (Primary)

- ✓ **NON-RECHARGEABLE – 1x Use**
- ✓ **LiSO₂** (Lithium-Sulfur Dioxide)
- ✓ **LiMnO₂** (Lithium Manganese **Dioxide**)
- ✓ **LiSOCI₂** (Lithium Thionyl Chloride)
- ✓ **Watches, Key Fobs, Cameras, Medical Devices**



LiMnO₂ 48Wh LiFeSO₂ 1.8Wh LMnO₂ 2.25Wh LMnO₂ 4.35Wh LiSOCl₂ 8.82Wh LMnO₂ 9Wh LiSOCl₂ 10.8Wh LiSOCl₂ 30.6Wh LMnO₂ 33.3Wh LiSOCl₂ 68.4Wh



Lithium Ion (Secondary)

- ✓ **RECHARGEABLE**
- ✓ **LiCoO₂** (Lithium Cobalt Oxide)
- ✓ **LiMn₂O₄** (Lithium Manganese **Oxide**)
- ✓ **LiNiMnCoO₂** (Lithium Nickel Manganese Cobalt Oxide)
- ✓ **LiFePO₄** (Lithium Iron Phosphate)
- ✓ **LiNiCoAlO₂** (Lithium Nickel Cobalt Aluminum Oxide)
- ✓ **Li₄Ti₅O₁₂** (Lithium Tintanate)
- ✓ **Cell Phones, Power Tools, Laptops, Drones Deep Cycle Marine Batteries**



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Determining Condition (lithium only)

DDR



Corrosion

Burn Marks



Leaking

Swelling



Dented/Punctured

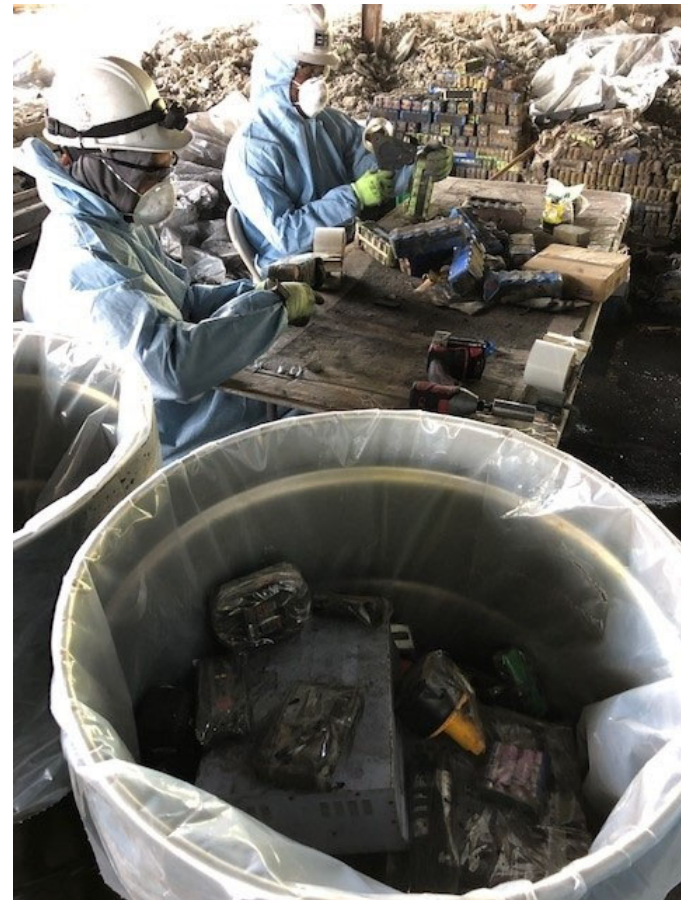
Non-DDR

Clean – No Evidence of damage



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Sorting Chemistry



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Packaging & Shipping Options

SHIPPING Options:

- DOT Fully Regulated (alkaline, NiCd, NiMH, Lead Acid, E-Waste)
- DOT Special Permit(s) (lithium ion/metal)

PACKAGING Options:

- Non-lithium batteries, per respective DOT regulations
- Lithium Ion/Metal Batteries, per 49 CFR § 173.185 (b)
- Lithium Ion/Metal Batteries, per DOT Special Permit(s)

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Shipping: Fully Regulated vs. Special Permit

DOT Fully-Regulated: (1) Battery per container (per 49 CFR § 173.185 (f))



DOT Special Permit: Batteries allowed in bulk, per container



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US DOT Special Permit(s)

US DOT Special Permit: **SP-16532**

- Site Specific
- Damaged/Defective/Recalled (DDR)
- Lithium chemistry, bulk packaging, with energy content restrictions
- Inner and outer packaging requirements
- 55-gallon, PGI, X-rated drum

US DOT Special Permit: **SP-21363**

- Site Specific
- Damaged/Defective/Recalled (DDR)
- Lithium chemistry, bulk packaging, NO energy content restrictions
- NO inner and outer packaging requirements
- Vented bung (3 to 15 psi)
- 55-gallon, Call2Recycle, CellBlockEX lined drum

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Call2Recycle Lined Storage Drums w/ CellBlockEX

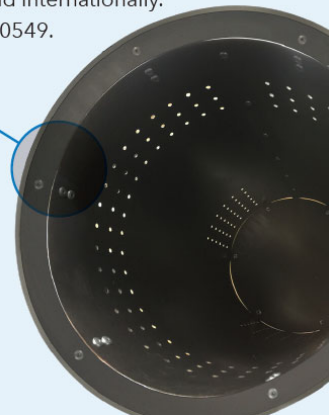


Lined Storage Drums

- CellBlockEX is used to line the perimeter of the drums. This protects against a dangerous evolution of heat and creates a higher level of safety than standard drums.
- Designed to filter and vent pressure and evolved smoke and gas.
- UN-rated and certified with CellBlockEX used as the packaging filler.
- Environmentally-friendly packaging using no vermiculite or mineral oil.
- Perfect solution for storage and/or closed-loop shipping.
- Ship domestically and internationally.
- Subject to DOT SP-20549.

Drum Liner Detail

Perforations allow filtering of heat, toxic smoke and fumes through the CellBlockEX.



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Total Battery & Waste Packaged & Shipped



NiCd Wet	43,123.0	10%
NiCd Dry	75,325.0	17%
Lead Acid	69,499.2	16%
Li Ion	123,725.0	28%
Li Metal	47,475.0	11%
Li Metal in Equipment	4,799.0	1%
Alkaline	24,932.0	6%
E-Waste	55,399.0	12%
Grand Total (lbs):	444,277.2	100%



Morris Lithium Battery – Disposal Information

Waste Stream	Quantity	Disposal Facility
Personal Protective Equipment/Debris	37.05 tons	Republic Land Comp LF Ottawa, Illinois
Non-hazardous Ash/Debris	74.69 tons	Republic Land Comp LF Ottawa, Illinois
Hazardous Ash/Debris	80 tons	US Ecology Belleville, Michigan
Electronic Waste	55,984 pounds	Universal Recycling Technologies Janesville, Wisconsin
Lead-acid Batteries	69,919 pounds	Retriev Technologies (Cirba) Lancaster, Ohio
Wet NiCad Batteries	43,827 pounds	INMETCO Ellwood City, Pennsylvania
Dry Cell Nickel Batteries	75,325 pounds	Retriev Technologies (Cirba) Lancaster, Ohio
Alkaline Dry Cell Batteries	24,932 Pounds	Retriev Technologies (Cirba) Lancaster, Ohio
Lithium Metal Batteries	60,569 pounds	Retriev Technologies (Cirba) Lancaster, Ohio
Lithium Ion Batteries	114,356 pounds	Retriev Technologies (Cirba) Lancaster, Ohio
Liquid Adhesive	1 drum	Chemtron Avon, Ohio
Battery Cooling Units	1 drum	McAlester Army Ammunition Plant McAlester, Oklahoma







QUESTIONS ?