Lakes Parkway Lithium Battery Fire

Jason Booth and Bryan Vasser, EPA OSCs R4
Batteries on-site

- Approximately 15,000 lbs of batteries
  - Around 90% of them were once 14 lb 476 wH scooter batteries
  - Half of those were still largely intact and half were individual cells separated into groups
**DOT Shipping Requirements - 49 CFR 173.185**

(f) *Damaged, defective, or recalled cells or batteries.* Lithium cells or batteries that have been damaged or identified by the manufacturer as being defective for safety reasons, that have the potential of producing a dangerous evolution of heat, fire, or short circuit (e.g., those being returned to the manufacturer for safety reasons) may be transported by highway, rail or vessel only, and must be packaged as follows:

1. Each cell or battery must be placed in individual, non-metallic inner packaging that completely encloses the cell or battery;

2. The inner packaging must be surrounded by cushioning material that is non-combustible, electrically non-conductive, and absorbent; and

3. Each inner packaging must be individually placed in one of the following packagings meeting the applicable requirements of part 178, subparts L, M, P, and Q of this subchapter at the Packing Group I level:
First Fire of the Day – recently packaged bucket
Technically not a Fire
Second Fire of the Day – bucket packaged 5 days ago
Aftermath

◆ Approximately 20 buckets were damaged during the second fire
◆ The bucket that caught fire had been packaged approximately 5 days ago and not been touched/moved for 4 days
Stop Work

Primary Goal:
◆ Stop calling the Fire Department

Secondary Goals:
◆ Stop having fires
◆ Find a way to safely package/ship/dispose of the DDR batteries
De-energizing Batteries

Recycling facilities regularly mentioned that prior to shredding they “soak” the batteries in salt water prior to shredding TO REDUCE EXPLOSIONS during the shredding process.
Battery De-energizing Test

- Salt water solution – Approximately 0.5% NaCl
- 1 lb NaCl per 25 gallons water
- Soak from 3 days to 3 months
- Potentially HF, Cl2, HCl, other gases similar to plastic fires released during combustion
- 24 hour results indicated full discharge of test batteries
Due to the proximity of the surrounding community, EPA maintained air monitoring until all batteries were in drums and awaiting shipment.

### Location 7 - Southwest of Staging Area at Suites 114 & 116 Loading Dock Stairwell

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Analyte</th>
<th>Action Level Exceedance?</th>
<th>Number of Readings</th>
<th>Number of Detections</th>
<th>Concentration Range</th>
<th>Period Average</th>
<th>Action Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AreaRAE 3</td>
<td>VOC</td>
<td>No</td>
<td>2875</td>
<td>0</td>
<td>0 - 0 ppb</td>
<td>0 ppb</td>
<td>1000 ppb</td>
</tr>
<tr>
<td></td>
<td>CO</td>
<td>No</td>
<td>2875</td>
<td>0</td>
<td>0 - 0 ppm</td>
<td>0 ppm</td>
<td>27 ppm</td>
</tr>
<tr>
<td></td>
<td>H₂S</td>
<td>No</td>
<td>2875</td>
<td>0</td>
<td>0 - 0 ppm</td>
<td>0 ppm</td>
<td>0.33 ppm</td>
</tr>
<tr>
<td></td>
<td>SO₂</td>
<td>No</td>
<td>2875</td>
<td>0</td>
<td>0 - 0 ppm</td>
<td>0 ppm</td>
<td>0.2 ppm</td>
</tr>
<tr>
<td></td>
<td>Cl₂</td>
<td>No</td>
<td>2875</td>
<td>720</td>
<td>0 - 0.3 ppm</td>
<td>0 ppm</td>
<td>0.5 ppm</td>
</tr>
<tr>
<td></td>
<td>Y</td>
<td>No</td>
<td>2875</td>
<td>2875</td>
<td>1 - 6 µrem/h</td>
<td>4.9 µrem/h</td>
<td>9 µrem/h</td>
</tr>
</tbody>
</table>

### Location 8 - Eastern Side of Northern Roll-Off Battery Box

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Analyte</th>
<th>Action Level Exceedance?</th>
<th>Number of Readings</th>
<th>Number of Detections</th>
<th>Concentration Range</th>
<th>Period Average</th>
<th>Action Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPM Flex 4</td>
<td>HCl</td>
<td>No</td>
<td>1490</td>
<td>0</td>
<td>0 - 0 ppm</td>
<td>0 ppm</td>
<td>1.8 ppm</td>
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<tr>
<td>SPM Flex 5</td>
<td>HF</td>
<td>No</td>
<td>867</td>
<td>0</td>
<td>0 - 0 ppm</td>
<td>0 ppm</td>
<td>1 ppm</td>
</tr>
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</table>
Timeline

◆ All batteries in the water by 12/24
◆ January 2 met with DOT and Recycling facilities to discuss shipment/disposal options
  ▪ Disposal facility could not accept bulk shipment of batteries
◆ Started procurement process and special permit process
◆ Mid February
  ▪ Special Permit approved – 6 days after application
  ▪ Procurement complete
  ▪ No fires in 6 weeks
Removing water and pile of batteries in rolloff
DOT SP-16532 – held by ER, not site specific

◆ Special Permit to package multiple “small” lithium ion batteries
  ▪ Up to 400 lbs in a standard 55-gallon drum
DOT SP-21329 – held by R4, site specific

◆ Special Permit to package multiple “large” lithium ion batteries
  ▪ Up to 180 lbs in a Call2Recycle drum ($800 per drum)
Project Completion

◆ Disposal Metrics
  ▪ 13,414 lbs of batteries shipped
  ▪ 6,300 gallons of non-haz water
  ▪ 30 CY of non-haz sand

◆ 3 months from start to finish

◆ Total costs: $400,000
Lessons Learned

◆ De-energizing batteries will save time and money
◆ Involve DOT early
  ▪ Special Permit is critical for shipping reasonable numbers of batteries in a drum
◆ Packaging Lessons
  ▪ Plastic buckets (PG1) are allowed by DOT, but may not be appropriate for high watt-hour batteries
◆ Limited Disposal Options
  ▪ Bulk shipment and on-site shredding are not currently available options
◆ [Response.EPA.gov website](http://Response.EPA.gov) for resources
Lessons Applied
Lessons Applied (cont)
Lessons Applied (cont)