

Lithium Ion Battery Recycling and Disposal

SWANA Evergreen Chapter
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Agenda

- Why Now?
- Lithium Ion Battery Problem
- National Sword
- National Efforts
- Case Study
- What You Can Do



Why Now?

- Evolution of more powerful lithium-based battery technology
- Increase use of these devices
- Increased contamination in recycling stream
- 13% increase in reported fires and explosions
- 244 MRF fires reported in 2016
- Becoming more aware of the cause of fires
- Endangers lives and costly damage

5.6 Billion Lithium Ion Cells Sold in 2016

Problems with Lithium Ion Batteries

- Integrated into cellphones, power tools and household devices
- Come in many shapes and sizes
- Hard to identify
- Confusion between lithium ion and alkaline batteries
- Can be very hazardous
- Recycling symbol on battery



Lithium-Based Primary Battery

- May come in the following sizes:
 - ✓ 9v, AA, AAA, C, D, Coin/Button Cell
- May be marked as:
 - ✓ “Lithium”
 - ✓ “Lithium cells”
 - ✓ CR###



Lithium-Based Rechargeable Battery

- Marked as “Rechargeable”
- Have battery chemistry name:
 - ✓ Lithium ion
 - ✓ LI-ION, Li-ion, LiPo
 - ✓ Button/coin cell (LIR####)
- Have battery seal or other mark
- Or may not



Batteries Recycled in 2017 by Call2Recycle

- *Rechargeable / Li-Ion: 2,263,077 lbs.*
 - *Primary / Lithium: 111,597 lbs.*
 - *Total Lithium batteries: 2,374,674 lbs.*
 - *Total recycled: 8,039,128 lbs.*
- 14 Million lbs. rechargeable LI batteries recycled out of 170 Million lbs. nationally
- Call2Recycle spends \$21 million a year collecting batteries



How are LI Batteries Ending Up in Recycling?

1. Curbside program

- Correct behavior
 - place bags on top of cart
- Problem
 - ✓ Not in proper bag
 - ✓ Placed on cart but driver can't see
 - ✓ Place bag or loose batteries in cart
 - ✓ Don't know LI batteries need to be taped
 - ✓ Don't identify differences in batteries



How are LI Batteries Ending Up in Recycling?

2. No Curbside program

- Correct behavior – take batteries to drop-off center
- Problem
 - ✓ Place batteries in cart due to recycling symbol
 - ✓ Don't realize batteries don't belong with recycling
 - ✓ Don't want to take time to properly dispose

Challenges

- Batteries end up in recycling
- Truck can catch fire
- Deliver recycling on tip floor, tractor can run over batteries and create explosion
- Batteries can go on recycling line and friction between materials can create explosion
- If batteries make it into residuals or paper, could ignite during transport



National Sword

- Contamination is of all kinds, including batteries
- Dangers of explosive nature of lithium ion batteries
- Will only create more problems if inspectors find LI batteries in loads
- Potential of fire: in bales on truck, sent to port and on ship



National Efforts

- NWRA, Call2Recycle, SWANA, KAB
- Met with battery manufacturers
 - ✓ Not willing to remove recycling symbol from battery
 - ✓ Education is asking communities to recycle
- Working group to develop cooperative educational campaign:
 - ✓ Messaging
 - ✓ Budget
 - ✓ Toolkit and outreach

Messaging / Municipalities

1. Issues

- Batteries in curbside recycling / confusing
- Batteries not properly prepared or placed in appropriate location

2. Remedy

- Educate households
- Proper preparation and placement
- Details on battery recycling drop-off locations

3. Key Message

- All batteries need to be prepared properly
- Tool Kit
- Consider NOT establishing curbside program

Messaging / Collection Companies

1. Issues

- Batteries in curbside recycling may cause fire in truck

2. Remedy

- Educate households on identification, proper preparation and placement
- Enforcement tool for hauler if LI's found in recycling or improperly packaged
- Work with municipalities to not start curbside program

3. Key Message

- Identification and proper handling
- Label training
- Fire training
- Tool kit

Messaging / MRFs

1. Issues

- Increase probability of a fire on sort line
- Damage can close MRF for months, cost significant money to repair, and increase insurance costs with possibility of being uninsurable

2. Remedy

- Educate households on identification, proper preparation and placement
- Reject loads that with LI batteries

3. Key Message

- Identification and properly handling
- Label training
- Fire training and HHW procedures on LI batteries and their characteristics
- Pre-sort audit kit for detection improvement and awareness

Case Study: RethinkWaste

- Single-Stream MRF
- September 2016 – Fire at facility
- Closed for 5 months
- Temporarily layoffs for 11 of 20 employees
- Recycling was transported to another facility



Results

- \$8.4 Million in damage
- Transported recyclables to another facility (9,000 tons a month)
- Insurance:
 - ✓ Insurance company paid all costs as outlined in policy
 - ✓ Insurance company no longer providing insurance to MRF's
 - ✓ RethinkWaste has 6 insurance providers to make up entire policy
 - ✓ Old policy - \$179,596
 - ✓ New Policy - \$550,000

Proactive Stance

Problem: RethinkWaste can't have another fire, they will be uninsurable

Solution:

1. Looking at becoming self-insured
2. Stakeholder meeting in December 2017
 - Story book
 - Educational needs
3. Special committee meeting
 - EPR
 - Message to residents and council

***RethinkWaste
Collects
Batteries at
Curbside***

RethinkWaste's Reality



- 5.48 Lithium based batteries found in MRF each hour / 44 a day
- Based on sampling results:
 - ✓ 620,246 lbs or 26 tons a year / total batteries
 - ✓ 10,421 lbs or 5 tons (3.2%) Lithium batteries
- 75% of batteries are handled properly
- 25% loose in MRF bin, 34% public drop-off, 41% curbside battery program

What You Can Do

1. Consider your battery recycling program (curbside or drop-off)
2. Work closely with your collection and processing companies
 - Create a baseline for the number LI batteries found in recycling
 - Come up with a “what if” plan
 - Monitor if batteries are in bales and identified by inspectors
3. Develop educational material or use NWRA Toolkit
4. Educate all stakeholders
 - City council / board of supervisors
 - Residents
 - Collectors and MRFs

Be Proactive, Don't Wait and Take
Charge!

Thank You!

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