



LIB Fires & the "ST[🔥]TIC" Cleanup Phase

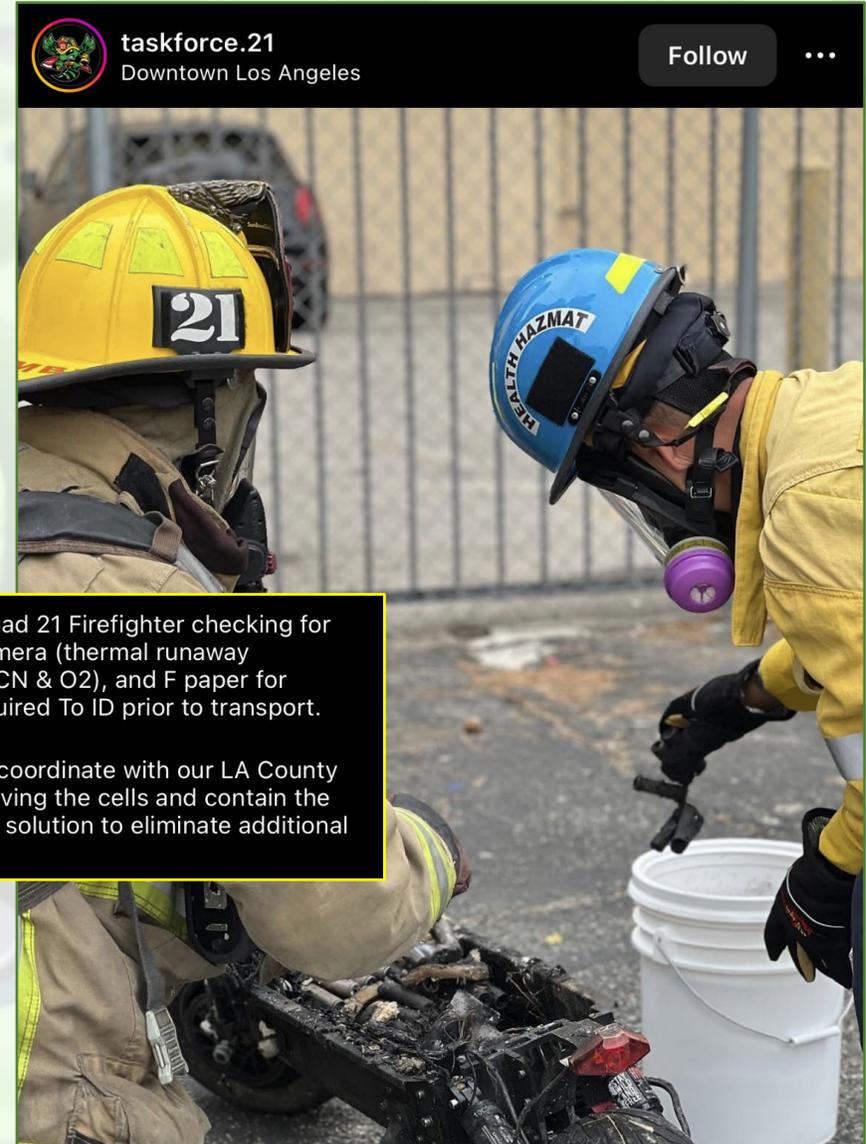
Ernie Hernandez, Supervising Hazmat Specialist
Los Angeles County Fire Dept. Health Hazmat Div.
W-12: February 28, 2024

26th California Unified Program
Annual Training Conference
February 26-29, 2024



OVERVIEW

- Health Hazmat's Role
 - Support (air monitoring)
 - Mitigation (re-ignitions)
 - Oversight (disposal)
- Response Guidelines
 - Incident Briefing
 - Battery Assessment
 - De-energization
 - Follow-up
 - Disposal
- Incident Reviews



SYLMAR INCIDENT

BRIEFING:

- LA City Fire Jurisdiction
- Aerospace company used battery pack to power mfg. equipment.
- Li-ion (NMC) battery pack
 - 7 modules (840 cells)
 - 9 kWh total energy



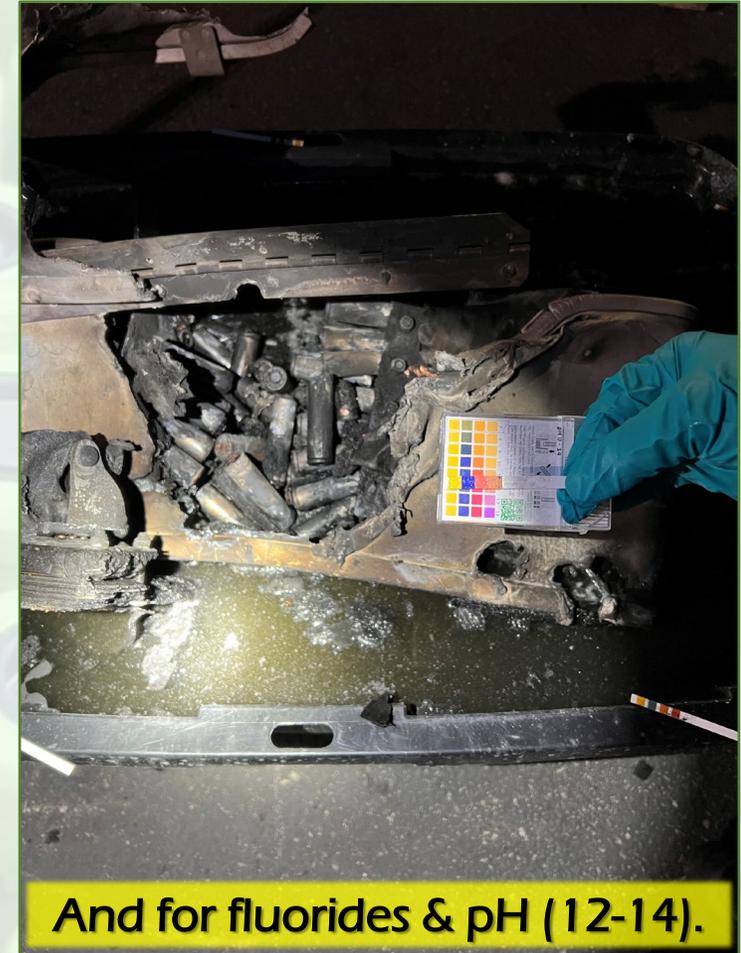
Battery Assessment



Ensure temperature is decreasing.



Monitor for HF, LEL, CO, HCs...



And for fluorides & pH (12-14).

De-energization



PPE: Chemical, flash & respiratory protection.



10% NaCl solution



De-energizing time – 3 weeks.

Follow-up & Disposal



Monitor for LEL, CO, Cl₂, VOCs.

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's Name and Mailing Address: Patriot Environmental Services, 1630 W. 17th Street, Long Beach, Ca 90812, 562-432-5445

2. Transporter 1 Company Name: Patriot Environmental Services

3. Designated Facility Name and Site Address: Crasby and Overton, 1630 W. 17th Street, Long Beach, Ca 90812, 562-432-5445

4. Waste Codes: 260, 202, 181

5. Waste Description: UN 3480, Waste Lithium-ion Battery, 9. PA 11

6. Special Handling Instructions and Additional Information: 96(1) Burnt Lithium-ion battery, Local Proper DPE volume handling

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HW vs. U-waste



DOT Approved?



DOT PACKAGING

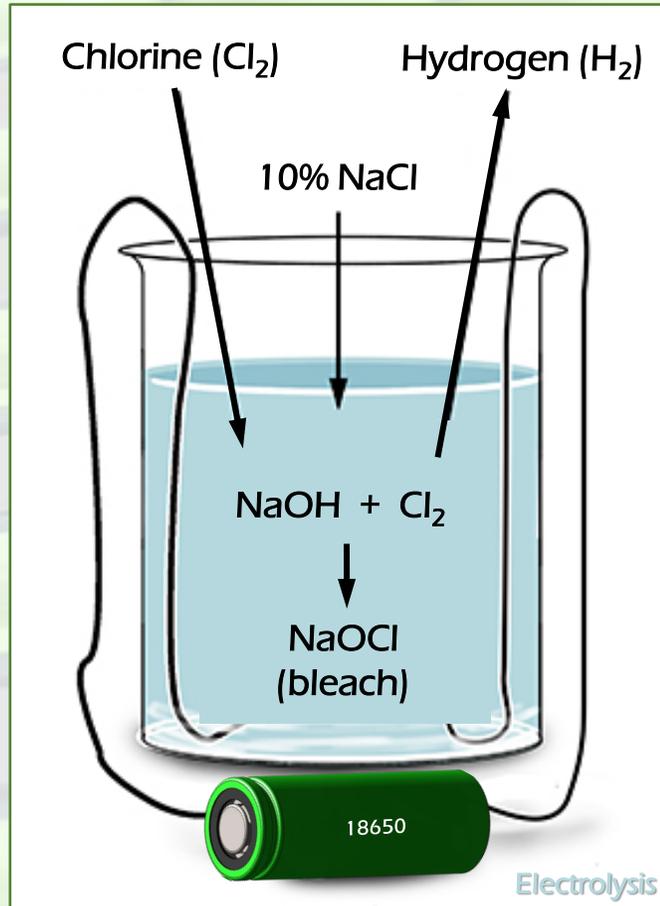
- Damaged, Defective or Recalled (DDRs) LIBs.
 - 49 CFR 173.185(f) or via DOT Special Permit
- Summary:
 - Individual, non-metallic inner packaging that completely encloses the cell or battery.
 - Cushioning material that is non-combustible, electrically non-conductive, and absorbent surrounding the inner packaging.
 - One lithium battery per inner packaging, and only one inner packaging per outer group 1 performance packaging.
 - Forbidden for transportation by aircraft.
- DOT Special Permit
 - Vented container.
 - Inner liner filled with fire suppressant material (e.g. CellBlockEX)
 - Multiple batteries with cushioning.
 - Watt-hour ratings.



AIR MONITORING

Thermal Runaway

- Hydrofluoric acid (HF)
- Carbon monoxide (CO)
- Flammables (methane, ethane, ethylene, hydrogen gas)
- Hydrogen cyanide (HCN)
→ From plastics.
- Particulates (smoke)



De-Energization

- Hydrogen gas (H₂)
 1. LEL, or
 2. CO (cross sensitivity)
- Chlorine (Cl₂)
→ Higher energy LIBs only.
- Volatile organics compounds (VOCs)
→ need more data.

Lessons Learned – Sylmar

- Fire Agency Coordination
 - LAFD JHAT
- Containers
 - Appropriate sizes
 - Safe storage location
- Air Monitoring
 - Thermal runaway (combustion) vs. De-energization (electrolysis)
- DOT Approved Packaging
 - Damaged, Defective or Recalled (DDRs) lithium-ion batteries.

NISSAN LEAF INCIDENT

BRIEFING:

- LA City Fire Jurisdiction
- Resident used LIBs to power backhouse rental.
- 7 x Li-ion (NMC) modules
 - 56 total pouches
 - 12 kWh total energy



Assessment & De-energization



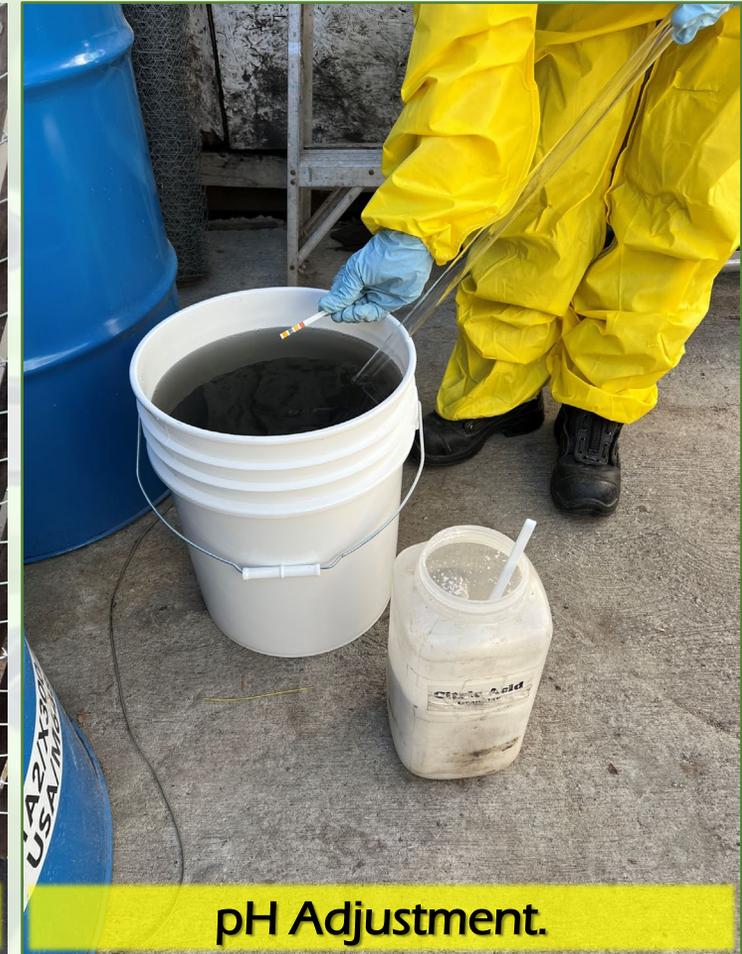
Follow-up



Monitor for LEL, CO, Cl₂, VOCs.



Solution pump out.



pH Adjustment.

Disposal



Verifying energy dissipation.



De-energized LIBs after 1 mo.



PW Coordination to HHW/s

Lessons Learned – Nissan Leaf

- **Verifying De-energization Process**
 - 10% NaCl solution seems to be working.
 - Terminals need to be exposed but protected from contact.
 - Check for visible sign of gas formation (i.e., bubbling, fizzing).
 - Continued air monitoring for LEL/CO (head space vs. vented).
 - Use multimeter to check voltage, if possible.
- **Lab Analyses**
 1. De-energizing Solution – multiple data sets
 - All below HW thresholds for heavy metals, fluorides, pH, and fish bioassay.
 2. Fire Water Run-off – no lab data but only caustic pH of concern.

RECAP

- Incident Briefing

- Cause of fire
- Fire-fighting measures
- Fire description

- Battery Assessment

- Audio-visuals
- Temp reading
- Air monitoring
- Battery info

- De-energization

- Safe location
- 10% NaCl solution
- Terminals
- Venting
- Time
- Follow-ups

- Disposal

- U-waste vs. HW
- DOT approved

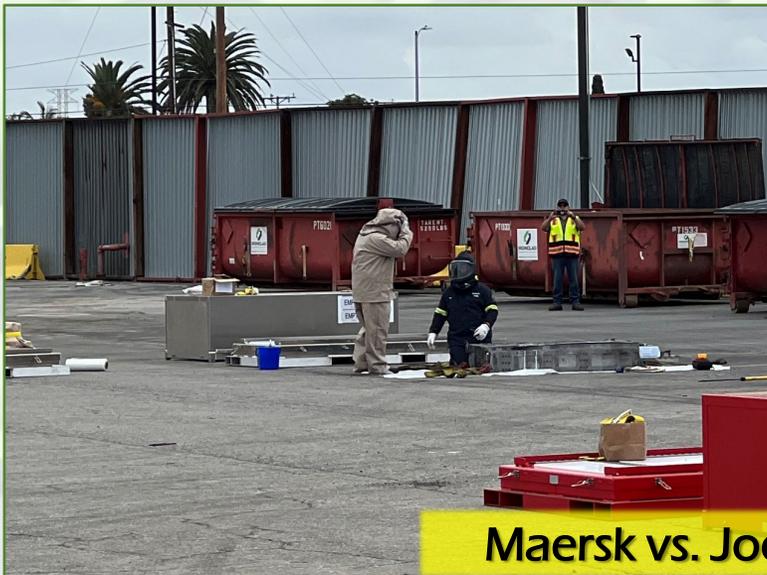
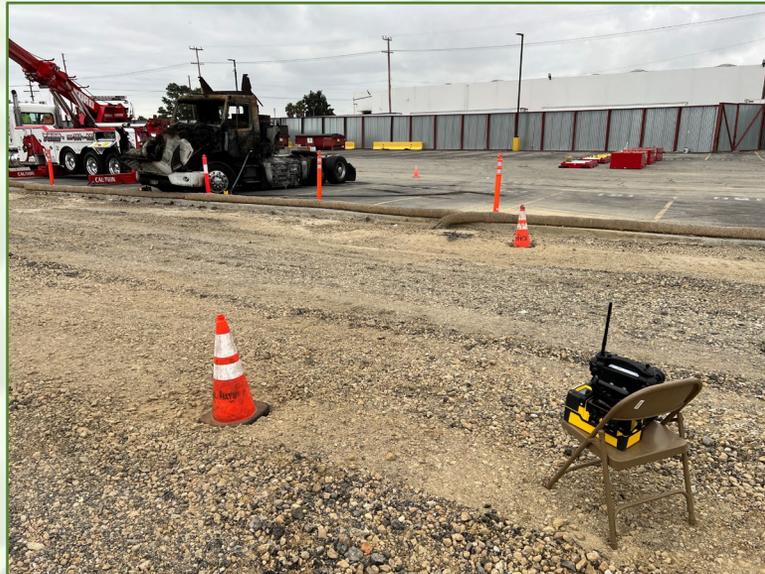
RESOURCES

- 8-hour paid training
- SOP Development
- Two 4-hour in-service trainings
- Equipment purchases
 - SPM Flex, FLIR TICs
- PPE upgrade
 - DuraChem® 200 Suits
- DDR containers
- De-energizing supplies (containers, salt, power tools, material handling equipment, etc.)



STAY ALERT





Maersk vs. Joe Public – HHM coordinating w/ auto dismantlers.

Any Questions?

Ernie Hernandez

Supervising Hazmat Specialist

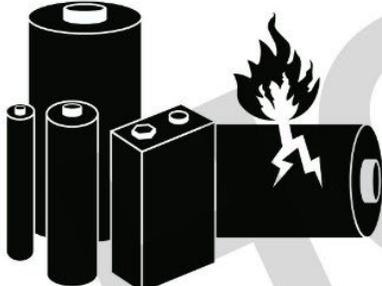
LACoFD Health Hazmat

ernie.hernandez@fire.lacounty.gov

(323) 890-4086

 **WARNING**

Damaged Lithium-ion Batteries



CARE OF
Los Angeles Co. Fire Dept.
Health Hazmat Division

Date: 02/28/24

**For your safety, please DO NOT DISTURB this container
under Quarantine Order pursuant to HSC 25187.6.**

For more information, please call (323) 890-4317.

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