



IAFC

International Association of Fire Chiefs



Fire Chiefs Role in Response to EV Incidents

September 12, 2022

Before we begin

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Chat, Q&A and Handouts

In the upper right corner of your screen, you will find the Chat and Q&A menus. You are encouraged share comments and submit questions for the speakers.

If the presenters have provided resource materials or links, you will find them in the Handouts section.



Host /Moderator



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City of Burnsville (MN)





Presenter

Michael O'Brian

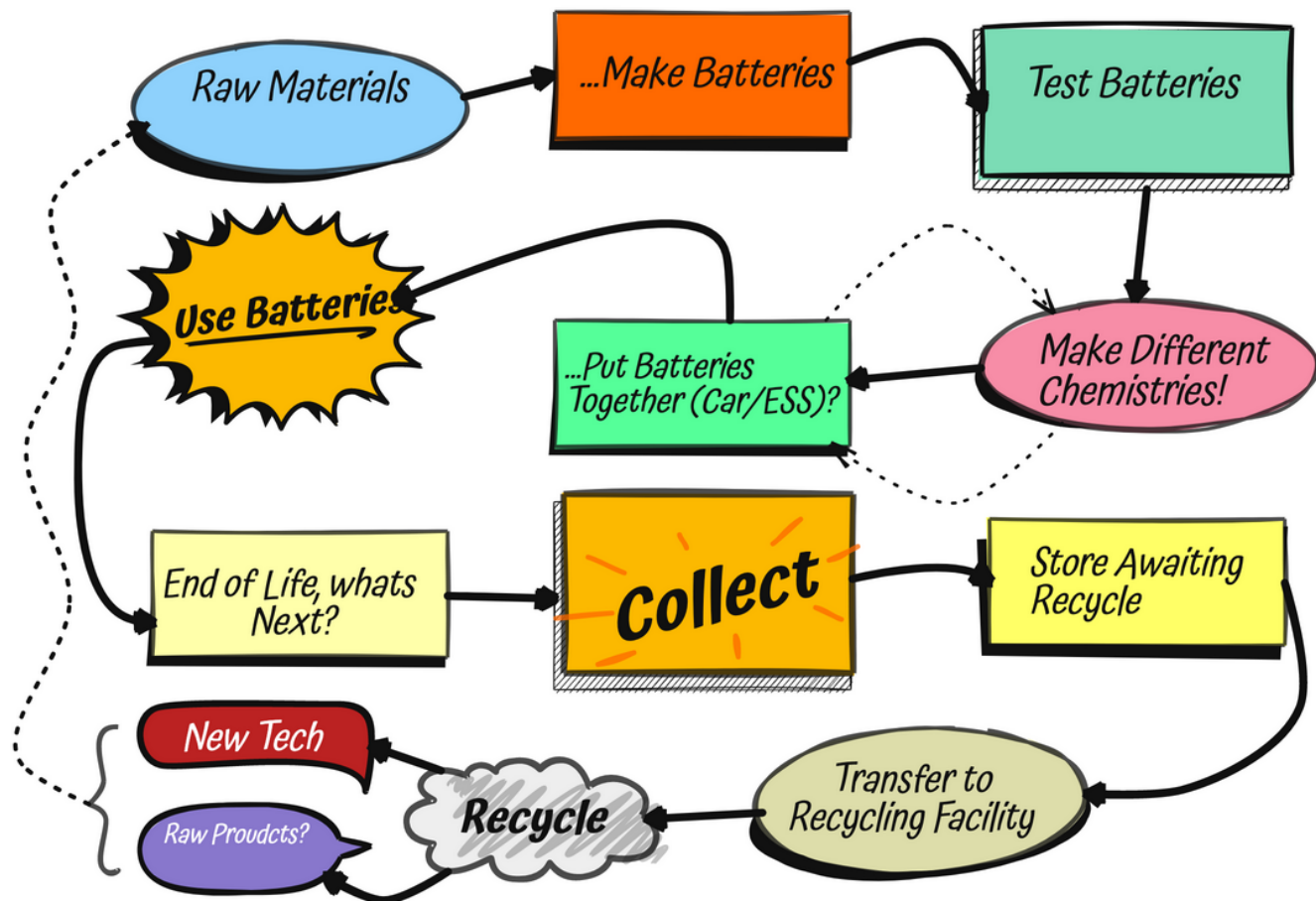
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Cycle Of Batteries!





Battery Responses Fall Into

- Mobility/Consumer grade (ebikes, scooters, hover boards etc)
 - Major Metro are seeing this on a very high stakes
- Electrical /Hybrid Vehicle (Car/Bus/Vehicle)
- Recycling (hauling, storing, moving, in waste stream)
- ESS (Energy Storage Systems)
- Storage/Manufacture



Not All Batteries Create Fire

- **What is the fire department use of batteries**
 - **New apparatus**
 - **Vehicles**
 - **Extrication Equipment**
 - **Lighting**
 - **Portable Equipment**
 - **Backup power at our Fire Stations**

SCAN ME



EV Response

- Joint meeting with SHS/FLSS
- Discussion on training/SOP
- When to let it burn
- Post incident



Fire Department Response to Electrical Vehicle Fires

Adapting our response plans through training, research, and experience is critical in the Fire Service. As sales of Electric and Hybrid vehicles increase, the fire service must continue to modify our tactics to properly respond and protect our firefighters. Fighting vehicle fires is inherently dangerous. When responding to a Electric or Hybrid vehicle fire there are additional challenges responding crews must consider.

Additional response-specific information can be found on most automobile manufacturer web-pages. [NFPA Quick Vehicle Response Guide](#)

Pre-Incident

Modify or establish your department policy or standard response guideline to vehicle fires and ensure it includes practices for electrical vehicle fires. Include guidelines for limited interaction and when crews should slow the vehicle to a stop.

When working on roadways protect the work area per department policy. Staff should consider that this may include a vehicle fire or extrication. Staff operating on roadways should anticipate possibly longer timetables to manage/control EV vehicle fires and maintain heightened situational awareness.

NFPA has a full series of documents on various EV safety response (including emergency response guides by manufacturer).

Review response and post incident procedures with law enforcement and towing companies.

Batteries that have been or are suspected of damage or otherwise compromised, but have not caught fire, need to be monitored for thermal runaway.

Train on department policy and perform practical scenarios which support the response plan



INCIDENT ACTIONS

When arriving on scene, the first arriving company should perform a proper size up. This includes the extent of the fire and if it is a compartment fire or includes the electric components of the car. Similar to other vehicle fires, is the "engine" compartment or the passenger compartment on fire? The best method for managing or controlling a battery fire is with water. Battery fires will initially show from under the vehicle.

- Protect your work area through established department policy and establish tactical priorities (fire, extrication, victim care) and ensure the vehicle is in park and off if possible.
- Wear full PPE with SCBA with face-piece and establish an appropriate command structure.
- Consideration and tactics may be categorized in offensive or defensive mode. This may be based on exposures and the extent of fire which may include actions to let the vehicle burn. Use a thermal imaging camera to help with the 360 size-up.
- Secure a large, continuous and sustainable water supply from one or more fire hydrants or multiple water tenders (3,000-8,000 gallons)
- Where safe, consider chocking the wheels. EVs move silently, so never assume it is powered off. Never assume that an EV will not move.
- Extinguish small fires that do not involve the high voltage battery using typical vehicle firefighting procedures.
- When attacking the vehicle fire, understanding that once the contents of the fire are extinguished, sustained suppression on the battery pack may be necessary. Use a large volume of water such as multiple 1 1/2-inch hand-lines to suppress and cool the fire and the battery. Put water on the burning surfaces.
- Have sufficient fire personnel and apparatus on scene for an extended operation to monitor the battery's heat or possible secondary ignition. The heat from the fire may have damaged additional cells, which may require additional suppression activities.
- Batteries should always be treated as energized. During overhaul do not make contact with any high voltage components.

Post Incident

Brief the towing company and their personnel on the hazards, including providing 50' clear space around the vehicle once stored and never inside a building. An engine company may need to escort the vehicle to the recovery location.

Batteries should always be treated as energized and pose an ongoing risk to the investigator. Follow NFPA 921 protocol for vehicle safety during post-response investigation, arson investigation, and vehicle investigation.

Thermal events with the battery system could continue for some time after the initial incident. Establish response protocol for secondary fires.





Pre Response

- Training for First Responders
- General understanding
- Burn or not burn
- Extinguishing methods
- Vehicle Extrication resources



Let it Burn or Water

- Entrapment
- Compartment vs battery pack
- Exposures
- Limited involvement
- Charger shutdown
- Vehicle from roll away



Cam

Vehicle with Exposures

- Tow out of garage or where stored if possible
- Extinguish and use large amounts of water





Post Incident

- Storage for Police
- Inside or outside
- Fire or just an accident
- Discussion with towing yards
- Recycle?

Charging



Caption

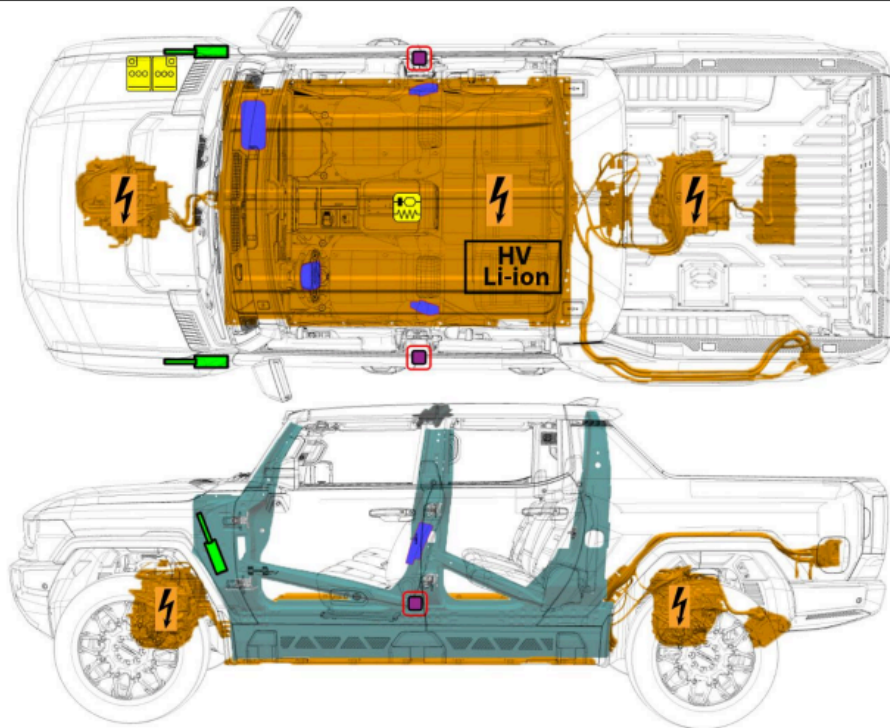


Vehicle Extrication

- Inner/outer Circle for Safety and patients
- Secure vehicle from movement
- Like blue card, identify this is a hybrid or electrical vehicle with type
 - Second in crews find the response guide
- How do we identify this is an electric or hybrid?



0. Rescue Sheet



	Airbag		Stored gas inflator		Seat belt pretensioner		SRS control unit		Pedestrian protection active system
	Automatic rollover protection system		Gas strut/ Preloaded spring		High strength zone		Zone requiring special attention		
	Battery low voltage		Ultra capacitor, low voltage		Fuel tank		Gas tank		Safety valve

Screenshot

7. In case of submersion

The high voltage battery is isolated from the vehicle chassis. If the vehicle is immersed in water, you will not be electrocuted by touching the vehicle.

After the vehicle was removed from the water, do the following:

1. Allow the vehicle to dry out.
2. Perform the high voltage disabling procedure in Section 3.

8. Towing / transportation / storage

Tow Hooks



The vehicle is equipped with two front tow hooks used to pull the vehicle onto a flatbed carrier from a flat road surface.

The vehicle may be equipped with two optional rear tow hooks to pull the vehicle onto a flatbed carrier from a flat road surface.

Vehicle Towing and Transportation

General Motors recommends a flatbed carrier to transport a disabled vehicle.



WARNING:

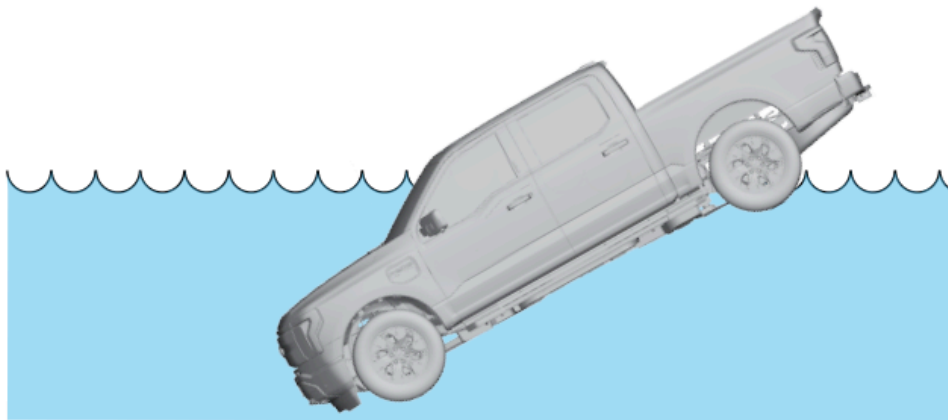
DAMAGED ELECTRIC VEHICLES SUBMERGED IN WATER PRESENT A POTENTIAL HIGH VOLTAGE ELECTRICAL SHOCK HAZARD. EXERCISE CAUTION AND WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING HIGH VOLTAGE SAFETY GLOVES AND BOOTS. REMOVE ALL METALLIC JEWELRY, INCLUDING WATCHES AND RINGS. DO NOT ATTEMPT TO EXTRACT THE VEHICLE UNTIL THE HIGH VOLTAGE BATTERY HAS DISCHARGED INDICATED BY THE ABSENCE OF BUBBLING OR FIZZING. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

If the vehicle is submerged in water, varying degrees of arcing/shorting within the battery will take place. Do not touch any High Voltage components or orange cables while removing the occupant(s). Do not remove the vehicle until you are sure the High Voltage battery is completely discharged. A submerged High Voltage battery may produce a fizzing or bubbling reaction to the water. If fizzing or bubbling is observed, the High Voltage battery will be discharged when the fizzing or bubbling has completely stopped. The battery should still be treated as if it is not discharged.

Battery Electric and Hybrid vehicles when submerged should only be handled while wearing the appropriate Personal Protective Equipment (PPE) for water rescue and vehicle extraction.

Vehicles that have been submerged in water may have potential risk of a high voltage electrical battery fire therefore should be handled with increased caution.

Once the vehicle has been removed from the water proceed to the high voltage depower procedure, as outlined in section 3 of this document.



Fire Service Leadership, Next Steps

- Review procedures with command staff and then take to Community Leadership
- Update Response policy and train department staff
- Review battery facilities with inspection/fire marshal staff
- Consider CRR Activities for mobility and other devices



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Q&A



Upcoming Events

- **Symposium in the Sun**
 - November 10-13, 2022 – Clearwater, FL
- **Wildland-Urban Interface (WUI)**
 - March 28-30, 2023 – Reno, NV
- **Community Risk Reduction Leadership Conference (CRRL)**
 - March 23-25, 2023 – Murfreesboro, TN



Recording and Survey

You will receive a link to today's recorded session by email, along with a brief survey. Please let us know about your experience today.



Thank you

