GLASTONBURY FIRE DEPARTMENT

STANDARD OPERATING GUIDELINES

SOG NUMBER: FDO-513 ISSUED DATE: 06-30-22 EFFECTIVE DATE: 06-30-22

REVISION #: 0 REVISED DATE: EFFECTIVE DATE:

CATEGORY: EMERGENCY OPERATIONS - GENERAL

SUB-CATERGORY: FIRE GROUND OPERATIONS

SUBJECT: RESPONDING FIRES IN ELECTRIC AND HYBRID VEHICLES

RELATED GUIDELINE:

Section I – Introduction

A. Objective

As the number of electric and hybrid vehicles increase, the Department must continue to modify its tactics to properly respond and protect its firefighters. Extinguishing vehicles fires is inherently dangerous. When responding to an electric or hybrid vehicle fire there are additional challenges firefighters must consider.

B. Applicability

Any vehicle fire, especially those that are identified as either electric or hybrid.

C. Reference

International Fire Chiefs Association – IAFC Bulletin dated October 15, 2021
U.S. Department of Transportation – National Highway Traffic Safety Administration
National Fire Protection Association – Electric and Hybrid Vehicle Quick Reference – Fire Service Edition

Section II - General Description

Arriving at any vehicle fire requires that a proper size up of the incident be performed. The size up should include the extent of the fire and if it is a compartment fire or includes the electric components of the vehicle. Similar to other vehicle fires, is the engine compartment or the passenger compartment on fire? Three key components to keep in mind when conducting an initial scene assessment of a vehicle fire:

1. Identify the drive system
2. Immobilize the vehicle
3. Disable high voltage and Supplemental Restraint System

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 tactical priorities (fire, extrication, victim care) and ensure the vehicle is in park and off, if possible. Members must wear full personal protective equipment, which includes a Self-Contained Breathing Apparatus. 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 assist with a 360 size-up. Secure a large, continuous and sustainable water supply from one or more fire hydrants or multiple tankers. Where safe, consider chocking the wheels. Electric vehicles move silently, so never assume it is powered off, and never assume that it will not move.

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 1-3/4 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.

Section III – General Warning and Cautions

1. Never cut orange high voltage, or yellow or blue medium voltage cabling.
2. Never touch damaged or submerged high voltage or medium voltage cables or components
3. Lack of engine noise in most hybrids and electric vehicles does NOT mean that it is off.
4. Silent movement or instant restart capability exists until the vehicle is full shut down.

Section IV – Considerations for Electric and Hybrid-Electric Vehicles:

In the event of damage, fire or flooding involving an electric vehicle or a hybrid-electric vehicle:

1. Always assume the high voltage battery and associated components are energized and fully-charged.
2. Exposed electrical components, wires and high voltage batteries present potential for high voltage shock hazards.
3. Venting (off-gassing) of high voltage battery vapors are potentially toxic and flammable.
4. Physical damage to the vehicle or high voltage battery may result in immediate or delayed release of toxic and/or flammable gases and fire.
5. A high voltage battery in a flooded vehicle may have high voltage and short circuits that can shock and cause fire.

Section V – Vehicle Shutdown and High-Voltage System Disabling:

1. Immobilize Vehicle
    a. Always approach vehicle form the sides to stay out of potential travel path.
    b. It may be difficult to determine if the vehicle is running due to the lack of engine noise.
    c. If possible, chock the tires, place the vehicle in Park, and set the parking brake.

2. Disable Vehicle
    a. Turn off the vehicle, and move the vehicle's key at least 16 feet away from the vehicle.
    b. Disconnect the vehicle's 12-volt battery
    c. CAUTION – safety restraints, air bags, and other safety systems may be active for up to 5 minutes after disconnecting the 12-volt battery.

Section VI – Fires Involving or Exposing the High Voltage Battery:

1. If a fire involves a lithium-ion battery, it will require large, sustained volumes of water for extinguishment.

2. Consider defensive tactics and allow the fire to burn out.
3. If occupants are still inside the vehicle or trapped, a fire extinguisher may be used to protect the occupants until a hose line is available or the occupants are removed.
4. Consider establishing a water supply to support long-term operation.
5. Use a hose line to apply water to extinguish the fire while continuing to cool the high voltage battery and its casing. **Never attempt to penetrate the high voltage battery or its casing to apply water.**
6. Avoid contact with orange high-voltage cabling and areas identified as high-voltage risk by warning labels.
7. Be alert. There is a potential for delayed ignition or re-ignition of a lithium-ion battery fire ever after it is believed to be extinguished. This may remain an issue until the lithium-ion battery is properly discharged.

Section VII – Accidents Damaging the Area of the High Voltage Battery:

1. If you detect leaking fluids, sparks, smoke, flames, increased temperature, gurgling, or bubbling sounds from the High Voltage battery compartment, assume there is a battery fire and ventilate the passenger area.
2. Move away from the vehicle and evacuate others from the immediate area if you detect any unusual odors or experience eye, nose or throat irritation.
3. Be alert. There is a potential for delayed fire with damaged lithium-ion batteries.

Section VIII – Post Incident Recommendation:

1. Brief the towing company and their personnel on the hazards.
2. Always assume the high voltage battery and associated components are energized and fully charged.
3. Ensure that passenger and cargo compartments remain ventilated.
4. Do NOT store a severely damaged vehicle with a lithium-ion battery inside a structure or within 50 feet of any structure, vehicle, or combustibles.
5. Fire Department may need to escort the vehicle to the recovery company's final destination.
6. Batteries should always be treated as energized and pose an ongoing risk to investigators.
7. Thermal events with the battery system could continue for some time after the initial incident.
8. Notify the Department of Energy and Environmental Protection (DEEP) of any potential run off associated with the lithium-ion battery.

Section IX – Approval

Fire Chief  Date of Approval 6-30-22