SUBJECT: Lithium-Ion Battery Incident Response

PURPOSE

To establish operational guidelines for effective response, mitigation, and safe operational procedures for Lithium-Ion battery incidents. To provide guidance to responders to assist in assessing the risks associated with Lithium-Ion battery fires.

AUTHORITY

- FIRESCOPE Field Operations Guide ICS 420-1
- FIRESCOPE ICS-1150 Lithium-Ion Battery Emergencies Operational Guidelines
- CSTI Lithium-Ion Batteries FRO
- San Luis Obispo County Fire Chiefs Association
- NFPA 470, Hazardous Materials/Weaponsof Mass Destruction
- NFPA 855, Standard for Installation of Storage Energy Systems

SCOPE

This SOG has been developed by the San Luis Obispo County Emergency Services Training Officers Association and adopted by the San Luis Obispo County Fire Chiefs Association. It applies to all emergency response personnel (permanent, seasonal, and paid-call) during interagency training, automatic and mutual aid incidents.

DEFINITIONS

Battery Cell: An individual battery can be grouped together with several other batteries to build a battery module. Cell components include the anode, cathode, electrolyte, and separator. Electrolyte materials in Lithium-Ion batteries are often flammable.

Battery Energy Storage System (BESS): BESS are built in a variety of sizes that range from small home units to large commercial occupancies that can be as large as a city block. The year 2020 is a distinct date due to the implementation of NFPA 855. Residential BESS systems differ from utility-scale BESS systems. Residential systems come in a variety of configurations ranging from permanently mounted to a portable battery-generator system. Utility-scale BESS systems may include containerized battery units, large cabinet installations, or grid-connected battery arrays used to support electrical grid stability.

Battery Management System: Responsible for managing batteries during charging and discharging cycles. Monitors batteries during operation to prevent the battery from overheating.

Battery Module/Pack: A subassembly consisting of a group of cells connected either in a series and/or parallel configuration, with or without protective devices and monitoring circuitry

Cold Cut Cobra: A firefighting system that uses a high-pressure water jet and abrasive material to puncture through the obstructing medium (wood, metal, concrete, etc.) and deliver high-pressure atomized water in the fire area.

Consumer Products: Broad category of personal electronics powered by Lithium-Ion batteries. Examples include vape pens, cell phones, tablets, laptop computers, battery packs for power tools, and portable power packs.

Electric Vehicle (EV): A fully electric vehicle that uses only battery power to operate.

Emergency Plug: A device that can be used on an EV that makes the EV think it is plugged into a charger. This should cause the EV to disable the drive train to reduce the risk of the vehicle moving unintentionally.

Fire Blanket (Lithium-Ion Battery Specific): Similar to a salvage cover in application but constructed of specialized materials. It is used to assist with reducing the exposure problem of a Lithium-Ion battery fire. It does not extinguish the fire, reduce the amount of toxic gases and particulates being produced, or fully resolve the fire. It can be used to help reduce the size of the exposure problem and contain the fire.

Hybrid Vehicle (HEV): Hybrid vehicles are vehicles that use both battery power and some other form of flammable or combustible liquid or gas, the most common being gasoline.

Insults: Damage to battery cells that can lead to failure. Types of damage include crushing, penetration, over-charging, internal short circuits, over-discharging, and over-heating.

Micro-Mobility Device: A battery-operated device intended to transport a person. Examples include electric bikes, scooters, hoverboards, wheelchairs, skateboards, mopeds, golf carts, etc. For this SOG this also includes small consumer level devices (phones, battery operated tools, power packs, vape pens, etc.).

Portable Power Stations: Battery generators and residential BESS that are not permanently mounted to a building may be treated similarly to a micro-mobility device. These can range from small portable power stations with built-in inverters to large portable residential BESS systems.

Propagation: The spreading of fire between Lithium-Ion battery cells initiated by a thermal runaway event.

Thermal Runaway: Occurs when a Lithium-Ion battery cell, or area within a cell enters a state of uncontrolled self-heating. Thermal runaway often begins when the heat generated within a cell exceeds the heat dissipated to its surroundings. It can be caused by various types of insults to a battery. Creates a positive feedback loop in which the Lithium-Ion cell enters an uncontrollable, self-heating state.

Stored/Stranded Energy: Battery systems have the ability to retain an amount of energy even during failure. This energy is commonly called stranded energy. This energy can pose an electrical or explosion hazard to responders, even if a shut-off switch has been used.

BACKGROUND

Lithium-Ion (Li-ion) batteries are becoming more prevalent in consumer products ranging in size from smaller products such as mobility devices up to and including use in large-scale power grid support. These smaller devices are being used in everyday applications by the public and are consequently being stored, charged, sold, or repaired inside residential and commercial occupancies.

Fires involving Lithium-Ion batteries have been increasing at an alarming rate and have resulted in fatalities. Even when the initial cause of a fire was not the Lithium-Ion device, the involvement of Lithium-Ion batteries in a fire can increase the intensity of the fire.

Lithium-Ion battery fires present unique challenges. Traditional firefighting methods are often ineffective. Battery cells are packaged into modules; modules are grouped together into battery packs and battery packs are protected from external damage. It is difficult to get water applied directly to the batteries. Attempting to cut or puncture the batteries with our typical methods often damages the batteries further and exposes personnel to electrical hazards. Gases released from the batteries during fires are extremely toxic, use of SCBA is critical. Lithium-Ion batteries can burn for hours, use significantly more water and have a high potential for re-ignition.

Lithium-Ion batteries are used in nearly all consumer electronics. They are the primary power source for micro-mobility devices, electric vehicles and energy storage systems. The use of Lithium-Ion batteries is rapidly increasing across a wide range of applications.

HAZARDS FOR ALL INCIDENTS WITH LITHIUM-ION BATTERIES

Batteries may rupture and vent toxic flammable gases and/or explode violently when the gases ignite, when subject to the following:

- Thermal – Hot or Cold temperatures.
- Physical – Impacted, crushed, or pierced.
- Electrical – Overcharging or forced discharge, including internal manufacturing defects or internal short circuiting.
- Drying after being wet.

It may be difficult to discern if a Lithium-Ion battery pack or cell is compromised; the resulting heat signatures may not be picked up by a Thermal Imaging Camera (TIC).

> **Note:** A thermal imaging camera shall not be relied upon to determine if a Lithium-Ion battery pack or cell is compromised.

Thermal Runaway. When the stable state of batteries/cells rapidly fails due to increased heat from charging or external conditions such as fire, the cell transitions from a stable state to an unstable state and then to catastrophic failure of the cell. Once thermal runaway begins it will propagate (spread, domino effect) to the adjacent battery cells. Thermal runaway can occur at any time without warning

Usually there is a “pop” or rupture sound heard preceding thermal runaway with pressurized white smoke (flammable/toxic gases) venting moments prior to ignition.

Water may not prevent a battery from entering thermal runaway. If able to penetrate the battery case, water may provide a cooling effect on the adjacent battery cells. This cooling may reduce propagation to other cells.

Dry chemical is ineffective for any type of Lithium-Ion related extinguishment. Carbon dioxide extinguishing agents can be used to aid in cooling batteries and electrical components with some propagation control.

***Flammable and Toxic Gases*.** Lithium-Ion batteries in thermal runaway produce many different gases. These gases combine to form a flammable, explosive, and toxic atmosphere. Toxicity and flammability levels vary depending on specific battery technology and manufacturer. Known chemicals include, but are not limited to, Hydrogen (H2), Carbon Monoxide (CO), Carbon Dioxide (CO2), Oxygen (O2), Hydrogen Fluoride (HF), and Volatile Organic Compounds (VOC). Particulates that include metals also pose an exposure threat. All of these chemicals highlight the necessity of respiratory protection and full PPE during all phases of a battery emergency.

Unexpected Re-ignition. Lithium-Ion Batteries are known to unexpectedly re-ignite (with no warning) minutes, hours or even days after all visible fire has been extinguished. Re-ignition is a common occurrence and should be expected. Exposure consideration is necessary and critically important when storing a damaged battery of any size.

Explosive Force. As noted in several incidents across the nation, Lithium-Ion batteries have ruptured and ignited with such force that walls were blown down resulting in structural damage and extensive fire spread.

GUIDELINES

PPE FOR ALL INCIDENTS INVOLVING LITHIUM-ION BATTERIES

- Wear full structural firefighting ensemble, including SCBA, at all times when working near damaged Lithium-Ion batteries.
- Lithium-Ion runoff is high corrosive and contaminated with heavy metals. Agencies should coordinate early with County Environmental Health to contain water if possible.
- Due to the rapid re-ignition danger when involved in fire or subjected to elevated temperatures, full PPE with a donned facepiece must always be worn during the following:
    - Whenever personnel are operating in the immediate area/same room.
    - When handling or removing batteries from an area to the bathtub, sink, or bucket.
    - When securing a mobility device with a rope for removal via window.
- Follow Preliminary Exposure Reduction and PPE laundering SOGs
- Any employee with a suspected exposure should be evaluated and tested for heavy metal exposure.

INCIDENT COMMAND CONSIDERATIONS

- The AHJ dispatching the Lithium-Ion incident shall include a specific life safety notification to all responding units requiring a positive acknowledgement
- HazMat **SHALL** be notified of any fire or incident involving a Lithium-Ion battery failure, the purpose of notification is at minimum for tracking, for County data collection
    - Not every Lithium-Ion battery incident will require a HazMat response. Considerations for when a HazMat response is recommended include, but are not limited to, complexity of the incident exceeds the training and capability of the on-scene resources, damaged batteries requiring stabilization, need for extensive air monitoring, and/or evacuation or shelter-in-place orders are given.
- HazMat Personnel may request assistance of on-scene personnel with the removal of batteries with Incident Commander (IC) authorization.
- A charged handline, minimum 1 ¾ shall remain ready until HazMat units have completed stabilization of the batteries
- On some occasions there may be a need for a watch line to be established for a prolonged period until proper removal of the hazard can be coordinated by HazMat. The determination of establishing a watch line, watch line rotation, and other logistical needs will be coordinated by the IC with guidance from HazMat.

- Completion of fire overhaul will be determined by the IC, not HazMat

- Larger scale incidents involving Lithium-Ion battery fires can involve numerous other agencies. Agencies that may be involved include County OES, County Environmental Health, CHP, Caltrans, DTSC, EPA, County Sheriff, and several others. Consider unified command or liaison officer.

- Consider assigning or requesting Public Information Officer (PIO) to the incident.

MICRO-MOBILITY DEVICES AND CONSUMER PRODUCTS

- Use a handline to extinguish the fire; flames from a Lithium-Ion Battery should be knocked down with copious amounts of water. Water application should continue until the battery or device is no longer producing flame, smoke, or off gassing.

- Lithium-Ion batteries or mobility devices which are involved in fire, found within a fire area, or subjected to elevated temperatures **MUST** be moved from the area in which personnel will be operating. This should be accomplished ***before*** overhaul operations begin.

- When a Lithium-Ion battery or mobility device fire involves a serious injury, fatality, or potential crime, all personnel operating should be aware of the need for scene preservation prior to the arrival of Fire Investigators.

- When possible, prior to overhaul in the area of the Lithium-Ion battery or mobility device, personnel should conduct a diligent search for stray battery cells. These individual cells may have become dislodged from the battery pack during the fire or by the hose stream during extinguishment.

    - Firefighters must not place the Lithium-Ion battery pack or cells in the pocket of their bunker coat or pants.

    - When possible, personnel should move Lithium-Ion by use of a non-conductive tool (i.e. a shovel with a wooden handle) or other method that does not require firefighters to carry the Lithium-Ion batteries in their hands.

- The batteries or mobility device should be moved to one of the following locations in order of preference until it can be appropriately stabilized by HazMat (should provide ventilation to prevent accumulation of toxic and flammable gases when indoors):

    - Outside the structure away from firefighting operations

        - Assessment of the safety of this operation, particularly when above the ground floor, should be made by on-site supervisors in consultation with HazMat as needed.

    - Bathroom tub in fire apartment, with all battery cells fully submerged in water.

    - Sink large enough that all battery cells can be fully submerged in water.

    - Garbage pail or bucket large enough that all battery cells are capable of being fully submerged in water.

- When the above options are not practical, the IC may remove the batteries or mobility device via a fire apartment window.

- When the battery or mobility device is in a location that makes removal via fire apartment window not practical, such as in an upper story apartment in a high-rise, the IC may move the batteries or mobility device to a different location on the fire floor and ensure the batteries are protected by a charged hose line. The charged hose line will remain in place until stabilization procedures have been completed by HazMat.

- A damaged Lithium-Ion battery shall NOT be moved in an elevator with any personnel at any time. Elevators may be required to remove damaged cells. If necessary, elevators will need to be controlled and monitored. A Lithium-Ion battery or mobility device shall **NOT** be moved in an elevator or via stairs unless stabilized by HazMat and approved by the IC.

HYBRID AND ELECTRIC VEHICLES

- Ensure all personnel are wearing full PPE and SCBA.
- If safe, chock the wheels. Utilize an EV Emergency Plug if appropriate and available.
- **NEVER** assume the vehicle is powered off and will not move.
- Immediately check for trapped victims.
- If possible physically separate the key FOB from the vehicle to prevent accidental start up.
- Avoid smoke and toxic gases whenever possible; consider the use of a PPV fan.
- Attack the fire as a normal vehicle fire as the batteries may not be involved
    - Use 1 ¾" line or greater
    - Attack all vehicle fires from an angle
    - Vehicle fires with battery involvement can produce jet fire that emits from the side of the vehicle
- After confirming the batteries are involved, notify the AHJ.
    - If safe to do so, allow the batteries to burn, protect exposures, and evacuate an area 330 feet in all directions.
    - If extinguishment is required, secure a water supply
    - Extinguishment may require copious amounts of water, likely in the thousands of gallons
    - Use of foam is ***NOT*** recommended
    - Request HMS-52 with the Cold Cut Cobra System

- If extinguishment is required, consider tilting the vehicle to gain access to the underside of the vehicle where the floor pan Lithium-Ion battery is located.
    - Crib the vehicle as it is lifted
    - Consider USAR response
- Locate the main Lithium-Ion battery
    - Refer to the Emergency Response Guide for the specific make and model of the vehicle for guidance. Utilize EV Rescue app and NHTSA guides.
    - A TIC should be used to check the temperature of the Lithium-Ion battery and cooling measures should be used if necessary.
    - Apply water as directly to the batteries as possible.
    - Once the fire is extinguished, locate the main disconnect to isolate power from the Lithium-Ion battery pack, if accessible.
    - This can be done by removing the negative terminal from the 12-volt battery and cutting the first responder loop.
- Never cut, crush, puncture, or open a high-voltage battery to extinguish it
    - If the cells are visible due to damage, you can direct a hose stream directly onto the cells.
    - Observe the battery for smoke and steam; stay alert for popping noises from the battery.
    - If any of these are observed, the Lithium-Ion battery is in thermal runaway.
- If any Lithium-Ion cells have come out of the battery and are lying on the ground request HazMat
    - Do not touch any battery with bare hands that have come out of the battery compartment
- Once the Lithium-Ion battery has been cooled, stand by for **AT LEAST ONE HOUR** and continue monitoring the battery using a TIC and observe for any other signs of thermal runaway (white smoke, hissing, popping, etc.).
    - If on a freeway, consider using CHP to move the vehicle out of the way, if feasible and safe
    - Once the vehicle is determined to be safe for transport, release the vehicle to the tow company for removal via flatbed. Wheel lift towing may send unwanted power to the Lithium-Ion batteries.

- The tow company is responsible for properly storing the vehicle
    - It is recommended to store the damaged vehicle 50 feet away from any other vehicles or buildings.

- **Auto Extrication Considerations**
    - Immobilize the vehicle
        - Chock the wheels
        - Stabilize the vehicle if needed
        - Place the vehicle in park and set the parking brake if possible
        - Locate the emergency cut loop (may disable the BMS system, check ERG
        - Use an EV Safe Plug if available (not compatible with all EV models)
    - Have a PPV fan in place near the vehicle
        - Provide ventilation in case the batteries begin to off-gas
    - Break out all windows
    - Place a gas detector in the passenger space
        - May see an alarm on the CO sensor to indicate battery failure
    - Ensure a hose line is charged and staffed by firefighters in full PPE and SCBA
    - Rocker panels are typically good places to work from, be cautious of puncturing or damaging vehicle batteries during extrication
    - Safety features and other functions may not work as expected on damaged vehicles

BATTERY ENERGY STORAGE SYSTEMS (BESS)

BESS are built in a variety of sizes that range from small home units to large commercial occupancies that can be as large as a city block. The year 2020 is a distinct date due to the implementation of NFPA 855.

A residential BESS can be found in several different configurations. They may be permanently mounted to the building, powered by both solar (DC) and utility (AC) sources. Permanently mounted systems should be treated more like a fixed commercial system. Evacuation and shelter in place recommendations may not be necessary for smaller scale residential BESS systems.

They can also be larger rack or wheeled assemblies that connect to a home electrical system like a gas generator configuration. Consider removing these types of systems (similar to a micro-mobility device or consumer product) from the occupancy to an isolated area if possible and safe to do so while wearing full structural PPE including SCBA.

The following points provide guidance for these fixed commercial scale facilities:

- Evacuate the area of all non-emergency personnel. Establish a 330-foot initial isolation zone (ERG Guide 147)
    - Wear proper PPE
    - Spot Apparatus upwind and uphill
    - Monitor for evidence of continued smoke/toxic gases venting or fire
    - There may be periods during which the thermal runaway propagates from battery to battery. The battery may not generate visible signs of a thermal event although it can still be active, and the battery can flare up.
- Contact
    - Site Emergency Contact/Product Manufacturer
    - HazMat Team
- If Possible, Shut off the unit/system
    - Smoke or a suspicious odor emanating from a BESS can be an indication of an abnormal and hazardous condition including thermal runaway.
    - White-Gray gases are TOXIC gases from the batteries decomposing
- Do not approach the involved unit and attempt to open any doors
    - Allow safety systems to operate as designed

- Some safety mechanisms are designed to keep all doors shut; some will have ventilation hatches and doors that will open automatically.
- Consider the unit similar to an ENERGIZED TRANSFORMER FIRE

- If a fire has developed
  - Identify an adequate water supply
  - Allow the affected unit to consume itself as it is designed to do (controlled burn)
  - Coordinate procedures with site emergency personnel, product manufacturer and/or HazMat Team
  - Do not apply water to neighboring units unless necessary
    - Use wide-fog stream, at lowest volume possible to achieve desired cooling of neighboring battery enclosures
    - Position attack lines to protect exposures and nearby battery enclosures
- Allow the battery pack to cool down – May take 12 to 48 hours or longer.

HAZMAT TEAM CAPABILITIES

- The San Luis Obispo County Hazardous Materials Response Team has numerous capabilities specific to Lithium-Ion battery responses
  - Gas monitoring for toxic gases
    - Remote monitoring capabilities
  - Overpack drum and Class D extinguishing material
  - Brine solution to discharge damaged batteries with stranded energy
  - Non-conductive tools for battery disassembly and handling
  - Support incident decontamination needs
  - Coordinate with other cooperating agencies
  - EV Fire Blanket (one located at Station 62 as well)
  - HMS-52 with Cold Cut Cobra

ATTACHMENTS:

Appendix A – Tactical worksheet for Lithium-Ion Battery Response

Date	Revision	SLO T/O Pres.	SLO Co. Chief Pres.
09/09/25	Original SOG development		

SAN LUIS OBISPO COUNTY FIRE CHIEFS' LITHIUM-Ion BATTERY RESPONSE TACTICAL WORKSHEET (Appendix A)

HM-1 DUTY PHONE – 805-441-9759

ICP LOCATION: _____ **STAGING AREA LOCATION:** _____

REPORT INFO

DATE_____ **S**TART **T**IME_____ **I**NCIDENT #_____ **R**EQ. #_____

Site location/address_____

Business/company Name(s)_____

Company Address_____ **C**ity, **S**tate_____

REPORTING PARTY / CONTACT PERSON_____ **P**HONE #_____

LIFE SAFETY

LIFE SAFTEY / PPE

☐ ALL PERSONNEL IN FULL-PPE (INCLUDING SCBA)

☐ ISOLATE / DENY ENTRY ☐ EVACUATE ☐ SHELTER IN PLACE

☐ NUMBER OF VICTIMS_____ TIME LAST SEEN_____ CONSCIOUS: ☐ YES ☐ NO RESCUE ☐ RECOVERY ☐

☐ CHOCK WHEELS OF VEHICLE (IF APPLICABLE) ☐ SHUT OFF THE UNIT/SYSTEM (IF APPLICABLE) ☐ SPOT APPARATUS UPWIND AND UPHILL

☐ PERFORM THOROUGH PPE AND PERSONAL DECONTAMINATION PROCEDURES

*NOTE: WHITE—GRAY GASSES ARE TOXIC FROM BATTERIES VENTING OR DECOMPOSING

MICRO-MOBILITY FIRE

OUTDOORS:

☐DEFENSIVE OR OFFENSIVE ACTION

☐EVACUATE AND ESTABLISH AN ISOLATION DISTANCE OF 330 FEET IN ALL DIRECTIONS

☐PREVENT PROPAGATION TO OTHER DEVICES/BATTERY PACKS

☐REQUEST HAZMAT ASSESSMENT TO ASSIST WITH BATTERY STABILIZATION,

☐MITIGATION, OVERPACKING AND DISPOSAL

INDOOR/STRUCTURE FIRE CONSIDERATIONS :

☐ATTACK THE RESIDENTIAL STUCTURE FIRE

☐CONSIDER EXPLOSIVE ATMOSPHERE IN ENCLOSED SPACE

☐REMOVE THE INVOVLED MOBILITY DEVICE FROM THE STRUCURE (IF POSSIBLE)

☐REMOVE ALL LITIUM-ION BATTERIES AND DEVICES PRIOR TO INITIATING OVERHAUL

☐USE NON-CONDUCTIVE TOOLS TO REMOVE UNIVOLVED BATTERIES

*(Do not use bare or gloved hands)

BATTERY ENERGY STORAGE (BESS) FIRE

IF POSSIBLE, SHUT OFF THE UNIT/SYSTEM:

☐SMOKE OR SUSPICIOUS ODOR EMANATING FROM A BATTERY ENERGY STORAGE SYSTEM (BESS) CAN BE AN INDICATION OF AN ABNORMAL AND HAZARDOUS CONDITION INCLUDING THERMAL RUNAWAY.

EVACUATE THE AREA OF ALL NON-EMERGENCY PERSONNEL. ESTABLISH A 330 FOOT INITIAL ISOLATION ZONE:

☐MONITOR FOR EVIDENCE OF CONTINUED SMOKE VENTING OR FIRE

*(There may be periods during which the thermal runaway propagates from battery to battery. The battery may not generate visible signs of a thermal event although it can still be active and the battery can flare up)

IF A FIRE HAS DEVELOPED:

☐IIDENTIFY AN ADEQUATE WATER SUPPLY

☐POSITION ATTACK LINES TO PROTECT EXPOSURES AND NEARBY BATTERY ENCLOSURES

☐ALLOW THE AFFECTED UNIT TO CONSUME ITSELF AS IT IS DESIGNED TO DO. APPLYING WATER TO THE BURNING UNIT WILL ONLY SLOW ITS EVENTUAL COMBUSTION

☐USE WIDE-FOG STREAM, AT LOWEST VOLUME POSSIBLE TO ACHIEVE DESIRED COOLING OF NEIGHBORING BATTERY ENCLOSURES

☐COORDINATE PROCEDURES WITH SITE EMERGENCY PERSONNEL, PRODUCT MANUFACTURER AND/OR HAZMAT TEAM

DO NOT APPROACH THE INVOLVED UNIT AND ATTEMPT TO OPEN ANY DOORS:

☐ALLOW SAFETY SYSTEMS TO OPERATE AS DESIGNED

□ SOME SAFETY MECHANISMS ARE DESIGNED TO MAINTAIN ALL DOORS SHUT; SOME WILL HAVE VENTILATION HATCHES AND DOORS THAT WILL OPEN AUTOMATICALLY

□ CONSIDER THE UNIT LIKE AN ENERGIZED TRANSFORMER FIRE

ALLOW THE BATTERY PACK TO COOL DOWN – MAY TAKE 12 TO 48 HOURS OR LONGER

ELECTRIC VEHICLE FIRE

ATTACK THE FIRE LIKE A NORMAL VEHICLE FIRE

□ ASSUME ALL VEHICLES ARE A HYBRID OR ELECTRIC UNTIL SHOWN OTHERWISE

□ INDICATIONS OF BATTERY INVOLVEMENT

- HISSING, POPPING NOISES
- WHITE-GRAY **TOXIC** GAS PRODUCTION/VENTING

□CONSULT MANUFACTURER'S EMERGENCY RESPONSE GUIDE (ERG) FOR VEHICLE SPECIFIC GUIDELINES AND RECOMMENDATIONS

DEFENSIVE

□EVACUATE AND ESTABLISH AN ISOLATION DISTANCE OF 330 FEET IN ALL DIRECTIONS

□KEEP ALL PERSONNEL AND CIVILIANS OUT OF THE TOXIC GASSES/PLUME

□PROTECT EXPOSURES

- CONSIDER TIME OF DAY, WEATHER, PROXIMITY, ETC.
- CONSIDER KNOCKING DOWN PLUMES TO REDUCE EXPOSURE POTENTIAL
- CONSIDER MOVING THE VEHICLE, ONLY IF NECESSARY
  - COORDINATE WITH CHP, TOW COMPANY, HAZMAT, COUNTY EH, CALTRANS, ETC.

OFFENSIVE – STABILIZE INCIDENT

□ SECURE A WATER SUPPLY OR WATER SHUTTLING OPERATION

□ NOT RECOMMENDED TO FORCE ACCESS INTO THE HIGH VOLTAGE BATTERY

- IF BATTERIES ARE EXPOSED DIRECT WATER ONTO THE BATTERIES

□ TOWING

- USE A FLAT-BED TOW
- CONSIDER FOLLOWING THE TOW VEHICLE TO THE YARD WITH AN ENGINE

OTHER CONSIDERATIONS

□ UNDERGROUND PARKING

- INITIAL IDENTIFICATION OF AN EV WILL BE VERY DIFFICULT
- SIGNIFICANT TOXIC ATMOSPHERE HAZARD – START HAZMAT FOR AIR MONITORING
- EXPLOSIVE ATMOSPHERE LESS LIKELY DUE TO AVAILABLE SPACE
- TAKE DEFENSIVE ACTIONS
  - IF SPRINKLERED THIS MAY TAKE SEVERAL HOURS WITH LESS POTENTIAL STRUCTURAL DAMAGE
  - IF NOT SPRINKLERED, SIGNIFICANT STRUCTURAL DAMAGE IS LIKELY

OPERATION CHECKS

Operations Perimeter Control □ Eliminate Ignition Sources □

Provide Lighting □ Protective Clothing & PPE □ Atmospheric Monitoring □ Ventilation □

Respiratory Protection: SCBA □ / SAR □ / APR □ / Dust masks □ / None □

Communication: Visual □ / Voice □ / Hardline □ / Radio □ / Searchcam □ / Rope □

ICS / PERSONNEL

SCENE MANAGEMENT

Incident Commander _____ **Operations** _____

Law Group _____ **Medical Group** _____

Safety Officer _____ **Accountability** _____

Search Group _____ **Rescue Group** _____

Division/Group _____ **Public Works** _____

Structural Engineer(s) _____

END

Personnel Accountability □ Equipment Removed □ Scene Secured □ Debriefing / CISD □

Time_____ Date_____ Operations/Safety Officer Signature_____