



SMALL COMMERCIAL/INDUSTRIAL AND RESIDENTIAL BATTERY ENERGY STORAGE SYSTEMS (BESS) INCIDENT CHECKLIST

LITHIUM ION TECHNOLOGY

Upon Dispatch:

- Access preplan information relative to the presence of a BESS at the structure.
- Have the dispatcher request the response of SCE.

Upon Arrival:

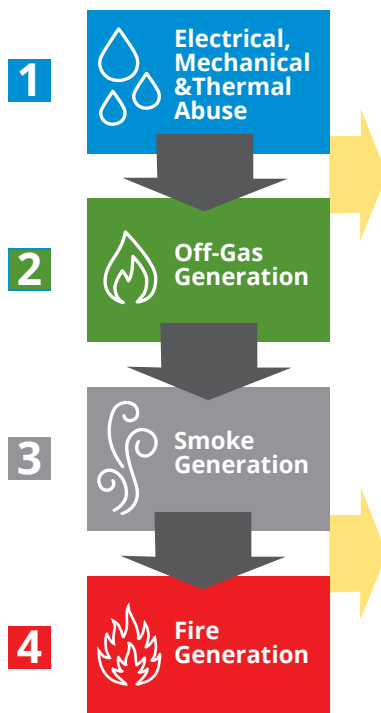
- Conduct a comprehensive scene size-up, including a 360-degree circle check of the facility.
- Assume command, confirm evacuation of occupants and coordinate resources. Maintain a 300 foot perimeter free of all unnecessary people.
- Review and interpret data available remotely from the battery storage system and through technical guidance provided by the vendor.
- Identify the probable abuse factor (electrical, mechanical or thermal) and the stage of battery failure, and match offensive actions to the level of risk present.
- Verify ventilation is ongoing. Vaporized electrolyte can ignite or can explode when confined.

- Consult with vendor/property owner relative to system disconnect options.
- Ask the SCE representative to verify grid disconnect.
- Remember that batteries contain stored energy despite system disconnection/discharge.

Initiating Operations:

- **Prioritize life safety over property conservation. If components are on fire, recognize that the system is not salvageable and, if possible, let it burn. In most cases, a free-burning condition will prevent buildup of explosive gas.**
- Protect personnel operating on the incident scene through distance, shielding and appropriate PPE.
- Evacuate occupants per the Emergency Response Guidebook (ERG) Guide 111, Mixed Load/Unidentified Cargo, and Guide 147, **Lithium Ion Batteries**. Consider sheltering adjacent occupants in place if they are not in immediate danger.
- Integrate all data sources to form an operational picture for data-driven incident management.
- Identify system components and battery chemistry; confirm with vendor or technical advisor.

FOUR STAGES OF BATTERY FAILURE



Stages 1 and 2: De-Escalation Tactics

- Electrically isolate the system and work with SCE personnel to verify grid disconnect.
- Cool compromised battery cells with water.
- Monitor off-gassing. The off-gassing phase is considered the best time to act. If possible, use positive pressure ventilation from a shielded position to reduce gas accumulation.
- Consider where the gas is venting and may accumulate. Evacuate accordingly.
- Consider the potential for ignition and explosion and establish defensive operations as the incident progresses from off-gassing (Stage 2) to smoke generation (Stage 3). Remember that conventional gas detection such as multi-gas meters cannot provide sufficient warning of the transition to smoke generation. (Specialty detection equipment for early warning is currently under development.)

Stages 3 and 4: Operational Safety and Containment Strategy

When off-gassing gives way to smoke generation, you are at the tipping point. You must transition to a containment strategy and defensive operations. Prepare for a long-term incident with high-volume toxic and explosive gas production, persistent shock hazards, the potential for re-ignition hours or even days after initial extinguishing, and the need for a sustained high-volume water supply. Pursue slow and methodical containment actions and consider the tactics on the reverse as appropriate.





VENTILATION

If gases are above the Upper Explosive Limit (UEL), exhaust venting may result in an explosion as the concentration falls within the flammable range and is subject to ignition sources. Consider the following tactics, as appropriate:

- Continually monitor gas levels beyond the standoff distance or from a shielded position.
- If possible, use positive pressure ventilation from a shielded position to reduce gas accumulation.
- Be prepared for development of a deflagration: rapid burning that may create a significant pressure wave, similar to an explosion. Position resources accordingly.
- Consider where the gas is venting and potentially accumulating, and evacuate accordingly.

FIRE SUPPRESSION-TACTICAL CONSIDERATIONS

Pursue slow and methodical actions and consider the following additional tactics as appropriate:

1. Establish water supply for potential extended high-volume operations.
2. Consider the need for a hazmat team response.
3. Determine appropriate evacuation distance per the ERG Guides 111 and 147 or on-site hazmat team.
4. Deploy hose lines at the standoff distance and ensure sufficient length to advance.
5. Protect interior exposures with unmanned streams and exterior adjacent exposures from a shielded position.
6. Develop an incident action plan (IAP) to guide further tactical action.
7. Post a fire watch, and do not turn the property back to the owner until thermal propagation has stopped and cells are no longer in thermal runaway or off-gassing. For extended event monitoring, a qualified facility SME may fulfill the role of a fire watch after visible flaming and smoke generation have subsided.

THERMAL EVENTS-TACTICAL CONSIDERATIONS

Thermal events are more dangerous than an actual ignition, as they result in off-gassing and have the potential to produce a toxic and explosive atmosphere. Expect a long-term event with high-volume toxic and explosive gas production and potential re-ignition. Pursue slow and methodical actions and consider the following additional tactics as appropriate:

1. Identify the number and location of modules involved.
2. Access safety-related information through the property owner and/or technical advisor.
3. Be prepared for a deflagration to occur at some point in the incident as vapors enter the flammable range. This may occur as vapors build, or as their concentration is reduced through ventilation.
4. Continually monitor gas levels beyond the standoff distance.
5. Establish water supply for extended high-volume operations.
6. Deploy hose lines at the standoff distance and ensure sufficient length to advance to protect interior and exterior exposures.
7. Develop an incident action plan (IAP) to guide further tactical action.

Electrolyte Release

Treat electrolyte release as a hazmat event and follow your department's SOPs for metering, monitoring, containment and decontamination. Ensure appropriate cleanup per health and safety requirements before the structure is reoccupied.

This material has been prepared for informational purposes only. SCE does not provide any advice or recommendations regarding life safety or emergency response protocols. You should consult your own life safety, emergency response, engineering and legal advisors before formulating an incidence response protocol for BESS incidents. SCE makes no recommendations or representations regarding the quality or accuracy of any source material referenced in this material. All information is made available on an "as is" and "as available" basis. SCE makes no warranty and hereby disclaims all warranties, whether express or implied, including without limitation as to the completeness or accuracy of any information.

