Jupiter
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Attachment E-1: Trimount Energy Emergency Response Plan

Pictured: Jupiter's Callisto | BESS in Harris County, TX

Prepared For:

Massachusetts Department of Energy Resources

Electric Distribution Companies:

Fitchburg Gas & Electric Light Company d/b/a Unitil

Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid

NSTAR Electric Company d/b/a Eversource Energy

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Trimount Energy Storage

Everett, MA

Trimount ESS LLC

Emergency Response Plan

This plan has been developed to assist the local emergency responders with important safety and emergency response information concerning the Hithium battery energy storage system.

This site-specific document and supporting material should be consulted prior to any fire service personnel entering the Trimount Energy Storage or engaging in any tactical operations.

Approved By: Jupiter Power LLC

Confidential

Document No. 465-038_Trimount ESS_ERP_Rev1

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SECTION 1 GENERAL INFORMATION

1.1 Purpose

The purpose of this Emergency Response Plan (ERP) is to provide information to battery energy storage system (BESS) subject matter experts (SME) and the members of the fire service on emergencies that can reasonably occur along with site hazards and the response tactics necessary to enhance safety and mitigate risk.

The Trimount Energy Storage facility design is preliminary and conceptual. This ERP will be revised to include additional pertinent information and emergency response procedures as the facility design is further developed.

1.2 Scope

This document is an Emergency Response Plan (ERP) for the Trimount Energy Storage facility. The ERP provides an overview of the facility and potential exposures, system equipment and modes of failure, site hazards, safety features, notification and response matrix, command and control structure and response tactics.

1.3 Site Owner

Trimount ESS LLC

HQ Telephone: 512.375.4052

1.4 Site Location

Beacham St, East of Robin St

Everett, MA 02149

42°23'44.8"N 71°3'32.7"W

1.5 Battery Energy Storage System Manufacturer

Hithium, 00 Block utilizing 3.2v – 314Ah Lithium Iron Phosphate cells.

1.6 Emergency Contact

The Jupiter Remote Operations Center (ROC) can be reached 24/7 regarding any emergencies that occur at the Trimount BESS. The emergency contact number will be located on the facility entry gate.

1.7 First Responder Contact Information

Agency – Group	Address	Phone
Site Emergencies	*LOCAL ONLY*	*911*
Everett Fire Department	384 Broadway, Everett, MA 02149	617.387.7198
Everett Police Department	45 Elm St, Everett, MA 02149	617.389.2120
CHA Everett Hospital	62 Lawrence Street, Everett, MI, 01249	617.394.7702

SECTION 2 ENERGY STORAGE SYSTEM INFORMATION

2.1 Site Overview

The Trimount Energy Storage facility is located on both sides of Beacham St, south of Robin St. The facility has a 50-foot setback from roadways and surrounding property lines. The facility is surrounded by industrial and commercial facilities. Scenarios resulting in fire conditions occurring within the BESS facility are expected to be confined to the facility.

2.2 Energy Storage System Site Design

The BESS facility will include Hithium Gen 2 BESS enclosures. The batteries are protected by an IP 55 enclosure. The enclosures also include smoke detection, hydrogen detection, heat detection, and an NFPA 69 ventilation system. Every enclosure is also equipped with a liquid cooling unit and a control panel. The control panel contains the relay modules that communicate with the site fire alarm control panel (FACP) to monitor and control the detection and ventilation systems. Containers are also equipped with a flood sensor, humidity sensor, and temperature sensors.

The container will be arranged in two levels. The bottom level will be at ground level and the top level will be mounted on a steel structure approximately 15 feet off the ground. The containers will be arranged so the top level is directly above the bottom level.

Every rack within the enclosure is equipped with an HV box which contains the cluster battery management unit (CBMU) and a disconnect switch for isolation of modules within the rack. The CBMU communicates with the system battery management unit (SBMU) located in the enclosure control panel.

Battery enclosures are divided into battery blocks. Each battery block consists of three battery enclosures and one power conversion system to transform DC to AC power and ramp voltage from battery enclosures to a level that is compatible with the local grid schedule.

2.3 Site Equipment

Figure 1 Battery Enclosure Overview

[redacted]

Figure 2. Control Panel

[redacted]

2.4 One-Line Diagram

Figure 3 One-Line Diagram

[redacted]

2.5 Cell Information

Table 1. UL9540a Cell; Test Data

Chemistry	Lithium-Iron Phosphate (LFP)
[redacted]	

2.6 Thermal Operating Range

Table 2 Critical Temperature Chart

Thermal Operating Range	Celsius	Fahrenheit
Normal Operating Range	-25 C / 45 C	-13 F / 113 F
Critical Temperature: Venting (flammable electrolyte)	203.7 C	398.7 F
Critical Temperature: Thermal Runaway	295.7 C	564.3 F
Post-Fire Disposal Temperature	40 C	104 F

SECTION 3 DEFINITIONS & ACRONYMS

3.1 Cell

The basic functional electromechanical unit contains an assembly of electrodes, electrolyte, separators, enclosure, and terminals. It is a source of electrical energy by direct conversion of chemical energy. Each cell has a nominal capacity of 314 Ah, nominal voltage of 3.2 Vdc, and is composed of Lithium-Iron Phosphate (LFP) chemistry. The cell is prismatic in geometry and is certified to UL 1973.

Figure 4 LFP Battery Cell

3.2 Module

[redacted]

3.3 Rack

Each rack contains 8 modules connected in series and a High Voltage Box (HV Box). The HV Box houses the rack battery management unit and electrical units to manage and control the rack.

[redacted]

3.4 BESS Enclosure

Each BESS enclosure is IP55 rated and contains 6 battery racks in parallel, a control panel, and a liquid cooling unit for the modules. The control panel provides auxiliary power, master communication, and fire alarm control to the enclosure.

Figure 7 Enclosure Configuration

[redacted]

3.5 Power Conversion System (PCS)

The Power Conversion System contains an inverter, a medium voltage transformer, and disconnect switch to island the battery block. The inverter transforms DC to AC and the medium voltage transformer ramps the 1,500 volts received from the battery enclosure to 34.5 kV for grid compatibility. The transformer is cooled and insulated using FR3 ester-based oil.

Figure 8 Power Conversion System

3.6 Auxiliary Power Transformer

These units provide basic light and power to the site and are supplied by the local grid. These units support critical operations such as the FACP, BMU, thermal management system and the NFPA 69 explosion prevention system. Two back-up diesel generators with a 24-hour runtime have been provided to ensure the light and power supply to the site is continuous.

[redacted]

3.7 E-Stop

This device is designed to stop the charging and discharging of system batteries. The operation of an e-stop will NOT remove the stranded energy hazard from cells/modules.

3.8 Stranded Energy

During an emergency at a BESS facility, e-stops may be operated to stop charging and discharging of modules. The e-stop feature does not discharge the electrical potential remaining in the cells/modules, known as stranded energy. During the failure of standard electrical equipment, power sources can be isolated. Batteries, on the other hand, cannot be simply isolated; they need to be discharged over time to safely remove their electrical charge.

3.9 Cell Venting

An initial stage of failure were flammable electrolyte vents from the module in gaseous state. During UL 9540A cell level testing, the average temperature where sustained venting began was 203.7°C (398.7°F). Gas venting is often a precursor of thermal runaway.

Figure 10 Cell Venting

3.10 Thermal Runaway

The incident when an electromechanical cell's temperature increases at an accelerating rate in an uncontrollable fashion sufficient to result in damage to the cell. The thermal runaway progresses when the cell's generation of heat is at a higher rate than the heat it can dissipate. During UL 9540A Testing, the average temperature where thermal runaway began was 295.7°C (564.3°F).

Figure 11 Thermal Runaway

3.11 Explosion Control

Explosion Prevention Systems (NFPA 69): This standard provides requirements for installing systems for the prevention and control of deflagration in cabinets that contain a concentration of flammable gases, vapors, mists, dusts, or hybrid mixtures.

3.12 Knox Box

A key box, accessible by a universal key carried fire departments, containing keys required to access the site.

3.13 Remote Operations Center (ROC)

A monitoring station that monitors the status of systems on the site including the fire alarm and BMS. The ROC can be contacted by phone and provide information to fire services personnel.

3.14 Alternating Current / Direct Current (AC/DC)

Energy produced by the cells can be categorized as DC. During electrical emergencies, the fire services traditionally use non-contact voltage testers to identify energized equipment. Non-contact voltage detectors cannot detect the presence of Direct Current (DC) and should never be used.

3.15 BESS Subject Matter Expert

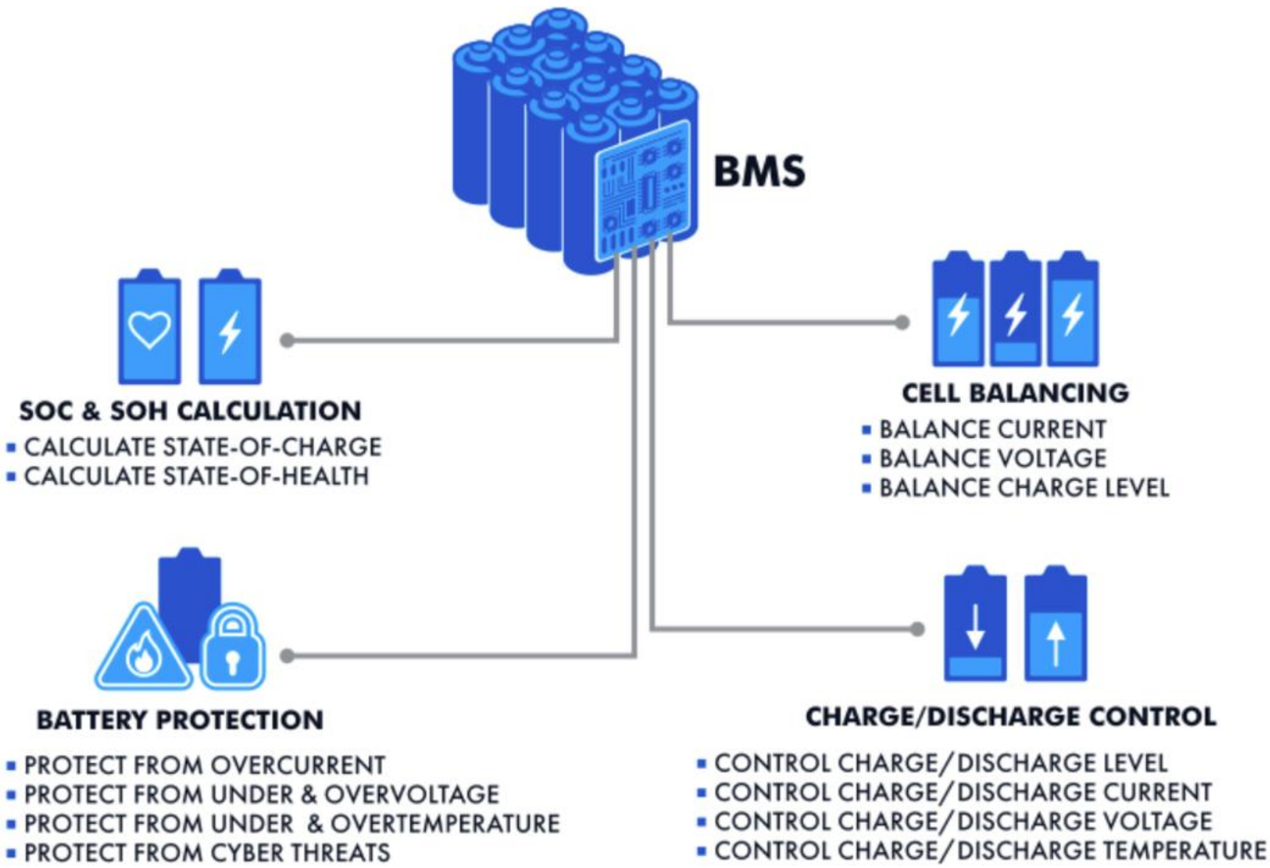
A site subject matter expert (SME), designated by the facility owner/operator, that responds 24/7 within a timely manner to work closely with the fire services to investigate and mitigate conditions, while ensuring the safety of all personnel operating at the scene.

SECTION 4 BATTERY MANAGEMENT SYSTEM (BMS)

The Hithium BESS includes an integrated battery management system (BMS) that monitors various aspects of the cells, such as their performance, voltage, current, and state of charge, along with many other data points. The BMS is a layered system that includes the MBMU (module level BMS), CBMU (rack level BMS), and SBMU (enclosure level BMS). It can identify possible risks to the battery system by monitoring battery cell temperatures and voltage. The BMS is engineered to react to fault conditions in an autonomous manner, with safeguards built into the firmware.

The BMS also interfaces with the fire alarm control panel (FACP). When the FACP receives an alarm such as gas, heat, or smoke, this notification is routed to the BMS, which autonomously isolates the trouble battery enclosure.

Figure 12. BMS Capabilities



SECTION 5 FIRE DEPARTMENT INFORMATION

5.1 Knox Box

A Knox Box will be installed at the main entrance to the facility. Battery energy storage facilities are operated remotely. The presence of on-site personnel is limited to system maintenance or alarm investigations. Any equipment that has failed cannot be saved. In response, unescorted access must be limited to life safety in the event the Jupiter ROC confirms that maintenance staff cannot be reached. Barring life safety entry should only be made to the site once at the direction of the battery subject matter expert (BESS SME).

5.2 Apparatus Access

The access road leading to and within the facility will comply with NFPA 1, Chapter 18 to ensure apparatus mobility and turnaround capabilities. Internal roads are at least 20' wide with the appropriate grade and can support the weight of the largest apparatus.

5.3 First Responder Station

The site will have a first responder station (FRS) located at the main entrance. The FRS will be outfitted with an annunciator panel capable of illustrating smoke, gas, and heat alarms along with the activation of the explosion control system. The annunciator will also display fault conditions on critical equipment such as the gas detectors, NFPA 69 explosion control system and the thermal management system.

5.4 Fire Alarm Control Panel (FACP)

The FACP monitors and controls the detection, notification, and ventilation systems for the battery enclosures. The FACP is supplied with a secondary power source that provides 24 hours of standby power or 2 hours of alarm. All FACP alarms will be sent to the Jupiter ROC, which will execute the notification matrix outlined in Section 7. The FACP also interfaces with the BMS to automatically isolate any trouble equipment.

5.4.1 Detection System

Each enclosure is equipped with two smoke, heat detectors and gas detectors (H_2). Detectors activate the enclosure's notification appliance and relay a signal to the section FACP via a relay module. Additionally, the site will be equipped with heat detectors outside of the containers to release the water spray system.

Figure 13. Automatic Fire Detection System

[redacted]

5.4.2 Gas Detection and Ventilation

Each enclosure is equipped with two combustible gas detectors and an exhaust system. During a cell venting or thermal runaway condition flammable gas will be emitted within the enclosure. At 10% of the LFL, the explosion prevention system will be activated, the battery container will be isolated via the BMS, and the FACP will provide notification to the ROC. The ventilation system can also be activated or deactivated manually by the ventilation system emergency start/stop button.

Figure 14 Gas Detection System

[redacted]

5.5 Alarm Annunciation

Alarms received at the FACP will generate audio and visual alarms on the exterior of the enclosure to alert staff and first responders of the location of the troubled equipment. The FACP will annunciate alarms to the Jupiter ROC. Notification devices such as horn strobes are powered by their own power supply from the enclosure.

5.6 Suppression Systems

Water Spray System: The site is equipped with a water spray system. The system is designed provide exposure protection and to protect the structure that holds the second level of containers. The system will be divided into multiple zones. When a heat detector in a particular zone is activated, only that specific zone will be triggered. The system is also designed to support two zones simultaneously in case of a failure in a container located on the border between two zones. The system will be supplied by city water and a fire pump.

Fire Department Connection (FDC): A fire department connection will be present for each zone to allow the fire department to support the water spray system. Fire department personnel should communicate with the Jupiter ROC to ensure they supply the FDC covering the zone where the trouble container is.

Suppression of Lithium-Ion Battery Fires: UL 9540A testing has shown that gases by venting can exceed 100 psi preventing extinguishing agents from reaching the seat of the fire. Due to this, no intervention is recommended for extinguishment of lithium-ion battery fires. As the cell vents, the state of charge drops, effectively decreasing the amount of fuel. Once the state of charge has been fully discharged, the fire will self-extinguish.

5.7 Water Hydrants

The facility will be outfitted with hydrants. In addition, there are several hydrants located on Beacham St.

SECTION 6 HAZARDS

In this section the following hazards will be covered:

- Chemical
- Electrical
- Explosion

6.1 Chemical

This section will outline the predominate chemicals hazards along with the recommended personal protective equipment.

- Lithium-Iron Phosphate (LFP)
- Hydrogen
- Freon 134a
- Transformer Oil
- Carbon Monoxide

6.1.1 Lithium-Iron Phosphate (LFP)

UL 9540A Data: Cells are outfitted with a vent that ejects flammable electrolyte during elevated thermal conditions. This safety feature manages the risk of internal pressurization that could lead to catastrophic failure. LFP batteries are more stable than other battery chemistries, are less likely to undergo thermal runaway, and are generally not susceptible to violent failures of the outer shell. During UL 9540A testing, cell failure propagation was not observed outside of the module level. There was no indication of flying debris, explosive discharge of gas or sparks, or electrical arcing.

Table 3 UL 9540A Cell Gas Analysis

Gas		Measured %
Nitrogen	N2	69.7808
Carbon Monoxide	CO	8.1173
Carbon Dioxide	CO2	4.8960
Hydrogen	H2	15.0719
Methane	CH4	1.1092
Ethane	C2H6	0.1655
Ethylene	C2H4	0.4196
Propane	C3H8	0.0545
Propene	C3H6	0.2250
N-Butane	N-C4H10	0.0207
N-Butene	N-C4H8	0.0666
N-Pentane	N-C5H12	0.0230
Isopentane	ISO-C5H12	0.0339
N-Cyclopentane	N-C5H10	0.0160

Toxicity: LFP cell gases are evaluated during UL 9540A. In the gases that were identified, IDLH levels were only observed for carbon monoxide and carbon dioxide. Exposure to these IDLH levels is unlikely as they were only found inside the non-occupiable battery cabinet. ***Note:*** *There is no dermal hazard associated with Carbon Monoxide.*

Hazards of Vented Electrolyte: Cell vent gas composition will depend upon several factors, including cell composition, cell state of charge, and the cause of cell venting. Vent gases may include volatile organic compounds (VOCs) such as alkyl-carbonates, methane, ethylene, ethane, hydrogen gas, carbon dioxide, carbon monoxide, soot, and particulates containing oxides of nickel, aluminum, lithium, copper, and cobalt. Additionally, phosphorus pentafluoride, POF_3, and HF vapors may form. Vented gases may irritate the eyes, skin, and throat. Cell vent gases are typically hot; upon exit from a cell, vent gas temperatures can exceed 600°C/1,110°F. Contact with hot gases can cause thermal burns. Vented electrolyte is flammable and may ignite on contact with a competent ignition source such as an open flame, spark, or a sufficiently heated surface. Vented electrolyte may also ignite on contact with cells undergoing a thermal runaway reaction.

Hazards of Leaked Electrolyte: Leaked electrolyte solution is flammable, corrosive and potentially irritating to the eyes and skin. If a liquid is observed that is suspected electrolyte, ventilate the area and avoid contact with the liquid until a positive identification can be made and sufficient protective equipment can be obtained (eye, skin, and respiratory protection). Chemical classifier strips can be used to identify the spilled liquid (electrolyte will contain petroleum/organic solvent and fluoride compounds). If it is confirmed to be electrolyte, personnel should stay away from the liquid, preferably uphill and upwind, until the emergency has been mitigated and the electrolyte can be removed.

Table 4 LFP SDS Hazard Information

Label Elements **Hazard Images:**  Signal Word: Danger Hazard Statements: H251 Self-heating; may catch fire H351 Suspected of causing cancer H372 Causes damage to organs through prolonged or repeated exposure (lung)	irritation (30 **Label Elements** **Hazard Images:**  **Signal word:** Danger Hazard Statements: H317 May cause allergic skin reaction. H370 Causes damage to organs (digestive system). H335 May cause respiratory irritation.

Exposure: The exposure risk outlined in Table 4 applies to personnel who handle battery cells in the manufacturing or decommission stages without the use of required personal protective equipment.

6.1.2 Hydrogen

When the temperature of a cell reaches the venting stage, the primary hazard is the production of hydrogen gas (H_2). The gas is odorless & colorless which requires internal sensors or external meters for detection. It is an extremely flammable gas which is lighter than air. Any H_2 gas accumulation within the cabinet will be found in the upper third of the unit.

Table 5 Hydrogen Characteristics

Appearance	Colorless Gas
Odor	Odorless
LFL	4 %
UEL	76 %
Auto Ignition	500°C / 932°F
25% LFL	1%
25% LFL (ppm)	10,000 ppm
Vapor Density	0.07 (Air = 1)

6.1.3 Freon 134a

The thermal management system utilizes R-134a refrigerant. R-134a is a colorless volatile liquid with a faint, sweetish odor. It is non-flammable but overexposure can lead to dizziness and loss of concentration. The risk from R-134a under this situation does not pose a health hazard since the BESS cabinet is installed outdoors, in the open ambient air, and it cannot be occupied. If a release is suspected, it can be simply managed by staging upwind and at a safe distance from the trouble BESS or donning the appropriate PPE, such as an SCBA to manage the respiratory hazard. Thermal decomposition of R134a freon can result in the production of hazardous by-products outlined in SDS data in Figure 15.

Figure 15. Freon 134a SDS Data

HAZARDS IDENTIFICATION

CLASSIFICATION:	**Gases under pressure, Liquefied Gas**
SIGNAL WORD:	**WARNING**
HAZARD STATEMENT:	**Contains gas under pressure, may explode if heated**
SYMBOL:	**Gas Cylinder**
PRECAUTIONARY STATEMENT:	**STORAGE: Protect from sunlight, store in a well ventilated place**

EMERGENCY OVERVIEW: Colorless, volatile liquid with ethereal and faint sweetish odor. Non-flammable material. Overexposure may cause dizziness and loss of concentration. At higher levels, CNS depression and cardiac arrhythmia may result from exposure. Vapors displace air and can cause asphyxiation in confined spaces. At higher temperatures, (>250°C), decomposition products may include Hydrofluoric Acid (HF) and carbonyl halides.

6.1.4 Transformer Oil

FR3 ester-based oil is used to insulate and cool the step-up and auxiliary power transformer. During the failure of a transformer, arcing and fire conditions cause heat retention in the windings and metal cabinet of the transformer. This condition keeps oil above its autoignition point making transformer fires persistent.

Table 6 FR3 Characteristics

Appearance	Clear Yellow Mineral Oil
Odor	Vegetable oil
Flash Point	310°C / 590°F
Auto Ignition	401°C / 753°F
Specific Gravity	0.92 (1= water)
PCB	No

6.1.5 Carbon Monoxide

Carbon monoxide (CO) is an colorless, odorless flammable gas formed by the incomplete combustion of fuels. The failure and subsequent arcing /burning of electrical components and cables can produce carbon monoxide. Within an enclosed space, it presents an asphyxiation and potential explosion hazard.

Table 7 Carbon Monoxide Characteristics

Appearance	Colorless Gas
Odor	Odorless
LFL	10.9 %
UEL	74.2%
Auto Ignition	607°C (1125°F)
25% LFL	2.7%
25% LFL (ppm)	27,000 ppm
Vapor Density	0.97 (Air = 1)

6.1.6 Personal Protective Equipment (PPE)

All chemicals associated with the failure of BESS equipment and ancillary electrical components present dermal and respiratory hazards. The failure of a BESS or electrical components can produce smoke and liquid runoff during fire suppression operations. NFPA 1971 structural firefighting gear and SCBA is recommended when dealing with the hazards posed by a BESS.

Note: The PPE recommendation applies to emergency response operations/life safety. PPE recommendations for the post-fire removal of damaged modules will be defined by conditions found at the time of decommissioning. Structural firefighting ensembles are not designed to provide protection from arc flash hazards. NFPA 1971 gear is not rated for arc flash hazards.

Figure 16 Minimum PPE Requirements

6.2 Electrical

Required Safe Standoff Distance: The highest voltage found in the BESS facility is 34,500 volts. The highest volts found in the substation is 115,000 volts. OSHA requires a safe standoff distance of 10 feet from exposed energized conductors of 50,000V or less. OSHA (29CFR 1910.333) requires 4" of clearances for each 10,000-volt increment over 50kV. Clearance for unqualified personnel to 115kV would be 12 feet 2 inches.

Electrical Safety: There are four basic rules for electrical safety in a battery energy storage/substation facility which are as follows:

- DO NOT Climb: The easiest way to avoid exposed overhead conductors in a substation is to remain on the ground.
- DO NOT Carry Tools/Equipment Above Shoulder Height: Higher voltages found in a substation do not require contact to cause injury. Carrying metal tools or ladders above shoulder height can present a target for an electrical arc to ground.
- DO NOT Cut Locks: Locked doors provide a buffer zone between personnel and energized conductors. Locks ensure our safety and should never be cut.
- DO NOT Enter Fenced in Areas: Ground level electrical equipment may be contained within fenced in areas to ensure casual contact does not occur. Do not enter these areas.

Stranded Energy: ESS products contain LFP batteries that are ALWAYS energized and present an electrical hazard even when disconnected from an electrical source. Voltages of up to 480V AC can be present within the battery cabinets. This may pose a shock or electrocution risk if the outer cabinet of the battery cabinet has been damaged during installation, inadvertent contact with transportation equipment, or equipment failure. Even when disconnected, powered off, or in a discharged condition, a substantial electrical charge is possible within the batteries, which can cause injury or death if mishandled.

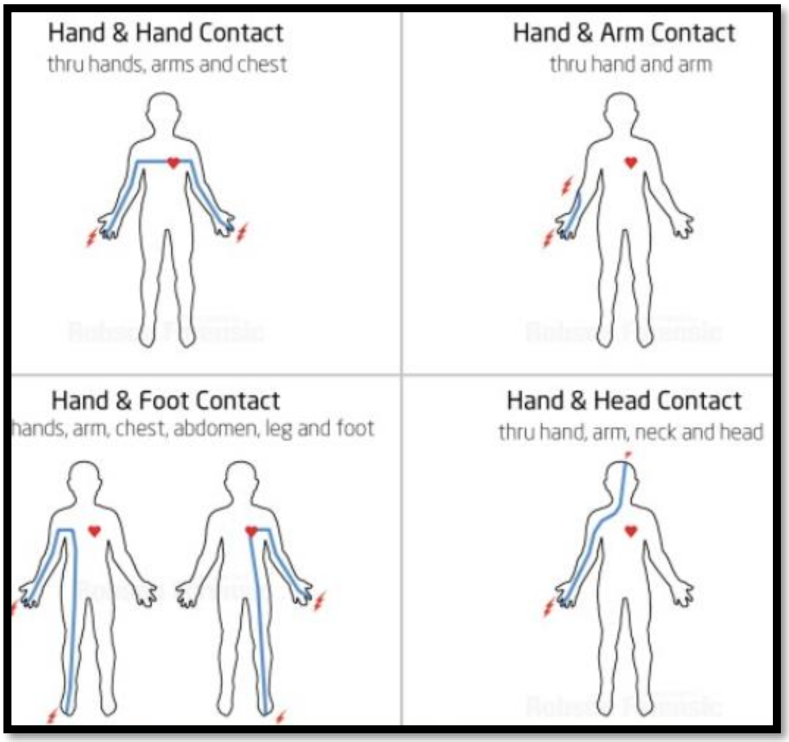
Electrical Current Effect: Current, the flow of electricity, is measured in amperage. Table 8 below outlines the OSHA study on the potential effects of current on the human body. It should be noted that between 1 and 4 amps is likely to cause a cardiac condition leading to death. The smallest breaker in most residential homes is 15 amps. Inadvertent contact with conductors can create conditions resulting in shock or electrocution which is explained below.

Table 8 OSHA Current Effects on the Human Body

Current Levels	Possible Effect on Human Body
1 mA	Perception level. Slight tingling sensation. Still dangerous under certain conditions
5 mA	Slight shock felt – not painful but disturbing. Average individual can let go. However, strong involuntary reactions to shocks in this range may lead to injuries
6-30 mA	Painful shock, muscular control is lost. This is called freezing current or “let-go” range.
50-150 mA	Extreme pain, respiratory arrest, severe muscular contractions. Individual cannot let go. Death is possible.
1,000-4,300 mA	Ventricular fibrillation (the rhythmic pumping action of the heart ceases). Muscular contraction and nerve damage occur. Death is most likely.
10,000 mA	Cardiac arrest, severe burns and probable death.

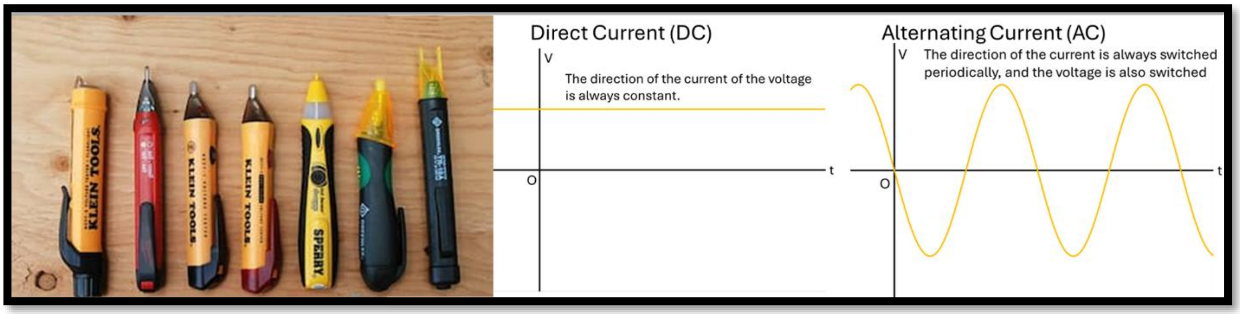
Shock & Electrocution: Shock is an injury that can either be minor or major. It results from inadvertent contact with an electrically energized object. Electrocution is death from contact with an energized conductor. The difference between shock and electrocution is defined by several factors such as how well the victim was grounded which facilitates current flow through the body, the path the current flows such as across the heart, and duration of contact with the energized object.

Figure 17. Electrical Contact Illustration



Non-Contact Voltage Tester: These devices are commonly used in the fire services to identify energized equipment/objects. However, the devices are only capable of identifying equipment/objects energized by alternating current (AC). To assess a surface for the presence of direct current (DC), a traditional meter with a ground reference is required. **Note**: D*o not use a non-contact voltage detector at a BESS facility without guidance from a BESS subject matter expert*.

Figure 18 E-Field Detectors & AC/DC Illustration



Equipment NOT Normally Energized: In a post fire scenario, protective shielding or insulation may be damaged causing equipment/objects that is not normally energized to become energized. Examples include the metal cabinet, battery racks, and modules. In a post-fire scenario, DC stray voltage testing should be conducted on container components until stray voltage from stranded energy can be safely ruled out. ***Note:*** *Acceptable reading must be below the OSHA perception standard of 1mA/900 micro-amps.*

6.3 Explosion

Flammable Gas: During the venting stage, hydrogen is the prevalent flammable gas. When hydrogen is detected at 10% of the LEL (4000 PPM), an alarm is sent to the BMU, and the ventilation system is activated. The ventilation stays active until the gas concentrations are below the safety threshold and the fan has operated for at least 5 minutes.

NFPA 69 Explosion Prevention System: The Hithium BESS enclosure is equipped with an explosion prevention system designed to maintain the flammable gas concentration below 25% of the LFL, minimizing the deflagration potential. It includes gas detection, an explosion proof 820 CFM exhaust fan, and a make-up air louver. The design of the explosion control system is being validated for compliance with the performance requirements of NFPA 69.
Note: *Firefighters operating at the scene of a BESS incident should maintain a 100-foot clearance from the battery enclosure doors. Personnel should conservatively assume safety features will not work to as designed. Risk is managed by maintaining the suggested exclusion zone.*

SECTION 7 NOTIFICATIONS

7.1 Notification Flow

The matrix below illustrates the notification and response posture for alarm conditions at the Trimount Energy Storage facility.

FACP Notifies	Jupiter ROC Notifies	Jupiter Response Team Notifies
Jupiter ROC	Jupiter Battery SME	911 as Appropriate
	Jupiter Response Team	FRA 24/7 Battery Emergency Line 888.423.7791
		Jupiter O&M Team

SECTION 8 UNIFIED COMMAND

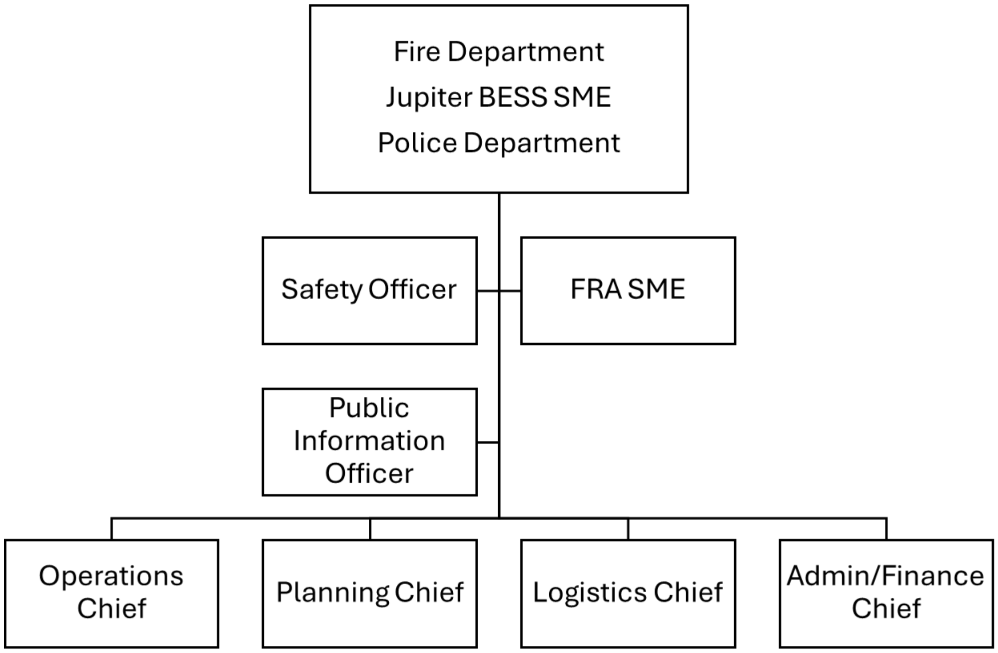
8.1 Subject Matter Expert (SME)

The Battery Energy Storage System subject matter expert (BESS SME) plays a critical role by guiding fire service chief officers through a "Scene Size-Up", allowing them to better understand the hazards and develop the appropriate response tactics. This will be discussed further in section 9.3. The SME will fall under the unified command structure where they will collaborate with members of responding agencies to bring the incident under control. The SME will assist coordinating the following:

- Ensure security of the site and limit access to only authorized personnel
- Ensure accountability of non-fire department personal inside the facility through written or electronic logs
- Ensure that authorized personnel have appropriate PPE for their assigned role/task
- Notify the fire service chief officer if plume conditions have impacted neighboring residential and commercial areas to support decision making in terms of seal in place or evacuation orders.
- Review and interpret BMS data, such as state of charge (SOC), state of health (SOH), temperature and service status of equipment to identify indicators that suggest conditions are deteriorating
- Ensure a 100' exclusion zone has been established around the trouble battery cabinet
- Locate & isolate trouble equipment facility grid when it is safe to do so without entering the exclusion zone
- Evaluate the status of the deflagration prevention system for the presence of smoke or flames
- Identify any internal exposures that may need to be protected through heat alarms, BMS cell temperature alarms, temperature readings of adjacent containers, or direct flame impingement
- Lead Post Incident Operations(battery cabinet access)
- Administer the decommissioning plan

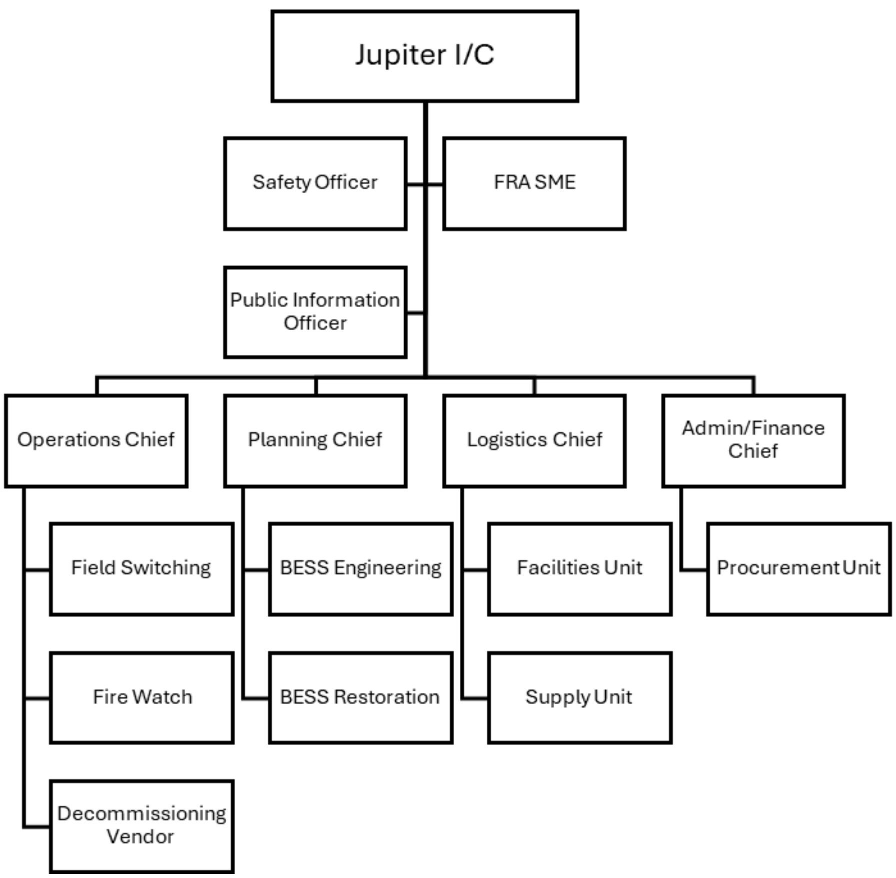
8.2 Unified Command Structure

Sample Unified Command Structure: Low frequency, high hazard incidents such as a BESS emergency will not be managed by one individual Incident Commander. The command structure will include all the stakeholders necessary to mitigate risk and ensure the safety of first responders and that of the surrounding community.



8.3 Incident Command Structure

A sample incident command structure is outlined below that may be used to coordinate the company's response to a site emergency or during the decommissioning process. The scope of staffing is scalable to the needs of the event.



SECTION 9 RESPONSE TACTICS

9.1 Personal Protective Equipment (PPE)

Electrical Switching: OSHA requires a hazard assessment under 29 CFR 1910.269 to identify FR clothing and insulated PPE required to conduct switching operations.

Fire Operations: Fire service personnel engaged in operations that can expose members to heat, flame, flammable gas and chemical hazards shall use NFPA 1971 structural firefighting equipment along with an SCBA for respiratory protection.

9.2 On Arrival

DO NOT FORCE ENTRY

Fire Department: Personnel should not encroach within 100 feet of the BESS until the trouble BESS cabinet has been identified.

Initial Status Briefing: Upon arrival, the fire officer should contact the Jupiter Remote Operations Center (ROC) (24/7 contact located on the main gate) to obtain a status briefing which should at a minimum should cover the following:

- Accountability
  - Coordinate with the site personnel at the main gate for accountability check and determine if there are any missing persons. If there are no personnel present, call the ROC using the number provided on the main gate.
- Location of Equipment in Alarm
  - A map should be available at the FRS that outlines equipment with ID numbers that can be used by the ROC to convey the location of the trouble equipment.
- Alarm Type
  - What type of alarm has generated the initial response? Have any other alarms been received that would suggest conditions are deteriorating?
- Isolation of Trouble Equipment
  - Trouble equipment should be cleared autonomously. Control center should verify the equipment has been isolated from the facility grid.

9.3 Scene Size-up

BESS/SME: Upon arrival of the BESS SME, they will collaborate with officers from the fire services to conduct a size-up, to develop the appropriate response tactics based on the failure scenario. There are ***eight steps*** associated with conducting a scene size-up.

Battery cabinets have been outfitted with robust safety systems, intervention is limited in most cases to exposure protection or a fire watch that will monitor data points until conditions have stabilized. These facilities are generally unstaffed and any equipment that has failed cannot be saved.

1. **Community Air Monitoring:** During an active fire scenario consideration may be given to conducting air monitoring to ensure safety and address community concerns. The properties of the gases generated during fire conditions indicate that they will rise vertically and dissipate. However, it is recommended based on wind direction that air monitoring for gases identified in UL9540a testing be conducted to determine if a

seal in place or an evacuation order is appropriate. Table 9 illustrates CDC threshold values for IDLH substances Table of IDLH Values | NIOSH | CDC along with the actual quantity of gases measured. Gases that exceeded the IDLH threshold value are highlighted in red. Sampling should focus on the presence of those gases to determine the need for public displacement.

Table 9. CDC IDLH Limit Values

Gas Name	Chemical Structure	% Measured	PPM	IDLH (PPM)
Nitrogen	N2	69.7808		N/A
Carbon Monoxide	CO	4.8960	48,960	1,200
Carbon Dioxide	CO2	8.1173	81,173	40,000
Hydrogen	H2	15.0719		N/A
Methane	CH4	1.1092		N/A
Ethylene	C2H4	0.4196		N/A
Ethane	C2H6	0.1655		N/A
Propene	C3H6	0.2250		N/A
Propane	C3H8	0.0545	545	2,100*
Butane	C4H10	0.0207	207	1600*
Butene	C4H8	0.0666		N/A
Pentane	n-C5H12	0.0230		N/A
Isopentane	Iso-C5H12	0.0339		N/A
Cyclopentane	C5H10	0.0160		N/A

2. **Fire Alarm Control Panel (FACP):** A review of the FACP will identify the location of the trouble equipment and scope of alarm(s).

3. **Battery Management System:** If an emergency involves the battery cabinet, the BMS shall be reviewed to determine the following information:

   - State of Charge: State of charge should be interpreted as fuel; a low state of charge suggests the event will be shorter in duration. A SOC of 30% indicates a shorter duration event. Whereas a SOC of 80% would suggest an event of longer duration.
   - Rise in Temperature: If additional cells in the trouble module or additional modules around the trouble module begin to show signs of increased temperature this would be an indication of propagation within the unit.

Table 10. State of Charge vs. Voltage

Percentage(SOC)	3.2V
100% Charging	3.65V
100% Rest	3.40V
90%	3.35V
80%	3.32V
70%	3.30V
60%	3.27V
50%	3.26V
40%	3.25V
30%	3.22V
20%	3.20V
10%	3.00V
0%	2.50V

4 **Isolation of Trouble Equipment:** Trouble equipment will be isolated from the facility grid autonomously by the BMS and relay protection schemes as appropriate. Where possible, disconnects should be opened to isolate the trouble equipment so as to prevent the cycling of breakers that may reclose into trouble/faulted equipment.

5 **Exclusion Zone:** A 100-foot exclusion zone should be established based on the location of the trouble battery enclosure. Doors are the primary risk for becoming projectiles in the event that the explosion prevention system fails to operate to design criteria. Battery cabinets only have doors on one side so the location of the enclosure within the site will define the exclusion zone. *See Figure 19 and Figure 20.* ***Note:*** *Apparatus or appliances used for asset protection to deliver water shall be placed outside the exclusion zone.*

Figure 19 Exclusion Zone Interior Enclosure

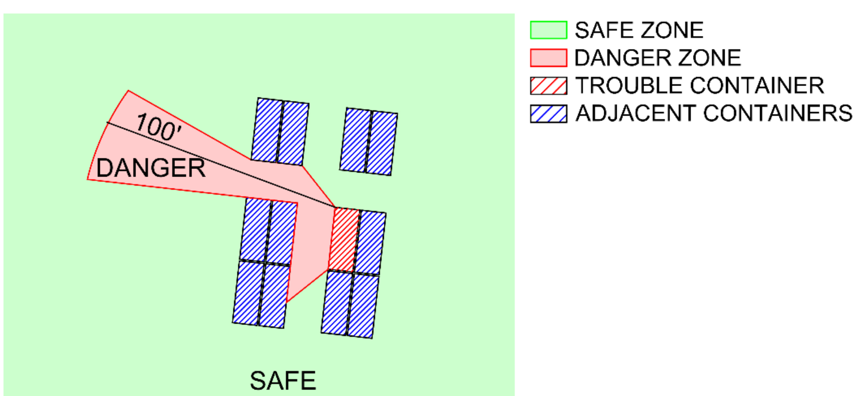
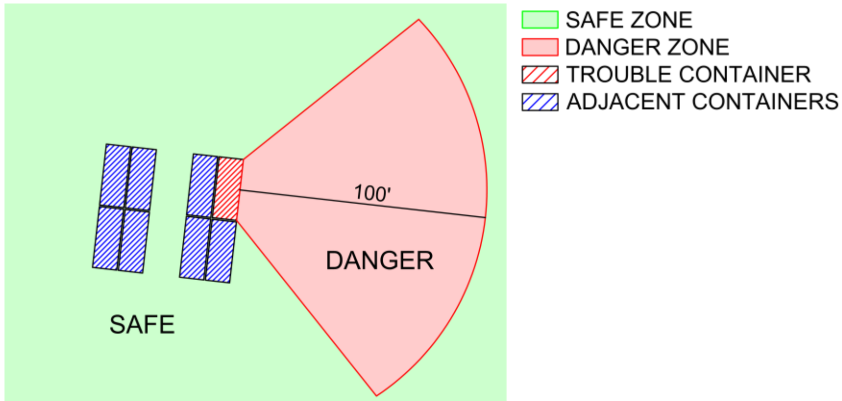


Figure 20 Exclusion Zone Exterior Enclosure



6 **Explosion prevention System:** LFP cells in thermal runaway will emit a white flammable gas which presents the appearance of smoke. This can be validated by concentrating the thermal imaging camera on the NFPA 69 explosion prevention system vent. Thermal runaway gases measure approximately 1,000 F. These conditions should be monitored without intervention and if the volume of gas appears reduced over time the trouble cell has reached a zero state of charge.

7 **Smoke / Fire Conditions:** The internal safety features of a battery energy storage system are designed to contain equipment failure to the battery cabinet. If conditions extend from the cabinet surrounding equipment may be at risk of failure from thermal conditions or direct fire impingement. See Exposures next.

8 **Exposures:** An exposure assessment will determine if intervention is appropriate for asset protection. Evaluate the following risks:

   a. BMS Alarms: Cell temperature rise, or alarms will be an indication that intervention will be necessary for asset protection.

   b. Thermal Imaging Assessment: Battery cabinets surrounding a fully involved cabinet should be assessed using thermal imaging camera. Intervention temperature is 262F which is 50% of battery cells vent temperature as determined by UL9540a testing.

   c. Direct Fire Impingement: UL9540a Unit Level testing indicates that a fully involved batter cabinet should not propagate to the sister cabinet. However, if wind influences fire conditions placing the sister cabinet at risk intervention for asset protection is recommended.

Water Use in a Class C Environment: During the application of water streams for exposure protection, the potential exists to contact energized electrical components in the trouble battery cabinet. In response, Table 11 below should be followed for the application of water on/near energized electrical equipment. The safe standoff distance for asset protection will be driven by the risk of explosion not the electrical hazard. As such the position of the apparatus or appliances to provide asset protection will be outside the exclusion zone far exceeding the required 25 feet. Water should not be applied using a straight stream, a rain down effect will be more useful in providing cooling and protecting a larger portion of the asset.

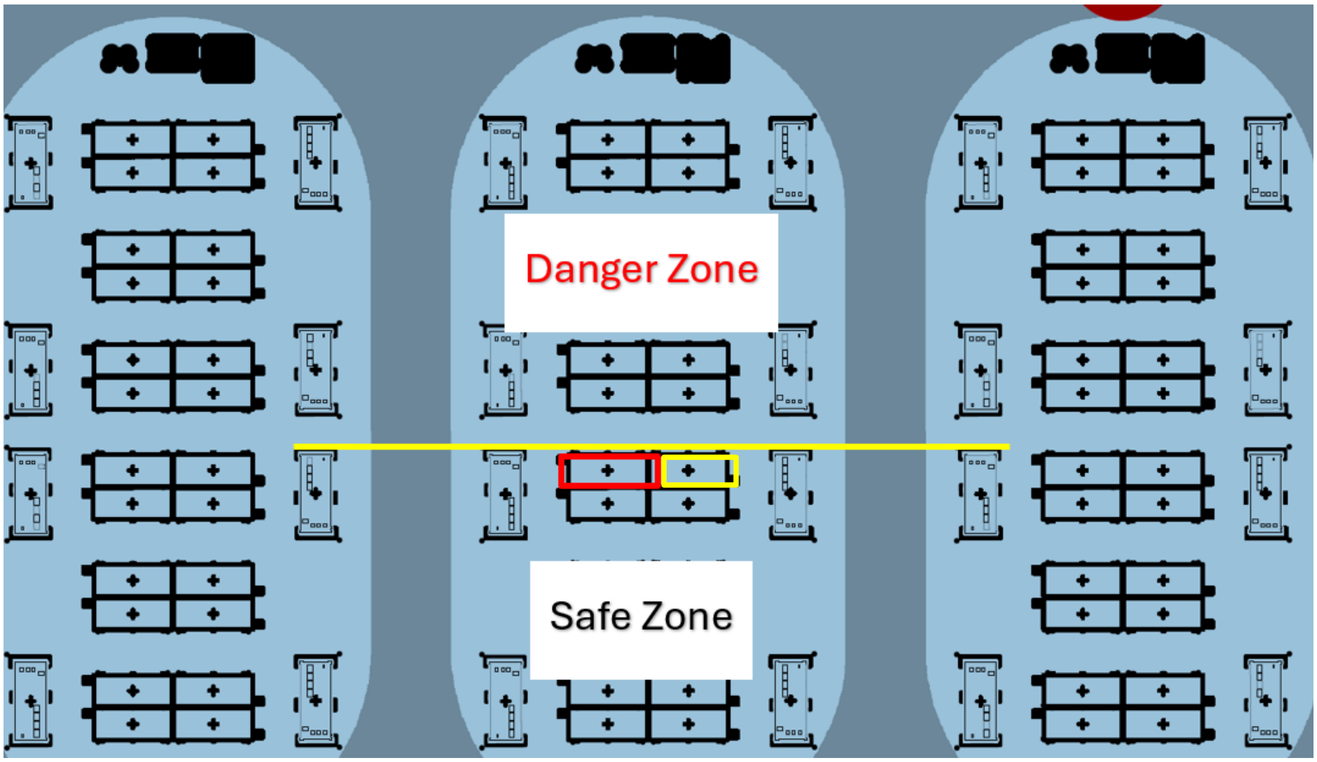
Table 11. Class C Water Application Distance

Agent	Voltage	Spray Pattern	Pressure	Min Distance
Potable Water	< 50 kV	30-Degree Fog	100psi	25 feet

Safe Staging: Figure 21 illustrates a fully involved enclosure (red) and an impinged enclosure (yellow) requiring water for asset protection. The application of water for asset protection should be made from the Safe Zone behind the yellow line as illustrated. The application of water should not be delivered from the opposing side labeled Danger Zone as the enclosure doors remain a projectile hazard. See Figure 21.

Note, that the site will be provided with an automatic water spray system. The need for water application must be determined after an assessment of the hazard against the water spray exposure pattern development.

Figure 21. Safe Staging for Exposure Control



Electrical Hazards: Where applicable, the BESS SME shall ensure that trouble electrical equipment other than batteries is deenergized and isolated from all electrical sources.

***Note:** Fire Department personnel should never operate any equipment or controls within the site. The BESS SME will coordinate all operational requests.*

Strategies and Tactics: Follow Section 9.4 below.

9.4 Response Scenarios

9.4.1 Cable Failure Response

	Cable Failure Response Matrix
Hazards	Cables are used to link cells and modules; cables connect to the electrical bus and provide power to ancillary equipment in the battery cabinet. Cable fires in an enclosed space such as a battery cabinet can create an accumulation of CO resulting in an explosive atmosphere. Fire department members operating at the scene shall maintain a 100' exclusion zone as outlined in Section 9.3 – Figure 19/Figure 20. This tactic is employed as a conservative measure in the event that the explosion protection system fails to operate to design criteria.
Alarm	A smoke alarm will be routed to the FACP. The FACP interfaces with the BMS which will isolate the trouble enclosure. The FACP will also notify the Jupiter ROC. The ROC will follow the notification matrix outlined in Section 7 as appropriate.
Fire Classification	This will be considered a Class C Fire, energized fire. Even after the battery enclosure has been isolated, stranded energy remains in the cells/modules and associated battery cables.
Switching	Upon receipt of a smoke alarm the trouble battery enclosure should be isolated autonomously through the BMS. This can be verified through SCADA rather than approaching the battery enclosure. If this cannot be validated the battery block connected to the PCS should be isolated as a conservative tactic.
Exposure Control	Supply the water spray system via the appropriate FDC. If the cable fire extends to the battery's modules proceed to Section 9.4.2 below.
Assessment	Doors shall remain closed until the smoke condition subsides. Review the BMS to determine if cells/modules are involved. Cell temperature alarms will be a clear indication of battery involvement. If conditions indicate there is no involvement of cells/modules move to the next step, access. If conditions visually or through data points suggest cells/modules are involved move to Section 9.4.2 Cell Failure Response.
Access	Follow guidance in Section 10 Post Incident Operations.
Suppression	After Section 10 has been completed and battery cabinet doors are open, CO_2, dry chemical agent or Purple-K may be used to extinguish any remaining pockets of fire. These agents have a Class C Listing and are rated for use up to 100,000 volts. The maximum voltage found in a battery cabinet is 1,500 Vdc.
Safe Standoff Distance	There is no required standoff distance for leakage current when using the prescribed agents. Standoff distance is driven by the potential for ARC flash. • Personnel wearing Arc Flash Protection: Apply agent from no closer than 5 feet. • Personnel wearing NFPA 1971 structural firefighting ensemble: 10 feet.

9.4.2 Cell Failure Response

	Cell Failure Response Matrix
Hazards	The potential for a fire exists when a cell enters thermal runaway impinging adjacent cells within the module. The temperature of vent gas can exceed 600°C/1,100°F causing thermal burns. The accumulation of flammable vent gas from thermal runaway presents the risk for an explosion in an enclosed space. The NFPA 69 explosion prevention system is designed to mitigate that risk. However, fire department members operating at the scene shall maintain a 100’ exclusion zone as outlined in Section 9.3 Figure 19/Figure 20. This tactic is employed as a conservative measure in the event that the explosion prevention system fails to operate to the design criteria.
Alarm	A gas (H2) alarm will be routed to the FACP. The FACP interfaces with the BMS which will isolate the trouble enclosure. The FACP will engage the explosion prevention system once the H2 gas concentration reaches 10% of the LFL. The FACP will also notify the Jupiter ROC. The ROC will follow the notification matrix outlined in Section 7 as appropriate.
Fire Classification	This will be considered a Class C Fire. Even after the battery cabinet has been isolated, stranded energy remains in the cells/modules and associated cables.
Switching	Upon receipt of an H2 gas alarm, the trouble battery enclosure should be isolated autonomously through the BMS. This can be verified through SCADA rather than approaching the battery enclosure. If this cannot be validated, the battery block connected to the PCS should be isolated as a conservative tactic.
Exposure Control	Supply the water spray system via the appropriate FDC.
Assessment	Review the BMS to determine if propagation is occurring or the failure is contained to the module. If conditions appear to have stabilized move to Access step. **ACTIVE FIRE:** If a fire were to occur, non-intervention is recommended as there are no listed suppression agents capable of stopping thermal runaway. Continue to provide exposure protection via the water spray system. Batteries should be allowed to consume themselves until they reach a zero state of charge (SOC). For active fire conditions proceed to step 9.4.3 Fully Involved Cabinet.
Access	Follow guidance in Section 10 Post Incident Operations.
Suppression	After Section 10 has been completed and battery cabinet doors are open, CO_2, dry chemical agent, or Purple-K may be used to extinguish any remaining pockets of fire. These agents have a class c listing and are rated for use up to 100,000 volts. The maximum voltage found in a battery cabinet is 1,500 Vdc.
Safe Standoff Distance	There is no required standoff distance for leakage current when using the prescribed agents. Standoff distance is driven by the potential for ARC flash. • Personnel wearing Arc Flash Protection: Apply agent from no closer than 5 feet. • Personnel wearing NFPA 1971 structural firefighting ensemble: 10 feet.

9.4.3 *Fully Involved Battery Enclosure*

	Fully Involved Battery Enclosure Response Matrix
Hazards	The main hazard associated with a fully involved battery cabinet is the potential for propagation to adjacent cabinets. Thermal heat transfer expands the explosion potential risk. In response, fire department personnel shall maintain a 100' exclusion zone as outlined in Section 9.3 Figure 19/Figure 20. This tactic is employed as a conservative measure in the event that the explosion prevention system fails to operate to design criteria.
Alarm	The initial failure event will generate heat, smoke, H2 and BMS alarms. The battery enclosure will be isolated via BMS. Once the battery enclosure is involved in fire all internal detection devices serving as data points will be considered compromised and not relied upon for decision making. Surrounding battery enclosures should be monitored for alarms which would may indicate failure propagation.
Fire Classification	This will be considered a Class C Fire, energized fire. Even after the battery cabinet has been isolated, stranded energy remains in the cells/modules and associated cables.
Switching	Isolate the entire battery block associated with the PCS along with any other battery enclosures that have generated alarms or sustained direct fire impingement.
Exposure Control	Supply the water spray system via the appropriate FDC. If the container is adjacent to another zone, supply the adjunct zone's FDC also.
Assessment	**ACTIVE FIRE:** There are no listed agents capable of suppressing a lithium-ion fire or interrupting thermal runaway. Cells should be allowed to consume themselves until they reach a ZERO state of charge (SOC). At a zero state of charge there is no fuel left to support fire conditions. While providing exposure protection, conditions on the surrounding battery cabinets must be closely monitored for alarms, specifically anything related to temperature. Alarms that would suggest additional failures have occurred in surrounding cabinets will require the expansion of the exclusion zone and require additional exposure protection. Consideration may also be given to the preemptive isolation of surrounding cabinets as a conservative measure.
Access	Follow guidance in Section 10 Post Incident Operations .
Suppression	After Section 10 has been completed and battery cabinet doors are open, CO_2, dry chemical agent or Purple-K may be used to extinguish any remaining pockets of fire. These agents have a Class C Listing and are rated for use up to 100,000 volts. The maximum voltage found in a battery cabinet is 1,500 Vdc.
Safe Standoff Distance	There is no required standoff distance for leakage current when using the prescribed agents. Standoff distance is driven by the potential for ARC flash. • Personnel wearing Arc Flash Protection: Apply agent from no closer than 5 feet. • Personnel wearing NFPA 1971 structural firefighting ensemble: 10 feet.

9.4.4 Step-Up Transformer Failure

	Step-up Transformer Failure Response Matrix
Hazards	The Step-up transformer contains insulating oil which is ignited during the failure of the unit. The elevated temperature arc associated with the failure causes heat retention in the windings and metal enclosure of the transformer, keeping the oil above its autoignition temperature. These fires are persistent in nature. The primary hazard is the sustained thermal condition on the adjacent battery cabinets or potential direct fire impingement of the battery cabinets. An exclusion zone as outlined in Section 9.3 Figure 19/Figure 20 should be established as a measure to guard against injuries associated with a potential explosion.
Alarms	The failure of the transformer will trip the collector circuit and isolate the battery enclosures in the block in the transformer block. These conditions will be received through SCADA alarms remotely at the ROC.
Fire Classification	Transformer fires are considered Class B/C fires until the electrical source has been removed. Never attempt to suppress an energized fire.
Switching	Verify open the collector circuit and isolate the battery enclosures in the block.
Exposure Control	Supply the water spray system for the zone adjacent to the transformer via the appropriate FDC.
Assessment	In the absence of any alarms in the adjacent battery cabinets, CO_2 is the recommended agent for transformer fires. The use of other gaseous agents such as dry-chemical and Purple-K have no cooling value. A transformer fire may be unresponsive to these agents. The use of foam-based products is not recommended due to their negative environmental impact without any additional benefits. The transformer cannot be salvaged after a failure event. If the fire is unresponsive to the recommended agent, the unit should be allowed to burn off and consume the insulating oil.
Suppression	Prior to engaging in suppression, the Battery SME should verify that the trouble transformer has been deenergized and isolated. CO_2, the recommended agent has a Class C Listing and is rated to 100kV.
Standoff Distance	Approach is limited to fire tolerance; however, the transformer is not grounded so a no contact rule should be observed.

SECTION 10 POST INCIDENT OPERATIONS

10.1 Personal Protective Gear (PPE)

While operating near trouble equipment, the fire services personnel should remain in NFPA 1971 structural firefighting gear. If cabinet doors are open, fire service members must maintain a 10-foot standoff distance to guard against arc flash hazard. Facility personnel should don the appropriate PPE for arc flash hazards associated with potential stranded energy conditions until a Post-Fire Assessment has been completed. If cells are at a zero SOC PPE may be downgraded.

10.2 Under Control

Under control when no obvious signs of thermal runaway (fire or smoke). If doors or opened the incident is done. If doors are closed, coordinate with the owners to set up a fire watch.

The fire department has three strategic objectives at a fire, life safety, incident stabilization and property conservation. Once these objectives have been achieved the incident can be placed under control. Section 10 describes similar strategies for placing a BESS emergency under control. Each step focuses on personal safety. Favorable results in these steps indicate incident stabilization allowing the process to advance toward opening the battery cabinet doors. Once all battery cabinet doors have been opened, a final assessment will be completed. A thermal imaging camera and air monitoring will be utilized to ensure there is no active fire or thermal runaway conditions. This step validates that the incident is contained to the trouble cabinet with no extension into neighboring cabinets, achieving the final objective of property conservation.

Note: Hazards posed by stray voltage and the potential for an explosion may still be present. The failure associated with batteries can be broken down into three scenarios. Select the guidance that is applicable to the existing conditions. **Begin the assessments outlined in Section 10.2 once there is no active fire for a period to 24-hours.**

10.2.1 Roof Breached

Existing Conditions: The roof of the battery cabinet is breached by fire conditions, alleviating the accumulation of any flammable gases within the space. The properties of the target gases that present the primary risk to responders is Hydrogen (H2) and Carbon Monoxide, (CO). These gases are lighter than air and would escape the breached roof thus removing/reducing the explosion risk.

24-Hour Safety Stand-Down: Coordinate with the BESS operator to assign a fire watch for a 24-hour period. Observe and record hourly thermal readings over the breached roof for the 24-hour period. The vent temperature of cells is 398.7ºF. A thermal imaging camera should be used to assess the thermal column above the breached sections of the roof to determine the temperature of any existing vent gases. Evaluate conditions until vent gases are sustained below <199ºF for 12 hours. If conditions comply with guidance in Section 10.2.1 proceed to step 10.3, Lock Out / Tag Out.

10.2.2 Roof Intact/Data Points Available

Existing Conditions: BMS shows no signs of propagation. No active or additional FACP alarms.

48-Hour Safety Stand-Down: Coordinate with the BESS operator to assign a fire watch for a 48-hour period. Observe and record hourly thermal readings over the trouble container. The ROC will observe and record all trouble alarms generated by the trouble battery cabinet once the safety stand-down period commences.

- **Firewatch**: The fire watch should focus thermal imaging readings on the roof where the umbrella and over-pressure vents reside. The time that the safety stand-down begins (day/night) will influence baseline temperature readings. In response there should be no observed readings above 167ºF for the duration of the stand-down. Temperatures above 199ºF or a sustained rise in temperature shall be reported immediately to the Battery SME.

- **ROC**: No additional alarms should be received over the course of the stand-down. Any additional alarms received will be relayed to Tesla for guidance and will result in a restart of the 48-hour safety stand-down period.
- Upon conclusion of the 48-hour safety stand-down, data from the fire watch and ROC will be reviewed by the Battery SME. If conditions comply with guidance in Section 10.2.2 proceed to step 10.3 LOTO.

10.2.3 Roof Intact/No Data Points Available

Existing Conditions: Overpressure vents have not lifted and the BMS is not reporting.

1-Week Safety Stand-Down: Coordinate with the BESS operator to assign a 24/7 fire watch for a 1-week period to observe and record hourly thermal readings over the trouble container. The ROC will observe conditions on the trouble battery cabinet if BMS reporting reoccurs.

- **Firewatch**: The fire watch should focus thermal imaging readings on the Thermal Roof where the umbrella and over-pressure vents reside. The time that the safety stand-down begins (day/night) will influence baseline temperature readings. In response there should be no observed readings above 167ºF for the duration of the stand-down. Temperatures above 199ºF or a sustained rise in temperature shall be reported immediately to the Battery SME.
- Upon conclusion of the 1-week safety stand-down, data from the fire watch and ROC will be reviewed by the Battery SME. If conditions comply with guidance in Section 10.2.3 proceed to step 10.3.

10.3 Lock Out / Tag Out

Once emergency conditions have concluded, prior to accessing the trouble enclosure or removing any modules. E-Stops and Disconnects associated with the trouble array shall be locked or tagged out as required by OSHA 29 CFR 1910.147.

10.4 Decommissioning

Once lock-out / tag-out has been completed the decommissioning plan should be implemented to define the process for safe access of the battery enclosure. Access will provide a means to conduct a final negative exposure assessment prior to removing modules for evaluation and disposal.

SECTION 11 TRAINING

Training shall be conducted for members of the first response community prior to batteries arriving on location. Training and familiarization tours on the hazards and response tactics associated with BESS facilities will be provided annually. The following topics will be covered in the training program:

- Energy Storage System Concept
- Site Overview & Exposures
- Equipment & Definitions
- Battery Management System
- Detection & Suppression
- Emergency System Shutdown
- Hazards
    - Chemical
    - Electrical
    - Explosion *(NFPA 68/69)*
- Lithium-Ion Battery Fires
- Exposure Control
- On Arrival
- Scene Size-Up
- Response Tactics
    - Cable Fire
    - Cell Venting/Fire
    - Fully Involved Cabinet
    - Step-up Transformer Fire
- Post-Incident Operations

SECTION 12 REVISION SHEET

Rev. No.	Date	Written By	Reviewed By	Approved By	Notes
Draft	8/30/24	CSF	DBP	MK	Initial Draft
1	9/6/24	CSF	MK	MK	Client Comments