

# First Responder Mitigation Guidelines

## BATTERY ENERGY STORAGE SYSTEMS



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## Table of Contents

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1. Introduction .....	3
2. Purpose.....	3
3. Project Contacts.....	4
3.1 Ward Hill   Contacts .....	4
4. Ward Hill   Battery Energy Storage Systems (BESS).....	5
4.1 Site Overviews.....	5
Table 1 Energy Storage Systems .....	6
Table 2 - Transformer(s).....	8
4.2 Remote Monitoring .....	22
5. Hazards.....	22
5.1 Fire Hazards .....	22
5.2 Chemical Hazards .....	22
5.3 Electrical Hazards.....	23
5.4 Physical Hazards.....	23
6. Action Plan.....	24
7. Site Information.....	26
7.1 Site Access .....	26
7.2 Site Layout.....	27
7.3 Battery Energy Storage System E-Stops .....	30

## 1. Introduction

The AGIC Emergency Response Pre-Incident Planning Evaluation and First Responder Mitigation Guidelines were developed to provide specific Energy Storage System (ESS) response guidance, emergency planning and training to first responders and trained ESS personnel and contractors for incidents involving ESS, specifically lithium-ion (li-ion) batteries and associated hazards (i.e., fire, explosion, toxic chemicals/gases, arc flash, stranded energy, etc.).

First Responders may include ANY Organization responding to the **Ward Hill BESS** (Central Massachusetts). These include Emergency Services (First Responders, HazMat, Rescue, EMS, etc.), BESS Personnel, and third-party contractors.

**Energy Storage Systems (ESS).** One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time to the local power loads, to the utility grid, or for grid support.

## 2. Purpose

The purpose of this document is to provide First Responders with awareness of typical but not exhaustive Risks & Hazards related to BESS during potential failure scenarios.

Wherever national, or local regulations or buyer or subcontractor health, safety, and environmental requirements differ from those described herein, the more stringent requirements shall apply. All employees, vendors, contractors, subcontractors, and visitors shall comply with applicable Health and Safety requirements. Failure to do so may result in personal injury or death.



### READ THIS PROCEDURE BEFORE ENTERING THE SITE

1. *When mitigation is granted, ensure First Responders are wearing Electrical Rated & Fire Retardant / HazMat PPE.*
2. *Before entering the ESS area monitor via Gas Detectors and Thermal Imaging Cameras.*

3. *Evaluate the site to determine if an alarm related to the battery containers is indicated by a flashing strobe light and audible alarm on the Fire Alarm control Panel (FACP). In the event a strobe light and audible alarm are activated **STOP** and evacuate the site. Under this situation, all personnel must remain outside the site area until management is notified and provides further guidance and escort.*
4. *Place separation distance of 8m (~25ft) between all personnel and the affected enclosures if an incident related to the batteries is suspected.*
5. *In the event the battery enclosure is not alarming the site can be accessed, with Plant Management approval and escort. Proceed with caution and evacuate if fire or smoke is observed from the battery enclosure.*
6. *The Safety Systems of the Energy storage Sites run on the Auxiliary Power supply to the site. Therefore, this must never be disconnected unless done so by designee personnel. Should back-up power be lost, maintain perimeter.*

### 3. Project Contacts

**NOTE:** To access the BESS, contact the numbers below and await Personnel at front gate for escort.

#### 3.1 Ward Hill | Contacts

Ward Hill   BESS		
Contact	Ward Hill	Address
Name		
Mobile		
E-mail		

## 4. Ward Hill | Battery Energy Storage Systems (BESS)

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### 4.1 Site Overviews

Each site includes battery energy storage systems, power stations, site perimeter and grounds.

Asset Name	Address	GPS
Ward Hill	Neck Rd. Haverhill, MA	42.749736, - 71.116003

A unique fire risk for each of the Sites is a fire caused by the failure of a Li-Ion battery cell in one of the Battery Energy Storage System (BESS) units. A brush fire can also be a concern depending on the level of vegetation management in and around the arrays, and this risk is effectively managed at these facilities.

The site is not exposed to a riverine flood, and significant site improvements have been made to effectively manage storm water and prevent erosion. The site is in central Massachusetts and are not exposed to high wind speeds.

## Ward Hill BESS

### Battery Energy Storage System

**Ward Hill** includes 276 5.28 MWh capacity, 2.85 MW (AC) usable power CATL ENERX units and consisting of a 40 ft long steel ISO container with double doors at each end and on both sides housing racks for CATL ENERX battery modules. The enclosure is provided with an FM Approved Novec 1230 clean agent gaseous suppression system with a single agent container activated by smoke detection and discharging to two nozzles. The system includes a Honeywell Notifier fire alarm panel inside the enclosure and a manual activation point, emergency stop button, horn/strobe, and abort switch outside the enclosure. The fire suppression system is interlocked to stop the HVAC system upon activation. Temperature and humidity sensors are provided throughout the enclosure. The unit has explosion venting in the form of four deflagration panels, one at each upper corner of the long sides of the enclosure. A manual emergency disconnect is provided.

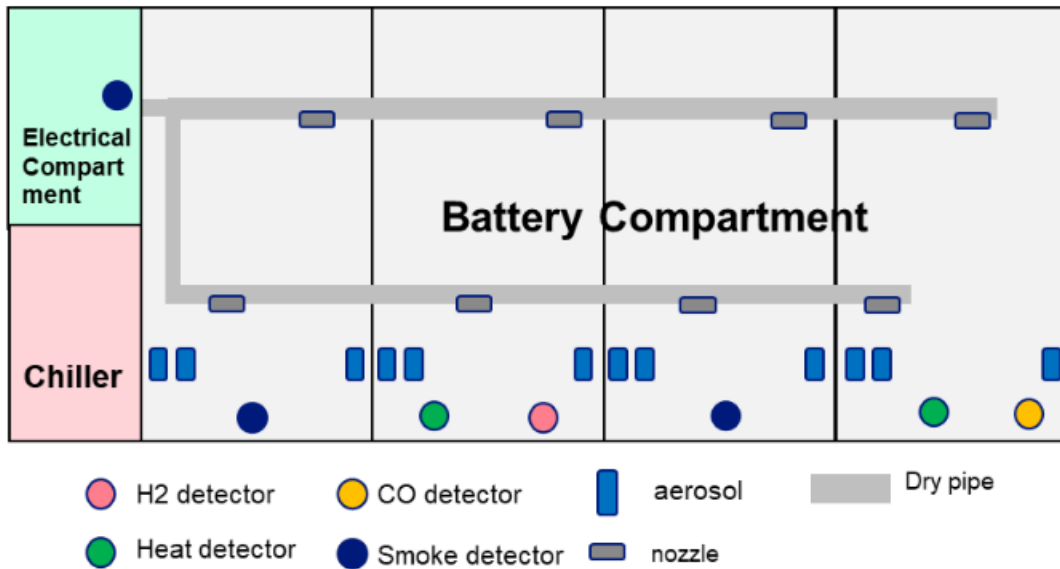


**CATL Battery Container – Right Side Overview**



**ENERX liquid cooling energy storage container overview**





**Locations of detectors for Fire Protection**

## Fire Protection Features

**Automatic Suppression:** NOVEC 1230 equivalent is provided. There are no automatic sprinkler systems installed at these sites.

**Water Supply, Water Mains, and Fire Hydrants:** There are no fire hydrants or water supplies installed at these facilities.

**Alarm Systems:** The battery energy storage systems at these sites are provided with, smoke detection, and fire suppression. Fire suppression system activation, smoke detection, alarms will be monitored 24/7.

**Security Measures:** These are remote sites without a dedicated operator. There is no guard service. Eight-foot-high chain-link fencing is used to secure the perimeter. Gates are locked with a combination pad lock.

**Portable Fire Extinguishers:** Maintenance vehicles are equipped with a portable fire extinguisher.

## 4.2 Remote Monitoring

Site monitoring will be provided 24/7.

## 5. Hazards

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### LITHIUM-ION BATTERIES (NFPA 855 APPENDIX B)

Ward Hill are CATL EnerX LFP battery modules.

#### 5.1 Fire Hazards

##### Normal Conditions

Fire hazard present from potential electrical equipment failure and thermal runaway.

##### Abnormal Conditions

Thermal runaway potential exists during abnormal conditions as well as increased risk for short circuiting.

**Under abnormal conditions batteries are subjective to the production of gases to include, but not limited to Hydrogen, Hydrogen Fluoride, Hydrogen Chloride, Carbon Monoxide, Methane, Ethane, and Ethylene gases, which may result in smoke, fire and/or explosion. With various gases previously mentioned, ensure appropriate PPE, including SCBA, and protective clothing (HazMat and Electrical rated) are worn prior to mitigation.**

#### 5.2 Chemical Hazards

##### Normal Conditions

Lithium-ion batteries pose limited to no chemical risks during Normal Conditions.

See the Safety Data sheet (Appendix A) for more information.

##### Abnormal Conditions

Under abnormal conditions, lithium-ion batteries are subjective to the production of toxic gases such as Hydrogen Fluoride (HF). Gases can be managed effectively using appropriate PPE, including SCBA, hazardous material protective clothing.

## 5.3 Electrical Hazards

### Normal Conditions

Ward Hill contain electrical equipment with voltage rating between 1500 V and 345 kV (or higher).

Battery equipment contains stranded or stored electrical energy during routine maintenance, even when disconnected. **Trained site personnel can only isolate batteries.**

### Abnormal Conditions

Battery equipment contains stranded or stored electrical energy even when disconnected. **Trained site personnel can only isolate batteries. Relocation or moving of equipment is hazardous and can result in serious injury unless performed by trained personnel. This includes operations associated with fire extinguishment overhaul.**

Arc flash labels are present on all devices where **arc flashes may occur.**

## 5.4 Physical Hazards

### Normal Conditions

High voltage

### Abnormal Conditions

Ensure full PPE, including SCBA is worn by First Responders.

Lithium-ion batteries may present fire and explosion hazards.

**Deflagration panels will direct pressure resulting from explosion from both sides of the enclosure.**

## 6. Action Plan

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1. Information in this section is to be reviewed alongside the attached Pre-Incident Plan (PIP).
2. The action plan describes the recommended personnel response during an emergency event based on its progression.

**Familiarization Tour** – Local Fire Departments are the first response to the BESS within 5 to 7 minutes.

The purpose of the tour is for site and hazard identification and familiarization with review of the PIP and this guide. **At a minimum, the tour must include, but is not limited to:**

- ☐ Site overview and operation (PPE requirements, etc.)
- ☐ Hazard Familiarization (normal and abnormal conditions)
- ☐ Site review (water sources, points of entry, roadways, staging location, Knox box locations, utilities, and any overhead hazards)
- ☐ Emergency Shut Down Location (Restricted Use Only)
- ☐ Means to monitor temperatures and LEL from enclosure systems if applicable
- ☐ Procedure for mitigation and/or entry
- ☐ FD policy and procedure for Utility Response
- ☐ Identification of Signage
- ☐ Validation of the latest PIP documents revision are available.

**Emergency Indication** – Upon indication of smoke or fire incident, the monitoring center will initially contact the proper Fire Department with the current conditions.

**BESS Emergency Response Notebook** – The responding agency or agencies will be given a Response Notebook containing the Ward Hill and (PIP) and First Responder Mitigation Guidelines.

## **INCIDENT ACTIVITIES**

**Incident Notification** – Upon notification of an incident the appropriate Fire Department will respond with appropriate emergency response.

**Prior and During Response** – The Fire Departments will review the Site Response Notebook for Emergency Response data pertinent to the BESS site. The monitoring center will provide additional emergency response direction as identified in the site Emergency Quick Response Guide.

**Staging** – Upon arrival at the site, stage along the public street if needed and await escort to the BESS. **DO NOT PROCEED PAST THE LOCKED GATES WITHOUT ESCORT.**

Analyze the incident with personnel and identify any hazardous materials that could be present (See abnormal conditions in the hazard section).

- ☐ Are there any known personnel within the area? Have all personnel been accounted for and documented?
- ☐ Identify the nature of the incident. Seek firsthand discussion with persons identifying the incident if available.
- ☐ Has the automatic suppression or smoke detection system activated?
- ☐ Has visible smoke been detected?
- ☐ Is there Visible Fire?
- ☐ Survey the hazard/incident and predict likely behavior of the hazardous materials that could be present during abnormal conditions (**See Section 5**).
  - Is there venting of off gases?
  - Are the utilities active?
  - Is there a potential for deflagration?
  - What are the enclosure temperatures?

**Initial Mitigation** – When personnel approves initial mitigation, utilize Self Contained Breathing Apparatus (SCBA), Gas detectors (e.g., Hydrogen, etc.), and Thermal Imaging Cameras and Ensure Personal Protective Equipment (PPE) worn protects against Thermal, Electrical and HazMat Hazards. **Unless rescue operations are intended, BESS container fires will normally result in Defensive Suppression Activities with exposure protection priorities.**

**NOTE: STRANDED ENERGY** – Even after BESS Power Disconnections, batteries are still ENERGIZED.

**Battery Failure** – Impending Battery Failure Signs include bulging and overheating, white smoke & hissing; **Immediately Evacuate BESS.**

If the Thermal Imaging cameras detect any abnormal rise in ambient temperature, they should report to the on-site personnel to take the Array in question electrically off- line, preventing Thermal Runaway and any possible propagation to adjacent batteries and arrays.

**Suppression** – If Management and Fire Department decide to fight the fire, utilize Water Fog Pattern @ 10-degree angle @ 5-ft minimum distance. **DO NOT physically encounter the Batteries and Battery Frames. Unless rescue operations are intended, BESS container fires will normally result in Defensive Suppression Activities with exposure protection priorities.**

**Fire Extinguishers** – **DO NOT** Utilize Class D Fire Extinguishers.

**Salvage and Overhaul Operations** – **DO NOT** perform Salvage Operations (Stranded Energy).

## **7. Site Information**

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### **7.1 Site Access**

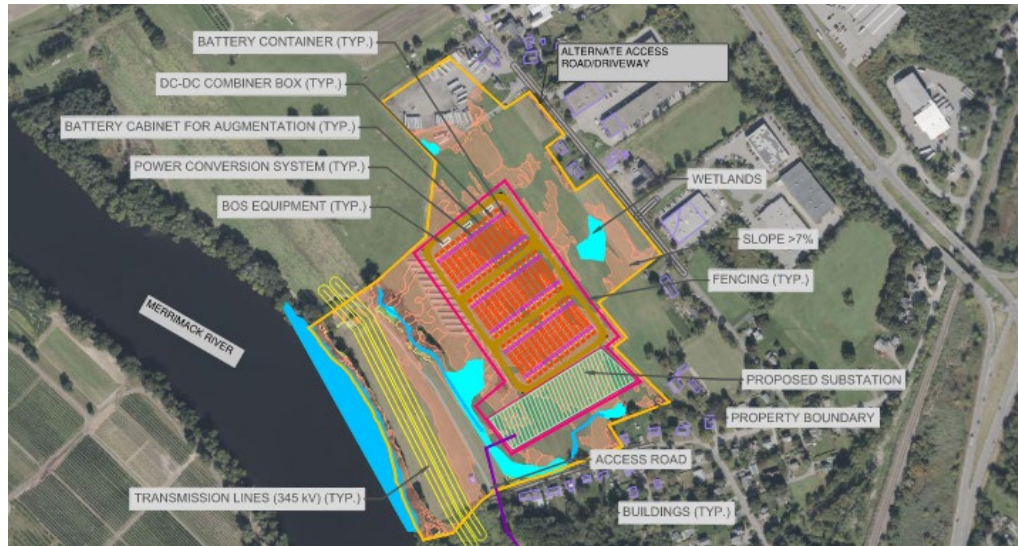
**NOTE:** *To access the site please contact the Emergency Numbers noted on page 4*



**BESS are not meant to be accessed without escort except, if necessary, for saving human life.**

## 7.2 Site Layout

### Ward Hill Layout





## 7.3 Battery Energy Storage System E-Stops

Each Battery Energy Storage Core (2 rows of battery racks + 1 inverter + 1 isolation transformer) has a single E-stop circuit that consists of multiple E-stop pushbuttons.

Upon pushing any of the E-stop push buttons, the following actions will occur for the enclosure and electrically attached equipment:

- Opens all BPU contactors in the battery racks.
- Opens the DC disconnect at the DC panels.
- Opens MV Breaker isolating step-up transformer and inverter.

**Caution:** The inverters have a built-in E-Stop button. Pushing this **ONLY** isolates the inverter. Battery equipment contains stranded or stored electrical energy during routine maintenance, or emergency shutdown, even when disconnected. **Trained site personnel can only isolate batteries.**